F4RN

FIBRE FOR RURAL NOTTINGHAMSHIRE

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Business Plan

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CO-OPERATIVES UK
COOP MEMBER

INCA
the independent networks cooperative association

Fibre for Rural Nottinghamshire Limited is a Community Benefit Society registered in England and Wales under the Co-operative and Community Benefit Societies Act 2014.
Registration Number 7186

Registered Address: Ossington Chambers, 6-8 Castle Gate, Newark, NG24 1AX

Above all, you want to create something that you're proud of

Richard Branson

We would like to thank Broadband for the Rural North (B4RN) and in particular Barry Forde and Chris Conder for their support in developing our project and for providing material for this Business Plan. B4RN have already connected over 1,000 properties to their network in Lancashire and every week they continue to attract new customers as well as considerable political and media attention. Although our plans are much more modest, we hope to join B4RN and a growing number of other rural communities to deliver ultra-fast broadband where BT and the other commercial operators are unable or unwilling to deliver.

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Why build a community ultra-fast broadband network?

The internet has become an essential part of our lives. We are increasingly reliant on a high speed and reliable broadband connection for work, education, entertainment and leisure.

Despite the government backed programme, BT will struggle to connect rural communities to their high speed network. Rural communities will be connected last, if at all, and the speeds provided will be much slower than those provided in larger towns and cities.

In Nottinghamshire, the final phase of the Better Broadband for Nottinghamshire programme to deliver speeds above 24Mbps will not be completed until 2018[1].

Fiskerton and Morton fall into this final phase.
We will not be upgraded for 2 years or more.

By then BT will be well on the way to upgrading urban areas to 300Mbps or 500Mbps. The BT target is to provide these speeds to 40% of the population – which excludes rural communities.

Virgin are already connecting customers at 200Mbps – but once again, only in urban areas

However, we can follow the example of other rural communities to build our own 100% fibre-optic broadband network. Costs are kept down by the community providing the labour – but the result is a broadband network that will deliver for generations, make the rural villages an attractive place to live and work, and help to maintain the vitality of our community.

By linking with other groups across the UK and Nottinghamshire, we can act as a catalyst to deliver Fibre for Rural Nottinghamshire

The Community Benefit

Although a community built fibre optic broadband network will provide obvious benefits through the provision of an ultra-fast, high quality broadband to rural communities which are poorly served by the commercial internet providers, the community benefit goes much further:

- The Community Benefit Society is owned and controlled by the members. Everyone who invests in shares automatically becomes a member and will have a vote in the way that the Society is operated.
- As the Society is not set up to make a profit for distribution to the shareholders, and the build and operating costs are kept low through the contributions of volunteers, the cost of the service can be kept down – below that charged by the commercial operators for lower speed broadband.
- The members decide how the network is operated and, more importantly, how much to charge for the service. With a large take up through the community the members can decide to keep the monthly charges low and provide some level of control over price rises. Alternatively, a higher charge could be set in order to generate more income for other community schemes.

[1] Although the Better Broadband for Nottinghamshire website has recently been updated to state that *"We can't confirm timelines at the moment, but we expect superfast broadband to be available from July 2017 onwards."* This depends on agreement with BDUK on the mechanism to fund the work involved.

- Any surplus that is generated after interest may be ploughed back into the community or invested in the network – the membership can decide how the surplus is used
- A successful scheme also pays interest on shares[2] and the shares can be sold back to the society[3] allowing members to recover their original investment.
- There is strong evidence that house prices are severely affected by slow broadband – an ultra-fast community broadband scheme will help to maintain or enhance property values
- Finally, the project can bring together the community with a common goal, working together to build a truly 21st Century broadband network that will serve generations to come.

This business plan has been updated to reflect the level of investment achieved during the initial share offer. The initial minimum investment threshold of £120,000 has not been achieved and as a result the network designs and costings have been reviewed.

This updated business plan reflects these changes as well as improved prices for the major components of the network. The target remains to deliver ultra-fast, up to 100Mbps symmetrical broadband to every property in Fiskerton-cum-Morton and to build a network capable of delivering 100% fibre direct to every property.

This will be achieved by:

- *Bringing a fibre optic connection to the national network directly into the Parish. This gives us full control of the connection speeds and how the broadband is shared between the subscribers.*
- *Building a high performance wireless network that covers every property. A number of wireless access points will be installed in the villages to ensure that the distances covered by wireless are as short as possible.*
- *Laying the fibre optic backbone between the two villages*
- *Connecting as many of the wireless access points as possible to the fibre optic backbone - this will further improve the quality and speeds obtained over the wireless network.*
- *Then extending the fibre optic network in phases, as funding allows, to connect properties directly to the fibre.*

[2] The F4RN rules, which have been approved by the Financial Conduct Authority, set a maximum interest rate of 5% per annum or 2% above the Bank of England Base Rate, whichever is higher. However, share interest can only be paid if the Society is financially secure and generating enough profit to cover the interest payment. The actual interest rate will be set by the Directors and paid once the accounts for the year have been audited.
[3] Share withdrawals are only possible once the Society has built up sufficient reserves and will not be possible for a number of years – share purchase should primarily be seen as a community investment rather than a purely financial investment.

1. Executive Summary

There has been considerable publicity recently into the roll out of high speed, Next Generation Access (NGA) broadband across the UK. The Government target is to ensure that 95% of the population have access to at least 24Mbps by 2017/18[4]. It is expected that this target will be achieved through a combination of commercially viable schemes in cities and urban areas, mainly supplied by BT and Virgin Media, and a subsidised roll out across the rest of the country using money from central government, county and local authorities. This subsidised activity is administered by Broadband Delivery UK (BDUK) on behalf of the Department of Culture, Media and Sport (DCMS). The nature of the framework arrangements established by BDUK means that the majority of these subsidised connections are delivered by BT Openreach who have an exclusive position as the chosen company to construct the new Fibre to the Cabinet (FTTC) network.

In order to achieve the 95% target as quickly and cost effectively as possible, BT are naturally focussing on areas where the most possible properties can be connected to each of their new cabinets. This means that more rural communities are being left until last and in many cases will not be connected to a high speed broadband network. Ironically, it is these communities who are most desperately in need of an improved broadband connection with ADSL speeds often <2Mbps and considerably less than those properties in more urban areas which are located closer to the telephone exchange.

The BT FTTC roll out will deliver a speed of at least 24Mbps to those properties that are included, however this should be measured against:

- The EU minimum standard for high speed broadband which is set at 30Mbps
- New EU and UK government targets of 100Mbps as the minimum download speed (UK aspiration for "nearly everyone" to achieve these speeds) meaning that the BT Infinity scheme is already obsolete.
- BT's announcement that they intend to deliver G.Fast, 300Mbps connections to 10 million premises by 2020. This represents 40% of the country so is likely to be focussed on urban areas
- Further plans from BT to increase the G.Fast speeds to 500Mbps.
- Virgin Media's "VIVID" broadband package which has recently been launched, providing speeds of up to 200Mbps to customers on their fibre+cable network.

Despite having over 300 properties connected to the local BT Primary Connection Cabinet (PCC) the villages of Fiskerton and Morton were left out of the first phases of the Nottinghamshire County Council NGA broadband programme. For Fiskerton and Morton the BT solution is "technically challenging" which means that the costs were too great to meet the BDUK value for money criteria. Nottinghamshire County Council have recently secured further funding to include some of the villages that were not included in the NCC Contract 2 (which will reach 97% of the county) but this is now caught up in wrangles around State Aid funding and delivery mechanisms.

Once these wrangles are resolved delivery of the BT superfast broadband will start. The latest information from the Better Broadband for Nottinghamshire programme is that the BT Superfast broadband will be available in Fiskerton, Morton from July 2017 onwards. However this date cannot be confirmed and there are still no guarantees on the speeds that will actually be delivered. Properties close to the new BT cabinet should receive speeds of 40Mbps or even 80Mbps for the very closest, but to provide these speeds to the whole of Fiskerton and Morton will require three new BT boxes – something that neither BT nor NCC will guarantee – and over rural distances existing copper cables cannot physically supply reliable high speed service. Some properties in the villages receive their telephone connection from Southwell – their connection has already been upgraded to BT Infinity but due to the distance from the cabinet there has been little improvement in broadband speeds and there is no prospect of any further improvement from BT for these properties.

[4] www.parliament.uk/briefing-papers/SN06643.pdf

Wireless solutions are offered as an alternative, but due to propagation issues and spectrum limitations neither satellite, wireless (WIFI) broadband nor 3G/4G/LTE mobile broadband deliver genuine NGA service. 5G promises higher speeds in a few years' time but the transmission distance decreases as the radio frequency increases[5], which means more transmitters and increased installation cost, again leaving a question mark over whether 5G will reach rural communities. To ensure that the rural communities attain a true high speed broadband which is future proofed – installed once and capable of all known future speed requirements for decades ahead – the only answer is to lay fibre optic cables all the way to the property. This is known as Fibre to the Home (FTTH).

Given the lack of any existing telecommunications company showing any inclination to upgrade our area to fibre we have decided to do the job ourselves, establishing Fibre for Rural Nottinghamshire Ltd (F4RN) as a Community Benefit Society. The original service area is set to cover Fiskerton-cum-Morton Parish containing 339 properties, with the potential to reach out to further parishes as the network becomes established. For this phase of the project the original cost estimate to build the core network is £115,000 with a further £17,000 required to cover the start-up costs in years 1 and 2. With a lower level of share investment it will still be possible to deliver the 100Mbps symmetrical service to every property in the two villages, starting with a high performance wireless network and then overlaying this with fibre as the finances allow.

1.1 Fibre for Rural Nottinghamshire

F4RN's purpose is to undertake the supply, installation and operation of a full Fibre to the Home (FTTH) network providing a fibre link directly into every property in its service area. In order to deploy the network as quickly as possible, a "hybrid network" will be constructed first – with a direct fibre connection to those properties around the edge of the villages and a high performance, mesh radio network operating over short distances to supply those properties in the centre of the village where obtaining wayleaves and digging and laying the fibre optic cables will be more challenging. This approach means that we can deliver an ultra-fast (up to 100Mbs) symmetrical service to everyone from day one. The fibre optic network will then be completed as wayleaves are arranged, providing the opportunity as required in the future to increase the bandwidth further – potentially up to 1Gbps (1000Mbps) for any customers who are connected to our fibre optic network.

Most residents in the village report that they currently get broadband speeds of 3Mbps or less – sometimes much less. This means that our initial offer will deliver speeds 30 times faster (or more!) than are currently seen. With further upgrades to our network in the future we will be able to deliver speeds that are potentially 300 times faster than today.

If the network is expanded in the future, then the approach will be to work on a parish by parish basis with the aim of delivering both technical excellence and 100% inclusivity within those targeted parishes. No exclusions because a property is too far away or too difficult to reach – it will be available to everyone. This is world class broadband, offering ultra-fast and symmetrical service speeds, and which will jump our rural community from the slow lane to the leading edge of technology and keep it there for decades to come, serving existing and future generations. FTTH is a fundamentally reliable technology which some telecommunications companies[6] are now choosing over copper due to the reduced failure rates and maintenance costs.

This dramatic increase in speed and reliability will allow, in addition to the basic broadband (including lighting fast access to cloud based storage and services), alarm system monitoring, remote CCTV, high quality VoIP telephone services (eliminating existing land line charges whilst retaining existing phone numbers) and down the line supply of HD television which will change substantially over the coming

[5] http://www.scientificamerican.com/article/will-millimeter-waves-maximize-5g-wireless/

[6] http://www.theregister.co.uk/2015/05/20/verizon_fibre_is_so_much_cheaper_than_copper_were_going_all_fttp/

years with the emergence of YouView broadcast services and on-demand TV. The latest Ultra HD (4K) as well as its successor 8K can be handled with ease on the F4RN network.

As a Community Benefit Society, the project will be funded, and to a great extent built, by the community for the community. Our ambition is to keep expenditure, where possible, within the community. As F4RN will be owned by the shareholders, service charges can be kept at the minimum level and any surplus used for community benefit.

Fibre for Rural Nottinghamshire Ltd (F4RN) has been established as a not for profit Community Benefit Society instead of a standard limited company to reflect its commitment to the community rather than any profit motive. It was registered as a Community Benefit Society within Co-operative and Community Benefit Societies Act 2014 on 5th August 2015, and is regulated by the Financial Conduct Authority.

F4RN was established in a form ready to issue shares to generate the investment needed to deliver the project. The first share issue of up to £150k was launched in January 2016 and was constructed to ensure compliance with the Seed Enterprise Investment Scheme (SEIS)[7] established by HMRC to encourage individual shareholdings in new, and therefore riskier, start-up companies. Under normal circumstances investors, who are also tax payers, can reclaim 50% of the value of shares purchased in this initial share offering via a tax refund.

The project timeline is expected to be 1 year from completion of the share offer, with first customers receiving the F4RN service within three months of the project starting and the construction of the core fibre network complete by late September 2016. However this could reduce significantly with a lot of support from the community to build the network.

