

**TV AND RADIO
TELECOMMUNICATIONS
INTERFERENCE
ASSESSMENT**



U+I (8AE) Limited and the London Fire
Commissioner (LFC)

8 ALBERT EMBANKMENT

TV and Radio Telecommunications Report



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TYPE OF DOCUMENT (VERSION) PUBLIC

PROJECT NO. 70016347

DATE: MARCH 2019

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QUALITY CONTROL

Issue/revision	Planning Issue	Revision 1	Revision 2	Revision 3
Remarks	Planning Issue			
Date	March 2019			
Prepared by	Andrew Lunn			
Signature	<i>UKAJL002</i>			
Checked by	Chris Chorlton			
Signature	<i>UKCCC001</i>			
Authorised by	Chris Chorlton			
Signature	<i>UKCCC001</i>			
Project number	70016347-S68			
Report number	One			
File reference	70016347-S68			

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1.1. INTRODUCTION

- 1.1.1. This report reviews and analyses the likely significant environmental effect of the Proposed Development on broadcast radio and television (TV) reception. In particular it considers the likely effects on properties in the survey area surrounding the Proposed Development due to interference with broadcast TV and radio signals.
- 1.1.2. The report has been produced as a technical document to support the planning application and forms an Appendix of the ES.
- 1.1.3. Description of Development – Phased mixed use development including up to 417 residential units and comprising: part redevelopment and restoration, conversion and extension of former Fire Brigade Headquarters building and demolition of the existing extension and re-provision of obelisk to provide a new fire station (Sui Generis), a new London Fire Brigade museum (Class D1), residential units (Class C3), a ten storey hotel (Class C1) with up to 200 bedrooms and a flexible retail/lobby space (Classes A1/A2/A3/A4/C1), and a rooftop restaurant with ancillary bar (Class A3); demolition and redevelopment of the central workshop building to provide buildings of up to twenty-six storeys plus basements, comprising business floorspace (Use Class B1), a gym (Class D2), retail units (Classes A1/A2/A3/A4) and residential units (Class C3); development of land to the rear to provide a eleven storey building plus basement, comprising a flexible commercial unit (Classes A1/A2/A3/A4/D1/D2/B1) and residential units (Class C3); all together with associated areas of new public realm, hard and soft landscaping, basement and surface parking, servicing, means of access and plant and equipment.
- 1.1.4. The Proposed Development building height is lower in height to a number of properties in the area which are under development. The height of the Proposed Development will not be unusually tall.
- 1.1.5. The characteristics of potential impacts of this Proposed Development are considered cumulatively with impacts brought about by the other committed development schemes within the area.

1.2. SUMMARY OF FINDINGS

- 1.2.1. This report describes a method of defining risks and mitigations according to a scale which accounts for:
- Legislation;
 - Local and national policy;
 - The TV and radio services that are accessed from residential properties;
 - The magnitude by which services are affected by the Proposed Development;
 - The quantity of residents that might be affected; and
 - The potential for obtaining services by other means
- 1.2.2. The above factors are assessed with regard to both the construction and operational (completed) phases of the Proposed Development.
- 1.2.3. It was found that TV and satellite reception for part of Whitgift House, Whitgift Street will be affected by the Proposed Development. It was also found that there were very few other residential properties in the area that might be affected by the Proposed Development.

- 1.2.4. It is concluded that there will be a major negative effect on Satellite and TV services for these properties, but the effect on radio services will be minor to negligible.
- 1.2.5. Mitigation measures are described in the document as possible options to lessen the adverse effects. In addition, possible mitigation options are offered should other issues be present which could not be reasonably assessed from the street level survey, which would include, for example, receptors behind façades.

1.3. LEGISLATION, POLICY AND GUIDANCE

LEGISLATIVE FRAMEWORK

The applicable legislative framework is summarised as follows:

Communications Act (2003)

- 1.3.1. This detailed Act of Parliament spells out technical aspects of regulation, implementing and enforcing the law with regard to Communications and ensures the transmission medium for high-quality television and radio is protected (Ref 1).

Wireless Telegraphy Act (1949, 1967, 1998 and 2006)

- 1.3.2. Under the Wireless Telegraphy Act 2006 (Ref 2), the Proposed Development must satisfy the requirements that electromagnetic and physical interference to telecommunication have been fully taken into account and appropriate mitigation measures provided where necessary. These requirements were considered in assessing the effect of the Proposed Development on radio and TV reception, as set out in this report.
- 1.3.3. The Radio Equipment and Telecommunications Terminal Equipment (Amendment No. 2) Regulations (2003)
- 1.3.4. Details actions to enforce a regulation that relates to the protection and management of the radio spectrum (Ref 3).

