Site Specific Supporting Operational and Technical Justification

for

Proposed Electronic Communications Base Station

at

the Existing BT Telephone Exchange at

Teddington Telephone Exchange, High Street, Teddington, London TW11 8JD

Site Reference – Teddington TE (Project ID: 212219)

Cellnex UK
TELEFONICA

1.0 Introduction

1.1 This document has been prepared to support the application to use an existing mobile communications base station at Teddington to provide mobile connectivity. This document should be read in conjunction with the other accompanying material, including the planning statement and radio coverage plots, supporting the application.

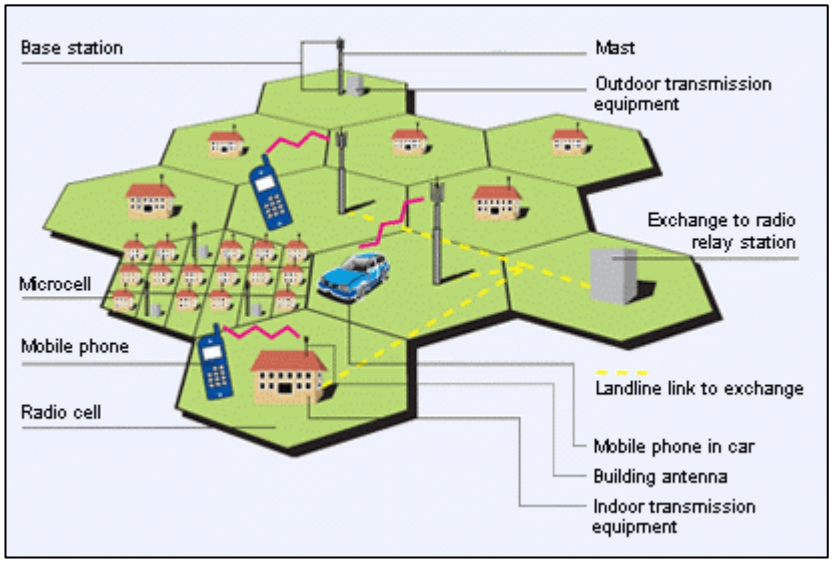
1.2 This document provides supporting site-specific technical information and justification on the following matters:

- The use of an existing operational base station to provide coverage
- Technical and Operational Requirements
- Explanation of coverage (radio plots) and transmission links
- Where necessary, a demonstration of the unsuitability of alternative sites

2.0 How a Base Station Operates

2.1 Section 6 of the Code of Best Practice on Mobile Network Development in England, published November 2016, explains how mobile networks function and such guidance is relevant to Scotland, Wales and Northern Ireland.

2.2 In very basic terms, mobile networks require base stations at intervals that provide localised areas of coverage, which are linked together like a patchwork quilt to provide nationwide coverage. This is often referred to as a 'cellular network'. Base stations typically require a supporting structure, like a mast or high building to support an array of antennas. Main base stations are often referred to as 'macro base stations' with these providing the bulk of mobile coverage. In urban areas it is sometimes possible to deploy micro base stations or small cell systems, especially where the requirement is to complete a very small gap in coverage and /or to provide additional network capacity in areas of high demand. This basic network architecture is illustrated below.



2.3 The mobile base station operates by receiving and transmitting to mobile devices, such as smartphones or tablets using radio waves. This is similar to television and radio reception, except the communication is two way. This is achieved by the antennas, dishes and other electronic communications apparatus, the main function of the supporting structure is to elevate this apparatus above intervening features such as tall trees, buildings, or valley sides that would otherwise cause interference.

2.4 Base stations use two forms of antenna systems. The first system uses sector antennas that typically look like vertically orientated strips. These look over the target coverage area and transmit and receive the signals to and from mobile devices.

2.5 The second system requires the use of dish antennas and these operate on a direct line of sight basis, a bit like a search light beam, to other dishes on corresponding installations on the network. These dish links to the wider network are critical for the following three main reasons:

- The dishes link the base station to the wider national network, which in turn is linked to other national and international networks.

- The dish links also link the base station to a master control centre that manages the call handover process that occurs when a mobile user moves from one cell area to another.

- The dishes also provide telemetric monitoring to ensure the site is working properly, with some faults able to be fixed remotely.

2.6 Base stations also require cabinets to house the electronic communications radio equipment and an electricity meter cabinet for the necessary power connection.

3.0 Importance of Cellnex UK

3.1 There are now four Mobile Network Operators (MNOs) and they receive and transmit calls within different frequency bands licenced by Ofcom and in relation to the different generation of mobile services they operate.