The core operating cost for the F4RN network, excluding depreciation but with an allowance for part-time staffing and maintenance, is in the order of £40k/pa. At 111 paying connections we can cover this from income and become self-sustaining. However this assumes that the majority of labour will continue to be provided by volunteers without charge. Clearly this cannot be sustained for long before volunteer fatigue sets in so, once the number of subscribers is sufficient, the intention is establish a retainer to cover maintenance activities – either directly through a local IT company[8] – to support the network. At 300 houses plus connected we could take on (if the shareholders feel the need) full-time and part-time service engineers.

[7] https://www.gov.uk/guidance/seed-enterprise-investment-scheme-background
At the point of publishing this Business Plan, the HMRC have been approached for Advance Approval for the Seed Enterprise Investment Schemes. This normally takes a number of weeks to be provided so will not be in place when the share offer is launched. However, the project will not go ahead and investors' money will not be taken until the HMRC approval is obtained.

[8] Discussions are already underway with companies who can support with the construction of the network and its ongoing operation.

2. Background

The provision of good quality broadband to properties in the rural areas of the UK has been a long standing problem. Current technology that uses existing copper phone lines has both range and speed limitations. Although any properties that are close to their telephone exchange can already receive speeds up to 17Mbps from the existing ASDL broadband service, many rural properties are unable to access service at anything like these speeds. There are also many properties which cannot get any service at all due to their excessive distance or the quality of the line from the telephone exchange.

The Government has made a commitment, the "Universal Service Commitment" (USC) which states that all properties in the UK will get a minimum of 2Mbs broadband service by 2016. They also wish the UK to be at the leading edge of broadband across the EU by the same date. To do this means not only delivering the USC but ensuring a substantial percentage of the population will get Next Generation Broadband (NGB)[9]. The definition of NGB varies depending on who is using the term and how it's to be paid for – for example, some countries such as Finland and Sweden aiming for 100Mbps by 2020. In contrast, Broadband Delivery UK (BDUK) originally defined Super-Fast Broadband as 24Mbs upwards – this is one of the lowest levels envisaged and falls below the EU minimum target speed of 30Mbps. It must also be remembered that these are usually "asymmetrical" connections with the upload speed being much lower than download speed. For current broadband applications this is not too important but for next generation applications upload speed will become progressively more critical. Cloud applications for instance need you to be able to not just download files but upload them too, so both directions need high speed.

The Government believes that two thirds of the population will get NGB via standard commercial operators who can make a business case to invest in the required infrastructure.

Given that the remaining third of the population would not receive NGB from the commercial operators, the Government established BDUK with the task of ensuring that all properties will get at least the Universal Service Commitment by 2016 and that "superfast broadband" will be available to 90% of the UK by 2015 and 95% by 2017[10]. Through projects with Local Authorities and the Devolved Administrations, the public sector is investing over £1.7 billion in improving broadband through the Superfast Broadband Programme. However due to the geographical realities, getting more than USC to the deeply rural areas is a huge challenge and the funding available to them is unlikely to be sufficient. In all probability, without some novel approaches and/or substantial additional investment, the last 5% will get no more than the USC. Although Nottinghamshire County Council expect to exceed the BDUK targets and will deliver Next Generation Access (NGA) broadband to 97% of the county, there are still some rural areas which will not be covered.

F4RN's interest lies in helping to solve this problem in the rural parts of Nottinghamshire, starting with Phase 1 - Fiskerton-cum-Morton.

BT's primary method of delivering superfast broadband is by upgrading their network to what is known as FTTC or Fibre to the Cabinet. Here they run fibre from exchanges out to street cabinets and then deliver the broadband to individual properties over the existing copper circuits using a communications standard referred to as VDSL2. The fibre part of the network can be run at very high speeds and because the copper section has been reduced in length it should be possible to increase the speed offered over it. However to achieve this increased speed there has to be a suitably located cabinet to upgrade and in many rural locations the cabinet is still too far from the property to sustain the higher speeds. The final option being used by BT is known as Fibre to the Property (FTTP) and this requires new fibre to be laid the whole way from the exchange to the property without falling back onto copper along the route. This is very costly to BT and hence very little FTTP has been scheduled so far. The

[9] Also referred to as Next Generation Access (NGA)

[10] http://www.publications.parliament.uk/pa/cm201415/cmselect/cmenvfru/834/83405.htm#a1

general consensus is that the FTTP rollout will be restricted to more urbanised areas where it is possible to make a business case for deploying it to commercial rather than domestic premises.

With a limited budget BT is going to concentrate on upgrading those exchanges with high user counts which will give a better return on investment (ROI) than smaller ones. With BDUK support it is expected that the proportion of the population which will get FTTC upgrades will increase from 60% to as much as 95% as some of these smaller exchanges get upgrades in later phases of the programme. However this still leaves around 5% of properties unable to get high speed broadband.

Alternative broadband providers such as Virgin Media will also be focused on the more profitable areas in the same way that BT will. Virgin Media have recently announced £3Bn of investment to extend their broadband network[11]. This includes 50,000 homes in Nottinghamshire which will receive speeds of up to 152Mbps[12], however Virgin have also indicated that their investment will be focused on urban areas. It is therefore quite likely that within the 60% commercially viable zone two or more companies will fight for market share but if you live in the last 5% there's not only no competition but no service either. The only way that rural properties are going to get true Next Generation Broadband (NGB) is by laying fibre all the way out to them. This is a costly process; in 2008, the Broadband Stakeholders Group (BSG) report quoted figures from Analysis Mason[13] of over £10,000 per property to service deeply rural properties. Neither BT nor the cable companies can make any commercial case to invest these sums. The BDUK subsidy will amount to between £100 and £250 per property. Even with other public sector support in the way of anchor tenants and aggregation of services the subsidy on offer will only extend service to a limited number of additional properties. It is generally agreed that the last 5% will have to live with a mixture of basic asymmetrical 2Mbs service via copper, 10Mbs via satellite or wireless broadband, and possibly LTE/4G mobile service coverage which will also be of limited speed and availability. The rural population will remain disadvantaged and unable to access existing and emerging services dependant on NGB.

Having spent £830M the government will be reluctant to provide more funding as they are likely to feel they have already done their bit. The options for rural communities will be to do nothing and live with the consequences, or as F4RN is proposing, to solve the problem with a true NGB solution by mobilising both the ingenuity and resources of the local community.

Martha Lane-Fox, the Government's UK Digital Champion published a document "Manifesto for a networked Nation"14 in July 2010 which gives some useful insights on the effects of exclusion from the Internet.

- *The economic and social case for a networked nation is overwhelming. Access to the internet can create benefits through higher educational attainment for children, access to employment opportunities for workless adults, improved standards of living for older people and increased democratic engagement and access to information. Furthermore, it can provide a lifeline from social isolation for the 3.1m people in the UK aged over 65 who go longer than a week without seeing a friend, neighbour of family member.*
- *PwC estimates that the total economic benefits of getting everyone in the UK online is in excess of £22bn*
- *Offline households are missing out on average consumer savings of £560 per year*
- *If the 1.6 million children who live in families without the internet got online at home, it could boost their total lifetime earnings by over £10bn.*
- *If just 3½% of unemployed non-internet users found a job by getting online it would deliver a net economic benefit of £560m.*

[11] http://about.virginmedia.com/press-release/9467/virgin-media-and-liberty-global-announce-largest-investment-in-uks-internet-infrastructure-for-more-than-a-decade
[12] http://newarkadvertiser.co.uk/articles/news/BwiHvkBNtsdWtT9q4p8dHtqjFB3sV3YcgxXYamgO8uRf8
[13] http://www.analysysmason.com/PageFiles/5766/Analysys-Mason-final-report-for-BSG-(Sept2008).pdf
[14] http://raceonline2012.org/sites/default/files/resources/manifesto_text_version.pdf

- *People with good ICT skills earn between 3% and 10% more than people without such skills. If every non-internet user in employment got online, each of them could increase their earnings by an average of over £8,300 in their lifetime and deliver between £560m and £1,680m of overall economic benefit.*
- *Each contact and transaction with government switched online could generate savings of between £3.30 and £12. There are an estimated 1.8 billion contacts with public services every year of which only about 20% are online.*
- *If all offline adults began using the internet and made just one online contact each month with government instead of a telephone or face-to-face contact it would save an estimated £900m per annum*

2.1 The financial impact of poor broadband speeds

Broadband is now considered by most as an essential part of 21st Century life and by many, high speed connectivity has become as important as the utility services – gas, electricity and water. Indeed, David Cameron recently said that "*Access to the internet shouldn't be a luxury, it should be a right - absolutely fundamental to life in 21st Century Britain*" and now talks about gas, electricity, water and broadband in the same context.

It is therefore not surprising that the poor internet speeds have a direct impact on house prices. Within Fiskerton and Morton we have first-hand evidence that this is the case, with at least one house sale falling through because the prospective buyer needed better speeds for their work as a journalist.

There are numerous studies and newspaper articles that reinforce this point:

- In March 2014, the Telegraph reported that "Slow broadband wipes 20% off house prices"15
- In August 2014, Imperial College published the results of their work that showed that internet speeds have an impact on house prices16
- In May this year, ISPReview published the results of their survey: "Survey Finds UK House Buyers Rejecting Homes with Slow Broadband"17
- In October there was even a report in our local newspaper, the Bramley, referring to the willingness of house buyers to pay up to 8% more for a property if it had access to broadband with speeds of at least 100Mbps
- In December, the Halifax reported that good broadband helps to fuel their list of the top 50 places to live.[18]
- And recent surveys even suggest that "*One in five Britons would prioritise broadband over water or gas when they move into a new home.*"[19]

At a macro level, government impact studies and other research have looked at the economic benefit of high speed broadband. In the Impact Study commissioned in 2013 by the Department for Culture, Media & Sport20, the planned interventions were reported to add about £17 billion to the UK's annual Gross Value Added (GVA) by 2024, with projected returns of approximately £20 in net economic impact

[15] http://www.telegraph.co.uk/technology/broadband/10671273/Slow-broadband-wipes-20-off-house-prices.html
[16] http://www3.imperial.ac.uk/newsandeventspggrp/imperialcollege/newssummary/news_1-8-2014-14-31-41
[17] http://www.ispreview.co.uk/index.php/2015/05/survey-finds-uk-house-buyers-rejecting-homes-with-slow-broadband.html
[18] http://www.ispreview.co.uk/index.php/2015/12/good-broadband-helps-fuel-halifaxs-uk-top-50-best-places-to-live.html
[19] https://www.cable.co.uk/news/broadband-more-important-than-water-or-gas-for-brits-moving-home-700001456/
[20] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/257006/UK_Broadband_Impact_Study_-_Impact_Report_-_Nov_2013_-_Final.pdf

for every £1 of public investment. This is an unusually high level of return for public funding, but was considered to be realistic, given that broadband is a General Purpose Technology which has an increasingly critical role in the day-to-day operations of the majority of UK businesses.

The bulk of this economic impact comes from improvements in the productivity of broadband-using firms, but the study also identified significant benefits from safeguarding employment in areas which would otherwise be at an unfair disadvantage, from productivity-enhancing time-savings for teleworkers, and from increased participation in the labour force.

As BT, Virgin and others start to think beyond their initial broadband offers, the speeds available in cities and other urban areas are starting to increase significantly. The standard BT "superfast" FTTC solution can provide speeds of up to 38Mbps (up to 78Mbps if you live very close to the cabinet), although the true speeds obtained are often much lower and depend very heavily on the length of the final copper connection between the cabinet and the property. Virgin are already offering speeds of 200Mbps in cities and other urban areas and BT are promising 300Mbps+ from their G.Fast technology. G.Fast still uses the copper connection to the property so again is affected by the length of this final copper link and is unlikely to deliver in rural areas.

Increased speeds prompt the development of new applications and services that rely on these speeds – once again driving a rural divide. In a BBC interview, John Popham, who advises rural communities wanting to get connected, commented on the widening gap between town and country: "For me the issue is that urban connections are getting faster. Stuff is then developed to take advantage of those fast connections which is then inaccessible to rural users."[21]

The F4RN proposals will ensure that Fiskerton and Morton do not suffer from this digital divide. With the initial connection targeting speeds of 100Mbps and with plans to improve on this speed in the future, house prices, employment and the standard of living will be protected.

[21] http://www.bbc.co.uk/news/technology-34765091

3. Project Proposal

The ultimate plan is to build an FTTH fibre optic broadband network with a direct connection available to every property.

F4RN's purpose is to undertake the supply, installation and operation of a full Fibre to the Home (FTTH) network providing a fibre link directly into every property in its service area. In order to deploy the network as quickly as possible, a "hybrid network" will be constructed first – with a direct fibre connection to those properties around the edge of the villages and a high performance, mesh radio network operating over short distances to supply those properties in the centre of the village where obtaining wayleaves and digging and laying the fibre optic cables will be more challenging. This approach means that we can deliver an ultra-fast (up to 100Mbs) symmetrical service to everyone from day one. The fibre optic network will then be completed as wayleaves are arranged, providing the opportunity as required in the future to increase the bandwidth further – potentially up to 1Gbps (1000Mbps) for any customers who are connected to our fibre optic network.

