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iSM INDEPENDENT SITE MANAGEMENT

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

DEVELOPMENT
SANDYFORD ROAD SHD

19 April 2022

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

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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 An Bord Pleanála (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.
Telecommunication Channels:	means Radio Frequency links & Microwave Transmission links (hereinafter referred to as "Telecommunication Channels")
The Applicant:	means Midsal Homes Limited(hereinafter referred to as the "Applicant")
The Development:	means the proposed development situated at properties known as 'Karuna' and 'Glenina' at Sandyford Road, Dublin 18, D18 C2H6 and D18 X5T7 respectively (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 Midsal Homes Limited (the "Applicant") within its submission to An Bord Pleanála (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

Midsal Homes Limited intend to apply to An Bord Pleanála for permission for a strategic housing development at this site of 0.829 Ha approx. comprised of the properties known as 'Karuna' and 'Glenina' at Sandyford Road, Dublin 18, D18 C2H6 and D18 X5T7 respectively. The site is generally bound by a residential development known as 'Coolkill' to the east, a detached dwelling known as 'The Pastures' to the south, Sandyford Road (R117) to the west and a residential development (which is under construction) known as 'Cul Cuille' to the north. Works are also proposed at Sandyford Road, which include the removal of a wall and the creation of a new pedestrian connection to the existing cul-de-sac adjacent to 'Cul Cuille' to the north (0.016 Ha approx.) and at the footpath at Sandyford Road to provide a new multi-modal entrance, pedestrian/cycle entrances and landscaping (0.015 Ha approx.). In addition, works are proposed for water services (0.05 Ha approx.): water supply to be sourced by way of a new connection to the existing 250 mm diameter water main across from the proposed main entrance at Sandyford Road; surface water drainage network to discharge to the existing 525 mm diameter surface water sewer located to the north of the site at Sandyford Road via a new 150 mm surface water sewer; and foul water to discharge to the 225 mm diameter foul sewer under construction at Sandyford Road. An additional 0.01 ha has been assigned for Dún Laoghaire-Rathdown County Council to undertake road works to upgrade Sandyford Road. The residential development site, pedestrian connection, entrance works, water services and road works area will provide a total application site area of 0.92 Ha.

The proposed development principally consists of the demolition of the existing dwelling and ancillary buildings known as 'Glenina', the existing dwelling known as 'Karuna' and the existing boundary wall fronting Sandyford Road, and the construction of a residential development principally comprising 137No. apartments (32 No. 1-bed units, 78 No. 2-bed units and 27 No. 3-bed units) in 4 No. blocks ranging in height from part-1 No. storey to part-6 No. storeys with a part-basement/part-undercroft level (at Blocks B, C and D).

The proposed development which has a gross floor space of 13,144 sq m (over a part-basement/part-undercroft level measuring 4,508 sq m, principally providing car and cycle parking and plant) also includes: internal communal amenities and support facilities (404 sq m);

137 No. car parking spaces, which include 127 No. spaces and 6 No. GoCar spaces located at basement level (accessed beneath Block B) and 4 No. set down spaces located at surface level adjacent to Block A; motorcycle parking spaces; cycle parking spaces; bin store; substation; switch room; meter rooms; plant rooms; new telecommunications infrastructure at rooftop level including microwave link dishes concealed in shrouds; hard and soft landscaping, including communal amenity space; private amenity space with balconies facing north, south, east and west; boundary treatments; and all associated works above and below ground.

