
Physical Infrastructure Market Review

Access to ducts and poles to support investment

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CONSULTATION:

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About this document

UK telecoms networks are increasingly reliant on high-capacity fibre lines. Such lines are distributed through the country within physical infrastructure specifically built for telecoms networks, such as underground ducts or telegraph poles. While it is open to any telecoms provider to construct such infrastructure, the high cost of construction can reduce the viability of investing in new networks and provides those with existing infrastructure a major advantage in making such investments.

This document is a consultation on proposals for regulation that will allow all telecoms providers access to the largest network of suitable telecoms physical infrastructure, the ducts and poles owned by BT.

Our proposals intend to promote telecoms network competition by making it cheaper and easier to build new high-capacity business and residential networks, and hence further the interests of residential and business customers. We invite stakeholders to comment on the proposals in this consultation by 1 February 2019. We expect to publish our final decision statement in spring 2019, with new measures taking effect one month after the date of that publication.

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1. Executive summary

Regulatory certainty to support long-term fibre investment

- 1.1 Ofcom’s strategy is to promote investment and competition, complemented by timely public interventions where there is no commercial case to build networks. Delivering better broadband for people and businesses can be done technically in a number of ways. In general, more fibre technology is critical: enabling better services through full-fibre networks, dedicated business connections, and providing connections to current 4G, and new 5G, mobile base stations.
- 1.2 We want to enable more fibre investment by alternative network operators and Openreach alike and to ensure that investment is not limited to meeting demand from one set of customers or another.
- 1.3 In July 2018, we set out a roadmap of actions to support competitive investment in fibre networks.¹ It had the following key elements:
- Looking at business and residential markets more holistically.
 - Introducing unrestricted duct and pole access.
 - Different regulatory approaches in different parts of the country – depending on the level of competition.
 - Longer-term certainty, with competition assessments rising from every three years currently, to at least five.
 - Incentivising Openreach to invest by providing the opportunity of higher returns on risky investments.
 - A smooth transition from older copper networks to fibre technology.
- 1.4 By 2021, we intend to implement a consolidated review of residential and business telecoms markets and physical infrastructure. Before then, we are taking certain steps to both facilitate our new consolidated review and to implement certain key elements of our strategy more quickly:
- **Physical Infrastructure Market Review:** In this document, we set out proposals to give unrestricted access to Openreach’s network of underground ‘ducts’ and telegraph poles, so companies have greater flexibility to lay fibre networks that serve residential or business customers. At present, duct and pole access is restricted to networks focusing primarily on the residential market. We intend to implement unrestricted duct access from spring 2019.
 - **Business Connectivity Market Review:** Publishing in parallel with this consultation is our consultation on the BCMR. Given the regulation in business markets will expire in March 2019, we need to refresh it before we carry out a single market review for business and residential markets holistically in 2021. This is a short review as we

¹ Ofcom, 2016. *Regulatory certainty to support investment in full-fibre broadband – Ofcom’s approach to future regulation*, www.ofcom.org.uk/.../investment-full-fibre-broadband.pdf

transition to our longer-term model for regulation, but we have included elements to ensure consistency with our longer-term direction.

1.5 Over the coming months we intend to set out the different elements of our holistic approach to regulation of business and residential markets, which will take effect from spring 2021:

- **Initial consultation on geographic markets:** by the end of the year, we will set out our initial proposals for how downstream competition assessments and regulation may vary by geography. Geographic markets will feature in our future holistic residential and business market review in 2021. As set out in July, in the markets for wholesale access to networks, we anticipate proposing that:
 - In areas that are effectively competitive, based on ultrafast networks already built, Openreach will no longer be required to provide wholesale access to its services;
 - In areas where non-Openreach full-fibre networks are being built, or are likely to be built, we impose remedies to incentivise investment while ensuring consumers remain protected until this network competition becomes effective;
 - In areas where we think non-Openreach full-fibre networks will not be built, we protect consumers while supporting investment by Openreach.
- **Initial consultation on approach to remedies:** by spring 2019, we intend to set out in more detail the approach to remedies that we think will best achieve the objectives of our holistic approach.
- **Consultation on formal proposals:** by autumn 2019 we will draw together these threads and consult on our proposed market analysis and full package of remedies, which will replace all existing regulation from spring 2021.

Table 1.1: Expected timing of market regulation

	2018/19*		2019/20				2020/21				2021/22
	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1
WLA	●  WLA										
BCMR	●  BCMR										
PIMR	●  PIMR										
Future approach to regulation of business and residential markets											
• Initial consultation on approach to geographic markets	●										
• Initial consultation on approach to remedies		●									
• Consultation on formal proposals						●					
• Statement for ongoing PIMR and downstream remedies										●	
• Integrated market review											 Continues to 2025/26

Key: ○ Statement/Consultation  Period of regulation ● Complete

*Note: Financial years, starting 1 April e.g. Q1 is April, May, June

Review of physical infrastructure markets

- 1.6 Openreach controls the networks over which phone, broadband and data connections are provided to most households and businesses in the UK. This allows the delivery of a very wide variety of services such as on demand video, conferencing, payments systems. Despite alternative networks such as Virgin Media (which covers over 50% of premises) and other local specialised networks, BT, through its ultimate ownership of the Openreach network, maintains a dominant position in most of these markets.
- 1.7 Until now, our reviews of whether a company has market power have focused on Openreach's position in specific categories of service, such as broadband and leased lines (high-speed, high-quality, point-to-point data connections that telecoms providers use for connecting offices, mobile base stations, and broadband access networks). We have intervened in order to promote competition in the retail delivery of such services.
- 1.8 While this approach has been successful in promoting competition, Openreach's control over the network providing such services gives it a privileged position in the market. Accordingly, it is able to dictate changes in the nature of the underlying network and the services delivered on it. This is reflected in the provisional significant market power findings outlined in this document.
- 1.9 We believe competition among different networks is the most effective way to spur continued investment and innovation in high-quality, full-fibre networks and other critical telecommunications services. Promoting competition is central to our efforts to stimulate investment in the UK's telecoms sector and the infrastructure the country needs. The remedies set out in this consultation further this objective.
- 1.10 The high cost of building the physical infrastructure required to deploy fibre, such as underground ducts and chambers or telegraph poles, is a barrier to large-scale network deployment by competing operators. Openreach's control of the largest and most comprehensive duct and pole network in the UK, allows it to deploy fibre more cheaply and quickly than its competitors. Improving access to Openreach's ducts and poles for rival operators can help to address this enduring advantage for Openreach in deploying fibre.
- 1.11 In the 2018 Wholesale Local Access market review, we put in place measures to ensure Openreach gives other companies access to its network of ducts and poles. While potentially halving the upfront cost of building a full-fibre network, this measure is only available to companies primarily deploying broadband and fixed telephony networks, because it was a remedy to competition problems identified in the defined WLA market. This restriction means that fibre operators using duct and pole access must demonstrate that they have a firm intention to deploy broadband – a hurdle that Openreach does not face.
- 1.12 Therefore, we propose to address the market power we have identified in physical infrastructure markets by imposing an unrestricted access remedy. We consider giving all companies greater unrestricted access to ducts and poles will allow competition to emerge more strongly in all telecoms services, both for residential and business customers and will

provide greater flexibility to operators seeking to provide new types of networks – for example fixed wireless broadband services based on 5G technology.

Our key proposals on market definition and significant market power are:

In this market review, we have assessed competition in the provision of access to existing physical infrastructure.

Our provisional view is that there is a single product market for the supply of wholesale access to telecoms physical infrastructure and that there are four distinct geographic markets, namely:

- **BT-only areas:** These are areas in the UK where there is no or limited alternative telecoms physical infrastructure to BT;
- **BT and Virgin Media areas:** These are areas where Virgin Media’s telecoms physical infrastructure is present as an alternative to BT, but there are no or limited other alternatives;
- **High Network Reach areas (excluding the Central London Area):** These are areas that have a high presence of rival leased lines infrastructure, with at least two rival networks to BT; and
- **The Central London Area:** An area of uniquely high presence of rival leased lines infrastructure.

In defining these markets we have provisionally concluded that other forms of physical infrastructure, such as sewers, electricity pylons, railways sidings, are not sufficiently close substitutes for physical infrastructure designed specifically for telecoms to be considered part of the market. While at times offering a suitable conduit for parts of a telecoms network, in general they are either more costly to break in and out of, offer more challenges to network maintenance or are not conveniently placed to deliver services to consumers.

We have provisionally concluded that BT has significant market power (SMP) in all four markets.

1.13 Specifically, we have provisionally concluded BT has SMP as it vests it with the following advantages in the construction of, and innovation in, telecoms infrastructure and the provision of downstream telecoms services:

- **Cost:** BT can deploy new fibre networks with a cost advantage of up to 50% in upfront costs;
- **Coverage and speed of provision:** BT can provide new network links more rapidly than competitors as the ubiquity of its network significantly reduces the need for the construction of new physical infrastructure;
- **Innovation:** BT’s flexible physical network provides capacity to construct new network or reconfigure networks more rapidly and at lower costs and with less risk than competitors.

1.14 It follows from this that, absent regulation, BT's SMP would give it the ability and incentive to engage in various forms of conduct that could distort downstream competition and/or harm consumers including:

- BT could refuse to supply access to its physical infrastructure, and thus continue to restrict competition in the provision of products and services in downstream markets
- BT could provide access on less favourable terms compared to those obtained by its own downstream businesses
- BT could set excessive wholesale charges for access to its physical infrastructure or engage in price squeeze behaviour

1.15 To address these concerns, we propose that BT should be required to provide unrestricted access to the entirety of its duct and pole network to all telecoms operators for any telecoms network purpose on equivalent regulated terms. Specifically, we are proposing:

Our general remedy proposals are:

- Requirement that BT provides network access on reasonable request – i.e. communications providers will have the right to request from Openreach new types of services related to ducts and poles
- Requirement to publish and operate a process for requests for new forms of network access i.e. that BT must have a clear and public process through which they consider these requests
- Requirement not to unduly discriminate – i.e. BT must offer all customers the same terms and conditions (including prices) and apply the same processes unless there is a reason to justify acting otherwise
- Requirement to publish a Reference Offer – i.e. BT must publish the terms and conditions under which any network access service using to ducts and poles is provided either to other companies or to themselves
- Requirement to notify changes to charges, terms and conditions
- Requirement to notify technical information
- Cost accounting
- Accounting separation
- Quality of Service requirements

Our specific remedy proposals are:

Obligations to provide network access in a specific form (ie our defined Physical Infrastructure Access (PIA) service) and supporting ancillary services:

- including controls on rental charges and ancillary services; and
- rules for the cost recovery of any necessary network adjustments

- 1.16 While we think BT's SMP in physical infrastructure access is likely to be a sustaining feature of the market, we consider that it would be appropriate to reconsider this market, particularly the charge controls imposed, in conjunction with our wider review of the telecoms markets in 2021. Given that the pricing obligations on the duct and pole access in the WLA market expire in March 2021, in the interest of investor certainty and market stability, we are proposing in this review to cap charges for the unrestricted duct and pole access product we are proposing at the level imposed under our 2018 Wholesale Local Access Market Review until March 2021 also.

Next steps

- 1.17 We will be consulting until 1 February 2019. We intend to reach our final position in spring 2019. We aim to implement remedies within one month from the date of our final decision statement.

2. Introduction

- 2.1 In this document we review the Physical Infrastructure markets in the UK excluding the Hull Area. As part of this, we define relevant markets, assess the market power of the undertakings present in those markets and propose obligations to impose on any undertakings with significant market power to remedy our competition concerns.
- 2.2 This introduction sets out useful contextual information for the rest of the document, including the Regulatory Framework, Legal Tests and the relevant impact assessments. We also articulate why Hull has been excluded from this market review. Finally, we set out the structure of this document.

Regulatory framework and legal tests

- 2.3 The regulatory framework for market reviews is set out in UK legislation and is transposed from five EU Directives. These Directives impose a number of obligations on relevant regulatory authorities, such as Ofcom, one of which is to carry out periodic reviews of certain electronic communications markets. The market review process involves:
- a) identifying and defining relevant markets;
 - b) assessing whether the markets are effectively competitive, which involves assessing whether any operator has SMP in any of the relevant markets; and
 - c) where SMP is found, assessing the appropriate remedies, based on the nature of the competition problems identified in the relevant markets.
- 2.4 We set out the applicable regulatory framework in Annex 5.
- 2.5 When defining markets, making SMP determinations and imposing regulatory obligations, we must satisfy various legal tests, take account of certain European Commission and BEREC publications and act in accordance with our statutory duties. We explain in Sections 4, 5 and 8 why we consider that our proposals satisfy the relevant legal tests, are consistent with our statutory duties and how we have taken account of relevant publications.

Forward look

- 2.6 Market reviews look ahead to how competitive conditions may change in the future. For the purposes of this review, we consider the period up to 2021, reflecting the characteristics of the retail, wholesale and physical infrastructure markets and the factors likely to influence their competitive development. This forward look period reflects the fact that, given that it is desirable for future telecoms competition assessments to be aligned, we intend to review Physical Infrastructure markets again alongside the new downstream access regulation we expect to introduce in 2021.
- 2.7 The prospective nature of our assessment over this period means that we are required to gather a range of evidence to assess actual market conditions as well as to produce

forecasts that we consider will appropriately reflect developments over time. This is particularly the case in our assessment of market definition and market power, and in our work underpinning the charge controls and remedies we are proposing to impose. Where appropriate, we have exercised our regulatory judgement to reach decisions on the evidence before us with a view, ultimately, to addressing the competition concerns we identify in order to further the interests of citizens and consumers in these markets.

Impact Assessment

- 2.8 The analysis presented in this document constitutes an impact assessment as defined in section 7 of the Act.
- 2.9 Impact assessments provide a valuable way of assessing the options for regulation and showing why the chosen option was preferred. They form part of best practice policy-making. This is reflected in section 7 of the Act, which means that, generally, we have to carry out impact assessments in cases where our conclusions would be likely to have a significant effect on businesses or the general public, or where there is a major change in Ofcom's activities. However, as a matter of policy Ofcom is committed to carrying out impact assessments in relation to the great majority of our policy decisions.²

Equality Impact Assessment

- 2.10 Annex 6 sets out our EIA for this market review. We are required by statute to assess the potential impact of all our functions, policies, projects and practices on equality. We have a general duty under the 2010 Equality Act to advance equality of opportunity in relation to age, disability, sex, gender reassignment, pregnancy and maternity, race, religion or belief and sexual orientation. EIAs also assist us in making sure that we are meeting our principle duty of furthering the interests of citizens and consumers regardless of their background or identity.
- 2.11 It is not apparent to us that the outcome of our review is likely to have any particular impact on race, disability and gender equality. More generally, we do not envisage the impact of any outcome to be to the detriment of any group of society. Nor do we consider it necessary to carry out separate EIAs in relation to race or sex equality or equality schemes under the Northern Ireland and Disability Equality Schemes.

Exclusion of Hull

- 2.12 We have always recognised that the markets in the Hull Area were distinct from those in the rest of the UK. The material differences in the sizes of these markets, the prospect of competitive entry and the relative cost of regulation on the incumbents (and the potential those costs are passed onto their customers) have led to differences in the nature of

² For further information about our approach to impact assessments, see Ofcom's document "Better policy-making: Ofcom's approach to impact assessment", 21 July 2005:

https://www.ofcom.org.uk/_data/assets/pdf_file/0026/57194/better_policy_making.pdf

regulation. In particular, we note that the prospects for infrastructure competition in the Hull Area, where KCOM have deployed a full fibre network, are different than for the rest of the UK. As a consequence, we have not extended this review to include an assessment of competition in the Hull Area.

Structure of the document

- 2.13 The following sets out the structure of this consultation document:
- a) Section 3 defines the relevant product and geographic markets and completes the assessment of market power in these markets;
 - b) Section 4 sets out the general remedies which we are proposing, including network access, non-discrimination, transparency, regulatory financial reporting and Quality of Service;
 - c) Section 5 outlines the specific access remedies that we are proposing, including an unrestricted Physical Infrastructure Access remedy;
 - d) Section 6 details our approach to cost recovery;
 - e) Section 7 sets out our approach to price regulation, including associated regulatory reporting requirements;
 - f) Section 8 sets out the legal tests that are relevant when imposing SMP obligations, and how our proposed remedies satisfy these tests; and
 - g) the Annexes provide information on responding to this consultation as well as background to telecoms networks, supporting evidence for our market analysis, and assessment of the impact of the specific remedy.

3. Market assessment

Introduction

- 3.1 In this section, we set out our assessment of the product and geographic market definition, and our assessment of market power, in relation to the provision of physical infrastructure access.
- 3.2 In summary, we have provisionally concluded that:
- a) there is a single product market for the **supply of wholesale access to telecoms physical infrastructure for deploying a telecoms network**;
 - b) there are four distinct geographic markets for the product market identified above, namely:³
 - **BT only areas:** areas where there is no or limited alternative telecoms physical infrastructure to BT;
 - **BT and Virgin Media areas:** areas with alternative telecoms physical infrastructure that has been deployed to support multi-service networks, but excluding High Network Reach areas – in practice, Virgin Media is expected to be the only significant operator of such infrastructure over this review period;
 - **High Network Reach areas (excluding the Central London Area):** areas outside of the Central London Area with a high presence of rival telecoms physical infrastructure deployed to support leased lines networks; and
 - **the Central London Area** – an area in Central London with uniquely high presence of rival telecoms physical infrastructure deployed to support leased lines networks.
- 3.3 Further we provisionally conclude that BT has SMP in all the relevant markets identified and we identify the competition concerns that arise as a result.

Context for analysis

- 3.4 We have found BT to have SMP in various markets related to the provision of services over fixed telecoms networks (e.g. broadband and leased lines).⁴ It follows that the underlying retail markets would not be prospectively competitive over the review period in the absence of regulation.
- 3.5 Access to physical infrastructure is the service underpinning all telecoms networks. The physical infrastructure is used to house the cables⁵ which connect the served locations and network sites, enabling end-users to communicate with each other. The market in which

³ We will not be considering the Hull area as part of this review.

⁴ We found BT to have SMP in the WLA market (2018 WLA Statement), and provisionally found BT to have SMP in various business connectivity markets (2018 BCMR Consultation).

⁵ Including associated equipment, such as splitters etc.

access to physical infrastructure is provided is the most upstream market of the retail markets in which competition problems have been found.⁶

- 3.6 In this market review, we consider whether there is a competition concern related to the provision of access to physical infrastructure. Specifically, we assess whether any undertaking enjoys a position of significant market power affording it the power to behave to an appreciable extent independently of its competitors, customers and ultimately consumers on any associated infrastructure market.

Approach to market analysis

- 3.7 In assessing whether any provider holds SMP in any given market, it is first necessary to define the relevant market. Market definition identifies product and geographic boundaries of a market. It is guided by a SSNIP⁷ framework, which asks whether a hypothetical monopolist supplying the specified set of products in the specific geography would set a price materially above a competitive level. It can be thought of as defining a set of services which are worth monopolising. This involves consideration of the competitive constraints acting on the products, and in turn, the geographic areas, under investigation.⁸
- 3.8 The SMP analysis assesses the actual position of undertakings within the defined market. SMP is defined in the Communications Act 2003 (the Act) as being equivalent to the competition law concept of dominance, that is, a position of economic strength affording a telecoms provider the power to behave to an appreciable extent independently of competitors, customers and ultimately consumers.⁹ This issue has parallels with the process of market definition itself. Asking whether a particular supplier has the ability to behave independently of competitors (SMP) is akin to concluding that it can raise prices above a competitive level, which is a similar question to that posed in the market definition exercise.

⁶ The SMP Guidelines state that having established whether absent regulatory intervention upstream, a risk of consumer harm due to a lack of competition in the retail market(s) would persist, NRAs should then identify the corresponding wholesale market(s) to assess whether they are susceptible to ex ante regulation. The Guidelines state that NRAs should start by identifying and analysing the wholesale market that is most upstream of the retail market in which said competition problems have been found. Paragraph 26, SMP Guidelines (*Guidelines on market analysis and the assessment of significant market power under the EU regulatory framework for electronic communications networks and services (2018/C 159/01)* [https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52018XC0507\(01\)&from=EN](https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52018XC0507(01)&from=EN)).

⁷ SSNIP stands for “small but significant non-transitory increase in price”.

⁸ Market definition is not a mechanical or abstract process but requires the analysis of all available evidence of past market behaviour and an overall understanding of the mechanics of a given sector. Where there is scope for interpretation of the evidence, or whether alternative approaches might be taken on the basis of the same evidence, we have used our judgement based on our experience of regulating fixed telecoms markets over successive reviews to take what we consider to be appropriate decisions on market definition.

⁹ Whilst market power is generally thought of in terms of the ability to profitably sustain prices above competitive levels, or to restrict output or quality below competitive levels, an undertaking with market power might also have the ability and incentive to harm the process of competition in other ways; for example, by weakening existing competition, raising entry barriers or slowing innovation.

Market context

Options for physical infrastructure access

- 3.9 Telecoms providers seeking to deploy a new telecoms network can build their own physical infrastructure and/or seek access to existing third party physical infrastructure to host their cables and associated equipment.
- 3.10 When looking to utilise existing third party physical infrastructure, telecoms providers potentially have a number of options available to them:
- a) BT's physical infrastructure – BT provides fixed connections to most households and businesses. The physical infrastructure that hosts these connections comprises ducts, chambers, and poles.
 - b) Other telecoms providers' physical infrastructure – other telecoms providers provide fixed connections to households and/or businesses, but their coverage varies by geography. The largest of these is Virgin Media, whose multi-service network covers around 50% of premises in the UK. The physical infrastructure comprises largely of ducts and chambers. There are other telecoms providers that operate only leased lines networks, with the underlying physical infrastructure comprising largely of ducts and chambers.
 - c) Non-telecoms physical infrastructure – telecoms networks could potentially be installed in physical infrastructure that was built for purposes other than the deployment of telecoms networks. Such physical infrastructure includes, but is not limited to, infrastructure for the supply of electricity, water, or gas, as well as for transportation, such as railways.
- 3.11 Some telecoms networks use wireless connections in place of fixed connections. These wireless connections require physical infrastructure to host radio transmission / reception equipment. For example, equipment might be hosted on dedicated masts (e.g. mobile cell site masts), municipal street furniture (e.g. lamp posts), or buildings.

Current supply

- 3.12 There is no significant supply of wholesale access to existing physical infrastructure at present. Telecoms physical infrastructure is largely only used for self-supply, with operators vertically integrated in the ownership of the infrastructure and the telecoms network(s) installed in that infrastructure.¹⁰
- 3.13 BT is required to offer access to its physical infrastructure as a result of SMP regulation most recently imposed in the 2018 WLA market review. Current volumes are relatively low,

¹⁰ Given operators are vertically integrated, they are likely to have a strong incentive to retail services over their own telecoms networks, rather than offer wholesale access to their physical infrastructure to rivals that would then compete with them downstream.

but several telecoms providers have indicated that they intend to use BT's infrastructure to deploy competing networks at scale (albeit deployment is still at an early stage).¹¹

- 3.14 Existing telecoms providers also rely on access to other telecoms physical infrastructure, and non-telecoms physical infrastructure, although the volumes are limited and represent a very small proportion of telecoms providers' total network deployment.¹² Also, in contrast to BT's infrastructure, we are not aware of any plans to make significant use of other telecoms physical infrastructure, and non-telecoms physical infrastructure.
- 3.15 The ATI Regulations¹³ allow network providers to access the physical infrastructure of telecoms providers as well as non-telecoms physical infrastructure. They are conceived as a means of facilitating commercial agreements for access on fair and reasonable terms, with Ofcom providing dispute resolution in the event agreement cannot be reached. We are not aware of any significant use of the regulations to date.

Demand for access to third party infrastructure

- 3.16 In principle, there is a range of potential access seekers, following different business models and strategies, and deploying different types of network, in terms of network architecture, number and type of premises covered, and services offered. For example:¹⁴
- a) full service providers supplying a range of downstream services to most premises within an area, including fixed broadband and leased lines;
 - b) providers supplying fixed broadband services to selected premises within an area (e.g. focussed on multi-dwelling units);
 - c) providers focused on supplying leased line networks and point-to-point leased lines to a subset of sites within an area (e.g. large business premises or mobile cell sites¹⁵); and
 - d) providers supplying backhaul or core connectivity (i.e. interexchange / trunk circuits).
- 3.17 We cannot foresee all the different ways in which networks might be deployed. Nevertheless, we expect telecoms providers to increasingly deploy networks supplying the full range of downstream services to most premises within an area. The advantages of this business model, in terms of the economies of scale and scope that can be realised, as well as the flexibility to meet changes in demand, make it likely that this will be the predominant business model for competitive network deployment in future.¹⁶

¹¹ Stakeholder [redacted] responses to question 2b of the WLA s.135 notice issued on 8 November 2017.

¹² See Annex 8 which sets out an overview of telecoms providers' current use of non-telecoms physical infrastructure.

¹³ 2016 No. 700 Electronic Communications, The Communications (Access to Infrastructure) Regulations 2016: <http://www.legislation.gov.uk/uksi/2016/700/made>

¹⁴ These examples are stylised and not intended to be exhaustive. See Annex 7 for an overview of telecoms network concepts.

¹⁵ This could include connections to existing macro cell sites, and connections to small cell sites for the provision of fixed wireless access or mobile services.

¹⁶ Retailers may continue to concentrate on the provision of certain services, however, the networks over which these services are provided are increasingly multi-service networks. Also, even where network builders initially focus on one of the approaches above, they may want the option to branch out from the initial deployment to expand into other geographic areas or products.

Market definition

Approach to market definition

- 3.18 Market definition identifies the product and geographic boundaries of a market. We inform our assessment of the market boundaries by considering the likely strength of competitive constraints from demand-side and supply-side substitution.
- 3.19 The hypothetical monopolist test is a tool we use to assess such substitution possibilities. This approach considers whether a hypothetical monopolist could profitably impose a small but significant non-transitory increase in price (a SSNIP) above the competitive level in a candidate market. If demand-side substitution to, or supply-side substitution from, alternative services is sufficient to render the price increase unprofitable, then the market should be widened to include the closest substitute services.
- 3.20 In principle, the hypothetical monopolist test also provides a framework for geographic market definition, but in the case of fixed telecoms services this will often lead to overly narrow geographic markets. In line with the EC framework and past Ofcom practice, we adopt an aggregation approach, and rather than analyse each geographic area separately, we aggregate geographic areas into areas where “the conditions of competition are similar or sufficiently homogenous”.
- 3.21 When we conduct our analysis we use the modified Greenfield approach.¹⁷ The market definition exercise is therefore conducted from a forward-looking perspective in the absence of any regulation that would result from a finding of SMP.
- 3.22 We are unable to observe actual market outcomes as there is no significant supply of wholesale access to physical infrastructure at present (infrastructure is largely only used for self-supply).¹⁸ Therefore, our market analysis uses qualitative evidence as to how such a market might operate in practice.¹⁹ In particular, we have engaged with a range of

¹⁷ See also Section 2.5 of the Explanatory Note to the 2014 EC Recommendation (European Commission, *Explanatory Note accompanying the Commission Recommendation on relevant product and service markets within the electronic communications sector*, 9 October 2014, available at <https://ec.europa.eu/digital-single-market/en/news/explanatory-note-accompanying-commission-recommendation-relevant-product-and-service-markets>).

¹⁸ In particular, in the absence of observed demand responses to changes in price (i.e. by third-party users of physical infrastructure access), we would not have a basis on which to conduct a SSNIP empirically.

¹⁹ BT is required to offer access as a result of our regulation. However, absent regulation it is likely that BT would have an incentive to act as a vertically integrated provider focused on providing retail services, rather than provide wholesale access to its infrastructure, as VM does today, and as BT did before regulation was imposed. We note the EC Staff Working paper on the SMP Guidelines: “In the absence of a merchant market and where there is consumer harm at retail level, it is justifiable and appropriate for NRAs to construct a notional market when potential demand exists.” Defining hypothetical or notional markets where currently there is only self-supply is not unfamiliar under the Framework: the WLA market did not exist beyond self-supply before the introduction of the local loop unbundling remedies. Commission Staff Working Document accompanying the Guidelines on market analysis and the assessment of significant market power under the EU regulatory framework for electronic communications networks and services, SWD(2018) 124, page 17. http://ec.europa.eu/newsroom/dae/document.cfm?doc_id=51927

potential access seekers to understand the importance of different characteristics affecting the suitability of different types of physical infrastructure.²⁰

Product market definition

Focal product

- 3.23 To apply the hypothetical monopolist test framework, we must first identify a focal product. Once we have done this, we can consider whether an expanded market, including the focal product and its closest substitute, would also be profitable to monopolise. If so, the original focal product is expanded to include the substitute products.
- 3.24 We begin with a focal product of wholesale access to telecoms physical infrastructure for deploying a telecoms network.

Our focal product includes all telecoms physical infrastructure used to host fixed elements of a network

- 3.25 The term physical infrastructure refers to all parts of a network which can be used to host elements of a network. It can include pipes, masts, ducts, inspection chambers, manholes, cabinets, buildings or entries to buildings, antenna installations, towers and poles.²¹
- 3.26 Our focal product includes only a subset of physical infrastructure:
- a) We limit the focal product to telecoms physical infrastructure, by which we mean physical infrastructure that was deployed for the purposes of supporting a telecoms network.²² That is, we exclude non-telecoms physical infrastructure.²³
 - b) We limit the focal product to physical infrastructure which is used to host fixed (or 'wired') elements of a telecoms network (e.g. ducts, poles and chambers). We exclude physical infrastructure which is used to host the radio transmission and reception equipment needed for wireless connections in a telecoms network (e.g. masts and antenna installations).²⁴
- 3.27 The focal product encompasses all telecoms physical infrastructure used to host fixed elements of a network irrespective of the current owner or operator of that infrastructure.

²⁰ In undertaking our analysis, we recognise that it is not differences in product characteristics that are important; rather, it is the manner in which these differences influence demand for the products.

²¹ This definition is based on the Broadband Cost Reduction Directive (*Directive 2014/61/EU of the European Parliament and of the Council of 15 May 2014 on measures to reduce the cost of deploying high-speed electronic communications networks*, 23 May 2014, OJEU L155/1, <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32014L0061&from=EN>).

²² This includes physical infrastructure that was built or enabled by non-telecoms entities, such as local councils, to accommodate telecoms networks.

²³ We consider below whether non-telecoms physical infrastructure would be a constraint on a hypothetical monopolist of telecoms physical infrastructure, and therefore whether the market should be expanded to include this.

²⁴ We note that physical infrastructure used to support wireless connections is largely separate from physical infrastructure used for fixed connections. We consider below whether wireless would be a constraint on a hypothetical monopolist of telecoms physical infrastructure which is intended to host fixed elements of a network, and therefore whether the market should be expanded to include this.

All telecoms physical infrastructure has in fact been used by a telecoms provider (i.e. the owner / operator) to deploy a telecoms network and is therefore potentially suitable for access seekers to deploy new telecoms networks. We recognise that there are differences between different operators' telecoms physical infrastructure which could affect their relative attractiveness to an access seeker looking to deploy a new telecoms network.²⁵ We take account of these differences when we examine each operators' position within the market in our SMP analysis.

Our focal product is the supply of infrastructure access for telecoms networks in general

- 3.28 Our focal product is for the supply of access for any type of telecoms network. As explained above, there is likely to be a range of potential access seekers, deploying different types of network. However, in general, the underlying product being supplied is the same irrespective of end use. The same physical infrastructure can be used to support different types of network and there is nothing inherent in the nature of the duct, or pole that make it suited to a particular purpose.²⁶ We think this is broadly true of all telecoms physical infrastructure.
- 3.29 We recognise that access seekers may have different preferences when deciding between physical infrastructure options, reflecting differences in their intended use. For example, a telecoms provider deploying a multi-service network to all premises is likely to place more weight on whether the infrastructure covers all premises than a telecoms provider deploying a single leased line. We have sought to reflect the different types of access seeker in our market analysis – both at the market definition stage and in our market power assessment.

Demand-side substitution

- 3.30 Demand-side substitutability is used to measure the extent to which customers are prepared to substitute other services or products for the service or product in question.
- 3.31 On the demand side, we consider both direct and indirect constraints.
- a) Direct constraints come from access seekers switching to alternative forms of access to physical infrastructure. Here the idea is that if a hypothetical monopolist increased the price for access network builders might have other choices available to them to build their networks and hence are not reliant on access to hypothetical monopolist's infrastructure. If such substitution would be sufficient to limit the ability of a wholesale operator to profitably impose a SSNIP, then an effective direct constraint exists.²⁷

²⁵ For example, differences in coverage, network architecture (tree and branch versus ring), the types of physical infrastructure used (ducts versus poles, full lead-ins versus toby boxes), the amount of available capacity, the state of repair, and the quality of information about the infrastructure that is available.

²⁶ One possible exception to this might be lead-in duct, which might only be useful for the customer specific connection. However, even here, we cannot rule out lead-in ducts being used in other ways (e.g. to connect to a FWA transmitter installed on a lamp-post).

²⁷ We consider that access seekers are only likely to switch to alternative forms of physical infrastructure at the point before they have deployed. This is because, once the network is in situ, they face significant switching costs in removing

- b) Indirect constraints come from demand for downstream services switching to services provided by alternative providers which are not reliant on the wholesale input. The idea is that if a hypothetical monopolist increased the price for access, this increase would be passed on downstream. This may result in customers downstream switching to substitute services, thus reducing demand for the wholesale input. If such substitution would be sufficient to limit the ability of a wholesale operator to profitably impose a SSNIP, then an effective indirect constraint exists.²⁸

Non-telecoms physical infrastructure as a direct constraint

- 3.32 Access to non-telecoms physical infrastructure is widely identified as being potentially useful in the deployment of telecoms networks. Access to such infrastructure might be provided commercially and, where commercial supply arrangements fail, there is the possibility that telecoms operators might seek to obtain access under the ATI legislation.
- 3.33 We have considered whether access to non-telecoms physical infrastructure would be a direct competitive constraint on a hypothetical monopolist of wholesale access to telecoms physical infrastructure for deploying a telecoms network. The relevant question here is whether a telecoms provider using telecoms physical infrastructure would switch to non-telecoms physical infrastructure in response to a SSNIP.
- 3.34 There may be some specific circumstances where using non-telecoms physical infrastructure to deploy a telecoms networks makes sense. For example, telecoms providers told us that they use canal towpaths, railway lines, sewers and local authority ducts in their network deployments. However, as set out in Annex 8, the use of this infrastructure is limited, representing a fraction of the total network deployment. The use of non-telecoms physical infrastructure is also generally limited to particular applications (long distance core/backhaul connections between two points or short connections between two points to overcome an individual obstacle).
- 3.35 However, in general we consider that non-telecoms physical infrastructure will not be an attractive alternative to infrastructure that has been specifically built for scale deployment of telecoms networks. The evidence we have gathered suggests that there are various reasons why using non-telecoms physical infrastructure at scale is either not viable, or involves relatively higher cost and operational complexity.
- a) **Lack of coverage:** Some types of non-telecoms physical infrastructure lack sufficient coverage. For example, railways do not reach end user premises and so cannot be used for deployment of access networks. Also, electricity poles, which are used in some countries to deploy telecoms networks, are not typically found in urban areas in the UK.

their existing network from one physical infrastructure and installing it in an alternative. Even if telecoms providers choose to exit the market, they would still likely be liable for the costs of removal.

²⁸ Therefore, although this is a review of the upstream market for wholesale access to physical infrastructure, the relationship between this market and downstream markets is important in our assessment. It is not necessary to formally define downstream markets to define the upstream market, provided that upstream market definition considers any indirect constraints that exist.

