Oxfordshire Digital Infrastructure Strategy and Delivery Plan

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Confidentiality of this document: Public
Statutory Bodies, Departments, Private Sector, and Stakeholders: Cross-Cutting;

Oxfordshire County Council, specifically Communities Directorate/Highways
Oxfordshire Planning Authorities
Oxfordshire Growth Board
Department for Digital, Culture, Media, and Sport
Ministry of Housing, Communities, and Local Government
Local Government Association
Association of Directors of Environment, Economy, Planning, and Transport
OxLEP
England's Economic Heartland
Fixed Network Operators
Mobile Network Operators
Oxfordshire Members of Parliament
Oxfordshire Councillors (County and Districts)
Oxfordshire Businesses
Oxfordshire Residents

Executive Summary

This document is formed from the Oxfordshire Local Broadband Plan which was put in place at the start of the Better Broadband for Oxfordshire programme in 2014. This programme has delivered a step-change in digital connectivity for the citizens and business in Oxfordshire, taking availability of superfast broadband to 97% from 69%. However, the volume of global internet traffic is expected to increase to 95 times that of 2005, by 2020, and is doubling every two years. In the mobile data domain traffic increases by 42% each year.

There are many drivers increasing demand for ever faster connectivity are orientated around two key areas – the move to cloud storage and applications, along with huge growth in video content. In tandem though, the convergence of IoT (Internet of Things) and AI (Artificial Intelligence) is transforming service delivery and business models, creating what is increasingly understood as the 4th Industrial Revolution. With this in mind, the focus of the Department for Digital, Culture, Media, & Sport (DCMS) has increasingly moved from superfast broadband to Full Fibre connectivity and 5G mobile data. The only way this rapid growth in bandwidth requirements can be accommodated is with full fibre broadband which offers speeds of 1Gb/s today and capable of much higher speeds in the future. This same fibre is also the backbone for backhauling 5G mobile.

There are few areas in the UK where the importance of world class digital infrastructure is as pronounced as in Oxfordshire. The county itself, and the Oxford to Cambridge Arc is the home to an economic growth engine for the UK, and this growth is predominantly founded on high Gross Value-Added businesses in

aerospace, advanced motor engineering, biosciences, space technologies, electronics & sensors, and Life Sciences. We also have a work force with above average skills, and of course excellence in academia. It is reasonable to compare this environment with the likes of Silicon Valley, Beijing, Los Angeles, Tel Aviv, and other world centres introducing revolutionary technical change. These are the locations Oxfordshire businesses compete with, and every one of these top tech hubs depend on world class digital connectivity.

Vision

Our vision is for Oxfordshire to be enabled with smart infrastructure, extending the smart city concept forward into our heartland. This means not only ensuring all residential premises and businesses are connected with full fibre, but the infrastructure fabric of our highways, signage, street furniture, public buildings, public transport, cycle paths, green spaces, medical facilities etc are connected, integrated, and enabled with IoT applications. This becomes particularly powerful when the data collected can be interrogated and combined with Artificial Intelligence to provide predictive assessments associated with health, travel, environment, and economic factors. This is an important contribution to our mission of creating thriving communities and a thriving economy in a sustainable and environmentally friendly manner. Examples include;

- **Intelligent Streetlighting – central management can allow detailed control of lighting, saving money whilst providing flexibility**
- **Strategic planning for Connected Autonomous Vehicles by way of 5G connectivity to accurately control the highways network**
- **A raft of sensors to measure air quality, spot fly-tipping, manage efficient refuse collections, measure noise pollution etc**
- **The means to provide real-time integrated public transport information**
- **ANPR data collected to show traffic patterns and predictability of what happens when there are problems on the road network leading to safer and more efficient journeys**
- **Sensors in homes of vulnerable people to enable access to services and permitted monitoring of live health data**
- **Facilitation of a Living Labs environment to trial new technology**
- **Predictability and management of public safety risks**

The deliverability of this vision requires long-term preparation and planning. Oxfordshire has an ideal opportunity to develop this as we facilitate delivery of a significant amount of new housing. Where new garden villages are planned, the means of delivering the necessary integrated infrastructure is relatively easy to design-in, rather that retro-fit, and these locations then become ideal digital infrastructure bridgeheads to launch into neighbouring communities.

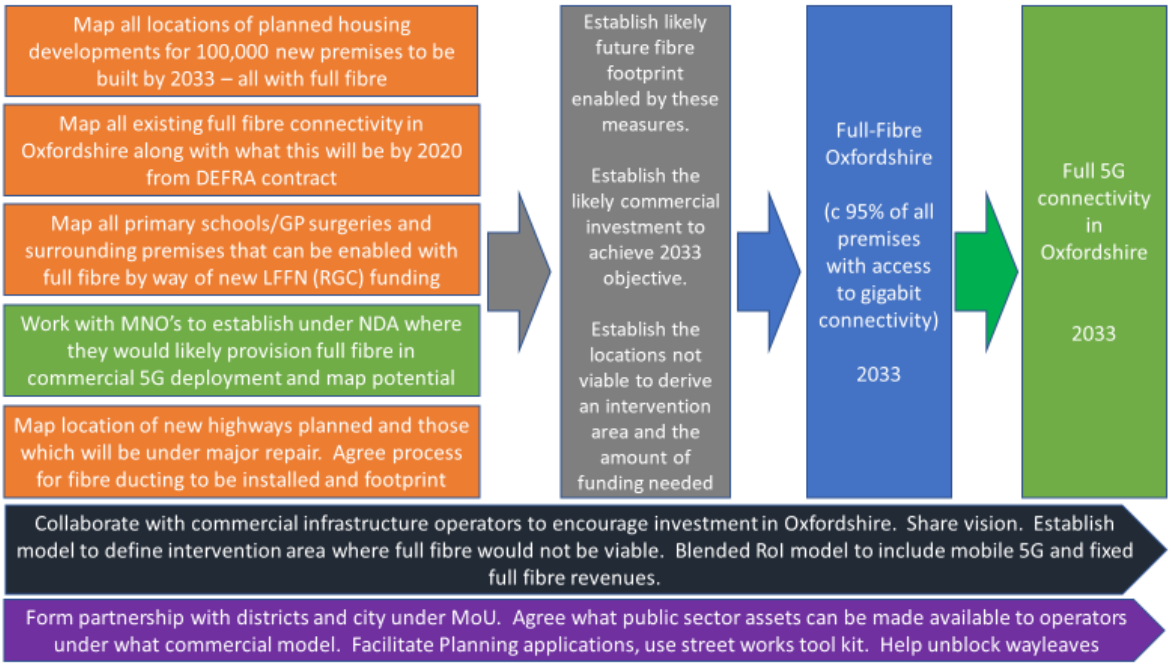
In Oxfordshire approximately 9% of premises currently have access to full fibre broadband infrastructure, meaning that to achieve ubiquitous access to this future-proof digital infrastructure will require deployment at a scale not seen before if we are to realise our growth ambitions. Equally, the next generation of mobile connectivity, 5G, depends on extensive availability of fibre to deliver the low latency and very high capacity demanded by this wireless technology. This creates a

requirement for the OCC led programme to change emphasis too, with the forming of a Digital Infrastructure Programme underpinned by a Digital Infrastructure Partnership comprising the county council, OxLEP, city, and district councils. This document provides the terms of reference for this programme.

By definition the public sector is not a digital infrastructure provider, and although this document sets out specific workstreams aimed at contracting digital infrastructure improvements, the key responsibility of the Digital Infrastructure Partnership is to provide strategic leadership, providing a coordinated facilitation role in ensuring private sector investment in digital infrastructure is maximised in Oxfordshire, for example by;

- **Enabling network operator access to public sector assets such as ducts, street furniture, & rooftops**
- **Taking a strategic approach to use of public sector assets to achieve maximum benefit rather than short term financial benefits**
- **Mapping potential public sector assets and make available to fixed/mobile network operators**
- **Ensuring Local Plans (as a multi-tier authority) are aligned with the latest (Feb 2019) NPPF guidance in respect of full fibre provision in all new housing developments**
- **Ensuring that a summary of this Digital Infrastructure Strategy and Delivery Plan is contained in all other relevant strategic documents such as the Local Industrial Strategy, Local Transport and Connectivity Plan, & Oxfordshire 2050**
- **Align OCC Highways with the DCMS Street works Toolkit where possible**
- **Appointment a Digital Infrastructure Champion by each partnership member to coordinate and lead on cross-public sector alignment and market engagement**
- **Creating a Digital Infrastructure Partnership with Oxford city council and all Oxfordshire district councils**
- **Setting targets for availability or superfast broadband, full fibre, and 5G**

This approach is critical in achieving the goal of significant **private sector investment** in our county, as well as being the agent applying for central government funding, and managing delivery of any resultant intervention programmes aimed at improving availability of full fibre and 5G mobile. We must provide a path of least resistance to fixed and mobile network operators, supplying them with all appropriate information equally and consistently (for example the locations of planned housing development as part of the Oxfordshire Housing & Growth Deal), and remove barriers to digital infrastructure delivery wherever this is practically possible. The structure chart below sets out at a high-level approach;



The diagram below sets out the structure of the Digital Infrastructure programme and its component project areas;

Superfast Broadband

Commercial Providers in Oxfordshire

'Commercial' superfast broadband simply means coverage provided by a supplier on a standard commercial basis where the investment required is considered by the supplier to return a profit over a standard return-on-investment period. This contrasts with 'intervention' coverage where public funds have been needed to support the business case for investment in the build of new network infrastructure. As of the end of 2018, most broadband infrastructure Providers, including Openreach, are only building full fibre (FTTP) infrastructure.

British Telecom plc:

Most commercial superfast broadband coverage in Oxfordshire is provided by BT (Openreach). This is an 'Open Access' network whereby over 100 Service Providers can productise and sell fibre-based broadband services. This is mandated by OFCOM due to the relative market dominance of the Openreach infrastructure. Openreach also delivers Fibre to the Premise which currently has a reduced number of Service Providers but is expected to grow. BT has made a public commitment to connecting 15m UK premises with full-fibre connectivity by 2025. It is important to note that Openreach is also required by OFCOM to grant other licensed Operators access to their duct and poles estate under an agreement known as PIA (Passive Infrastructure Access). From an engineering perspective, BT is also reconfiguring their network such that the hitherto separate leased line (private circuit) networks and fibre broadband networks are effectively combined into a single architecture whilst they prepare for switching off the PSTN (copper telephone line) network, currently set for 2025. This will be important for the UK in a number of areas as we move to Voice over IP (VoIP), including the strategic benefit of freeing up much needed space in their duct network.

Technical Information: The predominant VDSL solution deployed by Openreach is Fibre to the Cabinet (FTTC). As this depends on using the existing copper access network to distribute service to premises, it is constrained by distance between the fibre cabinet and the served property. This is currently a maximum of 80Mb/s download and 20Mb/s upload. Increasingly BT are enhancing this capability in Oxfordshire with a technology called G-Fast which enables up to 300Mb/s download for premises within 200m of the fibre cabinet. There is a growing Fibre-to-the Premise (FTTP) footprint offering 1Gb/s.

