MAST FACTSHEET

The parts of a mast and other FAQs

SHARED RURAL NETWORK

1 ANTENNA

Antennas send calls, texts and internet data to your smartphone using radio waves and in turn receive radio waves from the device. Most masts will have at least three antennas to provide coverage in every direction.

2 RADIO UNIT

The radio unit generates the radio waves transmitted by the antennas. Traditionally, the radio unit was installed at ground level. Nowadays, they're more likely to be installed higher up the mast closer to the antenna to help improve performance.

3 TRANSMISSION / BACKHAUL

Cables, traditionally copper but now far more likely to be fibre optic, are used to connect the mast with other masts and the rest of the mobile operator's network. These are usually buried in the ground. In some cases, a microwave dish is used instead.

4 CABINETS

Located at ground level, these contain computers which communicate with other masts in the network. Additional equipment, such as a battery backup in case of power failure and connectors for the transmission/backhaul, are also stored here.

5 POWER

Most masts will draw their power from the National Grid; some will have their own renewable power source on-site. In a handful of cases, such as with temporary masts, power will be provided by a diesel generator.

6 MICROWAVE DISH

In some locations, such as remote rural areas, a microwave satellite dish is used instead of fibre optic cables to act as transmission/backhaul, connecting the mast to the rest of the mobile operator's network. To do so, the dish must be within line-of-sight of a dish on another mast.

Factsheet content provided by Vodafone
Image used for illustrative purposes

How long does it take to build a mast?

It usually takes around 12-18 months, from engineers first identifying a potential site to the erected mast going live. The process includes making site investigations, negotiating with land owners and planning authorities, arranging equipment delivery and then carrying out the build. There is potential for challenges to crop up at every stage of this process, which could lead to delays, so timescales can vary from mast to mast.

Who decides where masts are built?

Engineers pick sites that best meet the technical, logistical, economic and regulatory requirements for hosting a mast. However, the local council has to grant planning permission for the building works to go ahead, so we try to engage with them, and the landowners, as early as possible to make sure our plans are aligned.

Does mast construction have to lead to road closures?

Not necessarily, but if the only way cranes and other heavy vehicles can deliver and install bulky equipment is by public road, then they may have to close temporarily. Once a local authority grants planning permission for construction, details of any planned road closures will be shared, which are kept to a minimum where possible.

What about the health effects of mobile phone masts?

Mobile masts – whether 2G, 3G, 4G or 5G – do not cause any adverse health effects. This is the consensus of international scientific bodies, such as the World Health Organisation and the International Commission for Non-Ionizing Radiation Protection (ICNIRP). The radio signals used are simply too weak to cause any damage to living cells or human DNA. Visit mobileuk.org/5g-and-health-concerns for more information.

Why do masts look like they do?

Masts are simply towers designed to raise the antennae up high enough to send and receive radio signals. They have to be sturdy and cost effective to build, so form follows function. Telecoms companies have experimented with different designs, particularly in rural areas. Some masts have even been disguised as trees, however, there comes a point where aesthetics begin to hamper the job the mast is supposed to be doing, so it's a trade-off.

Why can't you build it somewhere else?

Not all sites are suitable. To provide the strongest mobile signal to as wide an area as possible, there can't be too many neighbouring buildings, trees or other geographical features in the way. These tend to block the mast's signal. The taller the mast, the wider the area it can cover and the more people it can provide with a reliable mobile signal.

Masts also need their own power and what's known as 'backhaul' – data connections to the rest of the network. To meet soaring demand for faster speeds, that backhaul often consists of fibre optic cables under the ground. In rural areas we use 'hubs' where the mast links to the cables in the ground but can then wirelessly provide connections to other more difficult to reach masts. This is why getting mast locations right in rural areas is so important, one hub can provide coverage for a significant area through these wireless connections.

To run power and data lines to a mast, we have to negotiate with the owners of the land, and often, with the owners of land adjacent to it. Those negotiations aren't just about how much rent we will pay, but how easily we can access those sites for construction, maintenance and repairs. There are lots of variables that have to be considered when choosing mast locations and engineers have to do a lot of planning to get the right place.

For more information about the Shared Rural Network visit our website **www.srn.org.uk**

SHARED RURAL NETWORK

Factsheet content provided by Vodafone
Image used for illustrative purposes