77 Camden Street Lower, Dublin 2 Ireland D02 XE80
✆: +353 (0)1 905 8800 ✉: info@ismireland.com
💻: www.ismireland.com

iSM INDEPENDENT SITE MANAGEMENT

Telecommunications Report - Section 3.2 of the Building Height Guidelines (2018)

DEVELOPMENT
St. Vincent's Hospital Redevelopment

22 March 2023

Prepared by
Independent Site Management Limited
Christopher Plockelman
Director
✉:christopher@ismireland.com
✆:+353 (0)1 905 8800
www.ismireland.com

Independent Site Management Limited is a company registered in Ireland with company number 348181 & VAT number IE 6368181N

Table of Contents

DEFINITIONS

Author:	Independent Site Management Limited (hereinafter referred to as "ISM")
Mitigation Measures:	means the allowances made for the retention of important Telecommunication Channels (hereinafter referred to as "Mitigation Measures")
Planning Body:	means Dublin City Council (hereinafter referred to as the "Planning Body")
Radio Frequency:	means a frequency or band of frequencies in the range 104 to 1011 or 1012 Hz, of the electromagnetic spectrum suitable for use in telecommunications.
Microwave Links:	means the transmission of information by electromagnetic waves with wavelengths in the microwave range (1 m - 1 mm) of the electromagnetic spectrum suitable for use in telecommunications.
Report Date:	means the date which the assessment was carried out (hereinafter referred to as "Report Date")
Telecommunication Channels:	means Radio Frequency links & Microwave Transmission links (hereinafter referred to as "Telecommunication Channels")
The Applicant:	means St. Vincent's Hospital (hereinafter referred to as the "Applicant")
The Development:	means the proposed development situated at St Vincent's Hospital, Richmond Road and Convent Avenue, Fairview, Dublin 3 (hereinafter referred to as the "Development")

EXECUTIVE SUMMARY

Independent Site Management ('ISM') has been engaged to provide a specific assessment that the proposal being made by St Vincent's Hospital (the "Applicant") within its submission to Dublin City Council (the 'Planning Body'), allows for the retention of important Telecommunication Channels ("Telecommunication Channels") such as microwave links, to satisfy the criteria of Section 3.2 of the Building Height Guidelines (2018).

To provide this assessment, ISM reviewed the Applicant's proposed development (the "Development"), together with their proposed allowances to retain relevant Telecommunication Channels in the context of the immediate surrounding registered and documented telecommunication sites.

Pursuant to our review, ISM can conclude based on the findings outlined herein that the proposal being made by the Applicant within its submission to the Planning Body allows for the retention of important Telecommunication Channels, such as Microwave links, and therefore satisfies the criteria of Section 3.2 of the Building Height Guidelines (2018).

ABOUT THE AUTHOR

ISM is a consultancy firm and asset management company that provides telecommunication consultancy and services to developers and property owners.

ISM works closely with all providers of wireless and fixed line telecommunication services to bridge their infrastructure requirements with that of private and public development. ISM has successfully been providing this service in Ireland for 20 years.

ISM is a multidiscipline firm proficient in the 3 main areas in the delivery of telecommunication services:

(1) Radio Frequency technology;

(2) Microwave Transmission technology; &

(3) Fixed Line fiber optic & copper technologies.

ISM has had an integral part in procuring, designing, building and subsequently managing over 300 mobile base station and/or fixed wireless sites, the vast majority of which originated in densely populated, urban environments.

ISM has designed built and operates 6 in-building distributed antenna systems, and 2 large area managed fibre optic networks.

DEVELOPMENT DESCRIPTION

A **ten year planning permission** is sought for the proposed development comprising of the following (see public notices for the detailed description):

- Provision of a new part two and part three storey hospital building, providing mental health services, accommodating 73 no. beds, associated facilities, a single storey facilities management building, plant rooms and service areas, associated car and cycle parking, access roads, and open space, all on a proposed hospital site of c. 2.67 ha.
- Refurbishment and repurposing of existing buildings on site including Brooklawn (RPS Ref.: 8789), Richmond House, including chapel and outbuildings (RPS Ref.: 8788), the Laundry building and Rose Cottage for ancillary uses associated with the new hospital. The existing gate lodge building will remain in residential use and used by visiting members of staff to the new hospital.
- Change of use, refurbishment, alterations and extensions, to the existing hospital building (part protected structure under RPS Ref.: 2032), to provide residential amenity areas, a gym, a café, co-working space, a library, a childcare facility, and a community hall (referred to as Block K).
- The proposal includes the demolition of existing structures on site with a GFA of 5,872 sq.m, including the (1) westernmost range of the hospital building, which includes St. Teresa's and the Freeman Wing, (2) extensions to the south and north of the main hospital building, including the conservatory extension, toilet block extension, an external corridor, toilet core, lift core, and stair core (which are all part of / within the curtilage of RPS Ref.: 2032), (4) hospital buildings and outbuildings located to the north of the existing main hospital building (5) St. Joseph's Adolescent School located in the southeast of the site, (6) Crannog Day Hospital located in the southwest of the site, and (7) extensions to the Old Laundry Building and Rose Cottage.
- Provision of 9 no. residential buildings (Blocks A, B, C, D-E, F, G, H, J, and L) providing a total of 811 no. residential units, including 494 no. standard designed apartments (in Blocks A, B, C, G, H, J, and L) and 317 no. Build to Rent apartments (in Blocks D-E and F). Residential amenities and facilities are proposed in Block C, D-E, J and K. A retail unit is proposed in Block A and a

café in Block F. Block J is proposed as an extension of the existing hospital buildings (protected structure RPS Ref.: 2032- referred to as Block K).