Virgin Media plc

Virgin Media also have significant coverage in metropolitan areas in Oxfordshire, notably, Oxford, Banbury, Abingdon, Didcot, & Bicester. It can be noted that collecting accurate planned coverage extension of the Virgin Media network has proven very difficult as this is demand-driven under Project Lightning.
http://www.virginmedia.com/corporate/about-us/our-key-projects.html

This project is promising some £3bn investment to extend their footprint by a further 4m homes. (As at 2016 VM are estimated to have coverage serving 14.5m premises). The VM network is not 'open access' and all services are contracted directly with Virgin Media (as at 2017). The demand led investment process is informed by an application process known as 'Cable my Street'. Further information on Project Lightning, and registration of interest is available at: http://www.virginmedia.com/cablemystreet/

Technical Information: The Virgin Media network is a hybrid of fibre and 'cable' which is understood to be co-axial cable. Maximum speeds available in 2017 are 200Mb/s

Virgin Media along with Openreach are the two main national infrastructure Providers in the UK. Both have industrialised processes for building fibre infrastructure to new housing developments.

Gigaclear Plc

Gigaclear is a relatively new entrant to Fibre Broadband infrastructure delivery, having been formed in 2010. The business is based in Oxfordshire and delivered its first live network in Rutland. The Gigaclear network is predominantly contracted directly as a service from Gigaclear, but it is an open access network and they do have additional service providers. Further information is available at https://www.gigaclear.com/

Technical Information: Gigaclear is relatively unique in providing all broadband as FTTP, offering packages up to 1Gb/s

Within Oxfordshire, Gigaclear have provided superfast broadband to some 11,000 premises entirely within the rural and very rural topology. Although they started with a single supplier model, they have now onboarded additional service providers in a Wholesale model. They have yet to have sufficient scale to onboard larger service providers such as Sky or Talk Talk, but as the volume of their connected premises increases, this is more likely to happen. They have also recently won the second phase of BDUK broadband delivery in West Oxfordshire, among several other BDUK projects which they have successfully bid for, though they are currently not taking on any more intervention projects.

Hyperoptic

Hyperoptic broadband is a relatively new entrant to Fibre Broadband infrastructure, having been founded in 2011. They specialise in full fibre broadband to existing and new Multiple Dwelling Units – flats and apartments. The company is estimated to have around 75,000 full fibre connections in UK cities. They currently only provide retail services, but it is understood they are considering moving to an open access model. Hyperoptic is currently (May 2019) talking to Oxford city council about being able to provide their full fibre services to social housing in Oxford city centre.

Open Fibre Networks Ltd (OFNL)

OFNL provides full fibre broadband (as well as TV infrastructure) to new build residential and commercial MDU premises across cities in the UK. They have an open access network with six resellers currently providing service contracts. As with all full fibre infrastructure operators, the network offers speeds of up to 1Gb/s. They currently have live installations or planned installations numbering nearly 7,000 premises in Oxfordshire.

Zzoomm

The ex-CEO and founder of Gigaclear, Matthew Hare, set up a new gigabit broadband operation called ZZoomm in March 2019. The company has decided it's first target coverage area is for some 6,500 premises in Henley-On-Thames to be delivered between September 2019 and December 2020. This coverage is delivered as full-fibre in a ducted network and is effectively for the entirety of Henley-on-Thames. ZZoomm's target locations are market towns and suburban areas of cities. The company aspires to extend full-fibre coverage to 1m premises over the next five years and is based in Oxford.

Fixed Wireless Broadband

There are several fixed wireless broadband providers actively involved in Oxfordshire. The Better Broadband programme has engaged with a range of these, including Wurzl, Suganet, Countryside Broadband, Voneus, & Village Networks. Further information including contact details is available at the Better Broadband for Oxfordshire website: http://www.betterbroadbandoxfordshire.org.uk/cms/
Although the broadband services provided by these operators are not proven as technically Next Generation Access (NGA) compliant, in many cases they offer faster broadband access than is otherwise available.

Better Broadband for Oxfordshire (BBfO)

http://www.betterbroadbandoxfordshire.org.uk/cms/

The county council initiated the Better Broadband for Oxfordshire programme in 2013 to address broadband coverage in Oxfordshire which at the time had 69% of premises able to access broadband at speeds above 24Mb/s. The foundation of this initiative is a multi-million-pound contract with BT for superfast broadband to be deployed in areas defined as under market failure conditions, and targeted;

- 64,500 Premises to have access to superfast broadband by December 2015
- 75,600 Premises to have access to superfast broadband by December 2017
- 77,800 Premises to have access to superfast broadband by December 2018

Following Open Market Reviews (OMR's) in 2012, 2014, and most recently in December 2017, a premise qualified to be included within this targeted coverage only when no provider has superfast broadband available or planned on a commercial basis within three years from the date of the OMR. From the baseline commercial coverage data received in the OMR process we have been able to estimate percentage coverage of Oxfordshire in line with the dates/volumes above. The latest OMR data was extracted from September 2017 EPOCH 52 version of OS AddressBase Premium.

- 90% superfast coverage by December 2015 ✓
- 95% superfast coverage by December 2917 ✓
- 96.5% superfast coverage by December 2018 ✓

This is the broadband intervention programme managed by Oxfordshire County Council, in partnership with BT and supported by Broadband Delivery UK (BDUK). Funding Partners (Capital) for the programme are;

- Oxfordshire County Council (£10.4m)
- BDUK (£8m)
- South Oxfordshire District Council (£1m)
- Vale of White Horse District Council (£250k)
- Cherwell District Council (£500k)
- Oxford City Council (£150k)
- OxLEP (£2m)
- SEMLEP (£240k)
- BT (£9m)
- Total £31 .4m

Better Broadband for Oxfordshire (BBfO) was set up as a delivery programme in December 2013. This followed the selection of BT Telecommunications plc as the successful bidder for the intervention programme under the DCMS initiative for improving the availability of superfast broadband (defined as a minimum of 24Mb/s download speed). This is administered, governed, and part-funded by BDUK.

As described in the Introduction, coverage is contracted in three phases, currently concluding in June 2019.

BBfO Background & Strategy

Oxfordshire County Council (OCC) set out a simple vision for the programme in 2014. This was for the county to have the highest possible availability of superfast broadband (SFBB) with the funding available (£14m public funds + £6m BT investment). Coverage was modelled based on best value for money, i.e. no specific target sectors or types. The principle worked to was that this approach would build out the fibre footprint from urban locations (covered commercially), into the rural heartland of the county. The contract with BT was a non-framework contract and drafted to facilitate a call-off further coverage without the need for another procurement.

During 2014 BDUK confirmed a second round of DCMS funding under the Superfast Extension Programme (SEP), and OCC engaged with potential funding sources to be able to secure access to the SEP funding. This resulted in OCC contracting phase 2 during 2014, for delivery to start in 2016. This time, coverage was modelled to consider the funding source, as well as value for money. As three of the district councils had put up differing amounts and with different populations, the coverage was required to be modelled proportionately. Importantly, the funding provided by OxLEP was focussed on delivering to the Science Vale Enterprise Zone, and business parks across Oxfordshire.

Another driver for the BBfO programme was to make available better broadband based infrastructure to be able to migrate Oxfordshire schools and corporate sites from very expensive leased line services under the OCC legacy corporate WAN network, to superfast broadband. This has been substantively achieved under the programme with all but one school already migrated, and along with the savings achieved by migrating small and medium corporate sites, nearly £1m per annum cost avoidance has been achieved.

Intervention Area Delivery Statistics – June 2019

Speeds

- Below 2Mb/s = 1,421 Premises
- 2 – 24 Mb/s = 4,638 Premises
- 24 – 30Mb/s = 2,698 Premises
- 30 – 50Mb/s = 16,840 Premises
- 50 – 100Mb/s = 73,124 Premises
- 100Mb/s+ = 593 Premises

Take Up

66% (Cumulative to date across all three delivery phases). This is a very important aspect. Not only does it clearly demonstrate demand for good digital connectivity, but the contract with BT Openreach has a clawback mechanism whereby take up above 20% accrues a payment back to OCC. This has enabled the Digital Infrastructure programme to move forward on a self-funding basis.

Overall coverage in Oxfordshire (Think Broadband data)

- Superfast (>24Mb/s) = 97%
- Superfast (>30Mb/s) = 96.7%
- Ultrafast (>100Mb/s) = 56.3%
- Full Fibre = 8.9%
- Below USC (<2Mb/s) = 0.3%
- Below USO (<10Mb/s) = 1.9%
- Below 15Mb/s = 1.9%

West Oxfordshire

In 2014, West Oxfordshire DC (WODC) decided to not apply funding to the BBfO programme and to run a separate procurement targeting full superfast broadband coverage in the district. The initial progress was slow with the misfortune of the

selected Supplier terminating the contract in late 2016, without any delivery achieved.

This resulted in WODC needing to run a further procurement which was initiated in early 2017, and resulted in the award of a contract to Gigaclear plc. Delivery is now well underway and adding to the composite coverage for the county. The contract will enable some 4,600 premises in the district to have access to full fibre broadband and Gigaclear is also installing full fibre access to a further 5,700 west Oxfordshire premises using its own investment.

DEFRA Funded Superfast/Ultrafast project

OCC has been awarded £6.3m by DEFRA to provide superfast broadband coverage to businesses in rural Oxfordshire that remain without any planned coverage under the existing BT contract. This was subject to an OJEU procurement and is due to be contracted at the end of August with two Operators and rollout will complete by June 2021.

Following receipt of bids, evaluation, and selection of preferred bidders, the project will deliver full fibre broadband to 968 rural business premises and 907 residential premises. The proposed contracts will each deliver two Lots (different geographies within the county). This represents approximately 0.6% additional superfast (and full fibre) connections in Oxfordshire. The project will be delivered by the existing Oxfordshire Digital Infrastructure team with the project cost drawn down from the BT Better Broadband contract underspend and gainshare (from take-up) income.

New Focus on Full Fibre and 5G

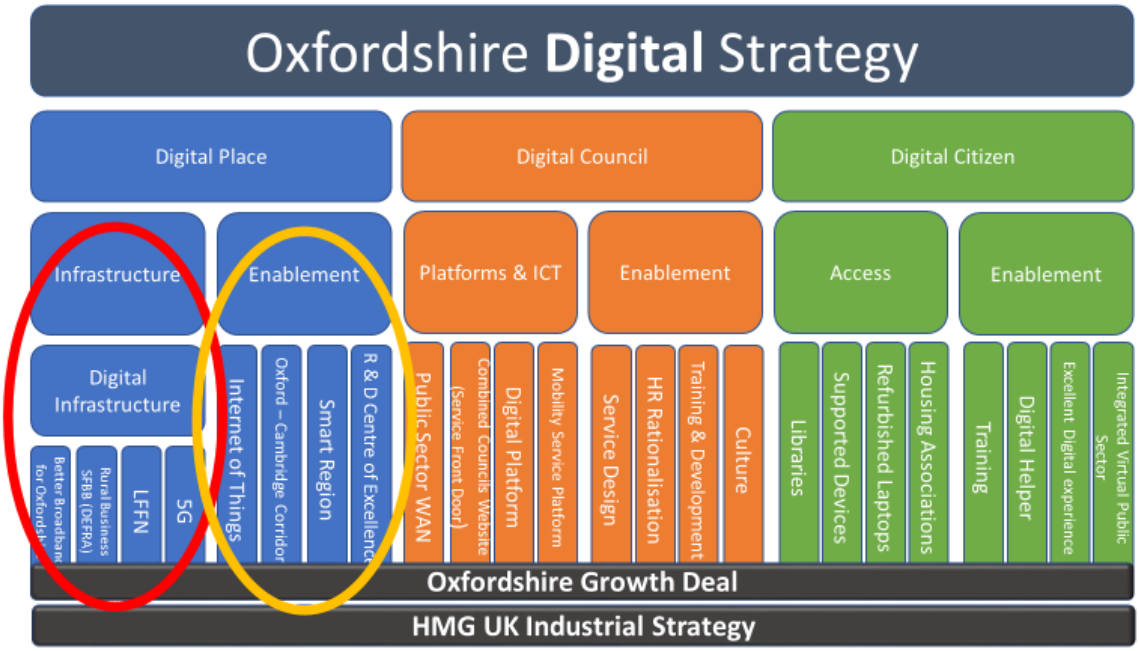
Whilst it was identified nearly ten years ago, that access to fast reliable broadband was to an important infrastructure consideration for Oxfordshire, the relevance and criticality of this has become more pronounced since the inception of the programme.

