

Our ref: CTIL 11711222

3<sup>rd</sup> January 2023

Felixstowe Town Council  
Town Hall  
Felixstowe  
Suffolk  
IP11 2AG

Clarke Telecom Ltd  
Unit E  
Madison Place  
Northampton Road  
Manchester  
M40 5AG

Dear Sir/Madam

**PROPOSED UPGRADE TO EXISTING RADIO BASE STATION INSTALLATION AT CTIL 11711222, FELIXSTOWE NORTH, HIGH STREET, WALTON, FELIXSTOWE, SUFFOLMD, IP119QR**

Cornerstone is the UK's leading mobile infrastructure services company. We acquire, manage, and own over 20,000 sites and are committed to enabling best in class mobile connectivity for over half of all the country's mobile customers. We oversee works on behalf of telecommunications providers and wherever possible aim to:

- promote shared infrastructure
- maximise opportunities to consolidate the number of base stations
- significantly reduce the environmental impact of network development

Cornerstone is in the process of identifying a suitable site in the Felixstowe area for a radio base station to maintain and improve existing levels of service provision. The purpose of this letter is to consult with you and seek your views on our proposal before proceeding with the works. We understand that you are not always able to provide site specific comments, however, Cornerstone is committed to consultation with communities on our mobile telecommunications proposals and as such would encourage you to respond.

As part of Cornerstone's continued network improvement program, there is a specific requirement for an upgrade to the existing installation at this location to provide enhanced coverage and capacity, and new 5G coverage ensuring that this area of Felixstowe has access to the latest technologies.

Mobiles can only work with a network of base stations in place where people want to use their mobile phones or other wireless devices. Without base stations, the mobile phones, and other devices we rely on simply won't work.

Please find below the details of the proposed site.


Our technical network requirement is as follows:

**CTIL 11711222, Felixstowe North**

**In the first instance, all correspondence should be directed to the agent.**

Cornerstone Planning Consultation Letter to Councillors - Standard V.3 – 15/04/2021

Registered Address:  
Cornerstone Telecommunications, Infrastructure Limited,  
Hive 2, 1530 Arlington Business Park, Theale, Berkshire, RG7 4SA.  
Registered in England & Wales No. 08087551.  
VAT No. GB142 8555 06

 Cornerstone, Hive 2,  
1530 Arlington Business Park,  
Theale, Berkshire, RG7 4SA

The site is needed to provide enhanced 2G, 3G, 4G coverage and capacity as well as new 5G service provision to ensure that customers experience access to the latest technologies currently available. The installation will also meet the extra demands on the network in this area as new technologies improve increasing the demand for 4G and 5G technologies.

The Government recognises that widespread coverage of mobile connectivity is essential for people and businesses. People expect to be connected where they live, work, visit and travel. That is why the Government is committed to extending mobile geographical coverage further across the UK, with continuous mobile connectivity provided to all major roads and to being a world leader in 5G. This will allow everyone in the country to benefit from the economic advantages of widespread mobile coverage. As well as improved mobile signal, 5G networks are also crucial to drive productivity and growth across the sectors that local areas are focusing on through their emerging Local Industrial Strategies. Enabling and planning for 5G implementation is central to achieving the Government's objective to deliver property at the local level and enable all places to share in the proceeds of growth.

The Government is determined to ensure the UK receives the coverage and connectivity it needs. To this end, the Government wants to be a world leader in 5G, the next generation of wireless connectivity, and for communities to benefit from the investments in the new technology.

The case for 5G is compelling as it will bring faster, more responsive and reliable connections than ever before. More than any previous generation of mobile networks, it has the potential to improve the way people live, work and travel, and to deliver significant benefits to the economy and industry through the ability to connect more devices to the Internet at the same time, creating the so-called "Internet of Things". This will enable communities to manage traffic flow and control energy usage, monitor patient health remotely, and increase productivity for business and farmers, all through the real-time management of data.

The demand for mobile data in the UK is increasing rapidly, and as households and businesses become increasingly reliant on mobile connectivity, the infrastructure must be in place to ensure supply does not become a constraint on future demand.

The preferred Cornerstone option is as follows:

**Felixstowe North, High Street, Walton, Felixstowe, Suffomd, IP119QR, NGR: E 628830 N 236037**

The proposed works comprise: The removal of the existing 12.50m monopole supporting 3 no. antennas and the installation of a replacement 20.0m monopole supporting 3 no. replacement antennas and 3 no. additional antennas. The installation of 2 no. dishes and the removal of 1 no. existing equipment cabinet. Ancillary development thereto including the installation of 3 no. Remote Radio Unit (RRUs) and 1 no. GPS module.


The operators are proposing to upgrade their existing installation to ensure the latest high quality, reliable, secure communications technology is able to be provided from this location. The amendments to the existing scheme are essential in order that customers' handheld devices continue to operate for the purposes in which they have become accustomed, accessible wherever they are whether that be indoors or outside.

The proposed height at 20m is essential in order to provide equivalent replacement coverage to the target coverage area. 5G new radio technologies operate in higher frequency bands than older technologies. Since it

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operates at higher frequencies where attenuation of the radio signal is naturally higher and the effects of clutter are greater it will normally require a higher structure to achieve the same coverage footprint. To increase capacity and data speeds to the user, the antenna will normally need to be mounted higher than conventional antennae. These factors drive a requirement for an increase in antenna height in 5G.

The new antennas are all unshrouded for technical reasons. However, they have been designed to be as tight as possible and virtually the same width as the main column, to minimise their visual appearance. The higher the radio frequency the more signal attenuation there is. The higher frequency 5G antennas are unable to operate effectively through the Glass Reinforced Plastic that the shroud is made up of and as such if these antennas were to be shielded then they would not be able to provide the necessary coverage to the target coverage area. An additional installation would be needed elsewhere within the cell area, leading to the proliferation of masts.

This is the slimmest design possible which will enable all technologies to be supported from this site. If the column width were to be any slimmer then the technology would not fit in the one column and another radio base station would be required, which would lead to the proliferation of masts contrary to national planning guidance. Similarly if the column were to be a uniform width throughout then the overall width would have to increase which would appear more visually prominent in the streetscene, than the proposed design.

The design of the column is a simple, functional, vertical structure which will not appear incongruous within the streetscene given the other vertical structures within the immediate area which help provide context for the replacement column. The column is proposed to be finished in a grey colour but can be coloured any other colour that the LPA consider appropriate.

As this is an existing streetworks installation and the amendments are relatively minor in nature, this is sequentially the most preferable site for the operators to upgrade their existing service provision to this cell area. As such, no other options have been considered.

The Local Planning Authority mast register and our records of other potential sites have already been reviewed, the policies in the Development Plan have been taken into account and the planning history of the site has been examined.

All Cornerstone installations are designed to be fully compliant with the public exposure guidelines established by the International Commission on Non-Ionizing Radiation Protection (ICNIRP). These guidelines have the support of UK Government, the European Union and they also have the formal backing of the World Health Organisation. A certificate of ICNIRP compliance will be included within the planning Notification.

In order to give you time to send your comments or request further information, we commit to allow at least 14 days before proceeding with the works. This 14-day period starts from the date at the top of this letter.


We would also be grateful if you could please advise of any local stakeholders or groups that might like to make comments. For your information pre-consultation letters and a set of plans have been sent to the local ward councillors for Western Felixstowe ward (Cllr T. Green, S. Bird, M. Deacon) and local MP.

We look forward to receiving any comments you may have on the proposal within 14 days of the date of this letter.