- b) **Lack of access points:** The deployment of cables through ducts require access points at regular intervals. This is not a typical feature of some types of non-telecoms physical infrastructure where the number of access points may be limited for safety reasons (e.g. electricity infrastructure) or for practical reasons (e.g. drinking water pipes and gas pipes). Utility ducts also tend to be laid deeper in the ground and so, even if possible, access to utility ducts is likely to be more expensive compared to telecoms physical infrastructure.
- c) **Restrictive rules of access:** Some types of non-telecoms physical infrastructure can have very restrictive rules of access. This is particularly the case with water, gas and electricity physical infrastructure, where access is provided only in accordance with strict health and safety rules and in some cases only at limited times of day.²⁹ Moreover, in the event of damage to utility infrastructure, telecoms networks would usually have lower priority than the utility provider, meaning that network operators will need to wait for the utility service to be restored before gaining access for carrying out their own repair work.³⁰
- d) **Construction incompatibilities:** Non-telecoms physical infrastructure can pose challenges to the deployment of telecoms networks, given it was not originally designed for this purpose. For example, some infrastructure, such as drinking water pipes and gas pipes, can branch at right-angles, which could present an excessive bend radius to fibre optic cables.³¹
- e) **Co-existence barriers:** Certain types of non-telecoms physical infrastructure can have a very hostile environment for network coexistence.³² For example, cables deployed in sewers need to be protected by materials that withstand sewer cleaning methods; and cables deployed in gas pipes need to be resistant to natural gas and its admixtures.³³
- f) **Lack of suitable sites for hosting technical facilities:** Non-telecoms physical infrastructure may not offer sites for hosting technical facilities which are sufficiently practical and cost-effective. For example, access seekers would likely need to build bespoke solutions, such as new buildings, in locations that may not be optimal.³⁴
- g) **Contractual complexities:** Using non-telecoms physical infrastructure may require complex contractual relationships which ultimately increase the cost of use. For example, in some cases ownership of the infrastructure is organised into sub-national monopolies, with different owners in different areas.

²⁹ For example, [3<]. Also, see [3<].

³⁰ For example, [3<].

³¹ Page 6 of Council of Europe, Deployment & Operations Committee, *White Paper: Innovative FTTH Deployment Technologies*, available at http://www.ftthcouncil.eu/documents/Publications/DandO_White_Paper_2_2014.pdf (Council of Europe White Paper)

³² [3<].

³³ Pages 6 and 10, Council of Europe White Paper.

³⁴ By contrast, telecoms physical infrastructure includes buildings which have been specifically designed for interconnect purposes (for example, exchanges in the case of BT).

- h) **Civils works required to make ready for use:** Use of most non-telecoms physical infrastructure still requires the construction or installation of ducts or conduits to host telecoms cables, involving additional time and cost compared to using purpose-built telecoms physical infrastructure.³⁵
- 3.36 These issues have been identified to varying degrees by telecoms providers in their trials using non-telecoms physical infrastructure.³⁶ These trials have generally been unsuccessful in establishing the suitability of non-telecoms physical infrastructure for scale deployment of telecoms networks. Consequently, no telecoms provider has so far used non-telecoms physical infrastructure for such purposes. Even existing builders such as CityFibre and Virgin (who have expressed interest in access to BT's duct) have preferred to build their own ducts.³⁷
- 3.37 The lack of use of non-telecoms physical infrastructure is not due to this infrastructure being unavailable. Access to non-telecoms physical infrastructure is possible in the UK through commercial deals arranged by the owners of such infrastructure or, if they fail, through the application of the ATI Regulations. While ATI legislation has drawbacks as a route for access to telecoms physical infrastructure (as discussed in Section 4) some of these drawbacks are diminished for non-telecoms physical infrastructure.
- 3.38 Therefore, we provisionally conclude that non-telecoms physical infrastructure is a poor substitute for telecoms physical infrastructure for the purposes of deploying telecoms networks, and so is outside of the relevant product market.
- 3.39 We recognise that in any network deployment, including scale network deployments, there will be cases when the network builder is confronted by an isolated issue (e.g. traversing a railway line, or overcoming issues with negotiating wayleaves) which potentially entails unusually high costs to overcome, so that a variety of solutions might be considered, including non-telecoms physical infrastructure. The preferred solution is likely to be specific to particular locations and circumstances. The use of infrastructure in this way may be a useful add-on to a scale deployment, but it is not likely to be the core element of new network build and is unlikely to be a significant consideration in the choice of which infrastructure to use elsewhere.³⁸ Therefore, we do not expect the presence of competitive tactical alternatives in some localised situations to materially impact on competitive conditions.

Wireless as a constraint

- 3.40 As explained above, some telecoms networks use wireless in place of fixed connections. This may be to enable mobile services or it may be to take advantage of lower deployment

³⁵ For example, [redacted].

³⁶ Telecoms providers that have conducted trials or at least considered the use of non-telecoms physical infrastructure include [redacted].

³⁷ [redacted].

³⁸ By analogy, supermarket shoppers may well purchase some individual items at their local corner shop, but that does not mean that local corner shops are in general strong competitors to supermarkets, because supermarkets can still offer shoppers the convenience and lower prices in buying the weekly shop.

costs. The degree to which wireless can be used, in what form, and at what level in the network architecture, depends on what services are being provided. However, for those parts of delivery where a wireless connection is used, access to physical infrastructure to house cables is obviously not required.

3.41 Wireless therefore represents a potential constraint on a hypothetical monopolist of access to telecoms physical infrastructure.³⁹ The strength of this constraint depends on two factors:

- a) the extent to which services provided using wireless connections compete with services provided using only fixed connections: if these services are a weak substitute, they will not constrain a hypothetical monopolist of access to telecoms physical infrastructure used to provide fixed connections; and
- b) the extent to which services provided using wireless connections can be supplied independently of access to the physical infrastructure which is within our focal product: given the technical constraints of wireless (for example, capacity limitations), telecoms networks will always be reliant to some degree on fixed connections and therefore access to physical infrastructure. The greater the scope for using wireless instead of fixed connections to build a network, the greater the potential constraint from wireless.

3.42 There are various forms of wireless connection, with different applications. We consider the factors above in relation to the following applications of wireless:

- a) using microwave links for mobile backhaul;
- b) using satellite to deliver broadband services; and
- c) using FWA to deliver broadband services.

Microwave links

3.43 Microwave backhaul is widely used by mobile network operators. However, in the 2018 BCMR Consultation, we identify several reasons why microwave links are a poor substitute for leased line mobile backhaul products:

- a) their ability to support only lower capacity links compared to fibre-based backhaul;
- b) their requirement for line of sight connectivity;
- c) their significantly lower transmission range than fibre-based backhaul links; and
- d) their higher risk of failure because microwave antennas are exposed.

³⁹ The constraint from wireless could take the form of a direct constraint, or an indirect constraint. The hypothetical monopolist could be directly constrained by access seekers who would have deployed fixed connections switching to using wireless connections in response to a SSNIP. Even if access seekers could not switch to using wireless connections (for example, if they have already deployed fixed networks) the hypothetical monopolist could still be indirectly constrained by customers switching downstream from products provided using the telecoms physical infrastructure to products provided using wireless.

- 3.44 We also point to the growth in mobile data usage and corresponding increase in bandwidth requirements, which will make microwave a less viable substitute compared to leased lines, as microwave is only able to support lower capacities.⁴⁰
- 3.45 Therefore, on the basis of the analysis set out in the 2018 BCMR Consultation, we provisionally conclude that microwave links do not constrain access to telecoms physical infrastructure, with the result that these services are not in the same product market.

Satellite

- 3.46 Satellite technology can be used to provide broadband services, with coverage available everywhere in the UK. However, in the 2018 WLA Statement, we concluded that satellite was not likely to be a good substitute for fixed broadband connections. We pointed to the lower speeds, poorer latency, lack of a voice service, and higher prices for satellite services. From responses to our consumer survey, we found that at most 2% of consumers said they would consider switching to satellite in response to a 10% SSNIP on fixed-lined broadband; this is lower than or equal to the proportion of consumers that said they would consider giving up internet access altogether.⁴¹
- 3.47 We recognised that there are some ongoing developments in satellite technologies, such as the development of low earth orbit satellite systems. However, given the time and cost required to deploy these systems, we do not believe that changes over the review period will lead to satellite becoming a significant constraint.
- 3.48 Therefore, on the basis of the analysis set out in the 2018 WLA Statement, we provisionally conclude that satellite does not constrain access to telecoms physical infrastructure, and so is outside of the relevant product market.

Fixed wireless access

- 3.49 In the 2018 WLA Statement, we considered the constraint from non-LoS FWA technologies and mobile broadband services designed for use at a fixed location.⁴² We observed that while in some respects, these services can be comparable to fixed line broadband, take-up of these services remains fairly low. However, we also pointed to the recent innovations that may lead to terrestrial-based wireless services becoming stronger substitutes for services provided over fixed access connections in the longer term, including:
- a) the release of higher frequency spectrum which may be suited to small cell, limited distance high bandwidth applications; and
 - b) 5G standards which may lead to the availability of higher speed data services.

⁴⁰ 2018 BCMR Consultation, Annex 9.

⁴¹ 2018 WLA Statement, paragraphs 3.90-3.94.

⁴² We also considered the constraint from Line of Sight (LoS) FWA and smartphone access over a mobile network. In relation to LoS FWA, we concluded that the number of consumers who would switch from services over copper/fibre/cable access to services over LoS FWA in response to a SSNIP is unlikely to be material. Our evidence showed that mobile access services are more likely to be used in addition to a fixed local access connection rather than as a substitute. We do not believe that this will change sufficiently over the review period to make mobile access a competitive constraint. 2018 WLA Statement, paragraphs 3.95-3.98.

- 3.50 Therefore, we recognise that it is possible that FWA services could in future become a closer substitute for fixed line broadband connections. However, to conclude it is an effective substitute now would be too speculative in our view, given the considerable uncertainty about how FWA might develop. Moreover, FWA will not be a substitute for all fixed line services e.g. it is unlikely to be considered a substitute for high bandwidth leased lines given capacity limitations.
- 3.51 Even if FWA emerges as an effective substitute for some fixed line telecoms services, current and future FWA networks are expected to rely on access to telecoms physical infrastructure. While access to certain elements of existing telecoms physical infrastructure (e.g. lead-ins) may not be required to support FWA networks, it is clear that FWA providers will still require access to infrastructure for fixed line links to cell sites or nests of cell sites.⁴³ This would limit the strength of any constraint faced by a hypothetical monopolist from FWA.
- 3.52 Based on the evidence available to us today, we conclude that FWA would not sufficiently constrain a hypothetical monopolist of access telecoms physical infrastructure intended to house fixed elements of a network over this review period. Therefore, our provisional view is that it should be excluded from the market.

Supply-side substitution

- 3.53 Supply-side substitutability is used to measure the extent to which suppliers other than those offering the product or service in question would be able to switch, or increase, production to supply the relevant products or services. In principle, a hypothetical monopolist could be prevented from raising prices by the entry of alternative suppliers who would be able rapidly and with minimal sunk investment to switch production to the supply of the products under consideration. However, potential entry to supply telecoms physical infrastructure access takes considerable time and involves incurring significant sunk costs. Therefore, we do not consider that there are supply side substitutes for access to telecoms physical infrastructure.

Our proposal for product market definition

- 3.54 We propose that the product market is the supply of wholesale access to telecoms physical infrastructure for deploying a telecoms network.

⁴³ There is currently uncertainty about what FWA deployments will look like, and the extent to which they will use fixed connections. Various network configurations are possible, with some still very reliant on access to telecoms physical infrastructure for fixed connections. For example, one possibility is that fibre is used for connections up to very distributed small cells, with 5G used to deliver only the “final drop” to the customers’ premises. In this case, the backhaul required for these cells could have a very high degree of overlap with a full fibre broadband network. Conversely, FWA might be provided over a smaller number of less distributed cells, and/or cells could be connected to the network using wireless backhaul. In this case, there would be less reliance on access to physical infrastructure, although it would still be required in parts of the network.

Geographic market definition

- 3.55 As explained above, we aim to identify areas where competitive conditions are sufficiently homogenous and which can be distinguished from neighbouring areas in which the prevailing conditions of competition are significantly different.
- 3.56 Our analysis of competitive conditions focuses on the presence of rival telecoms physical infrastructure as the main factor determining the prevailing conditions of competition in a given location. We analyse the presence of rival infrastructure across the UK and group together areas with similar levels of rival infrastructure.

Relevant geographic unit

- 3.57 In practice, our geographic market definition analysis needs to begin with the correct geographic unit, i.e. the geographic areas that we will analyse. We look at the presence of rival infrastructure in each unit, and then aggregate on this basis.
- 3.58 We consider that for this market review, postcode sectors are the appropriate geographic units for our analysis.⁴⁴
- 3.59 In selecting this unit (and rejecting alternatives), we have had regard to the SMP Guidelines which state that NRAs should ensure that the units for geographic analysis are:
- a) of an appropriate size, i.e. small enough to avoid significant variations of competitive conditions within each unit yet big enough to avoid a resource intensive and burdensome micro-analysis that could lead to a fragmentation of markets;
 - b) able to reflect the network structure of all relevant providers; and
 - c) have clear and stable boundaries over time.
- 3.60 The SMP Guidelines state that the geographic unit should be small enough to avoid significant variations of competitive conditions within each unit. In the 2018 BCMR Consultation, we identify areas where multiple alternative infrastructure operators are present, which could exhibit competitive conditions distinct from other areas. Using postcode sectors allows us to identify and analyse these smaller areas in the same or similar way they are considered in the BCMR.
- 3.61 There could be a case for a larger geographic unit, such as whole towns or cities, on the basis that we consider it likely that access seekers deploying at scale are likely to prefer the use of a single operator's infrastructure across a deployment area where possible, and therefore choose between individual operators' infrastructure at a relatively aggregated level.⁴⁵ This would imply that the conditions of competition are determined over an area considerably larger than a postcode sector, pointing to a relatively large geographic unit.

⁴⁴ First half of postcode plus one digit of second half, e.g. SE1 9... There are around 10,000 postcode sectors in the UK.

⁴⁵ This is because choosing between different operators' infrastructure at a granular level would involve combining physical infrastructure from different operators, which would add significantly to the cost and complexity of network deployment. We discuss this further in Annex 8. As explained in paragraph 3.39 above, we recognise that there will be cases when the

- 3.62 The SMP Guidelines state that the geographic unit should be big enough to avoid a resource intensive and burdensome micro-analysis that could lead to a fragmentation of markets. We think a postcode sector is the most granular level analysis can be performed without becoming resource intensive and burdensome (indeed, we use this approach in the BCMR).
- 3.63 The SMP Guidelines state that the geographic unit should be able to reflect the network structure of all relevant providers. As discussed above, there is likely to be a range of potential access seekers deploying different types of network. We think that the network structure of relevant operators can be mapped onto postcode sectors, although we are mindful of the risk in relation to fragmentation of markets.
- 3.64 Finally, in line with the SMP Guidelines, postcode sectors have clear and stable boundaries over time.
- 3.65 Based on the considerations above, we think postcode sectors are the most appropriate geographic unit for our analysis. In particular, as this is the first time we have analysed this market we consider that a more detailed analysis is warranted so as to be certain that factors that might give rise to significant regional variations in competitive conditions might be recognised. However, in future it may be appropriate to move to analysis based on a larger geographic unit, which is also likely to be more consistent with regulatory boundaries in downstream services.

Aggregation of geographic units into geographic markets

- 3.66 Having identified the relevant geographic unit, we now look to aggregate these into areas where the conditions of competition are similar or sufficiently homogenous.
- 3.67 Given there is limited actual wholesale supply in the market we are defining, several of the metrics we might usually consider do not help us.⁴⁶ We consider that the presence of rival telecoms physical infrastructure is likely to be a key determinant of competitive conditions. Therefore, we group postcodes sectors according to how competitive conditions might vary, based on the extent of alternative telecoms physical infrastructure in each geographic unit. We also take into account our analysis of competitive conditions in downstream markets.

network builder is confronted by an isolated issue so that a variety of solutions might be considered. The use of infrastructure in this way may be a useful add-on to a scale deployment, but it is not likely to be the core element of new network build and is unlikely to be a significant consideration in the choice of which infrastructure to use elsewhere. Therefore, we do not expect the presence of competitive tactical alternatives in some localised situations to materially impact on competitive conditions.

⁴⁶ A set of indicators relevant to the assessment of competitive conditions are provided in the Explanatory Memorandum to the 2014 EC Recommendation: (i) the number and size of potential competitors, (ii) distribution of market shares, (iii) price differences or variation in prices across geographies, and (iv) other related competitive aspects, which may result from relevant competitive variations between geographic areas (nature of demand, differences in commercial offers, marketing strategies etc.).

- 3.68 For the purposes of our analysis, we assume that BT is present in each geographic unit and covers all premises (except for the Hull area).⁴⁷ In identifying the presence of alternative telecoms physical infrastructure operators, we recognise that there are different metrics by which we can measure presence⁴⁸, and there is a continuum making it difficult to draw a clear line. The SMP Guidelines call for a practical and appropriate approach, bearing in mind the purpose of market definition, which is not an end in itself but a means to undertaking an analysis of competitive conditions, for the purposes of determining whether ex-ante regulation is required or not.⁴⁹ With this in mind, we have adopted the following approach to measuring presence.
- 3.69 As explained above, alternative operators of telecoms physical infrastructure are, like BT, vertically integrated in the ownership of the infrastructure and the networks installed in that infrastructure. Broadly speaking, these operators currently fall into two categories: (i) multi-service network operators providing both mass market broadband services and leased lines; and (ii) network operators focussed on providing leased lines. Differences in the economics of supplying these products mean that we have previously measured the presence of broadband operators and leased lines operators differently. The higher price for leased lines means that historically it has been economic to build short network extensions to supply individual leased lines in a way that is not economic for individual broadband connections, where new premises will only be connected if the network passes directly outside the property. To reflect this, we have previously used a buffer distance⁵⁰ when measuring presence of leased lines networks, but used premises passed⁵¹ when measuring presence of broadband networks.⁵²
- 3.70 In our present analysis, we want to take account of both categories of alternative telecoms physical infrastructure operator.⁵³ To do so, we measure presence of these operators by looking at both broadband coverage (using the premises passed metric) and leased lines coverage (using a buffer distance), as proxies for where physical infrastructure might be available. Specifically:
- a) In relation to broadband coverage, we consider that if an operator can serve more than [30-80]% of premises in a postcode sector, then that postcode sector is

⁴⁷ We recognise BT does not cover all premises, but exceptions are minor and therefore we do not consider this to be material. The Hull area is outside the scope of this market review.

⁴⁸ For example, proportion of premises passed; proportion of premises with an infrastructure connection into the premises (or to the wall of the premises); contiguity of coverage.

⁴⁹ EC Staff Working paper on the SMP Guidelines, page 21.

⁵⁰ The buffer distance is a measure of how close rival networks need to be to a business site so that it would be economic for them to extend their network to serve that customer. For example, see 2018 BCMR Consultation.

⁵¹ For example, see 2018 WBA Statement.

⁵² Both distances are based on industry practice in how close a network needs to be to serve a new customer.

⁵³ Although both categories of operator rely on the same types of physical infrastructure (e.g. ducts), their suitability may differ depending on the nature of the network an access seeker is looking to deploy (e.g. due to differences in the proximity of the infrastructure to premises). Although we expect the two categories to converge in the future, we do not expect significant changes over the period covered by this market review.

covered.⁵⁴ In practice, our assessment focusses on Virgin Media as the only significant broadband network operator with physical infrastructure that could be reused.⁵⁵

- b) In relation to leased lines coverage, we consider an operator to be present if it can serve more than 65% of large business sites in a postcode sector, within 50m of the customer location. This is the same approach as used in the 2018 BCMR Consultation.⁵⁶

3.71 Having identified the presence of alternative infrastructure operators in each postcode sector, we initially group together postcode sectors in the following way:

- a) First, consistent with our approach in the 2018 BCMR Consultation, we group together those postcode sectors with a high presence of alternative infrastructure used to supply leased lines i.e. postcode sectors with at least two alternative networks that can reach more than 65% of large business sites within 50m of the customer location.⁵⁷ We refer to these as “High Network Reach” (HNR) areas. In the 2018 BCMR Consultation, we consider competitive conditions in the provision of leased lines in these areas are likely to differ from areas with fewer rival networks. Although in this review we are considering competitive conditions upstream (and therefore take a wider view than just the provision of leased lines), we have decided to adopt a conservative approach and separate out these areas. We do this on the basis that at least some types of access seeker (e.g. those deploying networks focussed on the provision of leased lines) may have multiple alternatives to BT in these areas.⁵⁸ We consider below whether competitive conditions within the HNR areas are homogenous.
- b) Second, we split the remaining postcode sectors based on whether alternative infrastructure used to supply broadband services (typically alongside leased lines) is present i.e. whether Virgin Media passes more than [redacted]% [30-80]% of premises.⁵⁹ We do this on the basis that competitive conditions are likely to be different between these two areas. In areas where Virgin Media is not present, access seekers will have

⁵⁴ [redacted]

⁵⁵ CityFibre has only recently started deploying mass market broadband services; infrastructure used to support its existing leased lines services is captured below. TalkTalk has deployed mass market broadband services in York, but this is deployed using narrow trenching, limiting the amount of physical infrastructure that can be reused by a third party. Hyperoptic has deployed mass market broadband services, but [redacted]. Other operators which have deployed physical infrastructure are currently too small to affect the analysis (e.g. B4RN, Gigaclear, IFNL). See Annex 8.

⁵⁶ We describe this approach in detail in the 2018 BCMR Consultation, Section 5. Figure A8.3 in Annex 8 shows the postcode sectors with coverage by leased lines networks other than BT.

⁵⁷ Infrastructure may also be used to provide broadband services (i.e. over a multi-service network) in these postcode sectors. We consider this in our SMP assessment. We note that in the majority ([redacted]%) of these postcode sectors, no alternative operator passes more than [redacted]% [30-80]% of premises. Therefore, we consider that focussing on the metric of large business sites within 50m of the customer location is appropriate to measure presence for these postcode sectors.

⁵⁸ In the 2018 BCMR Consultation, we also separately identify areas where there is on average one rival network within the buffer distance (“BT+1” areas). We do not propose to do this here on the basis that we find in the BCMR that there is very limited rival infrastructure used to supply leased lines in the BT+1 areas. See paragraphs 6.48-6.53 of the 2018 BCMR Consultation. We note that in [redacted]% of the BT+1 areas identified in the BCMR, the rival is Virgin Media, and [redacted]% of these areas overlap with the areas where Virgin Media is present; therefore, we analyse the [redacted] of these areas already.

⁵⁹ There are a very small number of postcode sectors ([redacted]) where one of [redacted] is able to serve over [redacted]% [30-80]% of premises, and Virgin Media is not. We treat these postcode sectors as BT only areas, although this has no effect on our provisional conclusions. [redacted].

little or no choice and are mainly dependent on BT, whereas in areas where Virgin Media is present, BT faces competition from at least one alternative telecoms physical infrastructure operator.⁶⁰

3.72 In the 2018 BCMR Consultation, we examine the HNR areas in more detail to assess whether competitive conditions are sufficiently homogenous to consider all of them as a single geographic market or whether some of them constitute distinct geographic markets. We find that:

- a) there is significantly greater presence of rival networks in the CLA than in other HNR areas; and
- b) the distinction between other HNR areas (including between HNR areas in the top six metropolitan areas and HNR areas in the rest of the UK) is less clear-cut.⁶¹

3.73 Based on this analysis, we propose to treat the CLA as a separate geographic market, distinct from all other HNR areas.⁶² We do not propose to distinguish between HNR areas in the rest of the UK, preferring instead to consider these together as a single geographic market.⁶³

Our proposal for geographic market definition

3.74 We provisionally define the following relevant geographic markets:

- a) **BT only areas** - areas where there is no or limited alternative telecoms physical infrastructure to BT;
- b) **areas with alternative telecoms physical infrastructure that has been deployed to support multi-service networks, but excluding High Network Reach areas** – in practice, Virgin Media is expected to be the only significant operator of such infrastructure over this review period, therefore we refer to these areas as '**BT and Virgin Media**' areas;
- c) **High Network Reach areas excluding the Central London Area** – areas outside of the Central London Area with a high presence of rival telecoms physical infrastructure deployed to support leased lines networks; and

⁶⁰ In the 2018 WLA market review, we concluded that there was a single geographic market outside the Hull area, on the basis that competitive conditions would not be different due to a common pricing constraint. However, we do not think such a constraint necessarily exists at the upstream level. 2018 WLA Statement, Volume 1, paragraphs 3.154-3.170.

⁶¹ In some metrics (number of rival networks), they appear reasonably similar to each other and to other HNR areas in the rest of the UK, though there are some differences (proximity of those rival networks to businesses), and some differences between different metropolitan areas.

⁶² We define the CLA in the same way as it is defined in the 2018 BCMR Consultation.

⁶³ In the BCMR, we have decided to adopt a conservative approach and to treat each of the metropolitan areas as a separate geographic market, distinct from both the CLA and from HNR areas in the rest of the UK. However, ultimately the BCMR found that while the six Metro Areas do appear to be more competitive than the HNR Areas in the rest of the UK, BT's competitive advantage of being duct connected would hinder rival's ability to compete effectively. We find this particularly pertinent for our physical infrastructure market assessment. We would not expect our conclusions to change if we followed the BCMR approach to defining HNR Metro Areas.

d) **the Central London Area** – an area in Central London with a uniquely high presence of rival telecoms physical infrastructure deployed to support leased lines networks.

3.75 Table 3.1 below shows the proportion of postcode sectors and premises falling within each geographic market.

Table 3.1: Postcode sectors and premises falling within each geographic market

	BT only areas	BT and Virgin Media areas	HNR areas excluding the CLA	The CLA	Total (UK excluding Hull area)
Relevant postcode sectors	5,958	3,418	318	276	9,970
% of total postcode sectors in UK excluding Hull area	60%	34%	3%	3%	100%
Premises in relevant postcode sectors	15,672,531	13,068,867	436,283	186,690	29,364,371
% of total in UK excluding Hull area	53%	45%	1%	1%	100%
Large business sites in relevant postcode sectors	101,447	67,117	7,182	4,724	180,470
% of total in UK excluding Hull area	56%	37%	4%	3%	100%

Source: Ofcom

3.76 In general, we think grouping areas into these categories is a reasonable level of detail for the purposes of undertaking an analysis of competitive conditions. We recognise that within each of the geographic markets where alternative operators are present, there are differences in coverage. For example, Virgin Media will have coverage of [30] [30]% in some postcode sectors, but 90% in others. We address this in our SMP assessment.

Application of the three-criteria test

3.77 Under the European Framework, in considering whether it is appropriate to impose regulation in electronic communications markets, NRAs must begin by defining relevant markets appropriate to national circumstances in accordance with the principles of competition law and taking utmost account of the 2014 EC Recommendation.⁶⁴ This recommendation lists a number of markets in which it is presumed that *ex ante* regulatory

⁶⁴ European Commission, *Commission Recommendation of 9 October 2014 on relevant product and service markets within the electronic communications sector susceptible to ex ante regulation in accordance with Directive 2002/21/EC of the European Parliament and of the Council on a common regulatory framework for electronic communications networks and services (2014/710/EU)*, 11 October 2014, OJEU L 295/79, <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32014H0710&from=EN> (2014 EC Recommendation), page 6.

obligations may be warranted, taking into account the particular features of those markets. However, the 2014 EC Recommendation also sets out the following three criteria which must be applied if NRAs wish to identify markets other than those listed:⁶⁵

- a) the presence of high and non-transitory barriers to entry. These may be of a structural, legal or regulatory nature;
- b) a market structure which does not tend towards effective competition within the relevant time horizon. The application of this criterion involves examining the state of competition behind the barriers to entry; and
- c) the insufficiency of competition law alone to adequately address the market failure(s) concerned.

3.78 The markets we propose to find for the supply of wholesale access to telecoms physical infrastructure for deploying a telecoms network are not on the list of recommended markets. Therefore, it is necessary to apply these three criteria.⁶⁶

High and non-transitory barriers to entry

3.79 The markets we are considering exhibit high and non-transitory barriers to entry. In particular, there are significant structural barriers to entry as entry would require very high levels of investment to install new physical infrastructure and would take considerable time. Moreover, the costs associated with such investment are, to a large degree, likely to be sunk.

3.80 We have previously acknowledged these barriers to entry⁶⁷ and we see no clear evidence that underlying conditions are likely to change over this review period. We are not aware of any prospective entrants to the physical infrastructure market that would impose a significant competitive constraint on BT.⁶⁸

A market structure which does not tend towards effective competition

3.81 We consider that the markets we have identified will not, in the absence of regulation, tend towards effective competition in the foreseeable future.

3.82 BT's market power is significant and entrenched. The extent of BT's market power has not materially changed over time. In this market review, we propose that all of BT's physical infrastructure should be regulated.

⁶⁵ The three-criteria test is used to assess whether markets are susceptible to *ex ante* regulation.

⁶⁶ We note more generally that there appears to be growing momentum within the EU behind the inclusion of this market on the list of wholesale markets susceptible to *ex ante* regulation. For example, BEREC is currently preparing a report on access to physical infrastructure in the context of market analyses. The report will analyse the potential to isolate this market in order to conduct market analyses that would be methodologically robust and consistent with the regulatory framework.

⁶⁷ See, for example, 2018 WLA Statement, Volume 1, paragraphs 4.56-4.62 and 2018 BCMR Consultation, paragraphs 6.59-6.69.

⁶⁸ We discuss this further in our assessment of SMP.

3.83 We are also not aware of factors that may materially reduce the barriers to entry we have identified. For instance, we have not identified any technological developments that will change competitive conditions in this market in the foreseeable future.

Insufficiency of competition law

3.84 We set out later in this section our provisional conclusion that BT has SMP in the markets we have identified, and our main competition concerns arising from this. Specifically:

- a) BT could refuse to supply access to its physical infrastructure, and thus continue to restrict competition in the provision of products and services in downstream markets;
- b) BT could provide access on less favourable terms compared to those obtained by its own downstream businesses; and
- c) BT could set excessive wholesale charges for access to its physical infrastructure or engage in price squeeze behaviour.

3.85 Competition law, in particular the rules prohibiting the abuse of a dominant position, is an important part of the legal framework that BT needs to comply with. Given its position of SMP (which equates to the competition law concept of dominance) BT has a special responsibility not to allow its actions on the market (where conditions of competition are weak) to distort or impair competition.

3.86 However, we consider that national and EU competition law remedies would be insufficient to address the identified competition concerns on their own. First, competition law would focus on tackling the abuse of a dominant position, and would not be as effective as *ex ante* regulation in promoting downstream competition. Second, regulation must remain effective for the review period, and *ex ante* regulation better enables us to do this as it can be tailored to the particular circumstances in the market and services provided. Third, competition law does not provide enough regulatory certainty, which itself can undermine downstream competition where there is upstream SMP – and regulatory certainty is important in encouraging long-term investment in competing networks. In contrast, a benefit of *ex ante* regulation is that all industry stakeholders are clear in advance on the regulation that will apply. Fourth, *ex ante* regulation can facilitate more timely enforcement due to the greater certainty and specificity provided.

3.87 On that basis, while competition law enforcement may be used in appropriate circumstances, we do not consider that it would be sufficient to rely on it alone and that *ex ante* regulation is required.

Conclusion on application of the three-criteria test

3.88 We consider that the physical infrastructure markets which we are proposing meet the three-criteria test and therefore are susceptible to *ex ante* regulation.

SMP assessment

3.89 Having determined that the markets we propose to define are susceptible to *ex ante* regulation, we now consider whether there exists SMP in each of the markets we have defined i.e. the supply of wholesale access to telecoms physical infrastructure for deploying a telecoms network in each of our geographic markets.

Approach to assessing SMP

3.90 In our SMP analysis, we are ultimately interested in whether any telecoms provider has the ability to set excessive prices, price squeeze, or distort competition either by refusing access to its physical infrastructure or providing access on less favourable terms and conditions compared to those obtained by its own downstream businesses.

3.91 BT is the owner of the only ubiquitous telecoms physical infrastructure in the UK,⁶⁹ and BT has been found to have SMP in fixed telecoms markets in the UK excluding Hull. Our assessment focuses on whether BT has SMP in respect of the supply of wholesale access to its physical infrastructure. As we provisionally conclude that BT has SMP individually, we do not go on to consider the market position of other operators.

3.92 Given there is no significant supply of wholesale access to physical infrastructure at present (infrastructure is largely only used for self-supply), our approach to the SMP assessment is as follows:⁷⁰

- a) First, we consider BT's position in downstream markets as evidence of the indirect competition BT faces from rival networks that self-supply and as the starting point for evaluating BT's position in the upstream market.
- b) We then evaluate the extent to which BT would face direct competitive constraints in the upstream markets that would prevent it from being able to behave to an appreciable extent independently of competitors, customers and ultimately consumers. In doing so, we evaluate the extent to which BT would face competition from other operators offering access to their own infrastructure. While we do not expect that such operators would be likely in practice to compete in this way, we nevertheless examine how far rival infrastructure would be regarded as an effective alternative to BT on the hypothetical assumption that competitors did offer access to their infrastructure.

⁶⁹ Annex 8 shows how different operators of telecoms physical infrastructure compare in terms of coverage.

⁷⁰ The SMP Guidelines set out a non-exhaustive list of criteria to be considered in an SMP assessment, and state that a dominant position may derive from a combination of these criteria, which taken separately may not be determinative. Evidence on the most relevant SMP criteria should be considered in the round, and findings should not be based on assessment of a single criterion. As there is no significant active market in the supply of wholesale access to physical infrastructure (infrastructure is largely only used for self-supply), some of the indicators we might normally consider cannot be used.

BT's position downstream

- 3.93 BT is vertically integrated in the ownership of its infrastructure and the supply of telecoms services provided over networks installed in that infrastructure. BT maintains a dominant position in most or all key wholesale services, and absent downstream regulation would be likely to be dominant in all retail markets. As physical infrastructure is a key input into the supply of downstream services, we consider that SMP findings in downstream markets are indicative of BT also having SMP in the upstream market.⁷¹
- 3.94 Indeed, this is the basis on which Duct and Pole Access (DPA) as an SMP remedy has been imposed to date. For example, although our 2018 WLA market review focused on BT's position in the downstream market for the supply of wholesale local access at a fixed location, we imposed DPA as a remedy to address our competition concerns in that market. This was on the basis that the high cost of building physical infrastructure is a barrier to large-scale competitive network deployment.⁷² Where other NRAs throughout Europe have imposed DPA as a remedy, this has been imposed as a remedy to downstream SMP findings on similar reasoning. Although we are now defining markets for access to physical infrastructure, we consider that BT's position in downstream markets is a key part of the evidence base informing our assessment of its position in these upstream markets.
- 3.95 In the 2018 WLA Statement, we found BT to have SMP, reflecting among other factors:⁷³
- a) BT's very high and stable share of the WLA market in the UK excluding the Hull Area (around 80%). Although we defined a national market, we found that BT's share of local access connections within the Virgin Media footprint is at least 60%, and, if this were the relevant geographic market, such a share would be consistent with a presumption of dominance.⁷⁴
 - b) BT's returns being comfortably above benchmark cost of capital, despite a number of WLA services being charge controlled, consistent with enduring market power.⁷⁵
 - c) The high barriers to entry in the WLA market, arising particularly from the scale of the investment needed to do so, and the fact that a large part of the costs incurred are sunk.⁷⁶

⁷¹ In theory, SMP downstream could reflect advantages that BT has downstream. This is why we go on to evaluate the extent to which BT faces competitive constraints in the hypothetical upstream market.

⁷² Although we have not imposed duct access as a remedy in past reviews of the business connectivity markets, it was one of the remedies we considered.

⁷³ 2018 WLA Statement, Volume 1, Section 4.

⁷⁴ We noted that BT's share of local access connections currently supporting active superfast broadband services is currently around 40% in the area covered by Virgin Media's cable network. However, we considered BT's current share to be a poor proxy for its underlying market power, and projected this to increase to around 50% by 2020/21 as customers migrated to superfast broadband. 2018 WLA Statement, Volume 1, paragraphs 4.34-4.40.

⁷⁵ Absent regulation, we would expect BT's returns to be higher still. 2018 WLA Statement, Volume 1, paragraphs 4.45-4.55.