During 2018, DCMS significantly ramped up activity and focus on planning for the UK to have Full Fibre access to all premises by 2033, and for the UK to be a world leader in rollout of 5G mobile services. This is evidenced in the Future Telecoms Infrastructure Review. Correspondingly, Better Broadband for Oxfordshire is now one pillar of a Digital Infrastructure programme, increasingly focussed on the Full Fibre and 5G agenda and is incorporated in the draft Oxfordshire 2050 Plan, the Oxfordshire Transport & Connectivity Plan, and the evolving Oxfordshire Local Industrial Strategy being led by OxLEP:

Digital Infrastructure is increasingly understood to be a key enabler for transforming many facets of Oxfordshire life;

- Digital Council/Digital Citizen. As Oxfordshire councils and Oxfordshire Health bodies transform how public services are delivered, it is increasingly important to ensure all citizens can transact with the council online, and some of these applications, such as advanced remote healthcare, will require very high digital capacity
- Economic Growth – identified sectors/types
    - Enterprise Zones
    - Business Parks
    - Oxford, Milton Keynes, Cambridge Arc
    - Rural businesses/start-ups
    - Agriculture
- Attract inward investment and compete commercially both within UK markets and internationally
- Digital Inclusion to enable all to learn, work, and access economically advantageous goods and services online
- Environment – reducing the need to travel by working online from home
- Improving delivery of health and social care services
- Enabling the means of Connected Autonomous Vehicles (CAV's) to become reality
- Enabling Oxfordshire to operate as a Living Lab, for example by 'baking-in' Internet of Things (IoT) capability to all infrastructure projects, Oxfordshire can greatly improve the data capture (measuring/monitoring/tracking) to help improve analytics and ultimately improve service delivery

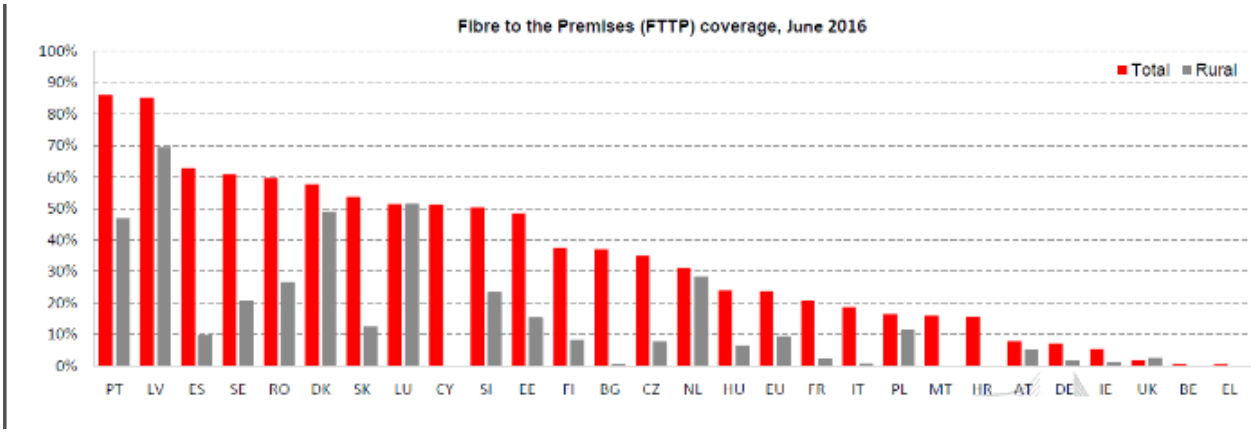
The Oxfordshire Digital Infrastructure Strategy can also be considered as a component of a broader Digital Strategy which encompasses how the public sector is increasingly shifting services online, which is described in the schematic below;



Full Fibre

The appointment in 2016 of Matt Hancock as Minister of State for Digital, saw a refocussing in DCMS from availability of superfast broadband to the availability of 'full fibre'. This has continued with Margot James in charge. The previous Minister, Ed Vaizey, had achieved a vast improvement in the availability of superfast broadband, defined as above 24Mb/s, but the current exponential growth in digital services has policy now directed to full fibre connectivity. An example of this is with the digital content most used across the world – video. Standard Definition on-demand content made way for High Definition, then 4K Ultra High Definition. Now TV sets capable of 8K definition are being sold. Each of these steps requires a quadrupling of bandwidth in order to stream content. The other major growth area in consumption of huge amounts of data is the shift to cloud computing and storage.

The UK landscape is poor in respect of full fibre connectivity at just 3% of premises having access. The table below shows the UK as third from bottom across Europe



Theoretically, full fibre networks have almost unlimited speed capability, with the constraint being the equipment at either end of the fibre path. A single fibre can transmit at terabit speeds using existing technology, and although expensive to install, it is then by definition effectively 'there for life' and has very low failure rates meaning maintenance costs are modest.

With this in mind, HMG is adopting a range of initiatives, including significant funding, aimed at expediting the roll out of full fibre. This currently mostly aimed at a model to stimulate commercial investment and exemplified by the Autumn Statement of 2016 in which HMG set out details of £700m of funding initiatives for Full Fibre & 5G rollout under the overarching National Productivity Improvement Fund. During 2017, DCMS has provided details of the Local Full Fibre Networks (LFFN) aspect which has been released with provisions for an initial £190m challenge fund (from the NPIF) https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/661364/Challenge_Fund.pdf for Government Bodies to apply for following four suggested themes*;

Public Sector Anchor Tenancy	DCMS support for the strategic procurement of fibre connectivity for multiple locations (where the public sector body is the long-term 'anchor' tenant) which creates additional fibre infrastructure in the region. This may include multiple public sector agencies. This approach may involve the separation of infrastructure provision from the delivery of services
Gigabit Voucher Scheme (GbVS)	The operation of a business voucher scheme which helps businesses (or clusters of businesses) buy gigabit capable connectivity, and anticipates the operator may subsequently extend the fibre 'footprint' to surrounding premises
Public Sector Building Upgrade	Direct tactical funding of connectivity using full fibre to specific public sector locations, where the costs of doing so cannot be met using existing business cases, and where the deployment of fibre extends the fibre 'footprint' to surrounding premises
Public Sector Asset Reuse	Support for capital costs associated with the re-use or development of public sector infrastructure assets (for example CCTV duct networks) to increase the commercial availability of fibre networks and extend the reach of backhaul or other services

Gigabit Voucher Scheme

This scheme is Supplier led and provides business and residential premises (as part of a scheme including businesses), £2,500 and £500 vouchers respectively to help fund installation of full fibre infrastructure. There are several relatively small-scale schemes underway in Oxfordshire. One possible large-scale scheme being worked on is to provide all premises in Watlington with full fibre. This is being led by the Watlington Business Association and supported by the parish council as well as a campaign group headed by Peter Richardson of Connect Eight . This could be an exemplar approach and is also being supported by OCC and SODC. Gigaclear and Openreach have both been invited to consider building proposals, and are approaching the project in different ways;

1) Build a full fibre solution for all premises in Watlington.
    a. Establish the total cost
    b. Establish the investment willing to be made by the Supplier
    c. This derives the amount required to be found locally
    d. Establish how many vouchers would be required to make up this amount
    e. Supplier campaigns to get businesses and residents to agree to contracting the minimum required service (100Mb/s for one year) and applying for their vouchers
    f. If this is insufficient the campaign would request financial contributions from businesses and the community
2) Supplier campaigns first to establish local areas of demand, rather than scope the whole town
    a. Supplier builds individual proposals pertaining to clusters of businesses and residents
    b. Each cluster would be a separate scheme and would follow the same process as above

Consideration is being given to see if this can be replicated and if DCMS would financially support this demand-side. It is already being mooted that under the

funding arrangements for the RGC programme there will be a new type of voucher which will support this strategy. (Update below)

Rural Gigabit Connectivity Programme (RGCP)

The next round of funding is aimed at an 'outside-in' approach and is known as the Rural Gigabit Connectivity programme. This £200m programme was officially launched on 19th May 2019.

The basis of this programme is to consider commercial provision of full fibre will be left to the market to deliver in urban and semi-urban areas and evidences a shift in government policy towards dealing with the hardest to reach areas first. The key with this programme is the definition of 'rural'. This is initially pegged against the DEFRA classification where premises must be in locations classified as D1 to F2. DCMS will also have a postcode checker which will further corroborate eligibility. The programme has two elements;

Rural Public Sector Hubs

Focussing initially on schools and GP practices, public sector building defined as being in the 'final 10%', i.e. rural as above, can be targeted to be provisioned with full fibre broadband. This would be contracted via a public procurement, likely to be under a new Crown Commercial Service (CCS) framework for 'Broadband Connectivity Services'. This will be broken down into three categories;

- Broadband Connectivity Services
- Infrastructure Build
- Point to Point Dark Fibre

The anticipated scenario would be that Oxfordshire CC select a range of public sector buildings (in locations defined as rural) in collaboration with the government agency occupying those buildings. These buildings would form the scope of a procurement for installing full fibre broadband infrastructure. In delivering that infrastructure however, it is expected the winning Supplier would also build out to other premises (business or residential) that would be passed by the infrastructure, at their own cost. This would then be augmented by;

Rural Gigabit Voucher Scheme

The **Rural** Gigabit Voucher Scheme will run in parallel with the Gigabit Voucher scheme (described above). This scheme is only available for premises in areas defined as 'rural' and differs in the following respects;

- Higher Values; The vouchers are worth £3,500 for a business premise and £1,500 for a residential premise
- The restriction for any joint scheme to include businesses is removed. Several residential premises may make a combined application without there being a business premise in the scope of the project

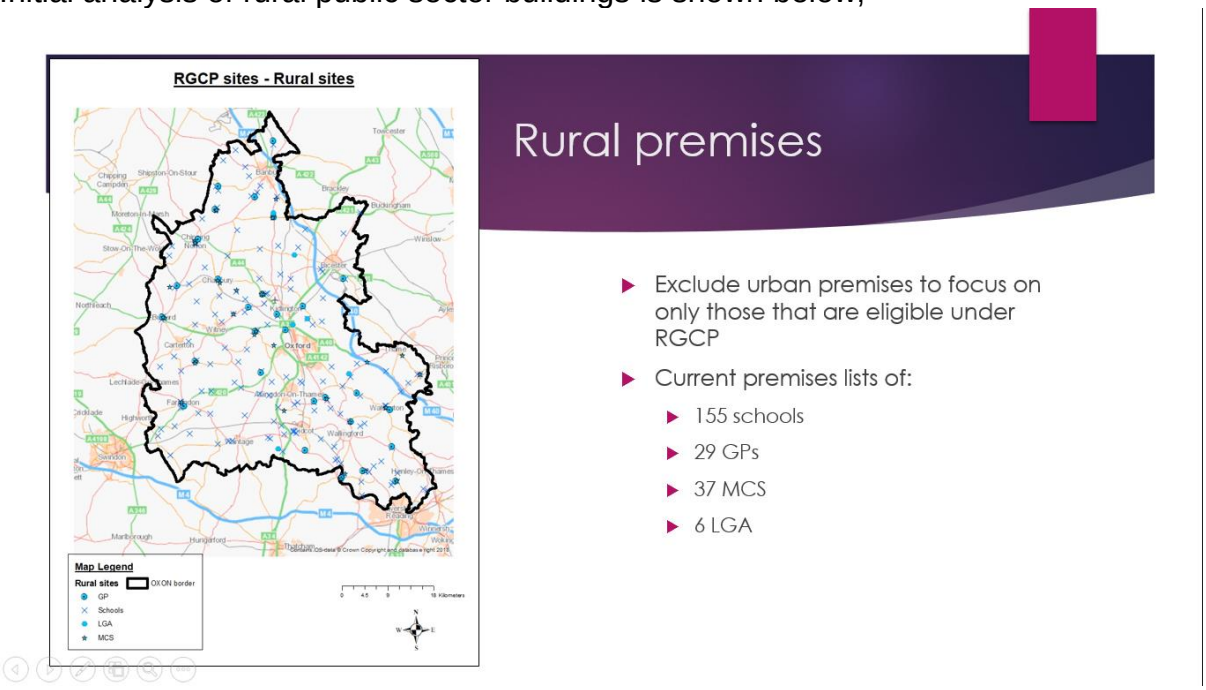
- There is however a new restriction whereby to qualify for a voucher, premises must not be able to receive superfast broadband (30Mb/s) currently or planned.

