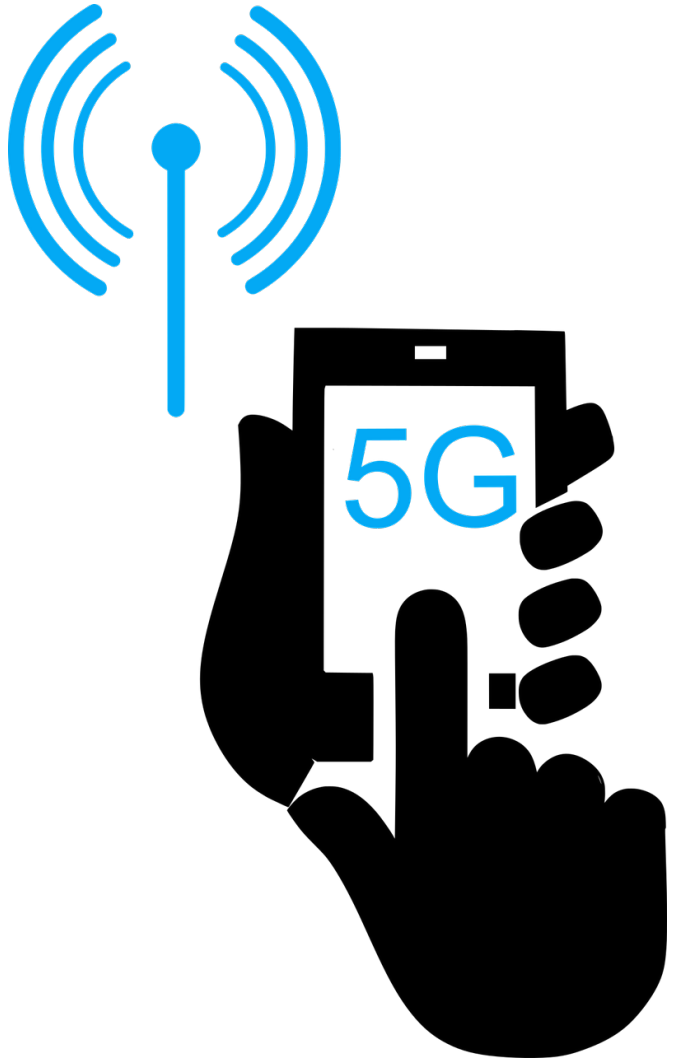


WHAT IS THE FUSS ABOUT?

4G TO 5G

An explanation about the technology and why there will be more masts and small antennae on buildings and street lights.....

Presentation Part 1 given by LENDF (Liz Brown)

History

- 2G, 3G 4G and 5G are ways of sending signals wirelessly from one mobile phone/device to another. 3G upwards have allowed mobile phones to send data.
- The G stands for Generation where 5G is the latest and fastest way of sending data.
- The signals are passed from mobile to mobile via mobile phone masts.
- South Korea was the first country to implement widespread 5G masts in 2019.
- The USA have already phased out 3G. Many countries, including the UK, will phase out 3G soon.
- This will leave the UK with 4G(LTE) and 5G(NR). Often the two generations will work together depending on use.

Set of rules governing transmission	
LTE	Long Term Evolution
NR	New Radio

Generation	Date introduced
2G	1991
3G	2001
4G	2009
5G	2019

A 5G mast is different from a 4G mast both physically and functionally:

- 5G masts need to be closer together; so more are needed
- 5G masts can be smaller
- 5G masts transmit data on an entirely different part of the radio spectrum.
- 5G can provide much better speed, and low latency.

Taken from https://www.lifewire.com/5g-cell-towers-4584192

*Some key words *

Latency is a length of time.

