

Draft South Yorkshire Digital Infrastructure Strategy

Version 6
10th September 2021

INTRODUCTION

A core part of the Northern Powerhouse, South Yorkshire plays a key part in the economic growth of the North. The Mayoral Combined Authority (MCA) and the Local Enterprise Partnership (LEP) provide the strategic leadership with partner local authorities in driving economic success. The organisations work at a regional level setting strategic policy and investing in delivering transport, housing, business growth, skills, and economic development related projects, as well as delivering wider environmental and social ambitions of the Mayor.

Through this strong private-public partnership South Yorkshire speaks with a single voice to Government and other bodies such as Transport for the North and fellow MCAs and other LEPs across the rest of the UK. Supported by the additional investment The MCA / LEP are driving the right investment decisions to meet the region's economic, infrastructure and transport needs; developing more ambitious proposals to connect the key growth areas and places within the region, across the North and nationally; and working with our communities, partners, and businesses to grow an inclusive economy. The aim is to make the region a better place; providing access to quality homes, infrastructure, jobs and education opportunities.

This Digital 'Infrastructure' Strategy is part of, and covers, one of three key areas of activity critical to providing a strategic approach to addressing the digital agenda across South Yorkshire in an integrated way. The other areas are digital 'skills' and digital 'innovation and business support.' The strategies and actions for delivering them will be developed by the MCA over the next 12-18 months in liaison with partners and stakeholders, and together will form the three component parts of the holistic approach for driving digital innovation and inclusivity to deliver the Strategic Economic Plan's (SEP) digital ambitions.

Geography

This document and the statistics and targets therein are focused on South Yorkshire, reflecting the MCA and LEP geography.



Figure 1: South Yorkshire Geography comprising the four South Yorkshire local authorities' areas.

Local Enterprise Partnership

The SCR Local Enterprise Partnership (LEP) was formed in 2010 as a partnership of business and political leaders. It brings together 14 business leaders, the Mayor, nine local authority leaders, the Trades Union Congress and three co-opted individuals from the private sector. The role of the LEP is to champion the private sector in the region and support the Mayoral Combined Authority in making decisions. The LEP is responsible for producing the Strategic Economic Plan (SEP); which outlines the vision, aims and objectives for growing and transforming the South Yorkshire economy. The SEP also sets ambitious and measurable targets that will measure and determine success.

Mayoral Combined Authority

The Mayoral Combined Authority (MCA) is a formal membership of councils. Formed in 2014, the constituent members of the Mayoral Combined Authority are Sheffield, Rotherham, Barnsley and Doncaster councils. The councils of Bassetlaw, Chesterfield, North East Derbyshire, Derbyshire Dales and Bolsover are currently 'non-constituent' members. The MCA and Mayor help shape policy with the LEP and lead on decision-making for investment decisions to deliver the SEP ambitions and activities, including digital infrastructure investment.

Our Economy

The economy in South Yorkshire is not dominated by a single sector or type of industry. Instead there is a diverse base which focuses on advanced manufacturing and high-performance materials alongside a more diverse base including transport, logistics and business services; all benefitting from close links to two world-class Universities and a proactive public sector. Yet, within South Yorkshire productivity levels and wages are low, employment rates and entrepreneurship are below the national average, and growth is slow¹.

The Strategic Economic Plan (SEP) focusses on ways to improve this picture including taking advantage of those sectors which offer increased growth and productivity. The SEP sets out a clear expectation of how digital will contribute to these wider objectives and sets the ambition for the MCA to “..be recognised as one of the best-connected city regions in the country where coverage, choice, and speed of communication stays ahead of demand and where there is an abundance of multi-skilled, digitally mature individuals to cater for every industry’s business needs. Enhanced digital connectivity and skills enable people to use digital applications and solutions to improve their lives and to sustain, grow, and create new businesses”

South Yorkshire already has high levels of Superfast Broadband and 4G coverage and is on track to repeat this success with Gigabit Broadband and 5G. But geographic coverage will not be enough; there are a large number of people for whom the problem is not geographic availability but one of affordable access and having the right device and appropriate digital skills. The SEP sets out a very specific ambition for inclusivity to be designed into the digital strategy so that nobody risks exclusion from the digital economy and the region will have the skilled workforce it needs to support its economic ambitions.

The MCA and local authorities in South Yorkshire have been working with mobile operators over recent years to support commercial rollout, achieving 99% availability of 4G and now overlaying 5G capacity. 5G has many features specifically designed for the business market, with the potential to improve manufacturing processes and create more intelligent products and service. Consequently there is a

¹ Sheffield City Region – Economic Evidence Base (2019)
(<https://moderngov.sheffieldcityregion.org.uk/documents/s1423/Appendix%201.pdf>; Accessed: 13/01/2020)

significant opportunity in helping the manufacturing businesses of the region become early adopters of 5G.

With focussed investment and strong governance, South Yorkshire is well positioned not only to have market leading digital infrastructure, but also to be leaders in translating this new connectivity into better social and economic outcomes for the region.

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LEP BOARD CHAIR & MAYORAL FORWARD

EXECUTIVE SUMMARY

South Yorkshire is well positioned to rely on the market to deliver much of the Gigabit broadband and mobile coverage the region needs. We will encourage operators to invest in the region with consistent and supportive policies, but we will also access Central Government Gigabit investment to deliver for harder to reach areas and address the challenges of digital exclusion.

Through the Superfast South Yorkshire programme the MCA and local authorities have made high speed broadband available to 96% of the 650,000 properties in the region. 99% of properties have 4G coverage and, unlike broadband, has been delivered entirely by mobile operator commercial rollout (there is still more to do in rural areas though, where mobile coverage remains variable). The conditions are right for the same successful pattern to be repeated for Gigabit Broadband and for 5G (although mobile operators will still rely on 4G working in tandem with 5G for rural coverage, for example). Multiple operators have begun fibre builds in the region including CityFibre, Openreach and Virgin-Media, but the most important contribution to South Yorkshire's Gigabit future is likely to come from the upgrade of Virgin-Media's existing cable TV network to support Gigabit speeds. Virgin-Media has a significant footprint in South Yorkshire, so could potentially cover over 50% of the region's premises.

The MCAs role is an enabling one, and along with local authority partners will be to make it easy for operators to build their networks by adopting consistent 'Barrier Busting' policies and opening up public sector sites and assets where they can enhance digital infrastructure provision. As part of the MCAs 'Intelligence Hub' we will also seek to ensure that we have up-to-date accurate data on digital infrastructure provision, gaps, and roll-out plans to inform future policy and investment decisions.

At the same time, the Government is making funding for connectivity in rural areas available through its Gigabit Britain programme and there are other supportive projects such as connecting rural GP surgeries. The MCA will seek to access these funds to close coverage gaps, using the 'granular' insight developed through this Strategy review.

Tackling digital poverty and ensuring we have a digitally skilled workforce demands innovation and is an opportunity for South Yorkshire to set the national benchmark

Whilst South Yorkshire is on course to have high levels of Gigabit Broadband availability, proximity to broadband is meaningless unless steps are taken to address the three components of digital poverty; the affordability of connectivity, access to a suitable device and having the skills to use them. The path to decent affordable broadband for low-income groups is clouded by deliberate obfuscation of the scale of the problem – not least by telecoms operators. There is a national leadership role for the MCA in driving towards new inclusive broadband models and new digital service delivery models.

5G fills in the enterprise capability gaps left out by 4G, so whilst its Gigabit speed capability is being marketing to consumers, the real opportunity is the business market which is where the MCA will focus.

5G features bring additional security, reliability, ultra-low latency and scale 'machine to machine' capability that makes it an ideal technology for manufacturing, machine and vehicle control and health tech applications. The MCA will seek to boost 5G enterprise innovation and encourage 5G adoption by the regions strong industrial base.

There is interest across the region in the potential of the Internet of Things (IOT).

Sheffield City Council already has a smart city demonstrator, and the other South Yorkshire Authorities are considering IOT applications as diverse as flood management and road gritting. The private sector

is also interested in IOT and there would be benefit in the MCA working collaboratively with these key stakeholders to enable a South Yorkshire IOT network that could also be opened-up to innovative start-ups who are increasingly attracted by the region's growing digital capabilities.

The lack of local data centre capability is not critical today but will become a consideration as more companies close their own data centres in favour of cloud offerings and proximity to data centres becomes an important factor.

'Edge' data centres are smaller and cheaper than the traditional 'hanger' data centres and take data processing and content closer to where data is created and consumed, which will become increasingly important as 5G drives the need for low latency delays and scales data traffic volumes. The MCA should seek to increase local data centre capability, exploring the potential of edge data centres at key innovation locations in the region.

'Lighthouse' projects will play a key role to anchor innovation.

The foundations of a strong digital infrastructure are being put in place in South Yorkshire and equal attention must now be paid to what the region will do with its renewed digital infrastructure. The prospects for South Yorkshire are very promising. The connectivity layer interventions being proposed in this Strategy (across broadband, 5G, IOT and data centres) will drive improvements in digital connectivity across the region, so should be noticeable for residents and businesses wherever they are. However, the impacts of the Strategy will be really brought to life in a series of 'lighthouse' projects which are aligned to growth and regeneration priorities set out in the SEP. Whilst this Strategy focusses on the strategic imperatives and the resulting policy framework, the digital infrastructure agenda and industry moves at pace and so it will be important to bring forward potential projects and programmes quickly that help meet the Strategy's objectives as outlined in the 'Delivery of the Strategy' section.

Delivery of the digital strategy will be a complex task.

As well as delivering interventions and taking 'lighthouse' projects from business case to delivery, there would be benefits in the MCA providing strategic leadership and sponsorship in enabling progress on everything from process alignment and presenting consistent 'barrier busting' approaches to the operators, to preparing South Yorkshire wide responses to funding calls (and ideally planning ahead to create a library of 'off the shelf' proposals). This is more than a basic governance task and would require the MCA to have the tools to deliver a digital agenda which cuts across multiple agendas.

It is noted that the 2018 Sheffield City Region Digital Action Plan had not been progressed in a coherent way and that there was little, or no evidence of formal governance being applied. There is a risk that without effective governance this much broader South Yorkshire Digital Infrastructure Strategy will similarly not be implemented effectively. The 'to do' list for governance, delivery and advocacy is significant and challenging, with a strong case for a centralised strategic digital function. A 'Chief Digital Officer' model has proven successful for a number of Authorities and is an option for consideration.

The speed of change in the Digital Sector requires an acceleration of decision making and intervention.

Covid-19 significantly changed the underlying assumptions and ambitions for the Digital Infrastructure Strategy. Whilst Covid-19 acted as an unprecedented accelerant to the pace of movement in fibre broadband (now Gigabit Capable) and the deployment and application of 5G, the framework of Central Government enabling policies has also moved on dramatically and would have done so without Covid-19. Issues like data centres were not on the agenda in 2019 but are now. The digital environment is changing quickly and with urgent central action these imperatives will still need to be addressed. A risk is that the four Authorities will continue to react individually, missing the opportunities for collective action and acting at scale. So immediate and empowered action is required now.

We believe South Yorkshire is well positioned to rely on the market to deliver the Gigabit broadband and mobile coverage the region needs supported by our enabling interventions set out in this Strategy. We will leverage Central Government Gigabit investments to connect ‘hard to reach’ premises across our region to ensure nobody is left behind.

5G provides opportunities for a differentiated approach that is supportive of the MCA’s manufacturing community. A closure of the data centre gap and judicious rebranding of the digital sector with important clusters around the Sheffield ring road, Barnsley’s Digital Media Centre and other areas will bring structure to the growth ambition for this important area of the economy.

Digital poverty is a poorly understood national challenge that the MCA should seek to provide leadership in. With targeted investment and focussed governance, the MCA could become a digital leader with an adventurous programme firmly connected to better outcomes for the people and businesses of South Yorkshire.



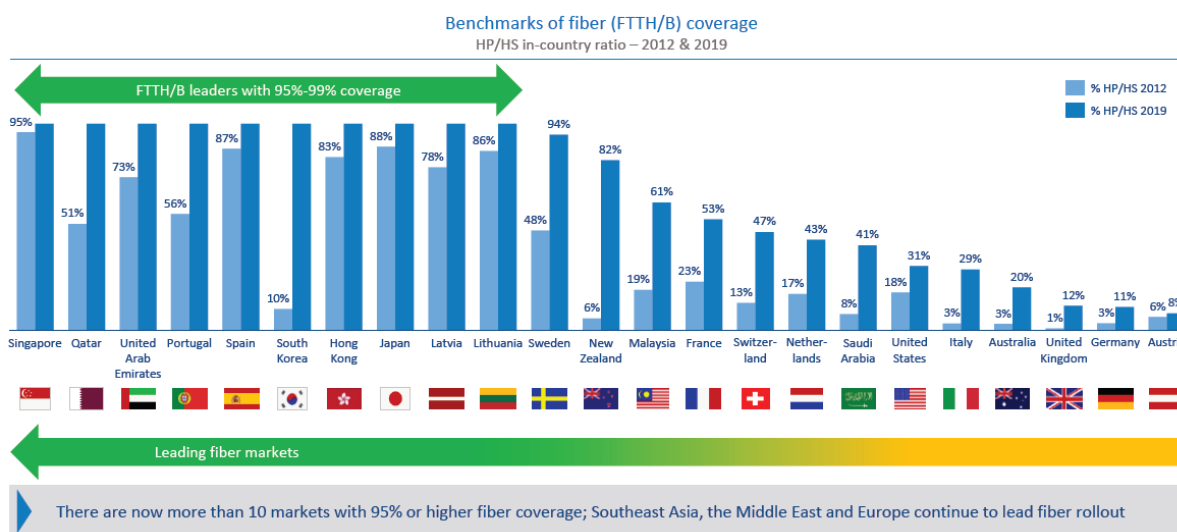
Figure 2: Summary of policy and targets

INTRODUCTION

International Context

The UK Government is pushing hard to reverse the perception that the UK is a laggard in the deployment of digital infrastructure. As recently as 2019, the OECD found that the UK was ranked only 35th out of 37 countries in the fibre broadband league table. The Government is also seeking to ensure that the similarly poor performance in 4G rollout is not repeated with 5G.

