

TV RECEPTION SURVEY REPORT

THIS POST CONSTRUCTION TV RECEPTION SURVEY WAS CONDUCTED BY:

SCS Technologies Ltd
Unit 4, Centre 21 Business Park
Bridge Lane
Woolston
Warrington
WA1 4AW
0800 3777 485
www.SCSTechnologies.co.uk

DATE OF SURVEY: 14th July 2023
REF NO: TBAER057

The contents of this document are confidential and for the addressee only, not for duplication nor amendments.
Unless under a controlled document referenced by SCS Technologies Ltd

Contents

SUMMARY	3
INTRODUCTION	4
SIGNAL BLOCKING	5
FIELD SURVEY METHOD	6
FIELD SURVEY EQUIPMENT	6
SERVICES LIKELY TO BE AFFECTED	7
TERRESTRIAL TELEVISION RECEPTION	7
SATELLITE TELEVISION RECEPTION	7
THE DEVELOPMENT:	8
CARRIED OUT ON BEHALF OF:	8
OVERVIEW OF DEVELOPMENT	8
DETAILS OF DEVELOPMENT	8
COORDINATES	9
TECHNICAL BACKGROUND – WINTER HILL	10
PLAN A: THE DEVELOPMENT LOCATION	11
PHOTO A: THE NEW DEVELOPMENT	12
PHOTO B: THE NEW DEVELOPMENT	13
PHOTO C: THE NEW DEVELOPMENT	14
TERRESTRIAL TELEVISION SERVICES	15
SATELLITE TELEVISION SERVICES	15
FIELD SURVEY TEST RESULTS AND INFORMATION	16
MITIGATION	27
POTENTIAL IMPACT ZONE – MAP 1	27
PHOTO 1: POTENTIAL IMPACT ZONES	29
REFERENCE OF TERMS	30

SUMMARY

The new building on Grosvenor Street is now fully complete. This Post Construction TV Reception Survey has been conducted to learn whether the introduction of the development has caused an impact to existing viewers' television reception in the surrounding area.

Since the Pre- Construction TV Reception Survey, which was undertaken in June 2015, the Winter Hill television transmitter has undergone certain changes (please refer to the Transmitter Technical Background section of this report). Although these changes have taken place, we are still able to conduct the comparison of the Pre and Post Construction Survey results, as the Winter Hill broadcast transmit powers have remained constant.

There has been noted a slight reduction in aerial signal to the southeast of the development. This is as largely as predicted in the first pre-construction report, however this area has predominantly commercial properties and some that are currently empty and earmarked for further development, so we expect a negligible impact.

A comparison of the pre and post construction test results shows that there has not been any widescale impact to television reception caused by the new development and that the pre-existing signal levels have been kept. But as always, we recommend that funds are available to deal with the investigation of any reported interference and to enable later mitigation requirements.

There was a satellite dish highlighted on the Preconstruction survey that would be affected to the north of the development, but when assessing this on the post construction survey it seems to no longer be in use.

If there are any buildings affected, it is likely this may would have already been highlighted and complaints received.

INTRODUCTION

Theory predicts, and practical evaluation has confirmed, that the introduction of new structures into an area can cause interference to television reception.

This Post-Construction TV Reception Survey has been undertaken to record the new television reception baseline conditions and assess if the introduction of the development has affected upon existing viewers' television reception in the surrounding area.

To enable us to make an assessment, a first desktop study is conducted, followed by a comprehensive field survey.

The desktop study is conducted using plans of the development for example the buildings' location and elevations, along with maps of the surrounding area and details of local television transmitter broadcast information.

The field survey is then conducted at several test point locations surrounding the development. Television signal test results and relevant information are recorded at each of the test point locations.

This report includes the information collated during the desk top study and field survey along with an assessment of where, or if, the introduction of the development has the caused interference to existing viewers' television reception and decide if mitigation is needed.

SCOPE

To conduct a desktop study and comprehensive field survey to record existing baseline television reception conditions in the surrounding area to the development. To supply details of any impact zone and methods of mitigation if required, to conform to Local Planning Authority requirements.

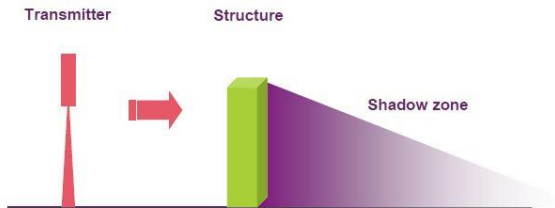
The results and information recorded during this field survey help in assessing if, or where, the introduction of the development has the potential to affect upon existing viewers' television reception.

DISCUSSIONS

The introduction of a new building or structure into an area has the potential to cause interference to existing viewers' television reception.

SIGNAL BLOCKING

Wireless signals, especially those using high frequencies such as television, behave much like light. Therefore, it is desirable to have a clear line of sight path between the transmitter and a receiving aerial to achieve the most reliable reception. The presence of a tall structure between the transmitter and receiver will cause a 'shadow' to be cast behind the structure on the side opposite the transmitter. This effect is like the way that an obstruction between a lamp and an observer's eye blocks out the light.

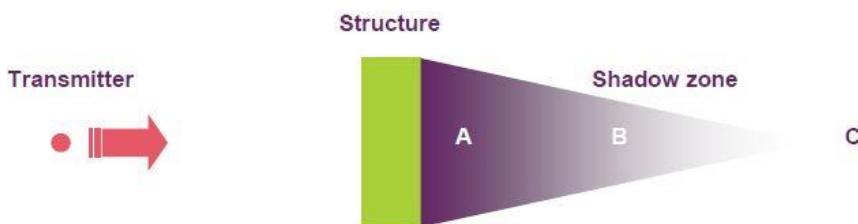


The shadow cast by a structure does not have hard edges though and does not usually extend indefinitely. While there would be a significant reduction in signal levels at once behind the structure, the blocking effect of the structure diminishes with distance because of diffraction. Diffraction is a process where signals appear to bend behind the structure and partially fill in the shadow.

