

Improving Mobile Coverage in Cambridgeshire & Peterborough Members Update November 2022

Introduction

Mobile services are at the heart of how most people stay in touch and go online:

- 95% of adults have access to a mobile phone, and 85% of adults use a smartphone to go online for a wide range of activities (Ofcom, 2020) with more devices being connected to mobile data.

Demand for mobile connectivity and data has accelerated, but coverage and/or capacity has not improved as rapidly in some areas:

- Around 92% of the UK is now covered by a good 4G signal from at least one operator, whilst 69% of the country is covered by all four main operators (*Ofcom Connected Nations Report Summer 2021*).
- Ofcom estimates that a 5G signal is currently available in around 50% of premises, although evidence suggests that 5G coverage in Cambridgeshire is behind the curve.

The benefits of improving mobile connectivity go beyond greater mobile coverage, including:

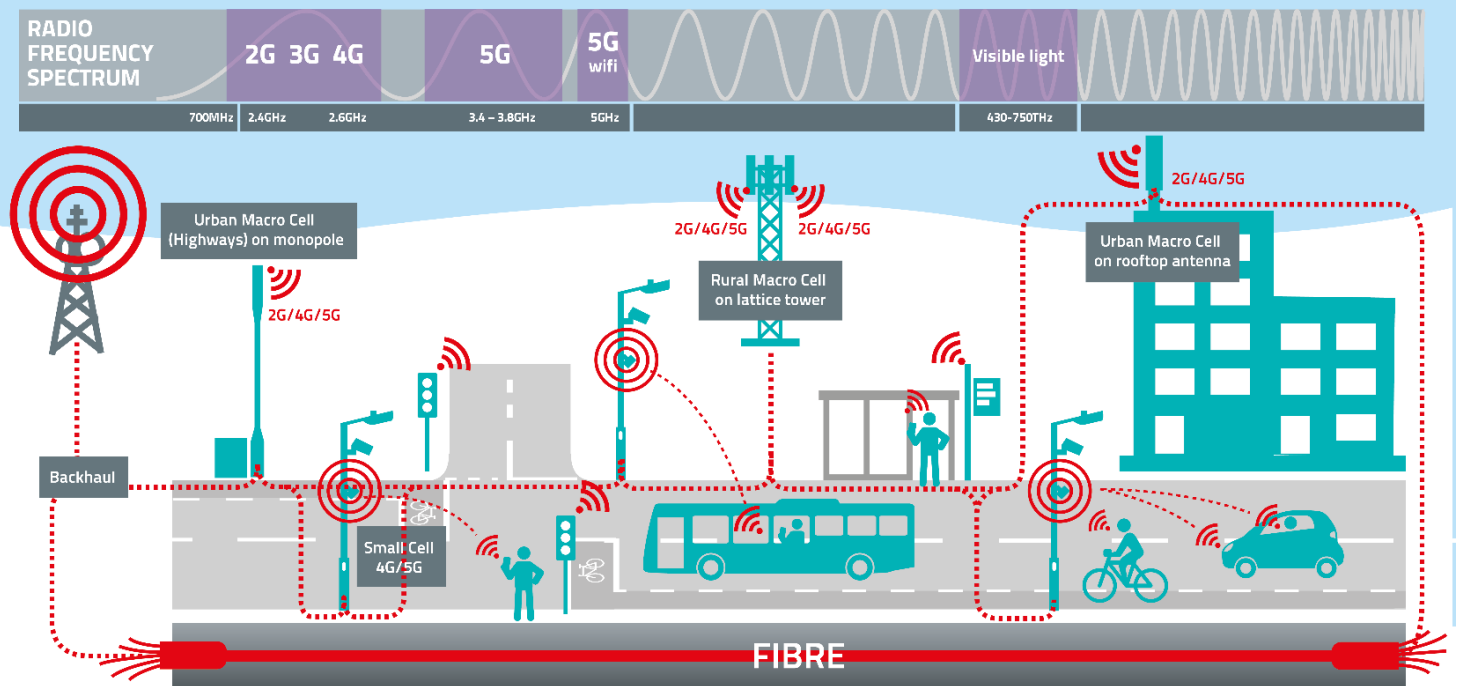
- Driving sustainable economic growth and supporting business - from Agritech to life sciences to market traders.
- Supporting communities and tackling digital exclusion - with access to local information on the go.
- Gathering local sensor and transport data – offering real-time updates on travel, flooding and air quality.
- Facilitating innovation in service transformation - supporting remote health and social care.
- Supporting moves towards zero carbon, climate change mitigation and adaption.