⁷⁶ 2018 WLA Statement, Volume 1, paragraphs 4.56-4.62.

- 3.96 In our 2018 BCMR Consultation, we have provisionally found BT to have SMP in the supply of Contemporary Interface (CI) Access services in all geographic areas except the CLA, and in the supply of CI interexchange connectivity, with the exception of BT exchanges where two or more operators are present. These provisional SMP findings flow directly from BT's control of the only ubiquitous telecoms network, and the advantage that provides in terms of being closer to customer sites.⁷⁷
- 3.97 Our analysis of BT's position in the 2018 WLA Statement and 2018 BCMR Consultation highlights BT's control and ownership of its physical infrastructure as a key source of its market power. This indicates that BT also has market power in the market for wholesale access to telecoms physical infrastructure.⁷⁸
- 3.98 In considering BT's position in downstream markets, we are mindful that the telecoms sector is dynamic, with continually evolving demand and supply, driven by innovation in technology and end-user services and changes in consumer preferences. Access to physical infrastructure is a key enabler of this innovation – both in terms of the deployment of new telecoms networks as well as innovation in existing networks. Therefore, BT's underlying market power upstream, linked to its ownership and control of its physical infrastructure, is likely to extend beyond the current use of its infrastructure to deliver the particular downstream services we see today.

BT's position upstream

- 3.99 We now evaluate the extent to which BT faces competitive constraints in the upstream markets, by assessing the following:
- a) **Strength of competition from existing competitors:** we consider whether BT would be constrained at the upstream level by switching to alternative telecoms physical infrastructure already in the market (the largest of which is Virgin Media).
 - b) We consider the **scope for entry and expansion** by new or existing operators deploying new telecoms physical infrastructure, including whether access seekers can enter the market themselves by self-supplying infrastructure.
 - c) We also consider whether telecoms providers buying access to physical infrastructure have **countervailing buyer power** i.e. a strong negotiating position which weakens BT's potential market power.
- 3.100 In relation to the strength of competition from existing competitors, as we are concerned with a wholesale product, there are two sets of constraints on BT to consider. First, there may be direct constraints which would arise from the ability of access seekers to substitute to alternative providers of telecoms physical infrastructure. Second, there may be indirect

⁷⁷ 2018 BCMR Consultation, Sections 6 and 7.

⁷⁸ We explain below why the provisional finding of no SMP in the CLA for CI Access services does not necessarily imply a constraint on BT's ability to exert SMP in the upstream market for physical infrastructure access.

constraints which would arise from the ability of downstream customers to substitute to services provided over networks that use alternative infrastructure.⁷⁹

- 3.101 Our analysis of BT's market position downstream, summarised above, suggests that the indirect constraint on BT's position upstream is generally weak.⁸⁰
- 3.102 In relation to the direct constraint, for BT to be constrained in this way requires that the owners of alternative telecoms physical infrastructure are willing to provide access to third parties. In reality, most, including Virgin Media, do not currently offer commercial infrastructure access for the deployment of telecoms networks at scale, and are not expected to do so in future.⁸¹ Although access is possible under the ATI Regulations, there are a number of drawbacks to relying on this as a route for access to telecoms physical infrastructure (as discussed in Section 4). If access seekers cannot secure effective access to alternative telecoms physical infrastructure, they cannot credibly threaten to switch, meaning that there is no direct constraint on BT in practice. In this case, the only constraint on BT from existing competitors would come from the indirect constraint.⁸²
- 3.103 Even if, hypothetically, it was the case that other infrastructure owners were to offer access in competition with BT (either commercially or under the ATI Regulations), we do not consider that this would offer an effective direct constraint. In what follows, we evaluate the strength of competition from existing upstream competitors by considering whether access seekers deploying telecoms networks in the future would consider alternative infrastructures sufficiently substitutable for BT.

Strength of competition from existing upstream competitors

- 3.104 As there is no significant active market in the supply of wholesale access to telecoms physical infrastructure (infrastructure is largely only used for self-supply), we do not focus on market shares as a criterion to determine whether BT has SMP.⁸³ Instead, to assess the strength of the potential constraint imposed by existing alternative infrastructures, we assess the characteristics of alternative networks which we understand are relevant for demand from access seekers.⁸⁴

⁷⁹ For example, a rise in the price of infrastructure access which is passed through to the price of retail services provided using BT's network switch could result in customers switching to retail services provided by Virgin Media.

⁸⁰ We note that the level of indirect constraint imposed will depend on the extent of pass-through of access charges to retail prices, and the fact that the impact of duct access charges on retail prices is likely to be diluted as they make up a relatively small proportion of the cost stack associated with the provision of retail services. This in turn is likely to dampen any response by retail consumers.

⁸¹ See Annex 8.

⁸² Limiting our analysis to the strength of the indirect constraint would have parallels with our approach to market definition in the 2018 WLA market review, where we consider Virgin Media as an indirect constraint on BT. See 2018 WLA Statement, Volume 1, paragraphs 3.60-3.69.

⁸³ BT's shares of current downstream services are the best available market share indicators of BT's position upstream.

⁸⁴ As explained above, we expect telecoms providers to increasingly deploy networks supplying the full range of downstream services to most premises within an area. However, we recognise that there are likely to be a range of potential access seekers. Our analysis considers competitiveness from these different perspectives, and takes an overall view of the potential effectiveness of alternatives to BT.

Ubiquity is an advantage for access seekers

- 3.105 Before considering the constraint from access seekers switching to alternative providers in each geographic market, we make a general observation that access seekers are likely to prefer physical infrastructure that is more ubiquitous.
- 3.106 Telecoms networks are built to connect to premises, or sites. Therefore, the ability to connect to as many residential premises or business sites within a deployment area as possible, and the flexibility and certainty to be able to provide any connection in the future quickly and without significant additional connection cost, is important to access seekers.
- 3.107 A ubiquitous telecoms physical infrastructure (both in terms of the overall coverage it provides, and the contiguity of that coverage within a particular area) provides this. Combining multiple infrastructures to provide the same level of connectivity introduces additional cost, time and operational complexity, which is likely to lead access seekers to prefer use of a single telecoms physical infrastructure where possible.⁸⁵
- 3.108 As such, access seekers are likely to value a more ubiquitous physical infrastructure network wherever they are seeking to deploy.⁸⁶ Therefore, this is a key characteristic we consider in assessing the strength of constraint imposed by alternative telecoms physical infrastructure operators on BT.

Strength of competition from existing alternative infrastructures in BT only areas

- 3.109 In BT only areas BT's infrastructure passes virtually every premises and there is limited alternative infrastructure. The second largest infrastructure provider in these areas is Virgin Media, which passes only [X]% of all premises.⁸⁷ As such, BT is unlikely to face constraints from existing alternative infrastructures in BT-only areas.

Strength of competition from existing alternative infrastructures in BT and Virgin Media areas

- 3.110 In these areas, there is one significant operator of alternative infrastructure, Virgin Media. We consider below whether Virgin Media would act as an effective competitor to BT, under the hypothetical assumption that it offered access to third party access seekers.

BT has the most ubiquitous network in these areas

- 3.111 BT's infrastructure passes virtually every premises in these areas ([X]%). Virgin Media's average coverage is materially less than 100% ([X]%). Virgin Media's coverage of premises is also lower than BT's in every postcode sector in these areas. This partly reflects our choice of geographic unit and the way in which we have defined these areas (i.e. if Virgin

⁸⁵ This is explained in more detail in Annex 8. We recognise that, for various reasons, access seekers could not deploy an access network exclusively using a single infrastructure, and so do combine self-build and alternative infrastructures in some cases. However, in general, this is based on necessity, rather than preference.

⁸⁶ [X] has noted that, even though it wishes to use its own infrastructure, Openreach's infrastructure would be an exception in part due to its ubiquity [X].

⁸⁷ See Annex 8, for more detail on the coverage statistics set out in this section.

Media can serve more than [X]% [30-80]% of premises in a postcode sector, then that postcode sector is considered covered and is included in its entirety).⁸⁸

- 3.112 There are some postcode sectors where Virgin Media has higher coverage of premises, passing over 90% of premises in around [X]% of the postcode sectors in the BT and Virgin Media areas. Although we identify the postcode sector as the most appropriate geographic unit for our market definition analysis, we recognise that access seekers are likely to deploy over a larger geographic area. Therefore, we consider the degree to which postcode sectors with high coverage are contiguous.⁸⁹
- 3.113 The majority of the areas where Virgin Media has contiguous high coverage (i.e. areas where Virgin Media passes over 90% of premises in contiguous postcode sectors) are relatively small.⁹⁰
- 3.114 [X] where Virgin Media has contiguous high coverage which contains more than [X] premises: [X]. However:
- a) [X] Virgin Media's coverage of large business sites is lower than its coverage of all premises;⁹¹ and
 - b) [X] unlikely to correspond to a desired deployment area and would not provide as much flexibility to expand, relative to the BT infrastructure.
- 3.115 More generally, we note that Virgin Media's average coverage of large business sites (within a buffer distance of 50m) in the BT and Virgin Media areas is lower than its coverage of all premises (in terms of premises passed).⁹²

BT's lead-in infrastructure is likely to offer cost and capacity advantages

- 3.116 Even where both BT and Virgin Media cover the same individual premises, BT's infrastructure offers advantages in terms of connecting premises. This is a result of the different mix of infrastructure types used to host the final connection between the customer premises and the network (the "lead-in"). Lead-ins can be carried overhead, in the form of dropwires attached to premises from poles, or underground, either through ducts or directly buried in the ground. Our understanding of the mix of connection types in

⁸⁸ Although Virgin Media's average coverage would be higher if we used a smaller geographic unit, we do not consider this to be an appropriate unit for our analysis for the reasons set out earlier. In the extreme, Virgin Media's coverage would be 100% if we used individual premises as the geographic unit to precisely map onto its footprint. However, this highlights the point that any telecoms provider who wants to deploy a network that is capable of serving all premises in a given area could not do so using Virgin Media's infrastructure.

⁸⁹ This analysis is set out in Annex 8.

⁹⁰ [X]% of premises in postcode sectors where Virgin Media has over 90% coverage are in clusters of contiguous postcodes with less than [X] premises.

⁹¹ [X]% of large businesses and mobile sites are within 50m of Virgin Media's network [X].

⁹² [X]% of large businesses and mobile sites are within 50m of Virgin Media's network in the BT and Virgin Media area. In postcode sectors where Virgin Media covers more than 90% of all premises, it is within 50m of [X]% of large business sites and mobile sites.

BT and Virgin Media's network is shown in the table below (with further detail set out in Annex 8).

Table 3.2: BT and Virgin lead-in types

	BT	Virgin Media
Overhead (poles)	50%	0%
Underground - ducted	45%	[X]%
Underground – direct buried	5% ⁹³	[X]%

Source: 2018 WLA Statement, Volume 3, page 29, fn 64; and Virgin Media response dated 7 September 2018 to questions 7 and 8 of the s135 information request dated 30 August 2018.

3.117 The different mix of lead-ins means that connecting customers using BT's infrastructure is likely to be cheaper and quicker than using Virgin Media's. This is because overhead lead-ins are likely to be cheaper and quicker to use than underground lead-ins,⁹⁴ and fully ducted lead-ins are cheaper to use than direct-buried lead-ins (which require the access seeker to deploy their own lead-in infrastructure).

3.118 Our own illustrative estimates suggest that the average overall cost of lead-ins is likely to be around [X]% higher using the Virgin Media network than using BT's, based on conservative assumptions.⁹⁵ We therefore consider that on the whole BT is likely to have a more attractive mix of infrastructure for connecting premises.

Therefore, we do not consider Virgin Media to be an effective constraint on BT in these areas

3.119 We consider that the ubiquity of BT's telecoms physical infrastructure is a significant advantage that suggests that its infrastructure is more attractive to access seekers than Virgin Media's. Even where both BT and Virgin Media's infrastructure cover the same individual premises, BT is likely to have a more attractive mix of lead-ins, which further implies that its physical infrastructure is more attractive to access seekers than Virgin Media's.⁹⁶ We therefore provisionally conclude that even if hypothetically Virgin Media

⁹³ BT estimates that around 5% of total lead-ins are likely to directly buried, although the exact number is unknown. This varies by region, between 1% in London and 8-10% in Southern England. See 2018 WLA Statement, Volume 3, page 29, fn 64.

⁹⁴ We understand from discussions with a number of stakeholders that overhead lead-ins are likely to be cheaper than underground lead-ins.

⁹⁵ This calculation assumes that the cost of overhead lead-ins is the same as the cost of ducted lead-ins, rather than less, which is likely to understate the cost advantage of using BT's network. See Annex 8.

⁹⁶ We have considered whether there are any differences in other relevant features of the two network infrastructures. However, we have not identified any evidence to suggest that Virgin Media's physical infrastructure offers advantages that would be sufficiently material to overcome the advantages of BT's network, in terms of its ubiquity, the contiguity of that ubiquity, and its more attractive mix of its lead-in infrastructure. We discuss these in Annex 8.

was to actively compete with BT in offering infrastructure access, it would not offer an effective competitive constraint.⁹⁷

We do not consider other telecoms physical infrastructure to be effective constraint on BT in these areas

3.120 Alternative telecoms physical infrastructure (including ducts owned by local authorities) is limited to small pockets within postcode sectors, and so is unlikely to be able to support deployment of a telecoms networks at scale. Given the costs of breaking in and out of duct, such alternatives are only likely to be suitable for tactical use.⁹⁸ Further, ducts owned by local authorities are often leased to third parties and their reuse offered on terms or charges that are unattractive to access seekers.⁹⁹ Therefore, we do not consider that BT would be competitively constrained by other telecoms physical infrastructure in these areas.

Strength of competition from existing alternative infrastructures in HNR areas

3.121 HNR areas have a high presence of alternative infrastructure used to supply leased lines - at least two alternative networks that can reach more than 65% of large business sites within 50m of the customer location. However, the proportion of all premises passed by these alternative infrastructures is much lower (indeed it is lower than the average in BT and Virgin Media areas). For example, while Virgin Media is [X] within 50m of [X]% of large business sites, it covers a smaller proportion ([X]%) of all premises in these areas.¹⁰⁰ As such, an access seeker wishing to deploy a multi-service network targeting all premises will not find these alternative infrastructures as attractive as BT's infrastructure, given the costs associated with combining multiple infrastructures.¹⁰¹ This implies that BT would not be constrained by the presence of a large number of rival infrastructures that are oriented towards leased lines.

3.122 In addition, while there may be greater competition for providing connections to large business and mobile sites, as a greater number of alternative infrastructures will be present on aggregate, we still consider that access seekers would not find these alternative infrastructures as attractive as using BT's infrastructure to build a network for such purposes:

- a) In the majority of cases each individual alternative infrastructure is only present in a subset of that HNR postcode sector, compared to the ubiquity of coverage that BT

⁹⁷ We also note that there is no evidence that providers have sought access to Virgin Media's infrastructure, even though access is available under the ATI Regulations (we have never received a dispute about failure to negotiate in good faith).

⁹⁸ As explained in paragraph 3.39 above, we do not expect the presence of competitive tactical alternatives in some localised situations to materially impact on competitive conditions.

⁹⁹ [X].

¹⁰⁰ [X].

¹⁰¹ We note that large business sites represent a small proportion of the total number of premises in the HNR areas overall (see Table 3.1 above).

offers.¹⁰² As such access seekers would need to combine multiple infrastructures to connect throughout the area, breaking in and out on multiple occasions. This is likely to significantly increase the cost of deployment relative to using only BT's network infrastructure.

- b) Even where an alternative infrastructure is present (i.e. within 50m), on average it is still further from the end customer than BT's network - the nearest rival is on average 22m away, which is likely to give a significant cost advantage (around £2,668) to using BT's network,¹⁰³ and existing providers rarely build when not connected even at these small distances. In addition to these cost advantages, where BT is already duct connected, the convenience from being able to readily connect to a customer is likely to be a significant advantage when seeking to attract downstream leased line customers.¹⁰⁴
- c) A typical deployment area is larger than an individual HNR. As such, the limited availability of alternative infrastructures in the areas surrounding the HNR means that access seekers using alternative infrastructures inside a HNR area will need to combine this with a different infrastructure outside the area, adding time, cost and operational complexity.

3.123 As such, we provisionally conclude that BT will not face effective competitive constraints from alternative infrastructures in HNRs.

Strength of competition from existing alternative infrastructures in CLA

3.124 There is significantly more alternative infrastructure present in the CLA, both at an aggregate level, and in terms of the proportion of the CLA that any individual infrastructure operator covers, than in the other geographic markets.¹⁰⁵

3.125 However, as in the HNR areas, we note that the alternative infrastructure is oriented towards leased lines, and the proportion of all premises passed by alternative infrastructure operators is low. No single alternative infrastructure passes more than 30% of all premises in the CLA.¹⁰⁶ In contrast, BT passes nearly all ([<])% premises in the CLA. Therefore, as in HNRs, an access seeker wishing to deploy a multi-service network will not find these alternative networks as attractive as BT's, implying that BT would not be

¹⁰² There is no single alternative infrastructure that is within 50m of every large business or mobile site in the postcode sector in 51% of postcode sectors in the HNR areas where at least one large business or mobile site is located.

¹⁰³ See 2018 BCMR Consultation Table A12.20. Analysis of distance to rival telecoms infrastructure providers' networks is described in Annex 12 of the 2018 BCMR Consultation. Calculations of infrastructure costs for different proximity scenarios are summarised in Figure 6.1 and set out in Annex 10 of the 2018 BCMR Consultation.

¹⁰⁴ See 2018 BCMR Consultation, paragraph 6.28.

¹⁰⁵ The most extensive leased lines network in the CLA is operated by [<], which is within 50m of [<]% of large business and mobile sites. It is therefore likely that an access seeker could provide coverage to the majority of business sites using a single infrastructure which is not BT.

¹⁰⁶ The highest coverage of all premises by an alternative infrastructure within the CLA is [<], which covers [<]% of all premises.

constrained by the presence of a large number of rival infrastructures that are oriented towards leased lines.¹⁰⁷

3.126 Even with respect to connections to large business and mobile sites, our 2018 BCMR Consultation noted some evidence which suggested that leased lines connections provided using BT's infrastructure could still have some competitive advantage:¹⁰⁸

- a) On average the closest alternative network is 16m away. While the advantage this confers is less than in other areas, use of BT infrastructure is likely to have a significant cost advantage (around £2,234 for 16m dig).¹⁰⁹ Further, the closest alternative network will not be the same for each business. For access seekers wishing to minimise the number of alternative infrastructures used, the relevant metric is the average proximity to businesses of a single infrastructure within the area. This distance will be greater than the 16m to the closest alternative network, and so use of BT's infrastructure is likely to have a greater cost advantage.
- b) While the proportion of on-duct connected new provisions is much higher for alternative infrastructures in the CLA (76%) than in other areas, it is still less than BT's (82%). Where BT is duct connected, and others are not, it will have some competitive advantage (albeit lower than in the other geographic markets).
- c) Where rivals were not duct connected, they chose to build for only 11% of connections, preferring to purchase off-net outside their existing network reach.

3.127 In the 2018 BCMR Consultation, we consider that the greater density of rival leased line infrastructures is sufficient to outweigh these factors and so provisionally conclude that BT does not have SMP in the supply of CI Access services. However, in this review, we are assessing BT's position upstream in respect of a wider range of access seekers, including those deploying multi-service networks. This additional consideration points to the constraint on BT upstream from alternative infrastructure operators in the CLA being weaker than the constraint identified in the BCMR.¹¹⁰

3.128 Further, while the CLA is likely to be a large enough deployment area to support an economically viable deployment, it is unlikely that an access seeker would wish to deploy solely within the CLA. As such, access seekers are likely to consider the availability of alternative infrastructures in other parts of their deployment area, which may reduce the attractiveness of using alternative infrastructures in the CLA.¹¹¹

¹⁰⁷ We note that large business sites represent a small proportion of the total number of premises in the CLA areas overall (see Table 3.1 above).

¹⁰⁸ 2018 BCMR Consultation, paragraph 6.113.

¹⁰⁹ Based on analysis for the 2018 BCMR Consultation. Analysis of distance to rival telecoms infrastructure providers' networks is described in Annex 12 of the 2018 BCMR Consultation. Calculations of infrastructure costs for different proximity scenarios are summarised in Figure 6.1 and set out in Annex 10 of the 2018 BCMR Consultation.

¹¹⁰ This is particularly so given we expect telecoms providers to increasingly deploy networks supplying the full range of downstream services to most premises within an area.

¹¹¹ In addition, on the supply-side, BT may be able to leverage market power from areas outside the CLA, where access seekers will be reliant on it, to more competitive areas, through using volume discounts, or through refusing to tying access to infrastructure in uncompetitive areas to purchases of access in competitive areas.

- 3.129 As such, we provisionally conclude that BT will not face competitive constraints from alternative infrastructures in the CLA.

Scope for entry and expansion

- 3.130 We consider that in general there are high entry barriers to constructing new physical infrastructure. This is because entry would require very high levels of investment, a large proportion of which are likely to be sunk costs, and a considerable period of time to rollout.¹¹²
- 3.131 We recognise that deployment of some new infrastructure is expected, and so, in some circumstances, the barriers to deploying new physical infrastructure can be overcome.¹¹³ We also acknowledge that such barriers to entry have not prevented the building of extensive infrastructure for the provision of leased lines to large business and mobile sites in the CLA.¹¹⁴
- 3.132 However, such entry is in general either geographically limited in scale or limited in scope to providing connections to large business and mobile sites and/or relies on use of BT's infrastructure via the existing DPA remedy in place as a result of regulation in the WLA market. Where entry would not have taken place absent regulation, it is not a relevant constraint under a modified greenfield approach. In addition, much new entry is direct-buried or micro-trenched, so is not suitable for sharing. Such entry could therefore only exert an indirect constraint, as it cannot be used by access seekers.
- 3.133 In fact, the nature of the expected entry is a likely reflection of the high barriers facing potential entrants. As such, we do not consider that the threat of entry or expansion by new or existing operators would effectively constrain BT.

Countervailing buyer power

- 3.134 In general, purchasers may have a degree of buyer power where they purchase a significant and material proportion of a supplier's total volumes and have a credible threat to switch to an alternative supplier or to self-supply, to an extent that would materially impact the supplier's profitability.
- 3.135 However, there are currently no such purchasers of wholesale access to BT's physical infrastructure. It may be possible that a buyer could (after a considerable period of time) purchase a significant enough volume of duct access to potentially exert countervailing buyer power. However, BT's involvement downstream weakens its incentive to offer supply on such a scale, as this would intensify downstream competition. In addition, we do not consider that such a buyer would be able to exert a credible threat to switch sufficient

¹¹² See 2018 WLA Statement, Volume 1, pages 81-82, 4.56-4.62, and 2018 BCMR Consultation, Section 6.

¹¹³ This entry is described in more detail in Annex 8.

¹¹⁴ See 2018 BCMR Consultation, Section 6, paragraphs 6.116-6.117.

volumes away from BT, due to the large switching costs and service disruption involved in removing and re-deploying existing infrastructure.

- 3.136 Purchasers of significant volumes of BT's downstream active products could potentially exert a degree of countervailing buyer power by threatening to switch their purchases of active products to alternative infrastructure providers.¹¹⁵ However, in the 2018 WLA market review and the 2018 BCMR Consultation, we have not identified any buyer able to exert sufficient countervailing buyer power to constrain BT in downstream markets.¹¹⁶
- 3.137 Therefore, we provisionally conclude that BT is unlikely to face significant countervailing buyer power in each of the geographic markets we have identified.

External constraints

- 3.138 There may be services which, while not part of the market, could be seen by some consumers as substitutes, and so could exert an external constraint on the ability to exercise market power. By their nature, such constraints tend to be relatively weak but they can, either when taken together and/or in combination with competition in the market, constrain a firm's ability to exercise market power.
- 3.139 However, taking account of the reasoning set out in our market definition analysis, we do not believe that external constraints will add sufficiently to the competitive pressure bearing on BT in the current review period.

Provisional conclusions on SMP

Market for the supply of wholesale access to telecoms physical infrastructure for deploying a telecoms network in BT only areas

- 3.140 We provisionally conclude that BT has SMP in this market, based on the following:
- a) BT's dominant downstream position, which is evidence of the market power it derives from control and ownership of its physical infrastructure;
 - b) BT is the only significant operator in the market – so there are no direct or indirect constraints;
 - c) The high entry barriers to constructing new physical infrastructure;
 - d) The absence of significant countervailing buyer power.

Market for the supply of wholesale access to telecoms physical infrastructure for deploying a telecoms network in BT and Virgin Media areas excluding High Network Reach areas

- 3.141 We provisionally conclude that BT has SMP in the market, based on the following:

¹¹⁵ For example, Sky and/or TalkTalk purchase significant volumes of MPF / GEA products, and MNOs purchase significant volumes of CI Access circuits.

¹¹⁶ 2018 WLA Statement, Volume 1, paragraphs 4.63-4.67 and 2018 BCMR Consultation paragraphs 6.42, 6.75 and 6.95-6.99.

- a) BT's dominant downstream position, which is evidence of the market power it derives from control and ownership of its physical infrastructure, and weak indirect constraints;
- b) The ubiquity of BT's duct access infrastructure and the more attractive mix of lead in infrastructure, which suggests that the direct constraints from existing competitors would be unlikely to be a sufficient discipline on BT, even if hypothetically rivals were to supply access to their infrastructure;
- c) The high entry barriers to constructing new physical infrastructure; and
- d) The absence of significant countervailing buyer power.

Market for the supply of wholesale access to telecoms physical infrastructure for deploying a telecoms network in High Network Reach areas

3.142 We provisionally conclude that BT has SMP in the market, based on the following:

- a) BT's dominant downstream position, which is evidence of the market power it derives from control and ownership of its physical infrastructure, and weak indirect constraints;
- b) Alternative infrastructures cover only a subset of these areas and are oriented towards leased lines, so cannot provide the ability to *connect* to all premises that BT's ubiquitous network provides, suggesting that the direct constraints from existing competitors are unlikely to be a sufficient *discipline* on BT, even if hypothetically rivals were to supply access to their infrastructure;
- c) The high entry barriers to constructing new physical infrastructure; and
- d) The absence of significant countervailing buyer power.

Market for the supply of wholesale access to telecoms physical infrastructure for deploying a telecoms network in the CLA

3.143 We provisionally conclude that BT has SMP in this market, based on the following:

- a) Coverage of residential premises by alternative infrastructures is low, and so cannot provide the ability to connect to all premises that BT's ubiquitous network provides, suggesting *that* the direct constraints from existing competitors are unlikely to be a sufficient discipline on BT, even if hypothetically rivals were to supply access to their infrastructure;
- b) Access seekers are unlikely to build deployments wholly within the CLA. As such, the alternatives available outside the CLA will be relevant to access seekers, given the costs associated with using multiple infrastructures;
- c) The high entry barriers to constructing new physical infrastructure for the deployment of a multi-service network; and
- d) The absence of significant countervailing buyer power.

Competition concerns arising from BT SMP in access to telecommunications physical infrastructure

- 3.144 Having provisionally concluded that BT has SMP in the supply of wholesale access to telecoms physical infrastructure for deploying a telecoms network, we now consider the consequences of this SMP.
- 3.145 Physical infrastructure is a key enabler of the provision of telecoms services – both in terms of the deployment of new telecoms networks as well as innovation in existing networks. This is because the civil engineering works associated with the deployment of physical infrastructure represent a sizeable proportion of the cost and time to deploy, and therefore a barrier to new network investment on a large scale.
- 3.146 As a vertically integrated provider, BT's access to its physical infrastructure provides it with a significant commercial advantage in the provision of all telecoms services in the UK (excluding the Hull area). This advantage can be seen in the enduring SMP BT continues to maintain in key downstream wholesale services (and would enjoy in the retail services absent regulation).
- 3.147 Access to ubiquitous telecoms physical infrastructure appears to offer BT the advantage of the lowest cost delivery path for new network installation and network upgrade, such that it is able to sustain and, in some cases, reinforce its SMP in downstream services. Specifically, it vests BT with the following advantages in the construction of, and innovation in, telecoms physical infrastructure and the provision of downstream telecoms services:
- Cost: BT can deploy new fibre networks with a cost advantage of up to 50% in upfront costs;
 - Coverage and speed of provision: BT can provide new network links more rapidly than competitors as the ubiquity of its network significantly reduce the need for the construction of new physical infrastructure; and
 - Innovation: BT's flexible physical network provides capacity to construct new network or reconfigure networks more rapidly and at lower costs and with less risk than competitors.
- 3.148 These advantages are demonstrated by the ease with which BT has dictated the changes in the nature of the underlying network and the services delivered on it (for example, in the move from ADSL to fibre-based broadband), with the competing access companies required to align their services strategy to that of BT's (while also experiencing a reversal of retail market share in BT's favour).
- 3.149 In the absence of regulation there are behaviours that BT could engage in that could distort downstream competition:
- a) BT could refuse to supply access to its physical infrastructure, and thus continue to restrict competition in the provision of products and services in downstream markets;

- b) BT could provide access on less favourable terms compared to those obtained by its own downstream businesses; and
- c) BT could set excessive wholesale charges for access to its physical infrastructure or engage in price squeeze behaviour.

3.150 In our next sections we consider how to address these competition concerns.

Consultation question(s)

Question 3.1: Do you agree with our proposed market definitions? Please set out your reasons and supporting evidence for your response.

Question 3.2: Do you agree with our proposed SMP assessment? Please set out your reasons and supporting evidence for your response.

4. General remedies

Introduction

- 4.1 In this section, we set out the general remedies that we propose to impose on BT, designed to address the competition concerns that we have provisionally identified in our market analysis associated with a finding of SMP (see Section 3).
- 4.2 The proposed general remedies would require BT to provide network access to services in the Physical Infrastructure markets, and support and make effective that network access. We summarise the proposed suite of general remedies in Table 4.1 below.

Table 4.1: Summary of proposed general remedies on BT in the Physical Infrastructure markets

Proposed remedies
Requirement to provide network access on reasonable request
Requirement to publish and operate a process for requests for new forms of network access
Requirement not to unduly discriminate
Requirement to publish a Reference Offer
Requirement to notify changes to charges, terms and conditions
Requirement to notify technical information
Cost accounting
Accounting separation
Quality of Service requirements

- 4.3 In addition to the general remedies set out in this section, we propose to apply a specific form of access remedy, Physical Infrastructure Access (PIA), as explained in Section 5. We also propose to apply pricing remedies to PIA, as explained in sections 6 and 7.
- 4.4 We start our analysis below by setting out why we consider that the ATI Regulations do not address our competition concerns. Then, for each general remedy, we set out our proposals and our reasoning.

The ATI Regulations do not address our competition concerns

- 4.1 The ATI Regulations set out measures intended to reduce the cost of deploying high-speed electronic communications networks. These measures include sharing the physical

infrastructure of telecoms network providers as well as physical infrastructure across different sectors (such as electricity, water and transport services) and certain associated obligations (such as access to information). Among others, the ATI Regulations provide for a network provider to access such infrastructure on fair and reasonable terms for the purposes of deploying elements of a high-speed electronic communications network.

4.2 We consider that the ATI Regulations do not address our competition concerns sufficiently such that it would be unnecessary to impose an obligation to provide network access on BT. We have identified several main reasons for this:

- a) The ATI Regulations are conceived as a means of facilitating commercial agreements for access on fair and reasonable terms, with Ofcom providing dispute resolution in the event no agreement can be reached. A general network access obligation provides greater certainty in that it forms a basis for the specification of the nature and terms of access to BT's physical infrastructure up front. We consider that such certainty is essential to ensure a network access remedy is effective
- b) There are areas where the rights and obligations established in the ATI Regulations may not be sufficient to encourage network deployment at scale based on access to BT's physical infrastructure. For example:
 - Although the ATI Regulations enable telecoms providers to obtain existing information held about the infrastructure, the regulations do not require information to be provided in a format other than that in which that information is already held.
 - While there may be some scope to develop operational processes or detailed timescales through the access terms and conditions that might be imposed under the ATI Regulations, the extent to which these could be specified is likely to be much more limited than under the telecoms *ex ante* framework.
 - There is significant uncertainty as to the prices that will be charged for access under the ATI Regulations, both generally and as between different instances where they apply. Under the ATI Regulations, there is a range of factors which we must consider in resolving a dispute and the precise approach will depend on the specific circumstances of each dispute.
 - The ATI Regulations do not include any explicit obligations to prevent vertically integrated infrastructure operators from discriminating between their own downstream businesses and rival access seekers when providing access.
- c) Although access seekers can refer disputes to us under the ATI Regulations, the lack of certainty in an *ex post* dispute resolution process is likely to act as a barrier to relying on this as the means to access BT's physical infrastructure to deploy a network at scale.

d) We also observe that if the ATI Regulations were an effective means of accessing BT's physical infrastructure, we would expect to have seen greater use of the ATI Regulations as a basis for accessing BT's physical infrastructure.¹¹⁷

4.3 Therefore, we do not consider that the ATI Regulations address effectively the competition concerns arising from BT's market power. We consider that achieving effective competition in the context of the Physical Infrastructure markets requires robust SMP regulation and a general network access obligation would provide the necessary foundation for such regulation.

Requirement to provide network access on reasonable request

Our proposals

4.4 For each of the markets in which we have provisionally found BT to have SMP, we are proposing that BT must offer network access where a third party reasonably requests it, and must do so on fair and reasonable terms and conditions, as soon as it is reasonably practicable. We believe that this obligation should include a requirement for BT to provide network access at fair and reasonable charges where no maximum charges or basis of charges obligation applies. We also propose that this obligation include the power for Ofcom to make directions in order that we can secure the supply of services and, where appropriate, fairness and reasonableness in the terms and conditions (and in certain circumstances, also the charges) of network access.

Our reasoning

4.5 We consider that our proposed network access obligation is appropriate and proportionate in relation to BT's market power in each of the Physical Infrastructure markets.

4.6 The level of investment required by a third party to replicate BT's physical infrastructure network, in order to build a downstream access network (and the time it would take to complete this), is a significant barrier to entry. An obligation requiring BT to provide network access where a third party reasonably requests it is therefore vital to promoting and protecting competition in downstream markets.¹¹⁸ Without such a requirement, due to its vertical integration and significant market power, BT would have the incentive and the ability to refuse access at the physical infrastructure level or provide access only on less favourable terms, thereby benefiting its own retail divisions and hindering downstream competition, ultimately against the interests of consumers.

4.7 We consider that for each market there is risk that BT might fix or maintain some or all of its prices for access to physical infrastructure at an excessively high level, or impose a price

¹¹⁷ We discuss this in detail in paragraphs 2.11-2.19, Section 2, Volume 3, 2018 WLA Statement.

¹¹⁸ A requirement to provide network access also includes any ancillary services as may be reasonably necessary for a third party to use the network access being provided.

- squeeze in relation to such access so as to have adverse consequences for end-users of public electronic communications services.
- 4.8 To address the risk of excessive pricing, we are proposing to impose on BT a maximum charges obligation for our proposed PIA obligation and certain related services, and a basis of charges obligation for all other related services (see Section 7). To the extent that a maximum charges or a basis of charges obligation applies, we do not consider that the residual risk of a price squeeze is sufficient to warrant further regulation. This is because a control on wholesale charges means BT could only impose a price squeeze by lowering the retail price, which would cut into its profits, rather than by raising the wholesale price.
- 4.9 In relation to all other forms of network access, i.e. new forms of network access requested under the general network access condition, we consider that the maximum charges and/or basis of charges obligation on PIA will act as an anchor to limit the risk of excessive pricing risk on other forms of network access. Nevertheless, given BT's vertical integration and significant market power, we consider that there is a risk of a price squeeze in relation to such access.
- 4.10 Consequently, we propose to impose in each market an obligation for charges for network access to be fair and reasonable, except to the extent that a maximum charges or a basis of charges obligation applies. Our general position is that we would interpret this fair and reasonable obligation to mean BT should not set prices that result in a price squeeze under *ex post* competition law. This provision would enable us to intervene more quickly where charges are not fair and reasonable than if we relied solely on *ex post* competition law.
- 4.11 In addition, we believe it is appropriate for this proposed condition to include the power for Ofcom to make directions in order to secure the supply of services, and where appropriate, fairness and reasonableness in the terms and conditions (and possibly charges) of network access. Therefore, we propose that the condition for each market includes a requirement for BT to comply with any such direction(s).¹¹⁹
- 4.12 In addition to the direction making power, we propose to include provision in the relevant SMP conditions to allow for Ofcom to consent to exemptions from the network access obligation in appropriate circumstances. One of the main areas of focus in the Strategic Review was reform of Openreach to provide it greater independence. We said this could, among other things, facilitate new models of investment in the industry, such as co-investment (i.e. where Openreach co-invests with telecoms providers other than BT). If we received a request from Openreach for an exemption, we would consider the specifics of that request at that time, and would consult on any specific exemptions to which we proposed to agree.¹²⁰
- 4.13 We consider that the proposed requirement in each market for BT to provide network access on reasonable request is proportionate in that it is targeted at addressing the

¹¹⁹ Therefore, any contravention of a direction would constitute a contravention of the condition itself, and would be subject to enforcement action (under sections 94-104 of the Act).