Laying new fibre optic cables all the way to remote rural properties is an expensive exercise. The headline figure per property quoted by the BSG in their report[22] is £10k per property. However the costs can be reduced to between £500 and £1,000 per property if a different ownership, funding and operating model is used instead of that traditionally deployed by the telecommunications industry. Whilst still a lot of money, it is affordable; especially if we take advantage of tax breaks and government grants.

The majority of the cost of the fibre laying is for digging trenches, installing duct and fibre and then making good. Traditionally telecommunications companies have used their code powers and installed duct under the highway or associated verges. This is expensive for several reasons not least the high costs associated with complying with health and safety and the street works act along with needing to reinstate tarmac and road signage. From their point of view this is a manageable process as issues around access and wayleaves are solved for them without having to negotiate with hundreds of landlords and regulatory bodies. Openreach publish a tariff of what they term Excess Construction Charges (ECC) which sets out what they would charge a third party for work done laying duct, installing poles etc.[23] As can be seen their charges for soft digging is currently £23/m whilst footway work comes in at £45/m and highway at £89/m. Across the F4RN area the total duct length that we need to dig is a touch over 20km to link 300 properties. Assuming all this was dug using highways in the traditional model would cost over £1.7M, or if it were all soft digging almost £0.5M, giving a per property cost of between £1.5K and £6K and this is just for the duct digging and ignores all the ancillary costs. Clearly, on the Openreach model, this is not a financially viable proposition.

F4RN adopts a different approach, laying the duct not on the highway but across farmland on the other side of the fence or hedgerow, so it is all soft digging. Within the village centre it will be necessary to run the ducting across gardens, once consent and wayleaves have been agreed, again ensuring that the construction is primality soft digging.

We then install narrow bore duct (a plastic pipe about the same size as a garden hose) into which we blow fibre mini cables once the route is completed. Digging a narrow trench and installing duct within it is dramatically less expensive across private farmland than along the highway. The work can be done by agricultural contractors and the farmers themselves; it's not high technology, similar to laying a simple water or drainage pipe which they do all the time. The combination of lower cost labour and simple installation without the regulatory burden of the street works act and similar impediments results in a dramatic reduction in cost per metre installed. Of course the costs of the materials will actually be rather higher than those paid by telecommunications companies due to our smaller scale of operations;

[22] http://www.analysysmason.com/Consulting/Sectors-we-cover/Fixed-operators/Digital-Britain/Pressreleases/BSG-publishes-Analysys-Mason-report-on-costs-of-deploying-fibre-based-broadband/

[23] http://www.openreach.co.uk/orpg/home/products/pricing/loadProductPriceDetails.do?data=uBVUx%2FA1Yri 6v477qpx5dw53kUQnGDAeritfVHpB5XFZ6rNZujnCs99NbIKJZPD9hXYmiijxH6wr%0ACQm97GZMyQ%3D%3D

however this is much more than offset by the reduced laying costs. Where necessary we will use the highways but this is for a small proportion of the duct length, mainly for road crossings and short sections where the farmland is either not available to us or unsuitable.

The original plans for the F4RN network were based on a budget of at most £135k[24] to build giving a per metre cost of less than £7 but this includes all the central equipment and setup costs. Excluding everything but the duct/fibre work gives us a cost closer to £2.12/metre making the project affordable!

The big problem is that for this model to work the land owners must be prepared to grant free wayleaves to lay duct across their land. Clearly they would refuse to do this if the applicant were a traditional telecommunications company working to the traditional profit model, but for a community owned cooperative, run for the benefit of the community, the story is different. We already have support from a number of local farmers, the Parish Council and the Sports and Gala Association. This covers a considerable proportion of the initial fibre optic route and we are confident that the remaining wayleaves will be forthcoming.

F4RN was registered as a Community Benefit Society within Co-operative and Community Benefit Societies Act 2014 on 5th August 2015. This reflects the fact that it will operate for the benefit of the community rather than its shareholders. However, we will need to issue shares to raise the capital required to build the network. These "community shares" are withdrawable shares with a face value of £1. They cannot be transferred and are only withdrawable at their original face value with no possibility of a capital gain. However, the shares will attract interest and will be issued in a manner to attract tax relief under the HMRC (Seed) Enterprise Investment Scheme[25] which should make them attractive to community investors. The community benefit route also means there is an asset lock which ensures that the network and any other assets belonging to the enterprise cannot be sold off to another company but must be held for the benefit of the community. Given this structure and asset lock the majority of landowners contacted so far are prepared to grant free wayleaves as it clearly benefits the community and they see no risk of anyone making a profit out of them.

In addition, the community cooperative model is one where we can expect members of the community to volunteer labour to help establish the network. As mentioned above, the work involved in laying fibre duct in a trench is well within the skill set of many members of our community. So as well as granting wayleaves we are able to ask the farmers and landowners to dig the sections across their land by way of supporting the project. Although we have not managed to speak to all the local land owners, the farmers that we have approached will support the project in this way.

During 2015, a series of village meetings were stimulated from leaflet dropping in Fiskerton-cum-Morton by a core group of volunteers. At these meetings, Chris Horne from F4RN gave a presentation of the community's options for faster broadband as well as explaining the F4RN project and answering questions.

We established a web site[26] in June 2015 to inform the community of what F4RN was all about, plus all the other options that they had for faster broadband. As well as this, a subsequent leaflet drop to homes was carried out, and messages shared through social media, inviting people to sign up for service and indicate their willingness to buy shares and donate labour to the F4RN project. We also asked what they would like to do. These options were;

[24] Covering the capital costs and start-up operating costs.

[25] We will confirm with HMRC that the shares are eligible for tax relief under the Seed Enterprise Investment Scheme. This will allow eligible tax payers to claim 50% of their investment as tax refund. The shares need to be held for a minimum of 3 years however you can claim your tax refund once the enterprise has been trading for 4 months and HMRC have provided the requisite paperwork to F4RN. In practice paperwork should be available around Christmas 2016 allowing you to claim the investment you make in early 2016 when you submit your tax return to 5 April 2016.

[26] www.f4rn.org.uk

1. Do nothing and hope that NCC and BT to deliver a FTTC solution
2. Sign up for a 10Mbps wireless broadband connection delivered by JHCS, a company based in Newark
3. Build our own "FTTH" fibre optic network

At this point, the County Council were still suggesting that Fiskerton-cum-Morton would be included in the next phase of their BDUK funded programme ("Contract 2 Phase 2") with an announcement expected in July 2015. Consequently, a significant number of people wanted to hold back on the community plans in case thus adversely affected the NCC negotiations with BT.

Despite these concerns, 15% of the village residents very quickly responded to indicate that they would be interested in the fibre optic solution and committed to invest £30k in community shares if the share offer goes ahead.

Nottinghamshire County Council have recently updated their web site with the message that:

> Nottinghamshire County Council has managed to secure some additional monies from BDUK which the County Council agreed to match to ensure that all Districts including Newark and Sherwood and Bassetlaw achieve 95% superfast coverage. This money was additional to the original money identified to fund our Contact 2 build (October 2017 to March 2018). Properties in your postcode are eligible for this additional funding but we are yet to agree with BDUK the mechanisms to incorporate these funds. We shall update this checker as soon as the approach agreed has been ratified.

In January 2016, a few days before F4RN launched the initial share offer, this message was updated to:

> Nottinghamshire County Council is working hard to ensure fibre broadband reaches your area. We can't confirm timelines at the moment, but we expect superfast broadband to be available from July 2017 onwards.
>
> The County Council has managed to secure some additional monies from BDUK which the County Council agreed to match to ensure that all Districts including Newark and Sherwood and Bassetlaw achieve 95% superfast coverage. This money was additional to the original money identified to fund our Contact 2 build. Properties in your postcode are eligible for this additional funding but we are yet to agree with BDUK the mechanisms to incorporate these funds.
>
> We shall update this checker as soon as the approach agreed has been ratified.

Even then, NCC cannot guarantee the speeds that will delivered or whether BT will simply update one cabinet or deliver the "three box"[27] solution that is needed to provide high speed broadband to all the properties in Fiskerton and Morton.

Given the delay of over two years before we are updated and the uncertainty over the delivery mechanism we expect the level of interest to increase significantly, particularly as the next stage in village engagement is to go door to door, to explain the project proposals in detail.

Based on the initial interest given about the F4RN project, the decision was made by the founders to complete the outline designs of the fibre optic network, to set up F4RN and to register the Society with

[27] At the public meetings in 2015, the BT Regional Director stated that the only technical solution for Fiskerton and Morton was to install three new cabinets – the "three box solution". This design was proposed by BT following surveys that they undertook in order to quote for a community funded FTTC solution. BT have now advised NCC that they will not be held to this solution but instead need to carry out further surveys in order to complete the design for the BDUK funded roll out.

the Financial Conduct Authority. This was done to ensure that IF the community decided to proceed with the F4RN project, once the BT Phase 2 Extension announcement was given, we would only need to raise the remainder of the funds to start the project. As the shares can only be issued if the business is registered with Financial Conduct Authority this registration is now in place.

As well as raising the share capital it is important that people sign up for the broadband connection. If 150 people commit to taking the broadband from F4RN then we will be in a very strong position to pay interest once the year 4 accounts have been audited. We would also have just under half the community's support, underpinning the assumption that free wayleaves will be forthcoming. With very little canvasing and community awareness of what is possible we had received 42 replies to the survey online and a commitment £30k investment. This is a very positive initial response and, whilst the numbers may seem low, the awareness has not yet passed around the community. A 50% uptake from the community would mean that the F4RN project would be very much be in profit (in the order of £13k per annum before depreciation), and with only modest increases in the number of subscribers would be able to offer additional benefits to the community, a potential reduction in the monthly subscription, or an agreement to expand the business, potentially bringing the future costs down even further. However, all these decisions would be made at the AGM, controlled by the Company Secretary and voted for by the shareholders.

3.1 How long will it take to build the network?

The construction of the network will be labour intensive – so the time it takes to build the network will depend heavily on the number of people who help with the key activities:

1. Digging trenches to lay the ducting around the villages
2. Blowing fibre through the ducts and the splicing the joints together
3. Making the final connections at each of the properties that want to take up the service.

Where the duct runs through a field it will be possible to use a mole plough on the back of a tractor – this is a very efficient way to lay the longer lengths of duct.

In our project plan, we aim to the have initial hybrid network live within 3-4 months of the share offer being launched, so if the share offer is completed in March 2016 the wireless network should be live by May/June 2016. Further work will then be required to complete the construction of the full fibre optic network but with enough support, and with several teams working on different sections of the network at the same time, then it should be possible to complete the core network by late September. Again, this also relies on volunteers working during the week and in the evening and not just at weekends.

There are some sections of the network which will be more challenging to build – the centre of Fiskerton for example will require road crossings and the network will need to run across gardens rather than through fields. These areas will initially be served by a wireless mess network but are engaging with a number of potential companies who can help construct these sections of the network and potentially run the fibre along the pavement if access across gardens is not possible - it all depends on how much support we have.

3.2 People

Behind F4RN is a team of people who have dedicated a huge amount of time and effort to get the project off the ground. We are local people who care deeply about the lack of quality broadband in our communities and are determined to do something about it. Between us there is a range of skills spanning everything from network design, engineering, IT, community engagement, marketing, management and business development. Below are short biographies of the main people who form the interim

management committee tasked with getting the project off the blocks. There are many other people who offer very valuable specialist advice and contribute their time and effort and for whose input we are very grateful.

Dr Chris Horne

Chris is a Chartered Electrical Engineer and Fellow of the Institution of Engineering and Technology.

Having completed a PhD at the University of Cambridge his career has included the design, manufacture and maintenance of electrical and control systems for ships before moving to the power industry with Powergen and E.ON. He has extensive experience in power generation and control systems, including the design, procurement, project management, installation and commissioning of power station control and metering systems. He established and led the E.ON power station metering business in the UK, has led a large electrical engineering department and now heads up an international department focussed on bringing innovation to new solutions for low carbon generation, improving energy efficiency and providing end customers with more control over their energy usage.

Chris has spearheaded the campaign to bring high speed broadband to Fiskerton and Morton. He is passionate about ensuring that this community and others in Nottinghamshire are provided with an affordable, reliable and high performance Fibre to the Home (FTTH) broadband solution.

Chris has lived in Fiskerton for 11 years. His three children attend the Minster School in Southwell and his wife, Allison, works in the Diocesan Education Department. He firmly believes that decent internet connectivity is essential for education, work and entertainment in the 21st Century and that through a combined Community effort it is possible to deliver a solution for the rural “final third” that is far superior to the BT Commercial and Government backed programmes.

Steve Dickman

Steve is a Chartered Engineer and Fellow of the Institute of Engineering and Technology. He is currently ‘working’ as IT Manager at Nottingham Forest Football Club (which as everyone knows is the best team on the planet!)

Steve has worked in telecommunications, networks and computers for many years, starting as an apprentice for Post Office Telecommunications (now BT) before attending Loughborough University to gain a 1st in Electronic and Electrical Engineering. Since graduating his career has included circuit, system and software design of telecommunication, switching and networking technologies in addition to systems for the security and defence industries. Later moving to become an Engineering Director at Lucent Technologies in Silicon Valley, California, in addition Steve worked as a Systems Engineering Reviewer for Bell Labs.