- The building heights of the proposed residential blocks range from part 2 to part 13 storeys. A proposed basement / lower ground level, containing car and cycle parking and plant areas, is located below and accessed via Blocks C, D-E and F.
- Access to the new hospital and associated grounds is provided from Richmond Road and Convent Avenue, with separate internal access points. A separate vehicular access to the residential development is provided from Richmond Road. The development includes a proposed pedestrian / cycle connection to Griffith Court, requiring alterations to the service yard of the Fairview Community Unit, pedestrian / cycle connections to the Fairview Community Unit campus to the north (providing an onward connection to Griffith Court), a pedestrian / cycle connection to Grace Park Wood, and makes provision internally within the site for a potential future connection to Lomond Avenue / Inverness Road.
- The proposal includes public open space, including allotments, children's play areas, a central park, a linear park and an entrance plaza, with a set down area at Richmond Road, and communal open space at surface level. The proposal includes communal roof terraces on Block C and Blocks D-E and private balconies / terraces for the apartments.
- The proposal also includes provision of internal access roads, car and cycle parking, pedestrian and cycle infrastructure, associated set down areas, alterations to existing landscape features, landscaping, boundary treatments, lighting, telecommunications infrastructure at roof level of Block B, green roofs, lift overruns and plant at roof level, site services, including a watermain connection / upgrade via Griffith Court, Philipsburgh Avenue and Griffith Avenue, site clearance, and all associated site works.

SITE LOCATION/LAYOUT MAP

Figure 1

TELECOMMUNICATION CHANNELS

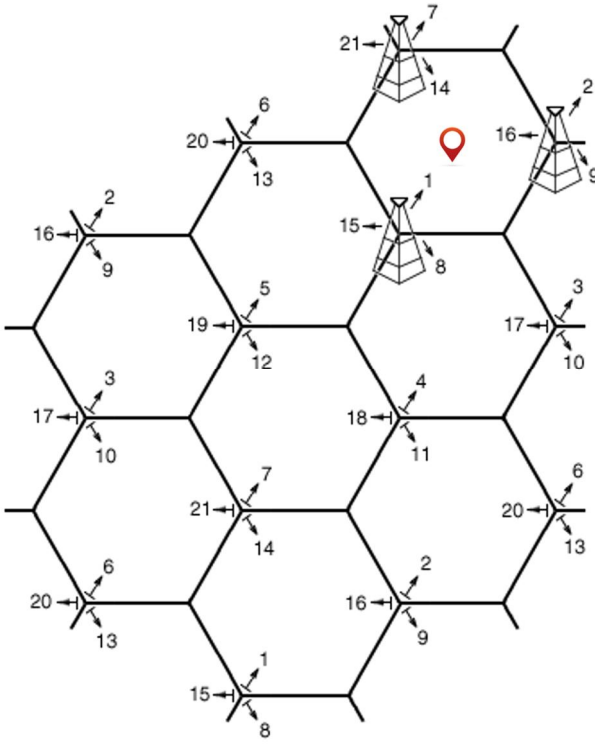
This report assessed the two wireless Telecommunication Channels or networks of Telecommunication Channels that may be affected by the height and scale of a new development, Radio Frequency links & Microwave Transmission links

Radio Frequency links & Microwave Transmission Links are used in Ireland's mobile phone and fixed wireless networks and disseminate at an average above ground level height of 20m, making them the most relevant Telecommunication Channels to be assessed in relation to the height and scale of a new development and to that end what allowance the Applicant needs to make for their retention.

Mobile phones send and receive signals via links from nearby antenna sites or cellular towers, technically known as base stations, using Radio Frequency waves. Microwave Transmission links use microwave dishes to "transmit" from these base stations to other base stations forming a network. Radio Frequency waves operate at a lower power within lower frequencies of the radio spectrum, whereas Microwave Transmission operates at higher power within higher frequencies of the radio spectrum.

Radio Frequency waves are distributed over land areas in "cells", each served by at least one fixed-location transceiver (base station), but more normally by three cell sites or base stations. These base stations provide the cell with the network coverage, which can then be used for voice, data, and other types of content. A cell typically uses a different set of frequencies from neighbouring cells to avoid interference and provide guaranteed service quality within each cell.

When joined together, these cells provide Radio Frequency coverage over a wide geographic area (Cellular network). This enables numerous portable transceivers (e.g., mobile phones, tablets and laptops equipped with mobile broadband modems, pagers, etc.) to communicate with each other and with fixed transceivers and telephones anywhere in the network, via base stations, even if some of the transceivers are moving through more than one cell during transmission.



As demonstrated on this cell map illustrating Radio Frequency coverage, each Radio Frequency "cell" is supported by at least 3No. base stations sites. This means that should an obstacle occur between an area and a base station site, such as a new development, the affected area will be covered by other base stations from other locations.

= a given location

= base station site

Figure 2

Cellular networks offer a number of desirable features, but most notably, additional cell towers can be added indefinitely and are not limited by the horizon, therefore it can be considered **indeterminable** as to whether a new development affects the Radio Frequency coverage of a geographical area which is being served by multiple base stations, not necessarily the closest.

Conversely, Microwave Transmission links are point-to-point links, which are easily determined to be affected, or not, by the height and scale of a new development. In point-to-point wireless communications, it is important for the line of sight between two base stations to be free from any obstruction (terrain, vegetation, buildings, wind farms and a host of other obstructions). As any interference or obstruction in the line of sight can result in a loss of signal.

While installing Microwave links, it is important to keep an elliptical region between the transmitting Microwave link and the receiving Microwave link free from any obstruction for the proper functioning of the system. This 3D elliptical region between the transmit antenna and the receive antenna is called the **Fresnel Zone**. The size of the ellipse is determined by the frequency of operation and the distance between the two sites.