¹²⁰ Equivalent provision has also been made in the proposed conditions on specific network access, EOI and no undue discrimination.

market power that we have provisionally found BT holds in the Physical Infrastructure markets. We do not consider that a different type of obligation or a more limited network access requirement would be sufficient to address the competition concerns we have identified. We also propose that charges should be fair and reasonable only where there is no maximum charges or basis of charges obligation, such that there is no unnecessary overlap of regulation.

- 4.14 In order to implement these proposals, we propose to set the SMP condition (Condition 1) published at Annex 10. Section 87(1) of the Communications Act 2003 (the Act), provides that, where we have made a determination that a person (here BT) has SMP in an identified services market, we shall set such SMP conditions authorised by that section as we consider appropriate to apply to that dominant provider in respect of the relevant network or relevant facilities and apply those conditions to that person.
- 4.15 Section 87(3) of the Act authorises Ofcom to set SMP services conditions requiring the dominant provider to give such entitlements as Ofcom may from time to time direct as respects the provisions of network access to the relevant network, the use of the relevant network and the availability of relevant facilities.
- 4.16 In determining which conditions are authorised by section 87(3) to set in a particular case, we must take into account, in particular, the factors set out in section 87(4). In this case we consider that: the economic viability of building alternative access networks means that in the absence of regulatory intervention, it is unlikely there will be significant network build by telecoms providers other than BT; we consider that it is feasible for BT to provide the physical infrastructure access we are proposing to require and we have designed the scope of our proposed requirement with this in mind; we do not consider that our proposal will risk undermining BT's investment made by BT in its network; and we consider that our proposed network access requirement is an important element of securing economically efficient infrastructure based competition.

Requests for new forms of network access

Our proposals

- 4.17 We propose a condition in each Physical Infrastructure market regarding the process by which BT must address requests for new forms of physical infrastructure access (known as the Statement of Requirements or SoR process). This form of proposed condition would require BT to publish guidelines in relation to requests for new forms of network access (which must provide for BT to respond to these requests in a reasonable amount of time, have clear and transparent criteria to assess requests and to set out clear reasons for rejecting requests) and would allow Ofcom to direct BT to make amendments to those guidelines.

Our reasoning

- 4.18 We are of the view that a requirement to have a process by which BT must address requests for new forms of physical infrastructure access is an appropriate and proportionate *ex ante* measure to complement the general network access requirement discussed in the preceding sub-section.
- 4.19 Vertically integrated telecoms providers have the ability and incentive to favour their own downstream business over third-party telecoms providers by differentiating on price or terms and conditions. Where a telecoms provider has SMP at the upstream level, such discrimination can harm competition in downstream markets. One form of discrimination is in relation to the handling of requests for new types of network access. This has the potential to distort competition at the retail level by placing third-party telecoms providers at a disadvantage compared with the downstream retail business of the vertically integrated provider with SMP. We consider BT is in this position in each of the markets in which we have found it to have SMP.
- 4.20 The form of requirement we are proposing only goes as far as we consider is necessary to address our concerns. Rather than specifying the exact process that BT must follow, the condition we are proposing for each market allows BT to implement its own process within certain parameters. In particular, we propose to impose a condition requiring BT to publish guidelines in relation to requests for new forms of network access (which must provide for BT to respond to these requests in a reasonable amount of time, have clear and transparent criteria to assess requests and to set out clear reasons for rejecting requests) and providing for power of direction to allow Ofcom to direct BT to make amendments to those guidelines.
- 4.21 In order to implement this proposal, we propose to set the SMP condition (Condition 3) published at Annex 10. Section 87(5), allows Ofcom to implement SMP services conditions securing fairness and reasonableness in the way in which requests for network access are made and responded to and for securing that the obligations in the conditions are complied with within periods and at times required by or under the conditions.

Requirement not to unduly discriminate

Our proposals

- 4.22 We propose to impose a 'no undue discrimination' condition on BT that applies to all forms of network access provided by BT in each Physical Infrastructure market. We would interpret this condition as requiring strict equivalence in respect of all processes and sub-products that contribute to the supply and consumption of network access services in each Physical Infrastructure market, unless BT can demonstrate that a difference is justified in any particular case. We also propose a requirement on BT to publish such information on non-discrimination in relation to network access as we may direct.

Our reasoning

4.23 For the reasons set out below, we consider that our proposed no undue discrimination obligation is appropriate and proportionate in relation to BT's market power in each of the Physical Infrastructure markets.

Reason for proposing non-discrimination obligation

4.24 A non-discrimination obligation is intended as a complementary remedy to the network access obligation, primarily to prevent the dominant provider from discriminating in favour of its own downstream divisions in a way that would harm competition and competing telecoms providers. Without such an obligation, the dominant provider has the ability and incentive to provide wholesale network access on terms and conditions that discriminate in favour of its own downstream divisions, thus distorting competition and harming consumers' interests.

Forms of non-discrimination obligations

- 4.25 A non-discrimination obligation can have different forms of implementation:
- Strict non-discrimination, or equivalence of inputs (EOI) (i.e. a complete prohibition of discrimination with no discretion) – the dominant provider provides exactly the same services to all telecoms providers (including its own downstream divisions) on the same timescales, terms and conditions (prices, service levels), same systems and by providing the same information.
 - Less strict non-discrimination, or equivalence of outputs (EEO) (i.e. more flexibility, certain discriminatory conduct possible¹²¹) – the dominant provider provides all wholesale inputs to access seekers in a manner which is sufficiently comparable in terms of functionality and price to what the dominant provider provides to its downstream divisions (but could be using different systems and processes) to avoid harm to downstream competition.

Need for non-discrimination obligations in the Physical Infrastructure markets

4.26 As discussed above, without a level playing field in relation to network access in each Physical Infrastructure market, BT could engage in practices that could distort downstream competition, including providing access, but on less favourable terms compared to those obtained by its own downstream businesses. This could further worsen consumer outcomes as the benefits from other telecoms providers deploying ultrafast networks may not be realised.

4.27 Imposing a non-discrimination requirement on BT in relation to network access would help address this competition problem. Among other reasons, this is because an effective

¹²¹ Compliance with this obligation would need to establish whether the discrimination in question was undue. See Ofcom, 2005. *Undue discrimination by SMP providers – How Ofcom will investigate potential contraventions on competition grounds of requirements not to unduly discriminate imposed on SMP providers.*

[http://stakeholders.ofcom.org.uk/binaries/consultations/undsm/undsm/statement/contraventions4.pdf](http://stakeholders.ofcom.org.uk/binaries/consultations/undsm/undsm/undsm/statement/contraventions4.pdf).

network access remedy requires other telecoms providers to choose to compete with BT downstream, while also relying on BT to provide upstream duct access that will enable this competition. Since this leads to a conflict in incentives for BT, other telecoms providers need to have confidence that they can use the network access remedy on fair terms. Without confidence that a level playing field will be maintained these potential competitors are less likely to invest at scale.

- 4.28 Therefore, an effective network access remedy requires that BT is prevented from discriminating, on both a price and non-price basis. This will help ensure a level playing field on which other telecoms providers can compete with BT in relation to network access in each of the Physical Infrastructure markets.
- 4.29 Our starting point is that to achieve a level playing field it is necessary to impose broad equivalence. However, when considering a non-discrimination remedy and ensuring other telecoms providers are not at a disadvantage to BT, we need to take care that the remedy itself is not so costly or disruptive to BT, or takes so long to impose, that the remedy fails to level the playing field, or even tilts it the other way. We consider below the precise form of non-discrimination obligation which we propose to impose on BT in the context of this market review.

Equivalence of inputs

- 4.30 Generally, we consider that a non-discrimination obligation in the form of EOI is the most appropriate form of non-discrimination obligation to impose where there are concerns that a dominant provider will discriminate in respect of network access. This is because EOI generates better incentives on the dominant undertaking to improve the products it offers to its competitors, and it increases transparency. It therefore offers greater potential to address the issue of inequality of access in a sustainable fashion.
- 4.31 We consider that EOI is the most effective non-discrimination remedy and we believe it to be proportionate to impose an EOI condition on BT where it already provides access services on an EOI basis. However, because EOI does not allow any discrimination at all, it may not be appropriate in circumstances where network access involves legacy products and processes which might need to be re-engineered to meet the requirement.
- 4.32 We consider that the application of the strict EOI obligation in relation to network access in physical infrastructure markets would not be appropriate at this time, given the cost, disruption and time involved in Openreach re-engineering its existing legacy processes and systems in order to comply with the obligation. The difficulties involved in implementing a strict EOI obligation would make an immediate obligation disproportionate.
- 4.33 Consequently, we have considered the extent to which a more limited form of non-discrimination obligation might be appropriate to be applied in relation to the proposed network access obligation.

Requirement for no undue discrimination

- 4.34 We therefore propose to impose a no undue discrimination SMP condition on BT in relation to network access. Although this falls short of the strict equivalence of EOI, we propose that in order to ensure a level playing field in downstream markets, this non-discrimination requirement should be as close to EOI as possible.
- 4.35 Therefore, we propose to interpret the no undue discrimination SMP condition in relation to network access as requiring strict equivalence in respect of all processes and sub-products that contribute to the supply and consumption of network access, with discrimination permitted only in cases where BT demonstrates that a difference in respect of a specific process step or sub-product is justified.
- 4.36 Where Openreach can justify any processes or systems used by network users as being different from those used by Openreach, the condition would still require these to be broadly equivalent. This means that any difference must not put network users at a disadvantage, particularly in terms of extra cost, time or uncertainty, compared to the processes Openreach follows internally.
- 4.37 Applying the no undue discrimination obligation to network access would mean that when BT establishes new processes or platforms that contribute to the supply and consumption of network access, these should be designed and implemented from the outset such that they are equivalent. We envisage that new platforms and/or processes used by BT would not differ from those used by other telecoms providers, other than in the most exceptional circumstances.
- 4.38 We consider that making new processes equivalent from the outset will not involve the same level of significant cost, disruption and time as associated with re-engineering existing legacy processes. Therefore, differences are far less likely to be justified, compared to the differences that could continue to exist for current legacy processes and platforms.
- 4.39 Under this proposed non-discrimination obligation, when Openreach charges itself internal transfer charges, it must do so in a manner that is consistent with the charging principles that it applies to determine charges faced by telecoms providers using network access, to the extent that a different approach cannot be justified. These internal transfer charges would then be relevant to any subsequent assessment of whether Openreach's prices for the relevant downstream services are appropriate.

Compliance with the no undue discrimination obligation

- 4.40 As outlined above, although we expect Openreach to be able to justify any instances of non-equivalence, we do not consider it necessary for Openreach to set out the entire end-to-end process on how passive infrastructure is used (with differences being individually identified and justified). We are not proposing an upfront obligation on Openreach to justify all instances of non-equivalence.
- 4.41 Instead, we propose to extend the ongoing monitoring programme we established following the WLA review to ensure Openreach complies with the non-discrimination

obligation. This programme involves working with the Office of the Telecoms Adjudicator (OTA) and access seekers, in order to evaluate their experience of the network access products. We will also continue to make use of our information gathering powers where appropriate in order to evaluate any network access processes that we identify are at risk of failing to be equivalent. Furthermore, we will carefully consider, and where appropriate investigate, any complaints of non-equivalence from other telecoms providers.

Transparency and KPIs

- 4.42 Given the importance of non-discrimination, in particular, in creating an environment in which competing providers have the confidence to make very substantial capital investments relying on access to BT's duct and pole network, we propose an obligation on BT to provide transparency around non-discrimination in relation to network access. Specifically, we propose a requirement on BT to publish such information on non-discrimination in relation to network access as we may direct.
- 4.43 We have considered whether we should propose specific KPIs on non-discrimination as part of our consultation, including a requirement to publish data necessary to allow the comparison of the supply and consumption of duct access by external telecoms providers as compared to Openreach's own internal consumption.
- 4.44 We consider that it is inappropriate to impose any specific transparency obligations on Openreach at this time. Instead, we will consider what requirements (if any) it might be appropriate for BT to report as KPIs alongside the work we are proposing to undertake on duct access KPIs in the WLA market which we expect to start after April 2019.
- 4.45 This is because we will be better placed once the Reference Offer for WLA duct access is put in place to identify which processes are the most relevant to indicating the performance of network access products. These aspects can then be appropriately compared with measures concerning Openreach's own internal consumption.
- 4.46 To implement these proposals, we propose to set the SMP condition (Condition 4) at Annex 10. Section 87(6)(a) of the Act authorises the setting of an SMP services condition requiring the dominant provider not to discriminate unduly against particular persons, or against a particular description of persons, in relation to matters connected with network access to the relevant network or with the availability of relevant facilities. Section 87(6)(b) of the Act authorises the setting of an SMP services condition requiring the dominant provider to publish, in such manner as we may direct, all such information as they may direct for the purpose of securing transparency in relation to such matters.

Consistency with EC Recommendations and the BEREC Common Position

- 4.47 We have taken due account of the EC's Costing and Non-discrimination Recommendation in proposing to impose a no undue discrimination condition on BT.¹²² There are three recommendations particularly relevant in respect of our proposal to apply a non-discrimination condition to network access:
- a) that where EOI is disproportionate, National Regulatory Authorities (NRAs) should ensure that the SMP operator provides wholesale inputs on at least an EOO basis;
 - b) that NRAs should ensure that when a non-discrimination obligation is imposed, access seekers can use the relevant systems and processes with the same degree of reliability and performance as the SMP operators' own downstream retail arm; and
 - c) that NRAs should require SMP operators subject to a non-discrimination obligation to provide access seekers with regulated wholesale inputs, which allow the access seeker to effectively replicate technically new retail offers of the downstream retail arm of the SMP operator, in particular where EOI is not fully implemented.
- 4.48 We consider that the no undue discrimination obligation which we are proposing is consistent with these recommendations.
- 4.49 Point 19 of that recommendation also provides that when imposing non-discrimination obligations, NRAs should impose KPIs in order to monitor effectively compliance with the non-discrimination obligation. We propose to impose a non-discrimination obligation and a power to impose KPIs. While we are not currently proposing KPIs relating to the PIA obligation, we will in due course consider what requirements (if any) it might be appropriate for BT to report as KPIs.
- 4.50 We note that the Costing and Non-discrimination Recommendation also provides for the application of a technical replicability test, whether undertaken by the SMP operator and provided to the NRA or undertaken by the NRA itself, to ensure that access seekers can technically replicate new retail offers of the downstream business of the SMP operator.
- 4.51 Having taken utmost account of the Costing and Non-discrimination Recommendation in relation to technical replicability, we consider that the additional imposition of a technical replicability test in the context of this review is not appropriate or proportionate. We are satisfied that, where access seekers demand network access in the Physical Infrastructure markets in the UK, the necessary provisions are in place to enable them to access regulated wholesale inputs that enable them to technically replicate BT's downstream retail offers.

¹²² Commission recommendation of 11 September 2013 on consistent non-discrimination obligations and costing methodologies to promote competition and enhance the broadband investment environment (C(2013) 5761). (September 2013 EC Recommendation on non-discrimination obligations). http://ec.europa.eu/smart-regulation/impact/ia_carried_out/docs/ia_2013/c_2013_5761_en.pdf.

- 4.52 We have also taken utmost account of the BEREC Common Position. In relation to achieving the objective of a level playing field, the BEREC Common Position identifies, among other things, as best practice that:¹²³

“BP19 NRAs should impose an obligation on SMP CPs requiring equivalence, and justify the exact form of it, in light of the competition problems they have identified.

BP19a NRAs are best placed to determine the exact application of the form of equivalence on a product-by-product basis. For example, a strict application of EOI is most likely to be justified in those cases where the incremental design and implementation costs of imposing it are very low (because equivalence can be built into the design of new processes) and for certain key legacy services (where the benefits are very high compared to the material costs of retro-fitting EOI into existing business processes). In other cases, EOO would still be a sufficient and proportionate approach to ensure non-discrimination (e.g. when the wholesale product already shares most of the infrastructure and services with the product used by the downstream arm of the SMP operator).”

- 4.53 We have further taken due account of the EC’s 2010 NGA recommendation.¹²⁴ Point 13 of the recommendation provides that where duct capacity is available, NRAs should mandate access to civil engineering infrastructure and this access should be provided in accordance with the principle of equivalence as set out in Annex II. While we propose to interpret the non-discrimination obligation as requiring strict equivalence, differences are permitted where it can be demonstrated that strict equivalence is not justified. To the extent that this means that network access is provided on terms falling short of the principle of equivalence, we consider that this is justified by UK national circumstances for the reasons set out in this section.

Ensuring transparency

- 4.54 Requirements for transparency of charges, terms and conditions in markets in which one operator is dominant are complementary remedies to ensure that third-party providers can make effective use of the dominant operator’s network access. We explain below our proposals to impose on BT requirements to:
- a) publish a Reference Offer;
 - b) notify changes to charges, terms and conditions; and
 - c) notify technical information.

¹²³ In this respect, the BEREC Common Position identifies the following competition issues which arise frequently: SMP players having an unfair advantage; having unmatchable advantage, by virtue of their economies of scale and scope, especially if derived from a position of incumbency; discriminating in favour of their own group business (or between its own wholesale customers), either on price or non-price issues; exhibiting obstructive and foot-dragging behaviour.

¹²⁴ EC, October 2010, Commission Recommendation 25.9.2010 on regulated access to Next Generation Access Networks (NGA) (2010 EC Recommendation on NGA). <http://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32010H0572&from=EN>.

Requirement to publish a Reference Offer

Our proposals

- 4.55 We propose that BT must publish a Reference Offer (RO) in relation to the provision of network access in each Physical Infrastructure market. The RO must include terms and conditions for provisioning, technical information, SLAs and SLGs, and availability of co-location.

Our reasoning

- 4.56 We consider that the requirement to publish a RO which we are proposing in each market is appropriate and proportionate.
- 4.57 An RO obligation has two main purposes:
- a) to assist transparency for the monitoring of potential anti-competitive behaviour; and
 - b) to give visibility to the terms and conditions on which other providers will purchase wholesale services.
- 4.58 The RO helps ensure stability (in regard to investment and promoting market entry) in Physical Infrastructure markets, allowing for speedier negotiations, avoiding possible disputes and giving confidence to those purchasing wholesale services that they are being provided on non-discriminatory terms. Without this, market entry might be deterred to the detriment of long-term competition and hence consumers.
- 4.59 The proposed RO obligation specifies the information to be included in the RO and how the RO should be published. We consider that this comprises the minimum information necessary to achieve the purposes set out above.
- 4.60 We propose that the published RO must set out (as a minimum):
- a) a clear description of the services on offer including technical characteristics and operational processes for service establishment, ordering and repair;
 - b) the locations of points of network access and the technical standards for network access;
 - c) conditions for access to ancillary and supplementary services associated with the network access including operational support systems and databases etc.;
 - d) contractual terms and conditions, including dispute resolution and contract negotiation/renewal arrangements;
 - e) charges, terms and payment procedures;
 - f) service level agreements and service level guarantees; and
 - g) to the extent that BT uses the service in a different manner to other telecoms providers or uses similar services, BT is required to publish a RO in relation to those services.

4.61 In Section 5, we set out the RO requirements that specifically relate to PIA, the specific form of network access we are proposing in these markets.

SLAs and SLGs

4.62 In order to be effective, it is important that the contractual arrangements for the supply of network access products and services that telecoms providers buy from BT in the wholesale markets are such that:

- they incentivise the efficient provision of reliable services to BT’s wholesale customers;
- they set out fair and reasonable compensation payments for delays in delivery and repair of such services; and
- they allow BT and its wholesale customers to monitor effectively the performance of BT’s provision and repair regulated wholesale services.

4.63 In order to achieve these objectives, contractual arrangements need to include:

- a set of SLAs which reflect the commercial SLAs provided to wholesale customers of physical infrastructure services;
- a set of SLGs which set out fair and reasonable compensation for delays in the provision and repair of such services;
- a requirement that SLG payments are made on a proactive basis by BT; and
- specific service level commitments on the availability of the relevant operational support systems (by which telecoms providers make requests for service provision, transfers and fault repair as applicable).

4.64 To give effect to these proposals we propose to set the draft SMP condition (Condition 7) at Annex 10. Section 87(6)(c) of the Communications Act 2003 authorises the setting of SMP services conditions requiring the dominant provider to publish, in such a manner as Ofcom may direct, the terms and conditions on which it is willing to enter into an access contract. Section 87(6)(d) also permits the setting of SMP services conditions requiring the dominant provider to include specified terms and conditions in the Reference Offer. Finally, section 87(6)(e) permits the setting of SMP services conditions requiring the dominant provider to make such modifications to the Reference Offer as may be directed from time to time.

Consistency with EC Recommendation and the BEREC Common Position

4.65 The EC Recommendation provides that NRAs should require SMP operators to implement SLAs alongside KPIs, which should include SLGs in the case of a breach of the SLA. The EC Recommendation also indicates that payment of financial penalties should, in principle, be made automatic and be sufficiently dissuasive. We have taken into account the EC Recommendation in relation to SLAs and SLGs.

4.66 We have also taken utmost account of the BEREC Common Position.¹²⁵ In relation to the objective to assist transparency for the monitoring of potential anti-competitive behaviour; and giving visibility to the terms and conditions on which other providers will purchase wholesale services, the BEREC Common Position identifies, among other things, as best practice that:

“BP26 NRAs should require SMP operators to provide clarity of terms and conditions of access (including those relating to relevant ancillary services) by publishing a Reference Offer (RO), the key elements of which should be specified or approved by the NRA. All material contractual terms and conditions which are known or knowable at the time of publication should be covered clearly.

BP26a NRAs should require SMP operators to take into account any reasonable views of wholesale customers in their RO, in particular regarding the evolution of the service offered.

BP26b NRAs should require SMP operators to publish the RO (i.e. make it operational) within a reasonable time after NRAs have imposed the obligation to grant access. NRAs should give guidance on the reasonable timeframe on a case by case basis.

BP26c NRAs should require SMP operators to update the RO as necessary, and in a timely manner (see BP22), to reflect relevant changes such as developments in line with market and technology evolution and/or changes to prices, terms and conditions for existing services or technical and operational characteristics. Where NRAs follow a pre-approval process, NRAs should further require SMP operators to inform them before publishing the necessary amendments to the RO.

BP26d Where applicable, NRAs should impose an obligation on SMP operators in relation to the minimum amount of information to be made available in the RO.

BP26e After lifting an obligation to apply a RO, NRAs should ensure that SMP operators provide provisions for the change in the contractual conditions which are in place on the basis of that RO for a transitional period to be determined accordingly.”

4.67 In relation to the objective of achieving reasonable quality of access products (operational aspects), the BEREC Common Position identifies, among other things, as best practice that:

“BP32 NRAs should require SMP operators to provide a reasonable defined level of service.

¹²⁵ BEREC, 2012. *Common Position on best practice in remedies on the market for wholesale (physical) network infrastructure access (including shared or fully unbundled access) at a fixed location imposed as a consequence of a position of significant market power in the relevant market.*
[www.berec.europa.eu/files/document_register_store/2012/12/20121208163628_BoR_\(12\)_127_BEREC_COMMON_POSITION_ON_BEST_PRACTICE_IN_REMEDIES_ON_THE_MARKET_FOR_WHOLESALE.pdf](http://www.berec.europa.eu/files/document_register_store/2012/12/20121208163628_BoR_(12)_127_BEREC_COMMON_POSITION_ON_BEST_PRACTICE_IN_REMEDIES_ON_THE_MARKET_FOR_WHOLESALE.pdf).

BP32a Service Level Agreements (SLAs) should cover specific service areas. Services areas when SLAs are most likely to be necessary are ordering, delivery, service (availability) and maintenance (repair).

BP32b SLAs should be made available to wholesale operators. To ensure maximum transparency and comparability of the terms provided by SMP operators to alternative operators and their downstream arm, all SLAs could be made available to all relevant wholesale customers (including those from outside a specific Member State). For example, SMP operators could make them available on demand or automatically publish these on their website (as part of their RO).

BP32c NRAs should take oversight for the process of setting SLAs. NRAs should determine the level of their involvement in this process by taking into account specific market circumstances and particular concerns for discriminatory behaviour.

BP33 NRAs should impose a generic requirement on SMP operators to provide Service Level Guarantees (SLGs).

BP33a SLGs should cover all necessary specific service areas. Service areas where SLGs are most likely to be necessary are ordering, delivery, service (availability) and maintenance (repair).

BP33b SLG payments should be made without undue delay and should be proactive in nature. That is, with a pre-established process for the payment and billing of the SLGs among operators and without the need for alternative operators to request the intervention of any third party i.e. NRAs or courts.

BP33c NRAs should take oversight for the process of setting SLGs. NRAs should determine the level of their involvement in this process by taking into account specific market circumstances and particular concerns for discriminatory behaviour.”

4.68 We consider that our proposal is broadly consistent with the best practice set out in the BEREC Common Position.

Requirement to notify charges, terms and conditions

Our proposals

- 4.69 We propose to make BT subject to an obligation to notify, in writing (known as an Access Charge Change Notice, or ACCN) changes to its charges for network access products and services in each of the Physical Infrastructure markets in which we have found BT to have SMP.
- 4.70 Regarding the notice period required for BT to inform its customers of changes, we propose that the period should be:
- a) 90 days for prices, terms and conditions relating to existing services in the Physical Infrastructure markets;

- b) 28 days for prices, terms and conditions relating to new service introductions; and
- c) 28 days for price reductions and associated conditions (for example, conditions applied to Special Offers) and the end of temporary price reductions.

Our reasoning

- 4.71 We consider that the requirement to notify charges, terms and conditions which we are proposing in each market is appropriate and proportionate.
- 4.72 Notification of changes to charges at the wholesale level has the joint purpose of improving transparency for monitoring possible anti-competitive behaviour and giving advance warning of price changes to competing providers who purchase wholesale access services. The latter purpose ensures that competing providers have sufficient time to plan for such changes, as they may want to restructure the prices of their downstream offerings in response to charge changes at the wholesale level. Notifying changes therefore helps to ensure stability in markets.
- 4.73 While price notification may have a ‘chilling’ effect (where other telecoms providers follow BT’s prices rather than set prices of their own accord), the Physical Infrastructure markets are characterised by a high level of reliance by downstream telecoms providers on BT’s wholesale services. Therefore, we believe it is appropriate for BT to be subject to an obligation to notify changes to its charges for wholesale network access services in order to provide the transparency, time to plan for changes and stability needed to facilitate investment and entry.
- 4.74 We also consider it appropriate to propose that BT notifies changes to terms and conditions in order to ensure transparency and provide advance warning of changes to allow competing providers sufficient time to plan for them. For the same reasons as outlined above, we consider that notifying changes to terms and conditions will lead to greater market stability, without which incentives to invest might be undermined and market entry made more difficult.
- 4.75 Regarding the content of the ACCN, we propose that it includes:
- a) a description of the network access in question;
 - b) a reference as to where the terms and conditions associated with the network access in question can be found in BT’s RO;
 - c) the date on which the new charges take effect (or the period over which the new charges will apply);
 - d) the current and proposed charge; and
 - e) other charges for services that would be directly affected by the proposed charge.

Changes to prices

- 4.76 Changes to prices, terms and conditions for the provision of wholesale inputs in Physical Infrastructure markets could have material impacts on consumers. Thus, we propose to impose a requirement on BT to give advance notice of price changes.
- 4.77 In regard to the timings of the notification, the notification period should allow sufficient time for downstream providers to make necessary changes to their downstream products and services. We consider that except for the special cases discussed below, BT should give 90 days' notice for changes to prices.
- 4.78 In the case where prices are being reduced, we recognise that industry and customers benefit from shorter notification periods. For example, there may be advantages in having a shorter notification period for price reductions that could encourage migration to newer or more efficient services. We therefore consider 28 days to be an appropriate notification period for price reductions for products and services in Physical Infrastructure markets.
- 4.79 Where Openreach is providing a Special Offer, customers benefit from a shorter notification period to enable them to react faster to the Special Offer, and maintain flexibility to try new services and transition over to the newly priced service, which will benefit consumers through new services and greater availability of choice. We therefore consider 28 days to be an appropriate notification period for Special Offers. We discuss extensions and amendments to Special Offers below.
- 4.80 Where Openreach introduces a new product or service in Physical Infrastructure markets, we consider that the prior notification period should reflect the lesser need for advance notice, since there will not be existing customers for whom wholesale price changes might require revisions to their own pricing or other commercial decisions, and the existing service(s) provide the core set of input services for downstream telecoms providers, and are protected by the longer notification period. We therefore propose that 28 days is an appropriate notification period for new products and services.

Changes to non-prices terms and conditions

- 4.81 We consider that 90 days is an appropriate notification period for existing and new products and services in the Physical Infrastructure markets and so are proposing an obligation that, in general, at least 90 days' notification should be given.
- 4.82 We do not consider that, where Openreach plans service development and service launches, the proposed requirement to notify changes to terms and conditions would be problematic, as we believe there is sufficient time in the development cycle of a new service to inform its customers of changes to the terms and conditions.

Extensions and amendments to Special Offers

- 4.83 A 90-day notification period has a potentially negative impact on Openreach's ability to amend Special Offer non-price terms and conditions, due to the misalignment of 28 days' notice for launching a Special Offer and/or changing prices, compared to 90 days' notice to

change the terms and conditions of the Special Offer. This has the potential to make it difficult for Openreach to launch Special Offers or to amend Special Offers in their lifetimes, even when it might be beneficial to customers to do so. Therefore, we propose to require Openreach to provide only 28 days' notice where it plans to amend the terms and conditions of a Special Offer.

- 4.84 We also propose to allow Openreach, where it has notified its customers of the price that will apply at the end of the Special Offer, to extend the Special Offer. Where the extension is at the current Special Offer price or below, Openreach must provide one working day's notice. Where Openreach extends the offer at another price that is below the one originally notified as the price to apply when the original Special Offer ended, or where it extends a Special Offer on updated T&Cs, we propose a 28 days' notice. We have outlined the proposed notification periods that will apply for where Special Offers are extended or amended in Table 4.2.

Table 4.2: Proposed notification periods on Openreach for amending or extending Special Offers

Amendment to Special Offer	Amendment concerns	Notification period
If Openreach wants to extend a Special Offer at the current SO price or lower price and current T&Cs	Prices and T&Cs	Next working day
If Openreach wants to extend a Special Offer on current T&Cs at a price above the initial Special Offer price but below the standard price	Prices	28 days
If Openreach wants to extend a special offer on updated T&Cs or amend T&Cs of existing Special Offer, irrespective of price	T&Cs	28 days

- 4.85 We consider that the proposed requirement to notify charges, terms and conditions only requires that information that other telecoms providers would need to know (in order to adjust for any changes) would have to be notified and that the proposed notification periods are the minimum required to allow changes to be reflected in downstream offers.
- 4.86 To implement these proposals, we propose to set the draft SMP condition (Condition 8) at Annex 10. Section 87(6)(b) of the Act authorises the setting of SMP services conditions which require a dominant provider to publish, in such manner as Ofcom may direct, all such information for the purpose of securing transparency. Section 87(6)(d) also permits the setting of SMP services conditions requiring the dominant provider to include specified terms and conditions in the Reference Offer.

Requirement to notify technical information

Our proposals

4.87 We propose to require BT to publish, in advance, changes to technical information in each Physical Infrastructure market. We think BT should notify its customers of changes to technical information not less than 90 days in advance of providing new services or amending existing technical terms and conditions.

Our reasoning

4.88 We consider that the requirement to notify technical information which we are proposing in each market is appropriate and proportionate.

4.89 The aim of this regulation is to provide advance notification of changes to technical characteristics to ensure that competing providers have sufficient time to respond to changes that may affect them. For example, a competing provider may need to introduce new equipment or modify existing equipment or systems to support a new or changed technical interface. Similarly, a competing provider may need to make changes to its network in order to support changes in the points of network access or configuration.

4.90 This remedy is important in the Physical Infrastructure markets to ensure that providers who compete in downstream markets are able to make effective use of existing or, where applicable, new wholesale services provided by BT. The technical information required by other providers includes:

- new or amended technical characteristics, including information on network configuration (e.g. information about the function and connectivity of points of access, such as the connectivity of exchanges to customers and other exchanges), locations of the points of network access, and technical standards (including any usage restrictions and other security issues);
- the information provided currently in the Network Information Publication Principles (NIPP) and Access Network Facilities (ANF) agreement; and
- any other additional information necessary to make use of the services provided in the Physical Infrastructure markets.

4.91 We believe that 90 days is the minimum time that competing providers would need to make modifications to their network to support changes.

4.92 The one exception to this is in relation to amendments to technical specifications that are developed and agreed through NICC Standards Limited.¹²⁶ NICC is a technical forum for the UK communications sector that develops interoperability standards for public communications networks and services in the UK. NICC specifications are developed by subject matter experts from BT and other telecoms providers and are adopted only with the approval of NICC members. In view of these arrangements, we do not consider it

¹²⁶ <http://www.niccstandards.org.uk/>.

necessary to propose a 90-day notice period where BT proposes to adopt an amended NICC specification, as telecoms providers are likely to already be aware of NICC specifications due to their participation in the forum (and will therefore be satisfied that they have been agreed by industry, and not imposed by BT unilaterally). We do, however, consider that BT should provide notification of changes based on the NICC standard. This is to ensure that published technical information is up to date, as without an obligation to notify changes based on NICC standards, service descriptions for various wholesale services could be out of date or incomplete. Our proposed SMP condition reflects this position.

- 4.93 We consider that the proposed requirement to notify technical information only requires information that other telecoms providers would need to know and that the proposed notification periods are the minimum required to allow changes to be reflected in downstream offers.
- 4.94 To give effect to these proposals we propose to set the draft SMP condition (Condition 9) at Annex 10. As set out above section 87(6)(b) of the Act authorises the setting of SMP services conditions which require a dominant provider to publish, in such manner as Ofcom may direct, all such information for the purpose of securing transparency.

Regulatory Financial Reporting

- 4.95 In the following sub-sections, we set out our proposals to impose accounting separation and cost accounting obligations on BT in Physical Infrastructure markets.
- 4.96 In the 2014 Regulatory Financial Reporting Statement we set out our conclusions on the regulatory financial reporting policy that should be applied to BT across all regulated markets and the changes to the framework for BT's regulatory financial reporting.¹²⁷ In Annex 2 to the 2014 Regulatory Financial Reporting Statement we set out 'pro-forma' SMP conditions which would implement the policy decisions made in that statement. We explained that in order to preserve the integrity and consistency of BT's Regulatory Financial Reporting, we considered that our starting point should be that the changes we proposed should be implemented across all regulated markets, subject to this being appropriate in light of the market analysis in each review. We noted that there were significant advantages to BT and stakeholders of BT applying one set of accounting rules across all markets and we also noted that BT was broadly supportive of the principle of applying a consistent approach across all markets.¹²⁸
- 4.97 Consistent with this approach, we have therefore considered whether regulatory financial reporting obligations are appropriate in the Physical Infrastructure markets in the UK and, to the extent that they are, whether the 'pro-forma' SMP conditions are appropriate in light of our market analysis.