Steve moved into Fiskerton in 1988 and only misses out on the ’25 years to become a local’ by his 8 years in the US. He sits on the Parish Council and has been actively involved in village events for many years.

Steve, and a business partner designed, set up and operated 4tons VCB (Village Community Broadband), a WiFi based broadband service for Fiskerton and Rolleston in 2003 when BT were unable to provide Bleasby Exchange with ADSL. His interest in providing high speed broadband has never wavered since that time and his focus is now to bring ultrafast speed broadband to the community via fibre to the home, the only true way to future proof deliver of broadband services.

Lee Farrar

Lee is Head of Strategics for a golf division in the adidas® Group for UK, Ireland and Benelux.

For the past 17 years Lee has been in the sales sector of the Golf industry and the latter 15 years with the adidas® group. His responsibilities involve managing a team of Area Sales Managers and Key Account Mangers ensuring that all aspects of the Go-To-Market for our key partners are executed without issues. This comprises of a lot of planning and preparation before the implementation of such projects. Lee is also responsible for forecasting sales, sales analysis and transaction negotiation, as well as having to work very closely with the Marketing, Finance and Product teams to ensure that all the Key Performance Indicators are delivered in the plan.

Lee moved to Fiskerton 6 years ago with his wife Sam and started a family and now are the proud parents of twins. A technically minded person himself, with a great eye for detail, he is very passionate to ensure that a high quality broadband service is available for the parish now and future generations to come.

Jim Connolly – *F4RN Company Secretary*

Jim has worked for the NHS for 30 years as a nurse and is currently a Director of Nursing for a Clinical Commissioning Group in Derbyshire. He has worked on and led a number of wide ranging programmes locally and regionally all focused on improving care outcomes for local populations. He has lived in Fiskerton with his wife since 1998 and is a keen supporter of the village though work with the SGA on Village Day, Carols on the Green and the Royal Wedding Celebrations. His sons attend The Minster and Lowes Wong schools, and Jim recognises the importance of them not being disadvantaged educationally (and socially) by not having high speed access to the internet. Jim is a keen drummer and a member of a local rock and pop covers band and has recently completed his own recording studio at home

He is passionate about the need for rural communities to have access to high speed broadband – both to support the changes in which rural communities can develop and survive as well as understanding how this technology can support changes in the way healthcare can be delivered in the future.

Paul Cook

Paul has worked in the IT & Communications industry since 1996. He spent a number of years with Cisco Partners, before joining Cisco in 2005, and VMware in 2013. Working for two of the largest and most innovative businesses in the sector has allowed Paul to be deeply involved with some very high profile projects, and on three occasions he has presented findings to the European Commission. Currently his focus is with the large London Acute hospitals, as well as Genomics England and UK-CRIS, who are research organisations using big data modelling to progress treatment for Cancer, Dementia and many rare genetic conditions.

Paul has been a home worker since 1997, when he used a 28k modem to check email. The emergence of real time communications such as IP telephony and video, really highlights the village's poor

broadband provision, and is causing him significant problems. He certainly never envisaged being the wrong side of the digital divide!

Having lived in Fiskerton since 2003, Paul is married with 2 children, who attend Bleasby School and the Minster School.

Andrew Norris

Andy is a consultant anaesthetist at the QMC Campus of Nottingham University Hospitals. A graduate of Sheffield Medical School, he has been closely involved in postgraduate medical education for many years. Currently, he is Head of Postgraduate School of Anaesthesia, Intensive Care and Pain Medicine for Health Education East Midlands. Other roles include Royal College Lead Assessor for Consultant Appointments, NIHR investigator, and Clinical Advisor to the Health Technology Research Priority Area for University of Nottingham, where he holds an Honorary Associate Professor position.

Andy has introduced a number of IT based innovations to postgraduate medical education. Two of his three children recently graduated from the Minster School Southwell, and one will soon start the GCSE curriculum. He believes that local children will find studying increasingly difficult without adequate broadband provision.

Chris Price (Crom)

Chris is a local farmer, coming from a family that has farmed in and around Fiskerton and Morton for several generations. He has lived in Fiskerton for 37 years, having grown up in the village.

Crom is committed to the vitality of the villages and rural communities in general – he chairs the Parish Council and can often be found in and around the two villages – from leading litter picking to ensuring that the drainage gullies are clear, engaging with District and County Councillors or supporting the local pubs he is always approachable and keen to understand and represent local opinion. .

Crom firmly believes that high speed broadband is essential for rural communities if they are to continue to be attractive places to live and work. He has campaigned for Fiskerton and Morton to be included in the BT roll out but now believes that we will always be left in the slow lane unless we build our own fibre optic network

Peter Wheeldon

Peter is Managing Director of his own business brokerage, trading as PSW Industries Ltd, having lived in Southwell for 30 years and recently moved to Fiskerton. He has owned or invested in a number of companies since leaving corporate life in the early 1990's. He strongly believes that broadband is no longer just a useful facility but is now a utility, the reliance on which will increase each and every year. A residential or business property without access to at least superfast broadband is and will be at a distinct disadvantage both in appeal and value.

Roger Summerton

Roger is a semi-retired chartered accountant who was previously a partner at KPMG one of the major accounting firms. He now manages the Family Office of a wealthy East Midlands family. He and Nicky have lived in Morton for over 25 years and although their IT abilities are limited, with two grown up children living away, they understand the need to stay connected!

Dr Paul Newton

Paul gained an MA and then D.Phil from Oxford in Natural Sciences (Chemistry), and later an MBA from Loughborough. Until retirement in 2009 he was a Chartered Chemist (MRSC).

Paul had a career of over 30 years with Boots Manufacturing division in Nottingham, spanning pharmaceutical research chemist, chemical plant production manager, pharmaceutical production manager, New Products Project manager, and Technical Group manager.

Paul and his wife Janet moved to Morton in 2011, and are enthusiastic about involvement in the community. They have 3 daughters, now living in St Albans, Bingham, and Manchester, so are very keenly aware of the internet demands and expectations for a modern family home, especially when the children and their families now visit from 'superfast' areas!

Paul and Janet have run a small mail-order internet business from home for over 10 years, which would certainly benefit from improvements in connection speeds. It has necessitated a fairly competent working knowledge of electronics and internet systems.

Paul is keen on most areas of DIY, and believes in getting things done at the practical level, currently directed at modernising their house in Morton.

3.3 Community Engagement

The F4RN plans are to make the ultrafast broadband available to anyone within the reach of the network whether or not they invest or help with building the primary network.

However, the project can only succeed with the full support of the local community - investing in shares, helping collect wayleaves, confirming the route and most of all turning out to dig, blow fibre and supply cakes and cups of tea. The more people that get involved, the easier the job becomes but perhaps more importantly the community sense of pride and ownership increases. Community Engagement is therefore vitally important.

Over the past twelve months there has been an active campaign to raise awareness and to fight to be included in the Better Broadband for Nottinghamshire plans. This has included a petition and door to door surveys, public meetings with the local MP and BT regional director, as well as regular update messages and two further meetings to explain the options that are open to us. Further meetings have been held with representative landowners to obtain their support.

The next phase of the campaign will be to promote the share offer and recruit volunteers for the big build, including the following steps

- Presentation to the Parish Council
- Update email to anyone subscribed to the broadband campaign

- Christmas card delivered to all properties in the villages, raising awareness of the scheme and advertising the launch event
- Introductory letter and copy of the community share offer document delivered to all houses in the villages
- Additional posters and copies of the offer document in local pubs and village shop
- Launch event with follow up “drop-in” sessions
- Door to door visits to answer questions and promote support
- Follow up “town hall” meetings
- Regular updates via the Microgenius web site, F4RN web site, Facebook and email

Plans are also underway to install a 500m section of ducting to publicise the project and demonstrate what is involved.

Further details of the Community Engagement Plan are included in Appendix 2.

4. Network Design

The initial proposal is to build an "ultrafast" (up to 100Mbps) symmetrical broadband network to serve the villages of Fiskerton and Morton, covering up to 350 properties. The ultimate target is to do this via a direct fibre optic connection to every property (Fibre-to-the-Home or "FTTH") as this will provide the most resilient solution with scope to increase speeds up to 1Gbps or higher in the future.

4.1 Original Proposals

Although it is relatively easy to build a fibre optic network that runs round the outside of the villages, the compact nature of the properties in the village centres makes the construction of the FTTH network in these areas more challenging – primarily due to the number of wayleaves required and the additional effort involved in organising road crossings and laying the fibre optic across gardens rather than through open fields. For this reason, a two-phase approach is proposed:

Phase 1: Construction of a fibre optic network around each village and into areas which are easily accessible. This network will directly feed any properties that back onto the route of the fibre.

Installation of a high-performance, mesh radio network serving the village centres. This will be fed from the fibre-optic network and will operate over short range to ensure the ultrafast broadband speeds and resilience of the final connection to each property on a wireless connection.

Phase 2: Replacement of the wireless connections by extending the fibre-optic network into the village centres as wayleaves and access can be arranged. This work will be carried out once the Society has generated enough cash reserves to cover the additional equipment and works involved.

Once this network is established, further expansion is possible to neighbouring villages if there is demand for the ultra-fast FTTH service. Alternatively, the skills, experience and equipment built up by F4RN may be shared with other communities across Nottinghamshire who also wish to take control of their internet provision.

The map below shows the provisional plans for Phase 1 of the network (subject to detailed surveys and wayleaves). The red circles indicate the likely coverage of the mesh radio network. Primary fibre optic ducting shown in red, purple and yellow. Individual connections to houses are not shown in this diagram – routes will be confirmed at the time of making the connection to the property.

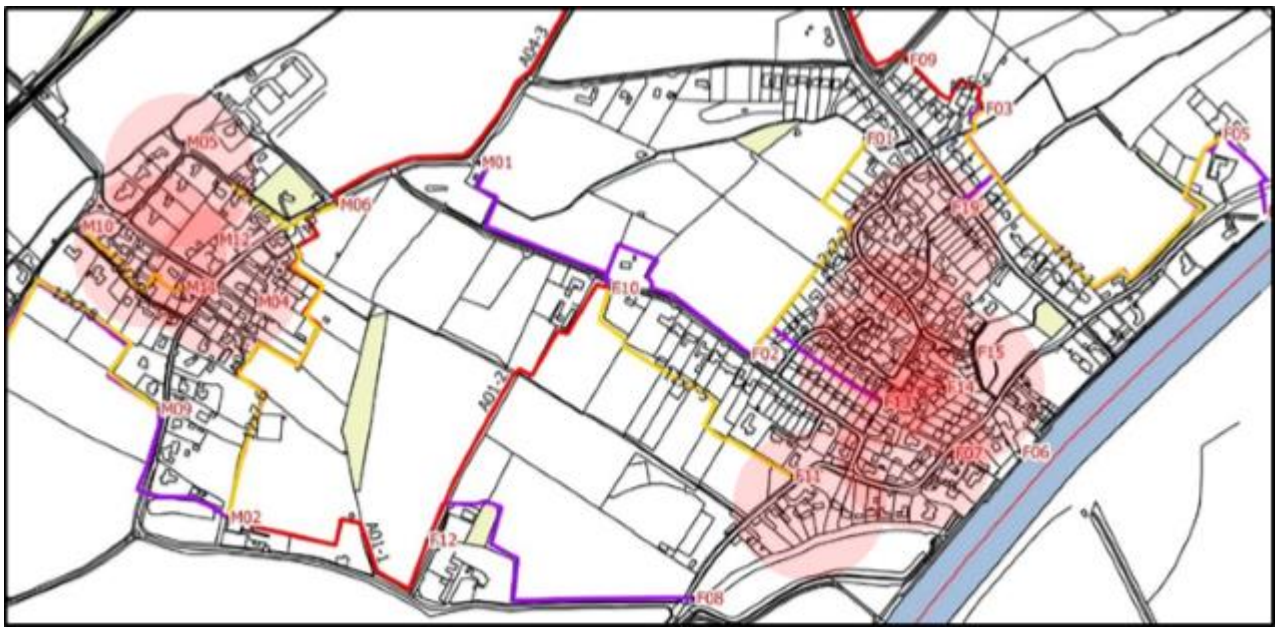


Figure 1 – Provisional Network Plan (Phase 1 Fibre-Optic Network)

The network will consist of a primary cabinet, ideally located at the Recreation Ground on Cooks Lane, Morton. This cabinet may supply all the properties in Fiskerton and Morton directly or alternatively, and depending on wayleaves and access, a secondary cabinet may also be installed near Marlock Close / Longmead Drive to supply properties in Fiskerton. The cabinet(s) will contain the network switches which are connected directly to the national fibre optic network at 1Gbps (symmetrical).

From the primary/secondary cabinet(s), fibre optic cables will be run using a "blown fibre" system where the fibre is fed through a thin plastic microduct using compressed air to assist the installation. A two fibre, single mode G652d or G657b cable will then be run to every property around the node; this is Point to Point (PtP) Fibre to the Home (FTTH). Once installed the fibre will be operated at 100Mbps symmetrical speeds without any rate limiting.