Fresnel Zone

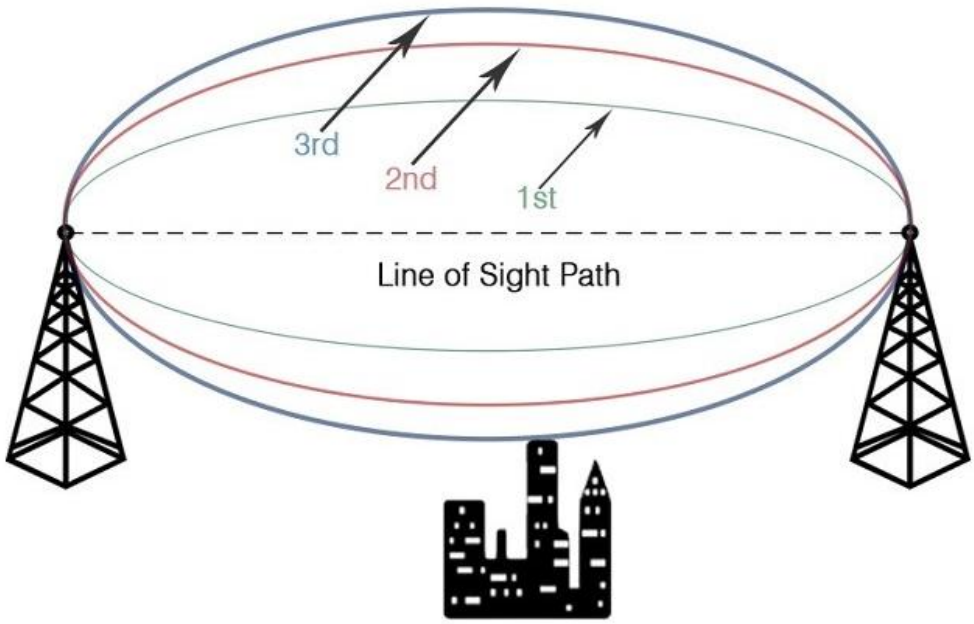


Figure 3

Essentially, if there is an obstacle in the Fresnel zone, part of the radio signal will be diffracted or bent away from the straight-line path. The practical effect is that on a point-to-point Microwave link, referred to herein, the refraction will reduce the amount of energy reaching the receiving microwave dish. The thickness or radius of the Fresnel zone depends on the frequency of the signal – the higher the frequency, the smaller the Fresnel zone. Microwave links are high frequency radio links used for point-to-point transmission.

FINDINGS

ISM's assessment did not identify Microwave links that will require the Applicant to make specific allowances for their retention ("Mitigation Measures").

Our assessment did not identify Radio Frequency links that will require the Applicant to make allowances for their retention.

ISM carried out a full assessment of neighbouring registered and documented telecommunication sites to assess what Microwave links would be impacted by the height and scale of the Development. Refer to Figure 5 & 6 of the appendices for full analysis. The assessment of Microwave Transmission links entailed both a visual survey of each identified neighbouring telecommunication site within a reasonable geographic proximity to the Development and a request for information from telecommunication providers where the visual survey was inconclusive.

ISM carried out a full assessment of neighbouring registered and document telecommunication sites to assess what Radio Frequency links might be impacted by the height and scale of the Development. To assess this, we carried out a walk test throughout the surrounding areas to ascertain what cells were serving the residential neighbourhoods and business districts to the north, south, east & west of the Development site. Refer to Figure 7 of the appendices for full analysis.

Our assessment identified Radio Frequency coverage for the local geographic area is served by a distinct lack of cells, especially to the north of the Development. This coupled by the fact that the majority of the local area telecommunication sites are either low lying, sub-optimal (lacking capacity for 5G or quad band antennae) or both which is not a typical cell pattern or structure required for urban high density Radio Frequency coverage. The walk test data determined that many of the existing local business, a majority of the residential, and some of the public road/amenity areas to the north, east and west of the development site are very underserved and receive extremely **poor** signal from Radio Frequency links emanating from telecommunication antenna sites located in the vicinity of the Development Refer to figures 4.1 & 4.2.

Telecommunication Antenna Sites in proximity to the Development

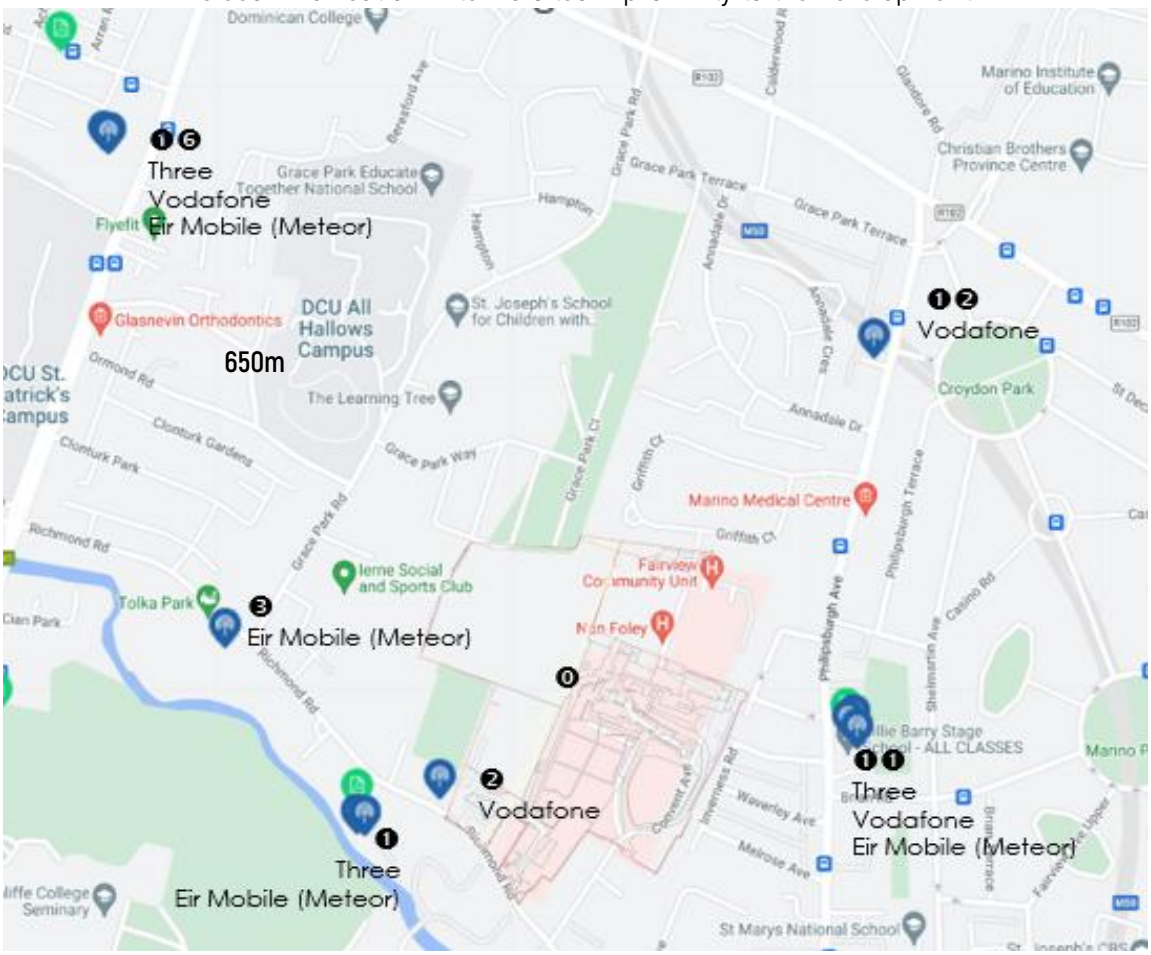
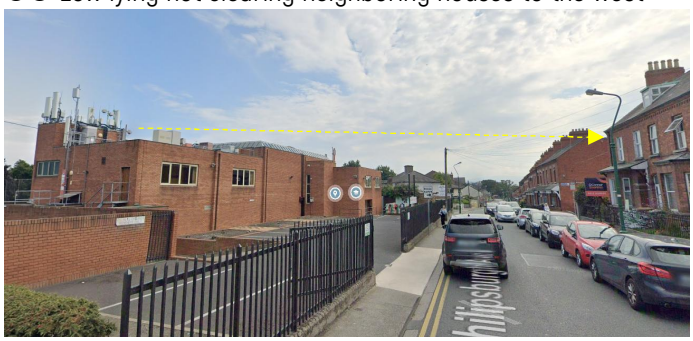