PLANNING POLICY CONTEXT

- 1.3.5. Planning policy at the national, regional and local level and its relevance to telecommunication policy relevant to this assessment from the following documents:

NATIONAL POLICY

- 1.3.6. National Planning Policy Framework (NPPF) (2018)
- 1.3.7. The revised NPPF was adopted in July 2018. The following NPPF paragraph is relevant to this assessment:

- 1.3.8. “114. Local planning authorities...should ensure that:
- 1.3.9. They have considered the possibility of the construction of new buildings or other structures interfering with broadcast and telecommunications services”

REGIONAL POLICY

The London Plan 2016

- 1.3.10. Policy 7.7D of, The London Plan, The Spatial Development Strategy For London Consolidated with Alterations Since 2011. March (Ref 5), on ‘Location and design of tall and large buildings’ states that,
- “D. Tall buildings:
- a) Should not affect their surroundings adversely in terms of microclimate, wind turbulence, overshadowing, noise, reflected glare, aviation, navigation and telecommunication interference”

LOCAL POLICY

Lambeth Local Plan 2015

- 1.3.11. The Lambeth Local Plan 2015 was adopted on 23 September 2015. There are no TV or radio interference requirements pertinent in the document (ref. 6)

GUIDANCE

- 1.3.12. The applicable guidance is summarised as follows:
- 1.3.13. Guidance on assessing the effects of new developments on telecommunications and broadcast transmissions is provided by the British Broadcasting Corporation (BBC) and Office of Communications (Ofcom) and include:
- BBC information on ‘Transmitters’ (Ref 7);
 - BBC and Office of Communications (2009) (Ref 8) The impact of Large Buildings and Structures and their Impact on Broadcast and other Wireless services; and
 - ‘Information for Viewers’ in the Ofcom website (Ref 9)

1.4. RELEVANT ELEMENTS OF THE PROPOSED DEVELOPMENT

- 1.4.1. The assessment is based on the application plans for the Proposed Development. The following components of the Proposed Development are relevant to the assessment of the likely significant effects in relation to broadcast radio and TV:
- Heights;
 - Scale; and
 - Massing

1.5. ASSESSMENT METHODOLOGY AND SIGNIFICANCE CRITERIA

SCOPE OF THE ASSESSMENT

- 1.5.1. The assessment consists of a desktop review of published telecommunications data together with a visual assessment of the Proposed Development and its surroundings to determine:
- The baseline conditions of the Proposed Development and the surrounding areas;
 - Likely significant effects based upon the Proposed Development, sensitive receptors to the effects, the magnitude of change and significance of the effects;
 - Potential effects identification for domestic TV, radio and satellite reception; and
 - Mitigation measures and assessment of the likely significance of the residual effects following mitigation.

LIKELY SIGNIFICANT EFFECTS

- 1.5.2. There are two mechanisms that can affect broadcast transmissions:
- Attenuation that is caused by a physical obstruction; and
 - Structures that reflect and refract transmitted signals.

EXTENT OF THE STUDY AREA

- 1.5.3. The study area consists of the area affected by the proposed scale and massing of the Proposed Development. It also includes consideration of the positions of local transmitters of broadcast radio and TV.

1.1.12 METHOD OF BASELINE DATA COLLATION

1.1.12.1 DESK STUDY

- 1.5.4. Baseline characterisation was determined from a desk study which included information gathered from the following sources:
- Transmitter locations and elevations from BBC (Ref 10); and
 - Satellite details from the “Dish Pointer” application (Ref 11).

1.1.13 SITE VISIT / OTHER ASSESSMENT

- 1.5.5. A Site visit was undertaken on 20th April 2017 by a representative of WSP to obtain information on the following:
- Adjacent building uses;
 - Approximate heights of neighbouring buildings; and
 - Presence of TV receiving equipment (aerials and face mounted dishes on buildings).

ASSESSMENT MODELLING

- 1.5.6. The baseline conditions were determined from the visual site inspection and desk study information. Additional topographical data was obtained from Ordnance Survey (OS). The assessment considers a potential 'worst case' scenario in terms of the behaviour of radio signals. This behaviour includes reflection, refraction and diffraction depending on factors such as the material of the Proposed Development; and they are based on information available at the time of the assessment.
- 1.5.7. The assessment used wave propagation theory to estimate line of sight shadows caused by the Proposed Development and the potential for signal reflections off building façades. Assessing the reception quality based on a direct line of sight approach highlights a worst-case scenario where a site is situated in a city or large town. TV and radio signals diffract around and reflect off buildings and other objects. In built up areas there is a significant chance that a secondary signal will be present which enables residents to receive a signal.