SITE LOCATION/LAYOUT MAP

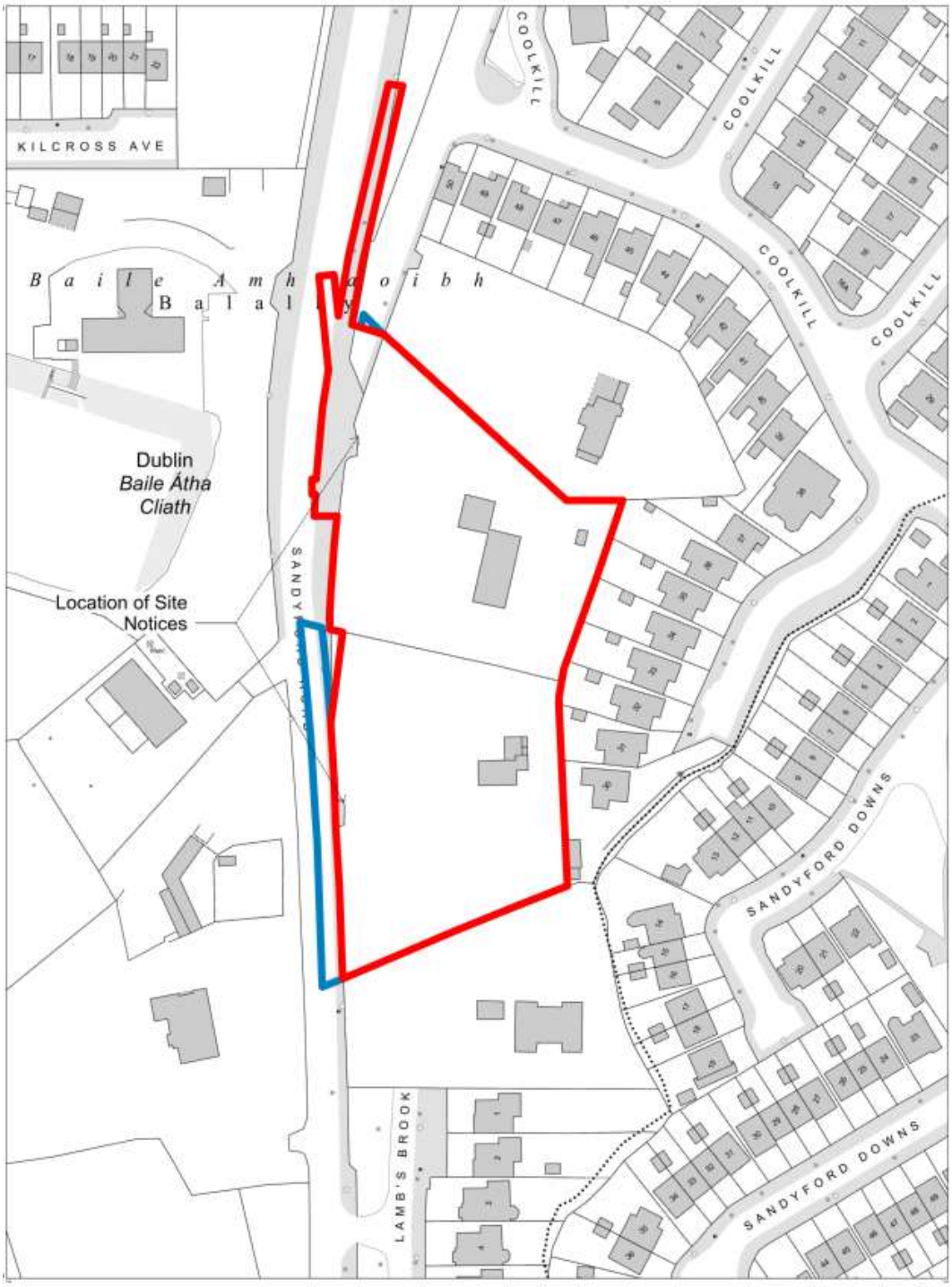


Figure 1

TELECOMMUNICATION CHANNELS

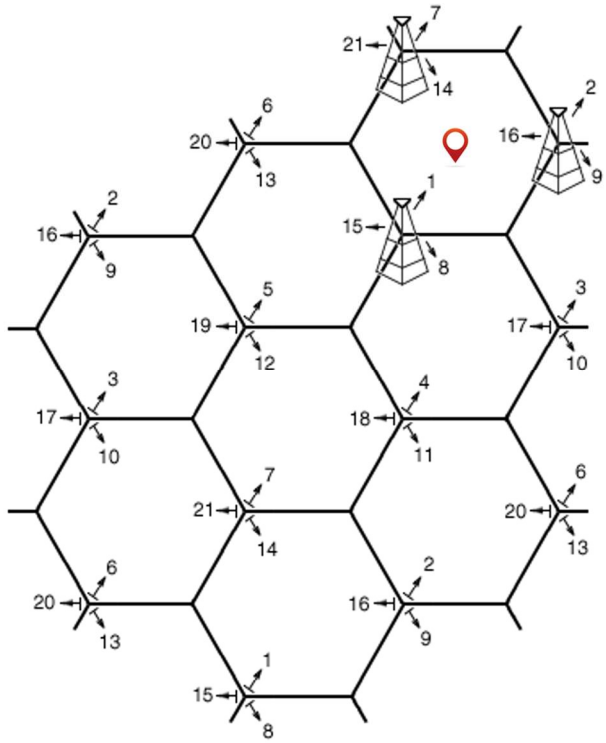
This report assesses the two wireless Telecommunication Channels or networks of Telecommunication Channels that may be affected by the height and scale of a new development, Radio Frequency links & Microwave Transmission links

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.