Figure 4.1

❶❷ Low lying/Sub-optimal/Micro

❶❶ Low lying not clearing neighboring houses to the west



❷ Sub-optimal

❸ Sub Optimal

❶ Low lying/Sub-optimal

❶❻ long distance

Figure 4.2

The average indoor coverage signal recorded was -115db across all 3 mobile phone networks. With -85db being the benchmark (optimal) coverage signal level, and with anything over -100db being poor too bad, -115db denotes extremely poor indoor coverage for the local area. Being that population density is a very significant factor related to signal strength & quality, it is our view that the scale of the Development, with respect to its density, scale and its height, will deteriorate the already existing bad mobile signal conditions in the immediate area.

The conditions we observed as part of our analysis for this report, overwhelming supports a technical justification for a new site(s) to support both the existing population density as well as the increase sought by the Applicant.

It is therefore our finding that the local area is significantly underserved by telecommunication channels (mobile phone signal/voice & data services) and any increase in the population density residing in the area resulting from the proposed development will create a significant strain on existing capacity and cell size, which becomes smaller the greater number of people using or accessing it for voice and data services.

We have set out the impacted area within Figure 7.

Please note the following that telecommunication networks are always evolving, and as such, these findings remain subject to change.

MITIGATION MEASURES

To provide an adequate allowance to support the density and scale of the Development with the appropriate level of telecommunication channels (mobile phone signal /voice & data services), the Applicant is seeking planning permission to install the following:

- 9No. support poles, affixed to ballast mounts on Apartment Block B rising 2.5 metres above parapet level. These support poles are sufficient to each accommodate 1No. 2m 2G/3G/4G antenna & 1No. 5G antenna each.
- 3No, support poles, affixed to the lift shaft overrun on the Development's Apartment Block B, rising 3metres above roof level. These support poles are sufficient to accommodate 2No. Ø0.3m Microwave links each.
- Together with all associated telecommunications equipment and cabinets ,
- To adequately screen the infrastructure, the support poles used for the antennae will be installed within Radio friendly GRP shrouds.

This will undoubtedly provide an adequate solution for the Applicant to mitigate the impact the Development will have on the existing poor mobile phone signal in the area and provide both the occupants of the Development and the local area with adequate voice and data services to meet modern demands.

Refer to Figures 8 & 9 of the appendices for full analysis and installation parameters for all the proposed replacement telecommunication infrastructure set out herein.

ISM can therefore conclude that the proposal being made by the Applicant within its submission to Dublin City Council allows for the retention of important Telecommunication Channels, such as Microwave links, to satisfy the criteria of Section 3.2 of the Building Height Guidelines (2018).

APPENDICIES

Figure 5: Identification of neighbouring registered and documented telecommunication sites (Area Telecommunication Analysis)

Figure 6: Identification of Microwave links disseminating from neighbouring registered and documented telecommunication sites (Microwave Link Analysis)

Figure 7: Identification of local area Cells by Cell ID (Cell Identification Analysis)