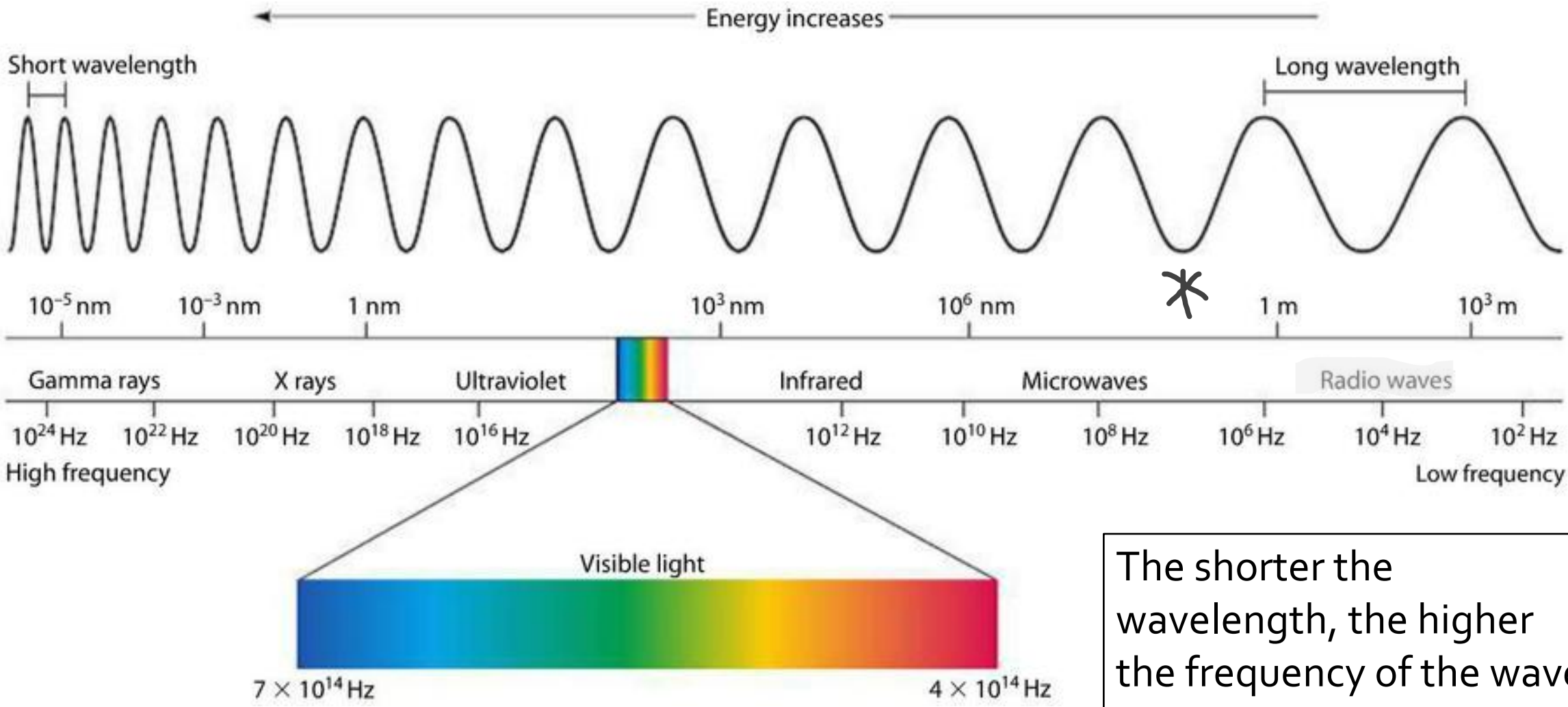
It measures the time it takes for a connected device to make a request and receive a response. This round-trip time is also called a **ping** and is measured in milliseconds (ms). 5G has a lower latency than 4G which means real time applications are more responsive such as the internet of things.

Speed is a capacity.

It measures how much data your device can download or upload at once**.** Speed is measured in megabits per second (Mbps). You can currently expect average **5G speeds of over 100Mbps**. It means that you could download a film using 5G in just a few minutes instead of 15 minutes on 4G.

This is why mobile phone companies are pressing to move to 5G. However some uses such as speaking to people using a mobile don't need 5G so 4G will still be used.

Some background on wireless transmissions of energy



The shorter the wavelength, the higher the frequency of the wave per second (Hz)

5G called the *millimetre band* (because its wavelengths range from 1-10 mm).

More about the radio frequencies of 5G transmissions

One part of the radio spectrum has a high frequency range between 30 GHz and 300 GHz (part of the EHF band), and is often called the *millimetre band* (because its wavelengths range from 1-10 mm). Wavelengths in and around this band are therefore called **millimeter waves (mmWaves)**. mmWaves are a popular choice for 5G in some countries but also have application in areas like radio astronomy, telecommunications, and radar guns. You need direct line of sight between masts over short distances as the waves are easily absorbed by buildings and moisture in the air. (*Apparently the UK are not yet implementing this band*)

Another part of the radio spectrum that's being used for 5G, is UHF, which is a lower frequency on the spectrum than EHF. The UHF band has a frequency range of 300 MHz to 3 GHz, and is used for everything from TV broadcasting and GPS to Wi-Fi, cordless phones, and Bluetooth. These waves can travel further and are less easily absorbed.