5G is the next generation of mobile communications, enabled by full fibre, which will underpin future connectivity including 'Internet of Things' (IoT) technology and become a vital building block of the wider digital transformation that is taking place throughout society.

The Connecting Cambridgeshire programme is working to improve mobile coverage and capacity in Cambridgeshire & Peterborough as part of the Combined Authority's Digital Connectivity Strategy (2021-2025). This includes:

- Identifying areas of poor mobile coverage affecting businesses and communities.
- Working with Council planning teams and mobile network operators (MNOs) to find solutions to fill the gaps.
- Liaising with the 4 main mobile network operators (MNOs) looking to invest in 4G and 5G networks

Extending mobile infrastructure to underpin future digital connectivity



How mobile networks will use macro and small cells to improve rural and urban connectivity enabled by full fibre.

Key Challenges and Drivers for Change

The mobile data landscape is changing including:

- Rapid development of new services which rely on high speed, low latency and reliable data connectivity.
- Physical changes (new buildings, tree growth etc) that impact line of sight coverage.
- Housing developments and business parks that increase /change patterns of demand.
- Phasing out of 2G and 3G by 2033.

Planning legislation and changing requirements

Local authority planning teams have seen a marked increase in applications for new/upgraded 4G and 5G masts, which need to be taller (18-20m). To date, most applications have been refused due to height or environmental concerns, with a lack of supporting information including the benefits of improved connectivity.

In April 2022, the Government agreed reforms to the Town and Country Planning (General Permitted Development) (England) Order 2015 that will increase the range and height of mobile masts, create room for extra equipment needed for faster networks, and make it easier for operators to upgrade and share infrastructure.

The changes to existing permitted development rights include:

- Existing mobile masts to be strengthened without prior approval, so they can be upgraded for 5G and shared between mobile operators. This allows increases to the width of existing masts by up to either 50% or two metres (whichever is greatest) and in unprotected areas allow increases in height up to a maximum of 25 metres (previously 20 metres). Greater increases will also be permitted subject to approval by the local authority.
- New masts to be built up to five metres higher - meaning a maximum of 30 metres in unprotected areas and 25 metres in protected areas, subject to approval by the planning authority.

- Buildings to host smaller masts (up to six metres in height above buildings) in unprotected areas without prior approval to accelerate network upgrades and reduce need to build new masts.
- Building-based masts to be set up nearer to public roads subject to prior approval to improve mobile coverage for road users.
- Cabinets containing radio equipment to be deployed alongside masts without prior approval and to allow greater flexibility for installing cabinets in existing compounds - fenced-off sites containing masts and other communications equipment - to support new 5G networks.
- Conditions to ensure telecoms equipment does not block pavements and access to properties.

Permitted development rights grant planning permission, without the need for a planning application, for specific types of development. Some permitted development rights are subject to a requirement to seek the prior approval of the local planning authority for the location and appearance of infrastructure before carrying out development. Where prior approval is not required the developer must notify the local planning authority of its intention to deploy. A new [Code of Practice for Wireless Network Development in England](#) provides operators and councils with guidance to ensure that the impact of mobile infrastructure is minimised and appropriate engagement takes place with local communities

Access to infrastructure

Difficulty accessing local authority assets such as land, buildings and highways infrastructure is slowing mobile network deployment nationally and in our area. For example, lighting columns are an ideal location to deploy smart cells networks to support mobile services, however standard PFI contracts for managing streetlights do not allow telecoms equipment.