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 Cornerstone, Hive 2,  
1530 Arlington Business Park,  
Theale, Berkshire, RG7 4SA

Should you have any queries regarding this matter, please do not hesitate to contact me (quoting cell number 11711222)

Yours faithfully




**Wasim Patel**  
Acquisition Surveyor  
Clarke Telecom  
Tel: +44 (0)161 785 4500  
Fax: +44 (0)161 785 4501  
Email: wasim.patel@clarke-telecom.com

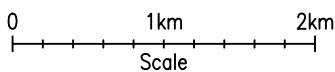
(for and on behalf of Cornerstone)

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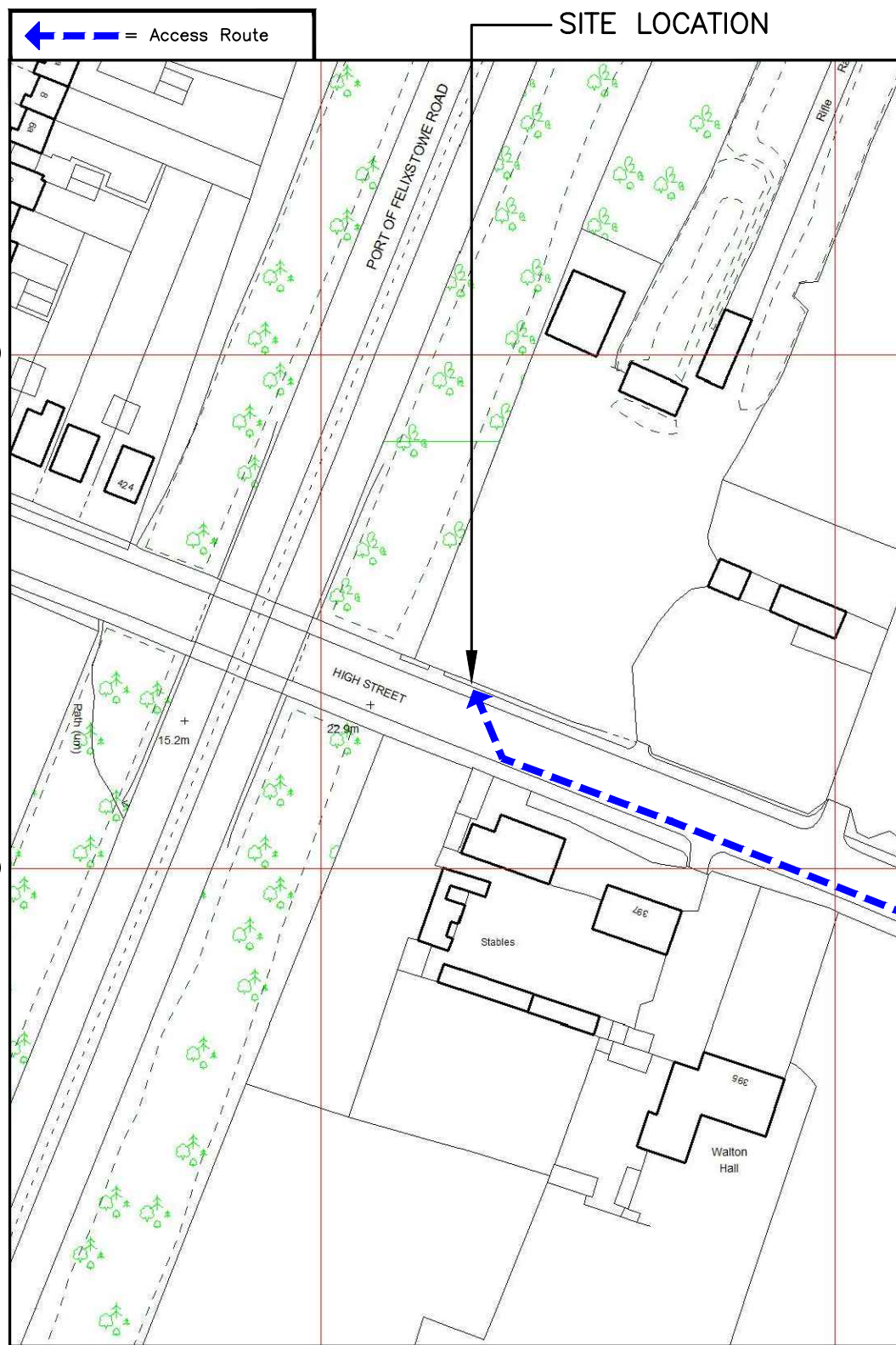
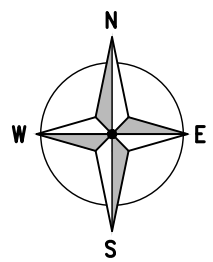


**SITE LOCATION**  
(Scale 1:50000)

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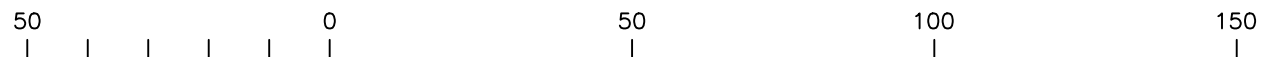


**SITE PHOTOGRAPH**



**DETAILED SITE LOCATION**  
(Scale 1:1250)

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ORIGINAL SCALE AT A3 - 1:1250

ALL DIMENSIONS IN METRES

ALL DIMENSIONS ARE IN mm UNLESS NOTED OTHERWISE

N.G.R E: 628830 N: 236037

**DIRECTIONS TO SITE:**  
FROM IPSWICH TAKE THE A14 SOUTHBOUND EXITING AT JUNCTION 59 ONTO A154. TURN RIGHT ON ROUNDABOUT REMAINING ON A154, TAKE FIRST RIGHT ONTO HIGH ROAD WEST, BECOMING HIGH ST. SITE IS ON THE RIGHT HAND SIDE JUST AFTER HAWKES LANE WHICH IS ON THE LEFT.

NOTES:

A	Issued for Approval	KM	SD	13.12.22
REV	MODIFICATION	BY	CH	DATE

**CLARKE telecom**  
Unit E, Madison Place, Northampton Road, Manchester, M40 5AG  
Tel: 0161 785 4500  
Fax: 0161 785 4501  
Web: www.clarke-telecom.com

**O<sub>2</sub>**  
**CORNERSTONE - BEACON**

Cell Name	Opt.
FELIXSTOWE NORTH	-

Cell ID No		
CTIL	TEF	VF
117112_22	071225	47695

Site Address / Contact Details		
HIGH STREET WALTON FELIXSTOWE SUFFOMD IP11 9QR		

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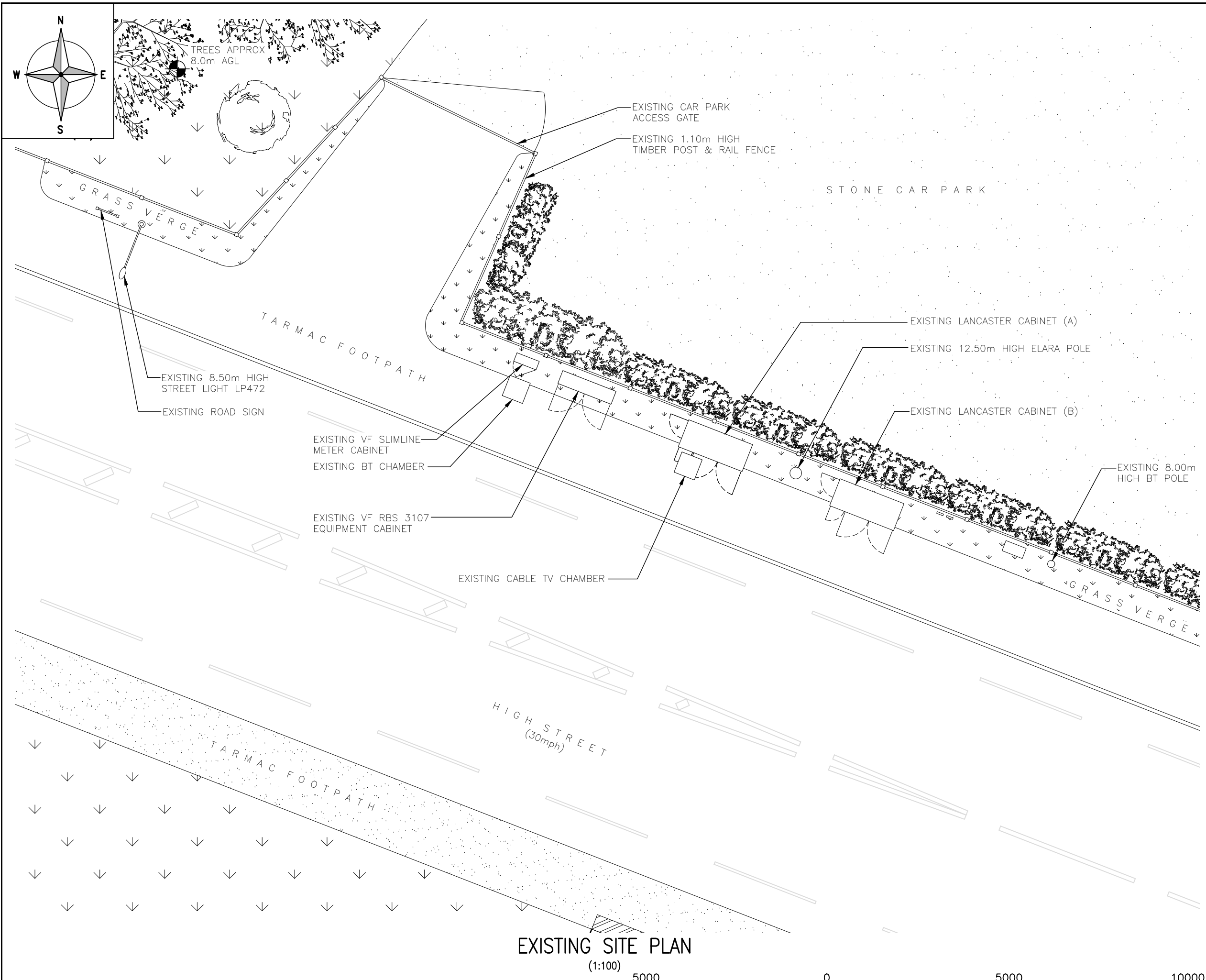
Purpose of issue:	PLANNING	Dwg Rev:
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Drawn:	KM	Date:	13.12.22	Checked:	SD	Date:	13.12.22	A
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The drawings comply with TEF & Vodafone Standard ICNIRP guidelines. Designed in accordance with CORNERSTONE document: SDN0013