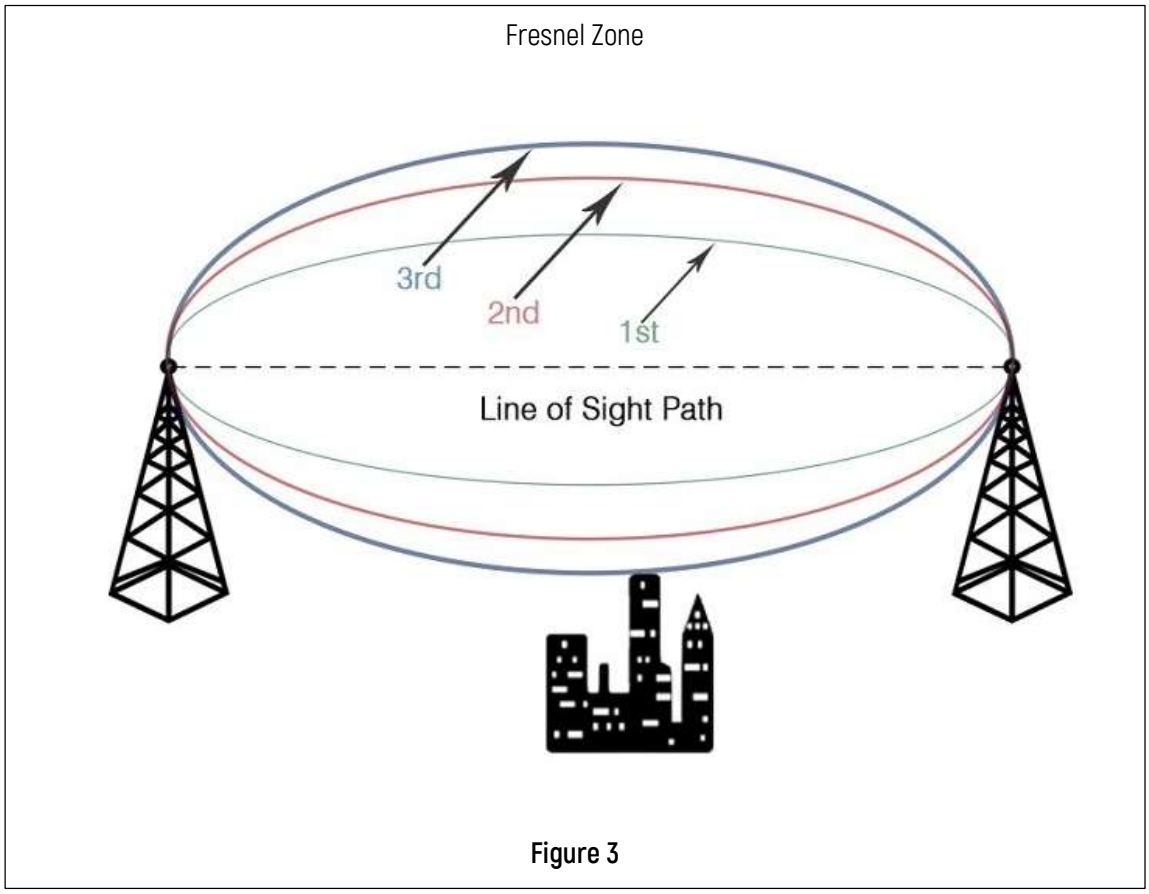


Figure 3

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 specific assessment identified 2No. Microwave links that will require the Applicant to make specific allowances for its retention ("Mitigation Measures").

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 4 & 5 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.

Impacted Microwave links

(1) 1 No. is a Microwave link installed by Eir Mobile

(2) 1 No. is a Microwave link installed by Three Ireland

The 1No. Eir Mobile Microwave link is installed on a telecommunication mast site located approximately 20m to the west of the proposed development site.

The 1No. Three Ireland Microwave link is installed on the same telecommunication mast site located approximately 20m to the west of the proposed development site.

This telecommunication mast site is providing cellular coverage for the immediate local area, catering predominantly for the residential estates and public amenity spaces, together with providing coverage for vehicular traffic running north and south along Sandyford Road.

The identified Microwave links are situated at approximate above ground level heights of 15m (AGL) and therefore the Fresnel zone of each will be diffracted by the height of the Development. We've calculated the average radiuses of the Fresnel zones of the link will not be greater than 2.4m at its widest point which would be at half the distance to the end site. The proposed height of the Development will cause significant diffraction to these Microwave links.