SIGNIFICANCE CRITERIA

- 1.5.8. The assessment of potential effects as a result of the Proposed Development has taken into account the construction and operational phases. The significance level attributed to each effect has been assessed based on the magnitude of change due to the Proposed Development and the sensitivity of the affected receptor / receiving environment to change. Magnitude and sensitivity are both assessed on a scale of high, medium, low and negligible.

IDENTIFICATION OF LIKELY SIGNIFICANT EFFECTS AND EVALUATION OF SIGNIFICANCE

- 1.5.9. Various methodologies were applied in order to determine the potential for significant environmental effects as a result of the demolition / construction works and operation of the Proposed Development.
- 1.5.10. Several criteria have been used to determine whether or not the likely environmental effects of the Proposed Development will be deemed 'significant'. The effects have been assessed quantitatively, where possible. The significance of effects has been assessed using the criteria detailed within the following section.
- 1.5.11. The assessment of significance considers the magnitude of change (from the baseline conditions), the sensitivity of the affected environment receptors and (in terms of determining residual effects) the extent to which mitigation and enhancement measures will reduce or reverse negative effects.
- 1.5.12. Each effect has been assessed against the change of magnitude and the sensitivity of the receptor as shown in Table 1.

IDENTIFICATION OF SENSITIVE RECEPTORS

- 1.5.13. The receptor sensitivity level is used to define how easily affected the users around the Proposed Development would be to any changes to television and radio receptions. The definitions of each sensitivity level and magnitude of change are detailed below:

- High: users surrounding the Proposed Development can only receive signals from a single source and already suffer from weak signal strength; or can only receive from a single direction.
- Medium: users surrounding the Proposed Development can receive television and radio signals from multiple sources and have medium to weak signal strength;
- Low: users surrounding the Proposed Development can receive television and radio signals from multiple sources and have medium to strong signal strength; and
- Negligible: users surrounding the Proposed Development can receive television and radio signals from multiple sources and have strong signal strength.

1.5.14. The magnitude of change is used to define how large an effect the Proposed Development has on the existing telecommunications reception in the surrounding area. The definitions of each magnitude of change level are detailed below:

- High: where the Proposed Development would cause a substantial permanent change (either positive or negative) to the existing telecommunications signal strength and end user reception. Once the Proposed Development is in place, the situation will be fundamentally changed;
- Medium: where the Proposed Development would cause a measurable but not substantial change (either positive or negative) to the existing telecommunications signal strength and end user reception. Once the Proposed Development is in place, the situation will be partially changed;
- Low: where the Proposed Development would cause a slight permanent change (either positive or negative) to the existing telecommunications signal strength and end user reception. Once the Proposed Development is in place, the situation will be similar to the baseline; and
- Negligible: change to telecommunications signal strength and end user reception will be barely or not perceptible.

EFFECT SIGNIFICANCE

1.5.15. The following terms have been used to define the significance of the effects identified:

- Major effect: where the Proposed Development could cause a substantial permanent change (either positive or negative) to the existing telecommunications signal strength and end user reception. Once the Proposed Development is in place, the situation will be fundamentally changed;
- Moderate effect: where the Proposed Development would cause a substantial temporary change (either positive or negative) to the existing telecommunications signal strength and end user reception. Once the Proposed Development is in place, the situation will be partially changed;
- Minor effect: where the Proposed Development could cause a slight permanent change (either positive or negative) to the existing telecommunications signal strength and end user reception. Once the Proposed Development is in place, the situation will be similar to the baseline; and be expected to result in a small, barely noticeable effect (either positive or negative); and
- Negligible: where no discernible effect is expected as a result of the Proposed Development on telecommunications signal strength and end user reception will be barely or not perceptible.

Table 1 - Matrix for Determining the Significance of Effects

		Sensitivity of Receptor / Receiving Environment to Change / Effect			
		High	Medium	Low	Negligible
Magnitude of Change / Effect	High	Major	Moderate to Major	Minor to Moderate	Negligible
	Medium	Moderate to Major	Moderate	Minor	Negligible
	Low	Minor to Moderate	Minor	Negligible to Minor	Negligible
	Negligible	Negligible	Negligible	Negligible	Negligible

1.6. SENSITIVE RECEPTORS

- 1.6.1. The sensitive receptors include buildings around the Proposed Development.
- 1.6.2. The most likely affected TV receptor locations identified in the assessment for TV are shown in Figure 1. Receptors for Satellite transmissions are shown in Figure 2. The details of area are discussed later within this report.