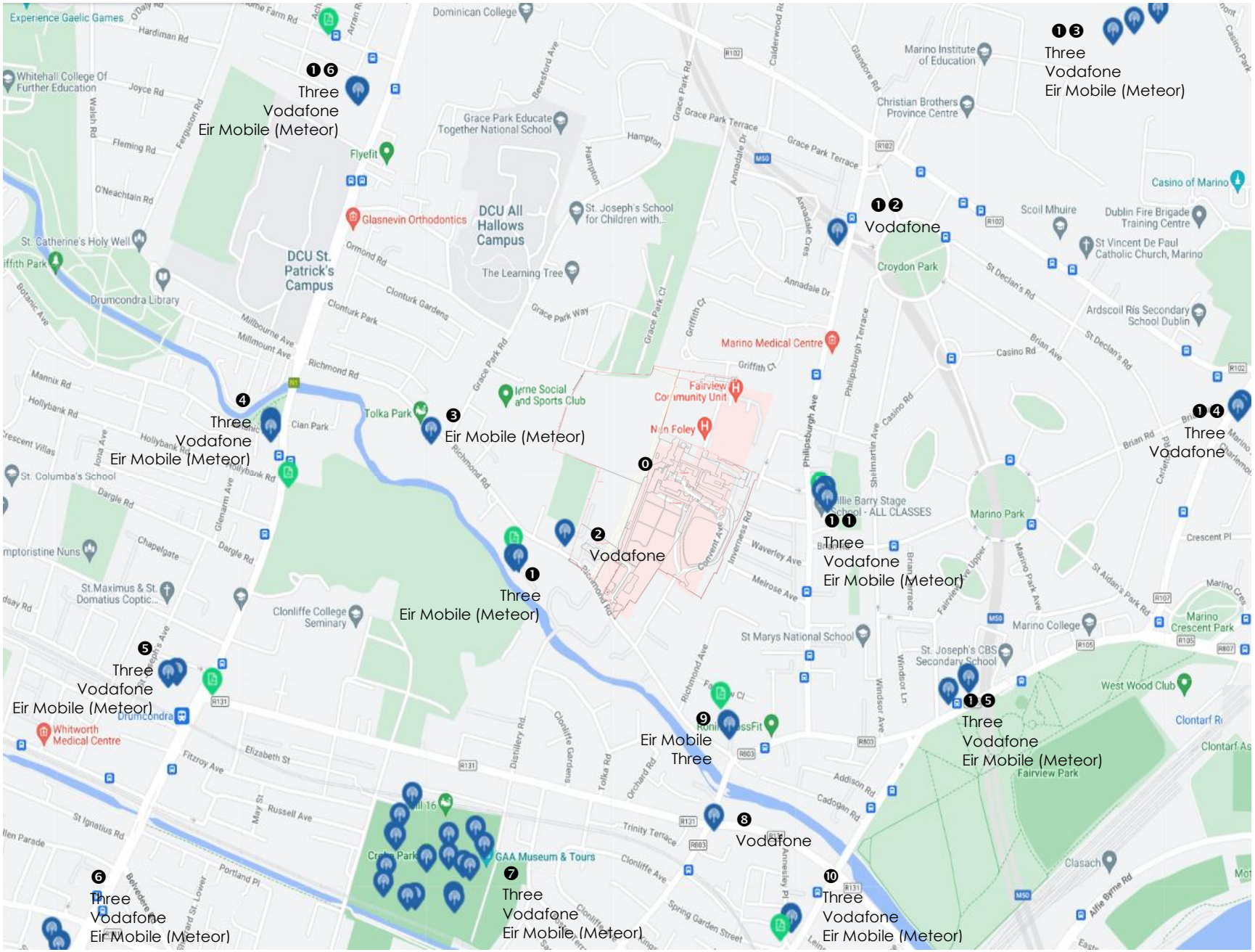
Figure 8: Mitigation Measures (1)

Figure 9: Mitigation Measures (2)

Figure 5

Area Telecommunication Analysis

Source: Comreg



Note
All Dimensions to be checked on site
No Dimensions to be scaled from this Drawing
This drawing to be read with relevant Consultant Drawings

- ⓪ Proposed Development
- ❶ Richmond Builders Prov.
- ❷ Charthouse
- ❸ Shelbourne F.C.
- ❹ Fagan's Pub
- ❺ Centre for the Deaf
- ❻ Synnott Place
- ❼ Croke Park
- ❽ Conliffe House
- ❾ Meagher's Pub
- ❿ Annesley House
- ❶❶ CYMCA (ISM Site)
- ❶❷ C&T Superstore
- ❶❸ St Vincent's GAA
- ❶❹ Grainger's Pub
- ❶❺ Fairview
- ❶❻ Skylon

FINAL

iSM INDEPENDENT SITE MANAGEMENT
77 Camden Street Lower,
Dublin 2, Ireland D02 XE80
☎ +353 1 905 8800
✉ info@ismireland.com