Rollout of 5G

Public concern about mast deployments and widespread misinformation about 5G safety together with operators' insensitivity to public opinion generates a considerable number of complaints and ambivalence about mobile infrastructure. This results in the seemingly contradictory situation whereby there are significant levels of dissatisfaction about coverage from businesses and communities whilst at the same time there is resistance to the deployment of additional telecoms infrastructure, which would alleviate the problem.

Public Health England (PHE) provides [guidance on the health and safety of mobile technologies including 5G](#)

Design considerations to improve Mobile capacity and coverage

Coverage and capacity are key concepts in mobile infrastructure with several design considerations, including

- Height of the mast
- Surrounding topography
- Antennae Type/Capacity
- The wavelength of the radio signal
- Data usage density

Location issues to meet the varying requirements for siting Macro cells in urban or rural settings, include:

- Wayleaves
- Existing Network
- Space
- Structure
- Planning permissions

See Appendix for further details of design considerations and how they affect the rollout of 4G and 5G networks.

[Work underway to improve 4G/5G mobile coverage in Cambridgeshire & Peterborough through the Connecting Cambridgeshire programme](#)

- **Benchmarking** – Undertaking local surveys to understand areas of poor mobile connectivity, as well as issues surrounding planning application refusals through comprehensive data analysis.
- **Increased engagement** - Liaising with MNOs, DCMS and Local Planning Teams to understand existing mobile coverage/capacity needs and working collaboratively with stakeholders and local residents to support improvements.
- **Specialist Planning Resource** – A dedicated digital connectivity planning officer, shared across Cambridgeshire local authorities and funded by the Combined Authority is being recruited to proactively engage with MNOs and aim to balance their requirements for new infrastructure with local planning sensitivities. Local Plans now include sections to ensure that mobile coverage is included as a consideration, particularly on large developments.
- **Small Cell trial deployment** – Small Cells trials are planned for Peterborough and Cambridge, working with operators.
- **Rail routes** – Using data from recent mobile coverage surveys for the Life Sciences sector clustered in South Cambridgeshire and train lines to London to evidence improvements and lobby the DfT to further improve coverage on key rail routes.
- **Smart Street furniture** – Exploring innovative use of street furniture such as lighting columns and multi-use utility poles to host a range of functions including small cells and sensor networks
- **Neutral host network trials** – Investigating options for a network infrastructure owned and maintained by a third party that rents or leases its infrastructure to any network operators looking to scale up their network capacities.

Useful links:

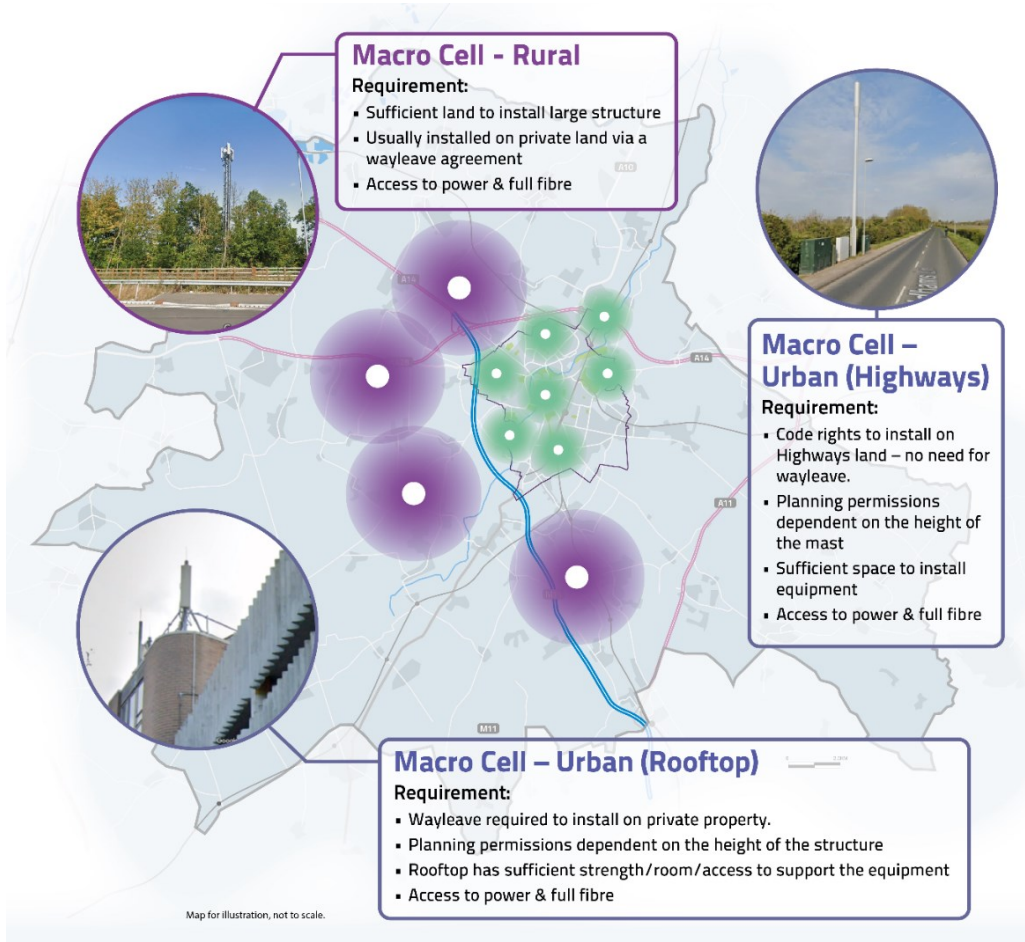
- Find the [Cambridgeshire & Peterborough Digital Connectivity Strategy \(2021-2025\)](#) and further Mobile updates at www.connectingcambridgeshire.co.uk.
- **National planning legislation** – [changes to permitted development rights for mobile masts in England](#) April 2022 cited in the House of Commons Library research briefing: [Building broadband and mobile infrastructure](#) March 2022.
- **A new Code** – [Code of Practice for Wireless Network Development in England](#) provides operators and councils with guidance to ensure that the impact of mobile infrastructure is minimised and appropriate engagement takes place with local communities.
- **Ofcom** provides a [mobile coverage checker](#) for voice, 3G and 4G services from all major providers. A joint Government and Ofcom [guide to 5G mobile technology](#) gives people the facts and tackles disinformation about 5G.
- **5G factsheets** – MobileUK has created a [Local Authority Toolkit](#) with the latest research into safety standards for 5G deployments developed by an independent safety body. The kit shows how 5G will support work to address health, climate change, the environment, industry and rural opportunities.

Contact us:

If you have queries about mobile connectivity in your area, contact the Connecting Cambridgeshire team by emailing connecting.cambridgeshire@cambridgeshire.gov.uk with the location, postcode and issue.

Appendix 1 Design considerations to improve Mobile capacity and coverage

Macro Cells provide the widest range of radio coverage in a mobile phone network used in rural/urban areas and along highways. In urban environments masts generally tend to be shorter due to engineering constraints and the preference to reduce their visual impact. At the same time, however, in the urban environment there are also more physical obstructions and greater usage of mobile data meaning the mast/antennae network needs to be much denser to provide the required coverage and capacity.



The varying requirements for siting Macro Cells (using the Greater Cambridge area for illustration only)

Coverage Considerations in mast location/design

- Mast height – higher antenna can transmit further than an antenna installed lower down.
- Surrounding topography including hills, trees, buildings etc – flatter and clear terrain provides less disruption to the radio signal so it can generally travel further.
- Antennae type – different antenna types support 2G/3G/4G/5G mobile technology.
- Radio signal wavelength – longer wavelengths used for previous generations of mobile technology can travel further and are less impacted by the terrain than the shorter wavelength used for 5G.