Figure 2: FTTH/B households passed



Source: Arthur D. Little, FTTH Council Europe, MENA, Asia-Pacific, regulator reports, Discussions with individual telcos, ADL past case work
HS – Households in the country, HP – Households passed by FTTH/B, HC – Households connected by FTTH/B

Figure 3: The UK relative to other national 'full fibre' performance (source: AD.Little)

Figure 3 above shows the extent to which the UK (and other notable major economies) lag behind the top ten 'full fibre' nations. It also shows that there is an argument that the comparison is not necessarily a fair one to make. Part of the reason why the UK (and Germany) lagged in full fibre is that the country had invested some £1.9Bn in public funding and had led the field in the rollout of Superfast Broadband, with over 96% of premises able to enjoy broadband speeds of 30Mbps+; a highly capable service that still meets most of today's residential requirements. Some Countries like Singapore (and Hong Kong – now part of China) have geographic advantages that favour rapid technology deployment; they are small and have highly concentrated population centres. South Korea likewise is very mountainous resulting in high levels of urban population concentration. Spain has a much higher propensity than the UK for apartment living, and it is faster and cheaper to connect a multi-dwelling unit (MDU) than individual properties. Regardless of the reasons for the performance gap the gap is significant, and the UK has much to do to catch up with the leading fibre nations.

National Context

The Government has seized on the narrative provided by the fibre industry and has also rightly recognised the wider industrial potential of 5G to galvanise a dual ambition to close the fibre gap and for the UK be a leader in 5G.

Led by the Department of Culture, Media and Sport (DCMS), Government has done much to create a positive investment climate for fibre operators, providing over £190M of funding via programmes such as 'Local Full Fibre Network.' 5G has seen a similar range of stimulus interventions, with £200M being invested in trials and testbeds across the country. DCMS created a 'Barrier Busting' team to address

the many problems that cause delays and drive costs for operators, as well as mandating Gigabit connectivity for all new developments from 2018.

In 2016, after continued pressure from the industry regulator Ofcom, BT agreed to open up access to the duct and pole infrastructure belonging to its Openreach subsidiary. This was a huge step forward for the alternative network operators ('Altnets') such as CityFibre, who could now make use of BT's existing infrastructure rather than face the cost and delays of building their own ducting. Whilst the process was difficult to use to start with, it has gradually been refined to a point where 'PIA²' now accounts for a significant part of altnet rollout plans.

BROADBAND TYPE	TYPICAL PERFORMANCE	DESCRIPTION
Full Fibre broadband	1 Gbit/s	Known variously as:- Full Fibre Fibre to the Premise (FTTP) Fibre to the Home (FTTH)
Ultrafast broadband	100Mbit/s – 360Mbit/s	Typically cable delivered services from Virgin-Media who also offer higher speed 'full fibre' services
Superfast broadband	Whilst Ofcom have a single Superfast Broadband category, for the purpose of this report we also use the following sub-divisions to provide more granular insight: 'Good' Superfast 30Mbit/s - 100Mbit/s 'Basic' Superfast 10 Mbit/s – 30 Mbit/s	Fibre to the Cabinet (FTTC) as provided by Openreach and their reseller Service Providers
Decent broadband	c10 Mbit/s	usually older 'DSL' services)

Figure 4: Broadband Taxonomy

Also worthy of note were the changes to operator Code Powers in 2017, which were designed to make it easier for operators to access sites they needed to build their networks and to make it more affordable. Whilst landlords (including the public sector) have understandably resisted these changes which are removing a lucrative and in some cases important revenue stream, rooftop and other site rentals are beginning to drop, from tens of thousands of Pounds to the hundreds for a city centre rooftop site.

The positive environment the Government has sought to create, and the driver of a 'generational shift' in technology (copper to fibre, 4G to 5G) is reflected in the £5.7Bn that operators invested in their networks during 2019³.

In its 2018 Future Telecoms Infrastructure Review⁴ the Government set out an objective of achieving full-fibre broadband coverage by 2033, with 50% to be covered by 2025. During the 2019 election campaign Boris Johnson called the 2033 target "laughably unambitious" and called for the advancement of the timetable by a full eight years. Despite some misgivings from the telecoms industry itself, the Johnson Government put its weight behind full fibre and the 2020 Budget Statement published in March of that year confirmed the Government's intention to release £5Bn of funding for fibre to 'hard to reach' rural areas. A further £1Bn (half coming from the UK's mobile operators) was made available to extend geographic coverage of 4G to 95% of the UK by 2025, encouraging operators to share existing rural sites and creating the Shared Rural Network to fill in remaining coverage gaps with new shared infrastructure.

² Passive Infrastructure Access (PIA) is the process defining how third-party operators can access Openreach duct and pole infrastructure.

³ Source: Ofcom Connected Nations Report 2020 published 17th December 2020

⁴ Produced by Department of Culture Media and Sport

From an informed local authority perspective, the emphasis has gradually shifted from seeking to participate directly in the telecoms value chain (i.e. deriving rental revenues from rooftop assets or creating a telecoms Joint Venture) to performing an enabling role to capitalise on fibre and mobile operator investment in new networks and to seek indirect social and economic benefit from the resulting infrastructure.

However, by November 2020 and after eight months of the Covid-19 pandemic, the Government reconsidered its full fibre vision objective. The new target was set out in the much-delayed National Infrastructure Strategy⁵ :-

*“The government is working with industry to target a minimum of 85% gigabit capable coverage by 2025 **but** will seek to accelerate roll-out further to get as close to 100% as possible. The government will continue to implement an ambitious programme of work to remove barriers to broadband deployment and maximise coverage in the hardest to reach areas of the country.”*

Whilst the headline target reduction from 100% to 85% grabs the attention, the subtle shift from ‘full fibre’ to ‘Gigabit-Capable’ broadband is a much more significant (albeit it very rational) move of the goalposts. Whilst ‘full fibre’ effectively specified that only ‘fibre-delivered’ broadband would qualify for the target, the new definition opened the door to including any technology that could deliver the required Gigabit performance; so upgraded cable TV networks and 5G wireless could now both count towards the 85% target. Given that Virgin-Media are in the middle of upgrading their extensive national network to be Gigabit-capable (to be completed by 2024), the implications are obvious. Instead of starting from a baseline of 18% full fibre coverage⁶, with over 44% of UK homes having access to the Virgin-Media network, the reset will deliver over half of the new 85% national target when Virgin’s upgrade is complete. This figure that will be more like 60% in those urban areas with a strong Virgin Media presence.

Mobile operators have been pushing ahead with their commercial 5G network rollout, with c3,000⁷ of their radio sites upgraded as of September 2020. As with previous generations of mobile technology, the initial build has been focussed in urban areas where customer demand is greatest, in part to relieve pressure on 3G and 4G networks by providing additional capacity where its most needed. The need to remove existing Huawei equipment and to find alternative 5G suppliers has added some complexity, cost and delay to 5G. Whilst 5G coverage will gradually expand, as with preceding generations of technology, it is designed to work in combination with 4G (‘carrier aggregation’ in operator speak) which will remain the primary coverage offering from operators for many years to come. The Shared Rural Network being funded by Government and mobile operators to take *geographic* coverage up to 95% is exclusively using 4G technology, 5G will largely be focussed in urban areas where its unique capabilities will be put to best effect.

It is worth noting that the Government’s digital infrastructure targets have almost exclusively been defined in terms of geographic coverage; Local Full Fibre Network was primarily aimed at closing urban coverage gaps and the current DCMS ‘Project Gigabit’ programme is attempting to do the same for ‘hard to reach’ rural areas. But universal geographic coverage cannot overcome the challenges of digital poverty where affordability, the lack of affordable broadband, access to an appropriate device and the prerequisite digital skills can be just as significant barriers for those affected.

The pandemic reinforced the importance of digital connectivity, enabling 46% of the UK workforce to work exclusively from home during lockdown. The Royal College of General Practitioners reported that face to face consultations had dropped from 75% pre-pandemic to only 25% by July 2020 presenting

⁵ <https://www.gov.uk/government/publications/national-infrastructure-strategy>

⁶ Source: Ofcom Connected Nations Report December 2020

⁷ Source: information provided to Ofcom by the MNOs in September 2020 for Connected Nations report

an opportunity and requirement for digital technology to enable health services to continue to be provided virtually to fill this accessibility gap.

The switch to online lessons allowed education to continue for pupils from schools that had invested in technology and parents who could provide broadband, devices and oversight for their offspring. Many were not so fortunate as according to the Children's Commissioner 9% of families do not have access to a PC or tablet. A £100M fund provided by Government only managed to provide devices to 37% of the 540,000 children eligible for the fund. Covid-19 therefore created a landscape of behaviours that could and should be locked in for the future but has also starkly illuminated the digital divide that existed before the pandemic and highlighted inequalities that demand attention.

Local Context

The Strategic Economic Plan (SEP) considers the total economic impact of full fibre and 5G to potentially be as high as £2.8Bn over the next fifteen years and has set out a clear digital ambition for the region and how this benefit is to be realised; *'Sheffield City Region [South Yorkshire] will be recognised as one of the best-connected city regions in the country where coverage, choice, and speed of communication stays ahead of demand and where there is an abundance of multi-skilled, digitally mature individuals to cater for every industry's business needs. Enhanced digital connectivity and skills enable people to use digital applications and solutions to improve their lives and to sustain, grow, and create new businesses.'*

The SEP identifies five key intervention areas:

- Creating the enabling conditions for a digital future through the accelerated roll-out of full fibre and 5G across South Yorkshire and supporting 'SMART cities' interventions.
- Ensuring South Yorkshire is an attractive place to invest in the digital sector and encouraging the private and public sector to adopt cutting edge digital technology and innovate.
- Maximising digital's contribution to economic growth by nurturing commercial and entrepreneurial successes and increasing businesses' digital capability, adoption and access.
- Boosting digital skills development by connecting talent with employers, connecting the digital community and maximising opportunities from digital skills development programmes.
- Focus on digital skills and collaboration to support individuals and organisations in tackling digital inequalities.

South Yorkshire's Digital Infrastructure Strategy will build to this vision and will be built on the strong foundations to seek to enable Gigabit Broadband and 5G whilst at the same time seeking to leverage the infrastructure for better social and economic outcomes for the region:

- Superfast South Yorkshire has delivered an excellent foundation of 96%+ availability of 30Mbps 'Fibre to the Cabinet' broadband.
- Fibre build by CityFibre is in progress and Openreach have committed to fibre upgrade more of its exchange areas by 2024. Virgin are upgrading their cable network to fibre speeds and operators new to the region are indicating a willingness to invest.
- DCMS have indicated that they will fund fibre investments in at least two areas of the Region as part of their 'Project Gigabit' rural fibre programme.
- Ofcom report near 99% availability of 4G and there are already all four operators supporting 5G in Sheffield and are on track for regional 5G coverage to be in line with other major conurbations.
- There are significant clusters of digital businesses in Sheffield and beyond, and the success of Barnsley's Digital Media Centre (DMC) points to the digital potential of the region. Innovation clusters such as Advanced Manufacturing Innovation District (AMID) are well positioned to exploit the enterprise features that are key to 5G.

Purpose and Scope of the Digital Infrastructure Strategy

Whilst this Strategy is focussed on digital infrastructure (referred to as 'hard' infrastructure in the SEP), the purpose is very much to reflect on the enabling capability of digital because, ultimately, coverage is an enabling metric and what is more important is that the people and businesses of South Yorkshire can benefit from that coverage.

This Digital 'Infrastructure' Strategy is part of, and covers, one of three key areas of activity critical to providing a strategic approach to addressing the digital agenda across South Yorkshire in an integrated way. The other areas are digital 'skills' and digital 'innovation and business support.' The strategies and actions for delivering them will be developed by the MCA over the next 12-18 months in liaison with partners and stakeholders, and together will form the three component parts of the holistic approach for driving digital innovation and inclusivity to deliver the SEPs digital ambitions.

The telecoms market rarely stands still and even by its own dynamic standards the confluence of the rollout of fibre and the beginning of the 5G era is creating huge change dynamics, and commensurate opportunities and risks. The Strategy frames the policy interventions that will deliver the first part of the SEP's digital ambition.

Having set out the policy framework for how to ensure the 'hard' Gigabit Broadband and 5G infrastructure is put in place by leveraging the natural momentum of fibre and 5G investment, the Strategy also provides policy guidance on how to maximise the benefits of these new connectivity layers for the social and economic benefit of the region.

The Strategy highlights the areas where the MCA could have the greatest impact, which include the SEP Growth Areas and Innovation Clusters. Providing the leadership to enable our regional manufacturers to benefit from the early adoption of 5G and in the exploration of new ways to build our digital skills base and tackle digital poverty head on. There are also times when we will need our partners to take the lead and the MCA will provide a supporting role, for example by creating the consistent 'barrier busting' policy environment that will make it easy for telecoms operators to build.

The strategy's 'place' priorities will also be embedded in related strategic approaches such as the Economic Blueprints being prepared with partners for each of the SEP Growth Areas.

There will inevitably be complexity in building and leveraging this new digital infrastructure. The resulting programme will require close collaboration with our local, regional, and national partners and particularly focussed and informed approach to Governance. We will need to make more effective use of data to inform the associated decision making and prioritisation. The Strategy recommends the required changes so that South Yorkshire's digital infrastructure will play its full part in turning the SEP digital ambitions into reality.

VISION AND GOALS

Vision

For South Yorkshire to have:

A Gigabit digital infrastructure that accelerates new social and economic possibilities for all the people and businesses of South Yorkshire

Goals

1. Ensure South Yorkshire's superfast broadband and 4G success is repeated for Gigabit broadband and 5G.
2. Support the social and economic priorities set out in the SEP.
3. Form an inclusive platform that enables better outcomes for all sections of society.
4. Be supported by the Governance and data-driven approach needed to maximise the digital potential of South Yorkshire.
5. Position South Yorkshire as a leading centre of *applied* digital innovation and adoption.

The evidence supporting the Vision and these Goals is given in the following sections.

GIGABIT CAPABLE BROADBAND – EVIDENCE

South Yorkshire has near ubiquitous access to high-speed broadband services.

In its Connected Nations report of Spring 2020, Ofcom provided national data for broadband availability and a breakdown to Authority level. Table 1 below summarises the data for the four authority areas in South Yorkshire and contrasts with the aggregate data for England (which is typically slightly higher than the combined UK data which factors in Wales and Scotland).