A service provider might use higher 5G frequencies in areas that demand more data, like in a popular city where there are lots of devices in use. However, low-band frequencies are useful for providing 5G access to more devices from a single tower and to areas that don't have direct line-of-sight to a 5G cell, such as rural communities.

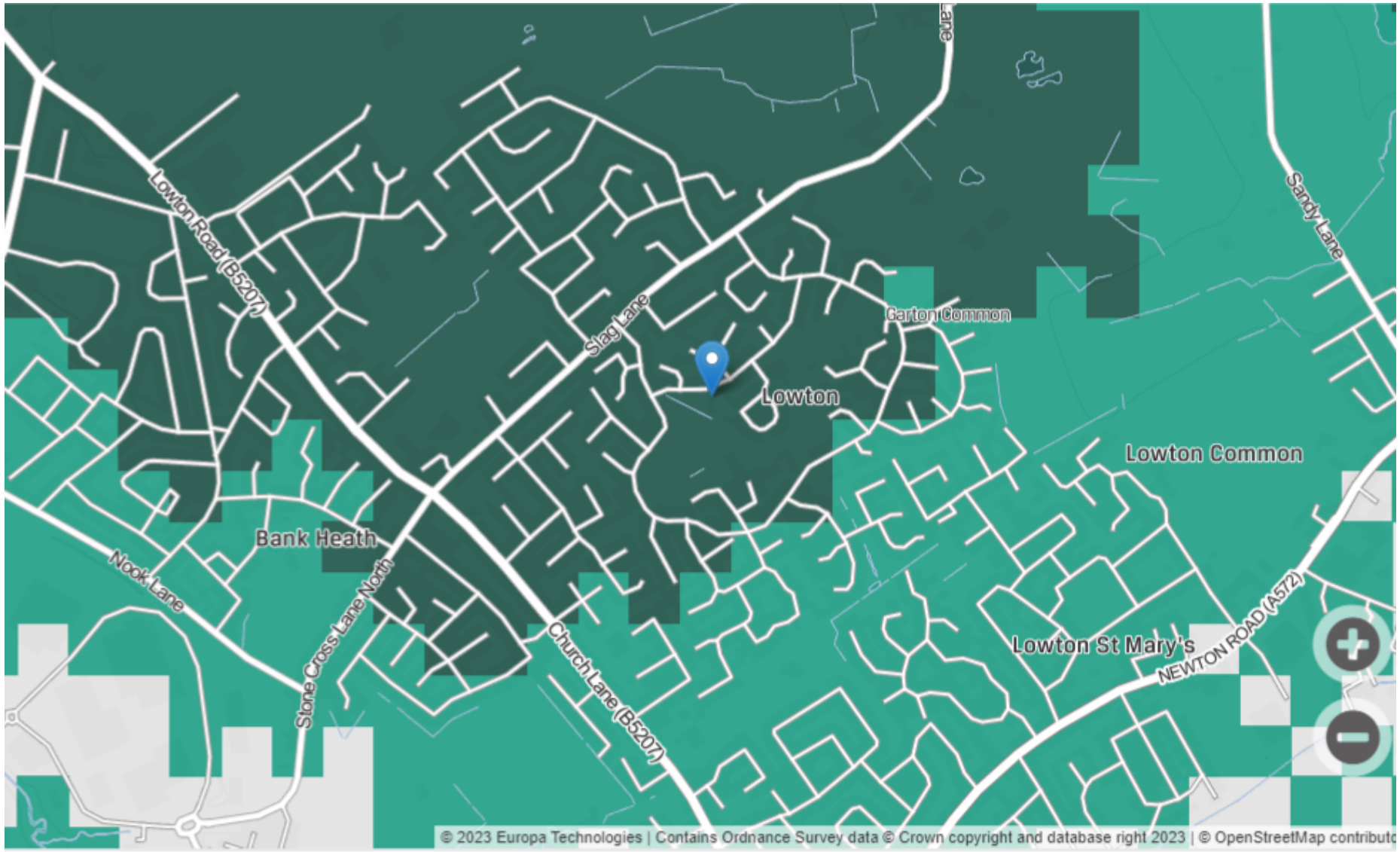
5G Spectrum and Frequencies: Everything You Need to Know (lifewire.com)

There are 4 mobile phone networks in the UK

This means there will be potentially 4 sets of 4G/5G masts to give coverage. 4G and 5G antennae can be on the same mast for the same network but extra 5G antennae will be needed in each case because 5G can't travel as far. Also some of the 4 networks will share masts.