The plan is that premises within range of full fibre broadband, for example delivered under the Rural Public Sector Hubs initiative, can use the vouchers to connect to the fibre network by using the Rural Gigabit Vouchers

This renewed focus is raising the bar both in terms of the percentage superfast coverage aimed for, and the availability of full fibre (gigabit capable) infrastructure.

OCC is planning to bid for funding aimed primarily at connecting rural schools and GP surgeries to full fibre broadband infrastructure. Alternatively, or additionally, we have an option to procure full fibre broadband infrastructure to serve OCC buildings which would have the additional benefit of reducing connectivity costs from existing leased lines. By bring fibre broadband connectivity to these buildings, it also means the presence of this fibre makes it more commercially viable for adjacent business and residential premises to benefit in the short-medium term.

Initial analysis of rural public sector buildings is shown below;



The rules for the scheme and application process are not known and will be updated in June 2019, but Oxfordshire is considering making an unsolicited proposal to DCMS which would be for a subset of these premises in a selected geography, possibly aligned with the Ox Cambs Arc .

Longer term Strategy for Full Fibre

Current DCMS funding is limited to testing approaches and assumptions and is therefore constrained by the amount of funding available and the requirement to have any resulting projects completed by March 2021.

A long-term strategy is required to facilitate a full fibre Oxfordshire by 2031 which is the target date described in the Future Telecoms Infrastructure Review. This strategy is formed from several key elements;

City and Major towns

In line with HMG strategy, commercial investment by infrastructure operators will need to form the basis of full fibre provision. It is important to differentiate between infrastructure operators/suppliers as a category, from service providers which use that infrastructure to deliver internet services to the end user. The **infrastructure operators** currently active in Oxfordshire are;

1) Openreach plc
2) Gigaclear plc
3) Virgin Media plc
4) Hyperoptic
5) Open Fibre Networks Ltd (OFNL)
6) Zzoomm

Rural Premises

The final 10-20% or so of premises of rural premises will require public investment to support commercial delivery. The FTIR sets out that 10% of premises in the UK will need to be funded from the public purse, and using the figures in that document, that equates to some £3bn - £4bn investment. We expect the means of dispersing this funding will be described in the next funding round, but the current delays with Brexit and uncertainty on a possible general election could mean we won't know for some time.

New-Build Housing & the Growth Deal

The Oxfordshire 2050 (JSSP) plan is for 100,000 new houses to be built by 2033 (Approximately 25% of which are completed and 25% approved through the planning process). This represents an increase of nearly one third to the housing stock in Oxfordshire. OCC will work alongside Planning authorities to ensure appropriate steps are taken to have full fibre infrastructure installed at these sites.
This also presents an opportunity to work proactively with fibre infrastructure operators to establish viability of connecting premises passed with fibre from their points of presence en route to the new housing developments. Equally, proactive working with Mobile Network Operators which will have new revenue opportunities from the new housing can encourage fibre to be installed for their mobile mast infrastructure. The Digital infrastructure programme is also developing a blueprint for embedding smart infrastructure in the new villages planned for build over the next twenty years. This will aim to reduce travel, improve well-being, and create a sustainable approach for a larger population

Small Towns and Semi-rural

This is the mid-ground between rural areas which will have targeted intervention funding, the more densely populated areas which will be commercially covered, and the areas in which new housing is built.
The Oxfordshire Digital Infrastructure Partnership (See Enabling and Planning for Digital Infrastructure, p19), will have a collective role to play in promoting commercial investment by infrastructure operators in these areas. The OCC Better Broadband programme and the West Oxfordshire superfast programme have enabled some 600km of fibre to be installed across the county, with much of it laid in semi-rural environs. This means that the incremental cost of extending that fibre backhaul network into individual premises is significantly lower than it would have been without these intervention programmes. When combined with increased demand over time for ultrafast broadband, as online content and applications evolve, the business case for commercial upgrading of digital infrastructure will become stronger. Demand driven (for example vouchers) intervention may be required to supplement commercial investment to complete delivery

In summary, there are several aspects which will work together to collectively build a full fibre Oxfordshire;

1) Map all planned housing build in the county. Most of the locations for the 100,000 premises are known with some accuracy. With close management of developments going through planning we can ensure these are all built with full fibre access
2) Map all existing FTTP deployment in the county by all suppliers
3) Map the city and large towns in Oxfordshire as planned for full fibre being built on a commercial basis by 2031
4) That will leave the area and scale of uncertainty which can also be mapped at a premise level. These locations can then be plotted as approximate distances from existing fibre bridgeheads serving new housing developments and city/towns and existing FTTP.
5) This becomes the intervention area requiring intervention funding

Mobile Connectivity

Developments with very high-speed mobile broadband (under the banner of 5G), provide the enabler for a range of evolving technologies which are no longer ‘sometime in the future’. This is the technology required for a connected world where device-to-device connectivity is to become a standard. This is known as the Internet of Things (IoT), and there are already estimated to be over 7bn such connected devices in the world, and again the growth is exponential. The efficient management of key infrastructure will be driven by access to 5G, allowing better use of highways, safer (probably driverless) cars, more environmentally sustainable street lighting, traffic monitoring, air quality measurements, integrated public transport, remote health and social care capabilities etc will all benefit from 5G access. A strategic aim of the Oxfordshire Digital Infrastructure programme is to

develop 5G IoT applications in Oxfordshire which will have provide practical improvements to the lives of our residents and enhance economic growth whilst using this new technology to assist with sustainability and a reduction in travel and congestion wherever possible.

This technology cannot be separated from the Full Fibre subject either. 5G depends on traditional mast mounted equipment and also small cell deployment. Small cell technology is dependent on mobile transmitters every 100m or so, and most transmitters requires a fibre connection. Even 3G and 4G mobile networks currently use wireless backhaul (mast to mast) in some 40% of the UK installations, and this is not going to be sufficient in the medium term.

Alongside the Full Fibre initiative being managed within the Department for Digital, Culture, Media, and Sport (DCMS), there is a 5G Testbeds and Trials Programme. This is aimed at ensuring the UK is at the forefront of 5G development and implementation. During the summer of 2018 DCMS launched a funding application process for Urban Connected Cities (UCC) with a grant of £100m being awarded to the West Midlands Combined Authority as selected partner to work alongside DCMS in delivering a large-scale testbed.

Further funding is expected to be made available by DCMS to support user cases for 5G applications in a rural environment.

Whilst government funding initiatives for 5G pilots has a role to play, delivery at scale is clearly dependent on MNO (Mobile Network Operator) investment. During the second half of 2019 the four UK MNO's (Vodafone, O2, EE, and Three) have been releasing information about when and where they are planning to roll out 5G infrastructure. To date there have been no plans formally announced for any coverage in Oxfordshire, but the digital infrastructure partnership team have engaged with the two UK mobile infrastructure service companies – CTIL and MBNL (CTIL build and maintain the radio mast infrastructure for Vodafone and O2, whilst MBNL perform this function for EE and Three). This has been facilitated by Mobile UK with discussions geared to encourage investment in Oxfordshire for both 5G and 3G/4G coverage. During December we have established that CTIL have plans to install a significant footprint of 5G cells across Oxford City.

Whilst the future of mobile connectivity is focussed on designing and delivering 5G platforms, there remains a real challenge in parts of Oxfordshire where there is no ability to make or receive simple voice calls, as well as areas devoid of 3/4G mobile data coverage.

Despite intervention attempts such as the Mobile Infrastructure Project (MIP), and promises from industry, a recent report (December 2017) identifies that only 20% of people living or working in rural areas (national) have access to 4G mobile connectivity. Ofcom has published coverage data for mobile connectivity, but it is difficult to use this to distil an informed view to real-world experience. ThinkBroadband estimates that the average download speed of mobile data (average of both 3G and 4G networks) in Oxfordshire is 28.6Mb/s. This is up from around 14Mb/s in 2016

Following the same trend as occurred with landline technology, data transmission has overtaken voice with mobile communications. Increasingly absence of fast data capability for mobile based workers, has become a real constraint to business efficiency and effectiveness. In a world where knowledge is the sought-after commodity, having no, or slow access to these virtual resources becomes a significant barrier to local economic growth.

There is a £1bn initiative between HMG and the mobile industry called the Shared Rural Network (SRN) which aims to banish rural 'not-spots', which is likely to be signed-off early in 2020. The HMG contribution (approximately £500m) is to fund the deployment of mast infrastructure in rural areas where there is no mobile coverage at all. Meanwhile the MNO's will jointly invest a further £500m to fix the problem of partial coverage where the coverage is not across all four MNO networks. They will cure this by way of agreeing to share the mast infrastructure such that all four MNO's host their equipment on masts. The SRN initiative has been in development for nearly two years and is the mobile industry's response to an HMG plan to force the MNO's to resolve the partial coverage problem by way of rural roaming (as for example happens when abroad and a mobile handset will default to whichever Operator has the strongest signal.