Zone A - close behind the structure (typically tens of metres) there may be a significant reduction in signal level with a possible complete loss of reception.

Zone B - further away (typically hundreds of metres) the signal reduction is less severe, and the shadow will be smaller as diffraction effects partially fill in the shadow. Depending on the size of the structure, some locations could still lose reception completely.

Zone C - some distance away (1-5km) the shadow will effectively have disappeared. The resulting shadow is therefore a triangular shape as shown in Figure 2.



It should be noted that the severity of the reduction and the actual size of the shadow will depend upon many factors including the construction of the structure and its height – the distances given above are for guidance only.

FIELD SURVEY METHOD

Tests are conducted at a selection of locations in the area surrounding the development.

Test results are recorded about television signal strength and quality: -

Strength is recorded in: dBµv.

Quality is recorded in: VBER (Standard definition SD)
LBER (High-definition HD)

Due to the rollout of the 4G Networks all results are recorded with a CAI approved benchmarked aerial with a balun and LTE filter.

An alternative transmitter is evaluated for and where receivable, results are recorded.

All tests are conducted at a 10m height above ground level.

The direction and type of existing viewers' television aerials is noted.

A bearing and distance to the development is recorded at each test point location, for comparison with the bearing and distance to the television transmitter serving the area.

Existing obstructions to television reception are noted.

FIELD SURVEY EQUIPMENT

The field survey is conducted using the following equipment: -

Specialist vehicle complete with telescopic mast.

360° Antenna rotator

14 Element CAI approved wideband UHF antenna with balun and LTE filter, one vertical and one horizontal polarisation.

20m x WF100 twin screened CAI approved coaxial cable.

Televes spectrum analyser/field strength meter

Ordnance survey maps

Garmin GPS receiver

Compass

Digital camera

Digital terrestrial television decode.

SERVICES LIKELY TO BE AFFECTED

TERRESTRIAL TELEVISION RECEPTION

There are two potential ways that the introduction of a new building can cause interference to terrestrial television reception; these are obstruction and reflection.

Obstruction occurs when existing viewers are in an area where their television aerial beam path (direction) to the television transmitter is either through, or within proximity to, the new building or structure. This can result in a reduction of television signal strength and quality and in some cases (if existing viewers are found within the proximity to the new building or structure); receiving terrestrial television signals can become problematic and may not be achievable.

Reflection occurs when the new building reflects terrestrial television signals. These unwanted reflected signals are received on the existing viewer's television aerial along with the direct signals from the television transmitter, resulting in irregularities of television signal strength and quality. However, digital terrestrial television broadcasts are less prone to reflections than the earlier analogue television broadcasts, but this must still be considered when assessing any potential impact.

SATELLITE TELEVISION RECEPTION

Satellite television reception requires a clear line of sight between the satellite antenna and the satellite it is aligned to. In most cases the angle of the satellite antenna to the satellite orbiting the earth is between 20- and 30-degrees elevation.

This elevation must be considered when assessing if the introduction of the new building or structure has the potential to obstruct existing viewers' satellite antenna beam path to the satellite.

Satellite reception is very rarely affected on a large scale and is mostly only relevant to existing viewers within the proximity to the new building or structure.

THE DEVELOPMENT:

University of Manchester
Engineering Campus
(MECD) Grosvenor Street
Manchester

CONDUCTED ON BEHALF OF:

Balfour Beatty UK Construction Services – Regional Buildings
The Point
Birchwood Boulevard
Warrington
WA3 7WD

OVERVIEW OF DEVELOPMENT

The development is found on Grosvenor Street, Manchester, on land bordered by Upper Brook Street and Booth Street West.

The development consists of the demolition of existing buildings and the introduction of four new buildings.

DETAILS OF DEVELOPMENT

Development Type: Redevelopment of existing site with new build.

Number of Blocks: 4.

Building Heights: York Street Building = 28.75m
MEC Hall = 41m
ODFH Extension = 16.25m
UBSB = 23.5m

COORDINATES

Prior to the commencement of the survey, coordinates for the development are entered into a GPS receiver along with the coordinates for the television transmitter serving the area. This enables us to record a bearing and distance from each test point location to the development, for comparison with the bearing and distance to the television transmitter. The coordinates used throughout the survey are listed below and shown on Plan A.

LOCATION NGR

Winter Hill Transmitter SD 66000 14400

1	SJ 84445 97084
2	SJ 84535 97130
3	SJ 84578 97078
4	SJ 84618 97018
5	SJ 84566 96984
6	SJ 84507 96953

TECHNICAL BACKGROUND – WINTER HILL

Transmitter No: 103.00
 NGR: SD 660144
 Approximate bearing from the development: 313°
 Approximate distance from the development: 25.51 km