1. Lebara Mobile, Asda Mobile, Talk Mobile and VOXI **use the Vodafone network.**
2. Your Co-op, 1p Mobile, Utility Warehouse, Ecotalk, Plusnet and BT Mobile **use the EE network.**
3. iD Mobile and Smarty, Freedompop and Superdrug Mobile use **the Three network.**
4. Tesco Mobile, Giffgaff, Sky Mobile, Virgin Mobile and Lycamobile use the **O2 network.** So far O2 haven't rolled out 5G in the vicinity of Lowton.

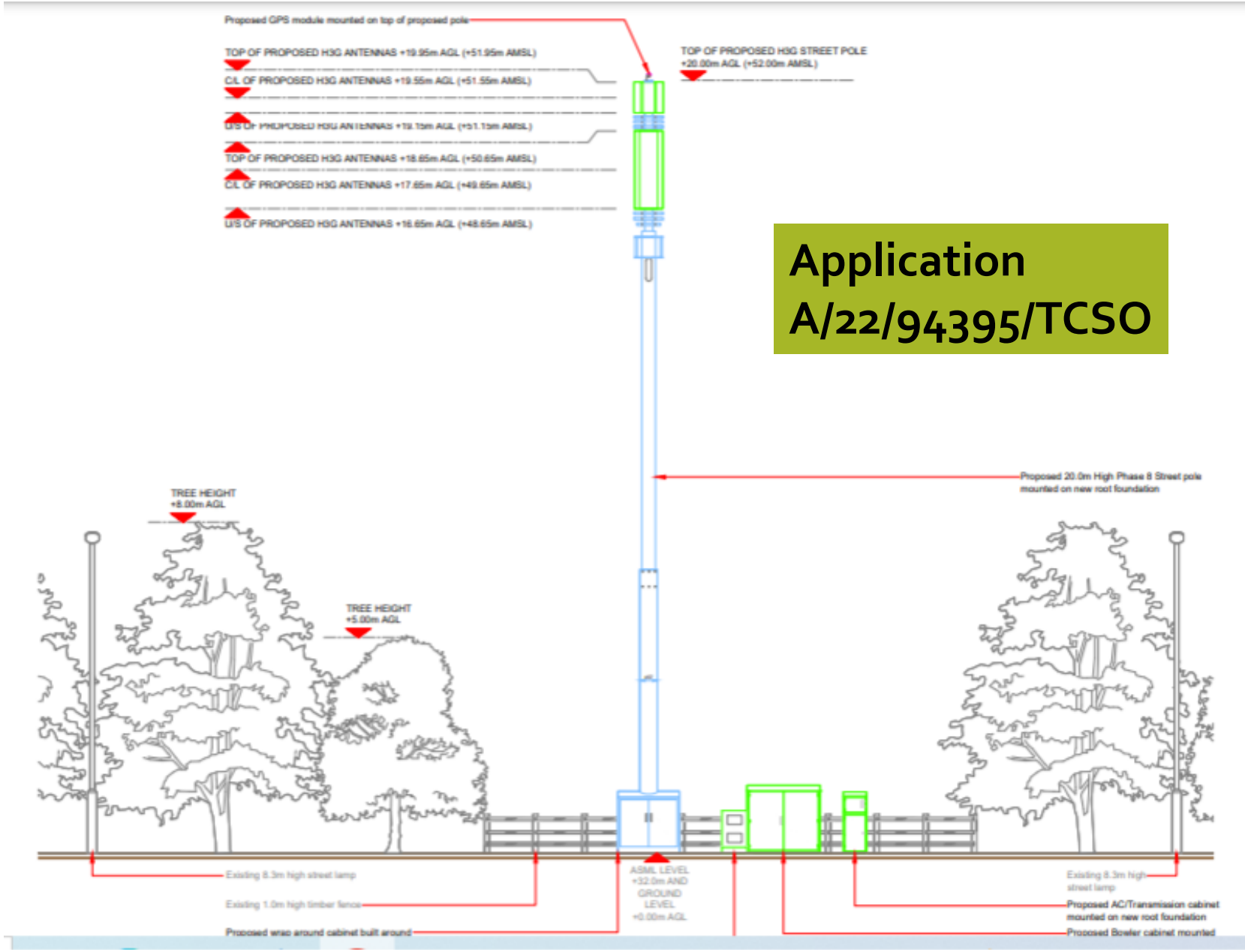
Coverage Map



The THREE provider 5G existing coverage around Braithwaite Road before the new mast is switched on.