ALL DIMENSIONS ARE IN mm UNLESS NOTED OTHERWISE

N.G.R E: 628830 N: 236037

NOTES:

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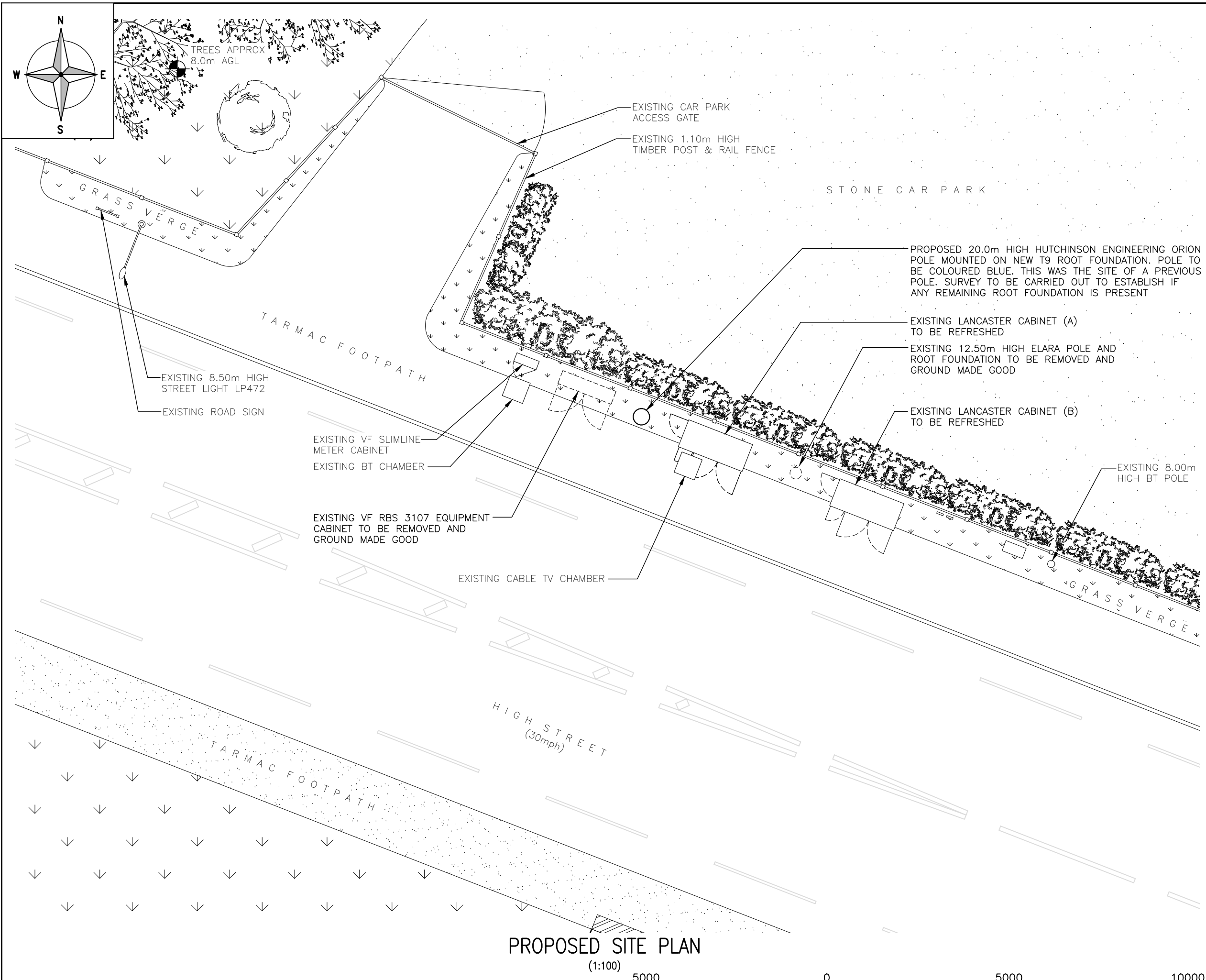
Cell ID No		
CTIL	TEF	VF
117112_22	071225	47695

Site Address / Contact Details  
 HIGH STREET  
 WALTON  
 FELIXSTOWE  
 SUFFOLK  
 IP11 9QR

Drawing Title: EXISTING SITE PLAN	
Purpose of issue: PLANNING	Dwg Rev: A
Drawing Number: 200	Pack Issue: A
Surveyed By: JW	Original Sheet Size: A3
Drawn: KM	Date: 13.12.22
Checked: SD	Date: 13.12.22

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ORIGINAL SCALE AT A3 - 1:100 ALL DIMENSIONS IN MILLIMETRES



ALL DIMENSIONS ARE IN mm UNLESS NOTED OTHERWISE

N.G.R E: 628830 N: 236037

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117112_22	071225	47695

Site Address / Contact Details  
 HIGH STREET  
 WALTON  
 FELIXSTOWE  
 SUFFOMD  
 IP11 9QR

Drawing Title: PROPOSED SITE PLAN		Dwg Rev: A
Purpose of issue: PLANNING		Pack Issue: A
Drawing Number: 201		
Surveyed By: JW	Original Sheet Size: A3	
Drawn: KM	Date: 13.12.22	Checked: SD Date: 13.12.22