1.6.3. IDENTIFICATION OF MITIGATION MEASURES

- 1.6.4. Mitigation measures have been identified to prevent, reduce or remedy any likely significant adverse environmental effects.
- 1.6.5. An assessment of the in-combination effects of the Proposed Development and other existing committed developments found a possible impact from the redevelopment of Parliament House, 81 Black Prince Road.

1.7. BASELINE CONDITIONS

- 1.7.1. There are four platforms in the UK by which users receive TV services to their homes: satellite and terrestrial, which are covered by this report, and Cable and Asymmetric Digital Subscriber Line (ADSL), which are not affected by buildings and are therefore not covered by this report. Cable and ADSL TV services are received via cables connected directly into a receiver. Although still in wide use, the use of terrestrial TV (also known as over-the-air) or broadcast TV is decreasing in many densely-populated areas. Terrestrial TV works via radio waves transmitted through open space, which are received by (usually roof mounted) aerials, usually unencrypted (commonly known as 'free-to-air' TV). Satellite services are received via a satellite dish connected to a receiver, e.g. a digital set-top-box.
- 1.7.2. The UK TV transmission network comprises many transmitters, rebroadcast links, microwave links and landlines.
- 1.7.3. Not all households and other buildings in the area are dependent on terrestrial TV as their primary source of TV. In general, it can be assumed that large commercial establishments are less likely to

depend on terrestrial TV reception and are more likely to have cable and satellite TV services. The increasing uptake of cable and satellite TV services is likely to further reduce the number of households affected by shadows to terrestrial TV caused by a development.

BROADCAST TELEVISION

- 1.7.4. Within the UK, broadcast TV is currently transmitted in digital format. The Crystal Palace transmitter is the main transmitter covering the Proposed Development and the surrounding area.
- 1.7.5. The high-power Crystal Palace TV transmitter provides BBC1, BBC2, ITV, Channel 4 and 5 as well as other 'free view' digital broadcasts to this area of London, which is located approximately 8.2km south-southeast of Proposed Development at TQ 339 712.
- 1.7.6. Other lower power TV transmitters to the area include Reigate 27kms to the south and Woolwich 15.4kms to the east.
- 1.7.7. The quality of terrestrial TV reception achieved is dependent on the equipment used at the receiving point. In many cases, a standard roof-top wide gain aerial is sufficient to obtain adequate signal reception in strong reception areas. In weak reception areas high gain, more directional antenna, and / or masthead amplifiers are employed.
- 1.7.8. The observed existing TV aerials located on residential properties around the Proposed Development and within 1km of the north-north west (as indicated to be within the theoretical shadow zone and immediately surrounding Proposed Development) shown in Figure 1 are mainly aligned with the Crystal Palace transmitter to the south. A number of aerials are orientated in different directions and point towards the other transmitters and may be legacy from before the digital change-over or maybe receiving weak signals. TV aerials installed on Whitgift House are aligned to receive signals in a direction suggesting they will be in the shadow of the Proposed Development.

BROADCAST RADIO

- 1.7.9. BBC digital radio broadcasts to the London area are provided by the Alexandra Palace transmitter at TQ 296 900. The transmitter at Wrotham TQ595 604 also supplies services to the area.
- 1.7.10. BBC FM and AM radio broadcasts to this area of London are provided by the Alexandra Palace transmitter with FM being supplied by Wrotham and AM by Brookmans Park transmitters. Other sites which transmit to the area are Duxhurst, Bow and Croydon.
- 1.7.11. Radio transmissions are less affected by broadcast shadowing from buildings. This is because the lower frequency radio signals can more easily refract around buildings and hills, although some loss of signal strength can occur the effects are less severe than for signals which travel in a more direct line of sight such as television signals. It is not expected that mitigation will be required to maintain access to broadcast radio transmissions.

SATELLITE TV AND RADIO

- 1.7.12. Satellite TV broadcast services are provided largely by the ASTRA 2 satellite located at a geostationary orbital location of 28.2 degrees east. For properties located in this area of London area, optimum reception is obtained by aligning dishes to the south east on a compass bearing of 145 degrees and an elevation to the horizontal of 25 degrees.
- 1.7.13. A number of the surrounding residential properties all located within Whitgift House were observed to have externally mounted satellite TV dishes aligned through the Proposed Development. Satellite dish orientations were generally southerly at a bearing of 140 to 160 degrees and inclined at approximately 25 degrees to the horizon.

FUTURE BASELINE

- 1.7.14. There is likely to be greater uptake of satellite, cabled and internet services and a corresponding reduction in the use of terrestrial transmitted signals. This assessment has been undertaken for the current conditions.