The link to the OFCOM map below provides all sorts of interesting information

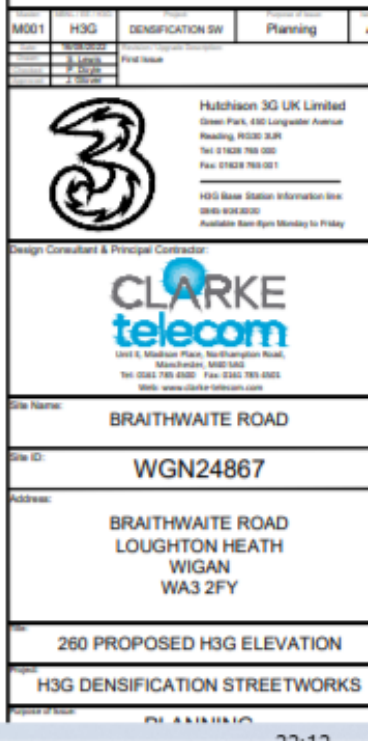
https://www.ofcom.org.uk/phones-telecoms-and-internet/advice-for-consumers/advice/ofcom-checker



Application A/22/94395/TCSO

Braithwaite Road mast:
20 metre high monopole to carry 6 antennas.

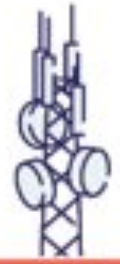
The **provider THREE** wants to enhance 5G coverage levels and network capacity in Lowton.



The mast will provide improved 3G and 4G mobile phone coverage and new 5G service to this area

https://www.techtarget.com/searchnetworking/feature/Macrocell-vs-small-cell-vs-femtocell-A-5G-introduction

Macrocells vs. small cells vs. femtocells



← lots

	MACROCELLS	SMALL CELLS	FEMTOCELLS
SIZE	Around 50 to 200 feet tall	The size of a pizza box	The size of a paperback book
AVERAGE COVERAGE RANGE	A few miles	A football field -- 100 yards	A home or small business
AVERAGE COST TO INSTALL	$200,000	Under $10,000	Around $100
DEPLOYMENT	The U.S. has about 200,000 macrocells	The U.S. will have 5 to 10 times more small cells than macrocells once fully deployed	Anyone can purchase a femtocell for their home or small business

Alison Truman

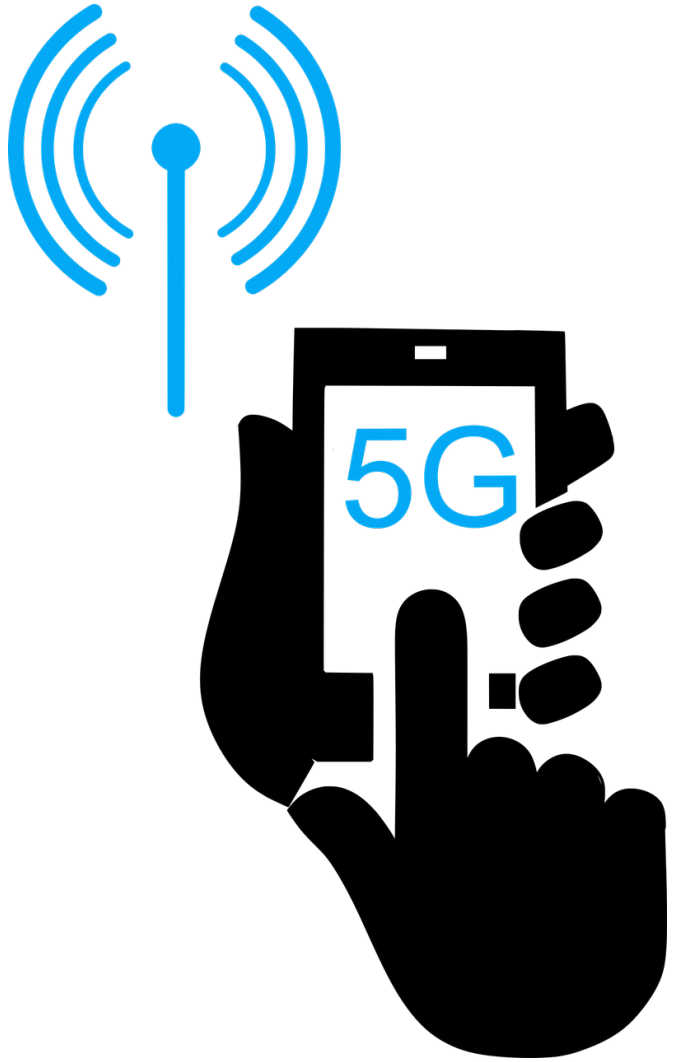
Planning team leader for Wigan Council

Will now take us through the planning process for 4G and 5G infrastructure in the Wigan Borough including the example on Braithwaite Road