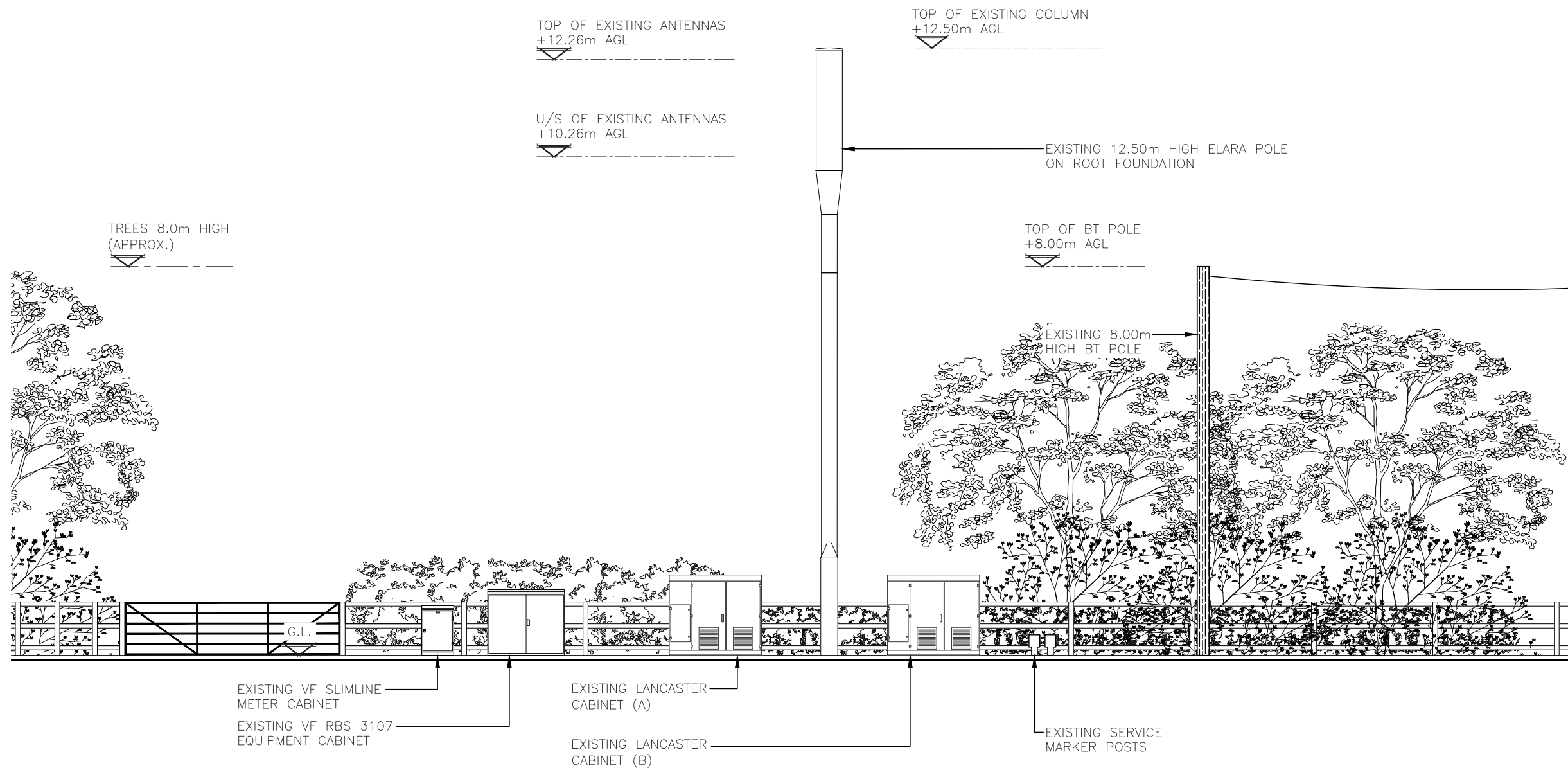
The drawings comply with TEF & Vodafone Standard ICNIRP guidelines.  
 Designed in accordance with CORNERSTONE document: SDN0013

ORIGINAL SCALE AT A3 - 1:100  
 ALL DIMENSIONS IN MILLIMETRES

ALL DIMENSIONS ARE IN mm UNLESS NOTED OTHERWISE

N.G.R | E: 628830 | N: 236037

NOTES:



EXISTING SOUTH WEST ELEVATION  
(1:100)



ORIGINAL SCALE AT A3 - 1:100

ALL DIMENSIONS IN MILLIMETRES

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Cell ID No		
CTIL	TEF	VF
117112_22	071225	47695

Site Address / Contact Details  
HIGH STREET  
WALTON  
FELIXSTOWE  
SUFFOMD  
IP11 9QR

Drawing Title: EXISTING SITE ELEVATION

Purpose of issue:	Dwg Rev:
PLANNING	A

Drawing Number:	Pack Issue:
300	A

Surveyed By:	Original Sheet Size:	Pack Issue:	
JW	A3	A	
Drawn:	Date:	Checked:	Date:
KM	13.12.22	SD	13.12.22



ALL DIMENSIONS ARE IN mm UNLESS NOTED OTHERWISE

N.G.R E: 628830 N: 236037

NOTES:

TOP OF PROPOSED POLE  
+20.00m AGL

TOP OF PROPOSED LOWER  
ANTENNAS +18.75m AGL

U/S OF PROPOSED LOWER  
ANTENNAS +16.55m AGL

C/L OF 2No. PROPOSED  
DISHES +14.73m AGL

PROPOSED GPS MODULE  
AT TOP OF POLE

TOP OF PROPOSED UPPER  
ANTENNAS +19.77m AGL

U/S OF PROPOSED UPPER  
ANTENNAS +19.02m AGL

PROPOSED 3No. UPPER  
AND 3No. LOWER ANTENNAS

PROPOSED 3No. T23 AZNC RRU's

PROPOSED TEF 2No. 300Ø DISHES  
INSTALLED ON NEW ORION STRUCTURE

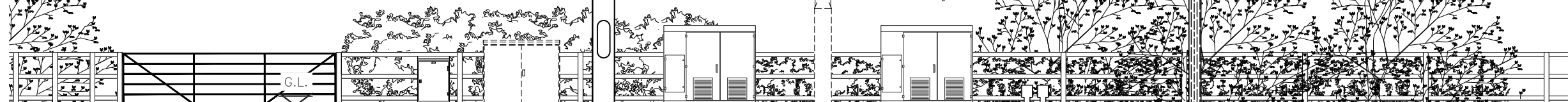
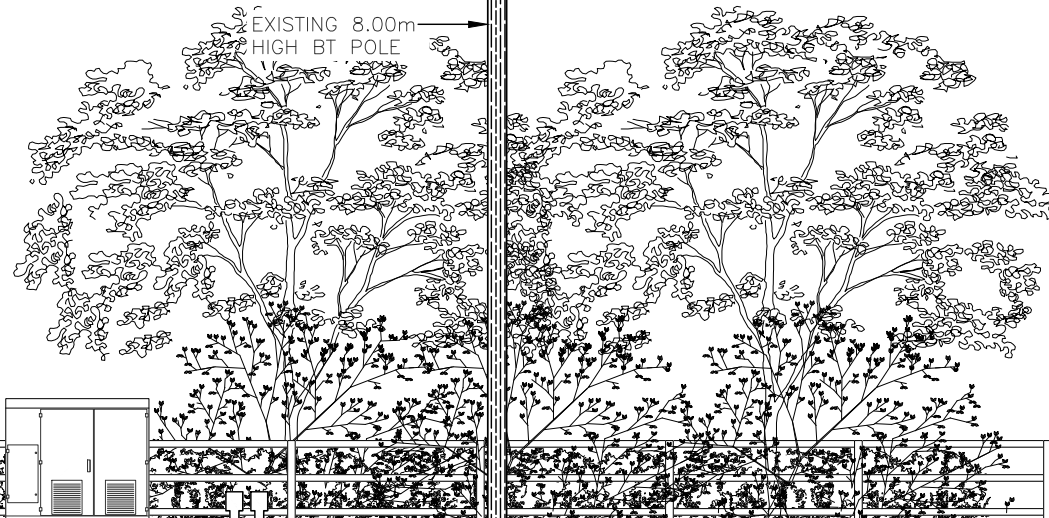
PROPOSED 20.0m HIGH HUTCHINSON  
ENGINEERING ORION POLE MOUNTED  
ON NEW T9 ROOT FOUNDATION. POLE  
TO BE COLOURED BLUE. THIS WAS  
THE SITE OF A PREVIOUS POLE.  
SURVEY TO BE CARRIED OUT TO  
ESTABLISH IF ANY REMAINING ROOT  
FOUNDATION IS PRESENT

EXISTING 12.50m HIGH ELARA POLE AND  
ROOT FOUNDATION TO BE REMOVED AND  
GROUND MADE GOOD

TREES 8.0m HIGH  
(APPROX.)