	All Premises	All Matched Premises	SFBB availability (% premises)	UFBB availability (% premises)	Full Fibre availability (% premises)	% of premises unable to receive 2Mbit/s	% of premises unable to receive 5Mbit/s	% of premises unable to receive 10Mbit/s	% of premises unable to receive 30Mbit/s	% of premises below the USO	% of premises with NGA	% of premises able to receive decent broadband from FWA	% of premises able to receive SFBB from FWA
BARNSELY	117029	116965	98	61.6	19.9	0.1	0.3	0.4	2	0.5	99.3	0	0
DONCASTER	145903	145805	96.8	45.5	9.2	0.1	0.4	0.7	3.1	0.9	98.7	14.7	13.9
ROTHERHAM	123995	123883	98.2	58.5	8.3	0	0.3	0.6	1.7	0.7	99.3	0.4	0.2
SHEFFIELD	271375	271143	95	44.9	3.1	0	0.1	0.5	5	0.8	96.1	0	0
SOUTH YORKSHIRE	658302	657796	96.5	50.6	8.4	0	0.2	0.5	3.4	0.7	97.8	3.3	3.1
ENGLAND			96	59	13								

Source: Ofcom Connected Nations Spring 2020

Table 1: Broadband coverage and performance in South Yorkshire

The Superfast South Yorkshire (SFSY) programme has performed well but as with the rest of the country, there remain areas where broadband services still fail to meet expectations.

96% availability of Superfast Broadband reflects positively on the efforts of Superfast South Yorkshire (SFSY) in driving the delivery of two BDUK contracts with Openreach, which saw a combined £40.1M of public and private sector funding invested in the region. But as shown in figures 5 and 6 there are still parts of the region where broadband speeds are still poor by today's standards, with users still struggling to get 30Mbit/s or even 10Mbit/s broadband.

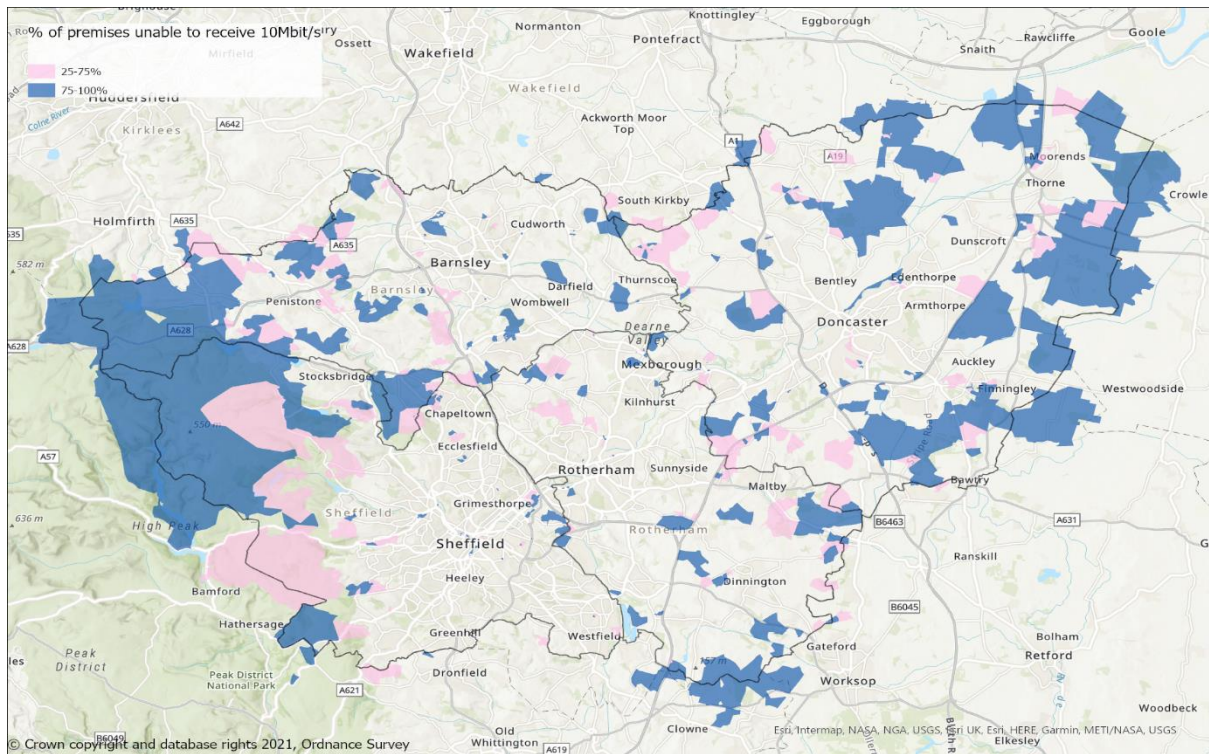


Figure 5: Areas currently unable to get 10Mbit/s broadband (Source: Arcadis analysis)

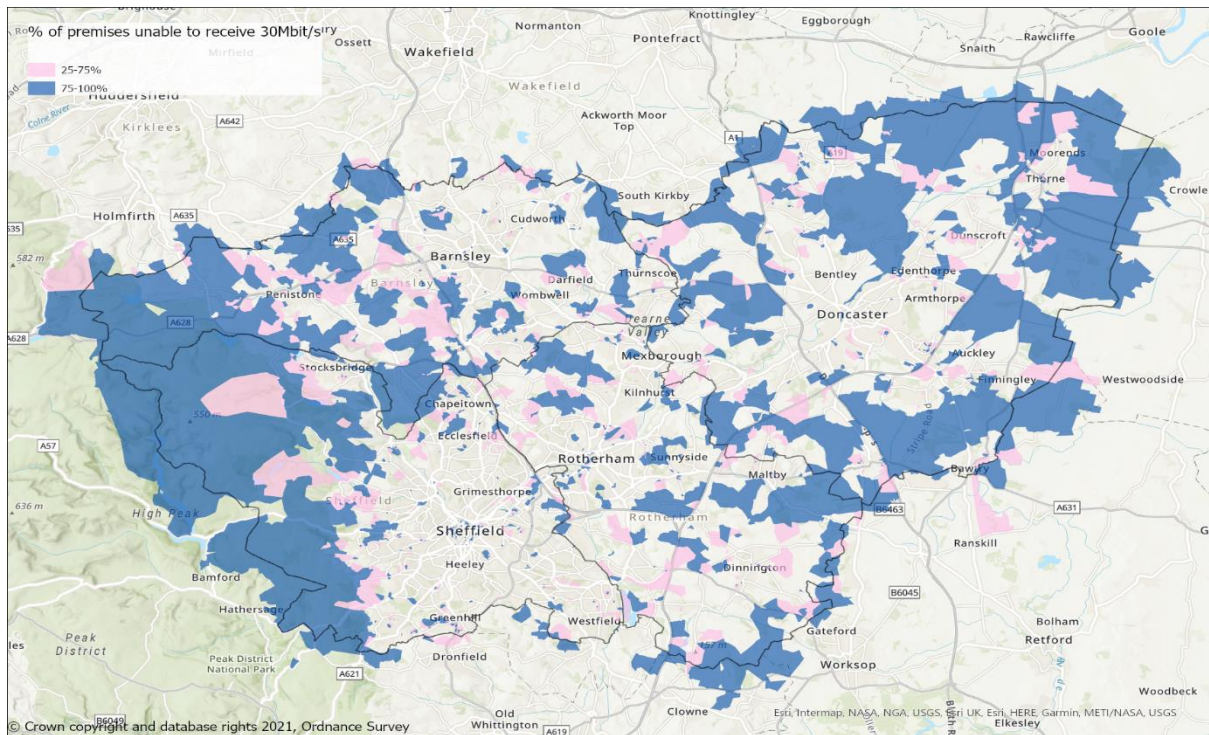


Figure 6: Areas currently unable to get 30Mbit/s broadband (Source: Arcadis analysis)

The 'full -fibre' coverage is currently only at c4% and would require significant investment from the public and private sector to get anywhere near the 96% availability benchmark that was set for Superfast Broadband.

Full fibre availability across South Yorkshire only covers around 4% of the region compared to 15% nationally, although CityFibre is now active in the four urban centres and Openreach have committed to fibre upgrades to nine exchange areas in the region. Figure 7 shows the limitation of current full fibre build in the region.

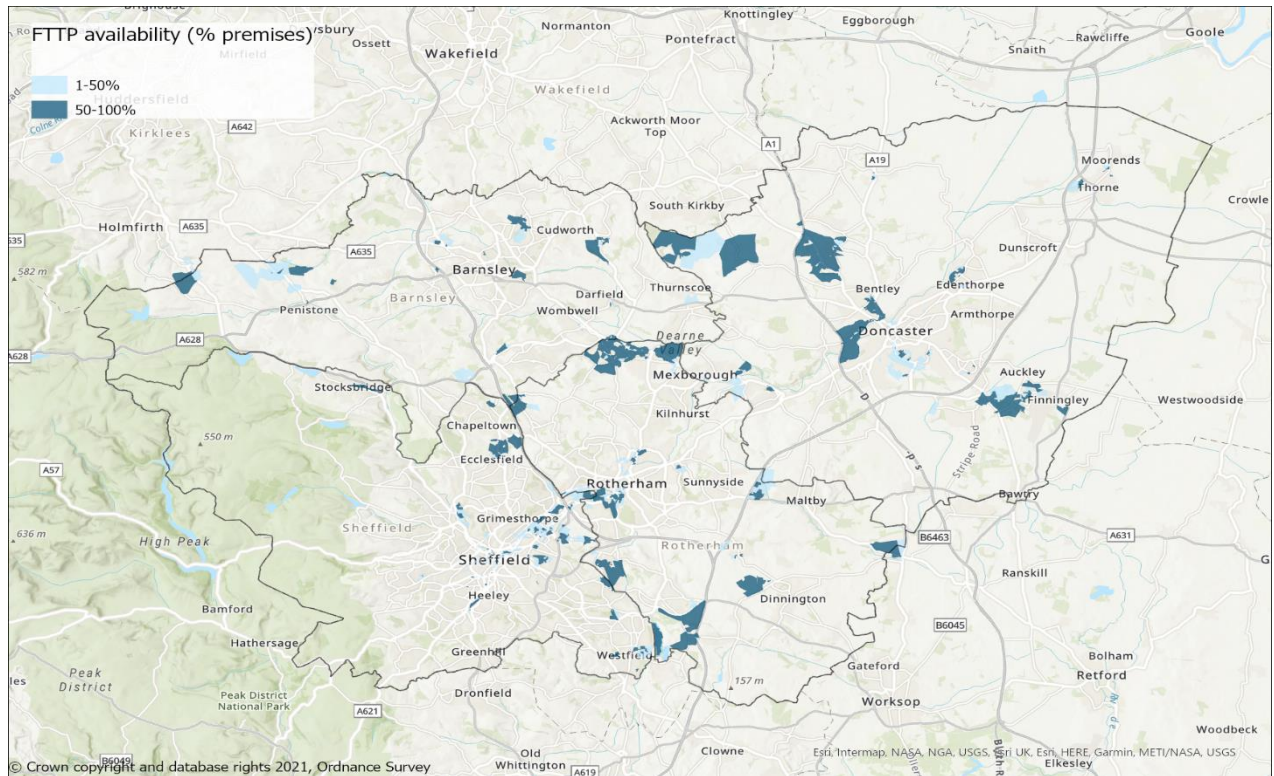


Figure 7: Only c4% of premises in South Yorkshire have 'full-fibre' access today, although with the Government now shifting focus to 'performance rather than technology, Virgin-Media's upgraded cable network will boost this number significantly.

Virgin Media already have a significant Ultrafast footprint in the Region which is in the process of being upgraded to Gigabit speed⁸. So will mean South Yorkshire has a much-enhanced gigabit capability once the upgrades are complete.

Virgin-Media are in the process of a national upgrade of their cable TV network to the DOCSIS 3.1 standard which should be completed by the end of 2024. Virgin have tested their upgraded network to speeds of over 2 Gbit/s but will initially offer 1 Gbit/s services.

Given Virgin-Media's extensive urban footprint in South Yorkshire (see figure 8) the company will become a major contributor to the SEP's gigabit-speed ambitions. Virgin also have a 'full fibre' network build programme (Project Lightning) that is rolling out fibre-optic broadband in areas not already covered by its cable TV network. South Yorkshire has some 'Lightning' activity although Virgin have not released detailed information yet.

⁸ Openreach also started to roll out its own 'Gfast' Ultrafast broadband in Barnsley and Sheffield from 2018 before eventually dropping it in favour of full-fibre. Openreach have stated that because of the recent investment in GFast, these areas are not likely to be prioritised for full-fibre upgrade.

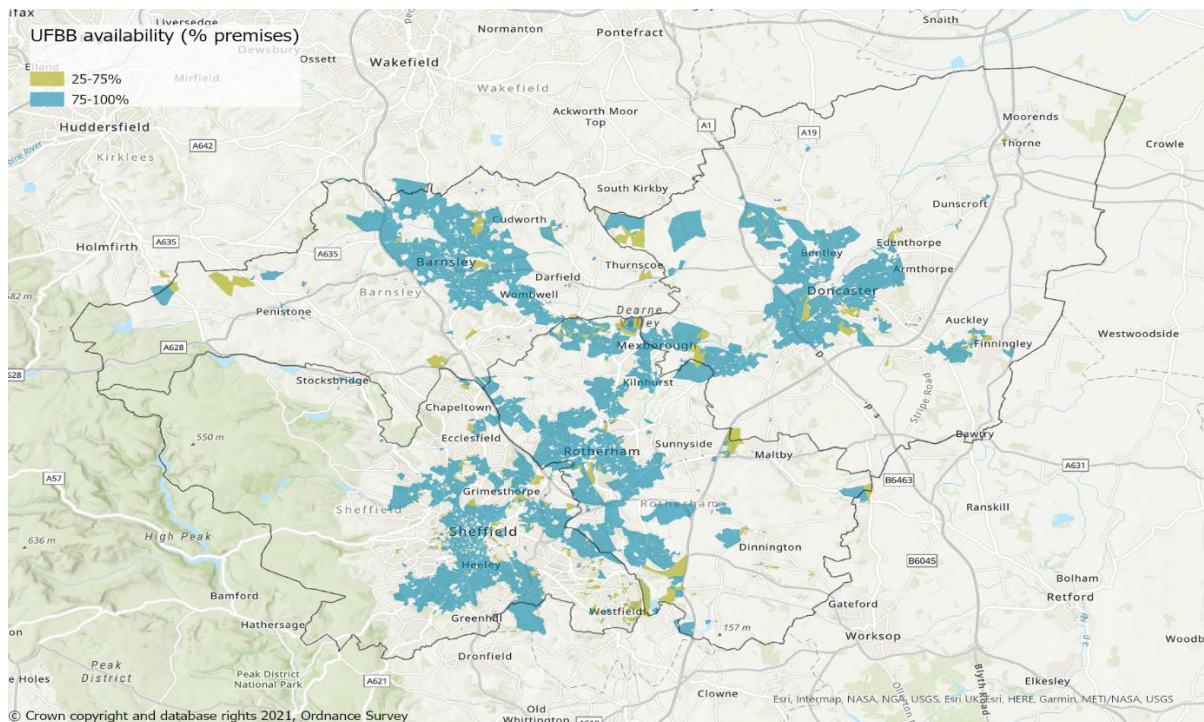


Figure 8: Ultrafast Broadband coverage in South Yorkshire. Whilst a small amount of this is Openreach GFast, the bulk is Virgin-Media cable TV footprint which is in the process of being upgraded to support Gigabit speeds.