The combined effect of the infrastructure build associated with the 5G rollout and the SRN initiative will lead to significantly more build of mobile mast infrastructure than has been the case in recent years. The 2016 amendments to the Permitted Development Rights and the planned additional revisions of 2019 will make it easier for MNO's to progress the infrastructure build, but it will be important for Oxfordshire planning authorities to work closely with CTIL and MBNL on behalf of the MNO's, to facilitate the planning process. This is set out in the Digital Infrastructure Partnership Memorandum of Understanding and includes aspects such allowing Operators to have access to public sector assets where practical;

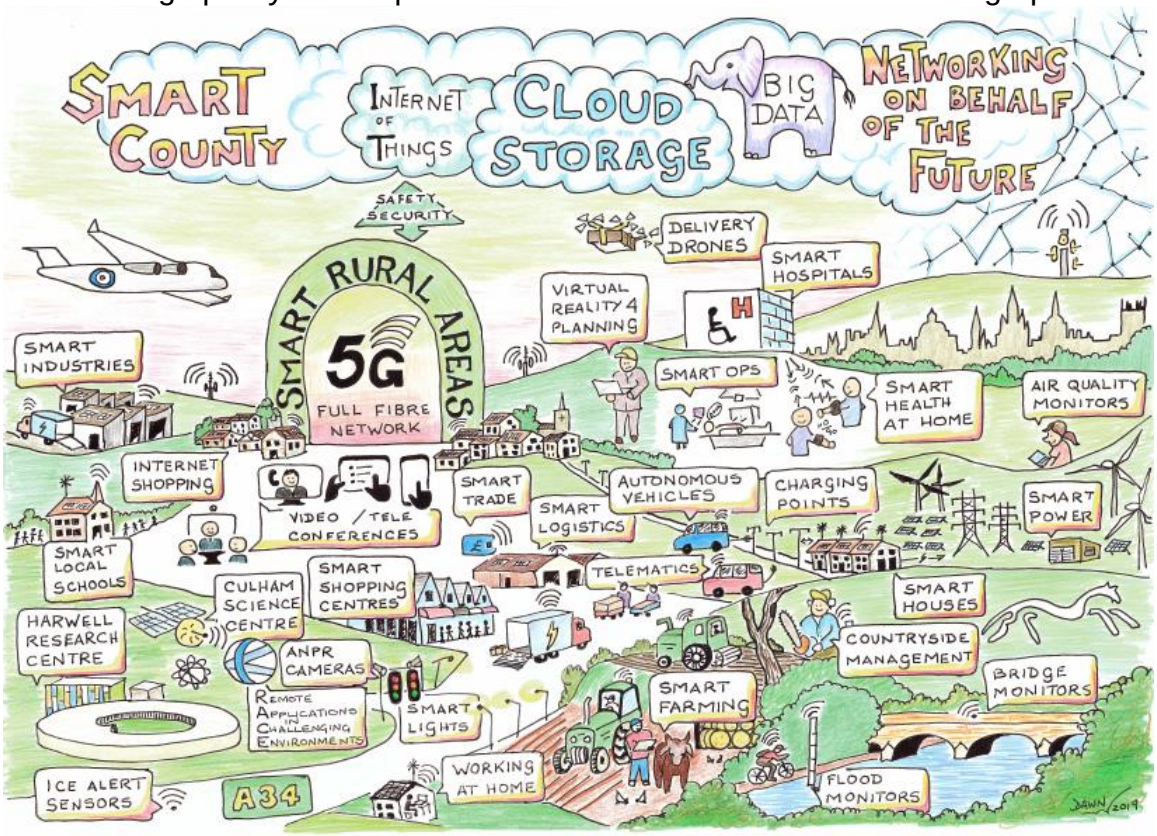
- **Planning Permission**; The Mobile Network Operators (MNOs) frequently cite they are prevented from installing mast infrastructure in the locations necessary to improve coverage, because of not being granted the necessary planning consent by the Planning Authorities. OCC must ensure that encouragement is given to find ways to avoid this by bringing the MNOs together with the planning Authorities to seek alternatives
- **Public Sector Assets**; OCC is about to invest in a significant street lighting replacement, including several thousand new columns. Consideration is being given in this procurement to specifying street furniture which is suitable for mounting not just IoT sensors such as traffic monitoring, air quality sensors etc, but also small cell wireless capability. OCC will consider as part of this how we may incentivise MNO's to extend coverage using these assets, preferring a neutral host commercial model to maximise the strategic value of these asset, providing the right strategic outcome (greater coverage from all mobile operators), rather than a short-term revenue opportunity. The potential use of public sector assets will include not just those assets owned by OCC, but the city and district councils too. Engagement with UK Mobile is underway to gain their perspective.

- **Facilitating Wayleaves**; Experience gained in delivering the Better Broadband for Oxfordshire programme demonstrates that it is often easier for us a public body, to expedite telecoms related wayleaves, with private landowners. This is because we can provide context as to the community benefit achieved by installation of full fibre broadband.

Smart Oxfordshire

Smart Infrastructure comprises a wide scope of components. Planning for a Smart County, requires coordination across a cross-section of OCC business units and external public sector bodies. This impacts multiple vertical stakeholder groups across the region. Coordinating a strategy to bake-in smart capabilities requires a blueprint approach with separate approaches into;

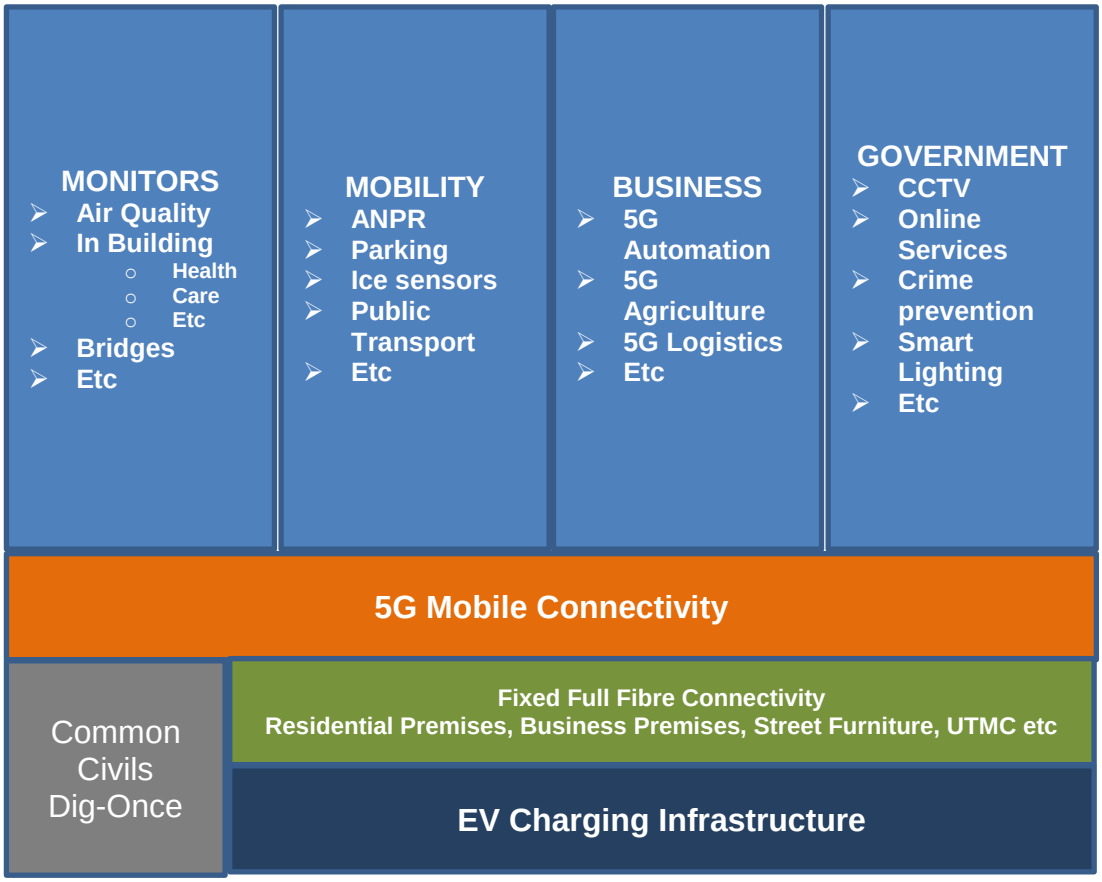
- **Greenfield Blueprint:** Aimed at new villages, towns, housing developments, and growth corridors where a clear vision combined with careful planning and coordination, this can translate to a few templates which can be embedded in design policy. A template vision for this is as shown in the infographic below:



- **Retrofit Blueprint:** The critical underlying full fibre and 4G and 5G infrastructure dependency is the biggest barrier to enabling smart services. In approaching this challenge OCC will form a range of proactive policy changes to facilitate cost-effective commercial delivery of smart infrastructure into a built environment, design rules will be put in place to avoid dead-end

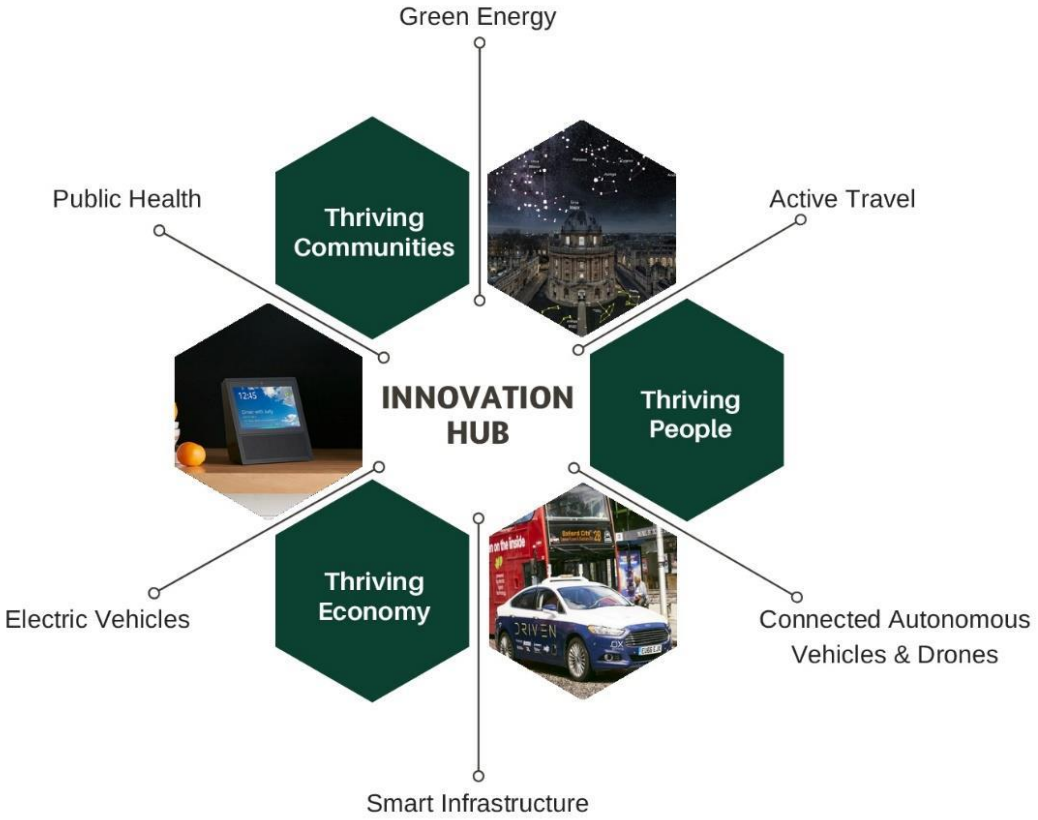
architectures, and intelligence-led integration with any adjacent greenfield deployment. This latter point is vital given the amount of new-build housing planned in Oxfordshire. The blueprint needs to include a schedule of known locations for new-build housing, mapping opportunities for the greenfield infrastructure being built can extend into adjacent areas by way of a 'fibre bridgehead' strategy. A memorandum of understanding will be put in place with planning authorities to agree a common approach to encouraging commercial investment, and the OCC digital infrastructure team will continue to engage with central government to secure intervention funding for the areas remaining as commercially unviable. See the Future Telecoms Infrastructure Review

Smart Infrastructure Components:



Oxfordshire Innovation Hub

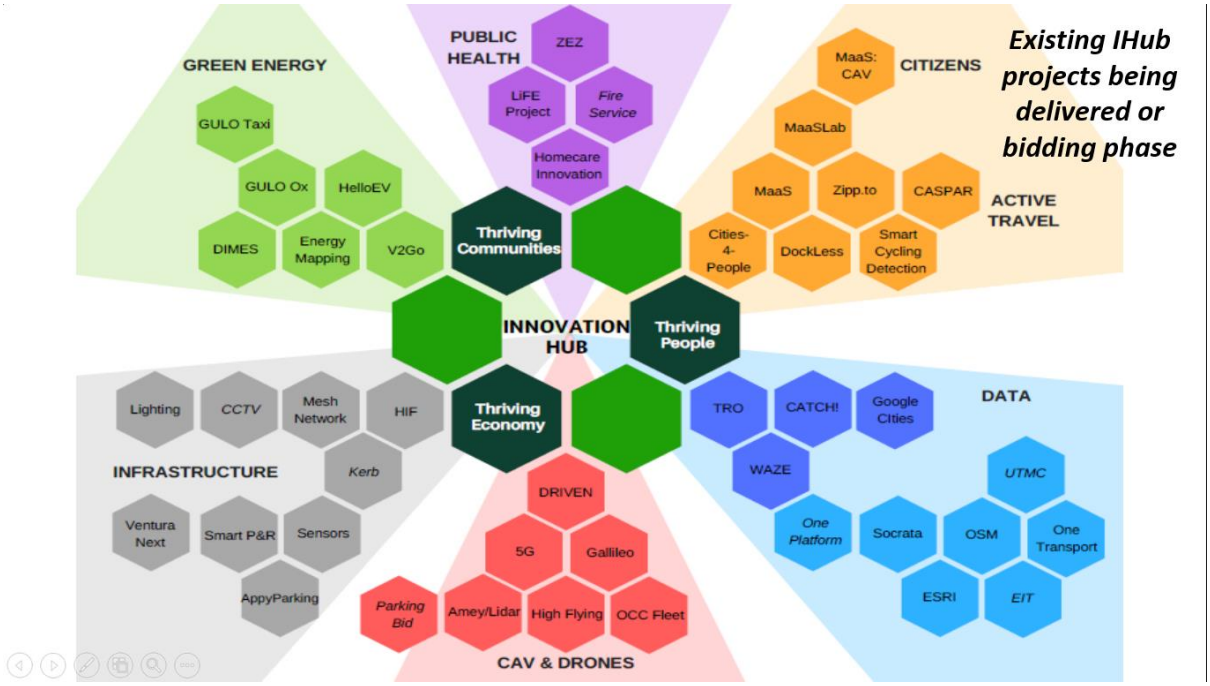
Fixed & Mobile Broadband – Applications and IoT



OCC has a Research and Innovation team responsible for developing capacity and capability in Smart City/Smart County, IoT applications including street furniture connectivity, Autonomous Vehicles, Integrated Mobility, Healthcare, and other related developments which will enrich the lives of Oxfordshire residents.

Much of the work undertaken by this team is dependent on enhanced digital infrastructure. This team also access funding opportunities through organisations such as Innovate UK and has a Community Interest Company MoBOx CIC

There are specific OCC projects which can encourage early deployment of next generation mobile broadband. A current example is the current procurement of a streel lighting contract which will see over 20,000 streetlights replaced with new columns. Here the opportunity is to specify the columns to be able to have smart capabilities such that they can communicate with each other and a central control unit. This will likely be connected with LoRa WAN (Low Power, Wide Area) networking technology. The opportunity is to consider commercial models for Mobile Network Operators (MNO's) to have access to this as an asset for improving small cell mobile coverage on a non-exclusive basis. In return OCC might have access to the MNO fibre ducting for building a high capacity mobile network available to the public sector and small/medium enterprises looking to trial new technologies – this is known as a Living Lab approach. The diagram below describes the range of projects being evaluated or delivered.



Oxfordshire Local Industrial Strategy

OxLEP is currently building a Local Industrial Strategy submission to central government. This will be a critical placeholder for the development of Oxfordshire and the region from a local economic prosperity perspective. It is also sets the scene as Oxfordshire being part of one of three regions with a very significant positive contribution in GVA to the Exchequer.

The Fourth Industrial Revolution in many respects holds a mirror to the development of Oxfordshire's Local Industrial Strategy. This confluence of digital, physical, and Bioscience aspects of industrial development typifies the opportunity for Oxfordshire to increase the pace of economic productivity. These are the areas of the most important technical and social change that the world will witness this century, building on the Personal Computing and www digital revolution of the late 20th century. The opportunity is enormous for those economies with the right mix of skills, infrastructure, and investment. The identifiable domains include artificial intelligence, robotics, nanotechnology, blockchain, quantum computing, IoT, 3D printing, autonomous vehicles, and biotechnology. These are all highly disruptive and likely to have a similar impact on society as the second industrial revolution of the late 19th century which saw mass automation displace jobs and huge population movements. For Oxfordshire this represents a significant opportunity for growth and wealth creation building on already well-established employment sectors.

The county has the expertise, skills, businesses, culture, and means of further skills development to create a highly developed, highly skilled, high value-add and well-balanced economy to capitalise on this technological led change. We must however focus on ensuring the infrastructure is fit for purpose and '4IR Ready'. In this context no infrastructure is more important nor more relevant than digital infrastructure. Ubiquitous very high-speed affordable connectivity both fixed and mobile will be the

lifeblood for ensuring opportunity is optimised. The building of this infrastructure will require significant investment both in cash terms and policy/planning/political terms.

Enabling & Planning Digital Infrastructure

The Future Telecoms Infrastructure review targets near 100% coverage of full fibre broadband by 2033, and near full access to 5G mobile services. About 26,000 of Oxfordshire's 335,000 premises currently have full fibre infrastructure. Therefore some 22,000 premises will need to be connected every year for the next fourteen years to achieve the full fibre target. As this is by definition new infrastructure delivered to the curtilage of premises, it represents a huge civils undertaking over a protracted period. Planning and collaboration among multiple public and private sector entities will be a key element in bringing this goal to reality, along with the need to consider significant new structure deployment for mobile 5G infrastructure. Planning consent, access to public sector assets such as street furniture, access to install ducting in Oxfordshire's roads, paving, and verges will all require careful planning and noticing. This aspect will be a key output of the Digital Infrastructure Partnership and the role of Digital Infrastructure champions will be needed to help ensure there is a strong element of collaboration.

A focussed, collective, collaborative engagement with private sector Operators will be required to ensure Oxfordshire receives appropriate attention in bringing digital infrastructure investment into the county. We have to make it as easy as possible for Operators to see a return on investment, ease access to our highways, create non-restrictive access to our assets for deploying infrastructure, and be innovative in working with all utility companies to avoid multiple instances of civils. Above all we must engage to show the unique opportunity Oxfordshire presents through the planned growth strategies we have underway, and the means of using the county as a Living Lab to trial technical innovation here.

The Digital Infrastructure Programme is set up to encourage this collaboration;

- ✓ Formal partnership with Oxford City, Cherwell DC, West Oxfordshire DC, South Oxfordshire DC, Vale of White Horse DC, and OxLEP
- ✓ Partnership operational board meetings monthly
- ✓ Quarterly strategic boards
- ✓ Draft MoU in place to formalise;
    - Consistent approach to Planning Guidance in respect of Digital infrastructure
    - Library (and map) of public assets which could be of use to Suppliers in improving infrastructure
    - Formal conduit to engage and manage all stakeholders
    - Collaborative funding approach

Businesses

Whilst large enterprises are likely to continue to use leased line fibre connectivity due to the resilience and class of service incumbent with private high-speed connections, small and even medium sized businesses will benefit from access to full fibre broadband. The Oxfordshire Better Broadband programme has targeted the enterprise zones and business parks in rolling out superfast broadband and we have ample case studies describing the huge benefit this has brought to businesses. As described in the Executive Summary, Oxfordshire has a much higher proliferation of digital, research, science, and technology companies. This profile of business has a particularly high dependency on world class digital connectivity for communicating with customers and their respective supply chains.

In general, the move to cloud-based applications and storage creates a demand for ever-faster broadband anyway, so when combined with the profile of businesses which have invested in Oxfordshire, the requirement for connectivity is amplified. Additionally, as the strategy for enshrining the so called 'brains' arc between Oxford and Cambridge gathers pace, it is important to use this investment opportunity to plan now for how digital infrastructure can be deployed. Examples include ensuring all new highways and rail links have fibre ducting and mobile infrastructure backhaul designed-in rather than needing to be retro-fitted. Consideration should be given to the fact that 1m new homes are planned to be built in the Arc and although this is understandably unpopular for environmental reasons, ensuring 21st digital infrastructure is installed at the build phase will significantly mitigate environmental impacts; More people will be able to work from home, reducing the amount of traffic on the roads; Full 5G infrastructure and electric vehicle charging points installed at the point of new-build will enable a future of electrically powered autonomous vehicles to be used on-demand; Intelligent buildings will optimise environmental controls reducing power consumption are just a few examples.

The Oxfordshire Housing and Growth Deal affords Oxfordshire an opportunity to strategically plan digital infrastructure provision alongside 'traditional infrastructure' creating a place where businesses want to invest and grow. We have the skills, resources, academic institutions, planned housing, and potential world class digital connectivity that will enable this part of the UK to compete with anywhere in the world.

Targets

The Digital Infrastructure Programme has interim targets of achieving **99% superfast** coverage by 2021 and **16% Full Fibre** coverage in the same timeframe.

Digital Infrastructure for Oxfordshire Stakeholders:

Members of Parliament;

Victoria Prentis	Banbury
John Howell	Henley
Anneliese Dodds	Oxford East
Layla Moran	Oxford West & Abingdon
Ed Vaizey	Wantage
Robert Courts	Witney

Oxfordshire County Council;

Leader	Cllr Ian Hudspeth
Cabinet Member	Cllr David Bartholomew

District Councils;

Oxford City	Cllr Susan Brown
Cherwell	Cllr Barry Wood
West Oxfordshire	Cllr James Mills
South Oxfordshire	Cllr Sue Cooper
Vale of White Horse	Cllr Emily Smith

Parish Councils;

Parish council	Name	Role
Abingdon-on-Thames Town Council	Mr Nigel Warner	(Town Clerk)
Adderbury Parish Council	Mrs Theresa Goss	(Clerk)
Adwell Parish Meeting	Mr W.R.A. Birch-Reynardson	(Chairman)
Alvescot Parish Council	Mrs C Hoad	(Clerk)
Ambrosden Parish Council	Lynne Bustin	(Clerk)
Appleford Parish Council	Lucy Guinn	(Clerk)
Appleton-with-Eaton Parish Council	Ms Susan Blomerus	(Clerk)
Ardington and Lockinge Parish Council	Dr C.F. Knights	(Clerk)
Ardley with Fewcott Parish Council	Mr Huw Jenkins	(Clerk)
Arncott Parish Council	Mrs A.J. Davies	(Clerk)
Ascott-under-Wychwood Parish Council	Mrs Angela Barnes	(Clerk)
Ashbury Parish Council	Clarie Arnold	(Clerk)
Asthall Parish Council	Mrs Rita Gunn	(Clerk)
Aston Cote Shifford and Chimney Parish Council	Mrs Helen Sandhu	(Clerk)
Aston Rowant Parish Council	Tracy Lambourne	(Clerk)
Aston Tirrold Parish Council	Ms Claire Picken	(Clerk)