TOP OF BT POLE  
+8.00m AGL

EXISTING 8.00m  
HIGH BT POLE



EXISTING VF SLIMLINE  
METER CABINET  
EXISTING VF RBS 3107 EQUIPMENT  
CABINET TO BE REMOVED AND  
GROUND MADE GOOD

EXISTING LANCASTER  
CABINET (A) TO BE  
REFRESHED  
EXISTING LANCASTER  
CABINET (B) TO BE  
REFRESHED

EXISTING SERVICE  
MARKER POSTS

PROPOSED SOUTH WEST ELEVATION  
(1:100)



ORIGINAL SCALE AT A3 - 1:100

ALL DIMENSIONS IN MILLIMETRES

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SUFFOMD  
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Drawing Title:  
EXISTING SITE ELEVATION

Purpose of issue:	PLANNING	Dwg Rev:
Drawing Number:	301	A

Surveyed By:	JW	Original Sheet Size:	A3	Pack Issue:
Drawn:	KM	Date:	13.12.22	Checked:
				SD
		Date:	13.12.22	A



# Allaying health concerns regarding 5G and exposure to radio waves

An IET guide for policy makers  
and local planning authorities  
**2nd edition**

[theiet.org/5G-health](https://theiet.org/5G-health)

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**Allaying health concerns regarding 5G and exposure to radio waves is published by the Institution of Engineering and Technology.**

Please note that the views expressed in this publication are not necessarily those of the IET. It is not intended to be a guidance note with a specified set of recommendations or actions but rather seeks to add understanding and debate around the topic.



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## — About this guide

This Institution of Engineering and Technology Guide aims to give policy makers and Local Planning Authorities a better understanding of what 5G is, and what it is not, as it affects the concerns that have been expressed about exposure to radio waves.

The document is intended as a brief overview and references for further reading are provided in the footnotes.

**Prof Will Stewart** FREng, FInstP, FIET, FOSA  
Chairman of the IET Digital Communications Policy Panel

**Prof Stephen Temple** CBE FREng CEng FIET  
IET Guide Lead Editor

The IET Digital Panel would welcome any comments you may have on the contents/ your ideas for future digital publications. Please get in touch via [sep@theiet.org](mailto:sep@theiet.org).

## — Foreword



There has been an "infodemic" of misleading and false information circulating in the media about 5G and alleged health effects. Some of it is pure fantasy, but there have also been sincere concerns expressed by some people, including scientists, who are not up to date with how 5G has evolved in the UK.

The second edition of the IET Guide "Allaying health concerns regarding 5G and exposure to radio waves" provides a bridge to understanding how the 5G technology being implemented and the frequencies being used affect radio wave exposure, compared to the earlier mobile technologies that everyone is very familiar with.

The Guide is also helpful in another respect. It brings together, in one publication, an explanation of the overall rigorous radio exposure safety framework for public mobile services, embracing both the mobile networks and smartphones. The conclusion that 5G is as safe as 4G, 3G and Global System for Mobile communication (GSM) is not a political soundbite, but a conclusion drawn from an objective detailed examination, by independent professional engineers, who belong to institutions committed to the very highest professional standards.

A handwritten signature in black ink that reads "D. A. George". The signature is written in a cursive, flowing style.

**Professor Danielle George**  
IET Deputy President

# Introduction



## What is 5G?

5G is the next evolution in mobile technology that will provide the underlying wireless infrastructure to cope with the relentless rise in data consumption<sup>1</sup> and support many new applications. This includes everything from connected cars and virtual and augmented reality through to the foundations for emerging smart city and Internet of Things (IoT) technologies. It delivers this through the use of revolutionary new hardware like beam forming antennas and innovative new radio coding software at its core.

## Features of 5G



### Faster download speeds

It is expected that 5G will provide Gb/s data speeds. This would mean things that currently take minutes to download would only take seconds. Even more important will be the ability to support higher download speeds for many more concurrent users in the same place. This will lead to a more predictable and consistent performance.



### Lower latency

5G can support significantly lower latency, where appropriate, meaning very little lag, or buffering. This could enable mobile applications that simply aren't possible today, such as multiplayer gaming, factory automation and other tasks that demand quick responses.



### Greater capacity

5G will also have vastly greater capacity, allowing networks to better cope with not only the rapidly increasing data demands of customers today, but also the growth of high-demand applications being planned in the future.

<sup>1</sup> Ofcom "Enabling 5G in the UK" [https://www.ofcom.org.uk/\\_data/assets/pdf\\_file/0022/111883/enabling-5g-uk.pdf](https://www.ofcom.org.uk/_data/assets/pdf_file/0022/111883/enabling-5g-uk.pdf).

## Key observations



The 5G technology itself, *in so far as it affects radio wave exposure*, is very similar to 4G and in terms of its pulsed signals, the same as Global System for Mobile communication (GSM), Digital Enhanced Cordless Telecommunications (DECT) phones and a version of 4G.



As there has been no dispensation for 5G safety standards, it will have to meet the same safety standards as 4G, 3G and GSM, meaning **5G will be just as safe as 4G, 3G and GSM.**



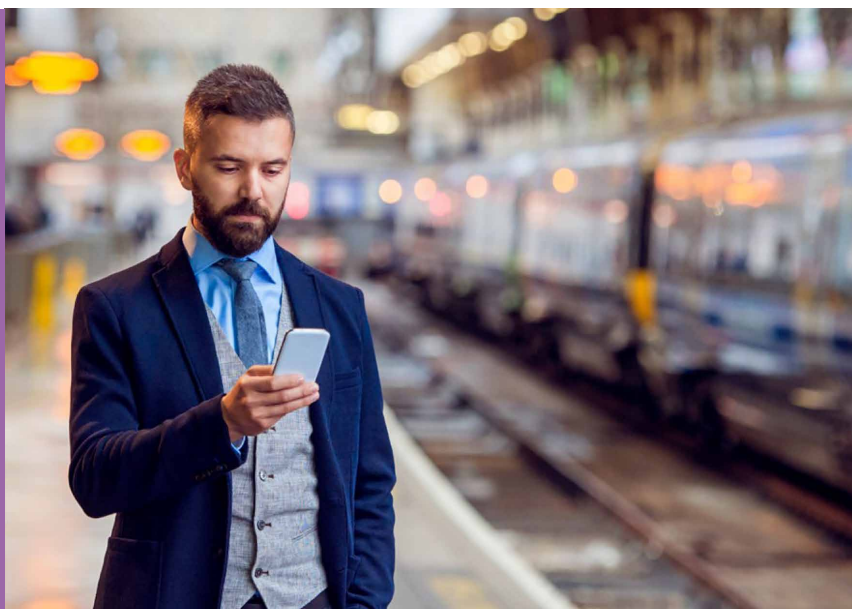
There are no "higher frequency" (mmWaves) commercial 5G mobile antennas **deployed anywhere in the UK** and none are currently planned (due to high cost of coverage).



Reducing exposure to radio waves in the future requires more base stations **in order to drive down both** smartphone and base station power levels.

# Electromagnetic Field (EMF) exposure guidelines developed by the International Commission on Non-Ionizing Radiation Protection (ICNIRP)

The first element of the cellular mobile radio wave exposure safety framework are the international recommended guidelines set by the ICNIRP at levels to ensure no harm<sup>2</sup>.



The most recent set of ICNIRP guidelines were published on the 11th March 2020, following a comprehensive assessment of peer-reviewed scientific literature over two decades, covering both thermal and non-thermal effects. The guidelines are designed to ensure that all people are not exposed to electromagnetic radiation at radio frequencies<sup>3</sup> in a way that would have any adverse effect on the body, such as excessive heating. No evidence for cancer, infertility or other health effects<sup>4</sup> has been found at the exposure levels recommended in the guidelines.

The reference exposure level for bands below 6 GHz (i.e. all the frequencies currently used in the UK for GSM, 3G, 4G & 5G) has not been changed in the revised guidelines. They have been calculated by reference to specific absorption rate (SAR)<sup>5</sup> and incorporate a substantial margin of safety.

For bands above 6 GHz, where the body does not really absorb the Radio Frequency (RF), the guidelines are set by reference to Power Density (PD)<sup>6</sup>, and again incorporating a substantial margin of safety.

<sup>2</sup> <https://www.icnirp.org/en/frequencies/radiofrequency/index.html>.