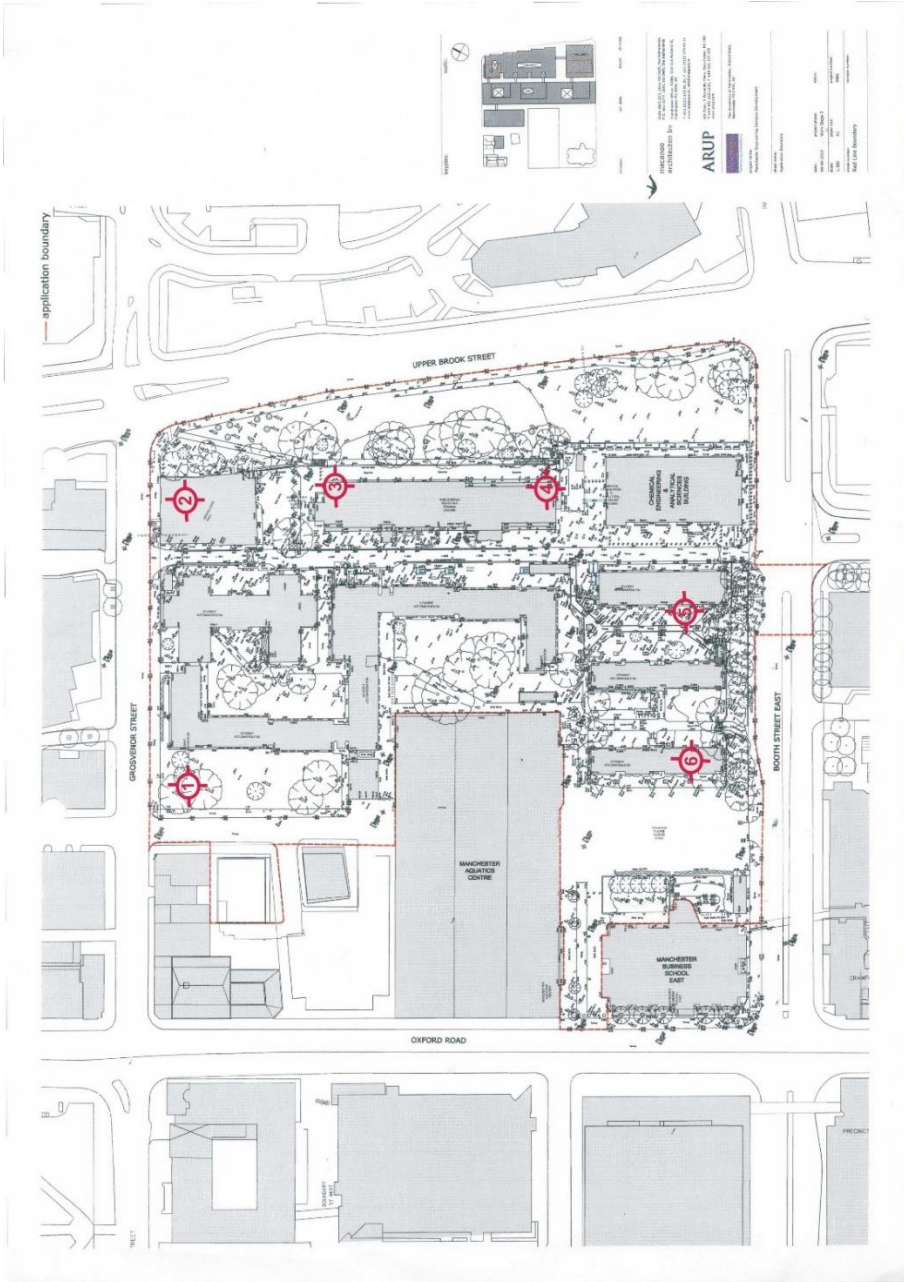
Television Broadcasts from the Winter Hill Transmitter at the time of the Pre-Construction Television Reception Survey (June 2015):

UHF Channel	Frequency	Multiplexer	Format	Broadcast Power
31	554.0	COM7	HD	25,700W
37	602.0	COM8	HD	14,000W
49	698.0	ARQA	SD	100,000W
50	706.0	BBCA	SD	100,000W
54	737.8	BBCB	HD	100,000W
55	746.0	ARQB	SD	100,000W
56	754.0	LM	SD	1,000W
58	770.0	SDN	SD	100,000W
59	778.0	D3+4	SD	100,000W

Television Broadcasts from the Winter Hill Transmitter at the present time (July 2023):

UHF Channel	Frequency	Multiplexer	Format	Broadcast Power
37	602.0	ARQB	SD	100,000W
31	554.0	ARQA	SD	100,000W
32	562.0	BBCA	SD	100,000W
35	585.8	BBCB	HD	100,000W
29	538.0	SDN	SD	100,000W
34	578.0	D3+4	SD	100,000W

PLAN A: THE DEVELOPMENT LOCATION



The contents of this document are confidential and for the addressee only, not for duplication nor amendments.
 Unless under a controlled document referenced by SCS Technologies Ltd

PHOTO A: The new development



The contents of this document are confidential and for the addressee only, not for duplication nor amendments.
Unless under a controlled document referenced by SCS Technologies Ltd

SCS Technologies Terms & conditions apply (available from www.SCSTechnologies.co.uk)

PHOTO B: The new development



PHOTO C: The new development



TERRESTRIAL TELEVISION SERVICES

Viewers in the surrounding area to the development are receiving their terrestrial television services from the Winter Hill transmitter, found to the northwest.

The Winter Hill transmitter broadcasts 6 digital multiplexers providing the full range of standard definition and high-definition digital terrestrial television services available on Freeview, with regional programming for the northwest. Please refer to the transmitter details for further information about the Winter Hill Transmitter.

The test results recorded during the survey show that reception from the Winter Hill transmitter within the area surveyed is acceptable at most test point positions. However, there are several test points where television signal strengths are low and certain terrestrial television digital multiplexers are receiving corruption. This is due to existing obstructions to television reception in these areas. Please note that the results are recorded at a 10m aerial height following TV reception survey specifications, and that for existing television aerials sited at multi storey height, reception could be much improved.