¹²⁷ Ofcom, 2014. *Regulatory Financial Reporting - Statement*, (2014 Regulatory Financial Reporting Statement). https://www.ofcom.org.uk/data/assets/pdf_file/0025/78460/financialreporting-statement-may14.pdf

¹²⁸ 2014 Regulatory Financial Reporting Statement, paragraphs 7.15-7.19.

4.98 For the reasons explained below and noting the benefits of applying a consistent approach across all markets, our preliminary view is that it is appropriate and proportionate to impose regulatory financial reporting obligations in the Physical Infrastructure markets. We will set out the detail of these proposed obligations in a forthcoming consultation on regulatory financial reporting.

Accounting separation

Our proposals

4.99 We propose to impose on BT an accounting separation condition in Physical Infrastructure markets.

Our reasoning

4.100 Paragraph 3 of Point 1 of the 2005 EC Recommendation on accounting separation and cost accounting systems (2005 EC Recommendation) states that:

“The purpose of imposing an obligation regarding accounting separation is to provide a higher level of detail of information than that derived from the statutory financial statements of the notified operator, to reflect as closely as possible the performance of parts of the notified operator’s business as if they had operated as separate businesses, and in the case of vertically integrated undertakings, to prevent discrimination in favour of their own activities and to prevent unfair cross-subsidy”.¹²⁹

4.101 In the 2014 Regulatory Financial Reporting Statement we considered the purposes of regulatory reporting, which is supported by the imposition of an accounting separation obligation. In that statement we said that regulatory reporting “should provide us with the information necessary to make informed regulatory decisions, monitor compliance with SMP conditions, ensure that those SMP conditions continue to address the underlying competition issues and investigate potential breaches of SMP conditions and anti-competitive practices”.¹³⁰ In addition, we said that it “should provide reasonable confidence to stakeholders that the SMP provider has complied with its SMP conditions and add credibility to the Regulatory Financial Reporting Regime”.¹³¹ We consider that our proposal to impose an accounting separation obligation, together with a cost accounting obligation (see below), will help to ensure that these regulatory reporting objectives are met.

4.102 In order to carry out our duties it is important that financial information is available on the services and markets that we regulate. The availability of this information helps us

¹²⁹ Commission Recommendation of 19 September 2005 (2005/698/EC) on accounting separation and cost accounting systems under the regulatory framework for electronic communications, 11.10.2005, OJEU L 266/64, <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32005H0698&from=EN>

¹³⁰ 2014 Regulatory Financial Reporting Statement, paragraph 2.28.

¹³¹ 2014 Regulatory Financial Reporting Statement, paragraph 2.41.

understand the volumes, revenues, costs and returns of services and in markets, which allows us to monitor the impact and effectiveness of, and (for certain remedies) compliance with, the remedies imposed as part of a market review.

- 4.103 The proposed accounting separation obligation would also require BT to account separately for internal and external sales which allows us and stakeholders to monitor the activities of BT to ensure that, where relevant, it does not discriminate unduly in favour of its own downstream business. In practice, this obligation would require BT to produce a financial statement that reflects the performance of Physical Infrastructure markets as though they were a separate business. This, combined with the cost accounting obligation, helps us to ensure that costs are not inappropriately loaded onto one set of regulated services to the benefit of BT, where BT uses primarily another set of regulated services.
- 4.104 We believe this proposed obligation is required to monitor the overall impact and effectiveness of the remedies proposed, and especially to monitor BT's activities with regard to its proposed non-discrimination obligation. The proposed obligation is also necessary to support transparency by providing a greater detail of information on the relevant market than that derived from BT's statutory financial statements and give visibility, and thus reassurance, to stakeholders that BT has complied with its SMP conditions.
- 4.105 In respect of the specific accounting separation requirements we are imposing on BT in these markets, we have modified the condition set out in the 2014 Regulatory Financial Reporting Statement to remove the reference to the Regulatory Accounting Guidelines.¹³² The form of condition proposed implements our policy decisions on regulatory financial reporting set out in that statement,¹³³ and will:
- give Ofcom a greater role in the way that BT prepares its regulatory financial statements;
 - improve the presentation of the published regulatory financial statements and supporting documentation;¹³⁴ and
 - ensure that Ofcom and other stakeholders have the information they need.
- 4.106 To give effect to these proposals we propose to set the draft SMP condition (Condition 11) at Annex 10. Sections 87(7) and 87(8) allow the setting of SMP services conditions that require the dominant provider to maintain a separation for accounting purposes between such different matters relating to network access or the availability of relevant facilities.

¹³² As explained in the 2016 BCMR Statement (paragraph 8.175 and Annex 28), we no longer consider that it would be useful to establish high-level guidelines and accounting rules in the Regulatory Accounting Guidelines by way of direction. Where we find concerns about BT's detailed application of cost attribution rules, in line with what we have done in the 2016 BCMR, we propose to direct BT as to the specific reporting requirements consistent with the Regulatory Accounting Principles arising from each regulatory decision. The wording of our proposed condition reflects our decision not to issue the Regulatory Accounting Guidelines. Each proposed condition therefore requires BT to prepare the RFS in accordance with the SMP conditions, the Regulatory Accounting Principles and the Accounting Methodology Documents.

¹³³ 2014 Regulatory Financial Reporting Statement, page 1.

¹³⁴ This included a requirement on BT to publish annual reconciliation reports that show the impact of material changes and errors.

Section 87(6)(b) of the Act also allows Ofcom to impose a condition requiring the dominant provider to publish information to secure transparency, including accounting information.

Cost accounting

Our proposals

4.107 We propose to impose a cost accounting requirement on BT in the Physical Infrastructure markets.

Our reasoning

4.108 Recital 2 of the 2005 EC Recommendation states that the purpose of imposing the accounting separation and cost accounting obligations is “to make transactions between operators more transparent and/or to determine the actual costs of services provided”. Also, paragraph 2 of Point 1 of the 2005 Recommendation states that:

“The purpose of imposing an obligation to implement a cost accounting system is to ensure that fair, objective and transparent criteria are followed by notified operators in allocating their costs to services in situations where they are subject to obligations for price controls or cost-oriented prices.”¹³⁵

4.109 The imposition of a cost accounting obligation ensures that BT has in place a system of rules that support the attribution of revenues and costs to individual markets and services. It therefore supports the proposed accounting separation obligation, which requires BT to prepare and report financial information relating to individual markets and services, by ensuring that the rules attributing revenues and costs to individual markets and services are fair, objective and transparent. The cost accounting obligation is an important means of ensuring that:

- Ofcom and stakeholders can have confidence in the financial information prepared and provided by BT since the attribution processes and rules supporting that financial information are fair, objective and transparent. Where we do not consider that the attribution process and rules are fair and objective, transparency (via publication of the processes and rules followed by BT) allows us to effectively challenge them.
- Revenues and costs are attributed to individual markets and services in a consistent manner. This mitigates the risk of double recovery of costs or that costs might be unfairly loaded onto particular services or markets.
- BT records all information necessary for the purposes listed above at the time that relevant transactions occur, on an ongoing basis. Absent such a requirement, there is a strong possibility that the necessary information would not be available when it is required, and in the necessary form and manner.

¹³⁵ Commission Recommendation of 19 September 2005 (2005/698/EC) on accounting separation and cost accounting systems under the regulatory framework for electronic communications.

- 4.110 We believe the cost accounting obligation is necessary to ensure the processes and rules used by BT to attribute revenues and costs to individual markets and services are fair, objective and transparent.
- 4.111 Regarding the specific form of the cost accounting requirement, we propose to impose the form of condition as set out in the 2014 Regulatory Financial Reporting Statement, but modified to remove the reference to the Regulatory Accounting Guidelines. The purpose of defining the form (i.e. how BT provides its data to Ofcom) of the Condition is to:
- give Ofcom a greater role in the way that BT prepares its regulatory financial statements;
 - improve the presentation of the published regulatory financial statements and supporting documentation; and
 - ensure that Ofcom and other stakeholders have the information they need.
- 4.112 To give effect to these proposals we propose to set the draft SMP condition (Condition 11) set out at Annex 10. Section 87(9) to (11) (subject to section 88) of the Act authorises Ofcom to impose appropriate cost accounting obligations on a dominant provider. Section 87(6)(b) of the Act also allows Ofcom to impose a condition requiring the dominant provider to publish information to secure transparency, including accounting information.

Quality of service requirements

Our proposals

- 4.113 We propose to impose on BT an SMP condition that allows us to set directions specifying quality of service (QoS) standards and reporting requirements in relation to Openreach's QoS performance for services in each Physical Infrastructure market (QoS SMP condition).

Our reasoning

- 4.114 We consider that the quality of service requirements which we are proposing in each market are appropriate and proportionate.
- 4.115 One of the consequences of Openreach's SMP in Physical Infrastructure markets is that BT might not have the incentives to provide the quality of service that telecoms providers and customers require. Inadequate QoS delivered by BT has the potential to undermine the effective functioning of the network access remedies, to the detriment of both customers and downstream competition. Negative effects on customers may include prolonged loss of service and frustration resulting from long delays in service provisioning. QoS issues also have the potential to adversely affect telecoms providers and the intensity of competition in retail services. For example, long or uncertain waiting times may discourage switching between telecoms providers and/or between products.
- 4.116 Given these competition concerns, we consider it appropriate to impose QoS regulation for services in each Physical Infrastructure market over the review period. The QoS SMP condition provides the means of setting QoS standards. Because the QoS SMP condition

allows us to set QoS standards by direction, it also offers flexibility to adapt to changing market circumstances over the market review period.

- 4.117 We consider that the form of condition we are imposing is the minimum necessary to address our concerns around QoS. We are proposing a condition which allows us to set QoS standards, although we are not for the moment proposing to specify any such standards. Imposing a condition in this form allows us to target any future QoS standards to concerns that may arise rather than us imposing generic standards across Physical Infrastructure markets which may not be well targeted.
- 4.118 The SMP condition that we are proposing to set to give effect to these proposals (Condition 10) is published at Annex 10. Section 87(3) of the Act authorises the setting of SMP services conditions in relation to the provision of network access. Section 87(5) of the Act provides that such conditions may include provision for securing fairness and reasonableness in the way in which requests for network access are made and responded to and for securing that the obligations contained in the conditions are complied with within the periods and at the times required by or under the conditions. In this regard we note Article 12(1) of the Access Directive, which provides that national regulatory authorities may attach to conditions relating to network access obligations covering fairness, reasonableness and timeliness. Section 87(6)(b) of the Act also specifically authorises the setting of SMP services conditions which require a dominant provider to publish, in such a manner as Ofcom may direct, all such information for the purposes of securing transparency.

Implementation timeframe

Our proposals

- 4.119 We propose to allow BT one month from the date of publication of the PIMR statement to implement our proposed general remedies.

Our reasoning

- 4.120 We believe that our proposed general remedies would lead to minimal disruption for the industry and only require a short implementation period because the proposed conditions are equivalent to the ones imposed in the 2018 WLA market review. We discuss the implementation timeframe in relation to our proposed specific remedies, including price controls, in Section 5.

Consultation question(s)

Question 4.1: Do you agree with our proposed general remedies? Please set out your reasons and supporting evidence for your response.

5. Specific remedies

Introduction

- 5.1 In this section, we set out our proposals for a specific network access remedy (Physical Infrastructure Access (PIA)) and supporting obligations that we propose to impose on BT. This proposed requirement is made pursuant to and supplements the general network access obligation proposed in Section 4.

Table 5.1: Summary of proposed specific remedies

Proposed specific remedies
Specific access obligation to provide Physical Infrastructure Access (PIA), including network adjustments
Specific requirement to provide PIA ancillary services
Specific requirements for the publication of a Reference Offer

Addressing the competition concerns

- 5.2 In Section 3 we set out our market assessment and propose that BT has SMP in the supply of access to physical infrastructure suitable for telecoms networks.
- 5.3 We propose that as a consequence of this SMP and in the absence of regulation there are behaviours that BT could engage in, and in one case are already engaging in, that could distort downstream competition:
- a) BT could refuse to supply access to its physical infrastructure, and thus continue to restrict competition in the provision of products and services in downstream markets;
 - b) BT could provide access on less favourable terms compared to those obtained by its own downstream businesses; and
 - c) BT could set excessive wholesale charges for access to its physical infrastructure or engage in price squeeze behaviour.
- 5.4 Up to now, our market power assessments have focused on BT's downstream position in specific categories of service, such as broadband and leased lines. Regulatory intervention focused on wholesale access. However, while this approach has been successful in promoting competition in retail services, it has not empowered competing providers with sufficient control to drive core technical innovation – such control over innovation remains in the gift of network owners.¹³⁶

¹³⁶ We have imposed passive access obligations (PIA with service and geographic restrictions since 2010, and sub-loop unbundling opening access to street cabinets by third parties from 2001) intended to support third party networks but due

- 5.5 Openreach’s control of the main telecoms network means it can use its existing, widely-available network of ducts and poles to deploy new networks and network upgrades more cheaply and quickly than its competitors. Improving access to Openreach’s ducts and poles for rival operators can help redress this enduring advantage for Openreach.
- 5.6 We improved access to ducts and poles in the 2018 WLA review, through a revised physical infrastructure access obligation on Openreach. This requirement is only available to companies primarily deploying broadband and fixed telephony networks, because it is a remedy designed to address competition problems identified in the WLA market. This restriction means that full-fibre operators using duct and pole access must demonstrate that they have a firm intention to deploy broadband – a hurdle that Openreach does not face.
- 5.7 For the reasons set out below, we consider that it is appropriate to propose an access requirement which will in effect open ducts and poles to all telecoms operators without reference to specific downstream services. This approach should provide greater flexibility, better reflecting the needs of operators investing in fibre networks to build up its investment through the provision of a range of services. For example, operators may initially offer leased lines to businesses, and later broadband to homes, and equally to establish networks unrelated to existing regulated markets.
- 5.8 While the availability of even one fibre network in an area will bring significant benefits for consumers, our ultimate aim is to promote wide and extensive availability of multiple competing fibre networks. In the DCR, we said a good outcome in the long term would be to achieve network competition to around 40% of households. Since then, we have seen a number of announcements of deployment and strategic intents to invest in fibre, which could mean competition drives fibre deployment to a greater proportion of the UK. In its recent Future Telecoms Infrastructure Review, the Government has estimated that a similarly substantial portion of the country could support three or more networks.
- 5.9 Network competition provides clear benefits in terms of service innovation, price competition, speed of deployment and overall resilience in the national infrastructure. In the context of the competition problems we have identified and our broader strategy, it is therefore, appropriate to provide specific access remedies which are optimised to support such competitive deployment. The structure of these remedies is discussed in the remainder of this section.
- 5.10 [3<]

Approach to specific remedies design

- 5.11 We conducted an extensive review of the physical infrastructure access obligation imposed in the Wholesale Local Access market as part of our 2018 WLA market review. As a result,

to limits in the use and the immature state of interest in network competition at the time of imposition there has been limited take up. Our current proposal for a PIA remedy is in response to clearer industry signals of interest and is intended to remove the previous barriers that have undermined take-up.

in the 2018 WLA Statement we imposed an enhanced form of this physical infrastructure access obligation.

- 5.12 Given that physical infrastructure access in the WLA market is in most material respects the same as physical infrastructure access in the markets forming part of this review, we have used the WLA physical infrastructure access obligation as a starting point for considering the specific form of network access that we think should be imposed in the Physical Infrastructure markets.
- 5.13 For the reasons set out below, we are proposing that PIA in the Physical Infrastructure markets should be in the same form as the WLA physical infrastructure access obligation, but without the usage restrictions. We believe that were we to adopt our proposed approach, this would lead to minimal disruption for BT and industry and consequentially only require a short implementation period. We discuss the latter at the end of this section.

Specific access obligation to provide PIA

Our proposals

- 5.14 We propose to impose a specific network access remedy in the form of PIA in each of the Physical Infrastructure markets which requires BT to allow other telecoms providers access to deploy their own networks in BT's underground ducts and chambers or overhead on its telegraph poles. The proposed PIA product will have no usage or geographic scope restrictions.

Our reasoning

- 5.15 We consider that the specific form of PIA that we are proposing is appropriate and proportionate in relation to BT's market power in each of the Physical Infrastructure markets.
- 5.16 Given our provisional conclusion that BT has SMP in the provision of physical infrastructure in certain markets in the UK, we consider it likely that BT would have the incentive and ability to favour its own downstream businesses over rivals in the relevant downstream markets, distorting competition in these markets, which is ultimately against the interests of consumers. BT could refuse access to its physical infrastructure, or it could provide access to its physical infrastructure on less favourable terms and conditions compared to those obtained by its own downstream businesses.
- 5.17 Although the general network access remedy we propose in Section 4 is aimed at addressing this competition problem, establishing a request for access under this provision is likely to require complex industry negotiations about the specific terms of the requested network access. This would risk uncertainty and delay, undermining the effectiveness of our regulation. As explained in Section 3 and discussed above, BT's SMP is entrenched and enduring, leading to a significant competitive imbalance between BT and alternative providers. Therefore, more rapid developments in the market are needed than can be

achieved by the general network access remedy alone. Therefore, we consider that it is necessary for us to require BT to provide a specific form of network access. This approach means that telecoms providers will have certainty as to the basis on which they may have access to BT's physical infrastructure, while retaining the option of being able to request an alternative variant of network access under the general obligation where appropriate.

5.18 A specified network access remedy in the form of PIA would directly address the identified competition problem by requiring BT to provide access to its physical infrastructure on regulated terms as quickly as reasonably possible and overcome any industry inertia that might be associated with the development of a new remedy. PIA would ensure that the network access requirement we are proposing quickly leads to an effective remedy which we anticipate will:

- a) lower the cost of deploying fibre networks and make alternative network build more likely; and
- b) facilitate greater competition higher up the supply chain, allowing telecoms providers to create their own active services and exposing active components to competition.

5.19 When considering the form of our network access obligation, our starting point is to consider imposing a network access obligation without any restrictions on usage or geographic scope. In most instances where we impose network access obligations, such restrictions are unnecessary as the obligations are typically not expected to result in effects on products in other markets. In addition, restrictions present a risk of regulatory failure as they may limit a telecoms providers' flexibility to use the remedy in ways not foreseen by the regulator but nevertheless consistent with the intended purpose of the remedy, which may reduce the effectiveness of the remedy. Therefore, in most cases, imposing an unrestricted network access obligation is both appropriate and proportionate. For example, the LLU and VULA obligations we imposed in the 2018 WLA market review have no such usage restrictions.¹³⁷

5.20 However, to a greater extent than other forms of network access, an unrestricted PIA obligation can be used as an upstream input into several downstream products; a PIA remedy without usage or geographic scope restrictions can be used in the deployment of any service in any location and some of these uses and locations will impact on downstream markets. In particular, there might be a risk that an unrestricted PIA remedy may impact competition in downstream markets that are already competitive, stifle dynamic and allocative efficiency, increase the cost of competition and Openreach's costs and resource requirements, and cause some unintended effects related to network adjustments. We have therefore considered:

- a) the impact of any usage or geographic scope restrictions on the effectiveness of PIA in Physical Infrastructure markets; and

¹³⁷ Local loop unbundling (LLU) enables telecoms providers to take control of BT's physical telephone lines so that they can provide services direct to end customers. Virtual Unbundled Local Access (VULA) is used to deliver superfast broadband over BT's FTTC network.

- b) the potential impact of PIA on downstream markets.

Impact of usage or geographic scope restrictions on the effectiveness of PIA

- 5.21 As explained above, we are proposing to require BT to provide PIA to address BT's incentive and ability to refuse or impede access to its physical infrastructure which arises out of its SMP in that infrastructure. In doing so, our aim is to facilitate third party network build using BT's infrastructure which in turn will promote competition in downstream services. We consider that imposing usage or geographic scope restrictions on PIA risks undermining the effectiveness of PIA in achieving this aim.
- 5.22 Usage restrictions would undermine the effectiveness of PIA. Limiting technology flexibility and limiting the scope of the PIA remedy is likely to materially increase the risk that a telecoms provider may take the view that it is not viable to invest in the first place. For example, a fibre network is costly to build, but once deployed has almost limitless capacity. The commercial business case for the initial investment therefore typically relies on using this capacity to generate as many different revenue streams as possible, through a wide range of different services. Information received from stakeholders as part of the 2018 WLA market review supports this and suggests that any usage restrictions reduce the viability of their business cases, limiting the extent that investments could be justified. Therefore, in order to be effective, we consider the PIA remedy needs to allow telecoms providers to be able to take full advantage of the technologies available, the density of potential customers, and to achieve sufficient scale and scope.¹³⁸ Limiting the usage of the PIA remedy also removes the ability of telecoms providers to exploit the economies of scope possible from deploying and providing multiple services jointly on a single network.
- 5.23 Any restrictions placed on the geographic scope of the proposed PIA remedy would also impede its effectiveness. Any networks built now are likely to differ substantially in terms of architecture from BT's legacy network. Therefore, such a restriction would limit network architecture to that of BT's network and in doing so deter network investment and impede innovation.
- 5.24 We also consider restricting the flexibility of network builders to provide downstream services on either a service or geographic basis will impede their ability to compete downstream. To allow for effective network competition, network builders require flexibility at least equivalent to that BT has. BT is able to use any part of its physical infrastructure without any restrictions to deploy telecoms networks for any purpose and in any location. For example, BT's Single Fibre Network strategy¹³⁹ utilises this freedom by

¹³⁸ We set out in more detail the importance of technological flexibility to meet future demand and economies of scope in paragraphs 2.115-2.140 of Volume 3, 2018 WLA Statement.

¹³⁹ Openreach provided a slide pack summarising its current thinking on a potential new architecture for a fibre network - referred to as a 'single fibre network' - which could potentially be used to deliver a range of fibre-based products, including NGA broadband services and other Ethernet based services across four key market segments (Corporate, SME, Consumer, Mobile). The slide pack identified the following potential benefits of deploying a single fibre network: (1) improved delivery times, (2) a one-dig approach, building once for all fibre products; and (3) building network in the right place based on forecasted customer demand. Openreach response to question 1 of the WLA s.135 notice issued on 7 February 2018.

converging its residential and business fibre plant¹⁴⁰ in the most suitable architecture. Thus, BT leverages the cost savings and potential revenue benefits of both markets, while using the most cost-effective routes in its physical infrastructure. We therefore, believe that for downstream competition to become effective, the same flexibility and the same opportunity for efficiency gains needs to be available to all access seekers.

- 5.25 Another possible approach would be to impose targeted usage or geographic scope restrictions to prevent the use of PIA in respect of downstream markets that are already competitive. However, we consider that such an approach would undermine network investment for the reasons set out above and be unworkable in practice. We set out below some targeted PIA usage or geographic scope restrictions and explain why this is the case for each.
- 5.26 In our 2018 BCMR Consultation, we propose to find the market for provision of leased lines in the Central London Area¹⁴¹ to be competitive. We consider that specifying a restriction which prevents the use of PIA for leased lines in this geographic area will render the remedy ineffective.
- 5.27 First, a restriction on the use of PIA for leased lines in the CLA would reduce the incentives for investment for access seekers deploying telecoms networks at large-scale:
- a) Some access seekers would need to choose longer routes to connect adjacent areas or “mix and match” BT’s physical infrastructure with that of other telecoms providers in the CLA, which will increase their deployment costs. Therefore, access seekers would not be able to compete on the same level field as BT, which has freedom to choose the shortest and most cost-efficient routes.
 - b) Access seekers considering the use of Openreach’s duct and poles would not necessarily have the full flexibility they may need. For instance, an access seeker may want to use duct and pole access to provide leased lines for businesses, mobile backhaul for mobile operators (for example, for small cells) and, only later, fixed broadband services for residential consumers. A restriction on the use of PIA will create uncertainty and lack of flexibility that Openreach itself does not face.
 - c) Restrictions on the types of services offered in the CLA would also effectively create a validation process where BT would have to confirm the acceptability of an access request based on the services that will be offered, thereby restricting the flexibility and innovation of new network builders. This would create an unnecessary barrier to entry for access seekers, increasing uncertainty (i.e. whether a proposal will be compliant) and cost.
- 5.28 Second, defining access with reference to service type, inherently works against innovation as it restricts requests to access for currently recognised services. This would reduce the

¹⁴⁰ Deploying fibre optic cables that will be used to serve both residential and business customers.

¹⁴¹ The CLA broadly corresponds to the Central Activities Zone defined by the Greater London Authority as London’s business centre. See <https://www.london.gov.uk/what-we-do/planning/implementing-london-plan/supplementary-planning-guidance/central-activities-zone>

incentives for deployment of contemporary telecoms networks where the delineation between broadband and leased line services continues to lose its relevancy.

- 5.29 In our 2018 BCMR Consultation, we also propose to find that BT has no SMP in the provision of leased lines on certain Inter-Exchange Connectivity routes. Here too, we consider that specifying a restriction which excludes the application of PIA in this market will render the remedy ineffective.
- 5.30 Restrictions, such as the exclusion of certain Inter-Exchange Connectivity routes for leased lines purposes,¹⁴² would impose restrictions on the architecture of access seeker networks. While ducts may serve inter-exchange BT routes they may be equally valuable to access seekers wishing to deploy novel network designs. Geographic restrictions of this nature will therefore increase the cost of alternative network deployment cost, while allowing BT to retain the flexible use of such duct reinforcing their SMP position.
- 5.31 We therefore consider that imposing any restrictions on the PIA remedy will render it ineffective.

Potential impact of PIA on downstream markets

- 5.32 Given our provisional view that the effectiveness of our proposed PIA remedy would be undermined by imposing use or geographic scope restrictions, we have considered the potential impact of our proposed approach on downstream markets to assess whether there are any adverse effects arising which are disproportionate to our overall aim.
- 5.33 While our detailed assessment of the costs is set out in Annex 9, we provisionally find that in this review period any adverse effects arising are not disproportionate to our overall aim for the following reasons.
- a) **Impact on dynamic efficiency:** in relation to telecoms providers other than BT, we expect an effective PIA remedy to reduce the absolute costs and time required to build ultrafast broadband networks at scale which will encourage competitors to invest in their own networks. To the extent our remedy displaces some end-to-end competition, this is likely to be outweighed by the significant benefits of realising network competition based on PIA in potentially many more geographic areas. In relation to BT, we expect that competition, or threat of competition, under our proposed PIA remedy, will encourage BT to invest in their own networks. The impact on BT's cost recovery, specifically in the leased lines market, is likely to be minimal given the low take up expected in this review period. In the longer term the impact on BT's volumes could be more significant, but that is a matter we can consider at future regulatory reviews.
 - b) **Impact on BT's pricing structure:** we have considered the risk that the widespread use of the PIA remedy could result in BT having to change its pricing structure, with

¹⁴² Inter-Exchange routes are an artefact of BT network topology. PSTN networks use twisted-pair copper telephone lines to transmit voice calls. The signal attenuation of copper lines limits their effective range to about 4.5km. This has restricted the length and location of BT's duct and pole infrastructure and the size, location and number of BT's local exchanges. By contrast, contemporary telecoms networks using fibre technologies can support an operating range of about 70km.

potential reductions in allocative efficiency. However, taking regulatory measures in order to encourage relatively efficient pricing in circumstances where competition is absent does not imply that it is desirable to restrict (or avoid promoting) competition simply in order to preserve Openreach's ability to set prices flexibly. Although more competition would mean Openreach will have less control over pricing, that is a natural and desirable constituent of a more competitive market.

- c) **Impact on cost of competition:** PIA-based competition entails some duplication of fixed costs, such as fibre and active network elements, which could put upward pressure on industry average costs. However, in the long-term we expect new technologies to be required which will likely involve some element of duplication of the existing copper network and new networks, whether or not PIA is utilised for deployment of new technologies. By removing the need to dig, PIA minimises the duplication of fixed costs when competitors roll out networks.
- d) **Additional costs and resource requirements imposed on Openreach:** we have considered the effect of unrestricted PIA on BT's productisation costs and network adjustment costs.¹⁴³ In relation to PIA productisation costs, we consider the vast majority of these costs to be sunk and we do not expect BT to incur any material additional costs in adapting the existing PIA remedy for unrestricted use. In relation to network adjustment costs, we consider the resource burden to be sufficiently predictable for BT to manage without any significant adverse impact.
- e) **Impact on competitive markets:** we have considered the potential impact of unrestricted PIA on deregulated services and areas that are already competitive. Our current view is that PIA is not likely to have a large distortive impact on competition in these markets. PIA should lead to additional competition in these markets, which would benefit consumers through lower prices and better services. While it could be argued that more competition will be detrimental to existing operators in these markets, duct access will also reduce these operator's costs of supply, enabling them to compete better where they do not have an existing connection.
- f) **Externalities caused by our approach to network adjustment costs:** any requests for network adjustments will only arise where other telecoms providers are using PIA to deploy competing networks. Therefore, the scale of any impacts is contingent on the scale of network deployment, and so is directly linked to the scale of the benefits that result from imposing the PIA remedy. As a result, we consider that any adverse impacts are more likely to be justified by significant benefits to consumers in the longer term from greater network competitions.

5.34 We believe that, taken together, the adverse effects we have identified above are likely to be outweighed by the significant benefits to consumers arising from promoting greater network competition. These benefits include greater choice, innovation (including

¹⁴³ We refer to the costs Openreach incurs in setting up and managing the PIA product, and processing individual PIA orders, as 'productisation' costs.

innovation to increase efficiency and lower costs), stronger incentives to price keenly to attract customers and higher quality of service.

- 5.35 Therefore, in view of the analysis above, we consider the proposed unrestricted PIA remedy is proportionate. For the reasons set out above and in the discussion of network adjustments below, we consider that our proposals go no further than is necessary to address BT's SMP in Physical Infrastructure markets.

Single remedy for all proposed geographic markets

- 5.36 While our analysis suggests for the reasons set out in Section 3 above that there are variations in the competitive conditions between each Physical Infrastructure market sufficient to define separate geographic markets, the form of the specific remedy we are proposing in each market is the same. The competition advantage arising out of BT's SMP in each of the Physical Infrastructure markets is its ability to use its access to its physical infrastructure in a flexible, low cost manner without specific reference to the nature of the telecoms asset being deployed. The form of specific remedy that we are proposing to impose addresses this competitive advantage and as such is a necessary response in each of the markets.

Specific requirement for PIA to include dark fibre access if access to physical infrastructure is not available

- 5.37 Access to physical infrastructure is only possible when there is space available. While we are proposing that PIA includes an obligation to make network adjustments, we have considered whether PIA should also include a requirement to make available to the access seeker any existing spare unlit fibre in cases where network adjustments are not available.
- 5.38 As such a dark fibre provision would only be required where network adjustments are not feasible and/or do not promote economic efficiency (see discussion of network adjustments below). Moreover, such a dark fibre provision would only be possible where there exists spare optical fibre capacity (as additional fibre could clearly not be inserted). In our assessment, the number of instances when such a remedy would be available would be highly limited and accordingly, we do not think it would be appropriate or proportionate at this time to specify that PIA must include such a requirement. We would be open to reconsidering this in the future should evidence emerge that the demand and Openreach capacity to supply in the event of the demand are greater than we anticipate.
- 5.39 We observe that only three EU countries - Portugal, Spain and Ireland - have imposed a dark fibre backstop type remedy. However, to date, none of these countries has seen any take up of the product. We also note that during our engagement with stakeholders in preparation for this consultation, the dark fibre adjunct remedy was not raised.
- 5.40 We note also that it would be open to CPs to request a form of PIA incorporating a dark fibre component under the network access condition through the Statement of Requirements process to the extent that such a request comprises a reasonable request for network access under the condition. Such an approach would allow any such product to

be shaped by access seekers requirements and industry demand, which would avoid the risk of regulatory failure associated with our mandating the product.

- 5.41 Therefore, for the reasons set out above, our provisional view is that it is not appropriate or proportionate at this time to include within PIA a requirement to include a dark fibre backstop. However, we would be interested in stakeholder views on the effectiveness and proportionality of imposing such a remedy now or in the future.

Network adjustments

Our proposals

- 5.42 We are proposing an obligation on BT to provide network access in the form of PIA. The concept of network access includes making adjustments in order to make available to another user facilities and/or services for the purpose of providing electronic communications services. Therefore, the PIA obligation we are imposing includes a requirement on BT to make adjustments to its physical infrastructure network in the circumstances explained below (which we refer to in this section as ‘network adjustments’). In proposing the scope of PIA, we have assessed what level of adjustment is appropriate and proportionate to make BT’s physical infrastructure network available in the context of BT’s SMP in this market. Specifically, we consider below the extent of this obligation where BT’s physical infrastructure network is unusable.

Our reasoning

Openreach should be required to make adjustments to its infrastructure where it is unusable

- 5.43 Telecoms providers using PIA to deploy a competing network will encounter sections of infrastructure which they cannot use, either because the existing infrastructure is faulty or because there is insufficient capacity in that section. For the reasons set out below, our provisional view is that the remedy will be ineffective unless Openreach is required to adjust the physical infrastructure network to make it available for use in certain circumstances.
- 5.44 Our reason for proposing to require BT to provide network access in the form of PIA is to promote competition by facilitating third-party investment in competing networks. We consider that the efficiencies arising out of deploying a network using PIA, instead of building a new physical infrastructure network, will facilitate investment which would not otherwise be viable. In particular, rival telecoms providers avoid the costs and time associated with duplicating the physical infrastructure network, and instead only pay a share of the costs of the existing physical infrastructure. Our objective in imposing PIA is to unlock these efficiencies to the greatest extent possible to help facilitate such investment.

- 5.45 When a telecoms provider encounters an unusable section of BT's physical infrastructure when deploying a rival access network using PIA, it will be necessary to overcome this.¹⁴⁴ One approach would be for telecoms providers to install their own ducts or poles alongside BT's to circumvent the unusable section in BT's infrastructure. Another approach would be for Openreach to adjust the existing physical infrastructure to remedy the unusable section, for example, by repairing the faulty infrastructure or installing additional capacity where the existing capacity is full.
- 5.46 Given the range of options available to Openreach to overcome unusable sections of infrastructure, it will sometimes be more efficient (i.e. quicker, easier and/or cheaper) for Openreach to adjust the existing physical infrastructure than for a telecoms provider to install their own infrastructure alongside BT's. For example, it may cost less for Openreach to repair faulty infrastructure than for a telecoms provider to build new, parallel infrastructure.
- 5.47 Without a requirement on Openreach to adjust the existing physical infrastructure in these cases, telecoms providers deploying rival networks would need to incur additional cost and/or delay building their own infrastructure to overcome unusable sections of BT's physical infrastructure. The deployment of rival networks will therefore entail unnecessary duplication of the physical infrastructure network, and the benefits from sharing BT's existing physical infrastructure will not be fully realised. Ultimately, this will reduce the scope for competitive network investment, and in general the remedy will be less effective.
- 5.48 Moreover, requiring telecoms providers to install their own infrastructure to bypass the unusable sections would not ensure a level playing field with Openreach in those cases where it can overcome unusable sections of infrastructure at lower cost in any competing network deployment of its own (for example, an FTTP deployment). Knowing that Openreach has this competitive advantage could undermine incentives to invest in rival networks in the first place, rendering the PIA remedy ineffective as a basis for scale rollout of competing networks.
- 5.49 Therefore, we propose that the PIA access obligation should extend to requiring Openreach to make adjustments to its network where this is necessary for its physical infrastructure network to be available to telecoms providers for the purpose of deploying their own networks, including making certain adjustments to its network to overcome unusable sections of the physical infrastructure. This would promote network competition by realising greater efficiency benefits from sharing BT's existing physical infrastructure and ensuring a level playing field with Openreach. Without such a requirement, the

¹⁴⁴ With respect to the WLA market, in paragraph 4.25 of the April 2017 DPA Consultation, we set out examples of where unusable sections of infrastructure will be encountered, based on BT's own surveys of its physical infrastructure commissioned in 2008 and 2009, as well as more recent surveys carried out by other telecoms providers with a view to using the physical infrastructure access obligation in the WLA market. We set out a number of examples in more detail in Section 2, Volume 3 of the 2018 WLA Statement, and evidence as to their incidence in Annex 26 of the 2018 WLA Statement.

benefits resulting from other telecoms providers deploying ultrafast networks at scale are unlikely to be realised in full.