Client
St Vincent's Hospital

Project
St Vincent's Hospital Redevelopment

Option	1
Report Date	04/10/2022
File Name	St Vincent's Hospital Revelopmt

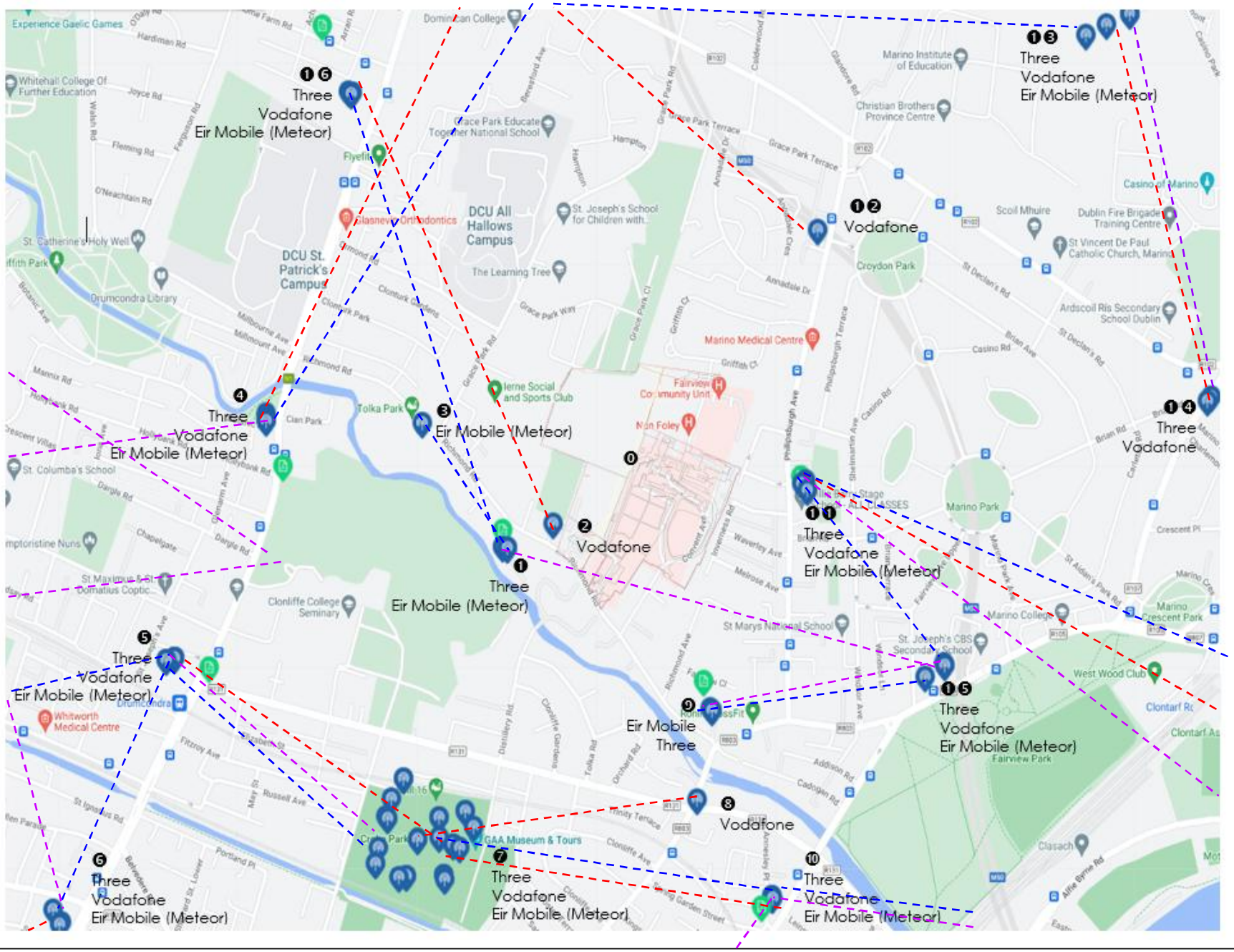
Drawing:
Area Site Analysis

Building	Drawing No.	Zone	Rev
SPN	J 0422		1

Figure 6

Microwave Link Analysis

Source: Comreg ISM Vodafone Three & Eir Mobile



- - - - Three Transmission Link
- - - - Vodafone Transmission Link
- - - - Eir Transmission Link

Note
All Dimensions to be checked on site
No Dimensions to be scaled from this Drawing
This drawing to be read with relevant
Consultant Drawings

FINAL

iSM INDEPENDENT SITE MANAGEMENT

77 Camden Street Lower
Dublin 2, Ireland D02 XE80
☎ +353 1 905 8800
✉ info@ismireland.com

St Vincent's Hospital

Project
St Vincent's Hospital
Redevelopment

Option	1
Report Date	04/10/2022
File Name	St Vincent's Hospital Revelopmt

Drawing:

Link Analysis

Building	Drawing No.	Zone	Rev
SPN	J 0422		1

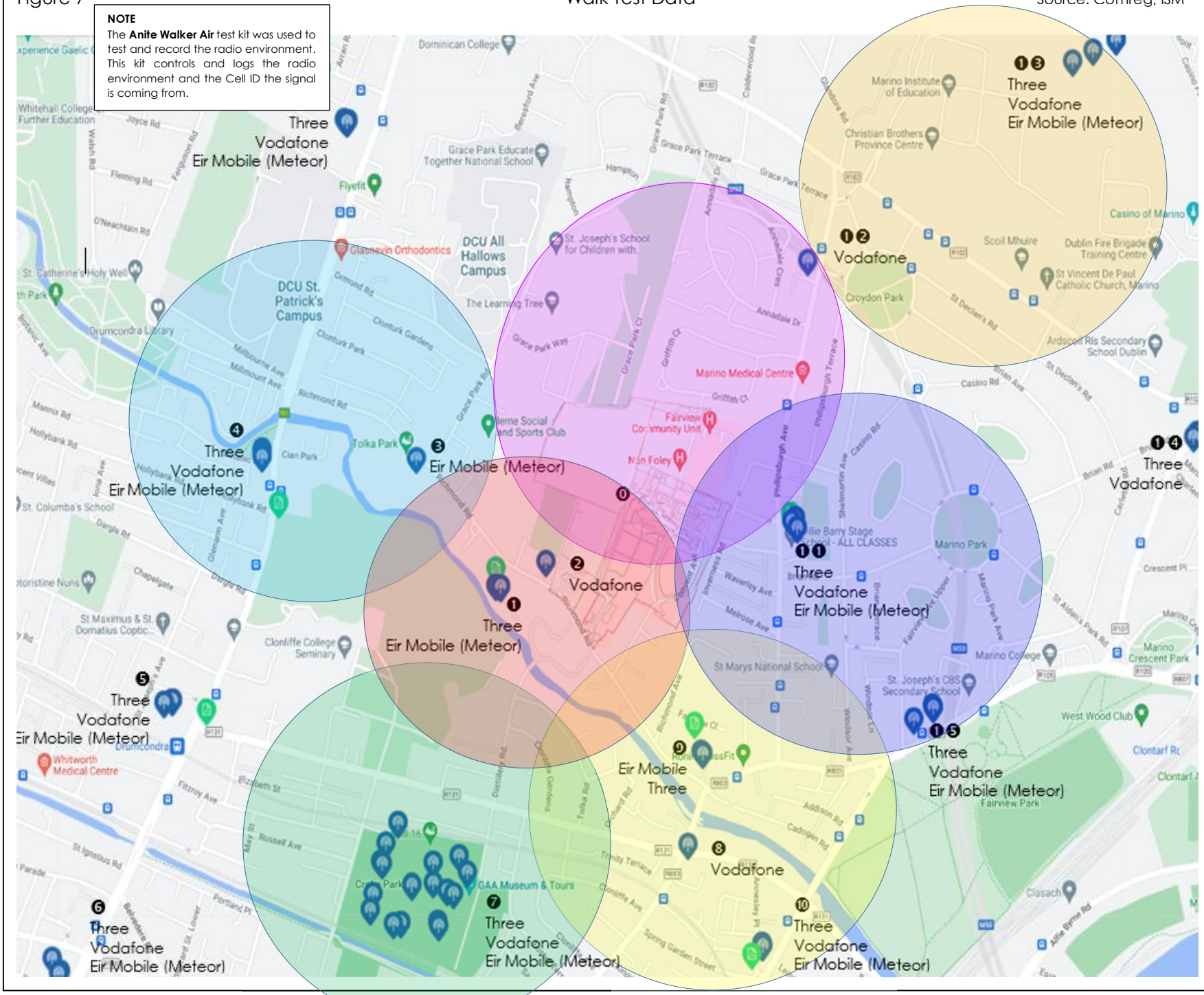
Figure 7

Walk Test Data

Source: Comreg; ISM

NOTE

The **Anite Walker Air** test kit was used to test and record the radio environment. This kit controls and logs the radio environment and the Cell ID the signal is coming from.