<https://www.icnirp.org/cms/upload/publications/ICNIRPrfgdl2020.pdf>.

<sup>3</sup> The radiofrequency ranges are in the non-ionising part of the Electromagnetic Spectrum (30Hz to 300GHz), well below, for example, the visible light portion of the Electromagnetic Spectrum (c.430-740THz).

<sup>4</sup> Other health effects mentioned include absurd theories linking 5G to Coronavirus.

<sup>5</sup> SAR is defined as the power absorbed per mass of tissue and has units of watts per kilogram (W/kg). SAR is usually averaged either over the whole body or over a small sample volume (typically 1g or 10g of tissue).

<sup>6</sup> Power density is the amount of power per unit area (Watts/M<sup>2</sup>).

## Compliance with ICNIRP guidelines for 5G mobile broadband networks

The second element of the cellular mobile radio wave exposure safety framework is *compliance* of base stations with ICNIRP recommended limits.

Ofcom intends to introduce a new condition in spectrum licences that will require licensees to ensure that all Electric and Magnetic Fields (EMF) emissions from radio equipment in excess of 10 watts (effective isotropic radiated power) complies with the relevant levels for general public exposure from the ICNIRP Guidelines. It will ensure Ofcom is in a position to take appropriate enforcement action in the event of non-compliance with the ICNIRP Guidelines.

Ofcom has already carried out their own independent measurements on some deployed 5G base stations and verified their compliance with the guidelines<sup>7</sup>.

As part of the process for obtaining planning consent for new 4G/5G sites and upgrades, each operator will continue to confirm compliance with ICNIRP guidelines<sup>8</sup>.



<sup>7</sup> See <https://www.comsoc.org/publications/ctn/truth-out-there-examining-science-around-5g-paranoia>.

<sup>8</sup> See <https://www.ofcom.org.uk/manage-your-licence/radiocommunication-licences/mobile-wirelessbroadband/exposure-electro-magnetic-fields>.



# Compliance with ICNIRP guidelines for 5G smartphones and consumer choice

The third element of the cellular mobile radio wave exposure safety framework are the recommended limits for smartphones and other mobile devices.

A manufacturer, by adding a CE marking, is declaring, on its own responsibility, conformity with all of the legal requirements to achieve CE marking, including compliance with ICNIRP guidelines.

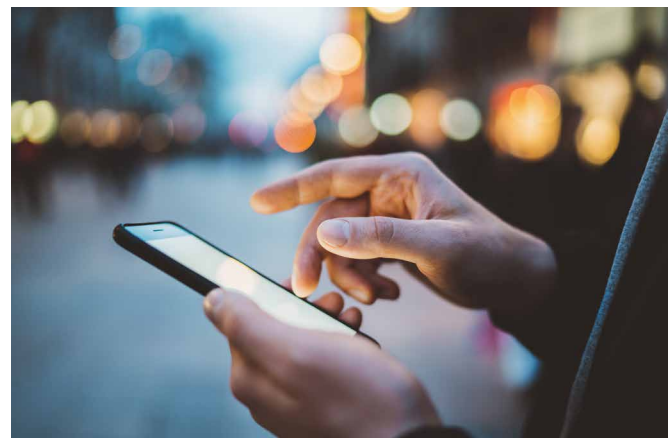
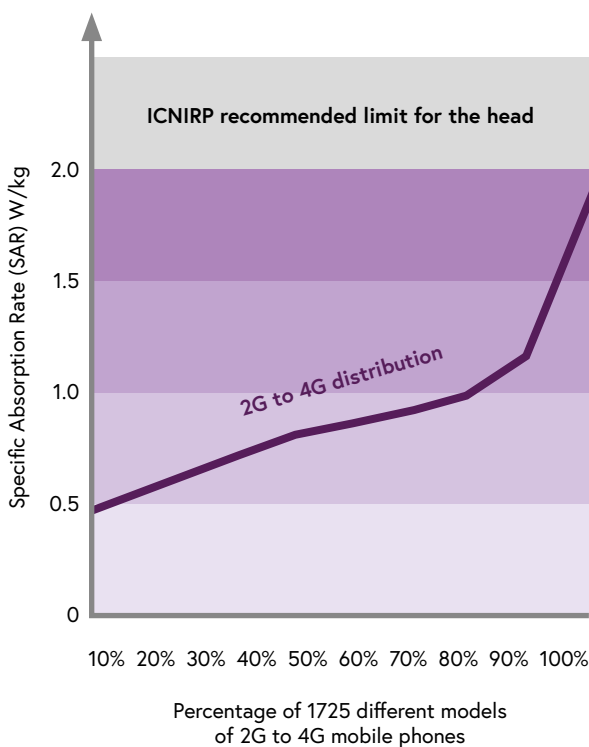
The illustration below indicates the distribution of Specific Absorption Rate (SAR) values for the head with GSM, 3G and 4G mobile technology generations based upon a very large sample of 1725 different models from 14 different manufacturers over a number of years.

The result shows almost 80% of all models in this very large sample had SAR values under 50% of the recommended limit. Data has been gathered on a number of 5G smartphones on sale in the UK. All the values were compliant and comparable to the earlier generations of smartphones. The frequencies built into the UK 5G smartphones were all below 6 GHz.

In recent years, SAR information for some phones has not always been easy for consumers to locate. SAR information should be included in publicly available technical specifications of all smartphones in order to facilitate consumer choice.

Finally, "handsfree working" is now standard on all smartphones. This offers consumers the discretion for further reducing RF exposure.

Specific Absorption Rate (SAR) values for the head with GSM, 3G and 4G mobile technology



# Exposure level reductions from new masts and small cells

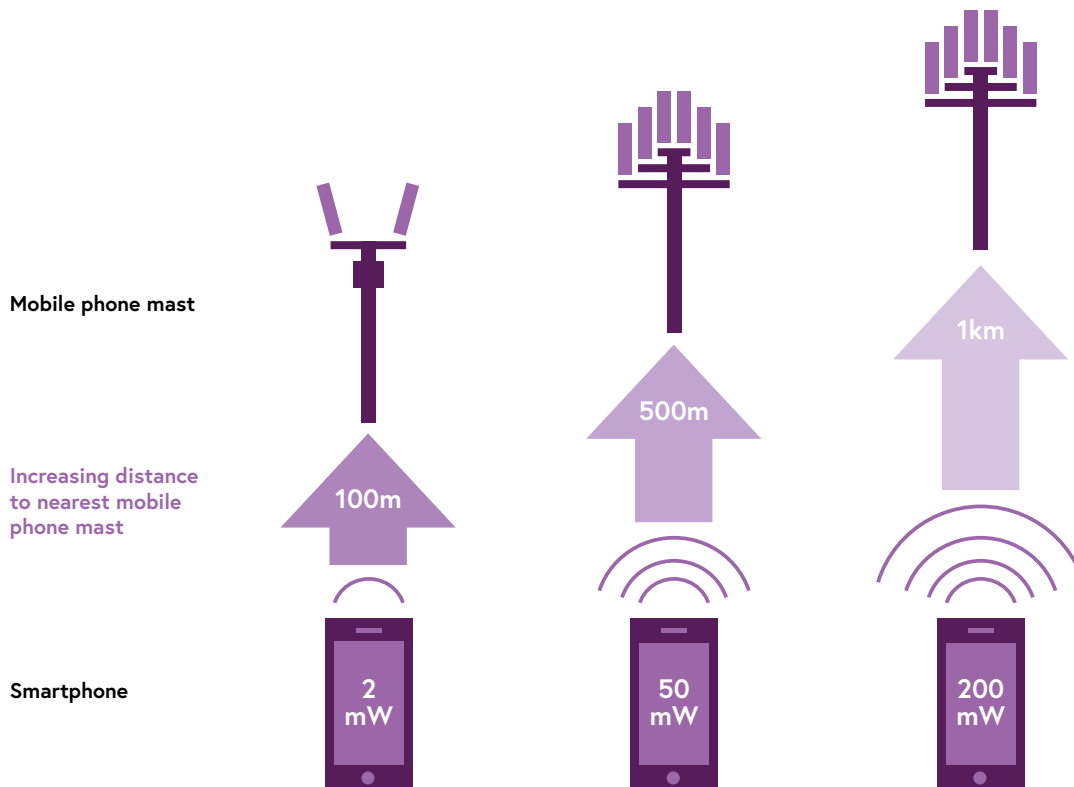
Small cells (micro-cells or pico-cells) are physically smaller antenna systems designed to work over a very short range to ease network congestion or fill in gaps in coverage.