During the survey tests were conducted to receive an alternative transmitter to the Winter Hill transmitter that broadcasts the same quantity of television services and regional programming as the Winter Hill transmitter. The result of these tests was that no alternative transmitter could be received at an acceptable quality or strength.

SATELLITE TELEVISION SERVICES

Both Sky TV and Freesat are broadcast from the same fleet of satellites found at an orbital position of 28.2° east of south, with a required satellite dish elevation of approximately 23°.

Sky TV is primarily a subscription-based service offering several packages of various television services at monthly subscription costs.

Freesat is a non-subscription-based service and offers a similar television service line up to Freeview and selectable regional programming.

FIELD SURVEY TEST RESULTS AND INFORMATION

TEST POINT LOCATION 1

Junction of Kincardine and Whitekirk Close

NGR: SJ 84850 96927

Alt: 40 m

Mast Height: 10 m

Visible Existing Aerial Arrays:

The property in this area is a 6-storey apartment block, with no visible TV aerial from the ground. This property will have a communal TV aerial found at roof top height serving the apartments within the block.

Visible Existing Obstructions:

Various multi-storey buildings in the direction of the Winter Hill Transmitter

WINTER HILL TRANSMITTER - REPORT

Pre-Construction signals as per report June 2015

Channel	Frequency	MUX	Format	Level (dB μ V)	CN dB	VBER	LBER	Quality
31	554.0	COM7	HD	54	29		-8	Pass
37	602.0	COM8	HD	52	26		-8	Pass
49	698.0	ARQA	SD	54	28	-8		Pass
50	706.0	BBCA	SD	54	27	-8		Pass
54	737.8	BBCB	HD	56	29		-8	Pass
55	746.0	ARQB	SD	57	29	-8		Pass
56	754.0	LM	SD	37	10	-8		Pass
58	770.0	SDN	SD	58	30	-8		Pass
59	778.0	D3+4	SD	58	31	-8		Pass

Post Construction signal levels as of July 2023

Channel	Frequency	MUX	Format	Level (dB μ V)	CN dB	MER	VBER	LBER	Quality
37	602.0	COM6	SD	55	29	26	-8		Pass
31	554.0	ARQA	SD	54	26	25	-8		Pass
32	562.0	BBCA	SD	52	27	26	-8		Pass
35	585.8	BBCB	HD	57	29	25		-3	Pass
29	538.0	SDN	SD	58	32	30	-8		Pass
34	578.0	D3+4	SD	55	28	26	-8		Pass

Television reception is of an acceptable quality and strength.

TEST POINT LOCATION 2

Junction of Whitekirk Close and Rudcroft Close

NGR: SJ 84930 96979

Alt: 40 m

Mast Height: 10 m

Visible Existing Aerial Arrays:

10 element aerials on 1m and 2m masts, mounted at rooftop and gutter height on 2 storey properties, directed towards the Winter Hill Transmitter

Visible Existing Obstructions:

Trees and then beyond these various multi-storey buildings in the direction of the Winter Hill Transmitter

WINTER HILL TRANSMITTER - REPORT

Pre-Construction signals as per report June 2015

Channel	Frequency	MUX	Format	Level (dBμV)	CN dB	VBER	LBER	Quality
31	554.0	COM7	HD	48	22		-8	Pass
37	602.0	COM8	HD	45	20		-8	Pass
49	698.0	ARQA	SD	53	26	-8		Pass
50	706.0	BBCA	SD	54	27	-8		Pass
54	737.8	BBCB	HD	51	25		-8	Pass
55	746.0	ARQB	SD	48	21	-8		Pass
56	754.0	LM	SD	27	1	-		Fail
58	770.0	SDN	SD	47	20	-8		Pass
59	778.0	D3+4	SD	48	22	-8		Pass

Post Construction signal levels as of July 2023

Channel	Frequency	MUX	Format	Level (dBμV)	CN dB	MER	VBER	LBER	Quality
37	602.0	ARQB	SD	54	29	26	-8		Pass
31	554.0	ARQA	SD	52	30	28	-8		Pass
32	562.0	BBCA	SD	55	28	26	-8		Pass
35	585.8	BBCB	HD	53	28	25		-4	Pass
29	538.0	SDN	SD	50	31	26	-8		Pass
34	578.0	D3+4	SD	58	30	28	-8		Pass

Television reception is of an acceptable quality and strength.

TEST POINT LOCATION 3

The contents of this document are confidential and for the addressee only, not for duplication nor amendments.
Unless under a controlled document referenced by SCS Technologies Ltd

Sefton Close

NGR: SJ 84995 96861
Alt: 39 m
Mast Height: 10 m

Visible Existing Aerial Arrays:

10 element and 18 element aerials on 1m and 2m masts, mounted at roof top and gutter height on 2 storey properties, directed towards the Winter Hill Transmitter

Visible Existing Obstructions:

Trees and beyond these various multi-storey buildings in the direction of the Winter Hill Transmitter

WINTER HILL TRANSMITTER - REPORT

Pre-Construction signals as per report June 2015

Channel	Frequency	MUX	Format	Level (dBμV)	CN dB	VBER	LBER	Quality
31	554.0	COM7	HD	51	20		-8	Pass
37	602.0	COM8	HD	50	19		-8	Pass
49	698.0	ARQA	SD	57	25	-8		Pass
50	706.0	BBCA	SD	55	24	-8		Pass
54	737.8	BBCB	HD	58	26		-8	Pass
55	746.0	ARQB	SD	59	26	-8		Pass
56	754.0	LM	SD	38	7	-8		Pass
58	770.0	SDN	SD	57	25	-8		Pass
59	778.0	D3+4	SD	58	26	-8		Pass

Post Construction signal levels as of July 2023

Channel	Frequency	MUX	Format	Level (dBμV)	CN dB	MER	VBER	LBER	Quality
37	602.0	ARQB	SD	52	28	26	-8		Pass
31	554.0	ARQA	SD	51	28	28	-8		Pass
32	562.0	BBCA	SD	50	28	26	-8		Pass
35	585.8	BBCB	HD	50	28	26		-4	Pass
29	538.0	SDN	SD	51	28	26	-8		Pass
34	578.0	D3+4	SD	49	28	24	-7		Pass

Television reception is of a good quality and strength.