CityFibre and Openreach are also currently adding to full fibre availability in the Region with Cityfibre active in the four urban centres and BT committed to nine exchange areas in South Yorkshire by 2024

Figure 9 shows Openreach's committed fibre exchange upgrade across South Yorkshire overlayed on the largely Virgin 'Ultrafast' Broadband which will be upgraded to fibre-like Gigabit speeds by 2024. This starts to give a picture of the currently emerging gigabit future of the region, with the challenge areas with sub-30Mbit/s and even 10 Mbit/s to the West and Eastern edges ('% of premises unable to receive 30Mbit/s') clearly visible.

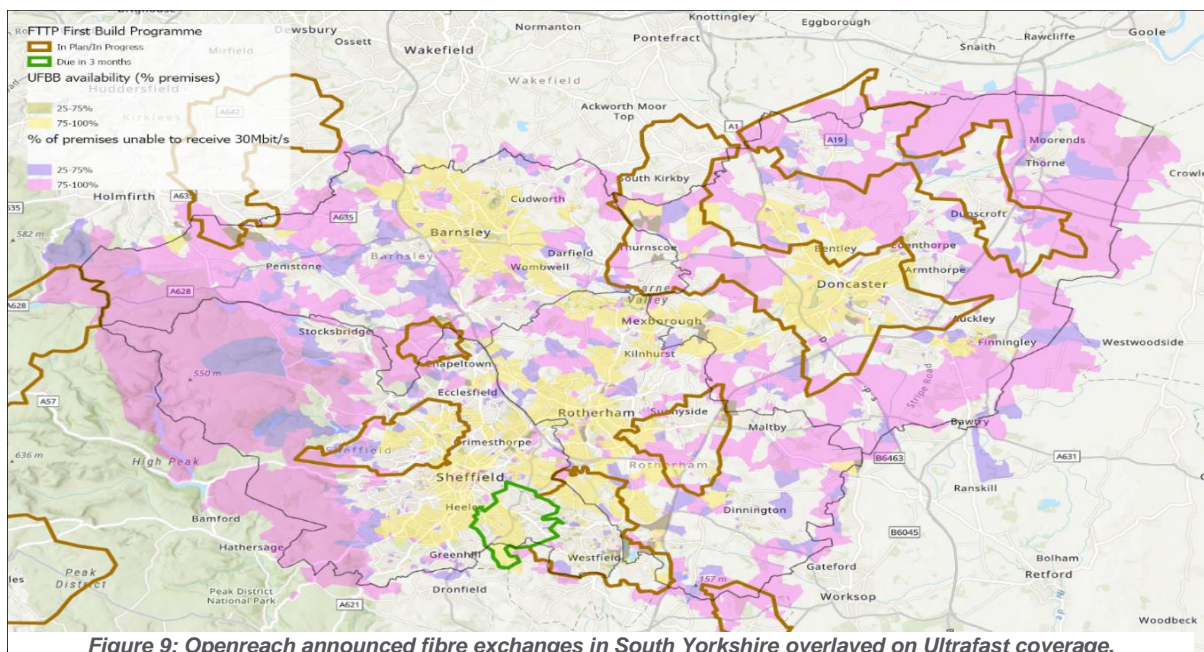


Figure 9: Openreach announced fibre exchanges in South Yorkshire overlayed on Ultrafast coverage.

The DCMS 'Project Gigabit' rural fibre programme will also contribute to South Yorkshire's Gigabit Capable footprint and a new 'Rural Gigabit Connectivity voucher scheme should go live in April 2021 releasing 'over £250M'⁹ for further targeted intervention.

DCMS have identified areas nationally where it considers there to be no viable commercial case for fibre deployment and has devised the 'Project Gigabit' programme to provide subsidies to interested fibre operators selected through a procurement process to provide gigabit capable connectivity in these areas of market failure. The procurement phase is due to commence in Spring 2021 with actual construction forecast to begin at the end of 2021 or early 2022. The average subsidy is expected to be in the region of £1,000 per premise passed. 'Large' and 'small' procurement areas have been identified, with the large ones more likely to attract large scale fibre operators like Openreach and CityFibre whilst smaller procurements are designed to attract smaller operators and new entrants who may be better able to tailor a more bespoke solutions to the specific needs of a locality.

The expected replacement for the Rural Gigabit Connectivity voucher scheme which ended in March 2021 has also been announced, although the speculated £250M investment in the new scheme has yet to be confirmed. The new scheme is expected to run concurrently with the old scheme it replaces which offered up to £3,500 to small businesses and £1,500 for residential users to fund a Gigabit speed connection, and vouchers could be pooled to attract operator interest.

Figure 10 below shows the large and small procurement area in South Yorkshire. DCMS are also consulting on two procurement areas in South Yorkshire. The colours are used by DCMS to illustrate separate but adjacent procurements, so the Penistone area and the Maltby – Tickhill – Bawtry area are part of a single proposed 'large' procurement area, whilst the Lowedges area South of Sheffield is a standalone 'small' procurement.

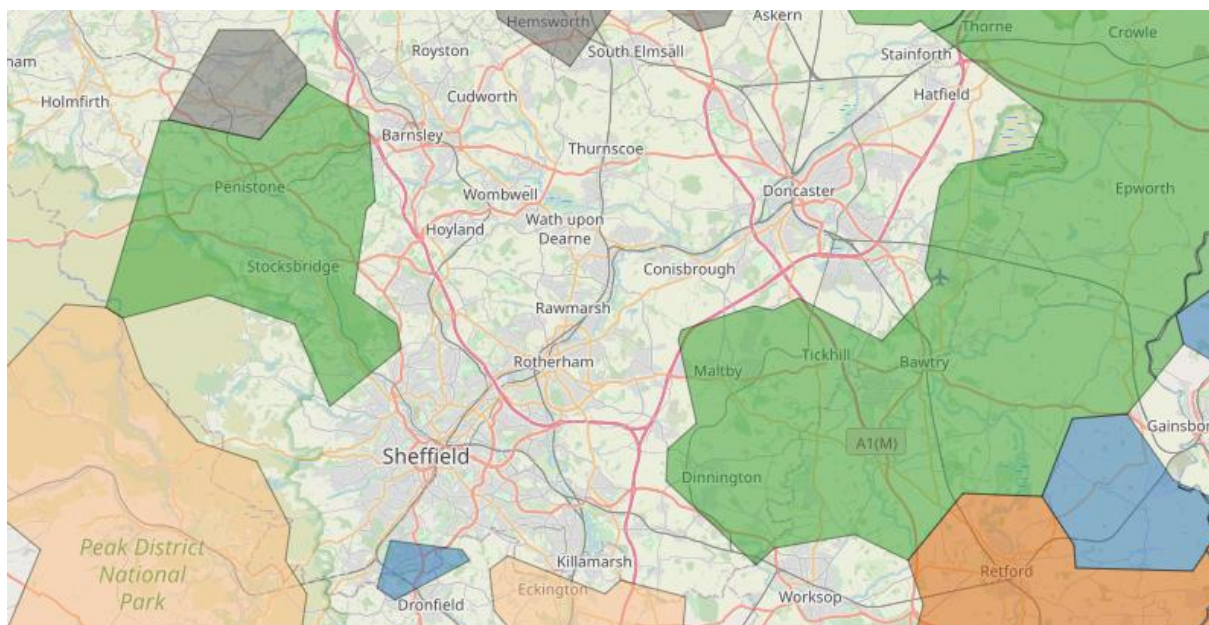


Figure 10: Proposed DCMS 'Project Gigabit' rural fibre procurements aimed at fibre connecting hard to reach locations across the UK

⁹ This figure has not yet been confirmed and was a notable omission from the 3rd March budget statement

By supporting all active Gigabit operators with enabling 'Barrier Busting' policies South Yorkshire should expect to achieve Gigabit availability of over 75% by 2025 (and set itself an even more ambitious target)

There is real momentum in the fibre and gigabit-capable broadband market in South Yorkshire and the task of the MCA will be to ensure that consistent and supportive policies are in place and that public sector assets such as ducting and other site assets are made available to accelerate build :-

- + Virgin-Media will complete upgrades to its existing cable network to run at higher Gigabit speeds by 2024 and is also carrying out new 'full fibre' Project Lightning FTTP build in the Region.
- + Openreach have committed to fibre upgrade a number of its exchange areas in South Yorkshire.
- + CityFibre is actively building in the four urban centres.
- + 'Carrier' operators like Zayo and SSE Telecoms (who typically sell wholesale service to other operators - both have national and international fibres running through the region.)
- + Other new commercial entrants have expressed interest in fibre build in South Yorkshire.
- + Government interventions in poorly served areas (DCMS's 'Project Gigabit' rural fibre and voucher schemes, for example.)

Figure 11 shows the consolidated impact of the combined publicly announced activities by the operators listed above, so is a reasonable representation of what Gigabit coverage in the region might look like in or shortly after 2025.

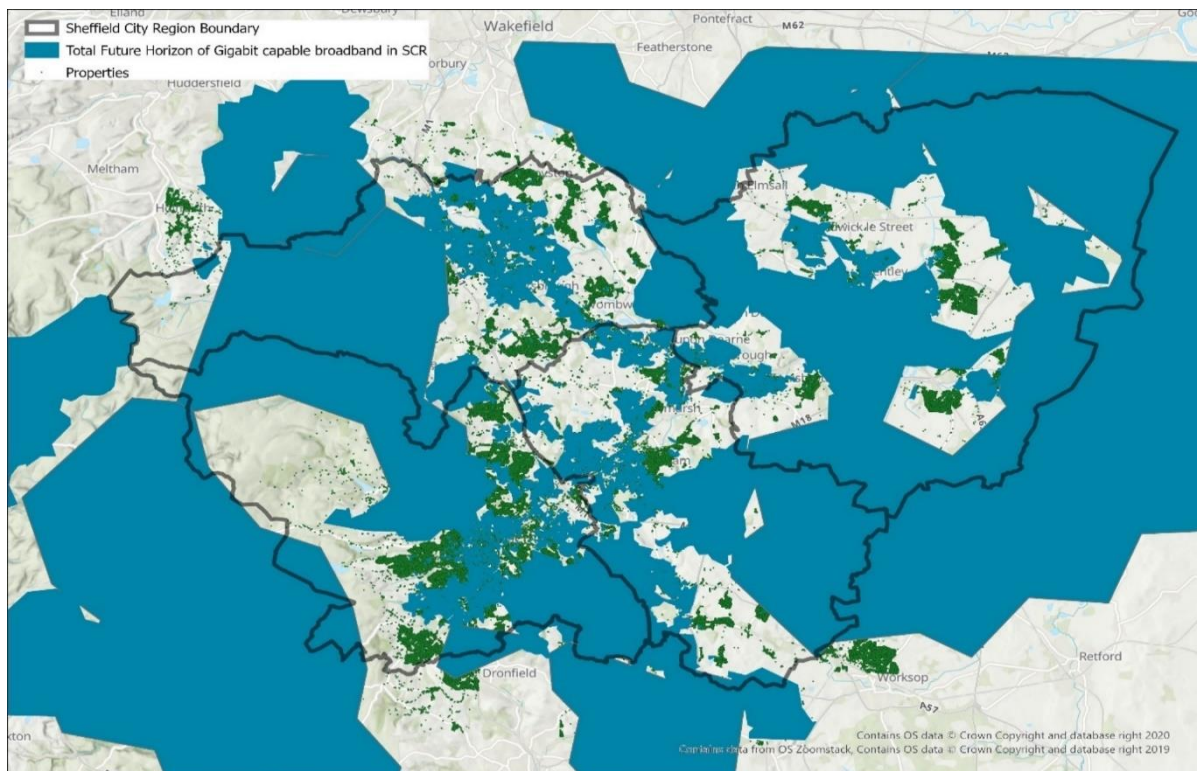


Figure 11: Estimated combined Gigabit-Capable broadband footprint in South Yorkshire by 2025 and properties where further commercial expansion and voucher interventions will be necessary.

So, just based on publicly committed activities, there will be an estimated 160,000 of the total c650,000 premises in South Yorkshire that are not covered by these known interventions. However, it is likely that many of these premises that are in clusters close to committed fibre build areas will be attractive adjacent build opportunities for fibre operators. This assumption is borne out by the data released by DCMS identifying areas where no further state intervention is deemed necessary. When DCMS published its proposed 'Project Gigabit' procurement areas (Figure 10) it also published areas where it believed no intervention was required. To reach this conclusion, DCMS have engaged with all interested operators, asking them where they were likely to provide commercial service in the next five years. By

identifying those areas of commercial interest, DCMS were then able to design the 'Project Gigabit' procurements to address the remaining areas where there was no commercial case and subsidy would be required. Figure 12 combines the DCMS 'no intervention required' data (the pale blue colour) with the publicly committed gigabit-capable data (dark blue). It would appear that DCMS have been given assurances by operators that they will collectively deliver a high level of coverage in South Yorkshire, although there is still the risk that the operators are not committed to these pale blue areas so some areas could be left without gigabit broadband well beyond 2025.