Some people have expressed concern that a large number of 5G cells may increase a person's exposure to radio waves. However, that is not the way cellular mobile networks work. Every time a new mast or small cell is added, the distance the signal has to travel reduces. Therefore, from the laws of physics, the power needed at the smartphone and base station for a reliable connection is much less. Using the lowest practical power level is essential to prevent users located in different cells from disrupting each other's connections. It also saves the user's smartphone battery life.

For many people, their smartphone will be by far the nearest source of radio wave energy to them. As a result, more masts or 5G small cells will lead to a reduction in the overall radio wave signal strength an individual smartphone user is exposed to.

At the moment, there are relatively few small cells in use in the UK and though their numbers are likely to increase over time, we don't expect a mass rollout of them any time soon.

Illustrating how more base stations reduce smartphone powers and hence RF exposure<sup>9</sup>



<sup>9</sup> The numbers are purely illustrative and the actual powers will be determined by many factors including, importantly, the physical distance but also the urban topology between the network antenna and the smartphone.

# The most widely used 5G band in the UK will be 3.6GHz

The UK and Europe proposed the use of three bands for 5G<sup>10</sup>. These were termed the 5G pioneer bands and each had a different purpose.



This band is to secure pervasive national coverage. It's likely to be deployed from the traditional tall mobile phone masts. Only modest data capacity can be supported.



The 3.6GHz band sits between the current WiFi bands at 2.4GHz and 5GHz that are already widely deployed in homes, offices and public places. 3.6GHz is the 'sweet spot' for achieving the best capacity over the largest areas for the lowest cost and has wide international support. The mass deployment of small low power base stations in towns and cities will most likely use this band<sup>11</sup>.



This high frequency (mmWaves) supports the largest capacity but at the highest cost of coverage. There are no 26 GHz (mmWaves) commercial 5G mobile antenna being deployed anywhere in the UK and none are currently planned.

Research engineers see a potential for 26GHz to be used for a data capacity lift in the limited number of locations where the 3.6 GHz frequency maxes out over the next 10 years (less than 3% of the UK<sup>13</sup>). Another use may be as a low power advanced manufacturing broadband access point (industry 4.0). Such examples of relatively short distance applications only need relatively low power levels.

## Beam forming antennas

For the past 20 years mobile operators have typically used three or four sectored antennas, so as not to waste radio energy in directions where it's not needed. New beam forming antennas (sometimes referred to as Massive (complexity) Multiple input Multiple output antenna) make the transmission much more efficient, with the equivalent of 40, much smaller sectors, but still able to deliver the same power to a user standing at the edge of the cell's coverage area but wasting less energy to achieve this<sup>12</sup>.



<sup>10</sup> European Commission Radio Spectrum Policy Group's "Strategic Roadmap towards 5G in Europe" [https://rspg-spectrum.eu/wp-content/uploads/2013/05/RPSG16-032-Opinion\\_5G.pdf](https://rspg-spectrum.eu/wp-content/uploads/2013/05/RPSG16-032-Opinion_5G.pdf)

and IET "5G Networks for Policy Makers" report <https://www.theiet.org/media/1166/5g-report.pdf>.

<sup>11</sup> Ofcom "Enabling 5G in the UK" March 2018 paragraph 1.13 [https://www.ofcom.org.uk/\\_data/assets/pdf\\_file/0022/111883/enabling-5g-uk.pdf](https://www.ofcom.org.uk/_data/assets/pdf_file/0022/111883/enabling-5g-uk.pdf).

<sup>12</sup> IEEE Spectrum "5G Bytes: Massive MIMO Explained" <https://spectrum.ieee.org/video/telecom/wireless/5gbytes-massive-mimo-explained>.

<sup>13</sup> techUK "UK SPF publish principles for the release of 26 GHz 5G pioneer band" <https://www.techuk.org/insights/reports/item/15915-uk-spf-publish-principles-for-the-release-of-26-ghz-5g-pioneer-band>.

## Conclusion



### **5G is just as safe as 4G, 3G and GSM**

This document has aimed to set out the reality around concerns regarding radio wave exposure, mobile coverage and 5G.

Small 5G base stations in our towns and cities will allow improved network coverage. They will reduce radio wave exposure to individual smartphone users and improve local 5G capacity for all manner of useful bandwidth-hungry applications. A good 5G fibre base local broadband infrastructure will be important to local communities over the coming decades in view of the ever-increasing amounts of data being consumed by the general public.

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# 5G Masts & Health

5G is a generation leap in mobile technology with multiple benefits. However, with new technology, it is understandable that people wish to seek reassurance as to its safety and how it works.

This guide provides an explanation of 5G and the equipment behind it, including the antennae and the masts, to ensure that there is no cause for concern in regard to health.

## 5G & Radio Waves

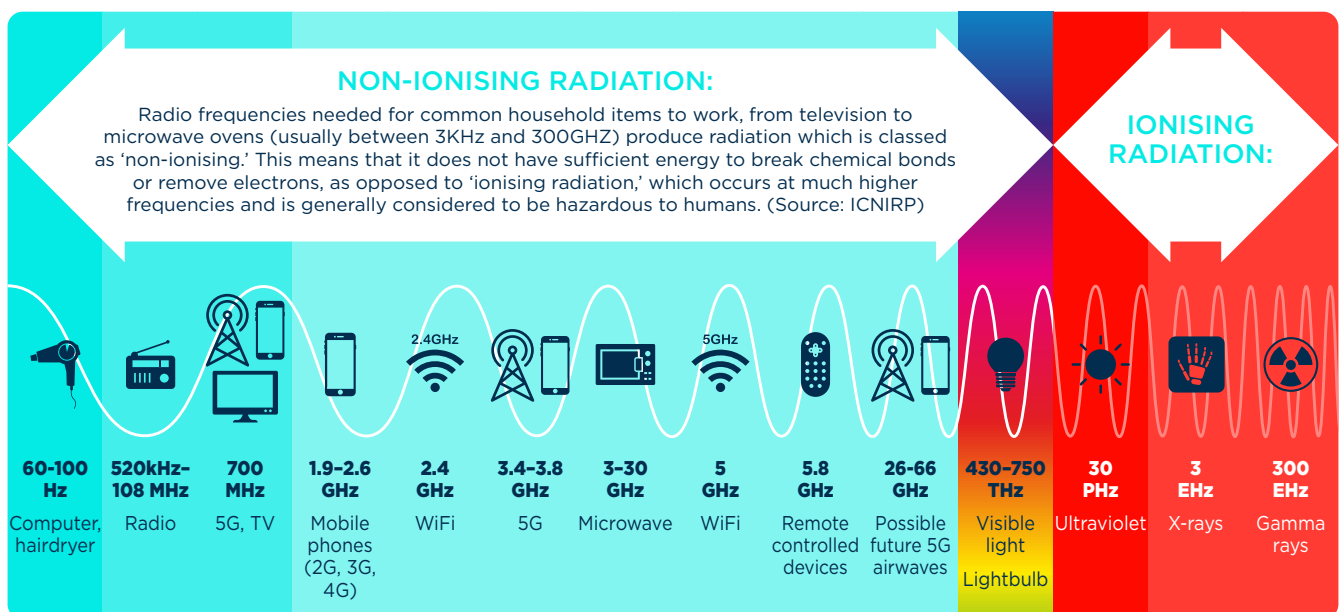
5G is broadcast using radio waves, which are a type of radiation in what is commonly referred to as the 'electromagnetic spectrum.' Sometimes the word 'radiation' scares people, because it is an invisible thing and something many people do not understand, or easily confuse with 'radioactivity.'

Radiation is simply the release of energy, just like the light from the sun or heat from our bodies. Most radiation is considered harmless, or in scientific terms, non-ionising when used within guidelines. It is part of our everyday lives, without us even realising it. Radio waves are used by your TV, radio and remote control.