ISM carried out a full assessment of neighbouring registered and documented 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 areas to the north, south, east & west of the Development site. Refer to Figure 6 of the appendices for full analysis.

Our assessment identified Radio Frequency coverage for the local geographic area is served by several cells at a range of distances from the development site on a 360° basis which is typical cell pattern for urban Radio Frequency coverage. The walk test data determined that the residential areas and public road areas to the north, south, east & west of the Development are adequately covered by the cell sites identified in figure 6 and are not reliant on Radio Frequency coverage from any one cell that would be obstructed by the Development.

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

MITIGATION MEASURES

To provide an adequate allowance for the retention of the 2No. identified Microwave links that will be impacted by the Development, the Applicant is seeking planning permission to install 4No, 300mm Microwave Transmission link dishes mounted on 2No. steel support poles affixed to the lift shaft overrun on Block D.

These support poles are sufficient to accommodate 2No. Ø.3m Microwave links each, which provides an adequate solution for the Applicant to mitigate the impact the Development will have on the identified Microwave links emanating from the neighbouring telecommunication mast site to the west of the Development, as well as providing some capacity for future links that may or may not be required.

Refer to Figures 7 of the appendices for full analysis.

ISM can therefore conclude that the proposal being made by the Applicant within its submission to An Bord Pleanála 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