The MCA could have a leadership role in seeking to leverage the Rural Gigabit Voucher Scheme and anchor tenancy options in 'at risk' areas to deliver the ambitious targets set out in this Strategy.

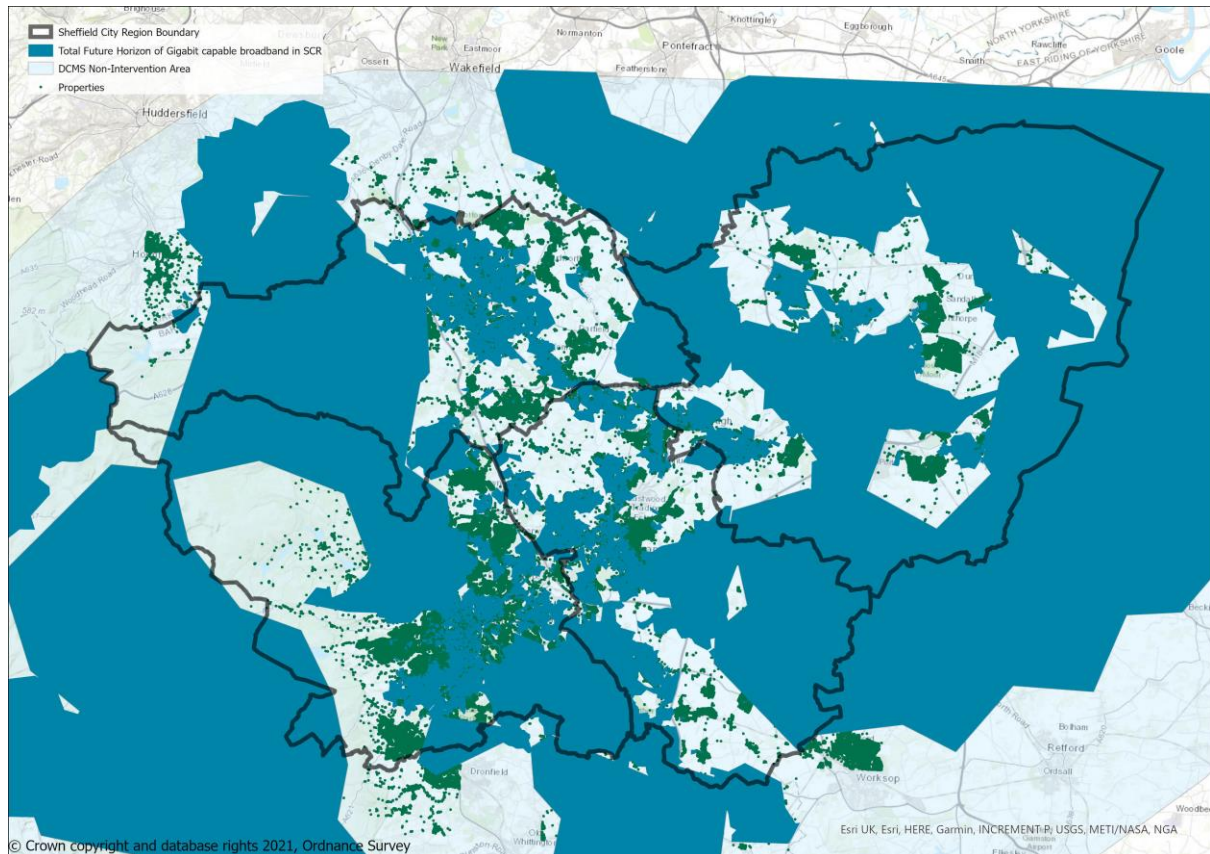


Figure 12: Dark blue areas are the consolidated gigabit-capable predictions for 2025 (as per figure 11) but with the pale blue overlay if areas where DCMS think no state intervention will be required; code for "a commercial operator has told us privately they intend to build."

Business connectivity and access to fibre for the business community is a commonly cited problem. New business parks on the edge of towns can often experience poor connectivity (and has consequently been a successful focus of SFSY intervention)

Starting in 2016, SFSY rolled out fibre based Ultrafast broadband to key enterprise zones and business parks with Openreach to make sure that over 1500 business properties in these areas have access to broadband speeds in excess of 100Mbps.

The SFSY Connection and Innovation Programme enabled 154 SMEs to access a variety of support packages and benefit from connectivity improvements. Of particular note was the significant demand for Innovation Vouchers highlighted the growing recognition of the business benefits that technology and digital connectivity can deliver. The SFSY Business Programme successfully led to the programme achieving its target for 501 additional businesses to take up broadband access of at least 30mbps. The second key element of the programme was the delivery of over 150 events to increasing awareness and understanding of the benefits of digital technology enabled by faster broadband.

Although becoming less of an issue with changes to planning requirements that mandate connectivity for new developments (including commercial developments), it is anticipated that within the next 18 months that secondary or potentially primary legislation will be introduced which will place an obligation on developers and planning authorities to ensure that digital infrastructure and Fibre To The Premise (FTTP) will be part of the planning application.

Most broadband providers that serve the SME market offer businesses a variant of their residential broadband service, usually only distinguishable by dedicated customer service and improved reliability and resilience (for example often bundled with a mobile data connection to restore service if the fixed line fails). Pricing is higher than the residential broadband offering to reflect these value-added elements but is still affordable. Superfast speeds (with near 96% availability in South Yorkshire) are already suitable for all but the most digitally-focussed businesses, so the headroom created by the path to regional Gigabit connectivity that has been noted earlier should provide greater certainty for the SME community.

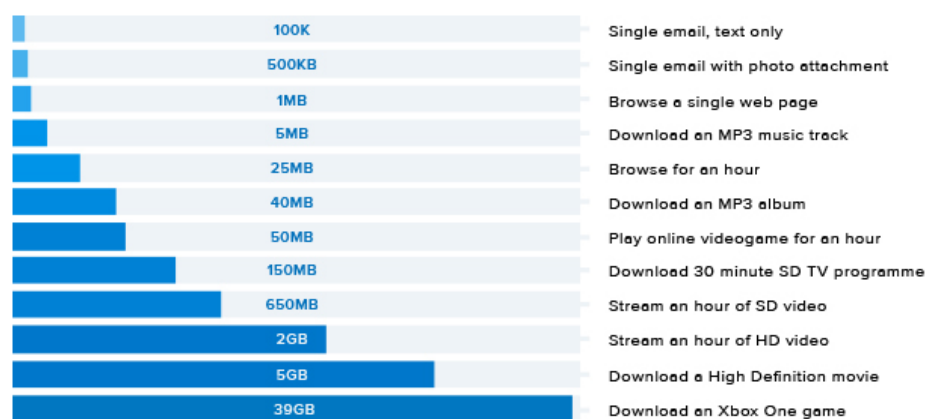


Figure 13: Typical SME user-cases (email, web browsing etc) have much lower performance requirements than typical residential applications, meaning Superfast broadband is sufficient for many smaller businesses

It is also important to note that many larger businesses use specific connectivity offering designed for the business market, such as Ethernet 'leased lines.' In the case of Openreach, Ethernet is delivered over a network that was kept completely separate¹⁰ from 'standard' broadband infrastructure and could

¹⁰ Openreach are gradually integrating the Ethernet and broadband networks so that broadband can be offered efficiently within the ethernet footprint and operational efficiencies can be made

be economically delivered into areas with poor broadband coverage. The implication is that at least for larger businesses, good connectivity is not completely dependent on the availability of Superfast or Full Fibre, but these options may not be affordable for SME's.

The success of leased line solutions like Ethernet also have wider counter-intuitive implications for the availability of Openreach fibre; the large businesses that could in theory anchor fibre investment into business parks are effectively taken out of the equation because they use an overlay Ethernet network, effectively removing demand and impacting the overall viability and relative priority for a business park. This will again become less of an issue as Openreach unifies its fibre and ethernet networks.

SOCIAL CONNECTIVITY - EVIDENCE

Central and Local Government broadband interventions are typically framed by the objectives of either plugging geographic gaps in coverage or increasing performance to Gigabit speeds where current service offerings are underwhelming. The current DCMS 'Project Gigabit' rural fibre programme is a good example of this geographic availability focus.

However, there is another more complex perspective to broadband access that is not resolved when a new fibre network fills a geographic gap. The stark reality is that even if the new fibre network runs by your front door, if you cannot afford broadband, don't have a device, and don't have even foundation digital skills (the three components of 'digital poverty') the you will not be able to use or benefit from enhanced broadband connectivity. These three issues need to be addressed in a coordinated manner to achieve the desired outcome. The distribution of devices to low-income families with children as has happened over this Covid19 crisis, is a positive move, but if there is no internet connection at home, the value of the device is much reduced.

Figure 35. Proportion of those aged 15+ who can do all of the Foundation tasks, split by nation and region, 2020

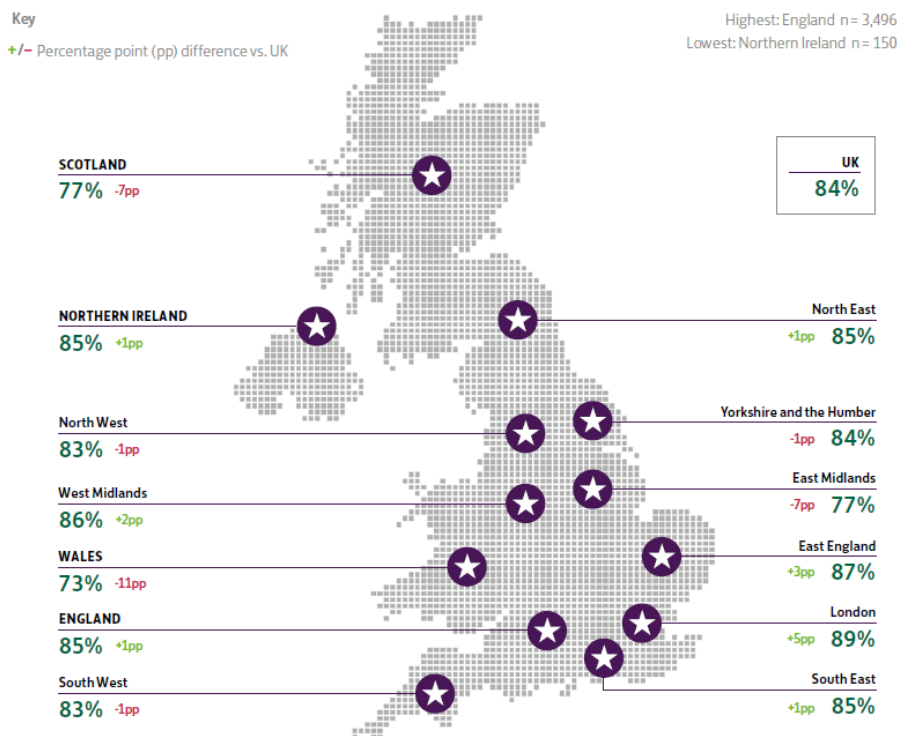


Figure 14: Yorkshire and Humberside are in line with national digital skills averages
(Source: Lloyds Bank UK Consumer Digital Index 2020)

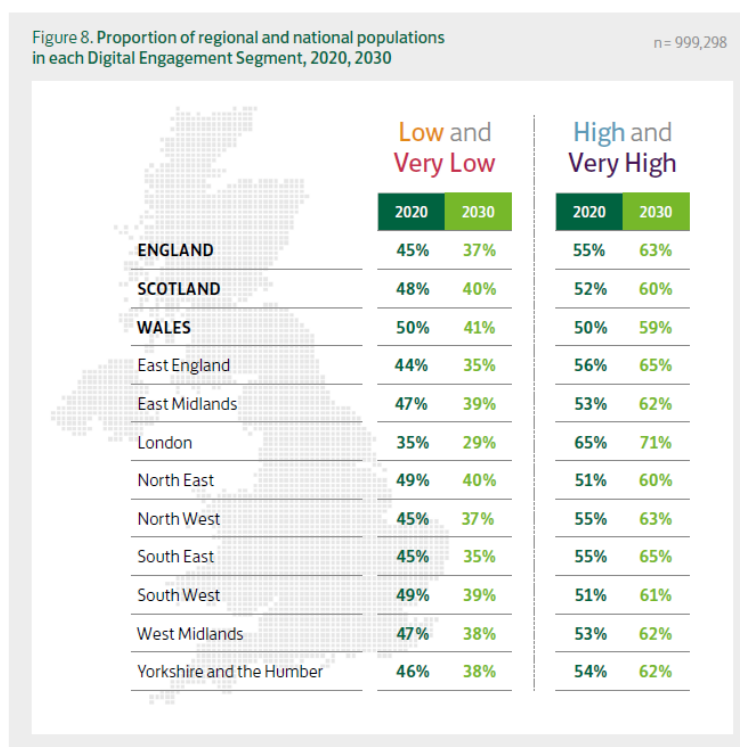


Figure 15: Yorkshire and Humber digital skills averages are moving in the right direction but there is more to do
(Source: Lloyds Bank UK Consumer Digital Index 2020)

ONS have recently published some more granular 'low geographic level' data on internet usage; Table 2 contrasts the performance of the four South Yorkshire districts with both Yorkshire and Humber and the UK national average. Whilst Sheffield out-performs the Yorkshire and Humber regional average, the other three South Yorkshire districts do not, and all are below the national average. There is clearly a need to address this shortfall and ideally moving ahead of the national average if the SEPs ambitions of upskilling local communities for economic growth and the social betterment are to be realised.