The proposed requirement to make adjustments is limited

- 5.50 We have considered the approach we should take to specifying the extent of the obligation on Openreach to make adjustments to its network. In our view, specifying the precise extent of this obligation in the SMP condition carries a risk of regulatory failure given that what is necessary is likely to depend on the specific circumstances of any case. Given the risk of regulatory failure, we do not believe it is appropriate to set prescriptive rules about which types of adjustments are included in the obligation. We therefore propose to supplement the general and specific network access requirements with guidance on where this obligation would apply.
- 5.51 While our approach allows Openreach some degree of flexibility, we are concerned to ensure that Openreach does not act unreasonably. Therefore, where Openreach refuses a request for network access, it should provide reasons for doing so. Furthermore, if it becomes apparent that this approach is not working, we will reconsider whether it is appropriate to adopt a more prescriptive approach.
- 5.52 When designing our proposed guidance on the extent of the network adjustments requirement we have taken into account the factors set out in section 87(4) of the Act, in particular:
- a) the technical and economic viability (including the viability of other network access products, whether provided by the dominant provider or another person), having regard to the state of market development, of installing and using facilities that would make the proposed network access unnecessary;
 - b) the feasibility of the provision of the proposed network access;
 - c) the investment made by the person initially providing or making available the network or other facility in respect of which an entitlement to network access is proposed (taking account of any public investment made);
 - d) the need to secure effective competition (including, where it appears to us to be appropriate, economically efficient infrastructure-based competition) in the long-term.
- 5.53 In selecting these criteria, we have taken particular account of the first, second and fourth of the 87(4) factors set out above. We consider these factors follow on from our reasons for proposing a PIA obligation. Without access to BT's physical infrastructure network, large-scale network deployment in significant parts of the country is likely to be unviable. As explained above, without an obligation to make network adjustments, the scope for competitive network investment will be reduced. Moreover, our objective in proposing PIA is to unlock the efficiencies arising from sharing existing infrastructure to the greatest extent possible to help facilitate competitive network investment at scale, and therefore promote effective competition in the long-term. However, in proposing PIA we are concerned that the obligation is appropriately limited and that we do not create incentives to use PIA where this is not necessary.

- 5.54 Specifically, our provisional view is that the following three criteria should be applied to determine whether a particular network adjustment falls within the scope of the PIA obligation.
- **Is the requested adjustment necessary?** This criterion considers the narrow question of whether an alternative option exists which would render the requested adjustment unnecessary, taking account of the first factor set out in section 87(4) of the Act.
 - **Is the requested adjustment feasible?** This criterion considers whether there are barriers that prevent Openreach from being able to make the required adjustment, taking account of the second factor set out in section 87(4) of the Act.
 - **Does the requested adjustment improve efficiency?** This criterion considers whether the requested adjustment promotes efficiency and is therefore consistent with our rationale for requiring BT to provide network access in the form of PIA (i.e. to unlock the efficiencies from sharing existing infrastructure). This takes account of the fourth factor set out in section 87(4) of the Act.
- 5.55 With respect to the third factor set out in section 87(4) of the Act, we take account of this through our approach to cost recovery, set out in Section 6. Specifically, we propose to ensure that Openreach has a fair opportunity to recover the costs of any network adjustments.

The three criteria for determining whether the obligation to make a network adjustment applies

- 5.56 Network adjustments involve facilitating access to existing infrastructure, rather than the construction of new infrastructure. Since the proposed network access obligation would require Openreach to provide access to existing physical infrastructure, it does not require Openreach to construct physical infrastructure on behalf of other telecoms providers. This does not mean that under our proposals Openreach would never be required to construct new physical infrastructure assets (e.g. new ducts, chambers or poles), but where it is required to do so, this would be for the purposes of facilitating access to existing physical infrastructure. Therefore, under our proposals Openreach should not be required to construct new physical infrastructure for rival telecoms providers in geographic locations where it does not already have infrastructure (i.e. outside its network footprint). This would amount to an extension of the infrastructure network rather than making use of existing infrastructure assets and would therefore always fall outside the scope of our proposed network access obligation. Similarly, where additional capacity is required within the existing network footprint, as the amount of additional capacity sought increases relative to the total capacity in that section of the existing infrastructure, the work required to provide that capacity is increasingly likely to resemble the construction of new parallel physical infrastructure, rather than the augmentation of the existing infrastructure.
- 5.57 Network adjustments involve making changes which are permanent. It is sometimes necessary to remove obstructions preventing use of existing infrastructure that is

otherwise in good working order.¹⁴⁵ Our provisional view is that it is more appropriate to regard the removal of obstructions as ancillary activities associated with the deployment and maintenance of access networks, rather than network adjustments. This is because activities associated with removing obstructions often need to be undertaken every time cables are to be installed or where a telecoms provider or Openreach needs to access its fibre network as part of on-going maintenance or repair of that fibre. The ability of telecoms providers to remove such obstructions would be provided for by virtue of our proposed requirement on BT to provide certain ancillary services, but we do not regard them as network adjustments.¹⁴⁶ In contrast, our provisional view is that network adjustments should involve permanent changes which are required to facilitate access to the physical infrastructure. Generally, this would involve making a permanent change to the physical infrastructure itself, although as we explain below, it may involve the permanent removal of redundant cables or equipment left in the physical infrastructure.¹⁴⁷

5.58 Below, we explain how we propose to apply the three criteria identified above, to determine whether a particular network adjustment falls within the scope of the PIA obligation. We consider that these criteria are cumulative, i.e. Openreach should only be required to make adjustments where all three criteria are met.

Is the requested adjustment necessary?

5.59 In some of the cases where a telecoms provider encounters an unusable section of physical infrastructure, an alternative option still using BT's physical infrastructure may exist which would enable the telecoms provider to deploy its access network without an adjustment to the physical infrastructure being made. Our provisional view is that provided these alternatives allow for a reasonably equivalent outcome for the telecoms provider compared to making an adjustment, Openreach is unlikely to be under an obligation to remedy the unusable section of the physical infrastructure.¹⁴⁸

Is the requested adjustment feasible?

5.60 Our provisional view is that adjustments which are infeasible are not required under the network access obligation. In some cases, there may be technical, operational or legal barriers that prevent Openreach from being able to make the required adjustment, for example, wayleave access for the work is not granted, or planning restrictions are in place.

¹⁴⁵ For example, removing silt from ducts, or pumping water out of chambers before being able to deploy and maintain access networks through Openreach's underground physical infrastructure. Similarly, it is sometimes necessary to cut back trees to access the top of poles and install or maintain dropwires or pole-top equipment.

¹⁴⁶ The practical effect of this is that these ancillary activities are not subject to our proposals regarding the recovery of network adjustment costs.

¹⁴⁷ The removal of redundant cables or equipment left in the physical infrastructure by telecoms providers using the infrastructure (including BT), is distinct from changes to BT's active network. We are not proposing that the latter is part of the PIA remedy (although under our proposals BT can choose to meet its obligations to make network adjustments by making changes to its active network in lieu of making a network adjustment).

¹⁴⁸ For further discussion please see paragraph 2.52 of Section 2, Volume 3, 2018 WLA Statement.

5.61 In some cases, such barriers may not be insurmountable, but the cost involved in overcoming any barriers would be significant. We consider that this is addressed by the third factor discussed below (i.e. whether the adjustment is efficient).

Does the requested adjustment improve efficiency?

5.62 We provisionally consider that Openreach should only be required to make adjustments where this improves efficiency (i.e. it is quicker, easier and/or cheaper for Openreach to adjust the existing physical infrastructure than for a telecoms provider to install its own infrastructure alongside BT's). This is consistent with our rationale for proposing to require BT to provide network access in the form of PIA. We want to encourage infrastructure sharing when it is more efficient than the other options available to a telecoms provider, such as building its own physical infrastructure, as these efficiencies will facilitate investment which would not otherwise be viable.

5.63 If telecoms providers paid the full upfront cost of any network adjustments they requested, we would expect them to have incentives to request network adjustments only where this was the most efficient way to overcome unusable sections of physical infrastructure. However, for the reasons set out in Section 6, we propose that Openreach should recover the costs of network adjustments over all users of the physical infrastructure up to a financial limit. We recognise that as a result, telecoms providers may not have the incentive to choose the most efficient solution to overcome unusable sections of physical infrastructure (for example, when choosing between requesting a network adjustment or building their own parallel infrastructure).

5.64 Given the risk that telecoms providers request network adjustments which would be inefficient, we propose that Openreach should only be required to make adjustments to its physical infrastructure where this improves efficiency.¹⁴⁹

5.65 We propose to consider whether this is the case by comparing two scenarios:

- a) Openreach adjusts its physical infrastructure to remedy the unusable section of Openreach's infrastructure (the 'factual' scenario); and
- b) the telecoms provider builds its own network asset to circumvent the unusable section of Openreach's infrastructure (the 'counterfactual' scenario).

¹⁴⁹ This reflects our aim in proposing to require Openreach to make network adjustments, namely, to avoid unnecessary duplication of the physical infrastructure in situations where it is quicker, easier and/or cheaper for Openreach to adjust the infrastructure than for a telecoms provider to install their own infrastructure. We recognise that it might be argued that Openreach should also be required to make network adjustments in situations where the adjustment is as efficient as the telecoms provider installing its own infrastructure, on the basis that this would promote greater network competition (as the costs of these additional adjustments would be recovered across all users of the infrastructure under our approach to cost recovery) and would still ensure telecoms providers cannot request network adjustments which would be inefficient. However, at this stage, we are not persuaded that such an obligation is necessary to ensure effective competition in the long term, or proportionate given our current understanding of the benefits and risks. For the avoidance of doubt, our proposed approach does not prevent Openreach from choosing to undertake a broader set of network adjustments than required under the network access obligation, provided it treats all telecoms providers including BT in the same way (unless differences can be justified).

- 5.66 We propose that Openreach should only be required to make adjustments where the factual scenario is more efficient than the counterfactual scenario, for example, it is quicker, easier and/or cheaper.¹⁵⁰
- 5.67 In this comparison, the cost in the factual scenario should be the incremental cost to Openreach of making the adjustment at the telecoms provider's request. For example, if Openreach would have carried out the work anyway, even if the telecoms provider had not requested the adjustment, the incremental cost will be lower than the cost of the civil works (and in some cases could be zero).
- 5.68 Moreover, the factual and counterfactual scenarios should be based on Openreach's own engineering practices applicable at the time. This would ensure that Openreach cannot refuse requests for network adjustments by requiring competing telecoms providers to choose a lower cost engineering solution that it would not choose for itself. This approach would also provide greater certainty to Openreach and competing telecoms providers in cases where a range of engineering solutions might exist.
- 5.69 We recognise that it might be argued that even in cases where it is more efficient for Openreach to make an adjustment than for the telecoms provider to build its own network asset, the costs involved in making the adjustment outweigh the benefits of making of the adjustment (i.e. so the adjustment could still be considered inefficient). At the level of individual network adjustments, we think a comparison of the costs and benefits is unlikely to be a meaningful exercise. This is because the benefits of making network adjustments – i.e. more fully realising the efficiency benefits of sharing the existing infrastructure, thereby increasing the scope for competitive network investment – arise from the cumulative impact of multiple adjustments, rather than an individual network adjustment. We consider that the risks of the costs outweighing the benefits should be assessed at the overall level of whether the entry of a competing network provider is efficient, and address this in Section 6.

Illustrative examples of whether the obligation to make a network adjustment applies

- 5.70 The extent to which an adjustment falls within the scope of the PIA obligation will depend on the application of the factors set out above to the relevant facts. In the 2018 WLA Statement, in order to provide certainty to Openreach and potential investors about the likely extent of the network access obligation, we considered how these three factors might apply to a number of examples.¹⁵¹ These illustrated the situations where we would expect the physical infrastructure access obligation imposed in the WLA market applies, and situations where it is not expected to apply. We consider that the same examples are relevant to the PIA remedy proposed in this consultation.

¹⁵⁰ We note that time and difficulty (or operational complexity) can be thought of as drivers of additional costs.

¹⁵¹ 2018 WLA Statement, paragraphs 2.63-2.88.

Openreach should choose how to undertake network adjustments.

- 5.71 We propose that where an adjustment is necessary for Openreach's physical infrastructure network to be available to telecoms providers for the purpose of deploying their own networks, Openreach should be able to choose the form of adjustment it makes to meet its obligation. This would provide Openreach with the flexibility to choose the most efficient solution possible, and allows it to take account of its own future requirements.
- 5.72 Notwithstanding the benefits of giving Openreach flexibility, it is important that Openreach is not able to exploit this flexibility to undermine the effectiveness of the remedy. We consider that our broader proposals prevent Openreach from doing this in the following ways:
- a) The non-discrimination requirements we are proposing to impose on BT prevent Openreach from applying a different approach for external PIA users to the approach taken for its own network deployments unless such a difference can be justified (see Section 4);
 - b) The requirement to produce a Reference Offer includes a requirement to set out the terms and conditions on which other providers may purchase PIA and access BT's infrastructure (see Section 4 and below);
 - c) Our proposal for how BT should recover the costs of making any adjustments provide Openreach with the incentive to select the most efficient approach and limit the incentive to select high cost solutions to increase a competing telecoms provider's costs of deployment (see Section 6)
- 5.73 Some network adjustments may be just as easily carried out by the telecoms provider. For the avoidance of doubt, our guidance sets out where a network adjustment is likely to be required. If an adjustment falls within the scope of the access obligation, although the responsibility for the adjustment rests with Openreach, it may meet this requirement by agreeing with industry arrangements for the telecoms provider to undertake the works itself (effectively on behalf of Openreach).¹⁵²

Breaking in and out of BT's network infrastructure

- 5.74 Telecoms providers are likely to deploy hybrid networks, using a mixture of Openreach's infrastructure and their own infrastructure.¹⁵³ Therefore, to make effective use of Openreach's physical infrastructure, telecoms providers need to be able to break in and out of the infrastructure to interconnect with their own infrastructure.¹⁵⁴ In addition, the ability of telecoms providers to overcome unusable sections of Openreach's physical

¹⁵² As network adjustments are made to Openreach's physical infrastructure, Openreach will retain ownership of the relevant assets.

¹⁵³ We expect most deployments to be hybrid designs.

¹⁵⁴ For examples of when telecoms providers may need to break in and out of BT's infrastructure see paragraph 2.92 and footnote 71, Section 3, Volume 3, 2018 WLA Statement.

infrastructure as efficiently as Openreach depends on the ability to break in and out of Openreach's physical infrastructure at particular points.¹⁵⁵

- 5.75 For the avoidance of doubt, the ability of telecoms providers to break in and out of the infrastructure is provided for by virtue of the proposed requirement on BT to provide certain ancillary services, but we do not regard breaking in and out of the network as network adjustments on the basis that these are for the purpose of enabling hybrid networks rather than making Openreach's network ready for use.

Specific requirement to provide PIA ancillary services

Our proposals

- 5.76 We propose that BT should be required to provide such PIA ancillary services as may be reasonably necessary for such use of PIA, including as a minimum: power, PIA Co-Location, PIA Co-Mingling (the provision of space and the ability to house equipment in a BT telephone exchange or equivalent), PIA Site Access (access to equipment that the telecoms provider has in a BT telephone exchange or equivalent) and PIA Database Access.

Our reasoning

- 5.77 We consider that it is appropriate and proportionate to require BT to provide PIA ancillary services.
- 5.78 A requirement to offer access to ancillary services has the purpose of assisting in promoting competition in downstream markets. We consider that such ancillary services are necessary to support the provision and use of PIA. For example, having access to sites where a telecoms provider locates its electronic equipment for the purposes of deploying a network using PIA.
- 5.79 In the absence of a requirement to offer ancillary services, there is a risk that BT would have the ability and incentive not to provide access to those ancillary services in order to render the PIA remedy ineffective.
- 5.80 We believe it is appropriate to limit such an obligation to only those PIA ancillary services as may be reasonably necessary for such use of PIA. In doing so, we consider that the requirement goes no further than is necessary to promote efficient and sustainable competition for the maximum benefit of customers of telecoms providers.
- 5.81 We also consider that it is necessary to impose certain specific ancillary services in relation to PIA. Our starting point for these is the specific physical infrastructure access services we imposed on BT in the WLA market which we think are equally necessary in the Physical Infrastructure markets. Therefore, we are proposing to impose a requirement on BT to

¹⁵⁵ For example, the ability to install duct directly between Openreach's chambers requires that they can break out of the end walls of Openreach's chambers (i.e. in the direction of the duct run).

provide PIA power, PIA Co-Location, PIA Co-Mingling, PIA Site Access and PIA Database Access, by specifying these in the PIA condition.

- 5.82 To give effect to our proposals in respect of a specific access remedy and supporting ancillary services set out in paragraphs 5.14 to 5.81 above we propose to set the draft SMP conditions at Annex 10. As set out in Section 8 section 87(3) of the Act authorises Ofcom to set SMP services conditions in relation to network access.
- 5.83 In determining which conditions are authorised by section 87(3) to set in a particular case, we must take into account, in particular, the factors set out in section 87(4). As set out in Section 8, in this case we consider that: the economic viability of building alternative access networks means that in the absence of regulatory intervention, it is unlikely there will be significant network build by telecoms providers other than BT; we consider that it is feasible for BT to provide the physical infrastructure access we are proposing to require and we have designed the scope of our proposed requirement with this in mind; we do not consider that our proposal will risk undermining BT's investment made by BT in its network; and we consider that our proposed network access requirement is an important element of securing economically efficient infrastructure based competition.

Specific requirements for the publication of a Reference Offer

- 5.84 In Section 4 we propose a requirement on BT to publish a reference offer in relation to network access in the Physical Infrastructure market. We have therefore considered whether to supplement this with specific requirements in relation to PIA.

Our proposals

- 5.85 We consider that it is appropriate and proportionate to impose a requirement on BT to publish a reference offer in relation to PIA in each Physical Infrastructure market. We are proposing to do so by imposing the same set of specific requirements for the publication of a Reference Offer in relation to PIA as those we have already imposed on BT in the WLA market in relation to the physical infrastructure access obligation in that market.

Our reasoning

- 5.86 As explained in Section 4 above, a requirement to publish a RO has two main purposes:
- a) to assist transparency for the monitoring of potential anti-competitive behaviour; and
 - b) to give visibility to the terms and conditions on which other providers will purchase wholesale services.
- 5.87 We consider that these purposes apply as much to PIA as they do to other forms of network access, such that a specific PIA reference offer is required in Physical Infrastructure markets.
- 5.88 In terms of the content of this obligation, we consider that it is appropriate to model our proposed PIA reference offer on the physical infrastructure reference offer requirement

we imposed as part of our WLA market review, which was imposed following a detailed assessment of BT's systems and processes.¹⁵⁶ Therefore, we propose that the PIA Reference Offer must set out (as a minimum):

- conditions for telecoms providers to gain access to Physical Infrastructure including if appropriate training, certification and authorisation requirements for personnel to access and work in/on Physical Infrastructure.
- conditions for the provision of forecasts by telecoms providers in respect of their future requirements for PIA.
- the location of Physical Infrastructure or the method by which telecoms providers may obtain information about the location of Physical Infrastructure.
- procedures for the provision of information to telecoms providers about spare capacity, including arrangements for visual surveys of Physical Infrastructure to determine spare capacity.
- conditions for the inspection of the Physical Infrastructure at which access is available or at which access has been refused on grounds of lack of capacity.
- technical specifications for PIA including:
 - technical specifications for permitted cables and associated equipment; and
 - cable installation, attachment and recovery methods.
- the methodology for calculating availability of spare capacity in Physical Infrastructure.
- conditions for reserving capacity that shall apply equally to BT and telecoms providers.
- arrangements for relieving congested Physical Infrastructure, including the repair of existing faulty infrastructure and the construction of new Physical Infrastructure.
- the information that a telecoms provider is required to provide to BT where that telecoms provider is requesting the repair of existing faulty infrastructure and/or the construction of new Physical Infrastructure necessary for SLAs and SLGs.
- Service Level Commitments and Service Level Guarantees in relation to the timescales for BT to respond to a request by a telecoms provider for PIA including where relevant to relieve congested Physical Infrastructure other than a congested Pole, where such a response confirms that the order has been accepted and includes how BT proposes to relieve that congestion.
- Service Level Commitments and Service Level Guarantees in relation to the timescales for completion by BT of any works necessary to relieve congested Physical Infrastructure (including the repair of existing faulty infrastructure and the construction of new physical infrastructure) other than a congested Pole.
- conditions on which telecoms providers may elect to undertake repair or build works on behalf of BT.
- conditions for the installation and recovery of cables and associated equipment.
- technical specifications for PIA, including:

¹⁵⁶ The exact detail of the Reference Offer that BT will make available pursuant to the obligation in the wholesale local access market is currently being negotiated with industry. BT is required to publish the final Reference Offer on 1 April 2019.

- technical specifications relevant to the repair of existing faulty Physical Infrastructure.
 - technical specifications relevant to undertaking build works.
 - Service Level Commitments and Service Level Guarantees in relation to the timescales for BT to respond to a request by a telecoms provider to undertake works itself to relieve congested Physical Infrastructure.
 - Service Level Commitments and Service Level Guarantees in relation to the timescales for BT to respond to a request by a telecoms provider to relieve a congested Pole where such a response confirms that the order has been accepted and how BT proposes to relieve that congestion.
 - Service Level Commitments and Service Level Guarantees in relation to the timescales for completion by BT of any works necessary to relieve a congested Pole.
 - the arrangements for maintenance of cables and associated equipment installed by telecoms providers and of the Physical Infrastructure, including the provision for the temporary occupation of additional infrastructure capacity for the installation of replacement cables.
- 5.89 We consider that these requirements comprise the minimum information necessary to achieve the purposes set out above in relation to PIA.
- 5.90 Our reasons for proposing to impose each of the above requirements in the Physical Infrastructure market are the same as those relied on in relation to the WLA market. Therefore, our reasons for proposing these specific reference offer requirements are as set out in Section 6, Volume 3 of the 2018 WLA Statement.
- 5.91 To give effect to these proposals, we propose to set the draft SMP conditions at Annex 10. As set out in Section 8 sections 87(6)(c) to (e) authorise the setting of SMP services conditions in relation to the Reference Offer.

Implementation timeframe

Our proposals

- 5.92 We propose to allow BT one month from the date of publication of the PIMR statement to implement our proposed specific remedies, including the proposed PIA remedy, specific requirement to provide PIA ancillary services, specific requirements for the publication of a Reference Offer, and price controls (see sections 6 and 7).

Our reasoning

- 5.93 We believe that our proposed specific remedies would lead to minimal disruption for the industry and only require a short implementation period because the proposed conditions, including price controls, are equivalent to the ones imposed in the 2018 WLA market review with the only difference being the removal of usage restrictions.

Consistency with EC Recommendations and the BEREC Common Position

- 5.94 In developing our proposed measures, we have taken due account of the NGA Recommendation and utmost account of the BEREC Common Position. We consider that our proposals are consistent with these measures.
- 5.95 The NGA Recommendation states that, where duct capacity is available, NRAs should mandate access to civil engineering infrastructure (Recommendation 13 of the NGA Recommendation). BP12(c) of the BEREC Common Position is to the same effect. The network access obligation we are proposing allows telecoms providers to access BT's physical infrastructure.
- 5.96 Recommendation 16 of the NGA Recommendation recommends that NRAs should, in accordance with market demand, encourage (or where legally possible under national law, oblige) the SMP operator, when building civil engineering infrastructure, to install sufficient capacity for other operators to make use of these facilities. While we do not propose to require BT to install additional capacity, our approach to relieving congested infrastructure gives BT the incentive to do so.
- 5.97 Recommendation 17 of the NGA Recommendation and BP28 of the Common Position propose the creation of a database containing information on civil engineering infrastructure. For the reasons explained in this section, we are proposing a requirement on BT to establish a physical infrastructure database. We consider that the scope of the information to be included in this database is appropriate in the context of the PIA requirement that we are proposing.
- 5.98 In relation to the objective of assurance of co-location at the access point (e.g. MDF, street cabinet, concentration point) and other associated facilities, the BEREC Common Position identifies, among other things, as best practice that:
- “**BP16** NRAs should impose obligations with regard to the provision of co-location and other associated facilities on a cost-oriented basis under clear rules and terms approved by the regulator to support viability of the access products mentioned above.
- BP16a** NRAs should ensure that the remedies allow the optimised use of alternative operators' existing infrastructures.
- BP16b** NRAs should ensure that these remedies allow co-location and other associated facilities to be used efficiently. In particular, NRAs should ensure that usage is not artificially segregated by product or market.”
- 5.99 We consider that our proposals are consistent with this best practice set out in the BEREC Common Position.

Consultation question(s)

Question 5.1: Do you agree with our proposed specific remedies? Please set out your reasons and supporting evidence for your response.

Question 5.2: Do you agree with our assessment not to impose a dark fibre backstop remedy in this review period? Please set out your reasons and supporting evidence for your response.

6. Cost recovery

- 6.1 In this section we set out our provisional view that:
- a) Openreach should recover network adjustment costs from all users of the infrastructure subject to a financial limit; and
 - b) Openreach should pool the productisation costs for PIA with those relating to BT's use of the infrastructure, and recover these from all users of the infrastructure.
- 6.2 This form of cost recovery would enable competing telecoms providers to access the infrastructure on a comparable basis to BT, directly addressing the competitive advantage BT currently holds due to its SMP.
- 6.3 In addition, we set out our proposals with respect to the level of the financial limit on the recovery of network adjustment costs, and how we would implement these proposals.

Cost recovery of network adjustments

- 6.4 In Section 5 we explain that the network access obligation should include a requirement on Openreach to make certain adjustments to its network. These adjustments are those necessary to make Openreach's physical infrastructure network available to telecoms providers for the purpose of deploying their own networks.
- 6.5 In this subsection, we consider how Openreach should recover the costs of making these network adjustments.

Our proposals

- 6.6 Our provisional view is that Openreach should recover network adjustment costs over all users of the infrastructure, in the same way as it does for adjustments relating to BT's deployments, subject to a financial limit.

Our reasoning

Openreach should recover the costs of network adjustments over all users of the physical infrastructure

- 6.7 We consider network adjustments required by competing telecoms providers are similar in nature to adjustments made by Openreach to support BT's own use of the physical infrastructure; both involve making necessary changes to facilitate continued use of the physical infrastructure for the provision of a range of downstream services.
- 6.8 To date, Openreach has to a large extent pooled the costs of infrastructure build and network adjustments required to accommodate the deployment and maintenance of BT's networks, and has recovered them across all users of the physical infrastructure via depreciation and return on capital employed on all products which use the physical infrastructure. This includes infrastructure costs relating to FTTP, FTTC and leased lines

deployments.^{157, 158} This means that even if the investment ultimately fails to generate the incremental revenues required to cover the incremental costs of the investment, the costs of network adjustments can still be recovered from products in markets in which BT has SMP.¹⁵⁹

- 6.9 We consider that Openreach should recover the costs of network adjustments required by competing telecoms providers in the same way as it does for BT, in order for other telecoms providers to face the same risk and cost profile as BT when considering an investment. Given the already high barriers to entry, such as the cost of deployment and BT's other incumbency advantages, we are of the view that a level playing field with respect to these costs is necessary to encourage network deployment.
- 6.10 An alternative approach in which third party telecoms providers are charged the costs of network adjustments that they require (which was Openreach's previous approach with respect to network adjustments that enabled competing FTTP network deployment under the previous WLA physical infrastructure access remedy) would increase the risk they face relative to BT, giving BT an advantage over its competitors.¹⁶⁰
- 6.11 As well as promoting a level playing field, recovering the costs of network adjustments over all users of the infrastructure, rather than only from the telecoms providers that request them, would have the following benefits:
- a) It would avoid the risk that telecoms providers are charged more than the incremental cost of network adjustments associated with their network deployments. For example, telecoms providers would not be required to pay the cost of infrastructure adjustments which increase the capacity available to Openreach or other third parties, nor would they be required to pay the cost of network adjustments which Openreach would have needed to undertake anyway.¹⁶¹
 - b) It would reduce Openreach's ability to exploit any flexibility it has to increase the costs of network adjustments to competing telecoms providers.¹⁶²
 - c) It would promote investment by reducing the upfront costs of network deployment, and reducing the uncertainty competing telecoms providers face over the level of expenditure required to make the physical infrastructure useable.¹⁶³

¹⁵⁷ We set out this approach in more detail in paragraphs 4.19 and 4.20 of the 2018 WLA Statement, Volume 3.

¹⁵⁸ We note that BT levies Excess Construction Charges (ECCs) to recover the costs of customer-specific network construction work in association with a new connection. Only those elements that are unique to a single end-user site are chargeable as ECCs. Construction work that forms part of Openreach's common network (i.e. can serve more than one end-user site) falls outside the scope of ECCs. ECCs are also incurred for work relating to additional circuits required by the customer for resilience purposes. For wholesale Ethernet circuits, ECCs are levied for costs above a threshold (currently £2,800). Costs up to the threshold are recovered by means of an Excess Construction Charge Fixed Fee uplift, currently £722, applicable to all connection charges. See 2016 BCMR Statement, Volume I, paragraph 10.103.

¹⁵⁹ We set out this argument in more detail in paragraph 4.22 of the 2018 WLA Statement, Volume 3.

¹⁶⁰ We set out this argument in more detail in paragraph 4.22 of the 2018 WLA Statement, Volume 3.

¹⁶¹ We set out this argument in more detail in paragraphs 4.41 of the 2018 WLA Statement, Volume 3.

¹⁶² We set out this argument in more detail in paragraphs 4.40 of the 2018 WLA Statement, Volume 3.

¹⁶³ We set out this argument in more detail in paragraphs 4.35 to 4.37 of the 2018 WLA Statement, Volume 3.

6.12 We acknowledge that some, particularly smaller, telecoms providers may use the proposed remedy to deploy leased lines without residential network deployment. As set out in Section 5, we are not proposing to restrict the scope of the remedy to particular service types as this would reduce flexibility, stifle innovation and reduce the incentives of telecoms providers to deploy competing networks. For the same reasons, we do not consider it appropriate to restrict our proposed approach to cost recovery of network adjustment costs to particular service or deployment types.

A financial limit should apply to network adjustment costs to mitigate the risks associated with our approach

6.13 Although we can estimate the cost of network adjustments that would be required as a result of the remedy, the incidence of network adjustments is uncertain and variable, and may be higher than we expect.¹⁶⁴ Accordingly, there is a risk that Openreach recovering these costs has a greater impact than we have anticipated. In particular, the higher the cost of adjustments, the greater the risk of promoting investment where the benefits to consumers are outweighed by the costs of deployment.

6.14 To mitigate this risk, we are of the view that a financial limit should apply to the costs of network adjustments. Any costs incurred above the financial limit would then be recovered directly from the telecoms provider requesting the network adjustment, through ancillary charges.

6.15 In addition, a financial limit would also provide the additional benefits of:

- a) reducing the uncertainty faced by Openreach over the level of network adjustment costs it would have to recover; and
- b) reducing the likelihood of disputes around the scope of the obligation in cases where the costs of adjustments are exceptionally high.¹⁶⁵

6.16 We are of the view that a financial limit should be set on a per kilometre basis, and that a single financial limit should apply to each PIA order based on the total number of kilometres of spine duct requested as part of that order.¹⁶⁶

Level of the financial limit

6.17 As part of the physical infrastructure access requirement we imposed in the WLA market, we set a financial limit of £4,750 per kilometre.¹⁶⁷ We were of the view that this was sufficient to cover the costs of adjustments typically in scope of the access remedy. In addition, we considered this sufficiently mitigated the risk that our decision could promote network investment where the benefits to consumers were outweighed by the costs of deployment.

¹⁶⁴ We set out our reasoning in more detail in paragraph 4.45 of the 2018 WLA Statement, Volume 3.

¹⁶⁵ We set out our reasoning in more detail in paragraph 4.48 of the 2018 WLA Statement, Volume 3.

¹⁶⁶ We set out our reasoning for this in paragraphs 4.56 to 4.58 of the 2018 WLA Statement, Volume 3.

¹⁶⁷ We set out our reasoning in paragraphs 4.51 to 4.64 of the 2018 WLA Statement, Volume 3.

- 6.18 We have considered what the appropriate financial limit is for our proposed unrestricted PIA remedy in each of the Physical Infrastructure markets. In doing so, as with our approach to pricing, we attach particular emphasis to providing investors with certainty and stability.
- 6.19 Our starting point for our proposal in this review is that the financial limit for PIA should be fixed at the same level (£4,750) as for the physical infrastructure access requirement imposed in the WLA market. We consider that imposing a financial limit that is consistent with that implemented in the WLA review will promote certainty which might otherwise be undermined by having a different financial limit. Taking this starting point, we consider below whether there are any specific reasons in the context of this review for departing from this approach.

A financial limit of £4,750 is likely to be sufficient to cover adjustments typically in scope of the remedy

- 6.20 In setting the level of the financial limit in the WLA market, we sought to identify those adjustments that we considered clearly in scope of the network access obligation, which primarily concerned broadband deployments. We then estimated the likely incidence of each type of adjustment and the average cost associated with making that adjustment. We also included an allowance to capture costs above the average, recognising there would be a distribution of costs of network adjustments. In determining the likely incidence of each type of adjustment, where possible, we based our assumptions on the assumptions Openreach itself uses when planning an FTTP network. We concluded a financial limit of £4,750 was sufficient to cover the costs of typical or normal network adjustments, without necessarily covering exceptional cases where the cost of a specific network adjustment is significantly higher than the average cost for that particular type of work. We concluded that a lower financial limit may not have been sufficient to cover the normal cost of network adjustments in those cases, and would risk undermining the remedy.
- 6.21 A financial limit of £4,750 is also likely to be sufficient to cover the cost of network adjustments required for leased line deployments. Although costs are uncertain, we consider that fewer network adjustments are likely to be required than for mixed or FTTP deployments. For example, Openreach is less likely to be required to relieve capacity pinch-points in spine (rider) duct which connects to lead-in duct,¹⁶⁸ as the majority of leased lines serve business sites which often have dedicated full size lead-in duct connections rather than the lead-in duct arrangements used for residential premises.¹⁶⁹ Accounting for this

¹⁶⁸ A pinch point issue may arise in connection with the swept-tee duct architecture used in recent years by Openreach for residential premises in new build areas. With this arrangement a group of premises are fed by a single 90mm duct, referred to as a rider-duct with swept-tee connections branching off to individual households. These lead-in segments are with smaller 50mm ducts.

¹⁶⁹ For large businesses, BT typically uses dedicated duct connections from a nearby chamber to the premises with the standard BT 90mm duct (or earlier equivalents).

distinction, we estimate an average network adjustment cost of £2,400 per kilometre for a leased line deployment,¹⁷⁰ which is below the proposed financial limit.

Setting the level of the financial limit at the same level as for mixed usage will not lead to disproportionate risks for Openreach over this review period

- 6.22 We establish above that a financial limit of £4,750 is likely to be sufficiently high so as to avoid undermining the effectiveness of the remedy. We now consider whether this financial limit would not lead to disproportionate risks for Openreach.
- 6.23 As we discuss in Section 7, an unrestricted access remedy will lead to further take-up of PIA, particularly for the deployment of leased lines. However, we expect that the additional PIA volumes due to the use of unrestricted PIA will be modest over the review period. In Section 7, we estimate these additional volumes will have an immaterial impact on BT's cost recovery. Consequently, our provisional view is that setting the financial limit at the same level as the WLA financial limit for mixed usage is reasonable and will not lead to disproportionate risks for Openreach over this review period.

Conclusion on the level of the financial limit

- 6.24 For the reasons set out above, we are proposing that the financial limit for PIA in each of the Physical Infrastructure markets should be fixed at £4,750 per kilometre.