Aston Upthorpe Parish Council	Claire Picken	(Clerk)
Baldons Parish Council	Lisa Fermer	(Clerk)
Bampton Parish Council	Mrs C Street	(Clerk)
Banbury Town Council	Mr Mark Recchia	(Clerk)
Barford St. John and St. Michael Parish Council	Mr David Best	(Clerk)
Baulking Parish Meeting	Mrs Chris Butler	(Clerk)
Beckley and Stowood Parish Council	Mrs Sue Cox	(Clerk)
Begbroke Parish Council	Mr Jeffrey Wright	(Clerk)
Benson Parish Council	Mrs Dianne Brooks	(Clerk)
Berinsfield Parish Council	Mrs A. Loveland	(Clerk)
Berrick Salome Parish Council	Chris Cussens	(Clerk)
Besselsleigh Parish Meeting	Mrs Carol Dodimead	(Clerk)
Bicester Town Council	Mrs Samantha Shippen FCIS, Fellow ILCM, CMC	
Binfield Heath	Mrs Marilyn Sermon	(Clerk)
Bix and Assendon Parish Council	Ms Jane Pryce	(Clerk)
Black Bourton Parish Council	Ms L Thorn	(Clerk)
Blackbird Leys Parish Council	Mr Nicky Clargo	(Clerk)
Blackthorn Parish Council	Mrs Charlesworth	(Clerk)
Bladon Parish Council	Ms P Aldridge	(Clerk)
Blenheim Parish Meeting	Mr D Hare	(Clerk)
Bletchingdon Parish Council	Mrs Rebecca McNaught	(Clerk)
Blewbury Parish Council	Miss Michelle Taylor	(Clerk)
Bloxham Parish Council	Theresa Goss	(Clerk)
Bodicote Parish Council	Mrs V. Russell	(Clerk)
Bourton (Faringdon) Parish Council	Mrs Maggie Brown	(Clerk)
Bourtons (Banbury) Parish Council	Mr Stephen Bowen	(Clerk)
Brightwell Baldwin Parish Meeting	Dr Stephen Rousseau	(Clerk)
Brightwell-cum-Sotwell Parish Council	Lucy Dalby	(Clerk)
Britwell Salome Parish Meeting	Mrs Denise Ballard	(Clerk)
Brize Norton Parish Council	Mrs A Riseley	(Clerk)
Broadwell Parish Meeting	Mr M Hough	(Chairman)
Broughton Parish Council	Mrs Christine Coles	(Clerk)
Bruern Parish Meeting	Mr D.W. Astor	(Chairman)
Buckland Parish Council	David Page	(Clerk)
Bucknell Parish Council	Sue Mackrell	(Clerk)
Burford Town Council	Mrs M. Andrews	(Town Clerk)
Buscot Parish Council	Mr J.D. Lindsey	(Clerk)
Carterton Town Council	Mrs Tan Marchant	(Town Clerk)
Cassington Parish Council	Ms T Cameron	(Clerk)
Caversfield Parish Council	Mrs Jane Olds	(Clerk)
Chadlington Parish Council	Ms Gill Hill	(Clerk)
Chalgrove Parish Council	Jo Murphy	(Clerk)
Charlbury Town Council	Mr S.R. Clarke	(Clerk)
Charlton-on-Otmoor Parish Council	Mrs S Hatwell	(Clerk)

Charney Bassett Parish Council	Mr Trevor Brown	(Clerk)
Chastleton Parish Meeting	Mr P. Eve	(Clerk)
Chesterton Parish Council	Mr Vic Keeble	(Clerk)
Childrey Parish Council	Mrs Deborah Lewis-Pryde	(Clerk)
Chilson Parish Meeting	Mrs D Walker-Arncott	(Clerk)
Chilton Parish Council	Mrs M.E. Morris	(Clerk)
Chinnor Parish Council	Mrs Liz Folley	(Clerk)
Chipping Norton Town Council	Mrs V Oliveri	(Clerk)
Cholsey Parish Council	Lucy Dalby	(Clerk)
Churchill and Sarsden Parish Council	Ms Helen Tomalin	(Clerk)
Clanfield Parish Council	Mrs L Scott	(Clerk)
Claydon with Clattercote Parish Council	Kirsty Buttle	(Clerk & Responsible Financial Officer)
Clifton Hampden Parish Council	Mrs A. Davies	(Clerk)
Coleshill Parish Council	Mrs Susan Homersham	(Chairman)
Combe Parish Council	Ms Julia Sharpe	(Clerk)
Compton Beauchamp Parish Meeting	Hamish McIntosh	(Chairman)
Cornbury and Wychwood Parish Meeting	The Lord Rotherwick	(Chairman)
Cornwell Parish Meeting	Ms L. Blackwell	(Secretary)
Cottisford Parish Meeting	Mr I.S. Torrance	(Chairman)
Crawley Parish Council	Ms J Butler Parker	(Clerk)
Cropredy Parish Council	Mr K I Porter	(Clerk)
Crowell Parish Meeting	Mr Daniel Squirrel	(Chairman)
Crowmarsh Parish Council	Mrs S. Rance	(Clerk)
Cuddesdon and Denton Parish Council	Dr Michael J. Mount	(Clerk)
Culham Parish Council	Mrs L. Dalby	(Clerk)
Cumnor Parish Council	Mrs Tina Brock	(Clerk)
Curbridge & Lew Parish Council	Mr Nigel Parker	(Clerk)
Cuxham with Easington Parish Meeting	Mr Ian Goldsmith	(Clerk)
Deddington Parish Council	Ms Lorraine Watling	(Clerk)
Denchworth Parish Meeting	Mrs Glenys Coldwell	(Clerk)
Didcot Town Council	Julie Perrin	(Town Clerk)
Dorchester Parish Council	Mr G.D. Russell	(Clerk)
Drayton (Abingdon) Parish Council	Mr David Perrow	(Clerk)
Drayton (Banbury) Parish Council	Mr G. Reynolds	(Clerk)
Drayton St Leonard Parish Council	Mrs Cassie Pinnells	(Clerk)
Ducklington Parish Council	Mr Richard Brown	(Clerk)
Duns Tew Parish Council	Mrs Hilary Skaar	(Clerk)
East Challow Parish Council	Ms Sheryl Sanders	(Clerk)
East Hagbourne Parish Council	Allison Leigh	(Clerk)
East Hanney Parish Council	Mr Guy Langton	(Clerk)
East Hendred Parish Council	Mrs Julia Evans	(Clerk)
Eaton Hastings Parish Meeting	Mr A.J. Cole	(Chairman)
Elsfield Parish Meeting	Mr James Plunket	(Chairman)
Enstone Parish Council	Mrs B. Sinclair	(Clerk)

Epwell Parish Council	Jacqui Harris	(Clerk)
Ewelme Parish Council	Mrs Penny Cooper	(Clerk)
Eye & Dunsden Parish Council	Mrs Marilyn Sermon	(Clerk)
Eynsham Parish Council	Mrs Katherine Doughty	(Clerk)
Faringdon Town Council	Mrs Sally Thurston	(Town Clerk)
Fawler Parish Meeting	Mrs Debbie lewis-Pryde	(Clerk)
Fencott and Murcott Parish Council	Vacancy	(Clerk)
Fernham Parish Meeting	Mr Mike Winter	(Clerk)
Fifield Parish Meeting	Mrs Catherine Hitchens	(Chairman)
Filkins and Broughton Poggs Parish Council	Mrs A Tyldesley	(Clerk)
Finmere Parish Council	Mrs Sharron Chalcraft	(Clerk)
Finstock Parish Council	Mrs J. Pratley	(Clerk)
Forest Hill with Shotover Parish Council	Helen Cross	(Clerk & Responsible Financial Officer)
Freeland Parish Council	Mrs L Smith	(Clerk)
Frilford Parish Meeting	Mr Shaun Forrestal	(Chairman)
Fringford Parish Council	Jane Olds	(Clerk)
Fritwell Parish Council	Mrs G Simmonds	(Clerk)
Fulbrook Parish Council	Mrs J Glyde	(Clerk)
Fyfield and Tubney Parish Council	Dr S. Fraser	(Clerk)
Garford Parish Meeting	Mr Neil Wright	(Clerk)
Garsington Parish Council	Mrs Lorna Stevenson	(Clerk)
Glympton Parish Meeting	Mr P Browne	(Chairman)
Godington Parish Meeting	Ms Lucy Broome	(Co-Chairman)
Goosey Parish Meeting	Mr Nicholas Kane	(Chairman)
Goring Heath Parish Council	Amanda Holland	(Clerk)
Goring-on-Thames Parish Council	Mr Colin Ratcliff	(Clerk)
Gosford and Water Eaton Parish Council	Ms Fern Spengler	(Clerk)
Grafton and Radcot Parish Meeting	Ms P Hichens	(Clerk)
Great Coxwell Parish Council	Miss Joanna King	(Clerk)
Great Haseley Parish Council	Mrs J. Simcox	(Clerk)
Great Milton Parish Council	Mr Tim Darch	(Clerk)
Great Tew Parish Meeting	Ms Sarah Holland	(Clerk)
Grove Parish Council	Mr G.M. Mundy	(Clerk)
Hailey Parish Council	Ms L Wilkinson	(Clerk)
Hampton Gay and Poyle Parish Meeting	Mr Andrew Smith	(Clerk)
Hanborough Parish Council	Mr Jon Gammage	(Clerk)
Hanwell Parish Council	Mrs Jayne Gordon	(Clerk)
Hardwick with Tusmore Parish Meeting	Mr David Barnes	(Chairman)
Hardwick-with-Yelford Parish Meeting	Dr D Rogers	(Chairman)
Harpsden Parish Council	Mrs Sarah Tipple	(Clerk)
Harwell Parish Council	Mrs Stephanie Taylor	(Clerk)
Hatford Parish Meeting	Mr Tony Thompson	(Chairman)
Henley-on-Thames Town Council	Janet Wheeler	(Clerk)
Hethe Parish Council	Mr David Jakeman	(Clerk)