During Phase 1, a mesh radio network will also be constructed to supply the properties in the centre of Fiskerton and Morton via a high speed wireless link. This will allow the rapid deployment of the service in these areas where direct access via fibre will be more challenging. The mesh radio network is self-healing and will operate over relatively short distances, so it will not be adversely affected by weather conditions or blocked by trees.

It is important to note that the primary 1Gbps connection is shared between all the subscribers to the network. This means that each user will initially receive "up to 100Mbps" depending on the number of people connected and the load on the network. However, as no application downloads data continuously it is very unlikely that anyone will ever notice the load on the network. If, at some point in the future, capacity does become an issue then it will simply be necessary to pay for more bandwidth on the connection to the national fibre optic network – the core infrastructure (fibre optic cable, switches etc) will not need to be upgraded or replaced.

Fibre optic networks are inherently more reliable and easy to maintain than the conventional copper phone networks used to deliver ADSL and FTTC broadband services. The fibre optic network itself is mechanically robust and unlikely to suffer damage.

The primary cabinets will contain the active equipment to service the properties surrounding the node. The active equipment is powered via battery backed up "uninterruptable power supplies" (UPS) and the cabinets will have external power sockets that will allow us to connect external generators during long power outages. The only single point failure that would affect the entire network is a failure in the primary connection to the national fibre optic network. Subject to the level of take up on the network, or future

expansion to cover more premises, a second connection will be investigated to further improve the resilience of the network.

There are 3 trunk routes radiating out from primary cabinet to pass all properties in the coverage area. Each trunk will have between 1 and 3 HDPE ducts of 14mm outside diameter (OD), 10mm inside diameter (ID) installed into which we will blow 96 or 144 fibre cables. At suitable locations along the trunk routes we install access chambers where the trunk cable can be broken into and sufficient pairs of fibre split out for local distribution. Secondary distribution ducts are then used to run 7mm OD, 3.5mm ID duct from the chamber to each local property and then blow in a 2 fibre cable. This is then spliced onto the dropped pairs in a "splice bullet" and at the property end it terminates on a fibre tray. Currently just one of the two fibres is used and this is locked into a holder on the tray ready for the CPE[28] to be clicked on. The second fibre is coiled up in the tray ready for future use.

Because we have made provision for 100% of properties we can accurately size the number of fibres needed on each trunk route. However we are also ensuring sufficient spare fibres to allow for potential new builds and property splits.

Currently every Internet Service Provider (ISP) offers broadband customers a range of different services which are differentiated by various "*up to*" speeds. These are theoretical figures based on short line lengths and good quality copper and in practice the number of customer lines delivering speeds approaching the number quoted is small. In rural areas where lines are generally longer than in urban areas the numbers achieving the "up to" figures are very small. It must also be remembered that the speeds quoted are not both way speeds but the maximum download speed; the upload speed will be very much slower. This is why the service is called asymmetrical, upload and download are not the same.

F4RN offers a single service which is initially delivers an (up to) 100Mbps symmetrical connection, i.e. upload and download speeds both at 100Mpbs.

Having a symmetrical service rather than an asymmetrical one is vital as we move to next generation applications. There is a fundamental shift under way towards a world where users are not only consumers of data but also providers. For instance Cloud computing means that rather than using a local disc for storage it is all held on virtual storage out there somewhere in the Internet. But to use Cloud services you need to be able to upload your files as quickly as you could to your hard disc, not just download them, otherwise the whole exercise becomes painful and unusable. Similarly applications like voice and video conferencing are two way processes. With Skype a voice call takes little bandwidth and can probably fit into an asynchronous pipe's upload capacity, but move to their new video conferencing and use an HD camera on your PC or Mac and suddenly the load shifts up a gear and you need symmetry. As more and more people realise that HD quality video conferencing will let them get together with family and friends around the world demand for bandwidth will soar.

Unlike broadband over copper we will not suffer from any range limitations. The standard optics[29] we will use can reach out to properties up to 10km from the local hubs and our design does not have any properties further out than that. However there are 20km, 40km, 80km and 120km optics available at steadily increasing prices if ever required.

The fibre we are laying to each property can operate at 1Gbs and 10Gbs today and 100Gbs tomorrow when cheaper optics begins to emerge. It is impossible to envisage any applications emerging over the next 25 years which we could not support with at most a change of optical drivers. This is true future proofing.

[28] CPE – Customer Premise Equipment or fibre optic broadband modem

[29] Base-LX 1310nm, SM, 8dB, 10Km

The duct being installed is HDPE which also has a very long service life. Exactly how long seems to be a matter of argument, but at least 25 years and probably much longer; over 100 years has been claimed by some manufacturers.

We install a CPE in the property which links to the fibre cable (or wireless network) and to which any user equipment can be connected. The CPE includes a wireless router so there is no need to install any other equipment in your property. As the broadband will be delivered over the fibre optic or high performance wireless network there is also no need to keep the old BT phone line – phone calls can simply be routed over the broadband connection using a system called "Voice over IP" or "VOIP". There are several companies who provide this service for a very low monthly fee and it is possible to retain the existing phone number if desired.

OFCOM recommend that where a VOIP is used then the broadband connection should have a battery backup in the customer's premises capable of maintaining service for up to an hour should mains power fail[30]. This is so that those who wish to use VOIP telephony services can still access them when the power fails in the same way as standard BT landline phones. At this point we do not propose to include battery backup in the CPE due to the extra costs involved and also the fact that most people also have a mobile phone that could be used in the event of a power failure. However, if you rely on the phone line for emergency contact then we can provide advice on a battery backup for the CPE or you may wish to consider keeping hold of the BT phone line.

4.2 Updated Proposals – April 2016

The original proposals were based around on a share offer of £150,000 with a minimum threshold of £120,000 before the project starts.

As of 9th April 2016 a total of £106,750 has been committed to shares in the project; this is below the original target but given the high level of support and continued interest in developing a community broadband network the Committee have reviewed the business plan. The target remains the same – to make an FTTH connection available to every property in Fiskerton and Morton, and to act as a catalyst for other community projects in Nottinghamshire, however by focussing on high performance wireless first, designing the fibre to serve those who have invested or signed up for the service, and by renegotiating with some of the key suppliers it has been possible to reduce the overall cost of the project to meet the investment that has been made.

The target remains to deliver ultra-fast, up to 100Mbps symmetrical broadband to every property in Fiskerton-cum-Morton and to build a network capable of delivering 100% fibre direct to every property. This will be achieved by:

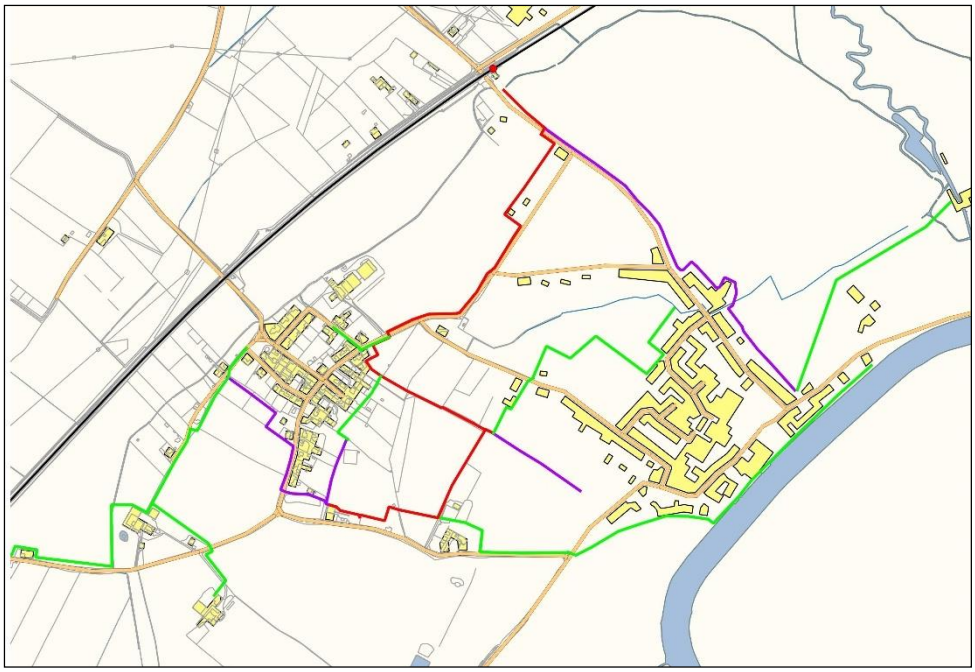
- Bringing a fibre optic connection to the national network directly into the Parish - with the primary cabinet at or near the Trent Valley Equestrian Centre. This gives us full control of the connection speeds and how the broadband is shared between the subscribers.
- Installing a second cabinet at the Sports and Gala Association in Cooks Lane, Fiskerton.
- Building a high performance wireless network that covers every property. A number of wireless access points will be installed in the villages to ensure that the distances covered by wireless are as short as possible.
- Laying the fibre optic backbone between the two cabinets (TVEC and the Sports Ground)
- Connecting as many of the wireless access points as possible to the fibre optic backbone - this will further improve the quality and speeds obtained over the wireless network.
- Then extending the fibre optic network in phases, as funding allows, to connect properties directly to the fibre. We anticipate that the core network and Phase 1 extension can be delivered from the investment received to date. A decision on Phase 2 will be made once the wireless network and core network are developed.

[30] http://stakeholders.ofcom.org.uk/consultations/superfast-broadband/summary

- It may be necessary to make a charge for transferring from wireless to fibre, to cover the new customer modem, as the speed of the fibre roll-out and transfer depends on sufficient funds being available
- As more customers subscribe to the network we can also increase the capacity of the main connection at TVEC to maintain the speeds obtained by the subscribers.

By starting with a wireless network we also have more time to plan the mole ploughing of the fibre optic ducting around the farmers' crops.

As all the connections will initially be delivered wirelessly we have approached two companies to build and support a wireless broadband network. They will carry out the installations for us as well as providing ongoing support once the wireless and fibre networks are in operation.



Overview of suggested route for the main fibre optic network.

- Core network (red)
- Phase 1 extension (purple)
- Phase 2 extension (green)

Individual connections to properties are not shown as it is expected that property owners will work together to agree the best way to connect to the core network.

This map is provided for indication purposes only. The exact route, timing of the construction and the extent of each phase will depend on the funding available at that time. Further extensions of the network to provide 100% fibre coverage will also follow as funding allows.

4.3 Wayleaves

The plans depend very heavily on obtaining the wayleaves (free of charge) to install the ducting and fibre around the villages. Before any of the money raised through the initial share offer is spent we will make sure that all the wayleaves for the core route are in place.

Given that this is a community project aimed at investing in the villages we are confident that we will get good support from the local landowners and have already obtained agreement from several local farmers, the Parish Council and the Sports and Gala Association. The B4RN experience in Lancashire is that landowners are very supportive and there have been few problems obtaining the wayleaves – particularly as anyone who initially refuses permission to lay the fibre will be charged full commercial rates for their connection if they later wish to join the network.

Obviously our preference is to obtain all the wayleaves necessary to build the network, but if there are any problems then we have a number of contingency plans:

- Under Phase 1 we will establish a wireless mesh network in the village centres. This may be extended to cover any small breaks in the core network.

- It may be necessary to route the fibre round one or two fields where wayleave have not been granted.
- The designs involve running a fibre around the outskirts of the villages. In most cases this can be built from two different directions so if it not possible to obtain a wayleave the impact on the network may be minimal
- We are also in discussions with a construction company with Code Powers, which gives us options to run the fibre in the road, pavement or verges if necessary. This option is expensive so will be considered as a last resort but gives us confidence that all properties can be reached.

4.4 Project Plan

The aim is to start construction in May 2016 with initial customers being connected to the wireless network within 12-16 weeks at 100Mbps. Construction of the core fibre optic network should be complete by late September 2016. With sufficient support, and with several teams working on different sections of the network at the same time, then it may be possible to improve on this programme.

5. Project Costs

5.1 Updated CAPEX

Based on total share investment of £100,000 the capital costs of the project are as follows:

Initial designs have been developed for a hybrid FTTH/wireless network which is capable of serving all the properties in Fiskerton and Morton, with a connection to the national fibre optic network. Manufacturers' quotations have been obtained for all the ducting, fibre, cabinets and active equipment necessary to build a network that is capable of serving up to 350 properties. The total cost of equipment for this core network and connection to the national fibre optic network is in the order of £100,000. This includes a budget for installing the fibre under a number of roads where this is required, but excludes any other labour costs.

Fixed Assets – Core Network		
Cabinets, Routers, UPS	£15,000	
Wireless Access Points	£17,500	
Connection to National Fibre Optic Network	£4,500	
Road Crossings	£7,000	
Network Security Equipment	£6,000	
Fibre Optic Network	£40,000	
Contingency	£10,000	
Total Fixed Assets		***£100,000***

This level of investment will allow us to build a wireless network to provide the 100Mbps symmetrical service to every property as well as constructing the core fibre optic network so that we able to connect any property that requests it. The FTTH Council definition of ***homes passed*** is where the trunk network is in place and any property requesting a connection can receive it with only minor construction work needed to reach the property. By building 100% of the core routes we meet these criteria and can truthfully say that as each trunk route is completed the properties to be served from it can be counted in our homes passed totals.