Note
All Dimensions to be checked on site
No Dimensions to be scaled from this Drawing
This drawing to be read with relevant Consultant Drawings

- ○ Multiple Cell IDs
  - ❸ Shelbourne F.C.
  - ❹ Fagan's Pub
- ○ Multiple Cell IDs (no 5G)
  - ❶ Richmond Builders Prov
  - ❷ Charthouse
- ○ Multiple Cell IDs
  - ❶❷ C&T Superstore
  - ❶❸ St Vincent's GAA
- ○ ❼ Croke Park
- ○ Multiple Cell IDs
  - ❽ Conliffe House
  - ❾ Meagher's Pub
  - ❿ Annesley House
- ○ Multiple Cell IDs
  - ❶❶ CYMCA (ISM Site)
  - ❶❺ Fairview
- ○ Impacted Area

FINAL

iSM INDEPENDENT SITE MANAGEMENT

77 Camden Street Lower
Dublin 2, Ireland D02 XE80
☎ +353 1 905 8800
✉ info@ismireland.com

St Vincent's Hospital

Project
St Vincent's Hospital Redevelopment

Option	1
Report Date	04/10/2022
File Name	St Vincent's Hospital Revelopmt

Drawing:

Cell Identification Analysis

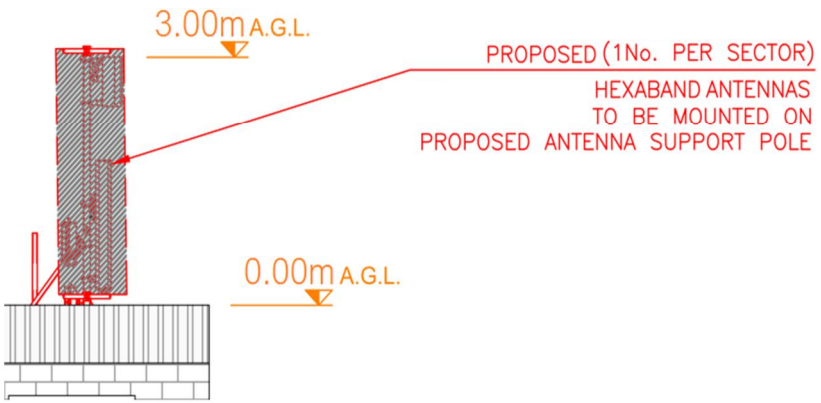
Building	Drawing No.	Zone	Rev
SPN	J 0422		1

Figure 8

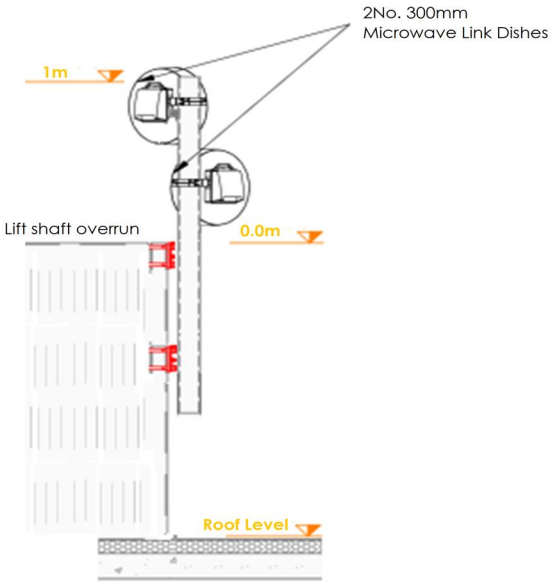
Mitigation Measure Design

Source: ISM

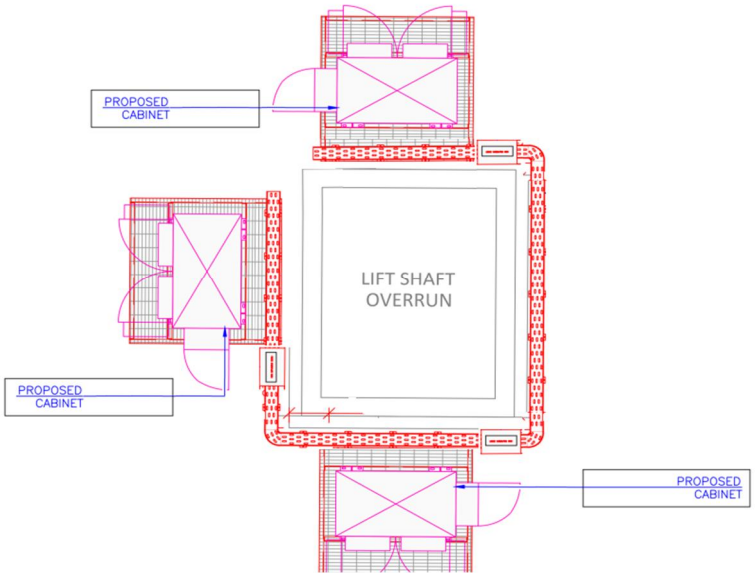
Antenna Elevation (3No. Antennas Locations Per Operator)