Cost recovery of productisation costs

Our proposals

- 6.25 Openreach incurs costs in setting up and managing the PIA product, and processing individual PIA orders. We refer to these costs as 'productisation' costs. These costs can be grouped into the following three categories:
- a) **setting up the PIA product:** the upfront costs incurred by Openreach in setting up the PIA product, for example, process design and systems development costs;
 - b) **managing the PIA product:** the ongoing administrative costs incurred by Openreach to support the PIA product; and
 - c) **per order processing costs:** costs incurred by Openreach when processing PIA orders.
- 6.26 The productisation costs incurred to provide PIA are different to the comparable costs faced by BT when it uses the physical infrastructure as an input to its own products. In addition, in some cases there is no functional equivalent of a PIA process when BT uses its physical infrastructure for its own purposes.¹⁷¹
- 6.27 We consider that any disparity in the costs associated with using the infrastructure has the potential to undermine telecoms providers' confidence that they can access BT's physical

¹⁷⁰ This figure includes an allowance for duct repair, new chambers where these are necessary to accommodate new duct, and new chambers where these are necessary to accommodate equipment.

¹⁷¹ We set out our reasoning in more detail in paragraph 4.131 of the 2018 WLA Statement, Volume 3.

infrastructure on a comparable basis to BT. As a result, we are of the provisional view that productisation costs incurred when telecoms providers use PIA should be pooled with those that are incurred when BT uses the infrastructure and recovered over all users.

- 6.28 We therefore propose that Openreach recovers productisation costs incurred to provide PIA over all users of the physical infrastructure, as we understand it does for certain costs related to BT's own use of the physical infrastructure. This would enable a level playing field with respect to those costs.
- 6.29 In reaching our proposal we have considered whether our proposed approach could promote inefficient investment. However, we do not consider this to be a significant risk. This is because a large proportion of productisation costs are not actually incremental to a particular telecoms provider's decision to invest, but are costs necessary to create an effective PIA remedy overall.
- 6.30 Moreover, our proposal to spread these costs over all users of infrastructure reduces Openreach's ability to exploit any flexibility it has to increase the costs to competing telecoms providers by incurring higher productisation costs.

Consultation question(s)

Question 6.1: Do you agree with our proposed approach to the recovery of network adjustment costs? Please set out your reasons and supporting evidence for your response.

Question 6.2: Do you agree with our proposal regarding the level of the financial limit? Please set out your reasons and supporting evidence for your response.

Question 6.3: Do you agree with our proposed approach to the recovery of productisation costs? Please set out your reasons and supporting evidence for your response.

7. Price regulation of PIA

- 7.1 In this section we set out our proposals on pricing remedies with respect to PIA. We first explain why price regulation of PIA is required. We then consider our approach to the two broad categories of PIA charges:
- a) **rental charges** which relate to infrastructure sharing, including duct, pole, joint box and manhole sharing; and
 - b) **ancillary charges** which relate to supplementary services or activities which Openreach carries out on behalf of a telecoms provider using PIA.
- 7.2 We are proposing to cap PIA charges at the same levels as the caps set under our 2018 WLA market review. We are also proposing to update the caps on PIA rental charges each year by CPI inflation, in line with our WLA decisions.

Need for price regulation on PIA

- 7.3 Given our provisional conclusion that BT has SMP in the physical infrastructure market, it is likely that it would have the incentive and ability to set excessively high prices for PIA. In particular:
- a) There is a risk that BT sets excessive prices to maximise the profit it earns from providing access to its physical infrastructure.
 - b) There is a risk that BT sets excessively high prices to increase the overall cost of building a network using PIA, with the intention of preventing or limiting the emergence of further network competition by undermining the investment case for network deployment based on PIA.¹⁷²
- 7.4 The adverse price effects could undermine the effectiveness of the obligation to provide PIA, and also result in higher retail prices, all of which is ultimately against the interests of consumers.
- 7.5 Consequently, it appears to us from the market analysis we have carried out that there is a relevant risk of adverse effects arising from BT fixing or maintaining its prices at an excessively high level, so as to have adverse consequences for end-users of public electronic communications services.
- 7.6 Price regulation guards against the risk that BT engages in such behaviour. Therefore, our provisional view is that price regulation is required to support the obligation to provide PIA.

¹⁷² Even if telecoms providers ultimately deploy competing networks using PIA, there is a risk that BT would set excessively high prices to favour Openreach's downstream business (which does not consume PIA as an input), putting rivals that have deployed a competing network using PIA at a competitive disadvantage. In addition, knowing that BT has the ability and incentive to increase prices in the future (to favour its own downstream business or maximise profit) could also deter competitive network investment from happening in the first place.

7.7 In what follows we consider the approach to rental charges first, then ancillary charges.

PIA rental charges

We are proposing to impose maximum charges at the same levels as the maximum charges set under WLA

- 7.8 We recently set maximum charges on PIA rental services under our WLA market review. We explained that while in some other charge controls we applied maximum charges based on BT's fully allocated costs, we did not consider this to be practicable for physical infrastructure access in the WLA market. Instead, we considered that imposing a cap on rental charges using the current methodology as a starting point for our calculations was appropriate as this would be an effective means of providing certainty to investors until the end of the market review period in 2021.
- 7.9 For the reasons set out in Section 5 above, we are now proposing to impose PIA in the Physical Infrastructure market. We are proposing that this remedy is specified in an equivalent way to the physical infrastructure access remedy in the WLA market, but we are proposing not to include use or geographic scope restrictions, recognising that this addresses the competition concerns we have identified in our assessment. Our view is that this variation will not have a material impact on BT's ability to recover efficiently incurred costs during this review period. We set out our analysis of this impact later in this section.
- 7.10 We consider that it is possible that if we maintain our proposals, demand for infrastructure access services will shift from physical infrastructure access in the WLA market to the unrestricted access product we are proposing. Given our objective continues to be to provide certainty and stability, we are concerned that our introduction of PIA in the Physical Infrastructure market could undermine the certainty of physical infrastructure access pricing that we recently established in the WLA review until 31 March 2021. Imposing a PIA maximum price different to the level of WLA physical infrastructure access charge would risk undermining this certainty for those having invested, or thinking of investing, in infrastructure. Our preliminary view is that this would be undesirable unless we find that the current level of PIA charges is clearly inadequate for unrestricted access, which we consider is not the case here due to the likely limited impact of our proposed remedy on BT's cost recovery in this review period.
- 7.11 Given this and the short duration of this review, we are minded to impose maximum charges on PIA rental services at the same levels as those for corresponding products in our 2018 WLA market review for the period of this review.

Impact on BT's cost recovery

- 7.12 We have considered whether setting the maximum charges at the same levels as the charges for physical infrastructure access in the WLA market could have a detrimental effect on BT's cost recovery.

- 7.13 We recognise that the broader form of PIA we are proposing may lead to additional PIA volumes relative to the WLA variant, as it may be used for deploying leased lines, at the expense of Openreach leased line volumes. This could have the following impacts on BT's cost recovery:
- a) higher unit costs in the supply of leased line services because of lower leased line volumes (i.e. reduced economies of scale); and
 - b) higher network adjustment and productisation costs due to additional PIA volumes.
- 7.14 On the first impact, we consider that the overall loss of leased lines due to the use of PIA will be modest over the review period. Openreach estimates a leased line volume loss of around [X] [0 – 4,000] circuits under the mixed usage remedy and a further [X] [1,000 – 5,000] circuits under the unrestricted access remedy during the period from 2019/20 to 2020/21.¹⁷³ In our recent BCMR consultation we considered a volume loss of up to 24,000 leased lines for the same period and still concluded that the CPI-CPI charge control proposal is an appropriate remedy.¹⁷⁴ Therefore, we are of the view that the 'cannibalisation' effect of unrestricted access on Openreach's leased lines is already addressed by our leased line charge control proposals.
- 7.15 On the second impact, any incremental PIA volumes due to the absence of use or scope restrictions (which we refer to below as "unrestricted access") will drive additional network adjustment costs for Openreach. These costs would arise from the need to clear duct blockages and/or to make additional capacity available in the Openreach network to support the supply of PIA services. We have already allowed for network adjustment costs caused by mixed usage in our the 2018 WLA charge control rental charges for physical infrastructure access in that market.¹⁷⁵ We therefore now consider the extent to which network adjustment costs might be higher over this review period as a consequence of unrestricted access.
- 7.16 To assess this, we have considered the likely additional PIA volumes due to unrestricted access (over and above those forecasted under the mixed usage remedy). We consider that a good proxy for this is the number of Openreach leased line volumes switching to unrestricted PIA.¹⁷⁶ As mentioned above, Openreach estimates this number is circa [X] [1,000 – 5,000] circuits for the period of this review.¹⁷⁷

¹⁷³ Openreach response dated 12 October 2018 to Question 1 of the s135 information request dated 8 October 2018.

¹⁷⁴ 2018 BCMR Consultation, Annex 18. There, we say that we anticipate a loss of c.12,000 connections each year, starting from 2019/20.

¹⁷⁵ Although in the WLA market review we did not explicitly consider leased line volumes in our calculation of network adjustment costs, we consider that telecoms providers using PIA to deploy mixed usage networks would deploy leased lines in the same areas where they deploy fixed broadband; therefore, we would expect negligible network adjustments in addition to those required for connecting residential premises.

¹⁷⁶ We acknowledge that leased line volume loss could overstate the additional number of PIA lines as leased line customers may switch more than one leased line circuit onto a single PIA route. However, we consider this does not affect our analysis materially as even under this conservative assumption we find minimal additional costs for BT over this review period.

¹⁷⁷ Openreach response dated 12 October 2018 o Question 1 of the s135 information request dated 8 October 2018.

- 7.17 Based on this volume forecast and an assumption of network adjustment costs of £[<]178 per leased line, we estimate incremental network adjustment costs for Openreach in the order of [<] [£3m – £14m] (£2,880 x [<] [1,000 – 5,000] circuits) over this review period. Given that Openreach would be able to recover these costs over the life of the underlying assets, i.e. 40 years, unrestricted access would mean additional costs for Openreach in the region of [<] [£0.19m – £1m] (including depreciation and cost of capital) per annum by 2020/21, and a total of [<] [£0.24m – £1.3m] over the review period. We consider these costs are immaterial, representing around [<] [0.03% – 0.15%] of Openreach’s physical infrastructure cost base of ~£650m179 per annum by 2020/21.
- 7.18 We have also considered the impact of unrestricted access on Openreach’s productisation costs. In our 2018 WLA market review we included productisation costs arising from the mixed usage PIA remedy in the WLA charge control and PIA rental charges. We concluded these costs vary between £2m and £3m per year, accounting for 0.4% of Openreach’s total infrastructure costs.180
- 7.19 We provisionally conclude that the additional productisation costs resulting from unrestricted access are likely to be small:
- a) **setting up the PIA product:** we do not expect substantial changes to the scale and functionality of PIA systems to be necessary for unrestricted access as these are mostly sunk assets and thus insensitive to changes in volumes. Therefore, our provisional view is that the costs of setting up the PIA product are unlikely to change materially.
 - b) **managing the PIA product:** these costs relate to SG&A costs such as management of the PIA product and PIA systems, billing support, legal and regulatory support, and responding to queries regarding accreditation. Some of these costs therefore may increase with the number of orders. However, we expect that the additional PIA volumes arising from unrestricted access will account for a minority of total PIA volumes over the review period.181 As the total SG&A costs to support the mixed usage remedy are relatively small (we estimated that these would amount to £400,000 per annum), we consider that any additional SG&A costs because of unrestricted access are also likely to be small.
 - c) **per order processing costs:** we expect the majority of leased lines using an unrestricted PIA product over the review period to be deployed in 2020/21. Openreach has estimated that by 2020/21 per order processing costs will fall due to systems developments which will reduce manual processing costs. For example, it is expected that the total per order processing costs in 2020/21 for a mixed usage remedy would

178 This is derived by assuming network adjustment costs of £2,400 per kilometre (see Section 6) and an estimated average length of a vulnerable leased line of 1.2 km.

179 2018 WLA Statement – cost models, PIA Rental Model.

180 2018 WLA Statement – cost models, PIA Rental Model.

181 While we estimate total PIA volumes in the order of 500,000 under the mixed usage remedy over the period from 2019/20 to 2020/21, we now expect a further [<] [1,000 – 5,000] PIA volumes under the unrestricted access remedy over the same period.

amount to less than £600,000 per annum. In our 2018 WLA charge control we assumed processing costs of circa £3 per fibre broadband connection¹⁸², which would mean additional processing costs of £[3,000 – 15,000] for the total additional PIA volumes. Therefore, we do not expect a material increase in the absolute level of per order processing costs as a result of unrestricted access in this review period.

- 7.20 Therefore, we expect total additional network adjustment and productisation costs to be less than £2m during this review period.¹⁸³ While this would represent a slight shortfall in recovery of the costs attributed to PIA, we do not consider it significant in the context of BT's broader ability to recover its costs. For example, our LLCC consultation we estimated that our CPI-CPI charge control proposal is likely to lead to BT over-recovering around £50m – £65m over the charge control period from 2019/20 to 2020/21.¹⁸⁴ Given this over-recovery and the importance of stability in PIA charges, for this review period we are not proposing to adjust charges to recover these costs.
- 7.21 For the reasons stated above, we provisionally conclude that setting maximum charges at the same levels as those for the corresponding WLA PIA charges will not materially undermine BT's ability to recover its efficiently incurred costs during the course of this market review period.

Future approach to regulating PIA rental charges

- 7.22 We recognise that we will have the opportunity to review our approach to PIA rental charges in future market reviews. For example, we may refine elements of the cost assessments (such as the allocation of costs to lead-in duct), consider further the likely longer-term take-up of PIA, or consider whether it is desirable to simplify elements of the structure of charges. We will look at these aspects in our next round of market reviews in 2021, alongside our consideration of active remedies.
- 7.23 In addition, we acknowledge that we are proposing to set price regulation only for the duration of the review period, whereas investors require certainty over a longer period. We cannot prejudge what actions we will take in the future, as any pricing decisions in future reviews will be made in light of the circumstances and legal framework applicable at that time. However, we would not expect significant movements in the underlying costs of Openreach's physical infrastructure in future reviews for the following reasons:¹⁸⁵
- Physical infrastructure costs are largely sunk (i.e. nearly all UK premises have already been connected to the Openreach physical infrastructure network) and hence the overall amount of costs to be recovered is likely to remain stable over time.

¹⁸² 2018 WLA Statement – cost models. See input cost of Other_Software Configuration element in Network Cost module.

¹⁸³ In calculating this cost impact we have considered any incremental revenue, associated with incremental PIA volumes, which would support Openreach's recovery of network adjustment and productisation costs and, therefore, ought to be netted against the overall cost impact. This is because the current level of PIA charges already includes an allowance for the recovery of these costs. However, given that this allowance is small relative to the total PIA charge (i.e. 1.3%), we expect minimal incremental revenues over this review period.

¹⁸⁴ 2018 BCMR Consultation, Annex 18.

¹⁸⁵ It may be that there are movements in the appropriate cost of capital which could have implications for PIA charges.

- Technological change is not typically a factor affecting physical infrastructure costs. This contrasts with active services, where technological change often reduces costs and can drive customer migration to new services with implications for cost recovery.
- Most of the cost uncertainty is around the allocation of infrastructure costs across different assets (i.e. spine duct, lead-in duct, joint boxes, manholes, poles), and not about the overall level of infrastructure costs, which is sourced directly from the information underpinning the RFS. This means that, on a per premises (or per kilometre) basis, infrastructure costs are unlikely to change as a consequence of updated information on cost allocations.
- Even if telecoms providers were to use PIA at scale in the longer-term, resulting in higher network adjustment costs for Openreach, we do not expect this to lead to significantly higher overall infrastructure costs and hence PIA charges.¹⁸⁶

The level of maximum charges

7.24 In our 2018 WLA market review we decided to update the levels of the maximum charges each year in line with CPI inflation to allow for changes in the underlying costs due to inflationary pressure over the review period.¹⁸⁷ We specified this update should be based on CPI inflation in the period of twelve months prior to 31 October immediately before the beginning of the relevant year.¹⁸⁸

7.25 We are now proposing to set maximum charges for unrestricted access at the same level as those for corresponding products in WLA, starting from 2019/20. Therefore, to derive maximum charges for the start year of the control we need to apply CPI inflation over the 12 months prior to 31 October 2018 to WLA maximum charges applicable for 2018/19. Given that the level of CPI inflation over this period is still unknown, we set out the level of maximum charges for the period from 1 May 2018 to 31 March 2019 (as per WLA) in the table below. We will update the levels of maximum charges by CPI inflation for the statement.

Table 7.1: Maximum charges for the period from 1 May 2018 to 31 March 2019 [to be updated by CPI inflation for statement]

	Maximum charge (per year)
Facility in Spine duct per metre - single bore	[£0.28]
Facility in Spine duct per metre - 2 bores	[£0.18]

¹⁸⁶ We considered a scenario of 40% PIA take-up and we assessed how this would impact Openreach's infrastructure regulatory cost base using our current cost methodology. At £68 per premises, we estimate around £700m in additional network adjustment costs. After depreciating these costs over the life of the underlying assets, i.e. 40 years, and including a return on capital employed, we estimate c. £70m costs to be recovered by Openreach each year. These represent around 10% of BT's total duct and pole regulatory cost base. This would mean that the average PIA rental charge paid by a telecoms provider wishing to use PIA to deploy a broadband network in a similar scale as Openreach would increase by 10% from £10 to £11 on a per premises basis.

¹⁸⁷ 2018 WLA Statement, Vol.3, section 5.

¹⁸⁸ 2018 WLA Statement, Annex 33.

	Maximum charge (per year)
Facility in Spine duct per metre - 3+ bores	[£0.13]
Facility in Lead-in duct per metre	[£0.55]
Facility on pole for Multi-end-user attachment	[£11.13]
Facility on pole for Single-end-user attachment	[£4.76]
Pole top equipment	[£3.45]
Cable up a pole (per cable)	[£2.25]
Facility hosting (per manhole entry)	[£8.34]
Facility hosting (per joint box entry)	[£2.01]
Customer Apparatus In-line Splice hosting and distribution joints (per manhole splice)	[£29.22]
Customer Apparatus In-line Splice hosting and distribution joints (per joint box splice)	[£18.11]
Customer Apparatus Cable Coil Hosting - small (per manhole)	[£14.61]
Customer Apparatus Cable Coil Hosting - medium (per manhole)	[£29.22]
Customer Apparatus Cable Coil Hosting - large (per manhole)	[£43.83]
Customer Apparatus Cable Coil Hosting - small (per joint box)	[£9.05]
Customer Apparatus Cable Coil Hosting - medium (per joint box)	[£18.11]
Customer Apparatus Cable Coil Hosting - large (per joint box)	[£27.16]

Note: Charges shown are per annum (excluding VAT). Rental charges for 'lead-in link' rental products are not shown, as these are equal to the corresponding duct rates. The maximum charge for these products is therefore set equal to the maximum charge for the corresponding duct rates. The maximum charges shown above are applicable for 1 May 2018 to 31 March 2019. In the subsequent year, the maximum charge will be updated for inflation, measured using the Consumer Prices Index (CPI).

Ancillary services

7.26 Consistent with our approach to PIA rental charges we are proposing to cap ancillary service charges at the same levels as the corresponding caps set under our 2018 WLA market review. This approach is in line with our proposals with respect to the recovery of network adjustment and productisation costs. Namely:

- a) We propose to cap ancillary charges related to network adjustments undertaken to provide capacity on poles or to make poles useable for dropwires at zero. This reflects our proposal that the costs of these network adjustments should be recovered from all users of the infrastructure without limitation.
 - b) For ancillary charges related to all other network adjustments, we propose to allow Openreach to charge only the amount that exceeds the financial limit. This reflects our proposal that the costs of network adjustments should be recovered from all users of the infrastructure up to the financial limit. In line with our WLA decisions, we are proposing to impose a basis of charges condition which requires that charges for these network adjustments are cost oriented, including when being calculated for the purposes of applying the financial limit.
 - c) We propose to cap the charges for ancillary activities that represent productisation activities at zero, reflecting our proposal that the costs of these activities should be recovered across all users of the physical infrastructure.
- 7.27 With respect to all other charges, including any new PIA products introduced in this review period, and consistent with our WLA decisions, we propose to impose a basis of charges condition which requires that charges are cost oriented.

Consultation question(s)

Question 7.1: Do you agree with our proposed approach to regulation of PIA charges? Please set out your reasons and supporting evidence for your response.

8. Legal Tests

8.1 In Sections 4 to 7 we set out our proposals to require BT to provide network access and associated remedies designed to support and make effective that network access. In summary we propose:

- A requirement to provide network access on reasonable request on fair and reasonable terms and conditions including fair and reasonable charges where no charge control applies
- A requirement to publish and operate a process for requests for new forms of network access
- A requirement not to unduly discriminate
- A requirement to publish a Reference Offer
- A requirement to notify changes to charges, terms and conditions
- A requirement to notify technical information
- Cost accounting
- Accounting separation
- Quality of Service requirements
- A specific access obligation to provide Physical Infrastructure Access (PIA), including network adjustments
- To impose a maximum cap on PIA rental charges
- A basis of charges condition for ancillary charges, apart from charges for network adjustments where we considered that Openreach should recover associated costs over all users of its infrastructure, subject to a financial limit.

8.2 In order to give regulatory effect to our proposals we propose to set the SMP conditions set out in Annex 10.

Section 47 tests

8.3 When imposing SMP obligations, we need to demonstrate that the obligations in question are based on the nature of the problem identified, proportionate and justified in light of the policy objectives as set out in Article 8 of the Framework Directive. For each proposed SMP condition set out in this consultation, we consider that the conditions we are proposing to impose satisfy the tests set out in section 47 of the Communications Act 2003 (the Act), namely that the proposed obligation is:

- objectively justifiable in relation to the networks, services or facilities to which it relates;
- not such as to discriminate unduly against particular persons or against a particular description of persons;
- proportionate to what the condition or modification is intended to achieve; and
- transparent in relation to what is intended to be achieved.

Objectively justified

8.4 We consider that each of the SMP conditions we are proposing is objectively justifiable. The remedies that we are proposing are designed to address the competition concerns that we have identified in our market analysis associated with a finding of SMP (see Section 3). Given our provisional conclusion that BT has SMP in the markets we have identified, we considered it likely that BT would have the incentive and ability to favour its own downstream businesses over rivals in the relevant downstream markets, distorting competition in these markets, which is ultimately against the interests of consumers. Therefore, in the absence of a requirement to provide network access, supported by associated obligations, BT could refuse or impede access to its physical infrastructure, or it could provide access to its physical infrastructure on less favourable terms and conditions compared to those obtained by its own downstream businesses. We explain in sections 4, 5, 6 and 7 for each obligation we are proposing, why we consider that obligation is objectively justified in the context of the markets we are reviewing.

Not such as to discriminate unduly

8.5 We consider that each of the proposed conditions does not discriminate unduly against BT. It is the only telecoms provider to hold SMP in each of the Physical Infrastructure markets that we have identified and the proposed conditions seek to address that market position.

Proportionate

8.6 We consider that each of the conditions we are proposing is proportionate to what those conditions are intended to achieve. In each case, we are proposing to impose an obligation on BT that: is effective to achieve our aim; is no more onerous than is required to achieve that aim; and does not produce adverse effects which are disproportionate to our aim. We explain why we consider each proposed remedy is proportionate in Sections 4 to 7 above. In Annex 9 we also present the detailed assessment of the potential adverse effects that informed our assessment of the proportionality of the specific access remedy we are proposing.

Transparent

8.7 We consider that each of the proposed conditions is transparent in relation to what is intended to be achieved. The text of the proposed conditions is published in Annex 10 and the operation of those conditions is aided by our explanations in this document. Our final statement will set out our analysis of responses to this consultation and the basis for any final decision that we take.

Section 88 tests

8.8 In sections 6 and 7 we have set out our proposals in relation to cost recovery and PIA pricing. In summary, we propose to:

- impose a cap on PIA rental charges;

- impose a basis of charges condition for ancillary charges, apart from charges for network adjustments and productisation costs where we considered that Openreach should recover associated costs over all users of its infrastructure, in the case of network adjustments subject to a financial limit.
 - In relation to all other forms of network access, i.e. new forms of network access requested under the general network access condition, an obligation for charges for network access to be fair and reasonable.
- 8.9 Before setting conditions falling within section 87(9) we are required to ensure that the condition satisfies the tests set out in section 88 of the Act. Section 88 of the Act states that Ofcom should not set an SMP condition falling within section 87(9), except where it appears from the market analysis that there is a relevant risk of adverse effects arising from price distortion¹⁸⁹ and it also appears that the setting of the condition is appropriate for:
- promoting efficiency;
 - promoting sustainable competition; and
 - conferring the greatest possible benefits on the end-users of public electronic communications services.
- 8.10 Under section 88(2) of the Act, when setting an SMP condition falling within section 87(9), we must take account of the extent of the investment in the matters to which the condition relates of BT.
- 8.11 In our opinion, the proposed conditions 1, 5 and 6 satisfy section 88 of the Act.
- 8.12 For the reasons set out in sections 3 and 7, it appears to us from our market analysis that in each Physical Infrastructure market there is a relevant risk of adverse effects arising from price distortion in that BT might both fix or maintain its prices at an excessively high level and/or impose a price squeeze so as to have adverse consequences for end-users of public electronic communications services. Specifically, given our provisional conclusion that BT has SMP in the relevant markets, it is likely that BT would have the incentive and ability to set excessively high prices or impose a price squeeze for network access, including for PIA. This could undermine the case for investment by competing telecoms providers, undermining the effectiveness of the obligation to provide PIA, and could also result in higher retail prices, all of which is ultimately against the interests of consumers.
- 8.13 In relation to the conditions we are proposing, overall we consider that our objective to encourage other telecoms providers to invest in their own networks in order to develop competition for high speed networks is consistent with our obligations under section 88. In general, our view is that our approach to rental charges and charges for ancillary services will promote sustainable competition, which we consider is likely to be the most effective way of benefiting end-users of public electronic communications services. This will bring significant benefits to consumers in the longer term from innovation (including innovation

¹⁸⁹ For the purposes of section 88 there is a relevant risk of adverse effects arising from price distortion if the dominant provider might (a) so fix and maintain some or all of his prices at an excessively high level, or (b) so impose a price squeeze, as to have adverse consequences for end-users of public electronic communications services.

to increase efficiency and lower costs), choice, stronger incentives to price keenly to attract consumers and higher quality of services.

Rental charges

- 8.14 The proposed condition 6 requires BT to ensure that its charges for the current set of PIA rental products do not exceed the maximum charges we have calculated.
- 8.15 As set out in Section 7 we consider that capping PIA rental charges at the same levels as those for corresponding products in our 2018 WLA market review for the period of this review will further promote sustainable competition in that it provides potential investors increased certainty as to the level of rental charges they would face. Providing investors with greater certainty that the level of PIA rental charges will not be excessive or allow for the imposition of a price facilitates the building of credible business cases for deploying a network using PIA. We consider this is necessary in order to realise the significant benefits resulting from other telecoms providers deploying fibre networks at scale. Encouraging such entry and expansion provides the greatest possible benefits to end-users.
- 8.16 The form of control also encourages Openreach to increase its productive efficiency, as it allows Openreach to keep any profits it earns within the defined period by reducing its costs compared to those envisaged in setting the control, while protecting consumers from excessive prices (i.e. allocative efficiency).¹⁹⁰
- 8.17 The extent of investment of the dominant operator has been taken into account as our approach provides for an appropriate return on the capital employed to be included in the charges.

Charges for ancillary activities related to productisation

- 8.18 The proposed condition 6.3 requires BT not to charge separately for ancillary services related to order processing. This gives effect to our proposal that productisation costs should be pooled and recovered from all users of the physical infrastructure.
- 8.19 In the absence of this requirement, Openreach could seek to recover these costs from PIA users alone (either through rental charges or ancillary charges). Any resulting disparity in costs faced by Openreach and the costs faced by other telecoms providers in respect of using the physical infrastructure has the potential to undermine confidence in the effectiveness of the PIA remedy as a basis on which to build competing networks at scale. Pooling these costs and spreading them across all SMP products that use the physical infrastructure would eliminate the differential, thereby ensuring a level playing field and promoting network competition. Again, encouraging such investment provides the greatest possible benefits to end-users.

¹⁹⁰ The benefits of any cost savings would potentially accrue to the regulated company in the short run and this would give BT incentives to make those efficiency savings. In the longer run, these cost savings could be passed to consumers through reductions in prices, either as a result of competition or through subsequent charge controls. In our view, this form of price regulation is also preferable to a rate of return type of control.

- 8.20 In addition, we have considered whether our approach to the recovery of productisation costs promotes inefficient investment. However, we do not consider this to be a significant risk. This is because a large proportion of productisation costs are not actually incremental to a particular telecoms provider's decision to invest, but are costs necessary to create an effective PIA remedy overall. Moreover, our proposal to spread these costs over all users of infrastructure reduces Openreach's ability to exploit any flexibility it has to increase the costs to competing telecoms providers.
- 8.21 The extent of investment of the dominant operator has been taken into account and our approach provides for an appropriate return on the capital employed to be included in the PIA rental charges.

Charges for network adjustments

- 8.22 The proposed conditions 6.4, 6.5 and 6.6 require BT not to charge separately for network adjustments falling within the financial limit we have calculated. These conditions give effect to our proposals that the costs of network adjustments should be pooled and recovered from all users of the physical infrastructure, subject to a financial limit. Charging telecoms providers the full upfront cost of network adjustments would undermine the business case, rendering the remedy ineffective. Recovering these costs from all users of the physical infrastructure ensures a level playing field with the costs faced by Openreach itself when using the infrastructure and promotes sustainable competition. As above, encouraging such investment provides the greatest possible benefits to end-users.
- 8.23 If telecoms providers have to pay the full cost incurred in undertaking any network adjustments this could deter efficient investment, as it does not reflect the benefits to BT and other telecoms providers, now and in the future. As a result, there may be some cases where competitive network investment will not take place because the telecoms provider does not value the required network adjustment enough to pay the full cost, but all parties that benefit (now and in the future) would be prepared to share the cost if faced with that decision. Therefore, sharing the cost of network adjustments can unlock competitive network investment that would not otherwise take place.
- 8.24 Moreover, we consider that the limit on the amount Openreach has to recover in this way mitigates the risk that the cost of network adjustments is higher than we anticipate, and therefore mitigates the risk that the costs of new entry outweigh the gains.
- 8.25 The extent of investment of the dominant operator has been taken into account as the PIA rental charge calculation, and our approach in the WLA charge control, provide for Openreach to recover the relevant costs. Also, our approach provides for an appropriate return on the capital employed to be included in the charges.

Basis of charges

- 8.26 The proposed Condition 5 requires BT to ensure that its charges for PIA services are reasonably derived from the costs of provision based on a forward looking long run incremental cost approach, allowing an appropriate mark up for the recovery of common

costs, including an appropriate return on capital employed. We consider that this requirement promotes efficiency and sustainable competition and provides the greatest possible benefits to end-users by enabling competing providers to buy network access at levels that might be expected in a competitive market.

- 8.27 The extent of investment of the dominant operator has been taken into account as the approach provides for an appropriate return on the capital employed to be included in the charges.

Fair and reasonable charges

- 8.28 Where there is no specific charge control, BT could set excessively high prices, or charges that, in combination with downstream prices, amount to a price squeeze, so as to have adverse consequences for end-users of public electronic communications services (also referred to as “price squeeze”). This concern only applies to forms of network access other than PIA (given that PIA charges are subject to a maximum charges or basis of charges obligation) and is addressed by our general network access remedy which requires that charges (in the absence of a charge control or basis of charges obligation) are fair and reasonable, as discussed in Section 4.
- 8.29 We consider that the fair and reasonable charges obligation will prevent BT from imposing a price squeeze that might impact other providers’ ability to compete with BT in downstream markets. We consider that the maximum charges and/or basis of charges obligation on PIA will act as an anchor to limit the risk of excessive pricing risk on other forms of network access. The provision of network access on fair and reasonable terms will therefore support the aim of promoting improved efficiency and promote sustainable competition by ensuring that other telecoms providers can effectively compete in downstream markets providing the greatest possible benefits to end-users.
- 8.30 We believe that fair and reasonable charges will allow BT’s costs to be taken into account and will also provide for common cost recovery.

Ofcom’s duties

- 8.31 The obligations we have proposed will promote network competition by incentivising commercial investment in fibre networks in as much of the UK as possible.
- 8.32 The key barriers to the deployment of rival networks in many parts of the UK are:
- the cost (and time) associated with the civil works required to replicate the physical infrastructure through which a network can be deployed to deliver services at a competitive price;
 - the challenges and risks entailed in entering as a direct competitor to BT and winning sufficient business for the investments to be commercially viable.
- 8.33 Therefore, a key element in our strategy, as implemented through these remedies, is to ensure that competing telecoms providers have access to BT’s physical infrastructure, on terms that ensure a level playing field in competing with BT to invest in new fibre

networks. This should lead to the development of network competition which will encourage innovation and continued investment.

- 8.34 Given this, we consider the package of SMP conditions that we are proposing both individually and together are consistent with our duties under section 3, including:
- our principal duty to further the interest of citizens in relation to communications matters and further the interests of consumers in relevant markets, where appropriate by promoting competition; and
 - the requirement on us to secure the availability throughout the UK of a wide range of electronic communications services.
- 8.35 In proposing these remedies we have had regard in particular to the desirability of: promoting competition in relevant markets, of encouraging investment and innovation in relevant markets and of encouraging the availability and use of high speed data transfer services throughout the UK. In performing our duties, we have also had regard to the principles under which regulatory activities should be transparent, accountable, proportionate, consistent and targeted only at cases in which action is needed.
- 8.36 We also consider that our proposed obligations are consistent with our duty to act in accordance with the six community requirements set out in section 4 of the Act, in particular:
- the first Community requirement to promote competition;
 - the third Community requirement to promote the interests of all persons who are citizens of the EU;
 - the fourth Community requirement to take account of the desirability of Ofcom's carrying out of its functions in a manner which, so far as practicable, does not favour one form of or means of providing electronic communications networks, services or associated facilities over another (i.e. to be technologically neutral); and
 - the fifth Community requirement to encourage the provision of network access for the purpose of securing efficiency and sustainable competition, efficient investment and innovation and the maximum benefit of persons who are customers of communications providers and of persons who make associated facilities available.
- 8.37 In developing proposals for identifying and analysing the markets in Section 3, we have taken due account of all applicable guidelines and recommendations which have been issued or made by the European Commission in pursuance of the provisions of an EU instrument and which relate to market identification and analysis or the determination of what constitutes significant market power in accordance with section 79 of the Act. In developing our remedies proposals in sections 4 to 7 we have taken due account of all applicable recommendations issued by the European Commission under Article 19(1) of the Framework Directive in accordance with our duties under section 4A of the Act. In each case, pursuant to Article 3(3) of Regulation (EC) No 1211/2009, we have also taken the utmost account of any relevant opinion, recommendation, guidelines, advice or regulatory practice adopted by the Body of European Regulators for Electronic Communications

(BEREC pursuant to Article 3(3) of Regulation (EC) No 1211/2009). Where relevant, we explain in sections 3 to 7 how we have taken account of these instruments.