5.2 Customer Connections

To connect each property to the network it is necessary to install the active equipment (the Customer Premise Equipment or CPE) and to connect this to the core network. The cost of the equipment is covered by the connection charge and the equipment is treated as an expense. A connection charge of £175 (£210 including VAT) will be charged to cover the cost of the CPE + miscellaneous expenses such as cables and fixings. Based on 110 connections being made during the first year of operation, the installation costs will be £19,250 (including a small contingency for cables, fixings and incidental expenses). This will be balanced by the connection charge.

Customer Connections (Year 1)		
Customer Premise Equipment (CPE) + Installation	£17,150	
Total Cost of Customer Connections		***£17,150***
Income from Customer Connections		***£19,250***
Contingency for miscellaneous cables, fixings and incidental expenses	£2,100	

5.3 OPEX

Our operating costs are made up of a number of items; leasing the fibre connection to the national fibre optic network, the maintenance of our equipment, IP-Transit and peering charges and general operating costs such as insurances and day to day expenses.

These amount to just over £30K in the first year, increasing to £40k per annum from year 2, excluding depreciation. During the build phase all work will be done by volunteers, however, once the network is operating it will be appropriate to pay someone to look after the network and deal with enquiries and new customers. The budget therefore includes an allowance for administration staff and maintenance. At a monthly charge of £30 (£36 including VAT) we would need a minimum of 111 subscribers to cover the base operating costs. The target, however, is to attract at least 150 subscribers – at this level we would generate sufficient income to cover all the operating costs, correctly account for depreciation and, from year 4, to pay interest to shareholders.

If more subscribers join the network, then it will be possible to employ further staff to support the increased operations or to reduce the monthly subscription charge.

It may well be that some volunteers, who will have gained a lot of practical experience of building out the network, move across to these paid posts. Other volunteers will choose to step back into a less active role of supporting the staff rather than doing all the work themselves.

First Year Operating Costs		
Backhaul (10 Months)	£14,000	
Insurance	£1,000	
Miscellaneous Expenses/Admin	£3,950	
Accountancy	£250	
Total First Year Operating Costs		***£19,200***
Subscription Income (Year 1)		
Year 1 Subscriptions	£27,300	
Total Subscription Income (Year 1)		***£27,300***

5.4 Capital Repayment

Our intention is to offer shareholders the opportunity to withdraw their shares once the Society had built up sufficient reserves. At the initial target level of 150 subscribers this will take a number of years to achieve[31] and it is therefore important that shareholders consider this as a community investment rather than a purely financial investment. Although share withdrawals will be limited, the financial analysis shows that he Society will be able to develop a healthy cash reserve to cover unexpected operating costs, replacement of capital items and share interest payment.

As can been seen from the figures in Appendix 1, the ability to repay the share capital depends very heavily on the number of subscribers. The business plan shows healthy cash flow based on 150 subscribers. This is a conservative estimate as it may well be possible to obtain a lower cost connection to the national fibre optic network and the allowance for maintenance is generous, particularly for the first years of operation.

Share repayment will only be possible as the number of subscribers grows further. At 300 subscribers the community benefit society will be in a position to repay the investors, substantially reduce the monthly charge and leave a healthy cash surplus for reinvesting into the community.

[31] The retained capital is projected to be negative for at least ten years based on the current financial analysis.

The amount of withdrawals allowed in any year, and the price paid[32], will be set each year at the AGM. Withdrawals will be prioritised to take into account any special circumstances such as deaths or members in financial difficulty before processing the rest in the order of first come first served.

5.5 Future Capital Investment

The balance sheet in Appendix 1 has been developed to demonstrate the viability of the Society during the early stages of the enterprise. The intention is to maintain the long term viability of the operation and, once the Directors have gained sufficient confidence in the underlying profitability of the Society, to reinvest in the network. Such investment will include refreshing the key components (such as the electronics in the central cabinet) as well as overlaying the wireless mesh network with a full fibre optic network and investing in additional services that may be delivered over the fibre optic infrastructure.

[32] Shares will normally be repaid at their face value of £1 each, however under the Society Rules, a lower price may be set to reflect the financial circumstances of the Society at that point. The Directors may also suspend the sale of any further shares if this is deemed necessary to protect the interests of the Society and other shareholders.

6. Project funding

The revised plan covers the delivery of a hybrid FTTH/wireless network to all properties in Fiskerton and Morton and with the core network costing in the order of £100k to deliver. It is intended to raise share capital through the issue of Community Shares to cover these cost construction costs. To date, £106,750 has been committed to the project by potential investors.

These revised proposals will be presented to the potential shareholders in a written (email) communication on 10th April 2016 and at a public meeting on 17th April (3pm, at the Arthur Radford Memorial Hall, Morton). At this point anyone who no longer wants to invest in the revised proposals will have the opportunity to cancel their investment. Conversely, anyone wishing to invest in the revised scheme or to increase their subscription will have until 25th April to do so.

During the **week commencing 25th April** cheques and online investments will be cashed and we will start work to build the network. All investors become members of the Society with a say in the future development and operation of the broadband network.

We have not included labour within the budget as, given the initial restriction to Fiskerton and Morton, the Community Benefit Society will not generate enough revenue to pay for labour, other than the subcontract costs for road crossings. The success of the project therefore depends on the community coming together for the common benefit.

6.1 Shares

It is intended to the first issue of Community Shares in January 2016. Shares will have a face value of £1 and are withdrawable, not transferrable shares and hence cannot be sold to a third party, only back to F4RN. When the investor applies to cash in or withdraw their investment F4RN will pay the £1 face value; there is no potential for any capital gains.

Under HMRC rules for the Seed Enterprise Investment Scheme (SEIS) the shares must be held for at least three years. As explained in Section 5, share withdrawals will only be possible once the Society has built up sufficient reserves and, at the initial target of 150 subscribers, this will not be for at least ten years.

From year 4 and onwards we are proposing to pay interest on the shares, with the interest payment being made once the year four accounts have been audited. So we can pay interest on the issued shares this must be at a rate appropriate to attract and keep investment only. The Society Rules set a maximum interest rate of 5% per annum, or 2% above the Bank of England base rate, whichever is higher, however the actual interest rate will be set by the Board based on the financial strength of the Society and with approval by the Society membership at the AGM. The financial analysis in Appendix 1 shows that an interest payment of 4% would be appropriate based on the initial estimates for construction costs, operating expenditure and income.

As the society will be owned by the members, then the membership may decide to reduce the amount of interest paid in order to release funds for other community purposes.

Each member gets a share account which is credited with the number of shares they purchase. When interest payments are made, F4RN will not deduct tax from these payments, so the shareholder will need to consider whether it is necessary to declare the interest to HMRC in their tax return.

Limits on investment will be described in the community share offer document, but the current intention is to set a minimum investment of £1,000 to keep administration manageable. Also a maximum investment of £15,000 is proposed to ensure that the initial share investment is available to the majority of the community. Any investor with at least the minimum shareholding is a member of F4RN and eligible

to vote at meetings. As a Community Benefit Society the rule is that each member gets one vote irrespective of the number of shares held and the society has to operate for the benefit of the community not of its shareholders. As mentioned previously the intention is to pay interest on shares once the year 4 accounts have been audited.

6.1.1 Seed Enterprise Investment Scheme Tax Relief

The initial share issue will be constructed to be compatible with the Seed Enterprise Investment Scheme (SEIS) operated by HMRC. This means that, subject to a number of rules, it should be possible for each shareholder to obtain a 50% tax refund; so for example a subscription of £1000 should only ultimately cost £500. You will need to have paid this amount of tax in this or the previous year. If you have a capital gain you can also use the investment to defer some of the capital gains tax.

This of course is subject to shareholder paying that amount of tax in the first place, either in the current or previous tax years. Under SEIS rules there is no lower limit on the investment but the individual shareholding must be less than 30% of the share capital to be eligible for SEIS relief. In our case we have followed the guidance of the Community Shares Unit and set the maximum shareholding to 10% of the total investment target and therefore, on investments between £1,000 and £15,000, the investor would get an Inland Revenue rebate of between £500 and £7,500 on their tax liability.

One restriction is you have to hold your shares for at least three years from the date they are issued and must not recover value from the society.

In year four and beyond you might be able to sell your shares back to the society - if the business has sufficient income which will be confirmed once the accounts are audited. As previously explained, it is unlikely that the Society will have sufficient retained capital to allow share withdrawals at this point and the investment should be treated as a long term investment in the community rather than purely a financial investment. Once the Society is in a position to allow share withdrawal then, in each year, we can only buy back 10% of the total number of shared issued. The society cannot pay you more than what you paid for them. If the enterprise fails you cannot create a capital loss or a loss for income tax purposes. You cannot transfer the shares other than on death.

You can claim your tax refund once the society has been trading for 4 months and HMRC have provided the requisite paperwork to F4RN. In practice paperwork should be available around Christmas 2016 allowing you to claim the investment you make in early 2016 when you submit your tax return to 5 April 2016. If you have already submitted your return you can apply in writing to HMRC for the refund.

To provide further reassurance to investors, we have approached HMRC to obtain a pre-approval certificate confirming the offer is eligible for SEIS and we will not issue any shares until this pre-approval has been obtained.

F4RN are not tax advisers so if you have any concerns you should speak to a professional adviser. F4RN cannot guarantee that the relief will be available but in the spirit of community support and subject to the financial constraints of F4RN we will help you where we can.

6.1.2 Future Share Offers

At this point we are focussed on the initial share offer to raise a target of £150,000. This will allow us to build Phase 1 of the project covering the hybrid fibre/wireless for Fiskerton and Morton. Phase 2, to overlay the wireless network with fibre, will be considered once the Society has generated sufficient cash reserves to cover the additional equipment and works involved.

We very much hope that other local villages will be interested in joining the F4RN network. This will involve more significant capital investment to cover the additional fibre, ducting, routers etc and at this point we will consider raising the additional funding through further share offers.

6.2 Connection Fees and Service Charges

As we add each customer to the network we will receive the connection fee of £175 (£210 including VAT). It is anticipated that the network will be completed within 12 months of starting work, with 300 properties passed by the end of 2016. At a 50% take up this will give us 150 connections.

Once connected each customer pays £30 a month (£36 including VAT) for their service and this generates income to F4RN of £360/pa ex VAT. With a 50% take up rate, we will have 150 subscribers, generating an income (excluding VAT) of £54k per annum.

The most significant cost of operation is the backhaul to the national broadband network. We have negotiated a three-year price for this connection which means that, provided F4RN has at least 150 subscribers, then there is a reasonable expectation that the monthly subscription will not need to increase, of if it does, then price rises in this three-year period can be kept to a minimum.

If two thirds of the properties passed take up the service then the annual income will increase to £72,000.

Competition from BT Openreach and wireless service providers may have an impact on the level of subscribers, however we are confident that the F4RN service will continue to be very attractive giving a higher speed connection at a lower price than the competition. (See Section 7 for more details on potential competitors)

6.3 Grant Funding

At this point, the business plan has been developed without considering grant funding. For political reasons, it is difficult for community broadband networks to obtain grant funding as state support for the national broadband roll out is being provided by BDUK. We will continue to seek alternative sources of funding including approaching BDUK directly for support and have made contact with the European Investment Bank who are considering a more widespread approach to funding of rural and community broadband projects

6.4 Other Sources of Support

Although grant funding has not been obtained to date, we have been offered considerable levels of support from other sources:

- We are members of Co-operatives UK and the Independent Networks Co-operatives Society, which gives us direct access to a great deal of expertise and experience in both running the society and building the network.
- We have met with the B4RN team, who have provided us with hands on training and the benefit of their experience
- We have had the opportunity to speak with some of the local farmers and have their support for the wayleaves and network construction.
- Fujikura, who supply the equipment for splicing (joining) the fibres, have offered us free training and free use of a splicing unit for 3 months
- Hellerman Tyton, who supply the splice bullets, have also offered us free training

- We have been offered free equipment (the fibre optic routers) for the central hub – these are key component of the active network and the equipment we have been offered is made by CISCO who are one of higher specification equipment suppliers.
- Western Power Distribution have already laid ducting for us in the centre of Morton during their recent electricity network upgrades. This provides us with a number of key road crossings on Main Street and Church Lane.

7. Competition

It is important to consider the competition and the impact that this might have on the project. We have identified five potential alternatives to the F4RN broadband services:

7.1 BT (Openreach) – ADSL Broadband

Openreach look after the telephone wires that are used to supply the existing ADSL service. Previous survey results have shown that most people would upgrade from the BT ADSL service today if they could.

For the remainder, who do not need a fast broadband connection, the ADSL service may be enough. However, the pricing of the F4RN network will be competitive with this service and the fibre optic connection will provide much superior performance as well as potentially improved call quality over a VOIP phone connection.

7.2 BT (Openreach) – BT Infinity "Fibre to the Cabinet"

This BT Infinity FTTC service presents the most significant competition to the F4RN network. This will not be delivered until late 2017/early 2018 so there is a two year window to establish the F4RN service. Evidence from a previous wireless network (4tons VCB33) and from other projects is that once a subscriber has connected to a high quality, competitive service they do not tend to move.