RECENT AND LAPSED INTERNET USERS AND INTERNET NON-USERS, BY LOW LEVEL GEOGRAPHICAL LOCATION, UK, 2014 TO 2020															
Persons aged 16 years and over															%
NUTS Code		Used in the last 3 months							Used over 3 months ago/Never used						
		2014	2015	2016	2017	2018	2019	2020	2014	2015	2016	2017	2018	2019	2020
	UK	85.0	86.2	87.9	88.9	89.8	90.8	92.1	14.8	13.5	12.0	10.9	10.0	9.1	7.8
UKE	Yorkshire and the Humber	83.6	85.3	85.9	86.8	87.9	89.8	90.7	16.3	14.4	13.6	12.6	12.0	10.1	9.2
UKE21	York	86.8	83.3	87.1	85.9	88.6	92.7	91.8	13.2	14.5	10.5	9.3	11.4	7.3	8.2
UKE22	North Yorkshire CC	84.6	89.0	84.2	85.8	85.3	90.0	91.4	15.3	10.6	14.1	12.4	14.6	10.0	8.5
UKE31	Barnsley, Doncaster and Rotherham	82.2	81.9	78.3	88.0	85.1	88.6	90.0	17.8	17.9	21.7	12.0	14.8	11.4	10.0
UKE32	Sheffield	83.1	83.4	88.4	86.6	89.7	89.2	91.7	16.9	15.7	11.4	13.4	10.3	10.8	8.3
UKE41	Bradford	82.2	87.3	84.8	87.3	87.3	90.5	91.8	17.8	12.5	15.0	12.7	12.0	9.5	8.2
UKE42	Leeds	86.9	87.0	87.8	87.1	91.1	94.9	90.6	13.0	13.0	11.2	12.0	8.9	4.7	9.4

Table 2: Internet usage in Sheffield, Barnsley, Doncaster and Rotherham contrasted with Yorkshire

Poorer households with low digital skills spend over £500 more a year on utility bills than those with higher levels of digital engagement

Digital Segment	Annual Salary	Average spend* per month
Very High	£0	£162
	<£20,000	£143
	£20,000+	£221
High	£0	£174
	<£20,000	£168
	£20,000+	£239
Low	£0	£198
	<£20,000	£207
	£20,000+	£276
Very Low	£0	£207
	<£20,000	£203
	£20,000+	£268

*Bills include water/council tax/tv licence/energy

Average monthly spend on utility bills split by digital engagement segment and annual salary

(source: Lloyds Bank UK Consumer Digital Index 2020)

Over 20% of lower income households with children cannot access the internet with anything other than a mobile phone

	All DE Households with children	Number of DE children affected estimate (lower)	Number of DE children affected estimate (upper)
No access to the internet at home	6%	110,000	390,000
Smartphone only access to the internet	9%	219,000	571,000
No home access to laptop or desktop or tablet or smartphone	4%	52,000	281,000
No home access to laptop or desktop or tablet	21%	649,000	1,182,000

(source: Ofcom Technology Tracker 2020)

Figure 16: National averages for connectivity and implications

Telecoms operators also exacerbate (and obfuscate) the problem of affordable connectivity. Some fibre companies were quick to recognise that blocks of flats – or MDU's (Multi-Dwelling Units) – presented an attractive market opportunity, being much cheaper and faster to connect as a cluster of homes than the complexity and cost of the more traditional model of digging up a street to lay new fibre and connect individual houses. The MDU market also offers more opportunity to be the exclusive broadband provider, protected by landlord agreements and even physical space in the buildings cable risers. As a consequence, fibre companies have increasingly targeted both private and social MDU's.

The fibre company and the Authority will announce that an MDU has been connected to fibre broadband and the fibre company will give a small number of 12-month free service vouchers to the Local Authority, but the reality is that the vouchers are of transient value only and take-up of fibre broadband (constrained by affordability, device and skills) will be relatively low. How low is difficult to ascertain given the paucity of data on digital poverty, but market intelligence suggests that take-up in MDU's may be below 30%, meaning 70% will not be connected.

Obfuscation extends to how access to the internet is defined; having a mobile phone with a data service can allow a household to be considered as having internet connectivity. This might allow some services to be accessed (for example reporting faults to the Housing Association or accessing Local Authority services) but mobile data is expensive, and a mobile phone may not be suitable for other more complex but no less important user cases like children's school work or accessing training resources.

Covid-19 has not created a digital divide, it has simply exposed and amplified what was there already.

The pandemic has necessitated an accelerated shift to distance learning, primary healthcare delivery by phone or online and home working. There are 25,000 individuals across South Yorkshire who were furloughed from their jobs as a result of the Covid-19 lockdown and national estimates are that 40% of those on furlough will not have a job to return to; so there will be a need for scale retraining programmes which are unlikely to all be delivered in a physical environment.

The pandemic has brought with it a further wave of operator obfuscation. Undoubtably the operators do want to deliver social value and play their part in the national response to Covid-19. But, they also want to be seen to make positive moves to avoid mandated action (Operators have, for example, been resistive of calls to allow their customers to donate unused data allowances to a social pool that can be accessed by those who can't afford internet access). Covid-19 has seen a flurry of free WiFi vouchers, mobile SIM cards and 'zero rating' of data usage to connect to socially valuable websites like NHS and educational resources, but these are all temporary measures that will not change the underlying digital poverty challenge once we have moved beyond Covid-19.

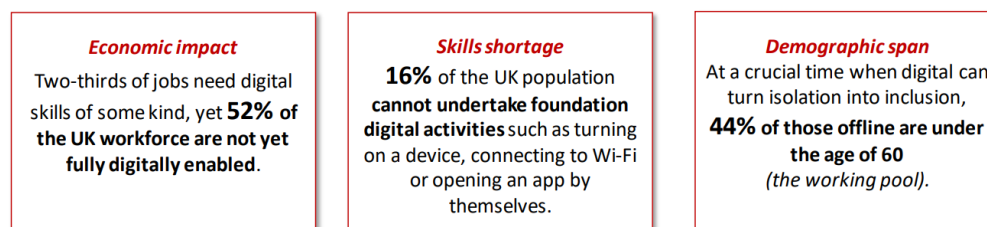


Figure 17: The motivations for addressing digital inclusion and digital poverty are not just about addressing inequality; it's equally about creating the skilled workforce South Yorkshire will need

The case for a more structured approach to social [infrastructure] connectivity and the wider digital poverty challenge should not be built entirely on a response to the systemic issues highlighted by Covid-19. Recovery and sustainable growth will need a digitally skilled and connected workforce so there are positive incentives to respond in the right way to the stimulus provided by the pandemic, making sure that the people of South Yorkshire are able to fill the new jobs that will be created as a result of the SEP.

4G AND 5G MOBILE COVERAGE AND CAPACITY - EVIDENCE

Mobile Operator commercial rollout of 4G has resulted in 4G being available at close to 99% of premises in South Yorkshire and there is similar commercial momentum behind 5G, with operators competing on number of towns and cities covered and network speed.

	Prem count	Outdoor coverage				Indoor Coverage			
		No 3G coverage	No 4G coverage	3G four operator coverage	4G four operator coverage	No 3G coverage	No 4G coverage	3G four operator coverage	4G four operator coverage
Barnsley	115599	0	0	99.67	99.76	0.02	0.1	90.86	78.77
Doncaster	141890			98.81	99.7	0	0.09	80.46	80.03
Rotherham	122070			99.31	99.63	0.01	0.17	84.59	79.45
Sheffield	260876	0	0.05	99.86	99.85	0.07	0.16	94.7	89.15

Source: Ofcom Connected Nation Report 2020

Figure 18: The mobile operators' commercial rollout of 4G has served South Yorkshire well, with Ofcom reporting 99% coverage, although we believe that the rural coverage figures (which are based on mobile operator calculations) are an over-statement.

5G is not a replacement for 4G; the two will work together with 4G providing coverage and 5G a focussed capacity boost where it is needed. As a result, 5G will not be available everywhere and an alternative to a 'coverage' metric is required.

It is important to note that mobile operators are using 'carrier aggregation' technology which allows 5G to combine with the underlying 4G network to offer very high performance, so effectively 4G is used to create a foundation of coverage and 5G provides an additional performance layer where it is needed. 4G is the technology currently being rolled out into remote rural areas by the £1Bn Shared Rural Network initiative funded by the mobile operators and Central Government to extend mobile coverage to 95% of the UK landmass¹¹ 5G is likely to remain a largely urban phenomena, providing the extra capacity layer where it is needed, so will probably be unlikely to hit more than 60% coverage.

Geographical coverage in [%]

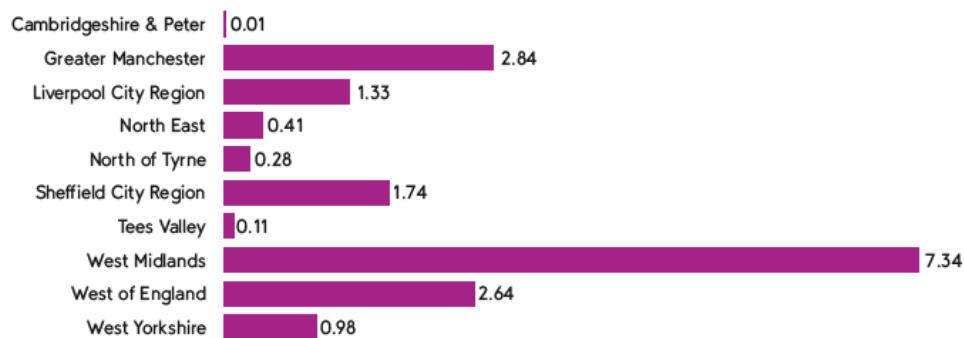


Figure 19: 5G Geographic Coverage by Combined Authority; SCR performing well at the early stage of national rollout (Source: Ofcom 5G Coverage in the UK 2020)

¹¹ It is important to note that the ambition for the Shared Rural Network is 95% of geographic coverage, which looks lower than the 99% availability reported for South Yorkshire by Ofcom. This is because the 99% is the percentage of premises in South Yorkshire rather than 99% of the geography of the region, which is a much harder target to achieve.

But evidence from a recent Ofcom study (Figure 19 above) suggests that South Yorkshire is performing well against its peers in 5G rollout, with only West Midlands (the location of the Government's £24M 5G Urban Connected Communities programme) and Manchester performing better than South Yorkshire ('Sheffield City Region') in a league table of Combined Authority areas; although the actual coverage figures remain very low.

The temptation for some Local Authorities has been to directly intervene in mobile coverage provision, particularly when 5G prestige is at stake. The Strategy considers that operator support rather than direct 5G 'value chain' intervention is the right course of action.

The Mobile Operators are typically reluctant to share rollout plans with Local Authorities given the commercial sensitivities surrounding their activities. This can be a barrier to progress as Local Authorities can be very supportive of operators looking to enhance coverage, or better still, introduce new technologies like 5G. An example of this is in a North London Borough, where one of the operators was trying to secure a Council owned rooftop for a very early 5G deployment but had not told the Council what the site was for. After much delay the operator told the Council why it needed the site and the Council responded positively making their rooftop one of the first 5G sites in the Country.

Apart from commercial confidentiality, one of the other obstacles to mobile operator / Local Authority relationships are the use of agents to manage access to public sector rooftops. Whilst these agents take away the burden from the Local Authority of working with operators, they may not necessarily be as focussed as local authorities on maximising the indirect social and economic value that good network coverage delivers.

The gap created between mobile operators and Local Authorities by operator confidentiality and the action of agents working on behalf of a Local Authority has been filled by third-party Wireless Infrastructure Provider (WIPs) companies offering to build mobile network infrastructure on Local Authority site assets (typically street furniture). The resulting networks (often referred to as 'neutral host networks') are offered to the mobile operators on a shared basis, the theory being that the streetscape is kept relatively clutter free (attractive to the Local Authority), the operators only pay a share of the costs (attractive to the operator) and in return the WIP will give a share of revenues to the Local Authority partner who can generate revenue and can claim a proactive position on 5G deployment (obviously both attractive to the Local Authority). In practice there are few working examples of neutral hosts (Aberdeen has one, for example and Sunderland are progressing a similar solution) and those that do are pilots with typically only one operator active on the 'shared' network. The reality is that there are technical and commercial challenges which makes this approach unattractive to many operators.

The Strategy seeks to make it easy for mobile operators to build their commercial networks and address some of the relationship barriers, rather than pursuing the more radical interventionist options, focussing energy on driving adoption of 5G

There are behaviours that South Yorkshire Authorities should adopt to speed up build and make it easier for operators to construct their networks.

The West Midlands Combined Authority secured the Government's £24M 5G Urban Connected Community fund because it offered a range of 5G innovation opportunities and signalled its willingness to innovate in developing the 'barrier busting' policy and process framework to support operators rolling out their networks. Wolverhampton have taken the leadership role in developing a viable open commercial model for operators to access public site assets that has been well received by the operators and has been adopted across the eight WMCA authorities as part of a wider harmonisation of policies towards telecoms operators. WMCA are currently leading an asset mapping and commercialisation project for DCMS which should result in a national template and toolkit for other Authorities to adopt. The Strategy seeks to adopt best practices and learning from other Authorities.

5G was designed primarily to fill in the enterprise capability gaps that were not addressed in 4G. The real 5G opportunity for South Yorkshire is helping our manufacturing sector benefit from early adoption.

5G has the speed, reliability and security features required for controlling vehicles, precision machinery and robotics and can support huge volumes of Internet of Things sensors and applications ranging from remote surgery to augmented reality and autonomous vehicles. It is this 'Industry 4.0' potential of 5G that is critical to supporting delivery of the wider economic ambitions of the SEP, given the continued strength of the region's manufacturing sector and the industrial heritage that is an important part of the identity of South Yorkshire.

There have been well over forty 5G innovation projects running in the UK over the last five years, attracting over £100M of funding and addressing opportunities ranging from connected factories to drone delivery services and everything in between¹². The formula for success is typically a combination of strong academic input and investment from an engaged Local Authority. Neither of these elements have yet fallen fully into place in South Yorkshire. To date the region's only success has been through the AMRC, but an £8.5M 5G factory of the future project is largely focussed on the BAe factory in Preston and a 5G rail project at London St. Pancreas station.

The success rate of the region in bidding for innovation funding could be increased by proactively identifying projects and building consortia that can be taken 'off the shelf' when an appropriate funding opportunity presents itself as many Government innovation competitions have very short turnaround times (sometimes as short as eight weeks) which leaves little time to move from concept to business case and sign off to financial commitments by consortia members.

Whilst the rollout of commercial 5G networks is now progressing and there are many active regional innovation projects already complete or in progress, there are still opportunities for a well-considered strategy.

The emergence of the private 5G opportunity is more to do with opportune changes in the mobile network equipment vendor ecosystem than 5G standards. The release of 5G has seen an upsurge in start-up challenger vendors offering open-source low-cost network equipment to challenge the established players like Nokia, Ericsson and Cisco. Motivated by the need to remove Huawei equipment and to drive lower costs, even the big four operators are starting to use this 'plug and play' equipment.

At the same time, telecoms industry regulator Ofcom (and other regulators around the world) has made unused and expensive licenced spectrum owned by the mobile operators (of which there is a surprising amount if you know where to look) available to organisations interested in building their own mobile radio networks for their factory or campus. These two factors together are stimulating a surge in interest in private 5G networks.