5G uses a specific frequency of radio waves, just like 4G and before that 3G. The exposure to these radio waves is very low and crucially, many times lower than public safety guidelines dictate.

*All frequencies that are currently and will in future be used for 5G fall within the part of the electromagnetic spectrum that includes radiation which is classed as non-ionising. This means that these radio waves do not carry enough energy to directly damage cells. This is different from 'ionising' radiation, which is generally considered to be hazardous to humans and includes gamma (nuclear) radiation as well as x-rays, which occur at the higher frequency end of the electromagnetic spectrum.*

- Ofcom



# 5G Masts & Health

## Research into the safety of 5G and mobile phone signals

Research into the safety of radio waves has been conducted for more than 80 years, across the UK and around the world. The strong consensus of scientific opinion and public health agencies, such as the World Health Organisation (WHO), is that no dangers to health have been established from exposure to the low-level radio signals used for mobile communications, including 5G, when used within guidelines.

## Strict safety guidelines

All mobile operators must ensure that their radio base stations (also known as masts) are designed and built so that the public are not exposed to radiofrequency fields above the strict safety guidelines which govern and limit public exposure to electromagnetic fields. In fact, base stations operate at low levels, emitting levels of radio waves many times lower than the guidelines.

The International Commission on Non-Ionising Radiation Protection (ICNIRP) is the universally recognised non-governmental organisation that governs the safety levels of electromagnetic field or radio wave exposure and is accepted by the World Health Organisation (WHO). The guidelines, updated in 2020, monitor frequencies up to 300GHz, anything below this threshold is considered to not cause adverse health effects and is therefore safe for the public. 5G radio waves fall well within this category, operating at 700MHz and between 3.4GHz 3.6GHz.

## Testing of 5G masts

In fact, the UK's telecoms regulator Ofcom carried out tests at 5G-enabled mobile masts across the country. The highest emission levels (e.g. radiation) recorded at mobile phone masts were consistently well within the strict safety guidelines that monitor radiation levels.

## Further Information

As the world depends more and more on mobile connectivity and we are consuming more data, existing networks are becoming congested. 5G has the capacity to handle this and future demand, as it will offer much faster data and upload speeds, allow more devices to access the mobile internet at the same time, and significantly reduce the amount of time it takes to send information from one point to another.

The rollout of 5G is not just about the benefits to each individual mobile phone user but the wider societal benefits of providing connectivity to all, such as the emergency services, local businesses and the provision of council services; the capability of 5G can transform, and ultimately help save lives.

For more information on 5G and health, and to learn about the wider benefits of 5G visit [www.mobileuk.org.uk/5G-and-health](http://www.mobileuk.org.uk/5G-and-health)

For further information from external sources regarding 5G and health, the following links may be helpful:

World Health Organization (WHO) - Radiation: 5G mobile networks and health: <https://www.who.int/news-room/q-a-detail/radiation-5g-mobile-networks-and-health>

BBC - Does 5G pose health risks?: <https://www.bbc.co.uk/news/world-europe-48616174>

Which? - Is 5G safe?: <https://www.which.co.uk/news/2020/06/is-5g-safe-everything-you-need-to-know-on-the-5g-powered-future/>

BBC Click - Testing the Safety of 5G: <https://www.youtube.com/watch?v=k2t1dUCyEOI&feature=youtu.be>

Cancer Research UK - Do mobile phones cause cancer?: <https://www.cancerresearchuk.org/about-cancer/causes-of-cancer/cancer-myths/do-mobile-phones-cause-cancer>

# Cornerstone Community Information Sheet

## 5G Services

As 5G technology is deployed across the country more and more services will become available and our lifestyles, economy and even the way we commute will be transformed. Additional base stations and upgrades to existing ones will be needed to meet this demand and improve the quality of service.

## Practical uses of 5G

Two areas where these benefits are becoming evident are education and health,

The relationship between 5G and education is evolving at a massive rate with educators exploring the relevance of Virtual Reality (VR) technologies for education and training. Crucially, VR can support remote learning, allowing students a presence in the classroom even when working elsewhere.

5G's ability to deliver real-time information (low latency), ultra-fast speeds (critical for high-definition images and video), increased capacity and heightened security will also allow learning on the job, thanks to technologies such as Augmented Reality (AR) goggles, which can give engineers real-time instructions on how to fix a machine on a production line, for example.

Health care is undergoing a rapid transformation, patients across the country are now becoming accustomed to relying on remote healthcare services such as virtual GP appointments, and ordering online deliveries of essential medical supplies.


5G will prove critical in providing the infrastructure required to deliver remote health services over the next decade. 5G's fast and secure services will be fundamental in scaling the patient benefits of remote healthcare and keeping medical records protected and private. Trials have shown that connecting ambulance crews to expert resources using 5G allows paramedics to work with doctors and conduct specialist procedures in real time whilst on the road.

## Health concerns

Various international assessments have concluded that below the International Commission on Non-Ionizing Radiation (ICNIRP) Guidelines there is no evidence of adverse health effects for wireless networks (including 5G).

In January 2019 the Finnish Radiation and Nuclear Safety Authority (STUK) concluded that:

In the light of current information, exposure to radio frequency radiation from base stations will not rise to a significant level with the introduction of the 5G network. From the point of view of exposure to radio frequency radiation, the new base stations do not differ significantly from the base stations of existing mobile communication technologies (2G, 3G, 4G).'  
<https://www.stuk.fi/aiheet/matkapuhelimet-ja-tukiasemat/matkapuhelinverkko/5g-verkon-sateilyturvallisuus>

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In the UK Ofcom, the regulator for the communications services, undertook measurements of electromagnetic fields (EMFs) around 5G base stations. In 2020 they noted: "In all cases, the measured EMF levels from 5G-enabled mobile phone base stations are at small fractions of the levels identified in the ICNIRP Guidelines" [https://www.ofcom.org.uk/\\_data/assets/pdf\\_file/0015/190005/emf-test-summary.pdf](https://www.ofcom.org.uk/_data/assets/pdf_file/0015/190005/emf-test-summary.pdf)

In Norway the Norwegian Radiation and Nuclear Safety Authority (DSA), noted:

'The overall research shows that the radiation from wireless technology is not hazardous to health, as long as the levels are below the recommended limit values. This is the prevailing view among researchers in many countries today, and it is supported by the EU Scientific Committee. We have used cell phones and radio transmitters for decades and much research has been done on how this affects our health. Risk factors of importance to public health have not been found. With the knowledge we have today, there is no need to worry that 5G is hazardous to health.' January 2019  
<https://www.dsa.no/temaartikler/94565/5g-teknologi-og-straaling>

In the light of concerns about 5G signals from some members of the public Public Health England (PHE) commented in 2019:

"It is possible that there may be a small increase in overall exposure to radio waves when 5G is added to an existing network or in a new area. However, the overall exposure is expected to remain low relative to guidelines and, as such, there should be no consequences for public health"  
<https://www.gov.uk/government/publications/5g-technologies-radio-waves-and-health/5g-technologies-radio-waves-and-health>.

In 2020 the ICNIRP updated their safety guidelines to include further restrictions for frequencies used for 5G services. ICNIRP Chairman, Dr Eric van Rongen stated 'the new guidelines provide better and more detailed exposure guidance in particular for the higher frequency range, above 6 GHz, which is of importance to 5G and future technologies using these higher frequencies. The most important thing for people to remember is that 5G technologies will not be able to cause harm when these new guidelines are adhered to.' [https://www.icnirp.org/cms/upload/presentations/ICNIRP\\_Media\\_Release\\_110320.pdf](https://www.icnirp.org/cms/upload/presentations/ICNIRP_Media_Release_110320.pdf).

In 2020 the World Health Organisation commented on 5G stating: "Provided that the overall exposure remains below international guidelines, no consequences for public health are anticipated"  
<https://www.who.int/news-room/q-a-detail/5g-mobile-networks-and-health>.


In common with all mobile phone base stations, Cornerstone sites with 5G technology will be checked and certified for ICNIRP compliance.

## For further information please contact

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