1.8. ASSESSMENT OF EFFECTS, MITIGATION AND RESIDUAL EFFECTS

- 1.8.1. Satellite dishes were observed on Whitgift House and are installed at various heights ranging from two metres above ground to roof top of the four-storey building. Whilst the theoretical shadow cast from the building indicates only those dishes at the northern end of the building will be affected, the visual inspection would suggest some of dishes at the southern end may also be within the shadow of the Proposed Development. It could be the dishes on the southern end which may point through the Proposed Development do not have an ideal alignment and there may be an opportunity to realign these aerials. The orientation of the dishes on the northern end of the building are aligned to point through the Proposed Development, confirming the calculated shadow cast by the Proposed Development.

DESIGN SOLUTION AND ASSUMPTIONS

- 1.8.2. The proposed roof level of the tallest building for the Proposed Development is at a height of 86.37m Above Ordnance Datum (AOD). The building will cast a broadcast shadow, the orientation and length of which will depend on the location and elevation of the source transmissions.
- 1.8.3. Broadcast shadowing can occur when a large structure blocks the reception of a TV or radio signal. This blocking effect creates a broadcast shadow behind the structure. The effect is the reduction (or elimination) of the signal strength within the shadow zone. The most significant factors affecting the potential for broadcast shadowing are a building's size and height above the surrounding sky line.
- 1.8.4. Broadcast TV signals do not create as 'hard' a shadow as, for means of comparison, visible light. For the purposes of explanation, a 'shadow' zone can be considered as having three sub-zones:
- Within a few hundred metres from a proposed building, the reduction in signal strength is significant;

- Further away from a building, within the limit of the 'shadow' zone, signal reduction is determined by diffraction at the edges of the structure and reflection off surrounding structures. The simple condition of whether or not a location has an optical view of the transmitter is not enough to classify the potential interference zone adequately. In general, the effect is that (i) the signal appears to bend around the sides of the structure; (ii) the shadow zone reduces in size; and (iii) the signal strength is reduced by much less than simple ray optics would suggest; and
- Even further away from the structure (approximately 5km), complex multiple reflections and diffraction, caused by structures in the locality, may result in the 'shadow' zone becoming almost non-existent.

DEMOLITION & CONSTRUCTION

Likely Effects on Broadcast TV Reception.

- 1.8.5. The main potential effects associated with demolition and construction on telecommunications would be the temporary use of cranes. This effect would be intermittent as the crane moves across the Proposed Development.
- 1.8.6. Properties located within the theoretical line of sight shadow caused by the construction equipment, could experience a reduction in TV signal strength if they are receiving signals from the transmitter. The overall magnitude of change on broadcast TV reception would be classified as medium for properties immediately adjacent to the Proposed Development on its north-north west side. The receptor sensitivity can be classed as low because residents can access digital broadcast, via other means. Therefore there could be a likely direct, short-term effect on reception of minor negative significance, prior to the implementation of mitigation measures.
- 1.8.7. The effects of cranes and temporary works during working hours are fairly minimal and cannot realistically be mitigated.

Likely Effects on Broadcast Radio Reception.

- 1.8.8. As with TV reception, the main potential effects associated with demolition and construction on telecommunications would be the temporary use of cranes. This effect would be intermittent as the crane moves across the Proposed Development.
- 1.8.9. Properties located within the theoretical line of sight shadow of the radio transmitter, could experience a very slight reduction in signal strength if receiving signals from the transmitter. The overall magnitude of change on broadcast radio reception would be classified as low for properties immediately adjacent to the Proposed Development. The receptor sensitivity can be classed as low because residents can access digital broadcast, via other means. Therefore there could be a likely direct, short-term effect on reception of Negligible to Minor negative significance prior to the implementation of mitigation measures.
- 1.8.10. The effects of cranes and temporary works during working hours are fairly minimal and in most instances not worth mitigating against as signals will be restored once plant stops moving.

Likely effects on Satellite Reception (TV and Radio)