The industrial potential of 5G and the historically poor indoor coverage of 3 and 4G networks means that for factories or hospitals the only way of getting a ubiquitous reliable and secure 5G network will be to build a private solution.

¹² Only one of the forty-plus 5G innovation programmes with a South Yorkshire component was AMRC's involvement in the £8.5M 5G Factory of the Future programme, funded by DCMS. But this project is centred at the BAe factory in Preston, so there will be no direct 5G upside for South Yorkshire.

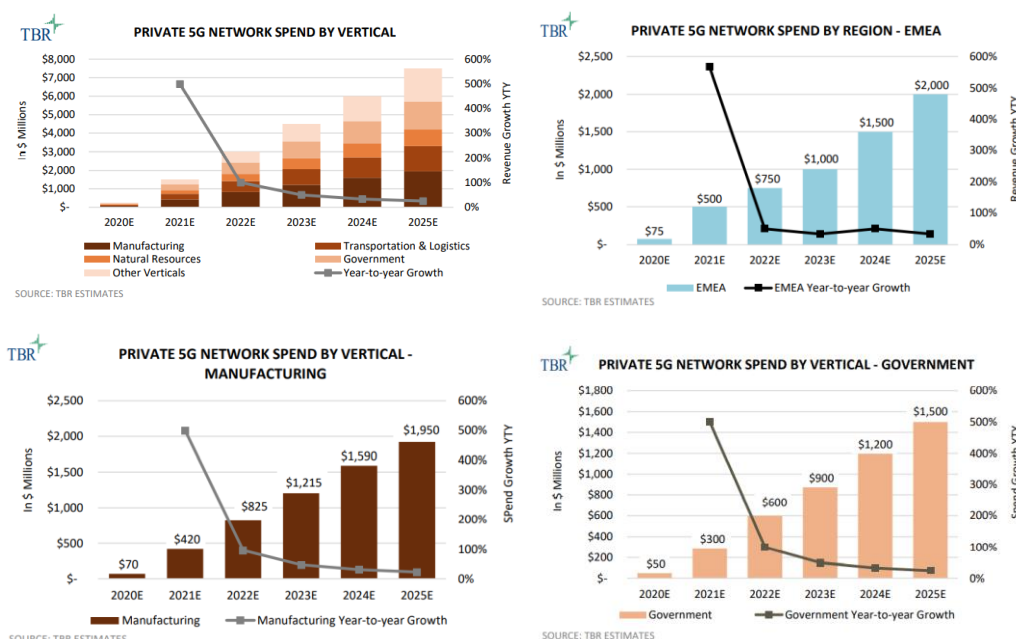


Figure 20: Projected Growth in Private 5G Networking spend by region and selected key sectors (Source: TBR Research 2020)

A 4G coverage ambition might still be valid, despite what the Ofcom statistics would suggest

Whilst Ofcom suggest that there is near-99% 4G availability across South Yorkshire, this is a percentage of premises with 4G coverage so the sparsely populated rural areas of the region will have much poorer coverage than the Ofcom figures would suggest. Rural coverage is still a challenge for many, which might be experienced as loss of signal for someone driving in the countryside or a farm industrial unit with very poor coverage.

Understanding where coverage challenges exist is further complicated by the way rural coverage is reported. The data used is the operators' own predictive coverage modelling (which can result in overstatement) report on a postcode basis, which can be a large area in rural constituencies resulting in a distorted picture.

Norfolk County Council faced a similar gap between reported coverage and the real-world experience and funded a drive-by mapping exercise to plot the actual performance of each individual operator on every rural B-Road in the County. This data was used to engage with the operators and has led to a quantifiable improvement as operators have reacted positively to the information and have added new sites to close gaps. Norfolk County Council have also adopted innovative 'Barrier Busting' approaches to offer public sector assets like fire training towers to the operators and successfully secured Local Full Fibre Networks funding to bring fibre to these sites that the operators could potentially use to connect their new radio sites.

DATA CENTRES - EVIDENCE

Data centres are an increasingly important part of the digital ecosystem.

Whilst fibre connectivity can offer high speed global connectivity, proximity to the physical sites where data is processed and stored can be significant; this is because data takes time to travel but people want access to data instantaneously. Data almost never travels in a straight line between sender and recipient. Instead, it meanders through networks, routers, and switches, each of which can add delay. The delay (or latency) problem is doubled by the 'round trip delay' where first of all the request has to travel to the data centre and then the data requested has to travel back to the user. Whilst this is not such an issue where ultrafast fibre is used, the consensus is that over 25 miles you do start to get a noticeable effect.

Businesses tend to operate hybrid data storage solutions, with 'hot' data required for immediate access stored on servers in the equipment room of their own facility. But the economies of scale of cloud data centres have won the 'build or buy' argument and industry analyst Gartner¹³ predicts that by 2025 80% of businesses will shut down their in-house data centres.

The arrival of 5G will also shape data centres demand, driving the construction of smaller 'edge' data centres taking processing and storage close to users.

One of the key features of 5G is its support for ultra-low latency, which is why mobile operators and digital businesses are interested in the 'Edge' data centres which take the processing power and storage closer to the application – effectively decentralising the data centre to a larger number of smaller sites. While centralised data centres still have a crucial role to play as they are the hubs of data distribution networks, it is Edge data centres that will act as the local depots of data. Gartner predicts that Edge computing will account for 75% of enterprise-generated data by 2025.

South Yorkshire would appear to have limited provision of data centres relative to neighbouring urban centres, which might be of future concern as businesses turn towards cloud services instead of 'in-house' solution managed from equipment rooms on site. Distance from data centres may then become an issue, with 'round trip' network delays impacting user experience.

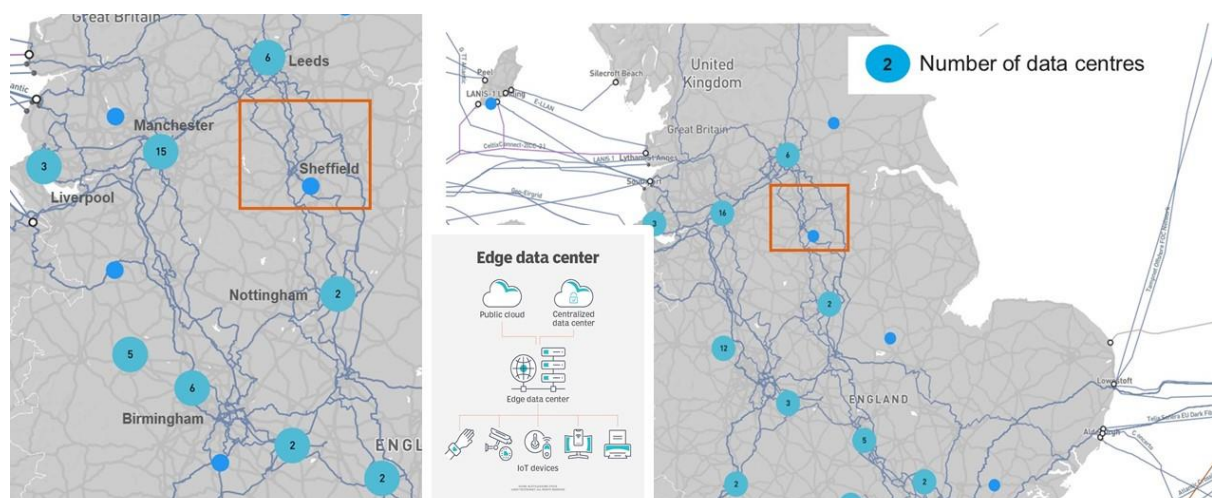


Figure 21: Whilst South Yorkshire is well connected to the national and international fibre routes (right) it is lacking in data centre capability compared to other nearby urban centres (source: Infragraphics)

¹³ Gartner – Strategic roadmap for Edge Computing (2021)

INTERNET OF THINGS – EVIDENCE

IOT uses low-cost low power radios embedded in sensors to send data back (typically over a radio link) to a central application that analyses the data to create insight and the opportunity for action. An IOT network can be provided by a commercial organisation like a mobile network operator (e.g. Vodafone or EE), a dedicated IOT network operator (e.g. Connexin or WND) or organisations can take advantage of the low cost of equipment and free to use radio spectrum and build their own.

IOT has been made possible by the development of low cost and very efficient radios that can be installed in sensors and run for years without any maintenance. These sensors are now so efficient that they can run for over ten years on just three 'AAA' batteries. Radio connections from the sensor are cheap (the radio spectrum used by LoRAWAN and Sigfox¹⁴ technologies favoured by independents like Connexin is free to use, for example)

Attracted by the low cost to build, an increasing number of public sector bodies (including neighbouring LEP areas) are actively building or planning to build regional IOT networks. The Scottish Government are building a national IOT network and innovative rural authorities like Norfolk CC have also built innovation platform IOT networks (the latter funded by the LEP).

There are already a number of IOT related pilot activities across South Yorkshire:-

- Sheffield are using a LoRA network provided by Amey (which uses the Connexin network) for smart city pilots
- Barnsley's Digital Media Centre (DMC) has built a local IOT network and has attracted IOT start-up businesses to its campus. Barnsley MBC are considering a self-build local IOT network.
- Doncaster has expressed interest in trial with applications potentially aimed at a diverse range of applications from flood controls to better informing road gritting decisions in winter.

The isolated applications may appear small in scale, but the same network can support multiple applications, and each can drive cost savings and performance improvements. In just one South Yorkshire Local Authority the cost of a gritting run is c£90,000 and there are three runs on a very cold night. IOT temperature sensors can provide real-time and localised road surface temperature data which can be used to determine if a gritting run is required, and even tailor the gritted area to those with greatest ice risk. There are many more user cases such as:

- Smart parking
- Ditch and gully water level monitoring
- Footfall counting
- Building management systems
- Telecare/telehealth
- Housing and building management
- Air quality – environmental systems
- Asset tracking
- Traffic monitoring

Key private sector stakeholders such as the region's utility providers are actively testing IOT networks for applications such as smart metering, so the MCA could consider working with these private sector organisations to create a single solution for a regional IOT network, which could be based on a commercial operator network offering or be a self-build solution piloted by other similar local authorities. The resulting regional IOT network could form part of the growing IOT narrative for the Barnsley DMC campus and create opportunities for new business growth, education and digital skills.

¹⁴ LoRAWAN (Long Range Wide Area Network) and SigFox are two ultra-efficient radio technologies used to create IOT networks. LoRAWAN is considered to be the more open standard option so is favoured by sensor developers over SigFox which is a more closed and proprietary solution.

KEY CHALLENGES

Digital Infrastructure Challenges:

1. Need to replicate Superfast South Yorkshire broadband success with Gigabit Broadband; starting from a low point of 4% which is lagging behind the national average of 15%.
2. There are c160,000 premises in South Yorkshire that are not covered by the Virgin Media 'gigabit-capable' upgrade or the various publicly announced fibre initiatives. Closure of this gap will require careful stewardship by the MCA.
3. No meaningful agenda for 5G which is significant given the Region's manufacturing capability and the Industry 4.0 focus of 5G technology.
4. Whilst having 4G available at 99% of South Yorkshire's c650K premises is a strong achievement it hides a rural coverage problem that needs quantifying and addressing.
5. Despite some commendable local initiatives (ranging from free connectivity vouchers to free laptops) digital poverty remains a barrier that needs to be addressed and will not be resolved simply by making fibre available.
6. Whilst there is growing aspiration there is no clear IOT strategy for South Yorkshire.
7. The region is underweighted in terms of local data centre capacity which will become increasingly important as business dependency on cloud services increases.
8. Growth of South Yorkshire's promising digital sector is compromised by lack of a clearly articulated narrative and identity.

Organisational and structural challenges:

9. Despite earlier efforts a fragmented 'four authorities' approach persists, making South Yorkshire harder to work with for operators and Government than better aligned Authorities, with the risk that investment goes elsewhere.
10. With the notable exception of SFSY and the Superfast programme, digital governance lacks the controls and specialist knowledge to make informed strategic choices and drive delivery.
11. Poor track record of digital thought leadership and ability to secure digital-related funding investment bids.
12. Data strategy is poor, compromising the ability to generate insight and consequently make informed and evidence-based interventions; critical when state aid is used to fund digital interventions.
13. Lack of academic anchor point for 5G innovation and as a catalyst of 5G adoption into the region's manufacturing sector.

OBJECTIVES OF THE DIGITAL INFRASTRUCTURE STRATEGY

Introduction

The National Infrastructure Committee estimated that the vision of Full Fibre Britain would require up to £30Bn of investment. Whilst the revised Gigabit Capable ambition will be able to build from a foundation of the Virgin Media cable network so will come with a reduced financial demand, the investment community has a seemingly limitless interest in investing in companies' intent on contributing to national fibre rollout. There are now over fifty fibre companies actively building or raising capital to fund fibre build, many of which are very small operators building in confined geographies. Six are active in South Yorkshire. The mobile operators are similarly committed to rolling out new 5G networks having only just put the finishing touches to their 4G networks.

Against this backdrop, the MCA and Local Authorities have two primary related objectives. Firstly, this is to ensure that both fixed and wireless operators disproportionately invest in South Yorkshire by adopting supportive policies and opening up public sector assets to make it easier for operators to build. This needs to be happening now given the wave of public and private sector investment going into digital infrastructure.

However, at the same time the MCA and Local Authorities need to have a clear view of how it will turn these new networks to economic and social advantage for local communities. Possibilities can range from enabling local businesses to leverage the transformative potential of 5G, to adopting new digital service delivery models for health, education and training and social services and extending these benefits to all sections of the community.

This plan for utilisation of new digital infrastructure cannot wait until the new networks are in place; indeed, there are opportunities to leverage support for operator network build into acceleration of some of the digitally enabled social and economic objectives set by the SEP and local strategies and plans. Rather than simply seeking to generate revenue from rooftop rentals (no longer a viable strategy given changes to operator statutory rights), authorities could seek subsidised access or skills training to drive direct social value.

The purpose of the South Yorkshire Digital Infrastructure Strategy is to set out the policy framework that will allow South Yorkshire to address the two parallel tasks of encouraging operators to provide ubiquitous Gigabit broadband and mobile services, and at the same time harness the social and economic potential these technologies bring; ideally creating a sustainable differentiator for the Region.