https://commonslibrary.parliament.uk/planning-rules-for-5g-masts-in-england/

https://www.gov.uk/government/news/new-laws-to-end-mobile-coverage-no-bar-blues

https://planning.wigan.gov.uk/online-applications/ (use TCSO as the search)



WHAT IS THE FUSS ABOUT?

SAFETY ISSUES 5G

Pros and cons of 5G

Presentation part 2 given by LENDF (Liz Brown)

Opinion is divided on whether long term exposure to 5G is detrimental to health as we approach higher wave frequencies and are exposed to a greater number of waves due to more densely populated masts.

Among others, those who believe 5G to be safe are:

OFCOM - https://www.ofcom.org.uk/ Ofcom is the regulator for the communications services that we use and rely on each day. They are independent, and funded by fees paid by the companies they regulate. A guide: https://www.ofcom.org.uk/__data/assets/pdf_file/0015/202065/5g-guide.pdf

The UK Health Security Agency (UKHSA) is responsible for protecting us from the impact of infectious diseases, chemical, biological, **radiological** and nuclear incidents and other health threats.
They provide intellectual, scientific and operational leadership at national and local level to make the nation's health secure. It is an executive government agency, partly replacing 'Health England' in April 2021
https://www.gov.uk/government/organisations/uk-health-security-agency
https://www.gov.uk/government/publications/mobile-phone-base-stations-radio-waves-and-health/mobile-phone-base-stations-radio-waves-and-health

The International Commission on Non-ionising Radiation Protection (ICNIRP) This link provides ICNIRP guidelines https://www.gov.uk/government/publications/5g-technologies-radio-waves-and-health/5g-technologies-radio-waves-and-health

Among others, those who believe 5G has NOT been proven as safe are:

https://actionagainst5g.org/about-us/ Are groups of individuals nationwide, including doctors, scientists and engineers, supported by a strong team of lawyers headed by **Michael Mansfield KC** *(Grenfell tower)*

There is information here about specific instances of health problems and of some UK councils who have voted to prevent 5G antennae from being erected on their land.

Judicial REVIEW(Feb 2023)

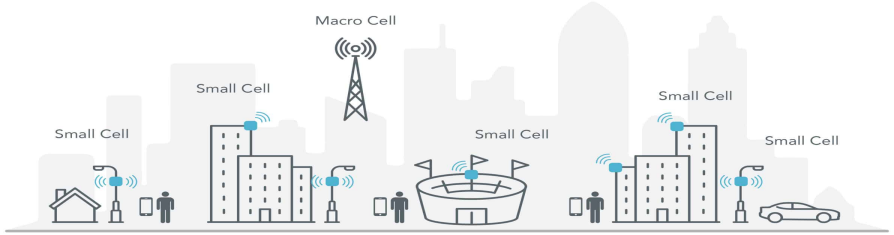
In February 2023 they instigated a judicial review to try and prevent the roll out of 5G in England. Here is a summary of the argument given by **Michael Mansfield KC** to the judge**:** https://nexuschambers.com/insights/what-i-learned-from-michael-mansfield-kc-about-the-safety-guidelines-followed-by-our-government-to-protect-our-health-from-5g/

The judge found **against** M Mansfield and the Action against 5G group. This is what the group had to say in defeat: https://actionagainst5g.org/case-updates/judgment-received/

This is what the judge had to say, read to the end: https://www.irishnews.com/news/uknews/2023/03/08/news/campaigner_loses_court_fight_over_adequacy_of_government_information_about_5g-3117680/

https://www.telegraph.co.uk/compare/broadband/guides/routers/5g

We haven't yet mentioned 5G routers inside the house. This link will explain the various options. Some of these routers won't need a landline to the wall as they will be small cell or femtocells base stations.



If you feel strongly that the **Braithwaite Road Mast** should not have been erected than please fill in this petition created by a Lowton resident who lives close to the new mast: https://chng.it/qcf5mrDsqL