The F4RN ultrafast broadband network will also be priced to be competitive (or cheaper) than the BT 40Mbps service and considerably cheaper than the BT 80Mbps offering. Future pricing will be decided by the Society membership.

BT have recently increased their line rental making the F4RN service potentially more attractive.

7.3 Other Independent Broadband Companies

There are a number of independent broadband providers that have started operating the last few years, some of which are looking to provide FTTH services in rural areas as well as in city centres. We have met most of these companies through our membership of the Independent Networks Co-operative Association (INCA) and have also approached them directly to see if they will build a fibre optic network in our area. Unfortunately, the answer has been "no". Perhaps the most active company in rural areas is Gigaclear (www.gigaclear.com) – they are very active in Hungerford, Gloucestershire and the Cotswolds, as well as working with Oxfordshire County Council. Unfortunately Nottinghamshire County Council have no plans to work with anyone other than BT and the remaining communities are too spread out to make viable business case for Gigaclear or any other commercial operator in our area.

[33] 4tons VCB was a 2Mbps wireless network which served Fiskerton and surrounding villages before BT introduced ADSL broadband. It relied on a satellite backhaul. At the time, the cost of an upgrade to the backhaul was prohibitively expensive and the service was eventually shut down several years after BT introduced ADSL broadband to the Fiskerton exchange.

7.4 Wireless Broadband

Wireless broadband is available from a small company in Newark (JHCS) who currently offer a 10Mbps/1Mbps asymmetrical service at £19.99 a month + VAT. This is cheaper than the proposed F4RN monthly charge, however it is expected that the superior speeds and service quality will attract the majority of customers to the F4RN fibre optic network.

7.5 4G or 5G wireless

Both wireless technologies may be introduced in the future, however neither are currently available in the villages. Mobile data charges tend to be high, or with capped usage limits, so these are not considered to offer serious competition to the F4RN network.

Appendix 1 – Key Financial Information and Projections

A1.1 Profit and Loss

P&L	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
SALES							
Installation Rev	£ 19,250.00	£ 1,750.00	£ 1,750.00	£ -	£ -	£ -	£ -
Recurring Rev	£ 27,300.00	£ 41,700.00	£ 45,000.00	£ 46,800.00	£ 46,800.00	£ 46,800.00	£ 46,800.00
Other Rev.	£ -	£ -	£ -	£ -	£ -	£ -	£ -
TOTAL Rev	£ 46,550.00	£ 43,450.00	£ 46,750.00	£ 46,800.00	£ 46,800.00	£ 46,800.00	£ 46,800.00
Cost of Sales	£ 34,350.00	£ 18,350.00	£ 24,986.00	£ 23,436.00	£ 23,436.00	£ 23,436.00	£ 23,436.00
Gross Profit	£ 12,200.00	£ 25,100.00	£ 21,764.00	£ 23,364.00	£ 23,364.00	£ 23,364.00	£ 23,364.00
Overheads							
Expenses	£ 8,250.00	£ 11,900.00	£ 12,000.00	£ 12,300.00	£ 12,300.00	£ 12,300.00	£ 12,300.00
Depreciation	£ 6,205.41	£ 9,382.20	£ 9,748.87	£ 9,748.87	£ 9,748.87	£ 4,646.74	£ 3,626.32
Share Interest	£ -	£ -	£ -	£ -	£ -	£ 4,000.00	£ 4,000.00
Estimated Tax							£ 2,000.00
Profit	£ (2,255.41)	£ 3,817.80	£ 15.14	£ 1,315.14	£ 1,315.14	£ 2,417.26	£ 1,437.69

Key Assumptions

- £100,000 raised in year 1 through the issue of community shares.
- Wireless network built initially, with fibre overlay of wireless areas carried out as Society finances allow.
- Wayleaves are free.
- Majority of construction and installation carried out by volunteers free of charge.
- 110 connections made in year 1 with further connections in following years. Wireless installations start from month 3; 25 installations completed each month. All connections charged at £175+VAT. Monthly subscription £30+VAT.
- The project suffers from high initial capital costs needed to create the network. These costs are disproportionate until such time as 120 subscribers have signed up for the service. With 120 subscribers the Society is self-sustaining.
- Interest earned at a suggested rate of 4% from year 5 with the earliest date of payment in year 6 following the completion of the year 4 accounts. The Society rules set a maximum interest payment of 5% or 2% above the Bank of England Base Rate, whichever is higher, however for planning purposes a lower rate of 4% has been selected which is considered more appropriate at this stage.
- Share withdrawals will be considered once the Society is trading profitably and has sufficient capital in reserve.
- There is no corporation tax until year 7 due to allowances and early year losses
- This is not a forecast but our best estimate of the position based on our current understanding. Facts may change and new challenges could arise. Start-ups are inherently risky and the community venture should be considered in that light. Purchase of shares should be considered primarily as a community investment not a financial investment.

A1.2 Balance Sheet

Balance Sheet	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
Fixed Assets	£ 66,139.05	£ 103,139.05	£ 103,139.05	£ 103,139.05	£ 103,139.05	£ 103,139.05	£ 103,139.05
Depreciation	£ (6,205.41)	£ (15,587.61)	£ (25,336.48)	£ (35,085.34)	£ (44,834.21)	£ (49,480.95)	£ (53,107.26)
TOTAL FIXED ASSETS	£ 59,933.64	£ 87,551.44	£ 77,802.57	£ 68,053.71	£ 58,304.84	£ 53,658.10	£ 50,031.79
Current Assets							
Stock	£ -	£ -	£ -	£ -	£ -	£ -	£ -
Other Debtors	£ -	£ -	£ -	£ -	£ -	£ -	£ -
Cash	£ 38,470.95	£ 14,820.95	£ 24,403.15	£ 35,392.15	£ 46,456.15	£ 57,520.15	£ 62,584.15
Total Current Assets	£ 38,470.95	£ 14,820.95	£ 24,403.15	£ 35,392.15	£ 46,456.15	£ 57,520.15	£ 62,584.15
Liabilities							
Creditors	£ -	£ -	£ -	£ -	£ -	£ 4,000.00	£ 4,000.00
VAT	£ 660.00	£ 810.00	£ 628.20	£ 553.20	£ 553.20	£ 553.20	£ 553.20
Total Curr. Liabilities	£ 660.00	£ 810.00	£ 628.20	£ 553.20	£ 553.20	£ 4,553.20	£ 4,553.20
Net Assets	£ 97,744.59	£ 101,562.39	£ 101,577.52	£ 102,892.66	£ 104,207.79	£ 106,625.05	£ 108,062.74
Shareholders Funds							
Share Capital	£ 100,000.00	£ 100,000.00	£ 100,000.00	£ 100,000.00	£ 100,000.00	£ 100,000.00	£ 100,000.00
Retained Earnings	£ (2,255.41)	£ 1,562.39	£ 1,577.52	£ 2,892.66	£ 4,207.79	£ 6,625.05	£ 8,062.74
Capital Employed	£ 97,744.59	£ 101,562.39	£ 101,577.52	£ 102,892.66	£ 104,207.79	£ 106,625.05	£ 108,062.74

A1.3 Detailed Cash Flow Analysis

Year 1

	Year 1											
	1	2	3	4	5	6	7	8	9	10	11	12
Starting Cash Position	£ 100,000.00	£ 98,500.00	£ 43,733.14	£ 42,353.14	£ 41,723.14	£ 51,450.95	£ 52,320.95	£ 53,580.95	£ 29,640.95	£ 30,960.95	£ 32,280.95	£ 37,150.95
Cash In												
Sales & Services	£ -	£ -	£ 5,125.00	£ 5,875.00	£ 6,625.00	£ 7,375.00	£ 5,050.00	£ 3,300.00	£ 3,300.00	£ 3,300.00	£ 3,300.00	£ 3,300.00
VAT In	£ -	£ -	£ 1,025.00	£ 1,175.00	£ 1,325.00	£ 1,475.00	£ 1,010.00	£ 660.00	£ 660.00	£ 660.00	£ 660.00	£ 660.00
Total Cash In	£ -	£ -	£ 6,150.00	£ 7,050.00	£ 7,950.00	£ 8,850.00	£ 6,060.00	£ 3,960.00	£ 3,960.00	£ 3,960.00	£ 3,960.00	£ 3,960.00
Cash Out												
Cost Of Sales	£ -	£ -	£ 6,025.00	£ 6,025.00	£ 6,025.00	£ 6,025.00	£ 3,250.00	£ 1,400.00	£ 1,400.00	£ 1,400.00	£ 1,400.00	£ 1,400.00
Expenses	£ 1,250.00	£ 500.00	£ 250.00	£ 375.00	£ 500.00	£ 625.00	£ 750.00	£ 800.00	£ 800.00	£ 800.00	£ 800.00	£ 800.00
CapEx	£ -	£ 45,139.05	£ -	£ -	£ -	£ -	£ -	£ 21,000.00	£ -	£ -	£ -	£ -
VAT Out	£ 250.00	£ 9,127.81	£ 1,255.00	£ 1,280.00	£ 1,305.00	£ 1,330.00	£ 800.00	£ 4,640.00	£ 440.00	£ 440.00	£ 440.00	£ 440.00
Shareholder Int.												£ -
ShareHolder Payback												£ -
Tax Provision												£ 21,747.81
Total Cash Out	£ 1,500.00	£ 54,766.86	£ 7,530.00	£ 7,680.00	£ 7,830.00	£ 7,980.00	£ 4,800.00	£ 27,840.00	£ 2,640.00	£ 2,640.00	£ 2,640.00	£ 2,640.00
VAT (Refund)	£ -	£ -	£ -	£ -	£ (9,607.81)	£ -	£ -	£ 60.00	£ -	£ -	£ (3,550.00)	£ -
Ending Cash Position	£ 98,500.00	£ 43,733.14	£ 42,353.14	£ 41,723.14	£ 51,450.95	£ 52,320.95	£ 53,580.95	£ 29,640.95	£ 30,960.95	£ 32,280.95	£ 37,150.95	£ 38,470.95

Year 2

	Year 2											
	13	14	15	16	17	18	19	20	21	22	23	24
Starting Cash Position	£ 38,470.95	£ 38,590.95	£ 15,250.95	£ 16,570.95	£ 16,690.95	£ 1,150.95	£ 3,070.95	£ 4,690.95	£ 9,150.95	£ 10,770.95	£ 12,390.95	£ 13,200.95
Cash In												
Sales & Services	£ 3,300.00	£ 3,300.00	£ 3,300.00	£ 3,300.00	£ 3,300.00	£ 5,350.00	£ 3,600.00	£ 3,600.00	£ 3,600.00	£ 3,600.00	£ 3,600.00	£ 3,600.00
VAT In	£ 660.00	£ 660.00	£ 660.00	£ 660.00	£ 660.00	£ 1,070.00	£ 720.00	£ 720.00	£ 720.00	£ 720.00	£ 720.00	£ 720.00
Total Cash In	£ 3,960.00	£ 3,960.00	£ 3,960.00	£ 3,960.00	£ 3,960.00	£ 6,420.00	£ 4,320.00	£ 4,320.00	£ 4,320.00	£ 4,320.00	£ 4,320.00	£ 4,320.00
Cash Out												
Cost Of Sales	£ 1,400.00	£ 1,400.00	£ 1,400.00	£ 1,400.00	£ 1,400.00	£ 2,950.00	£ 1,400.00	£ 1,400.00	£ 1,400.00	£ 1,400.00	£ 1,400.00	£ 1,400.00
Expenses	£ 1,800.00	£ 800.00	£ 800.00	£ 1,800.00	£ 800.00	£ 800.00	£ 850.00	£ 850.00	£ 850.00	£ 850.00	£ 850.00	£ 850.00
CapEx	£ -	£ 20,000.00	£ -	£ -	£ 17,000.00	£ -	£ -	£ -	£ -	£ -	£ -	£ -
VAT Out	£ 640.00	£ 4,440.00	£ 440.00	£ 640.00	£ 3,840.00	£ 750.00	£ 450.00	£ 450.00	£ 450.00	£ 450.00	£ 450.00	£ 450.00
Shareholder Int.												£ -
ShareHolder Payback												£ -
Tax Provision												
Total Cash Out	£ 3,840.00	£ 26,640.00	£ 2,640.00	£ 3,840.00	£ 23,040.00	£ 4,500.00	£ 2,700.00	£ 2,700.00	£ 2,700.00	£ 2,700.00	£ 2,700.00	£ 2,700.00
VAT (Refund)	£ -	£ 660.00	£ -	£ -	£ (3,540.00)	£ -	£ -	£ (2,840.00)	£ -	£ -	£ 810.00	£ -
Ending Cash Position	£ 38,590.95	£ 15,250.95	£ 16,570.95	£ 16,690.95	£ 1,150.95	£ 3,070.95	£ 4,690.95	£ 9,150.95	£ 10,770.95	£ 12,390.95	£ 13,200.95	£ 14,820.95