Accordingly, the Strategy's Vision is to deliver:

'a Gigabit digital infrastructure that accelerates new social and economic possibilities for all the people and businesses of South Yorkshire.'

This Vision is underpinned by five key goals:

1. Ensure South Yorkshire's superfast broadband and 4G success is repeated for Gigabit broadband and 5G
2. Support the social and economic priorities set out in the SEP.
3. Form an inclusive platform that enables better outcomes for all sections of society.
4. Be supported by the Governance and data-driven approach needed to maximise the digital potential of South Yorkshire.
5. Position South Yorkshire as a leading centre of applied digital innovation and adoption.

POLICIES

ENSURE SOUTH YORKSHIRE'S SUPERFAST BROADBAND AND 4G SUCCESS IS REPEATED FOR GIGABIT BROADBAND AND 5G

To achieve this: -

- We will encourage and where appropriate enable all the commercial operators to deliver their planned network upgrades and new build in the South Yorkshire.
- We will work closely with DCMS to maximise the investment of 'Project Gigabit' in rural broadband programme spend in South Yorkshire.
- **4G:** We will work with mobile infrastructure providers to promote good mobile coverage across our rural communities.
- **5G:** We will work with the region's businesses and Leaders in the adoption of 5G to drive sustainable advantage and competitiveness.
- We will open up our public sector assets based on a robust due diligence process and make it easier for operators to build their networks with our consistent 'barrier busting' policies.

SUPPORT THE SOCIAL AND ECONOMIC PRIORITIES SET OUT IN THE SEP

To achieve this: -

- As a foundation layer we will work with digital infrastructure providers to achieve ubiquitous Gigabit Broadband and 4G coverage across South Yorkshire and 5G where it is needed.
- We will seek to close the datacentre gap, reinforcing the success of the Region as a place to do digital business and 'future proofing' the region to cater for the anticipated growth in businesses utilising cloud infrastructure.
- We will seek to leverage 5G's unique enterprise capabilities (low delay, reliability, security, support for scale sensing networks) to the advantage of South Yorkshire's significant manufacturing sector.
- We will engage with South Yorkshire's major private sector organisations to leverage their digital know-how and seek mutually beneficial public-private sector outcomes.
- We will augment the growing narrative around the region's digital sector, business start-ups, innovation, and creation of 'lighthouse' innovation projects.

FORM AN INCLUSIVE PLATFORM THAT ENABLES BETTER OUTCOMES FOR ALL SECTIONS OF SOCIETY

To achieve this: -

- We will address the data gap to better understand the specific digital poverty challenges in South Yorkshire.
- We will drive and leverage social value upside from our digital activities and as a bi-product of our support for operators building their new networks.
- We will explore new models for social connectivity, exploring new service delivery options (digital health and government services) and seeking to quantify the better outcomes that digital connectivity can deliver.

- We will explore digital infrastructure opportunities to support the growth of digital health and welfare, linking back to other regional initiatives.
- We will consider how our site assets can better serve our communities to either anchor operator builds into less commercially attractive areas or to provide digital centres/hubs in their own right, offering connectivity and help.

GOVERNANCE AND DATA-DRIVEN APPROACH TO MAXIMISE THE DIGITAL POTENTIAL OF SOUTH YORKSHIRE

To achieve this: -

- We will build on the success of the Superfast South Yorkshire programme, creating the necessary governance structure to ensure that our infrastructure agenda is effectively coordinated and compliments the delivery of the wider SEP digital agenda and ambitions.
- We will create a centre of digital excellence for the region, allowing South Yorkshire to respond in a co-ordinated way to Government initiatives and to engage consistently with operators and other private sector stakeholders.
- We will make use of wider public and private sector specific digital and technology skills to advise and add depth and challenge to our digital infrastructure programme.
- We will make it easy for operators to build their networks with consistent 'barrier busting' policies adopted across the region, drawing on best practice from Local Authorities both within and beyond South Yorkshire.

POSITION SOUTH YORKSHIRE AS A LEADING CENTRE OF APPLIED DIGITAL INNOVATION

To achieve this: -

- We will seek to integrate and ensure that our digital infrastructure activities contribute to supporting the development of the SEP innovation clusters such as by creating 'lighthouse' projects reflective of our growing digital capability.
- We will seek to secure Government innovation funding awards by pre-preparing bids related to the SEP and our Digital Infrastructure Strategy.
- We will work with public and private sector partners to promote the development of Internet of Things network(s) across South Yorkshire to support public and private sector 'sensing' network ambitions and as a platform for innovation in our growing digital sector.

DELIVERY OF THE STRATEGY

The digital infrastructure agenda for South Yorkshire is complex, and is one part of the three elements, the other two being digital skills and digital innovation and business support, that will need to be progressed simultaneously to deliver the digital ambitions of the Strategic Economic Plan. This will require strong leadership by the MCA, in liaison with local authority partners and others, to implement this holistic approach and align all activities across these three elements.

The digital infrastructure agenda, delivering this Strategy, will involve creating a consistent enabling policy structure that makes it easy for operators to build their fibre and mobile networks in the region, taking best practice from other authorities who have already begun this journey. It will require the MCA and local authority partners to closely monitor progress in the specific areas identified in this Strategy to make sure that the 160,000 premises outside of the current predicted Gigabit-Capable coverage area are not left behind. There is also still a job to do in mobile, working with the mobile operators to understand rural coverage challenges which are known to still exist.

At the same time steps need to be taken to make sure that the new Gigabit Capable broadband and 5G networks deliver social and economic value for the region and align with the ambitions of the SEP. It will be important to make sure our enterprise sector is quick to seize the benefits of 5G and that our digital communications are deeply embedded within the narrative of our emerging innovation hubs and growing digital confidence.

We also need to make sure that the benefits of connectivity are available to all sections of our communities and that we have the digitally skilled workforce required to sustain economic growth. The digital narrative for South Yorkshire must run much wider than the confines of an infrastructure debate and clear leadership and sponsorship of this agenda is required, as set out in the diagram below. Our Superfast South Yorkshire programme has provided a template for collaboration to deliver regional success in the digital sphere.



Figure 22: MCA Digital Leadership Responsibilities

Steps are already being taken to develop this Leadership approach and will seek to bring together focussed public and private sector skills to advance the regional agenda, building on the foundations of this forward-looking Digital Strategy.

Consideration is being given to the opportunities of the 'clawback' funding from the Superfast South Yorkshire broadband programme, which will provide a significant secure funding source over the next 5 years to support the implementation of not only this Digital Strategy but also the activities related to the digital skills and digital innovation and business support agendas.

The MCA will determine how the 'clawback' funding will be deployed, informed by the MCA Housing and Infrastructure Board, MCA Education, Skills and Employability Board and MCA Business Recovery and Growth Board in relation to the digital infrastructure, digital skills, and digital innovation and business support agendas respectively. This funding will therefore provide the resource to enable the MCA to implement a holistic and integrated digital approach across these three interrelated activities.

The Governance arrangement is set out below:

Insert draft Governance diagram

The MCA will be appointing an Innovation Project Director to drive the innovation and business support activities, a key element of which will be digitally related. A key aim of the work of the Project Director will be to develop and implement a strategy for enabling the roll-out of digital innovation opportunities to businesses as part of maximising the benefits of 'innovation clusters' across South Yorkshire. Responding to these opportunities will take into account the related innovation and business support proposals highlighted in this Digital Strategy.

The MCA is also preparing a Skills Strategy for South Yorkshire where digital skills will feature strongly, with the aim to enable the transition to a more digitally competent workforce in South Yorkshire and addressing the digital exclusion issues highlighted in this Digital Strategy. Discussions are already taking place with local universities around better understanding the digital poverty issues and inclusion impacts in South Yorkshire as a result of the Covid19 epidemic.

In terms of the digital infrastructure agenda work, the Superfast South Yorkshire (SFSY) Board continues to oversee the successful SFSY broadband programme to completion by Summer 2022. The Board has also already been working with Government in preparation of the Government's 'Project Gigabit' that will supersede the SFSY programme. This has culminated in Government announcing in July 2021 that between £61m - £103m funding has been allocated to South Yorkshire to provide gigabit capable digital infrastructure and connectivity to 64,000 premises which the 'Market' would otherwise not be providing over the next 5 years.

Consideration is also being given with a range of public and private sector partners to the development of the type of 'lighthouse' digital infrastructure projects referred to in this Digital Strategy, as well as obtaining and setting up processes to collate and analyse standardised 'real-time' data as part of the wider MCA/LEP Data Observatory initiative.

Significant activity is therefore already underway to both implement this Digital Strategy and develop the other two key elements of the wider digital agenda. Importantly, a significant resource in the form of the SFSY clawback will enable this positive progress to be enhanced and accelerated so that there is a coordinated and effective holistic digital approach being adopted by the MCA and partners to deliver the digital ambitions of the SEP.

Delivering and measuring success: Targets and Monitoring

In setting out this Digital Strategy, the MCA is seeking to deliver a mixture of outcomes that are relatively straightforward to measure (for example Gigabit-capable broadband availability) and some that are not; tackling digital poverty falls into the latter category.

As described earlier in this Strategy, there is a national paucity of local evidence about digital exclusion, so measuring and even setting meaningful local goals is a challenge. There is enough evidence available at the supra-regional level (Yorkshire and Humberside) to support the need for digital inclusion interventions in the short term, but the objective we set ourselves is be about building a better understanding of the local challenges, which will then allow the intervention strategy to be refined (and new targets to be set, if appropriate).

Likewise, we consider the implementation of a strong governance model as outlined in the previous section above and the adoption of a meaningful data strategy to be a key part of the Digital Infrastructure Strategy even though they are enablers rather than deliverables.






	POLICY PRIORITY	TARGETS
	Ensure South Yorkshire's superfast broadband and 4G success is repeated for Gigabit broadband and 5G	<ul style="list-style-type: none"> 95% availability of Gigabit Broadband by 2025 95% mobile coverage, closing rural gaps
	Support the social and economic priorities set out in the SEP	<ul style="list-style-type: none"> Data centre parity with other equivalent urban centres in place by 2025 Establish a South Yorkshire Digital Forum to support and advise on implementation of the Strategy
	Form an inclusive platform that enables better outcomes for all sections of society	<ul style="list-style-type: none"> A local solution in place for tracking levels of digital poverty and impact of interventions across South Yorkshire To develop and implement social value pilot projects
	Governance and data-driven approach to maximise the digital potential of South Yorkshire	<ul style="list-style-type: none"> Identify appropriate resources to implement the Digital Infrastructure Strategy Put in place comprehensive digital data provision and monitoring by end 2022
	Position South Yorkshire as a leading centre of applied digital innovation	<ul style="list-style-type: none"> Establish South Yorkshire as a centre of digital excellence to pilot new digital infrastructure innovations and models Roll out 5G pilots with South Yorkshire businesses by 2025 Promote a South Yorkshire IoT network

Figure 23: Indicative targets to track the successful delivery of South Yorkshire's digital strategy.

GLOSSARY

Wireless mobile telecommunications technology:

3G	Third generation wireless mobile telecommunications technology meeting IMT-2000 technical standards, which includes providing peak data rates of at least 144 kbit/s.
4G	Fourth generation wireless mobile telecommunications technology providing a substantial level of improvement in performance and capabilities compared to 3G.
5G	Fifth generation wireless mobile telecommunications technology which delivers higher peak data speeds, ultra-low latency, greater connectivity and increased network capacity.

Broadband speeds:

Decent broadband	Defined by Ofcom and the UK Government as a connection capable of delivering a download speed of at least 10 Mbps and an upload speed of at least 1 Mbps.
Gigabit capable broadband	Gigabit-capable broadband is an internet connection that offers a download speed of at least 1 gigabit-per-second (1 Gbps or 1000 megabits per second, Mbps). This can be delivered by a range of technologies, including: full-fibre connections, high-speed cable broadband and potentially 5G networks.
Superfast broadband	There is no single definition of superfast broadband. The UK Government's targets for superfast broadband coverage were based on download speeds above 24 Mbps. However, the EU and Ofcom define superfast broadband as download speeds greater than 30 Mbps. This Strategy also defines two sub-categories: <ul style="list-style-type: none"> • 'Basic' superfast: 10 - 30 Mbit/s • 'Good' superfast: 30 – 100Mbit/s
Ultrafast broadband	Broadband connection with download speeds usually over 300Mbps but less than 1Gbps (one gigabit per second, or 1000Mbps). Typically delivered via fibre optic cables between the exchange and the premises (see Fibre To The Premise / Full Fibre Broadband above).

Other terms:

Cloud infrastructure	The infrastructure required to deliver computing services over the Internet, encompassing hardware and software components such as servers, storage, databases, networking, and software tools.
Data centre	A building or a dedicated space within a building, housing computer systems and associated components, such as telecommunications and storage systems.
Digital infrastructure	The physical resources needed to enable the use of technologies such as digital communication, computing, or data storage.
Digital poverty	Lack of ability to access digital services (including by internet and/or mobile telecommunications). Causes include lack of access to equipment (i.e. laptops, tablets, mobile phones), services (i.e. speed or availability of broadband provision) and costs associated with services and equipment.
Digital social value	Ensuring that opportunities for delivering social value are sought in digital investment and infrastructure deployment, contributing to the long-term wellbeing and resilience of individuals, communities, and society in general.

DOCSIS 3.1	Data Over Cable Service Interface Specification (DOCSIS) 3.1 is an international telecommunications standard used by cable television operators to provide internet access.
Fibre To The Cabinet	Provision of high-speed broadband services via fibre optic cable to a cabinet and then by copper cable to the end user.
Full Fibre Broadband / Fibre To The Home / Fibre To The Premise	Provision of broadband access through fibre optic cables which extend all the way to the end-user premises, rather than to a cabinet that services the area. High data speeds are possible due to the absence of copper-based telephone lines. In the UK this also encompasses fibre to the building (FTTB) where in apartment blocks a fibre runs to each floor and Gigabit Ethernet cable is then run to each apartment.
Internet of Things (IOT)	A network of physical objects which have sensors, software, and other technologies embedded allowing connection to, and exchange of data with, devices and systems over the Internet
Latency	The time it takes for data to go from source to destination in milliseconds (ms).

A further glossary of broadband terminology is available at:

<https://www.thinkbroadband.com/faq/broadband-glossary>