Heythrop Parish Meeting	Mr E Rigg	(Clerk)
Highmoor Parish Council	Jane Pryce	(Clerk)
Hinton Waldrist Parish Council	Mrs Allison Leigh	(Clerk)
Holton Parish Council	Mrs S. Barter	(Clerk)
Holwell Parish Meeting	Mr Gordon Baker	(Chairman)
Hook Norton Parish Council	Mrs Rosemary Watts	(Clerk)
Horley Parish Council	Mr David Marriott	(Clerk)
Hornton Parish Council	Mrs Katherine Mills	(Clerk & Responsible Financial Officer)
Horspath Parish Council	Mrs Hayley Kogel	(Clerk)
Horton-cum-Studley Parish Council	Mrs Alexia Lewis	(Clerk)
Idbury Parish Meeting	Mrs Karen Pare	(Chairman)
Ipsden Parish Council	Mrs Amanda McCrea	(Clerk)
Islip Parish Council	Mr Michael Wilkinson	(Clerk)
Kelmscott Parish Meeting	Mr J. Nelson	(Chairman)
Kencot Parish Meeting	Mrs Gill Cox	(Clerk)
Kennington Parish Council	Ms Rachel Brown	(Clerk)
Kiddington with Asterleigh Parish Meeting	Mr J E Goffe	(Clerk)
Kidlington Parish Council	Rachel Faulkner	(Clerk)
Kidmore End Parish Council	Mr R.F. Penfold	(Clerk)
Kingham Parish Council	Ms A Ogilvie	(Clerk)
Kingston Bagpuize with Southmoor Parish Council	Janet Eustace	(Clerk)
Kingston Lisle Parish Council	Mrs Debbie Lewis-Pryde	(Clerk)
Kirtlington Parish Council	Mrs Ruth M. Powles	(Clerk)
Langford Parish Council	Ms A Tyldesley	(Clerk)
Launton Parish Council	Ms Caroline Dunn	(Clerk)
Leafield Parish Council	Mrs L Grant	(Clerk)
Letcombe Bassett Parish Meeting	Ms Julie Davenport	(Clerk)
Letcombe Regis Parish Council	Mrs Elizabeth Jenkins	(Clerk)
Lewknor Parish Council	Ms Barbara Drysdale	(Clerk)
Little Coxwell Parish Council	Mrs Caroline Weston	(Clerk)
Little Faringdon Parish Meeting	Mr J. Abdy Collins	(Acting Clerk)
Little Milton Parish Council	Mr R. Fergusson	(Clerk)
Little Tew Parish Meeting	Mr C. Hollander	(Clerk)
Little Wittenham Parish Meeting	Mr Graham Warrington	(Chairman)
Littlemore Parish Council	Mr Richard Wilkins	(Clerk)
Littleworth Parish Meeting	Mr D J Mackay	(Clerk)
Long Wittenham Parish Council	Rhonda Hinson	(Clerk)
Longcot Parish Council	Mrs T. Brock	(Clerk)
Longworth Parish Council	Mrs Gill Carlisle	(Clerk)
Lower Heyford Parish Council	Ms Cathy Fleet	(Clerk)
Lyford Parish Meeting	Julie Halford	(Clerk)
Lyneham Parish Meeting	Mrs J. Lewis	(Chairman)
Mapledurham Parish Council	Mr R.F. Penfold	(Clerk)

Marcham Parish Council	Mrs L.A. Martin	(Clerk)
Merton Parish Council	Mrs Charlesworth	(Clerk)
Middle Aston Parish Meeting	Edward Dowler	(Chairman)
Middleton Stoney Parish Council	Mr A.F. Hickman	(Clerk)
Milcombe Parish Council	Mrs Thesesa Goss	(Clerk)
Milton (Abingdon) Parish Council	Mrs Joanne Myers	(Clerk)
Milton (Banbury) Parish Meeting	Mr Alan Plumb	(Chairman)
Milton-under-Wychwood Parish Council	Mrs Jenny Miller	(Clerk)
Minster Lovell Parish Council	Ms A Molton	(Clerk)
Mixbury Parish Meeting	Mrs Adrienne Brunton	(Clerk)
Mollington Parish Council	Mr Geoff Hall	(Clerk)
Moulsford Parish Council	Mr Geoff Twibell	(Clerk)
Nettlebed Parish Council	Jo Pugh	(Clerk)
Newington Parish Council	Claire Grant	(Clerk)
Newton Purcell with Shelswell Parish Meeting	Mr Patrick Clarke	(Chairman)
Noke Parish Meeting	Erica Rifat	(Clerk)
North Aston Parish Meeting	Mr James Taylor	(Secretary)
North Hinksey Parish Council	Mr A.J. Stone	(Clerk)
North Leigh Parish Council	Mrs Allison Leigh	(Clerk)
North Moreton Parish Council	Mr Andrew Wise	(Clerk)
North Newington Parish Council	Ms Sharon Davis	(Clerk)
Northmoor Parish Council	Mr M. Ryan	(Clerk)
Nuneham Courtenay Parish Council	Mr Geoffrey Ferres	(Clerk)
Oddington Parish Meeting	Dr Adrian Young	(Chairman)
Old Marston Parish Council	Mr Timothy Cann	(Clerk & Responsible Financial Officer)
Over Norton Parish Council	Miss K Linnington	(Clerk)
Piddington Parish Council	Mrs A Davies	(Clerk)
Pishill with Stonor Parish Council	Mrs P. Pearce	(Clerk)
Prescote Parish Meeting	Vacancy	
Pusey Parish Meeting	Mr Andrew Douglas	(Clerk)
Pyrton Parish Council	Genevieve Young	(Clerk)
Radley Parish Council	Mrs Jane Dymock	(Clerk)
Ramsden Parish Council	Mr J Gammage	(Clerk)
Risinghurst & Sandhills Parish Council	Miss Sonya Hill	(Clerk)
Rollright Parish Council	Ms Sue Glasson	(Clerk)
Rotherfield Greys Parish Council	Mrs Jane Pryce	(Clerk)
Rotherfield Peppard Parish Council	Mrs Joanne Askin	(Clerk)
Rousham Parish Meeting	Mr C. Cottrell-Dormer	(Chairman)
Saint Helen Without Parish Council	Ms Anna Clarke	(Clerk)
Salford Parish Council	Mrs Carol Ross	(Clerk)
Sandford St Martin Parish Council	Ms R Johnson	(Clerk)
Sandford-on-Thames Parish Council	Mrs E Shatford	(Clerk)
Shellingford Parish Meeting	Mr Roy Samways	(Clerk)
Shenington with Alkerton Parish Council	Ms C. Hill	(Clerk)

Shilton Parish Council	Ms A Tyldesley	(Clerk)
Shiplake Parish Council	Mr Roger Hudson	(Clerk)
Shipton-on-Cherwell and Thrupp Parish Council	Cherie Carruthers	(Clerk)
Shipton-under-Wychwood Parish Council	Ms L Wilkinson	(Clerk)
Shirburn Parish Meeting	Mr R. Beattie	(Correspondent)
Shrivenham Parish Council	Julia Evans	(Clerk)
Shutford Parish Council	Mrs B E Reynolds	(Clerk)
Sibford Ferris Parish Council	Mr Graham Beacham	(Clerk)
Sibford Gower Parish Council	Mr P Hardman	(Clerk)
Somerton Parish Council	Cathy Fleet	(Clerk)
Sonning Common Parish Council	Mr Philip Collings	(Clerk)
Souldern Parish Council	Cathy Fleet	(Clerk)
South Hinksey Parish Council	Mr G Ferres	(Clerk)
South Leigh Parish Council	Mr J. Ashwell	(Clerk)
South Moreton Parish Council	Cllr Lyn Deeley	(Chair)
South Newington Parish Council	Mrs C Coles	(Clerk)
South Stoke Parish Council	Mr Colin Ratcliff	(Clerk)
Sparsholt Parish Council	Mrs Deborah Lewis-Pryde	(Clerk)
Spelsbury Parish Council	Ms Anne Ogilvie	(Clerk)
Stadhampton Parish Council	Vacancy	
Standlake Parish Council	Mr D.C. Bevan	(Clerk)
Stanford-in-the-Vale Parish Council	Mr M. Dew	(Clerk)
Stanton Harcourt Parish Council	Ms T. Gasser	(Clerk)
Stanton St. John Parish Council	Dr Clare Massey	(Clerk & Responsible Financial Officer)
Steeple Aston Parish Council	Cathy Fleet	(Clerk)
Steeple Barton Parish Council	Mrs Annette Fowler	(Clerk)
Steventon Parish Council	Mrs Angela Einon	(Clerk)
Stoke Lyne Parish Council	Mrs Anne Davies	(Clerk)
Stoke Talmage Parish Meeting	Dr J. Stoneham	(Clerk)
Stonesfield Parish Council	Ms G Hill	(Clerk)
Stratton Audley Parish Council	Mrs Anne Davies	(Clerk)
Sunningwell Parish Council	Mr Brian Rixon	(Clerk)
Sutton Courtenay Parish Council	Mrs L. Martin	(Clerk)
Swalcliffe Parish Council	Christine Coles	(Clerk)
Swerford Parish Council	Mr J Drinkwater	(Acting Clerk)
Swinbrook and Widford Parish Council	Mrs L Harrop	(Clerk)
Swyncombe Parish Council	Ms Kristina Tynan	(Clerk)
Sydenham Parish Council	Stephanie Johns	(Clerk)
Tackley Parish Council	Ms J Read	(Clerk)
Tadmarton Parish Council	Mrs Christine Coles	(Clerk)
Taynton Parish Meeting	Mr Barry Jenner	(Chairman)
Tetsworth Parish Council	Clare Devey	(Clerk & Responsible Financial Officer)

Thame Town Council	Mr Graham Hunt	(Town Clerk)
Tiddington-with-Albury Parish Council	Mr Ken Poyser FCA FRSA	(Clerk)
Towersey Parish Council	Mrs Joanne Wills	(Clerk)
Uffington Parish Council	Mrs Julie Evans	(Clerk)
Upper Heyford Parish Council	Mr Jack L. Goodman Jr	(Clerk)
Upton Parish Council	Ms Liz Cooper	(Clerk)
Wallingford Town Council	Mrs Paula Lopez	(Town Clerk)
Wantage Town Council	Mr W.P. Falkenau	(Town Clerk)
Warborough Parish Council	Mrs Lynda Raynor	(Clerk)
Wardington Parish Council	Mr G Page	(Chairman)
Watchfield Parish Council	Claire Arnold	(Clerk)
Waterperry with Thomley Parish Council	Mr Adrian Cave	(Clerk & Responsible Financial Officer)
Waterstock Parish Meeting	Mr M. Tyce	(Chairman)
Watlington Parish Council	Ms K Tynan	(Clerk)
Wendlebury Parish Council	Jane Olds	(Clerk)
West Challow Parish Council	Mrs Deborah lewis-Pryde	(Clerk)
West Hagbourne Parish Council	Mr Andrew Wise	(Clerk)
West Hanney Parish Council	Mrs Kay Sayers	(Clerk)
West Hendred Parish Council	Mrs J. Evans	(Clerk)
Westcote Barton Parish Meeting	Mr Rupert Massey	(Clerk)
Weston-on-the-Green Parish Council	Mr Bob Hessian	(Clerk)
Westwell Parish Meeting	Mrs Sarah Robertson	(Chairman)
Wheatfield Parish Meeting	Mr I.R. Mann	(Correspondent)
Wheatley Parish Council	Michelle Legg	(Clerk)
Whitchurch-on-Thames Parish Council	Mrs Felipa House	(Clerk)
Wigginton Parish Council	Dr Coleen Weedon	(Clerk)
Witney Town Council	Mrs Sharon Groth	(Clerk)
Woodcote Parish Council	Ms Jenny Welham	(Clerk)
Woodeaton Parish Meeting	P.J. Hore	(Clerk)
Woodstock Town Council	Mrs Janine Saxton	(Clerk)
Woolstone Parish Meeting	Mr Julian Golec, PHD	(Clerk)
Wootton (Abingdon) Parish Council	Mr George Edmonds-Brown	(Clerk)
Wootton (Woodstock) Parish Council	Mrs J Carlin	(Clerk)
Worton Parish Meeting	Mr R.D. Bowerman	(Clerk)
Wroxton & Balscote Parish Council	Jacqui Harris	(Clerk)
Wytham Parish Meeting	Ms Stella O'Gara	(Clerk)
Yarnton Parish Council	Mrs L Whitley	(Clerk)

Local Enterprise Partnerships;

	Chief Executive	Chair
OxLEP	Nigel Tipple	Adrian Lockwood

SEMLEP	Hilary Chipping	Dr Anne Limb

Trade Bodies;

Thames Valley Chamber of Commerce, Banbury
Witney Chamber of Trade and Commerce, Witney
NFU Berkshire, Buckinghamshire, & Oxfordshire,