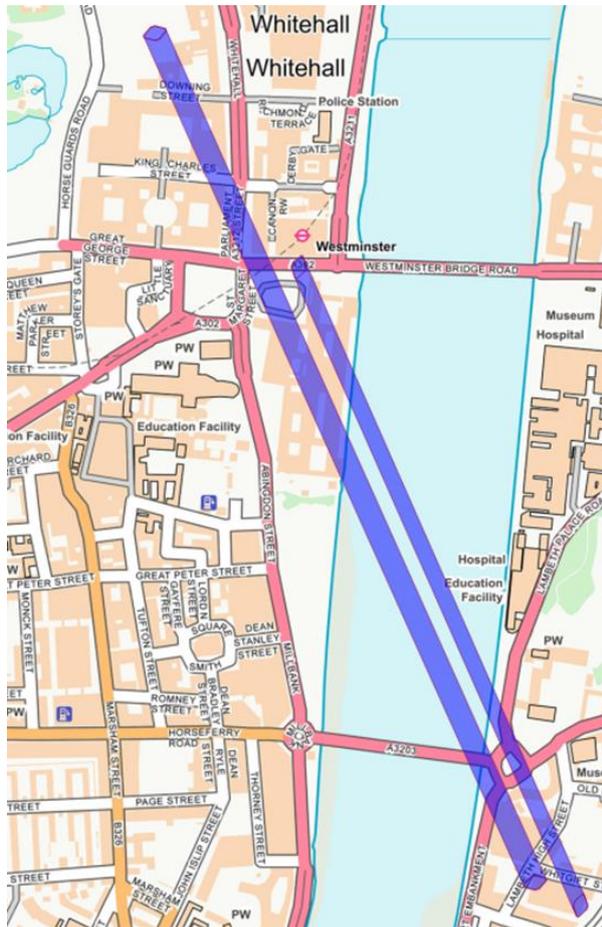
- 1.8.11. The overall magnitude of change on satellite reception for the satellite dishes mounted on Whitgift House would be classed as high. The receptor sensitivity can be classed as high as cranes and other plant could block out the signal. Therefore there could be a direct, short-term effect on reception of major negative significance prior to the implementation of mitigation measures.

OPERATIONAL PHASE

Likely Effects on Broadcast Television Reception

- 1.8.12. The highest level of the Proposed Development is a height of 86.37m AOD. The Proposed Development would cast a broadcast TV shadow, the orientation and length of which are fixed by the location and elevation of the source transmissions.
- 1.8.13. Properties located within the theoretical line of sight shadow of a transmitter could experience a reduction in TV signal strength, if receiving signals from the transmitter. The overall magnitude of change on broadcast TV reception would be classified as medium for properties immediately adjacent to the north, and north-west side of the Proposed Development. The receptor sensitivity can be classed as low because residents would be able to access digital broadcast, via other means. Therefore there would be a direct, long-term effect on reception of minor negative significance prior to the implementation of mitigation measures.
- 1.8.14. Broadcast signals diffract around buildings and structures which effectively reduces the width and length of the shadow. The broadcast signal strength is less affected as distance from the Proposed Development increases. Also if the existing signal strength is strong then reception could be maintained within areas of the broadcast shadow.
- 1.8.15. The direct line of sight broadcast shadows caused by the Proposed Development from the Crystal Palace transmitter would be to the north-north west of the Proposed Development.
- 1.8.16. Properties at greatest risk of interference are:
- Close to the boundary of the Proposed Development;
 - Close to the source of the shadow; or
 - Where a number of shadows overlap from different buildings within the Proposed Development.
- 1.8.17. Properties to the south of the Proposed Development with aerials facing east or south will be unaffected by the Proposed Development.
- 1.8.18. Properties which fall in the theoretical shadow from the Crystal Palace transmitter are shown in Figure 1.
- 1.8.19. Residential properties' external aerials were identified within the shadow area are installed on Whitgift House and aligned through the Proposed Development. The close proximity of properties in Whitgift Street suggests that some will be affected.

Figure 1 - TV signal shadow from Crystal Palace transmitter



MITIGATION

1.8.20. Mitigation could include one of, or a combination of, the following:

- Realigning end-user reception aerials in to an alternative transmitter;
- Realigning end-user aerials to ensure maximum reception strength;
- Upgrading end-user equipment (television reception aerials, cables and / or signal boosters / amplifiers);
- Relocating end-user aerials or satellite dishes on building façades or rooftops to maintain a direct line of sight; and
- Switching end users' systems to satellite, subscription cable or ADSL services.

RESIDUAL EFFECT

1.8.21. Where mitigation is applied, there would be negligible residual effect in relation to broadcast TV reception following the implementation of mitigation measures.

Likely effects on Broadcast Radio Reception

- 1.8.22. The sensitivity of reception for residents to the south of the Proposed Development is low and the magnitude of change, prior to any required mitigation, is low. There could be a direct, temporary, short-term effect on reception of Negligible to Minor negative significance prior to the implementation of mitigation measures.
- 1.8.23. Radio reception may be affected from the Alexandra Palace transmitter to areas directly south east of the Proposed Development. Radio services to the area can be received from more than one transmitter, which would enable radio reception to the end user in this area to be maintained.
- 1.8.24. Medium wave, long wave and short-wave transmissions are less affected by broadcast shadowing than broadcast TV. This is because low frequency signals can more easily diffract around buildings and hills, although some loss of signal strength can occur.
- 1.8.25. Very High Frequency (VHF) radio (FM) transmissions are more susceptible to broadcast shadowing effects because diffraction effects are less significant.