TEST POINT LOCATION 4

The contents of this document are confidential and for the addressee only, not for duplication nor amendments. Unless under a controlled document referenced by SCS Technologies Ltd

Brunswick Street

NGR: SJ 84931 96766

Alt: 39 m

Mast Height: 10 m

Visible Existing Aerial Arrays:

10 element and 18 element aerials on 1m and 2m masts, mounted at roof top height on 2 storey properties, directed towards the Winter Hill Transmitter

Visible Existing Obstructions:

Various multi-storey buildings in the direction of the Winter Hill Transmitter.

WINTER HILL TRANSMITTER - REPORT

Pre-Construction signals as per report June 2015

Channel	Frequency	MUX	Format	Level (dBμV)	CN dB	VBER	LBER	Quality
31	554.0	COM7	HD	46	15		-8	Pass
37	602.0	COM8	HD	47	16		-8	Pass
49	698.0	ARQA	SD	50	21	-8		Pass
50	706.0	BBCA	SD	52	20	-8		Pass
54	737.8	BBCB	HD	51	20		-8	Pass
55	746.0	ARQB	SD	53	20	-8		Pass
56	754.0	LM	SD	36	3	-8		Pass
58	770.0	SDN	SD	55	23	-8		Pass
59	778.0	D3+4	SD	54	23	-8		Pass

Post Construction signal levels as of July 2023

Channel	Frequency	MUX	Format	Level (dBμV)	CN dB	MER	VBER	LBER	Quality
37	602.0	ARQB	37	46	28	25	-8		Pass
31	554.0	ARQA	31	48	32	26	-8		Pass
32	562.0	BBCA	32	50	28	26	-8		Pass
35	585.8	BBCB	35	50	30	28		-4	Pass
29	538.0	SDN	29	51	32	30	-8		Pass
34	578.0	D3+4	34	50	30	27	-8		Pass

Television reception is of an acceptable quality and strength.

TEST POINT LOCATION 5

The contents of this document are confidential and for the addressee only, not for duplication nor amendments.
Unless under a controlled document referenced by SCS Technologies Ltd

Coleman Close

NGR: SJ 85058 96688
Alt: 40 m
Mast Height: 10 m

Visible Existing Aerial Arrays:

10 element, 18 element and high gain aerials on 1m, 2m and 3m masts mounted at roof top and gutter height on 2 and 3 storey properties directed towards the Winter Hill Transmitter

Visible Existing Obstructions:

Various multi storey buildings in the direction of the Winter Hill Transmitter

WINTER HILL TRANSMITTER - REPORT

Pre-Construction signals as per report June 2015

Channel	Frequency	MUX	Format	Level (dBμV)	CN dB	VBER	LBER	Quality
31	554.0	COM7	HD	57	26		-8	Pass
37	602.0	COM8	HD	55	23		-8	Pass
49	698.0	ARQA	SD	61	29	-8		Pass
50	706.0	BBCA	SD	62	30	-8		Pass
54	737.8	BBCB	HD	63	31		-8	Pass
55	746.0	ARQB	SD	63	30	-8		Pass
56	754.0	LM	SD	44	12	-8		Pass
58	770.0	SDN	SD	60	26	-8		Pass
59	778.0	D3+4	SD	59	27	-8		Pass

Post Construction signal levels as of July 2023

Channel	Frequency	MUX	Format	Level (dBμV)	CN dB	MER	VBER	LBER	Quality
37	602.0	ARQB	SD	55	28	28	-8		Pass
31	554.0	ARQA	SD	50	28	26	-8		Pass
32	562.0	BBCA	SD	48	28	25	-8		Pass
35	585.8	BBCB	HD	51	28	24		-4	Pass
29	538.0	SDN	SD	55	30	30	-8		Pass
34	578.0	D3+4	SD	58	32	30	-8		Pass

Television reception is of an acceptable quality and strength.

TEST POINT LOCATION 6

The contents of this document are confidential and for the addressee only, not for duplication nor amendments.
Unless under a controlled document referenced by SCS Technologies Ltd

Haworth Close

NGR: SJ 84850 97209

Alt: 40 m

Mast Height: 10 m

Visible Existing Aerial Arrays:

10 element, 18 element and high gain aerials on 1m, 2m and 3m masts, mounted at roof top and gutter height on 2 storey properties, directed towards the Winter Hill Transmitter

Visible Existing Obstructions:

Various multi-storey buildings in the direction of the Winter Hill Transmitter

WINTER HILL TRANSMITTER - REPORT

Pre-Construction signals as per report June 2015

Channel	Frequency	MUX	Format	Level (dB μ V)	CN dB	VBER	LBER	Quality
31	554.0	COM7	HD	49	12		-8	Pass
37	602.0	COM8	HD	47	12		-8	Pass
49	698.0	ARQA	SD	49	13	-8		Pass
50	706.0	BBCA	SD	49	12	-8		Pass
54	737.8	BBCB	HD	53	17		-8	Pass
55	746.0	ARQB	SD	51	14	-8		Pass
56	754.0	LM	SD	38	1	-8		Pass
58	770.0	SDN	SD	51	14	-8		Pass
59	778.0	D3+4	SD	52	15	-8		Pass

Post Construction signal levels as of July 2023

Channel	Frequency	MUX	Format	Level (dB μ V)	CN dB	MER	VBER	LBER	Quality
37	602.0	ARQB	SD	47	26	26	-7		Pass
31	554.0	ARQA	SD	54	30	28	-8		Pass
32	562.0	BBCA	SD	51	28	26	-8		Pass
35	585.8	BBCB	HD	51	30	28		-8	Pass
29	538.0	SDN	SD	52	30	28	-8		Pass
34	578.0	D3+4	SD	49	28	26	-8		Pass

Television reception is of an acceptable quality and strength.

