

3 Site Selection

One of the critical parameters for the efficient operation of a mobile network is the location and positioning of antennas. The antennas need to be located so that they can communicate with all of the mobile devices operating within the cell they serve, while at the same time not causing or receiving interference from mobile devices operating within an adjacent cell. This is achieved by closely controlling the power output from the transmitters, orienting antennas correctly, and by positioning the antennas at the correct height.

Height is critical for location of antennas in order to achieve effective service to mobile devices operating within the cell. If antennas are sited too high transmissions will “spill outside” the facility’s desirable coverage and result in interference with the operation of adjacent cell sites. On the other hand, antennas must be high enough to prevent them being blocked by large objects such as buildings and trees in the immediate vicinity. The antennas must also be sited so that coverage shadows are not created by nearby topography.

Antennas must also be located and positioned to provide a direct and unobstructed path to the receiver, while eliminating the possibility of objects or persons moving through or obstructing the transmission and thus degrading the quality of telecommunications. The principle of line-of-sight therefore guides the site selection process for antenna positioning.

At cellular frequencies, the radio wave must have at least a new line-of-sight path from the facility to the customer’s phone to ensure adequate signal strength for proper operation. The effects of large obstructions in the path of the radio signal results in areas of marginal or no coverage. Telecommunication facilities are designed with sufficient elevation to minimise multiple obstructions (and signal loss) caused by clutter and to maximise signal levels to counter the effect of penetration losses.

The choice of each telecommunications facility (location, height, positioning) is the result of a careful site selection process. A computer model of the cellular network using radio propagation software and digitised terrain maps first identifies a search area. Site options, which have the necessary technical and physical characteristics, are then identified within the search area. Those site options are evaluated in terms of the following criteria:

- Local topography and the occurrence of radio frequency shadows
- Availability of suitable sites for lease
- Relevant District Plans provisions
- Environmental and heritage/cultural constraints

This selection process has been followed and led to the subject site being chosen for operational and environmental reasons.