MITIGATION

- 1.8.26. Little can be done to 'design out' the effects to broadcast radio caused by the Proposed Development. Most of the mitigation measures would have to be carried out by end users, and could include one of, or a combination of, the following:
- Realigning end-user reception aerials in to an alternative transmitter; and
 - Realigning end-user aerials to ensure maximum reception strength
- 1.8.27. The receptor sensitivity can be classed as negligible because residents can access radio services from more than one transmitter which would enable radio reception to the end user to be maintained. Therefore the potential residual effects would be of negligible significance following the implementation of mitigation measures.

Likely Effects on Satellite (TV and Radio)

- 1.8.28. The main potential for effects on satellite reception associated with the Proposed Development relate to shadowing / signal blocking caused by the physical size of a building.
- 1.8.29. The sensitivity of reception for residents to the north-north west of the Proposed Development would be high and the magnitude of change, prior to any required mitigation, would also be high. Therefore, there could be long term effect on reception of Major significance prior to the implementation of mitigation measures. Using trigonometry, the theoretical shadow pattern cast for the satellite reception is indicated in Figure 2.
- 1.8.30. The impact on satellite reception for parts of Whitgift House will be severe with signals completely blocked once the constructed elevation reaches a predetermined height. Mitigation will be required to maintain services to the affected properties.

Figure 2 - Theoretical Signal shadow for Astra 2 satellite



MITIGATION

- 1.8.31. Mitigation measures could include one of, or a combination of, the following:
- Realigning satellite dishes (not available for residents located at the west end of Whitgift Street);
 - Upgrading end-user equipment;
 - Relocating end-user satellite dishes on building façades or rooftops to maintain a direct line of sight (towards the eastern end of the building);
 - Relocating satellite dishes remotely to maintain a direct line of sight; and
 - Switching end users' systems to subscription cable or ADSL services.
 - Residual Effects
- 1.8.32. Following the application of the proposed mitigation measures there would be a negligible effect in relation to satellite reception (TV and radio).

1.9. LIMITATIONS AND ASSUMPTIONS

- 1.9.1. It has been assumed that none of the transmitters will change during the period to which this report relates.
- 1.9.2. This assessment is made on the data available at the time of publication and the information available. Satellite shadows are particularly sensitive to any infringement upon the transmission path and any building size alteration will affect positively or negatively the shadow area. Additional items added to the building are likely to have a negative effect.
- 1.9.3. Whilst less critical, changes to the height or width of the building will affect the TV shadow.

- 1.9.4. This assessment highlights a worst-case scenario based on information available at the time. It is assumed that all information provided, including plans and models provided are accurate.

1.10. ASSESSMENT OF CUMULATIVE EFFECTS

IN-COMBINATION EFFECTS

- 1.10.1. Other development schemes were considered within a cumulative assessment and are listed Chapter 15 'Cumulative Effects' of the ES. Of these other schemes only the redevelopment of Parliament House, 81 Black Prince Road, in combination with the Proposed Development was considered to have an effect. Depending upon the building density or the buildings radio reflectivity, this development could give an in-combination effect to the TV signal from the Crystal Palace transmitter and reduce the potential for reflected and diffracted signals. This means there would be less opportunity for the projected shadow area from the Proposed Development to be reduced by reflection and diffraction. The consequence of this is that residences on the fringe of the shadow which may have retained reception are more likely to have the signal reduced or eliminated and may lose reception.

1.11. CONCLUSION

- 1.11.1. No receptors were found to lie within the shadow areas of broadcast TV with receiving equipment aligned to the transmitting equipment.
- 1.11.2. A combination of a desk study and site visit identified that residents surrounding the Proposed Development receive adequate broadcasts from the Crystal Palace transmitter to the south east. The future baseline is likely to change over the next 10 years with a greater uptake of satellite, cabled and internet services.
- 1.11.3. Radio transmissions are less affected by broadcast shadows from tall buildings because of their lower frequency signal, which can more easily diffract around buildings; therefore there will be a negligible impact from the Proposed Development on this type of transmission.
- 1.11.4. The impact on satellite reception for certain residents on Whitgift House will be severe with signals completely blocked once the construction reaches a predetermined height. Mitigation will be required to maintain services to the affected properties.