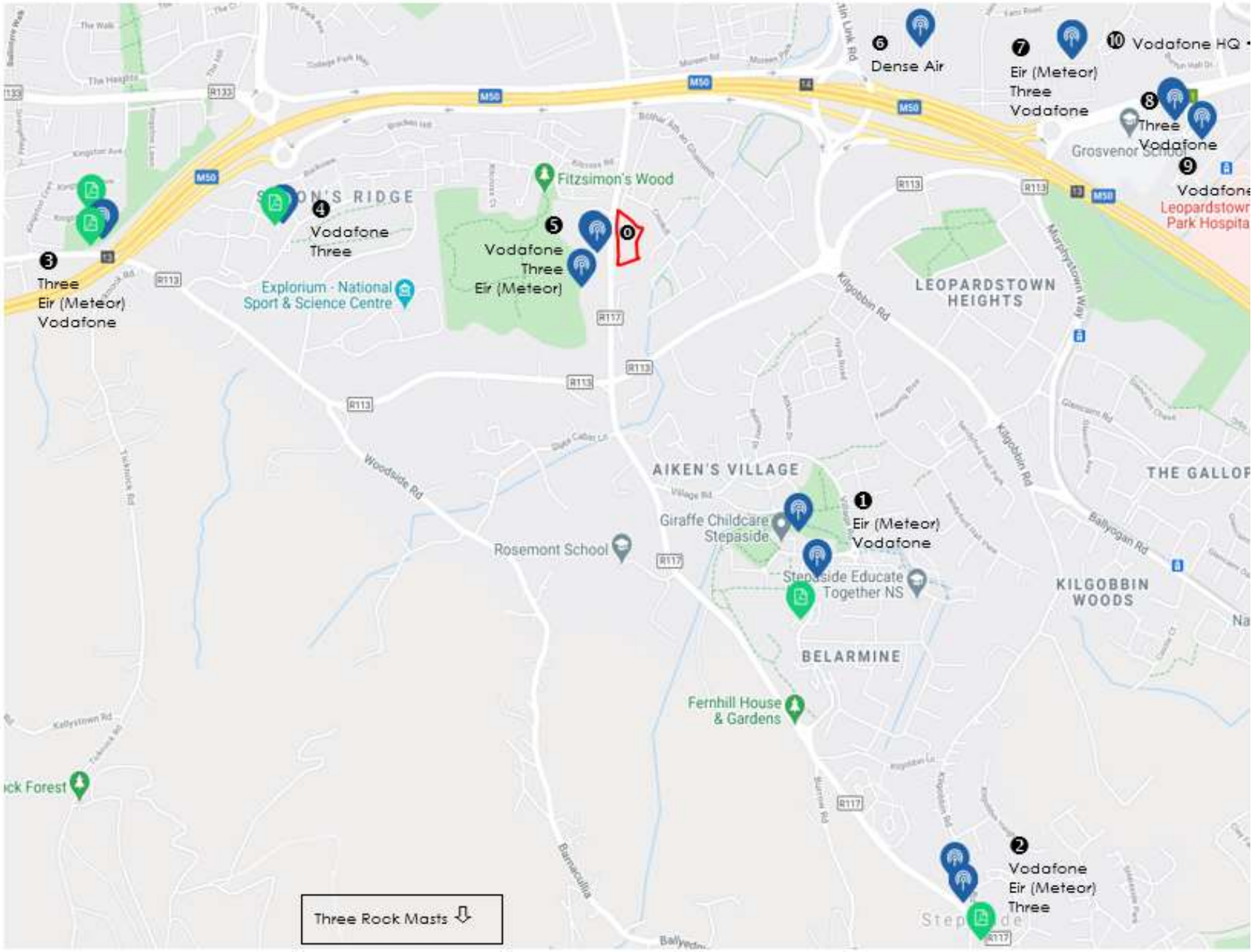
Figure 4: Identification of neighbouring registered and documented telecommunication sites (Area Telecommunication Analysis)

Figure 5: Identification of Microwave links disseminating from neighbouring registered and documented telecommunication sites (Microwave Link Analysis)

Figure 6: Identification of local area Cells by Cell ID (Cell Identification Analysis)

Figure 7: Mitigation Measures (if required in future)

Figure 4 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
- 1 Belarmine Plaza
- 2 Stepaside Garda Station
- 3 DLRCC Water Tower
- 4 Blackglen Medical
- 5 Sandyford ESB Mast(s)
- 6 Sandford St furniture
- 7 ESB Leapordstown Mast
- 8 Clayton Hotel
- 9 Central Park
- 10 Vodafone Headquarters