Year 3

	Year 3											
	25	26	27	28	29	30	31	32	33	34	35	36
Starting Cash Position	£ 14,820.95	£ 15,177.35	£ 15,323.75	£ 16,280.15	£ 16,036.55	£ 16,614.75	£ 17,811.15	£ 19,067.55	£ 20,005.75	£ 21,262.15	£ 22,518.55	£ 23,146.75
Cash In												
Sales & Services	£ 3,600.00	£ 3,600.00	£ 3,600.00	£ 3,600.00	£ 3,600.00	£ 5,350.00	£ 3,900.00	£ 3,900.00	£ 3,900.00	£ 3,900.00	£ 3,900.00	£ 3,900.00
VAT In	£ 720.00	£ 720.00	£ 720.00	£ 720.00	£ 720.00	£ 1,070.00	£ 780.00	£ 780.00	£ 780.00	£ 780.00	£ 780.00	£ 780.00
Total Cash In	£ 4,320.00	£ 4,320.00	£ 4,320.00	£ 4,320.00	£ 4,320.00	£ 6,420.00	£ 4,680.00	£ 4,680.00	£ 4,680.00	£ 4,680.00	£ 4,680.00	£ 4,680.00
Cash Out												
Cost Of Sales	£ 1,953.00	£ 1,953.00	£ 1,953.00	£ 1,953.00	£ 1,953.00	£ 3,503.00	£ 1,953.00	£ 1,953.00	£ 1,953.00	£ 1,953.00	£ 1,953.00	£ 1,953.00
Expenses	£ 1,350.00	£ 850.00	£ 850.00	£ 1,850.00	£ 850.00	£ 850.00	£ 900.00	£ 900.00	£ 900.00	£ 900.00	£ 900.00	£ 900.00
CapEx	£ -	£ -	£ -	£ -	£ -	£ -	£ -	£ -	£ -	£ -	£ -	£ -
VAT Out	£ 660.60	£ 560.60	£ 560.60	£ 760.60	£ 560.60	£ 870.60	£ 570.60	£ 570.60	£ 570.60	£ 570.60	£ 570.60	£ 570.60
Shareholder Int.	£ -	£ -	£ -	£ -	£ -	£ -	£ -	£ -	£ -	£ -	£ -	£ -
ShareHolder Payback	£ -	£ -	£ -	£ -	£ -	£ -	£ -	£ -	£ -	£ -	£ -	£ -
Tax Provision												
Total Cash Out	£ 3,963.60	£ 3,363.60	£ 3,363.60	£ 4,563.60	£ 3,363.60	£ 5,223.60	£ 3,423.60	£ 3,423.60	£ 3,423.60	£ 3,423.60	£ 3,423.60	£ 3,423.60
VAT (Refund)	£ -	£ 810.00	£ -	£ -	£ 378.20	£ -	£ -	£ 318.20	£ -	£ -	£ 628.20	£ -
Ending Cash Position	£ 15,177.35	£ 15,323.75	£ 16,280.15	£ 16,036.55	£ 16,614.75	£ 17,811.15	£ 19,067.55	£ 20,005.75	£ 21,262.15	£ 22,518.55	£ 23,146.75	£ 24,403.15

Year 4 Onwards

	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Starting Cash Position	£ 24,403.15	£ 35,392.15	£ 46,456.15	£ 57,520.15	£ 62,584.15	£ 62,648.15	£ 62,912.15
Cash In							
Sales & Services	£ 46,800.00	£ 46,800.00	£ 46,800.00	£ 46,800.00	£ 46,800.00	£ 46,800.00	£ 46,800.00
VAT In	£ 9,360.00	£ 9,360.00	£ 9,360.00	£ 9,360.00	£ 9,360.00	£ 9,360.00	£ 9,360.00
Total Cash In	£ 56,160.00	£ 56,160.00	£ 56,160.00	£ 56,160.00	£ 56,160.00	£ 56,160.00	£ 56,160.00
Cash Out							
Cost Of Sales	£ 23,436.00	£ 23,436.00	£ 23,436.00	£ 23,436.00	£ 23,436.00	£ 23,436.00	£ 23,436.00
Expenses	£ 12,300.00	£ 12,300.00	£ 12,300.00	£ 12,300.00	£ 12,300.00	£ 12,300.00	£ 12,300.00
CapEx	£ -	£ -	£ -	£ -	£ -	£ -	£ -
VAT Out	£ 7,147.20	£ 7,147.20	£ 7,147.20	£ 7,147.20	£ 7,147.20	£ 7,147.20	£ 7,147.20
Shareholder Int.	£ -	£ -	£ -	£ 4,000.00	£ 4,000.00	£ 3,800.00	£ 3,600.00
ShareHolder Payback	£ -	£ -	£ -	£ -	£ 5,000.00	£ 5,000.00	£ 5,000.00
Tax Provision				£ 2,000.00	£ 2,000.00	£ 2,000.00	£ 2,000.00
Total Cash Out	£ 42,883.20	£ 42,883.20	£ 42,883.20	£ 48,883.20	£ 53,883.20	£ 53,683.20	£ 53,483.20
VAT (Refund)	£ 2,287.80	£ 2,212.80	£ 2,212.80	£ 2,212.80	£ 2,212.80	£ 2,212.80	£ 2,212.80
Ending Cash Position	£ 35,392.15	£ 46,456.15	£ 57,520.15	£ 62,584.15	£ 62,648.15	£ 62,912.15	£ 63,376.15

Appendix 2 – Community Engagement Plan

The primary internet provider for Fiskerton-cum-Morton and other Nottinghamshire villages poorly serves the rural community and the future outlook is not encouraging.

The Fibre for Rural Nottinghamshire (F4RN) project has been established into order to provide a reliable, ultrafast broadband network that will serve both residents and business owners at a speed that will:

- Enable fast, multiple user home access for both social and educational needs
- Facilitate flexible working from home and the establishment of new home / local office businesses
- Allow existing businesses to offer a commercial platform that meets the demands of 21st Century e-commerce and on-line presence

The model is to raise funding through a Community Share Offer and then to call on local volunteer labour to construct the network, initially starting with the villages of Fiskerton and Morton, and then acting as a resource and support hub for other Nottinghamshire communities that wish to build their own broadband networks.

The project has to be community driven to mobilise local resources, delivering the network within a restricted community budget with immediate community benefit and inward investment, rather than relying on external funding, expensive contracting and third party delivery. In particular, the success of the project relies on:

- Acknowledgement of the pitfalls of the current and future planned broadband provision
- A general recognition of the growing need and expectation for high speed broadband services, now commonly regarded as a utility requirement
- Investment in the Community Benefit Society and
- Direct involvement during the network build phase

The community value will be threefold:

- Closer ties within the community to deliver a common goal of universal benefit
- The availability of ultrafast broadband at competitive prices
- Protection of property values

Past engagement has indicated strong support for the project based on a petition, door to door visits, village meetings and feedback from email communications and via the F4RN web site.

To date, support for wayleaves and development of the network has been obtained from a number of local farmers, the Parish Council and the Sports and Gala Association.

The planned future engagement will embrace:

<u>Online</u>

- Continued development and promotion of the website as a primary source of information, project resources and broadband guidance
- Use of the Microgenius website to promote the community share offer and supporting documentation
- Social media – Facebook and Twitter
- Regular email updates

<u>Hardcopy</u>

- Christmas card delivered to all properties in the villages, promoting the project and the launch of the share offer
- Copies of the community share offer document and introductory letter provided to every resident

- Offer document and full business plan available from the F4RN website
- Local press releases – The Bramley, Newark and Southwell Advertiser.
- Consideration of wider press activity – eg ispreview.co.uk
- Posters / flyers advertising the launch date and public meetings

Relationship Building

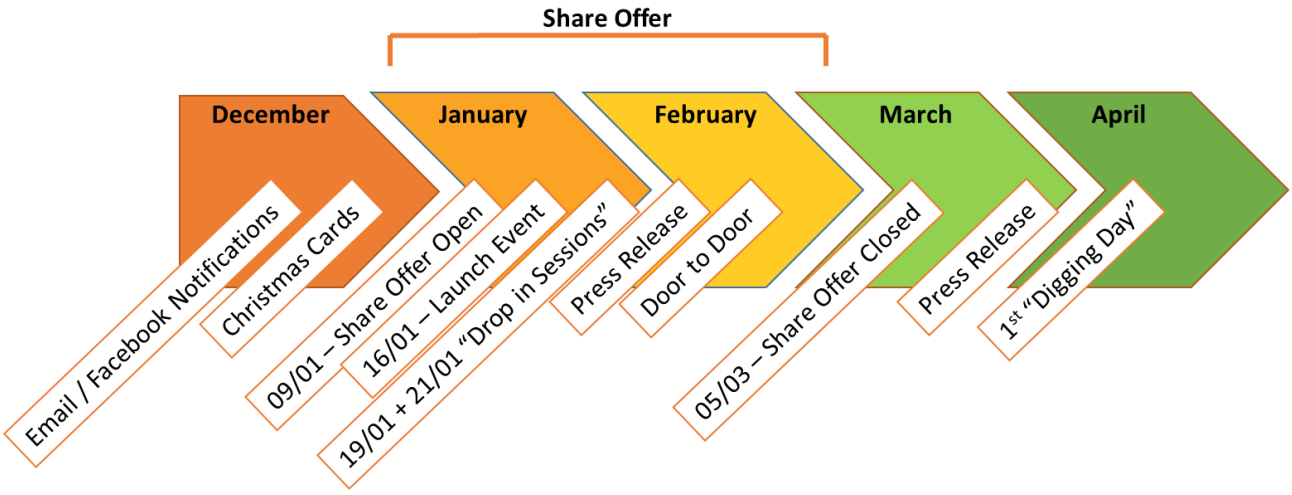
- Community share offer launch event with detailed information, speed demonstration, videos, Q&A, sign up opportunities
- House to house visits
- Demonstration of mole ploughing
- Integration of ultrafast broadband into the Fiskerton-cum-Morton Neighbourhood Plan
- "Silver Surfer" clubs and IT awareness / training sessions

Infrastructure Development

- Digging Days
- Celebration Events – first live connection, 50th Live connection etc
- Work with DoE, Scouts, Guides etc on Community Service – digging connections for members of the community who need support with the physical connection
- Visible signs of the scheme – for instance following the B4RN model of displaying a plastic spade outside each property that is connected to promote discussion.

Timeline of Key Activities (Original Plan)

Note that project start date is now May 2015



Appendix 3 – Risk Assessment

Ref	Description	Impact	Likelihood	Score	Mitigation
1	Insufficient support for share offer	5	2	10	Active and coherent campaign; strong committee drawing on key local people; early engagement with farmers and main landowners. Decision threshold – project will only proceed if £120k obtained
2	Insufficient support to build network	3	2	6	Build will be slower. Volunteer fatigue; Aim to engage local "seed activist" for each group of houses to organise digging parties. Investors have a vested interest in building the network Active promotion of build through local press and social media Celebrity support? Score boards in pubs and post office. Incentives for investors and farmers who build the network.
3	Cost of connecting backhaul – "Excess Construction Charges"	5	3	15	Highly likely. Backhaul will be ordered before share offer so that excess construction charges are clear at early stage in project. Potential to move connection point closer to Openreach node. Alternative suppliers – Vodafone (on 400kV towers) or microwave backhaul
4.	Wayleaves	2	4	8	It is expected that some people will refuse wayleaves. On the edge of the village this is not a problem as the route can be adjusted. In village core this is more of a problem – may need to accept that some areas will not have fibre but will need to stick with high speed WiFi
5.	Issue – construction in village core	5	2	10	The houses in the centre of Fiskerton and in small parts of Morton are built close together and surrounded by roads. This will require; a) Permission to build the network across gardens and/or b) Additional roadworks. Impact will be understood early in the project when wayleaves are being collected. Initial plans updated so that Phase 1 delivers WiFi to village centres with plans to overlay with fibre as and when demand and funding allows

Ref	Description	Impact	Likelihood	Score	Mitigation
6.	Rail crossing	5	1	5	It may be necessary to cross the railway line in order to pick up the fibre optic backhaul and to extend the network to neighbouring villages in the future. Using directional or more drilling will be expensive. Alternative is to build the network through one of the culverts that run under the railway. Cost of obtaining wayleaves and structural surveys may be significant
7	Damage to other utilities	2	5	10	Potential to damage electricity or phone cables, gas, sewage or water pipes. Detailed drawings have been obtained from Western Power distribution of their electricity network. We also have good contact with their local engineer. Plans of water and sewage pipes are available from Severn Trent Water and will be consulted before the build Route will be surveyed with a "CAT Scanner"
8	Major Injury	5	1	5	An injury would cause very bad publicity and put off people from assisting with the build. Members of the project have Health and Safety experience and a background in the utility and construction industries. Machinery will only be operated by trained individuals. Barriers to be placed around exposed holes. Full Risk Assessment and Method Statement to be prepared before all works. Tool box talks. First aid kit provided.
9	Insufficient income to cover ongoing OPEX	5	2	10	Some level of reassurance provided through interest of shareholders. Ideally 150, minimum 111 to cover full 1Gbps costs, Fall-back position would be to reduce bandwidth to 500Mbps.
10	Weather delays build	3	4	12	If necessary, delay connection of backhaul in order to avoid problems with the cash flow