Table 2 - Summary of Effects for Telecommunications

Description of Significant Effects	Receptor	Significance of Effects					Summary of Mitigation / Enhancement Measures	Significance of Effects					Relevant Policy	Relevant Legislation
		Major, Moderate, Minor, Negligible	Positive / Negative	P / T	D / I	ST / MT / LT		Major, Moderate, Minor, Negligible	Positive / Negative	P / T	D / I	ST / MT / LT		
Construction														
Use of Tower Cranes / Temporary Works	Broadcast TV,	Minor	Negative	T	D	ST	<ul style="list-style-type: none"> None Recommended (short time during working hours only) 	Negligible		T	D	ST	NPPF (114)	Wireless Telegraphy Act 2006
Use of Tower Cranes / Temporary Works	Broadcast Radio,	Negligible to Minor	Negative	T	D	ST	<ul style="list-style-type: none"> None Recommended (short time during working hours only) 	Negligible		T	D	ST	NPPF (114)	Wireless Telegraphy Act 2006
Use of Tower Cranes / Temporary Works	Satellite reception to residential properties (North West of the PD)	Major	Negative	T	D	ST	<ul style="list-style-type: none"> Realigning dishes Upgrading end user equipment Relocating end user satellite dishes 	Negligible		T	D	ST	NPPF (114)	Wireless Telegraphy Act 2006
Operation														



Television Broadcast	Broadcast TV to residential properties (Whitgift House),	Minor	Negative	P	D	LT	<ul style="list-style-type: none"> ■ None proposed. Options could include, if needed ■ Realigning end-user reception aerials in to an alternative transmitter ■ Realigning end-user aerials to ensure maximum reception strength; ■ Upgrading end-user equipment (television reception aerials, cables and/or signal boosters/amplifiers); ■ Relocating end-user aerials or satellite dishes on building façades or rooftops to maintain a direct line of sight; ■ Switching to digital television transmissions (ie. Freeview); and/or ■ Switching end users' systems to satellite, 	Negligible	N/A	N/A	N/A	N/A	NPPF (114)	Wireless Telegraphy Act 2006
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Description of Significant Effects	Receptor	Significance of Effects					Summary of Mitigation / Enhancement Measures	Significance of Effects					Relevant Policy	Relevant Legislation
		Major, Moderate, Minor, Negligible	Positive / Negative	P / T	D / I	ST / MT / LT		Major, Moderate, Minor, Negligible	Positive / Negative	P / T	D / I	ST / MT / LT		
							subscription cable or ADSL services.							
Radio Broadcast	Broadcast radio to residential properties to the (South) of the PD	Negligible to Minor	Negative	P	D	LT	<ul style="list-style-type: none"> ■ Realigning end-user reception aerials in to an alternative transmitter; and ■ Realigning end-user aerials to ensure maximum reception strength; 	Negligible	N/A	N/A	N/A	N/A	NPPF (114)	Wireless Telegraphy Act 2006
Satellite Reception	Satellite reception to residential properties (Whitgift House)	Major	Negative	P	D	LT	<ul style="list-style-type: none"> ■ Realigning dishes ■ Upgrading end user equipment ■ Relocating end user satellite dishes 	Negligible	N/A	N/A	N/A	N/A	NPPF (114)	Wireless Telegraphy Act 2006

Key to table:

P / T = Permanent or Temporary, D / I = Direct or Indirect, ST / MT / LT = Short Term, Medium Term or Long Term

N/A = Not Applicable

1.12. REFERENCES

- Ref 1 HM Government (2003), Communications Act 2003
- Ref 2 HM Government (1949, 1967, 1998 and 2006), Wireless Telegraphy Act (2006)
- Ref 3 HM Government (2003), The Radio Equipment and Telecommunications Terminal Equipment (Amendment No. 2) Regulations 2003
- Ref 4 Department for Communities and Local Government (2018), National Planning Policy Framework
- Ref 5 The London Plan. The Spatial Development Strategy For London Consolidated with Alterations Since 2011. March 2016
- Ref 6 The Lambeth Local Plan 2015, Core Strategy: Development Plan Document 2025 (Adopted September 2015).
- Ref 7 BBC (no date), Transmitters' accessed from the BBC website (<http://www.bbc.co.uk/reception/transmitters/>) [Date accessed: 15/02/2017]
- Ref 8 BBC and Office of Communications (2009) The Impact of Large Buildings and Structures (including Wind Farms) on Terrestrial Television Reception http://licensing.ofcom.org.uk/radiocommunication-licences/fixed-terrestrial-links/guidance-for-licensees/wind-farms/tall_structures/. [Date accessed: 08/02/2017]
- Ref 9 Ofcom (no date), 'Information for Viewers' accessed from the Ofcom website (<http://www.ofcom.org.uk/advice/>) [Date accessed: 08/02/2017]
- Ref 10 <http://downloads.bbc.co.uk/reception/pdfs/Nationaldab>. [Date accessed: 12/05/2017]
- Ref 11 <http://www.dishpointer.com/> [Date accessed: 12/05/2017]



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