TEST POINT LOCATION 7

The contents of this document are confidential and for the addressee only, not for duplication nor amendments.
Unless under a controlled document referenced by SCS Technologies Ltd

Grosvenor Road

NGR: SJ 84689 97270
Alt: 38 m
Mast Height: 10 m

Visible Existing Aerial Arrays:

10 element and 18 element aerials on 1m, 2m and 3m masts mounted at roof top and gutter height, directed towards the Winter Hill Transmitter.

There are several old aerials directed the opposite direction that may have been trying to receive a "reflected" signal that no longer can be received. All these properties have satellite antennas installed.

Visible Existing Obstructions:

Various multi-storey buildings in the direction of the Winter Hill Transmitter

WINTER HILL TRANSMITTER - REPORT

Pre-Construction signals as per report June 2015

Channel	Frequency	MUX	Format	Level (dBμV)	CN dB	VBER	LBER	Quality
31	554.0	COM7	HD	42	6		-8	Pass
37	602.0	COM8	HD	43	7		-8	Pass
49	698.0	ARQA	SD	44	7	-8		Pass
50	706.0	BBCA	SD	44	7	-8		Pass
54	737.8	BBCB	HD	47	10		-8	Pass
55	746.0	ARQB	SD	45	8	-8		Pass
56	754.0	LM	SD	37	0.6	-7		Pass
58	770.0	SDN	SD	46	10	-8		Pass
59	778.0	D3+4	SD	46	9	-8		Pass

Post Construction signal levels as of July 2023

Channel	Frequency	MUX	Format	Level (dBμV)	CN dB	MER	VBER	LBER	Quality
37	602.0	ARQB	SD	47	28	28	-8		Pass
31	554.0	ARQA	SD	48	28	26	-8		Pass
32	562.0	BBCA	SD	48	30	28	-8		Pass
35	585.8	BBCB	HD	49	28	26		-3	Pass
29	538.0	SDN	SD	51	30	30	-8		Pass
34	578.0	D3+4	SD	48	28	26	-8		Pass

Television reception is of an acceptable quality and strength.

TEST POINT LOCATION 8

The contents of this document are confidential and for the addressee only, not for duplication nor amendments. Unless under a controlled document referenced by SCS Technologies Ltd

Oxford Road

NGR: SJ 84397 96972
Alt: 37 m
Mast Height: 10 m

Visible Existing Aerial Arrays:

High gain aerials on 3m and 4m masts mounted at roof top height on 5-storey university building, directed toward the Winter Hill Transmitter

Visible Existing Obstructions:

Various multi-storey buildings in the general direction of the Winter Hill Transmitter.

WINTER HILL TRANSMITTER - REPORT

Pre-Construction signals as per report June 2015

Channel	Frequency	MUX	Format	Level (dBμV)	CN dB	VBER	LBER	Quality
31	554.0	COM7	HD	37	10		-8	Pass
37	602.0	COM8	HD	39	12		-8	Pass
49	698.0	ARQA	SD	46	20	-8		Pass
50	706.0	BBCA	SD	46	18	-8		Pass
54	737.8	BBCB	HD	46	19		-8	Pass
55	746.0	ARQB	SD	47	20	-8		Pass
56	754.0	LM	SD	31	3	-7		Pass
58	770.0	SDN	SD	43	16	-8		Pass
59	778.0	D3+4	SD	41	14	-8		Pass

Post Construction signal levels as of July 2023

Channel	Frequency	MUX	Format	Level (dBμV)	CN dB	MER	VBER	LBER	Quality
37	602.0	ARQB	SD	45	26	24	-7		Pass
31	554.0	ARQA	SD	52	28	28	-8		Pass
32	562.0	BBCA	SD	51	26	26	-8		Pass
35	585.8	BBCB	HD	48	26	24		-4	Pass
29	538.0	SDN	SD	55	30	28	-8		Pass
34	578.0	D3+4	SD	49	28	28	-8		Pass

Television reception is of an acceptable quality and strength.

TEST POINT LOCATION 9

The contents of this document are confidential and for the addressee only, not for duplication nor amendments.
Unless under a controlled document referenced by SCS Technologies Ltd

Brunswick Street

NGR: SJ 84733 96653

Alt: 38 m

Mast Height: 10 m

Visible Existing Aerial Arrays:

High gain aerials on 3m and 4m masts mounted at rooftop height on 4, 5 and 8 storey university buildings, directed towards the Winter Hill Transmitter

Visible Existing Obstructions:

Various multi-storey buildings within the proximity and in the direction of the Winter Hill Transmitter