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Client
Midsal Homes Limited

Project
Sandyford Road SHD

Option	1
Date	19/04/2022
File Name	Sandyford Road SHD

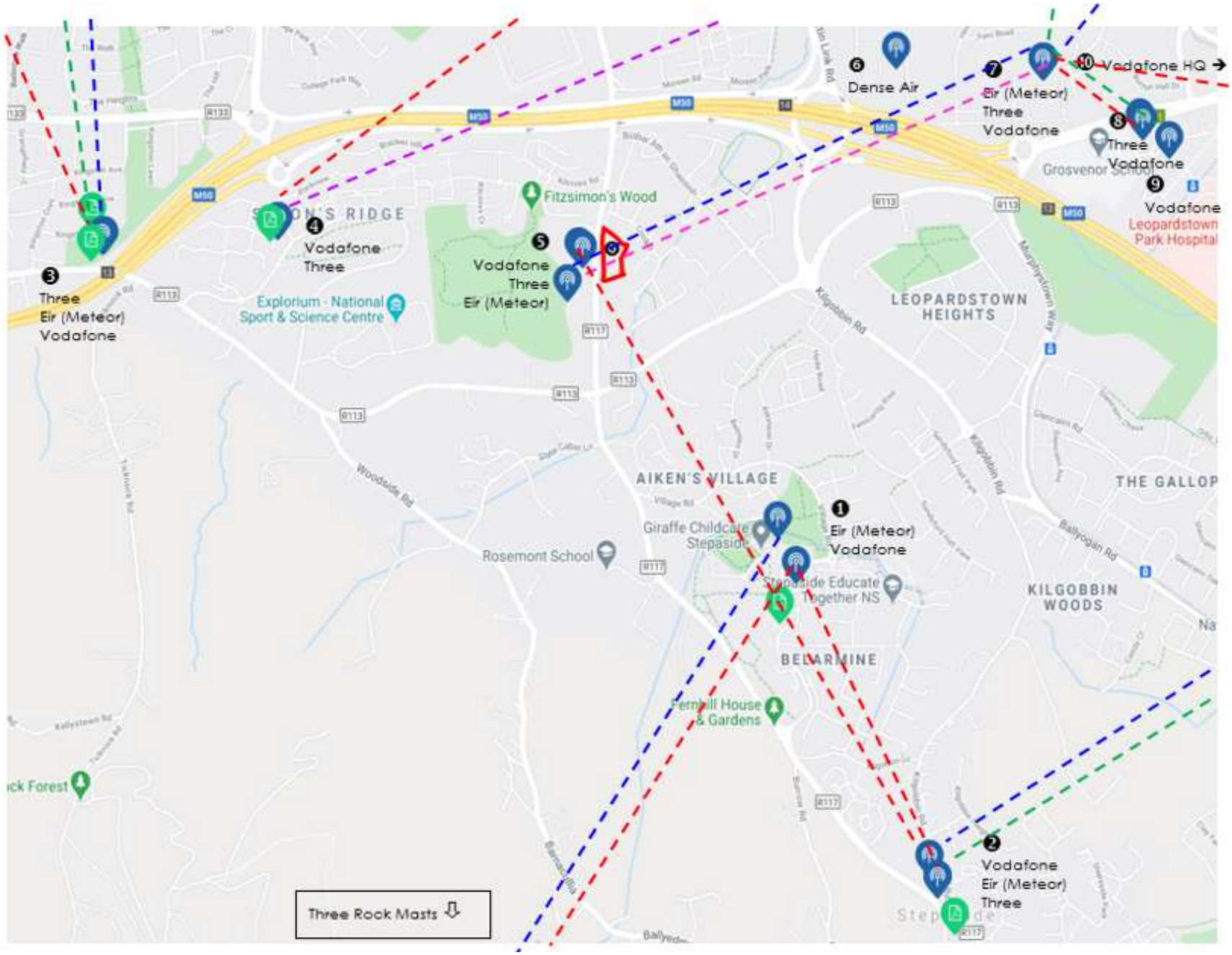
Drawing:
Area Site Analysis

Building	Drawing No.	Zone	Rev
SPN	C 2922		1

Figure 5

Microwave Link Analysis

Source: Comreg ISM Vodafone Three & Eir Mobile



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

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Drawing:

Link Analysis

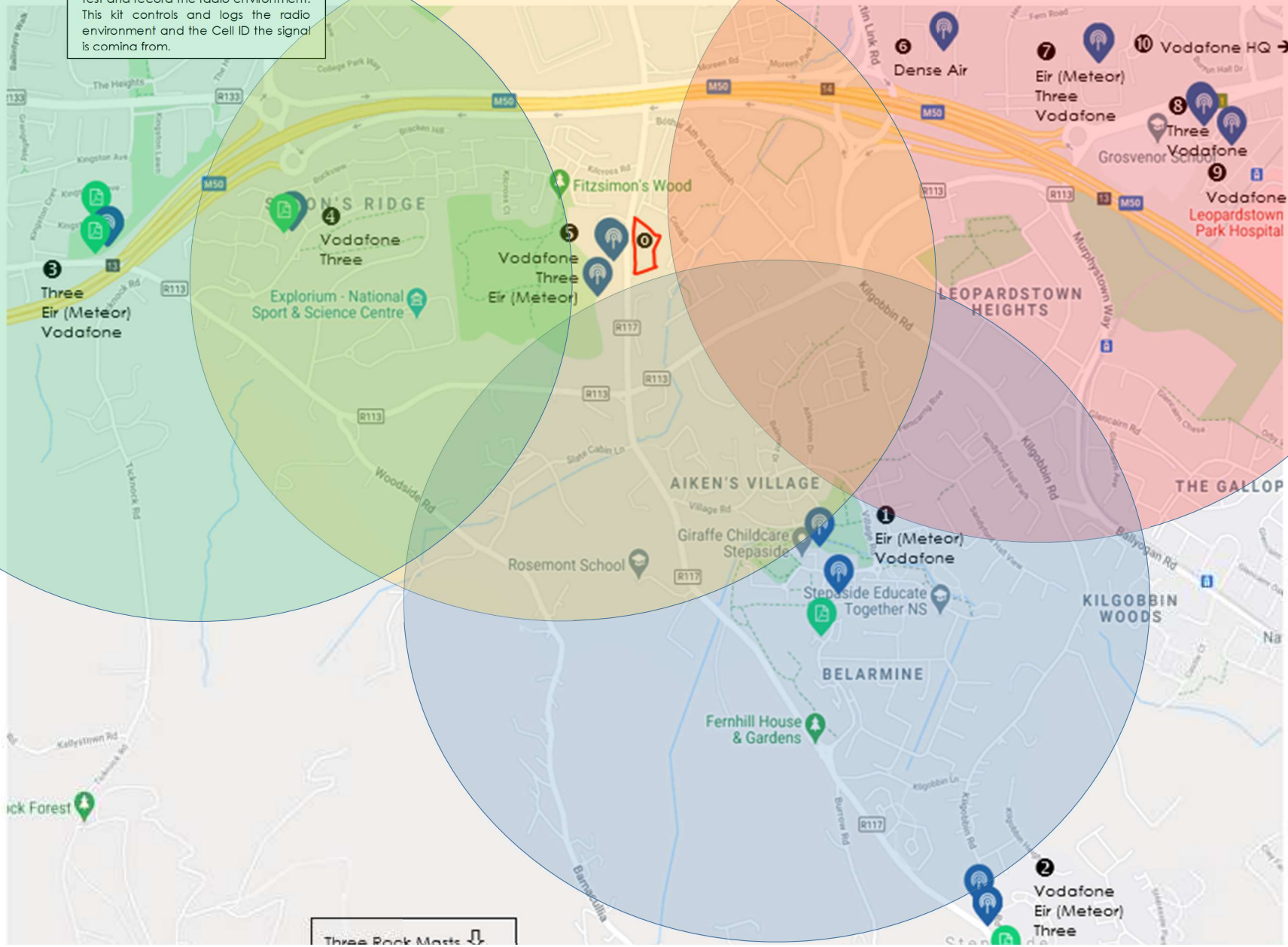
Building	Drawing No.	Zone	Rev
SPN	C 2922		1