3.2 As part of a wider pan-European business, Cellnex UK operates around 9000 active 'shared' wireless infrastructure sites (neutral host) in the UK. These are utilised by all the Mobile Network Operators (MNOs) for the deployment of existing and future generations of mobile connectivity. As an independent Wholesale Infrastructure Provider (WIP), Cellnex is the largest in the UK today, being owner / operator of shared communications sites both rural and urban.

3.3 The successful improvement of network coverage is very dependent on WIPs like Cellnex, with the Mobile Network Operators (MNOs) themselves increasingly depending on their own 'captive' or other 'neutral' infrastructure system providers. This continues a trend and represents a marked change from earlier deployments of mobile connectivity.

4.0 Using existing operational base stations as the starting point

4.1 The Mobile Network Operators existing networks now cover a large part of the geographical area of the UK, with well-established levels of 2G, 3G and 4G mobile

coverage. This is provided from their own infrastructure sites and the shared use of Cellnex infrastructure in its capacity as a neutral host WIP.

4.2 The operators continue to improve their existing networks, often upgrading services from 3G to 4G and now 5G. There remain areas, often remote, where there are still particular difficulties in providing coverage to communities and these areas are subject to other delivery programmes to address coverage deficit.

4.3 The deployment of mobile connectivity will continue to follow the same principles of earlier generations of mobile deployment:

- To improve coverage, where possible, existing sites which might include adding apparatus onto an existing mast or building, redeveloping existing masts or installing new apparatus on a building or structure where an existing site cannot accommodate the apparatus and;

- To align with longstanding planning policy to share or reuse existing operational communication sites or existing buildings before considering new masts – so minimising the proliferation of new mobile infrastructure and;

- To comply with obligations within the Electronic Communications Code (ECC) and associated Communication Code Regulations to share existing infrastructure.

5.0 Technical and Operational Requirements

5.1 The location of any base station is guided by operational and technical factors in the first instance. Whether it is the upgrade of an existing mobile base station or provision of a new site, a combination of the following operational considerations will apply:

- The need to provide an acceptable level of coverage over the target coverage area by the sector antennas and to meet expected demands and network resilience (antennas can only handle certain call and data levels)

- The need for a dense and superfast fixed fibre network, necessary for a base station to rapidly process calls and data instructions and connect to the wider network
- Where necessary, point-to-point radio transmission dish antennas with heights required to allow direct line of sight
- Proximity to a suitable and reliable power source
- Positioning to meet public and occupational exclusion zones to meet ICNIRP guidelines (International Commission for Non-Ionising Radiation Protection)
- Demarcation and safety handrailing, protected cable routes, climbing access and some small signage
- Positioning on rooftops, to avoid interference with access hatches, maintenance routes and other operational features like plant rooms, air conditioning, rooflights
- Positioning to avoid interference with other installed communications apparatus and necessary separation
- An accessible route for construction and future maintenance access – pedestrian or vehicular
- A reasonable degree of security and associated signage
- A sympathetic and willing site provider
- For new ground-based masts, sufficient buffer space to allow for drop and exclusion zones
- Suitable ground and rooftop conditions to accommodate load bearing apparatus.

6.0 Predicted Coverage over the Target Area

6.1 In this case radio propagation plots are attached and submitted with the application, which illustrate the extent of new coverage:

- The existing network coverage across the wider area
- The existing network coverage together with coverage from the proposed site

6.2 The radio propagation plots have been produced by computer modelling software. This software is used by the operators as a network planning tool and has been tested against actual coverage readings to ensure that it has reasonable confidence level. The extent of coverage is dictated by many factors including the height of the antennas above ground level, the frequency of the antennas, the nature of the surrounding topography, and the presence of buildings and trees that can cause reflections or absorb the radio signals. These plots are the recognised means of illustrating proposed coverage in the context of an existing network.

6.3 The following information is shown on the plots:

- The orientations of the antennas, which are indicated by the three symbols;
- Existing coverage and proposed coverage;
- The extent of coverage is illustrated by the pink and yellow shading. As indicated in the key this shading differentiates between excellent signal levels (pink), moderate signal levels (blue areas) and marginal level of coverage (yellow areas).

7.0 The unsuitability of alternative sites

7.1 We have already provided an explanation on other locations that were considered but were found unsuitable compared to the application site, in the Planning Statement (section 3).

7.2 As can be seen, a thorough search has been undertaken that has had due regard to environmental considerations, especially the need to reduce to an acceptable level the potential visual impact on the locality. There are no other sites in the immediate area that present a comparably better town planning option for delivering coverage

than sharing an existing building where the operator already has a deemed consent from 2018.