WINTER HILL TRANSMITTER - REPORT

Pre-Construction signals as per report June 2015

Channel	Frequency	MUX	Format	Level (dBμV)	CN dB	VBER	LBER	Quality
31	554.0	COM7	HD	43	16		-8	Pass
37	602.0	COM8	HD	35	8		-8	Pass
49	698.0	ARQA	SD	44	17	-8		Pass
50	706.0	BBCA	SD	41	14	-8		Pass
54	737.8	BBCB	HD	39	12		-8	Pass
55	746.0	ARQB	SD	40	12	-6		Pass
56	754.0	LM	SD	32	4	-7		Pass
58	770.0	SDN	SD	42	15	-8		Pass
59	778.0	D3+4	SD	43	17	-8		Pass

Post Construction signal levels as of July 2023

Channel	Frequency	MUX	Format	Level (dBμV)	CN dB	MER	VBER	LBER	Quality
37	602.0	ARQB	SD	42	26	25	-7		Marginal
31	554.0	ARQA	SD	43	28	24	-7		Marginal
32	562.0	BBCA	SD	43	24	22	-7		Marginal
35	585.8	BBCB	HD	43	26	16		-3	Marginal
29	538.0	SDN	SD	45	29	22	-8		Pass
34	578.0	D3+4	SD	43	25	21	-7		Marginal

Television reception is of low quality and strength.

TEST POINT LOCATION 10

The contents of this document are confidential and for the addressee only, not for duplication nor amendments.
Unless under a controlled document referenced by SCS Technologies Ltd

University of Manchester

NGR: SJ 84508 96667

Alt: 37 m

Mast Height: 10 m

Visible Existing Aerial Arrays:

High gain aerial on a 4m mast mounted at roof top height on a 4 storey building directed towards the Winter Hill Transmitter

Visible Existing Obstructions:

Various multi-storey buildings in the direction of the Winter Hill Transmitter.

WINTER HILL TRANSMITTER - REPORT

Pre-Construction signals as per report June 2015

Channel	Frequency	MUX	Format	Level (dBμV)	CN dB	VBER	LBER	Quality
31	554.0	COM7	HD	30	3			Fail
37	602.0	COM8	HD	29	2			Fail
49	698.0	ARQA	SD	30	3			Fail
50	706.0	BBCA	SD	32	4			Fail
54	737.8	BBCB	HD	31	4			Fail
55	746.0	ARQB	SD	32	5			Fail
56	754.0	LM	SD	27	0			Fail
58	770.0	SDN	SD	30	3			Fail
59	778.0	D3+4	SD	30	3			Fail

Post Construction signal levels as of July 2023

Channel	Frequency	MUX	Format	Level (dBμV)	CN dB	MER	VBER	LBER	Quality
37	602.0	ARQB	SD	33	25	20	-6		Fail
31	554.0	ARQA	SD	40	22	21	-7		Marginal
32	562.0	BBCA	SD	36	22	18	-6		Fail
35	585.8	BBCB	HD	36	18	16		-2	Fail
29	538.0	SDN	SD	34	18	18	-6		Fail
34	578.0	D3+4	SD	40	23	21	-7		Marginal

Television reception is of low quality and strength.

TEST POINT LOCATION 11

The contents of this document are confidential and for the addressee only, not for duplication nor amendments. Unless under a controlled document referenced by SCS Technologies Ltd

St Peter House

NGR: SJ 84582 96867

Alt: 38 m

Mast Height: 10 m

Visible Existing Aerial Arrays:

High gain aerial on a 1m mast mounted at roof top height on a 3 storey university building, directed towards the Winter Hill Transmitter

Visible Existing Obstructions:

Various multi-storey buildings in the direction of the Winter Hill Transmitter

WINTER HILL TRANSMITTER - REPORT

Pre-Construction signals as per report June 2015

Channel	Frequency	MUX	Format	Level (dBμV)	CN dB	VBER	LBER	Quality
31	554.0	COM7	HD	45	14		-8	Pass
37	602.0	COM8	HD	47	16		-8	Pass
49	698.0	ARQA	SD	55	23	-8		Pass
50	706.0	BBCA	SD	51	20	-8		Pass
54	737.8	BBCB	HD	56	24		-8	Pass
55	746.0	ARQB	SD	56	23	-8		Pass
56	754.0	LM	SD	35	2	-7		Pass
58	770.0	SDN	SD	48	15	-8		Pass
59	778.0	D3+4	SD	52	20	-8		Pass

Post Construction signal levels as of July 2023

Channel	Frequency	MUX	Format	Level (dBμV)	CN dB	MER	VBER	LBER	Quality
37	602.0	ARQB	SD	42	20	20	-7		Marginal
31	554.0	ARQA	SD	50	28	28	-7		Pass
32	562.0	BBCA	SD	48	28	26	-8		Pass
35	585.8	BBCB	HD	52	30	26		-4	Pass
29	538.0	SDN	SD	50	30	30	-8		Pass
34	578.0	D3+4	SD	52	28	26	-8		Pass

Television reception is of an acceptable quality and strength.

MITIGATION

Terrestrial Television Reception

Remedial Aerial Work

One or a combination of the following may aid in rectifying interference being received to terrestrial television reception.

Change of aerial type to one most suited to the type of interference being received.

Redirecting existing television aerial to an alternative transmitter that is not affected, in some cases the existing television aerial may not be suitable for redirecting and the installation of a suitable television aerial may be needed.

Re-siting of the television aerial to a position on the property where interference is reduced or not present.

Increase or decrease of aerial height.

Installation of masthead amplification to improve television signal strengths being received.

Remote Television Aerial

When a remote television aerial is positioned at a location with good quality television reception, (which can be a considerable distance from the affected area), and the signals are brought back via a cable network to the affected properties.

Utilising Satellite Reception

Should rectifying terrestrial television reception prove problematic, the installation of satellite systems utilising the Freesat platform can assist in rectifying reception issues.