Figure 6

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
  - ❶ Belarmine Plaza
- Multiple Cell IDs
  - ❺ Sandyford ESB Mast(s)
- Multiple Cell IDs
  - ❸ DLRCC Water Tower
  - ❹ Blackglen Medical
- Multiple Cell IDs
  - ❻ Sandford St furniture
  - ❼ ESB Leapordstown Mast
  - ❽ Clayton Hotel
  - ❾ Central Park
  - ❿ Vodafone HQ

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Drawing:
Cell Identification Analysis

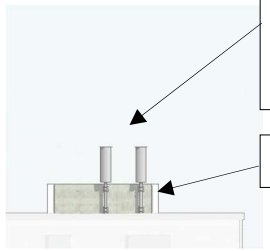
Building	Drawing No.	Zone	Rev
SPN	C 2922		1

Figure 7

Mitigation Measure Design

Source: Comreg ISM

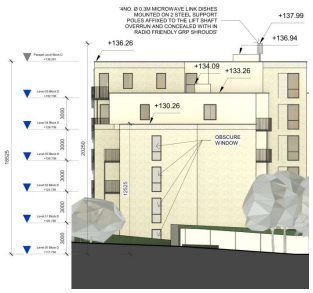
EXAMPLE



2No. Ø 0.3m Microwave link dishes mounted on 2No. steel support poles affixed to plant screen steel work and concealed with in radio friendly GRP shrouds

Lift shaft overrun

South Elevation



'4NO. Ø 0.3M MICROWAVE LINK DISHES MOUNTED ON 2 STEEL SUPPORT POLES AFFIXED TO THE LIFT SHAFT OVERRUN AND CONCEALED WITH IN RADIO FRIENDLY GRP SHROUDS'

OUTLINE OF BLOCK B OF DEVELOPMENT AT THE PASTURES AS APPROVED UNDER D21A/0595, CURRENTLY UNDER APPEAL

+137.99

+136.94

+136.26

+134.09

+133.26

+131.09

+130.26

+127.26

OBSCURE WINDOW

Parapet Level Block D +136.261

Level 05 Block D +132.736

Level 04 Block D +129.736

Level 03 Block D +126.736

Level 02 Block D +123.736

3000

3000

3000

18525

20258

12525

16350

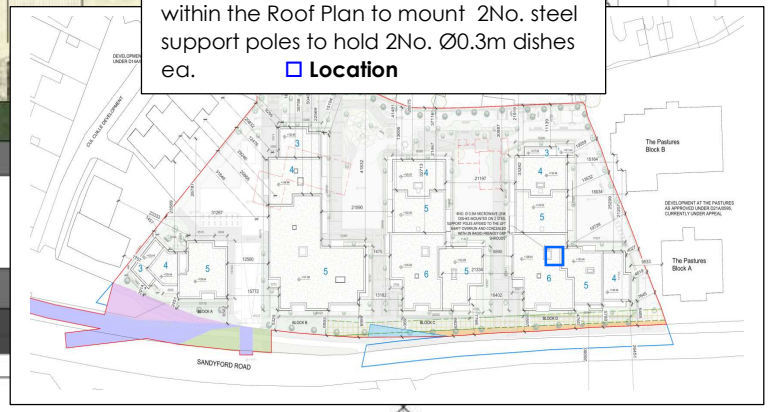
15525

3150

36304

BLOCK D

Applicant has nominated a location within the Roof Plan to mount 2No. steel support poles to hold 2No. Ø0.3m dishes ea. ☐ **Location**



Note
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Typical Installation

☐ Location of Steel support Poles

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