Capacity Considerations in mast location/design

- Antenna capacity – each antenna can only support a finite level of data usage
- Data usage density – the greater the density of data usage the more masts are required in that area
- Radio signal wavelength – the shorter the wavelength i.e., such as that used for 5G, the more data it can generally carry.
- **Location Issues:**
- Wayleaves – can be a complex legal issue that take many months to negotiate an agreement to install equipment.

- Existing Networks – new locations must tie in, without interfering with, the existing operation, but also cover gaps in coverage/capacity.
- Space – mobile masts and their base stations require sufficient space for the equipment to be installed.
- Structure – whether rooftop, highway or greenfield it must be able to support the infrastructure.
- Planning permissions must take account of reforms of permitted development rights.

Mobile Network Operator (MNO) improvements

MNOs are making significant investments in mobile infrastructure to:

- Increase the capacity of 4G networks by deploying small cell technology to boost data capacity in areas of high demand.
- Deliver a nationwide 5G network by deploying new infrastructure that can deliver a complete 5G network.

Localised Capacity Improvements - 4G Small Cells

A Micro or Small Cell covers a very limited area in dense urban settings.

Small Cells will play a vital role in the future of 5G deployments:

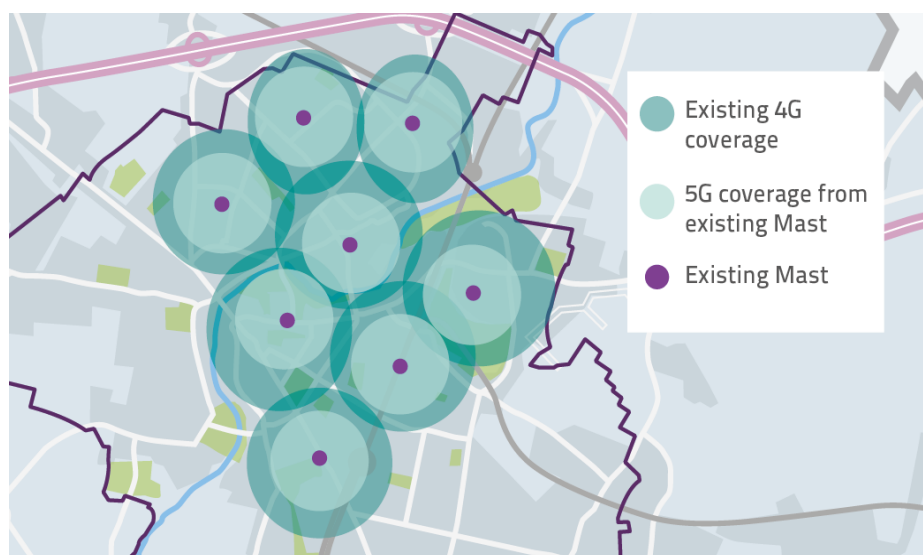
- Located at street level on existing Highways infrastructure, they can boost capacity in more localised high demand areas.
- Requires access to power and a full fibre connection.
- No impact on the existing Mobile Network due to their local level of coverage.
- Usually deployed in city centres, stadiums, trains stations, tourist/ entertainment hotspots etc.
- Can be deployed on the highway under code powers for which planning is considered de minimis.

Deploying a 5G network - Installation of new/replacement masts and antennae

5G cannot always be deployed directly on to the existing network infrastructure because:

- Shorter 5G wavelength cannot travel as far and is disrupted more by obstructions than 4G that would lead to gaps in the network.
- New masts are sometimes required as some existing sites do not have the space/strength to accommodate the additional 5G antennae technology.
- Existing 2G/3G/4G services must be retained and cannot simply be “swapped out” for 5G.

To deploy 5G, a combination of new masts and some existing masts being increased in height will be required to provide the coverage and fill gaps. This must also tie in with, and not disrupt, the existing network.



5G infrastructure

As can be seen from this simplified illustration, gaps in coverage would occur if the existing infrastructure was used for 5G - so either new masts would need to be installed in the gaps or the range of the antenna increased by deploying them on taller masts.