To supply satellite television reception for individual affected dwellings or commercial units requires the installation of a satellite dish and set top box.

Satellite Television Reception

Remedial Satellite Work

One or all the following may aid in rectifying satellite television reception issues.

Re-siting of the satellite antenna to a position on the property where a clear line of sight can be achieved.

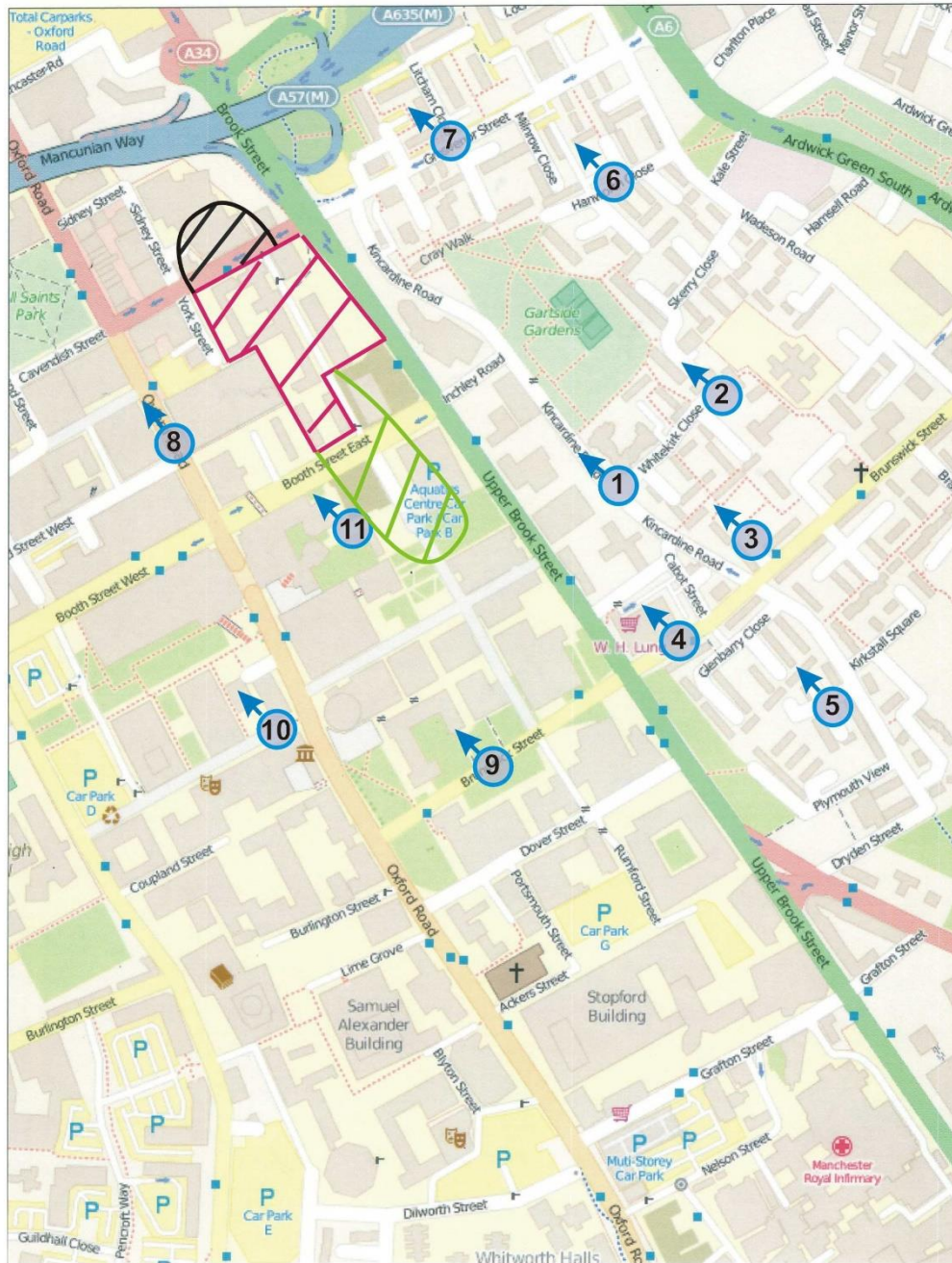
Increase in height of the satellite antenna to achieve a clear line of sight to the satellite.

Remote Satellite Dish

When the receiving satellite dish is sited in a position where a clear line of sight can be achieved; this can sometimes be a considerable distance from the affected property. In some instances, the satellite dish may require siting on the offending property to achieve a clear line of sight, or on an adjoining property where permission will have to be looked for. The signals are brought back to the affected property via a cable and amplifier network.

The need for such mitigation would need to be decided on a case-by-case basis.

POTENTIAL IMPACT ZONE – MAP 1



KEY



Proposed Development



Test Point Position showing local TV aerial direction



Potential Impact Zone for Terrestrial Television Reception



Potential Impact Zone for Satellite Television Reception

PHOTO 1: POTENTIAL IMPACT ZONES

SATELLITE DISH LOCATED ON THE SUGDEN SPORTS CENTRE (no longer in use)



REFERENCE OF TERMS

c.	Circa
CH	The UHF Channel allocation from the transmitter.
MUX	The digital multiplexer allocation/operator.
dBμv	Carrier strength reading (decibel microvolt).
C/N	Carrier /Noise Ratio
VBER	Measurement for digital signal after error correction (BER after VITERBi)
LBER	BER after been applied the LDPC (low density parity check) error correction.
SD	SD Standard Definition
HD	HD High Definition
NGR	National Grid Reference
ALT	Altitude above sea level at the location.
BRG	Bearing from North.
GPS	Global Positioning System.