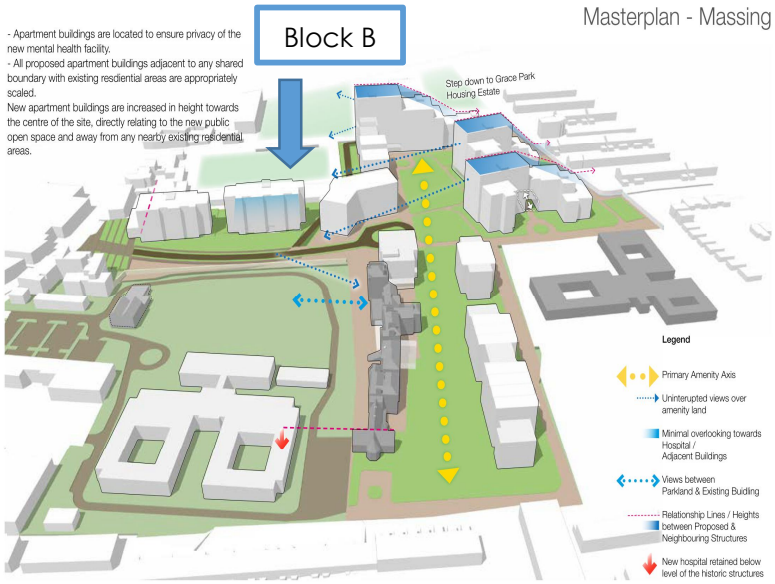
Microwave Link Dishes (2No. Dishes Per Operator)



Equipment Cabinets (1No. cabinet Per Operator)

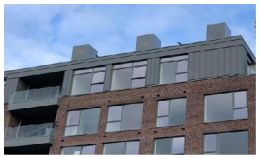


Building Block Selection



Note
All Dimensions to be checked on site
No Dimensions to be scaled from this Drawing
This drawing to be read with relevant Consultant Drawings

Typical Installation



FINAL

iSM INDEPENDENT SITE MANAGEMENT
77 Camden Street Lower
Dublin 2, Ireland D02 XE80
☎ +353 1 905 8800
info@ismireland.com

St Vincent's Hospital

Project
St Vincent's Hospital Redevelopment

Option	**1**
Report Date	04/10/2022
File Name	St Vincent's Hospital Revelopmt

Drawing:
Mitigation Measure

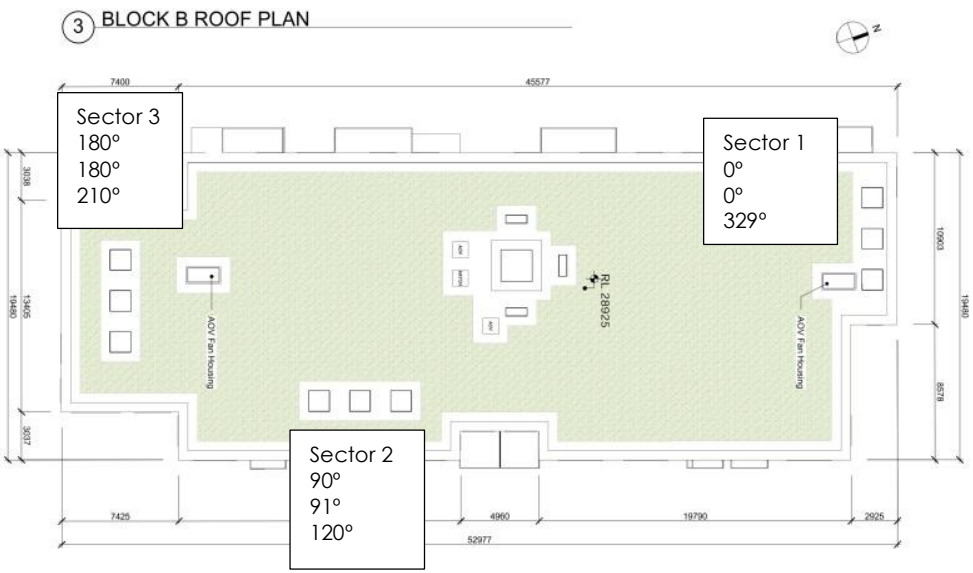
Building	Drawing No.	Zone	Rev
SPN	J 0422		1

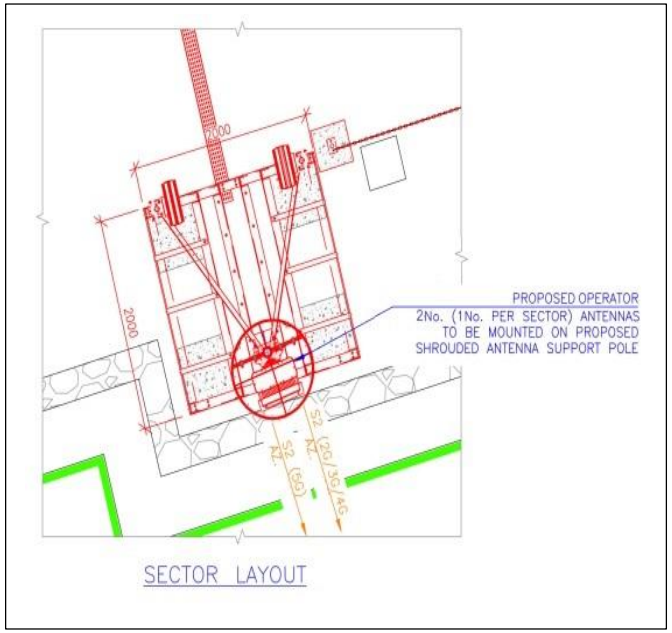
Figure 9

Mitigation Measure Design

Source: Three Ireland; Vodafone Ireland; & Eir Mobile

SITE LAYOUT





EAST ELEVATION

SOUTH ELEVATION

Note
All Dimensions to be checked on site
No Dimensions to be scaled from this Drawing
This drawing to be read with relevant Consultant Drawings

Proposed Equipment

FINAL

iSM INDEPENDENT SITE MANAGEMENT
77 Camden Street Lower
Dublin 2, Ireland D02 XE80
☎ +353 1 905 8800
✉ info@ismireland.com

Client
St Vincent's Hospital

Project
St Vincent's Hospital Redevelopment

Option	**1**
Report Date	04/10/2022
File Name	St Vincent's Hospital Revelopmt

Drawing:
Mitigation Measure

Building	Drawing No.	Zone	Rev
SPN	J 0422		1