A1. Responding to this consultation

- A1.1 Ofcom would like to receive views and comments on the issues raised in this document, by 5pm on 1 February 2019.
- A1.2 You can download a response form from <https://www.ofcom.org.uk/consultations-and-statements/category-1/physical-infrastructure-market-review>. You can return this by email or post to the address provided in the response form.
- A1.3 If your response is a large file, or has supporting charts, tables or other data, please email it to pimr@ofcom.org.uk, as an attachment in Microsoft Word format, together with the cover sheet (<https://www.ofcom.org.uk/consultations-and-statements/consultation-response-coversheet>). This email address is for this consultation only, and will not be valid after 25 January 2019.
- A1.4 Responses may alternatively be posted to the address below, marked with the title of the consultation:
- Physical Infrastructure Market Review Team
- First Floor
Ofcom
Riverside House
2A Southwark Bridge Road
London SE1 9HA
- A1.5 We welcome responses in formats other than print, for example an audio recording or a British Sign Language video. To respond in BSL:
- Send us a recording of you signing your response. This should be no longer than 5 minutes. Suitable file formats are DVDs, wmv or QuickTime files. Or
 - Upload a video of you signing your response directly to YouTube (or another hosting site) and send us the link.
- A1.6 We will publish a transcript of any audio or video responses we receive (unless your response is confidential).
- A1.7 We do not need a paper copy of your response as well as an electronic version. We will acknowledge receipt if your response is submitted via the online web form, but not otherwise.
- A1.8 You do not have to answer all the questions in the consultation if you do not have a view; a short response on just one point is fine. We also welcome joint responses.
- A1.9 It would be helpful if your response could include direct answers to the questions asked in the consultation document. The questions are listed at Annex 4. It would also help if you could explain why you hold your views, and what you think the effect of Ofcom's proposals would be.

A1.10 If you want to discuss the issues and questions raised in this consultation, please contact pimr@ofcom.org.uk.

Confidentiality

A1.11 Consultations are more effective if we publish the responses before the consultation period closes. In particular, this can help people and organisations with limited resources or familiarity with the issues to respond in a more informed way. So, in the interests of transparency and good regulatory practice, and because we believe it is important that everyone who is interested in an issue can see other respondents' views, we usually publish all responses on our website, www.ofcom.org.uk, as soon as we receive them.

A1.12 If you think your response should be kept confidential, please specify which part(s) this applies to, and explain why. Please send any confidential sections as a separate annex. If you want your name, address, other contact details or job title to remain confidential, please provide them only in the cover sheet, so that we don't have to edit your response.

A1.13 If someone asks us to keep part or all of a response confidential, we will treat this request seriously and try to respect it. But sometimes we will need to publish all responses, including those that are marked as confidential, in order to meet legal obligations.

A1.14 Please also note that copyright and all other intellectual property in responses will be assumed to be licensed to Ofcom to use. Ofcom's intellectual property rights are explained further at <https://www.ofcom.org.uk/about-ofcom/website/terms-of-use>.

Next steps

A1.15 Following this consultation period, Ofcom plans to publish a statement in Spring 2019.

A1.16 If you wish, you can register to receive mail updates alerting you to new Ofcom publications; for more details please see <https://www.ofcom.org.uk/about-ofcom/latest/email-updates>

Ofcom's consultation processes

- A1.17 Ofcom aims to make responding to a consultation as easy as possible. For more information, please see our consultation principles in Annex 2.
- A1.18 If you have any comments or suggestions on how we manage our consultations, please email us at consult@ofcom.org.uk. We particularly welcome ideas on how Ofcom could more effectively seek the views of groups or individuals, such as small businesses and residential consumers, who are less likely to give their opinions through a formal consultation.
- A1.19 If you would like to discuss these issues, or Ofcom's consultation processes more generally, please contact the corporation secretary:

Corporation Secretary
Ofcom
Riverside House
2a Southwark Bridge Road
London SE1 9HA
Email: corporationsecretary@ofcom.org.uk

A2. Ofcom's consultation principles

Ofcom has seven principles that it follows for every public written consultation:

Before the consultation

- A2.1 Wherever possible, we will hold informal talks with people and organisations before announcing a big consultation, to find out whether we are thinking along the right lines. If we do not have enough time to do this, we will hold an open meeting to explain our proposals, shortly after announcing the consultation.

During the consultation

- A2.2 We will be clear about whom we are consulting, why, on what questions and for how long.
- A2.3 We will make the consultation document as short and simple as possible, with a summary of no more than two pages. We will try to make it as easy as possible for people to give us a written response. If the consultation is complicated, we may provide a short Plain English / Cymraeg Clir guide, to help smaller organisations or individuals who would not otherwise be able to spare the time to share their views.
- A2.4 We will consult for up to ten weeks, depending on the potential impact of our proposals.
- A2.5 A person within Ofcom will be in charge of making sure we follow our own guidelines and aim to reach the largest possible number of people and organisations who may be interested in the outcome of our decisions. Ofcom's Consultation Champion is the main person to contact if you have views on the way we run our consultations.
- A2.6 If we are not able to follow any of these seven principles, we will explain why.

After the consultation

- A2.7 We think it is important that everyone who is interested in an issue can see other people's views, so we usually publish all the responses on our website as soon as we receive them. After the consultation we will make our decisions and publish a statement explaining what we are going to do, and why, showing how respondents' views helped to shape these decisions.

A3. Consultation coversheet

BASIC DETAILS

Consultation title:

To (Ofcom contact):

Name of respondent:

Representing (self or organisation/s):

Address (if not received by email):

CONFIDENTIALITY

Please tick below what part of your response you consider is confidential, giving your reasons why

Nothing

Name/contact details/job title

Whole response

Organisation

Part of the response

If there is no separate annex, which parts? _____

If you want part of your response, your name or your organisation not to be published, can Ofcom still publish a reference to the contents of your response (including, for any confidential parts, a general summary that does not disclose the specific information or enable you to be identified)?

DECLARATION

I confirm that the correspondence supplied with this cover sheet is a formal consultation response that Ofcom can publish. However, in supplying this response, I understand that Ofcom may need to publish all responses, including those which are marked as confidential, in order to meet legal obligations. If I have sent my response by email, Ofcom can disregard any standard e-mail text about not disclosing email contents and attachments.

Ofcom seeks to publish responses on receipt. If your response is non-confidential (in whole or in part), and you would prefer us to publish your response only once the consultation has ended, please tick here.

Name

Signed (if hard copy)

A4. Consultation questions

Question 3.1: Do you agree with our proposed market definitions? Please set out your reasons and supporting evidence for your response.

Question 3.2: Do you agree with our proposed SMP assessment? Please set out your reasons and supporting evidence for your response.

Question 4.1: Do you agree with our proposed general remedies? Please set out your reasons and supporting evidence for your response.

Question 5.1: Do you agree with our proposed specific remedies? Please set out your reasons and supporting evidence for your response.

Question 5.2: Do you agree with our assessment not to impose a dark fibre backstop remedy in this review period? Please set out your reasons and supporting evidence for your response.

Question 6.1: Do you agree with our proposed approach to the recovery of network adjustment costs? Please set out your reasons and supporting evidence for your response.

Question 6.2: Do you agree with our proposal regarding the level of the financial limit? Please set out your reasons and supporting evidence for your response.

Question 6.3: Do you agree with our proposed approach to the recovery of productisation costs? Please set out your reasons and supporting evidence for your response.

Question 7.1: Do you agree with our proposed approach to regulation of PIA charges?
Please set out your reasons and supporting evidence for your response.

A5. Regulatory framework

- A5.1 This annex provides an overview of the market review process to give some additional context and understanding of the matters discussed in this document, including the draft legal instruments published in Annex 10.
- A5.2 Market review regulation is technical and complex; and requires us to apply legislation and take into account a number of relevant recommendations and guidelines. This overview identifies some of the key aspects of materials relevant to this market review but does not purport to give a full and exhaustive account of all materials that we have considered in developing our proposals on this market.

Market review concept

- A5.3 A market review is a process by which, at regular intervals, we identify relevant markets appropriate to national circumstances and carry out analyses of these markets to determine whether they are effectively competitive. Where an operator has significant market power (SMP) in a market, we impose appropriate remedies, known as SMP obligations or conditions, to address this. We explain the concept of SMP below.
- A5.4 In carrying out this work, we act in our capacity as the sector-specific regulator for the UK communications industries, including telecommunications. Our functions in this regard are to be found in Part 2 of the Communications Act 2003 (the Act).¹⁹¹ We exercise those functions within the framework harmonised across the European Union for the regulation of electronic communications by the Member States (known as the Common Regulatory Framework or CRF), as transposed by the Act. The applicable rules¹⁹² are contained in a package of five European Directives, of which two Directives are particularly relevant for present purposes, namely:
- Directive 2002/21/EC on a common regulatory framework for electronic communications networks and services (the Framework Directive); and
 - Directive 2002/19/EC on access to, and interconnection of, electronic communications networks and associated facilities (the Access Directive).
- A5.5 The Directives require that National Regulatory Authorities (NRAs) such as Ofcom carry out reviews of competition in communications markets to ensure that SMP regulation remains appropriate and proportionate in the light of changing market conditions.
- A5.6 Each market review normally involves three analytical stages, namely:
- the identification and definition of the relevant markets (the market definition stage);
 - the assessment of competition in each market, in particular whether the relevant market is effectively competitive (the market analysis stage); and

¹⁹¹ <http://www.legislation.gov.uk/ukpga/2003/21/contents>.

¹⁹² The Directives were subsequently amended on 19 December 2009. The amendments have been transposed into the national legislation and applied with effect from 26 May 2011 and any references in this document to the Act should be read accordingly.

- the assessment of appropriate regulatory obligations (the remedies stage).

A5.7 These stages are normally carried out together.

Market definition

A5.8 The Act provides that, before making a market power determination¹⁹³, we must identify “the markets which in [our] opinion are the ones which in the circumstances of the United Kingdom are the markets in relation to which it is appropriate to consider whether to make such a determination” and analyse those markets.

A5.9 The Framework Directive requires that NRAs shall, taking the utmost account of the 2014 EC Recommendation¹⁹⁴ and SMP Guidelines¹⁹⁵ published by the European Commission (EC), define the relevant markets appropriate to national circumstances, in particular relevant geographic markets within their territory, in accordance with the principles of competition law.

A5.10 The 2014 EC Recommendation identifies a set of product and service markets within the electronic communications sector in which *ex ante* regulation may be warranted. Its purpose is twofold. First, it seeks to achieve harmonisation across the single market by ensuring that the same markets will be subject to a market analysis in all Member States. Second, the 2014 EC Recommendation seeks to provide legal certainty by making market players aware in advance of the markets to be analysed.

A5.11 However, NRAs are able to regulate markets that differ from those identified in the 2014 EC Recommendation where this is justified by national circumstances by demonstrating that three cumulative criteria referred to in the 2014 EC Recommendation (the three-criteria test) are satisfied and where the EC does not raise any objections.

A5.12 The three criteria, which are cumulative, are:

- the presence of high and non-transitory structural, legal or regulatory barriers to entry;
- a market structure which does not tend towards effective competition within the relevant time horizon, having regard to the state of infrastructure-based and other competition behind the barriers to entry; and
- competition law alone is insufficient to adequately address the identified market failure(s).

A5.13 The fact that an NRA identifies the product and service markets listed in the 2014 EC Recommendation or identifies other product and service markets that meet the three-

¹⁹³ The market power determination concept is used in the Act to refer to a determination that a person has SMP in an identified services market.

¹⁹⁴ *Commission Recommendation of 9 October 2014 on relevant product and service markets within the electronic communications sector susceptible to ex ante regulation in accordance with Directive 2002/21/EC of the European Parliament and of the Council on a common regulatory framework for electronic communications networks and services (2014/710/EU)*. <http://eurlex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32014H0710&from=EN>.

¹⁹⁵ Guidelines on market analysis and the assessment of significant market power under the EU regulatory framework for electronic communications networks and services (2018/C 159/01): https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.C_.2018.159.01.0001.01.ENG&toc=OJ:C:2018:159:TOC.

criteria test does not automatically mean that regulation is warranted. Market definition is not an end in itself but rather a means of assessing effective competition.

- A5.14 The relationship between the market definitions identified in this review and those listed in the 2014 EC Recommendation is discussed in relevant parts of this document.
- A5.15 The SMP Guidelines make clear that market definition is not a mechanical or abstract process. It requires an analysis of any available evidence of past market behaviour and an overall understanding of the mechanics of a given market sector. As market analysis has to be forward-looking, the SMP Guidelines state that NRAs should determine whether the market is prospectively competitive, and thus whether any lack of effective competition is durable, by taking into account expected or foreseeable market developments over the course of a reasonable period¹⁹⁶ in the absence of regulation based on significant market power (known as a 'Modified Greenfield Approach').¹⁹⁷ The SMP Guidelines clarify that NRAs enjoy discretionary powers which reflect the complexity of all the relevant factors that must be assessed (economic, factual and legal) when identifying the relevant market and assessing whether an undertaking has SMP.
- A5.16 The SMP Guidelines also describe how competition law methodologies may be used by NRAs in their analysis. In particular, there are two dimensions to the definition of a relevant market: the relevant products to be included in the same market and the geographic extent of the market. Ofcom's approach to market definition follows that used by the UK competition authorities, which is in line with the approach adopted by the EC.
- A5.17 While competition law methodologies are used in identifying the relevant markets *ex ante*, the markets identified will not necessarily be identical to markets defined in *ex post* competition law cases, especially as the markets identified *ex ante* are based on an overall forward-looking assessment of the structure and the functioning of the market under examination. Accordingly, the economic analysis carried out for the purpose of this review, including the markets we have identified, is without prejudice to any analysis that may be carried out in relation to any investigation pursuant to the Competition Act 1998¹⁹⁸ (relating to the application of the Chapter I or II prohibitions or Article 101 or 102 of the Treaty on the Functioning of the European Union¹⁹⁹) or the Enterprise Act 2002.²⁰⁰

Market analysis

Effective competition

- A5.18 The Act requires that we carry out market analyses of identified markets for the purpose of making or reviewing market power determinations. Such analyses are normally to be

¹⁹⁶ The SMP Guidelines provide that the actual period used should reflect the specific characteristics of the market and the expected timing for the next review of the relevant market by the NRA – see paragraph 14.

¹⁹⁷ SMP Guidelines, paragraphs 13-17.

¹⁹⁸ <http://www.legislation.gov.uk/ukpga/1998/41/contents>.

¹⁹⁹ Previously Article 81 and Article 82 of the EC Treaty, <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:C:2010:083:FULL:EN:PDF>.

²⁰⁰ <http://www.legislation.gov.uk/ukpga/2002/40/contents>.

carried out within two years from the adoption of a revised recommendation on markets, where that recommendation identifies a market not previously notified to the EC, or within three years from the publication of a previous market power determination relating to that market. Exceptionally, the three-year period may be extended for up to three additional years where the NRA notifies the EC, and it does not object.

A5.19 In carrying out a market analysis, the key issue for an NRA is to determine whether the market in question is effectively competitive. The 27th recital to the Framework Directive clarifies the meaning of that concept:

“It is essential that *ex ante* regulatory obligations should only be imposed where there is not effective competition, i.e. in markets where there are one or more undertakings with significant market power, and where national and Community competition law remedies are not sufficient to address the problem”.

A5.20 The definition of SMP is equivalent to the concept of dominance as defined in competition law. In essence, it means that an undertaking in the relevant market is in a position of economic strength affording it the power to behave to an appreciable extent independently of competitors, customers, and ultimately consumers. The Framework Directive requires that NRAs must carry out their market analysis taking utmost account of the SMP Guidelines, which emphasise that NRAs should undertake a thorough and overall analysis of the economic characteristics of the relevant market before coming to a conclusion as to the existence of SMP.

A5.21 In that regard, the SMP Guidelines set out, additionally to market shares, a number of criteria that can be used by NRAs to measure the power of an undertaking to behave to an appreciable extent independently of its competitors, customers, and consumers, including:

- barriers to entry;
- barriers to expansion;
- absolute and relative size of the undertaking;
- control of infrastructure not easily duplicated;
- technological and commercial advantages or superiority;
- absence of or low countervailing buying power;
- easy or privileged access to capital markets/financial resources;
- product/services diversification (for example, bundled products or services);
- economies of scale and economies of scope;
- direct and indirect network effects;
- vertical integration;
- a highly developed distribution and sales network;
- conclusion of long-term and sustainable access agreements;
- engagement in contractual relations with other market players that could lead to market foreclosure; and
- absence of potential competition.²⁰¹

²⁰¹ SMP Guidelines, paragraph 58.

- A5.22 A dominant position can derive from a combination of these criteria which when taken separately may not necessarily be determinative.

Sufficiency of competition law

- A5.23 As part of our overall forward-looking analysis, we also assess whether competition law by itself (without *ex ante* regulation) is sufficient, within the relevant markets we have defined, to address the competition problems we have identified. We consider this matter in our assessment of the appropriate remedies which, as explained below, are based on the nature of the specific competition problems we identify within the relevant markets as defined. We also note that the SMP Guidelines clarify that, if NRAs designate undertakings as having SMP, they must impose on them one or more regulatory obligations.
- A5.24 In considering this matter, we bear in mind the specific characteristics of the relevant markets we have defined. Generally, the case for *ex ante* regulation is based on the existence of market failures which, by themselves or in combination, mean that the establishment of effective competition might not be possible if the regulator relied solely on *ex post* competition law powers which are not specifically tailored to the sector. Therefore, it may be appropriate for *ex ante* regulation to be used to address such market failures along with any entry barriers that might otherwise prevent effective competition from becoming established within the relevant markets we have defined. By imposing *ex ante* regulation that promotes competition, it may be possible to reduce such regulation over time as markets become more competitive, allowing greater reliance on *ex post* competition law.
- A5.25 *Ex post* competition law is also unlikely in itself to bring about (or promote) effective competition, as it prohibits the abuse of dominance rather than the holding of a dominant position itself. In contrast, *ex ante* regulation is normally aimed at actively promoting the development of competition through attempting to reduce the level of market power (or dominance) in the identified relevant markets, thereby encouraging the establishment of effective competition.
- A5.26 We generally take the view that *ex ante* regulation provides additional legal certainty for the market under review and may also better enable us to intervene in a timely manner. We may also consider that certain obligations are needed as competition law would not remedy the particular market failure, or that the specific clarity and detail of the obligation is required to achieve a particular result.

Remedies

Powers and legal tests

- A5.27 The Framework Directive prescribes what regulatory action NRAs must take depending upon whether or not an identified relevant market has been found effectively competitive. Where a market has been found effectively competitive, NRAs are not allowed to impose SMP obligations and must withdraw such obligations where they already exist. On the

other hand, where the market is found not effectively competitive, the NRAs must identify the undertakings with SMP in that market and then impose appropriate obligations.

- A5.28 NRAs have a suite of regulatory tools at their disposal, as reflected in the Act and the Access Directive. Specifically, the Access Directive identifies a number of SMP obligations, including transparency, non-discrimination, accounting separation, access to and use of specific network elements and facilities, price control and cost accounting. When imposing a specific obligation, the NRA will need to demonstrate that the obligation in question is based on the nature of the problem identified, proportionate and justified in the light of the policy objectives as set out in Article 8 of the Framework Directive.
- A5.29 Specifically, for each and every SMP obligation, we will explain why it satisfies the requirement in section 47(2) of the Act that the obligation is:
- objectively justifiable in relation to the networks, services, facilities, apparatus or directories to which it relates;
 - not such so as to discriminate unduly against particular persons or against a particular description of persons;
 - proportionate to what the condition or modification is intended to achieve; and
 - transparent in relation to what is intended to be achieved.
- A5.30 Additional legal requirements may also need to be satisfied depending on the SMP obligation in question. For example, in the case of price controls, the NRA's market analysis must indicate that the lack of effective competition means that the telecoms provider concerned may sustain prices at an excessively high level or may apply a price squeeze to the detriment of end-users and that the setting of the obligation is appropriate for the purposes of promoting efficiency, promoting sustainable competition and conferring the greatest possible benefits on the end-users of public electronic communications services. In that instance, NRAs must take into account the investment made by the telecoms provider and allow it a reasonable rate of return on adequate capital employed, taking into account any risks specific to a particular new investment, as well as ensure that any cost recovery mechanism or pricing methodology that is mandated serves to promote efficiency and sustainable competition and maximise consumer benefits.
- A5.31 Where an obligation to provide third parties with network access is considered appropriate, NRAs must take into account factors including the feasibility of the network access, the technical and economic viability of creating networks²⁰² that would make the network access unnecessary, the investment of the network operator who is required to provide access²⁰³, and the need to secure effective competition²⁰⁴ in the long term.
- A5.32 To the extent relevant to this review, we demonstrate the application of these requirements to the SMP obligations in question in the relevant parts of this document which set out proposals on remedies. In doing so, we also set out our assessment of how, in our opinion, the performance of our general duties under section 3 of the Act will be

²⁰² Including the viability of other network access products, whether provided by the dominant provider or another person.

²⁰³ Taking account of any public investment made.

²⁰⁴ Including, where it appears to us to be appropriate, economically efficient infrastructure-based competition.

secured or furthered by our regulatory intervention, and that it is in accordance with the six European Community requirements in section 4 of the Act. This is also relevant to our assessment of the likely impact of implementing our proposals.

Ofcom's general duties – section 3 of the Act

- A5.33 Under the Act, our principal duty in carrying out our functions is to further the interests of citizens in relation to communications matters and to further the interests of consumers in relevant markets, where appropriate by promoting competition.
- A5.34 In doing so, we are required to secure a number of specific objectives and to have regard to a number of matters set out in section 3 of the Act.
- A5.35 In performing our duties, we are also required to have regard to a range of other considerations, as appear to us to be relevant in the circumstances. For the purpose of the Physical Infrastructure Market Review (PIMR), we consider that a number of such considerations are relevant, in particular:
- the desirability of promoting competition in relevant markets;
 - the desirability of encouraging investment and innovation in relevant markets; and
 - the desirability of encouraging the availability and use of high speed data transfer services throughout the UK.
- A5.36 We have also had regard to the principles under which regulatory activities should be transparent, accountable, proportionate, consistent, and targeted only at cases in which action is needed, as well as in the interest of consumers in respect of choice, price, quality of service and value for money.
- A5.37 However, Ofcom has a wide measure of discretion in balancing its statutory duties and objectives. In doing so, we take account of all relevant considerations, including responses received during our consultation process, in reaching our conclusions.

European Community requirements for regulation – sections 4 and 4A of the Act and Article 3 of the BEREC Regulation

- A5.38 As noted above, our functions exercised in this review fall under the CRF. As such, section 4 of the Act requires us to act in accordance with the six Community requirements for regulation. In summary, these six requirements are:
- i) to promote competition in the provision of electronic communications networks and services, associated facilities and the supply of directories;
 - ii) to contribute to the development of the European internal market;
 - iii) to promote the interests of all persons who are citizens of the EU;
 - iv) to take account of the desirability of Ofcom's carrying out of its functions in a manner which, so far as practicable, does not favour one form of or means of providing electronic communications networks, services or associated facilities over another (i.e. to be technologically neutral);

- v) to encourage, to such extent as Ofcom considers appropriate for certain prescribed purposes: the provision of network access and service interoperability; securing efficient and sustainable competition; efficient investment and innovation; and the maximum benefit for customers of telecoms providers; and
 - vi) to encourage compliance with certain standards in order to facilitate service interoperability and secure freedom of choice for the customers of telecoms providers.
- A5.39 We consider that the first, third, fourth, and fifth of those requirements are of particular relevance to the matters under review and that no conflict arises in this regard with those specific objectives in section 3 of the Act that we consider are particularly relevant in this context.
- A5.40 Section 4A of the Act requires Ofcom, in carrying out certain of its functions (including, among others, Ofcom's functions in relation to market reviews under the CRF), to take due account of applicable recommendations issued by the EC under Article 19(1) of the Framework Directive. Where we decide not to follow such a recommendation, we must notify the EC of that decision and the reasons for it.
- A5.41 Further, Article 3(3) of the Regulation establishing BEREC²⁰⁵ requires NRAs to take utmost account of any opinion, recommendation, guidelines, advice or regulatory best practice adopted by BEREC.
- A5.42 Accordingly, we have taken due account of the applicable EC recommendations and utmost account of the applicable opinions, recommendations, guidelines, advice and regulatory best practices adopted by BEREC relevant to the matters under consideration in this review.

Impact assessment – section 7 of the Act

- A5.43 The analysis presented in this document represents an impact assessment, as defined in section 7 of the Act.
- A5.44 Impact assessments provide a valuable way of assessing different options for regulation and showing why the preferred option was chosen. They form part of best practice policy-making. This is reflected in section 7 of the Act, which means that generally Ofcom has to carry out impact assessments where there is likely to be a significant effect on businesses or the general public, or when there is a major change in Ofcom's activities. However, as a matter of policy, Ofcom is committed to carrying out and publishing impact assessments in relation to the majority of its policy decisions.²⁰⁶

²⁰⁵ Regulation (EC) No 1211/2009 of the European Parliament and of the Council of 25 November 2009 establishing the Body of European Regulators of Electronic Communications (BEREC) and the Office (the BEREC Regulation)

<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:337:0001:0010:EN:PDF>.

²⁰⁶ For further information about Ofcom's approach to impact assessments, see the guidelines, *Better policy-making: Ofcom's approach to impact assessment*, which are on the Ofcom website:

http://stakeholders.ofcom.org.uk/binaries/consultations/better-policy-making/Better_Policy_Making.pdf.

- A5.45 Specifically, pursuant to section 7, an impact assessment must set out how, in our opinion, the performance of our general duties (within the meaning of section 3 of the Act) is secured or furthered by or in relation to the regulation we impose.
- A5.46 Ofcom is separately required by statute to assess the potential impact of all our functions, policies, projects, and practices on equality.²⁰⁷ This assessment is set out in Annex 6.

Regulated entity

- A5.47 The power in the Act to impose an SMP obligation by means of an SMP services condition provides that it is to be applied only to a “person” whom we have determined to be a person having SMP in a specific market for electronic communications networks, electronic communications services or associated facilities (i.e. the “services market”).
- A5.48 The Framework Directive requires that, where an NRA determines that a relevant market is not effectively competitive, it shall identify “undertakings” with SMP in that market and impose appropriate specific regulatory obligations. For the purposes of EU competition law, “undertaking” includes companies within the same corporate group (for example, where a company within that group is not independent in its decision making).²⁰⁸
- A5.49 We consider it appropriate to prevent a dominant provider to whom an SMP services condition is applied, which is part of a group of companies, exploiting the principle of corporate separation. The dominant provider should not use another member of its group to carry out activities or to fail to comply with a condition, which would otherwise render the dominant provider in breach of its obligations.
- A5.50 To secure that aim, we apply the SMP conditions to the person in relation to which we have made the market power determination in question by reference to the so-called “Dominant Provider”, which we define as “[X plc], whose registered company number is [000] and any [X plc] subsidiary or holding company, or any subsidiary of that holding company, all as defined in section 1159 of the Companies Act 2006”.

²⁰⁷ Ofcom has a general duty under the 2010 Equality Act to advance equality of opportunity in relation to age, disability, sex, gender reassignment, pregnancy and maternity, race, religion or belief, and sexual orientation.

²⁰⁸ *Viho v Commission*, Case C-73/95 P [1996] ECR I-5447.

<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:61995CJ0073:EN:PDF>.

A6. Equality Impact Assessment

Summary

- A6.1 Ofcom is required by statute to assess the potential impact of all our functions, policies, projects and practices on equality.²⁰⁹ An equality impact assessment (EIA) also assists us in making sure that we are meeting our principal duty of furthering the interests of citizens and consumers regardless of their background or identity.
- A6.2 We have considered whether the proposed remedies are likely to have an adverse impact on promoting equality. In particular, we have considered whether the proposed remedies are likely to have a different or adverse effect on UK consumers and citizens with respect to the following equality groups: age, disability, sex, gender reassignment, pregnancy and maternity, race, religion or belief and sexual orientation, and, in Northern Ireland, political opinion and persons with dependants.
- A6.3 Our provisional view is that our proposed remedies will not have a differential impact on any equality group.
- A6.4 Furthermore, we have not considered it necessary to carry out separate EIAs in relation to race or sex equality or equality schemes under the Northern Ireland and Disability Equality Schemes. This is because our provisional view is that our proposed regulatory intervention will not have a differential impact on people of different sexes or ethnicities, consumers with protected characteristics in Northern Ireland²¹⁰ or disabled consumers compared to consumers in general.
- A6.5 Rather, we consider that our proposed regulatory intervention will further the aim of advancing equality of opportunity between different groups in society by furthering the interests of all consumers that use services reliant on physical infrastructure.

Analysis

- A6.6 The intention behind our approach to regulating the Physical Infrastructure markets is to promote competition to the ultimate benefit of end consumers and businesses by, for example, requiring any telecoms provider with Significant Market Power (SMP) to provide access to its physical infrastructure on regulated terms.
- A6.7 To understand how our decisions may affect equality groups, we have considered how different groups in society engage with communications services. In 2016, we conducted market research that enabled us to assess the potential impact of future regulation on

²⁰⁹ Ofcom has a general duty under the 2010 Equality Act to advance equality of opportunity in relation to age, disability, sex, gender reassignment, pregnancy and maternity, race, religion or belief and sexual orientation.

²¹⁰ In addition to the characteristics outlined in the 2010 Equality Act, in Northern Ireland consumers who have dependants or hold a particular political opinion are also protected.

fixed broadband access services on certain equality groups, particularly older consumers.²¹¹ While our research identifies differences in take-up and use of fixed broadband access services by different groups within society, as our regulation is aimed at promoting competition across the range of services that rely on physical infrastructure we see no reason that the impact would not be evenly spread.

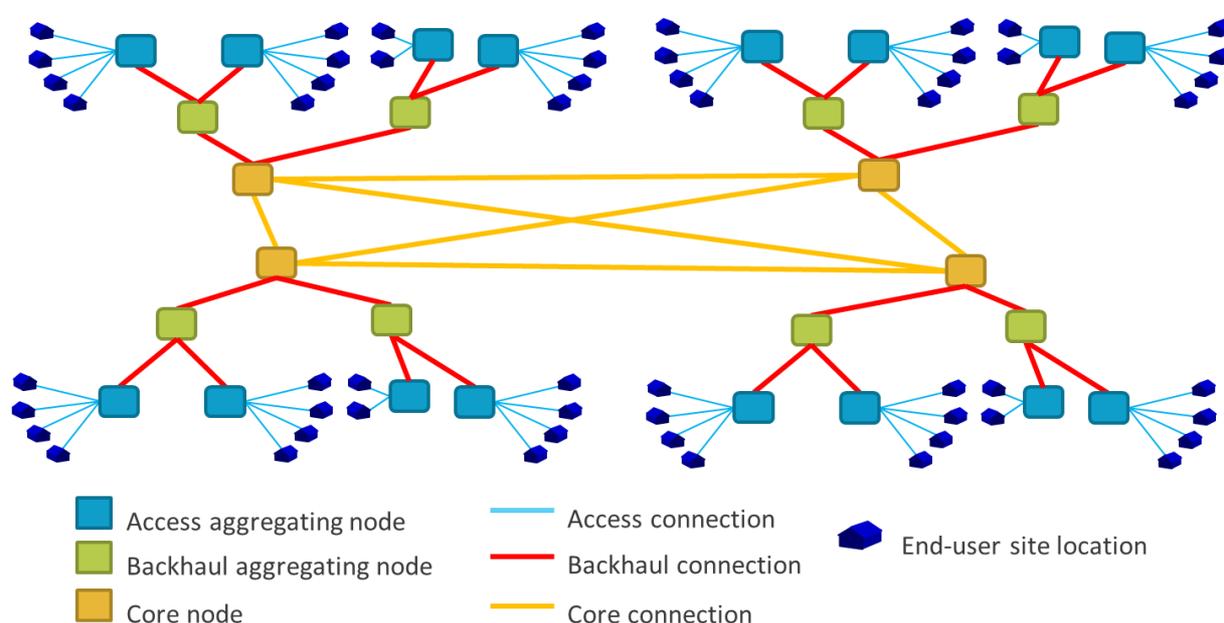
- A6.8 Similarly, while the proposed regulation should have an impact on the businesses who rely on leased line services and who in turn provide services to the different equality groups, we see no reason why the effect of the regulation would ultimate have a differential downstream impact on the equality groups.

²¹¹ Ofcom, 2016. *Residential and SME Broadband Research*.
https://www.ofcom.org.uk/_data/assets/pdf_file/0031/99643/Broadband-residential-research.pdf.

A7. Background to telecoms networks

- A7.1 This annex sets out an overview of network concepts in support of our analysis in this consultation.
- A7.2 A communications network provides the services that enable end-users to exchange information. A network routes its communication services through its network nodes²¹² and connections between them. The nodes are often located in buildings such as BT exchanges, switching centres, data centres, and telecoms providers' buildings. Figure A7.1 sets out how the nodes and connections are logically arranged in a typical network.

Figure A7.1: Illustration of logical arrangement of a communications network



Source: Ofcom

- A7.3 This structure is common to the networks used to provide most voice and data communications services – such as PSTN, mobile, broadband, and leased lines.
- A7.4 To enable communication between different networks, networks can be interconnected with one another.

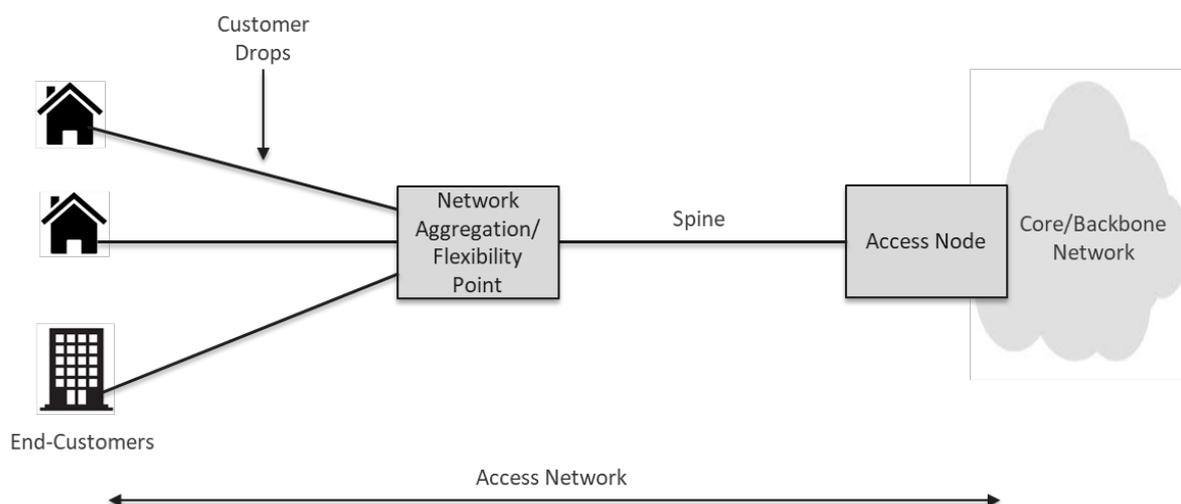
Elements of access networks

- A7.5 While there are number of different types of access network, all share certain common attributes which make up the access connection between end user sites and an access aggregating node, such as customer drops, aggregation/flexibility points, spine links and

²¹² Nodes and connections in this context are considered to be combinations of electronic and optical equipment. Buildings or sites in this context house the nodes.

access nodes. Figure A7.2 below illustrates how the constituent elements typically relate to one another.

Figure A7.2: Generic fixed access network



Source: Ofcom

- A7.6 Customer drops, or lead-ins, are the dedicated physical bearer (or radio links in the case of wireless networks) connecting an end-customer's equipment, so-called customer premises equipment (CPE) or mobile terminals, to the network.
- A7.7 Aggregation nodes or flexibility points terminate a number of customer drops and either aggregate traffic or consolidate multiple transmission bearers into a smaller number for backhaul purposes.²¹³
- A7.8 Spine links are transmission bearers that carry aggregated customer traffic from an aggregation node or flexibility point to an access node. Access nodes host the technology-specific equipment that controls the access network.

Common types of telecoms network

- A7.9 Telecoms networks can be used to deliver a range of services and can do so using different network architectures and technologies. We set out below some of the most common contemporary telecoms networks used to deliver services. For ease of exposition, we discuss the different types of networks separately, however, we expect telecoms providers to increasingly deploy networks supplying the full range of downstream services.
- A7.10 In the description below, we refer to leased lines. These are high-quality point-to-point business connectivity services which tend to be symmetric (i.e. the capacity is the same in both directions) and uncontended (i.e. the capacity is guaranteed and not subject to reduction by the presence of other communication services). These are different from

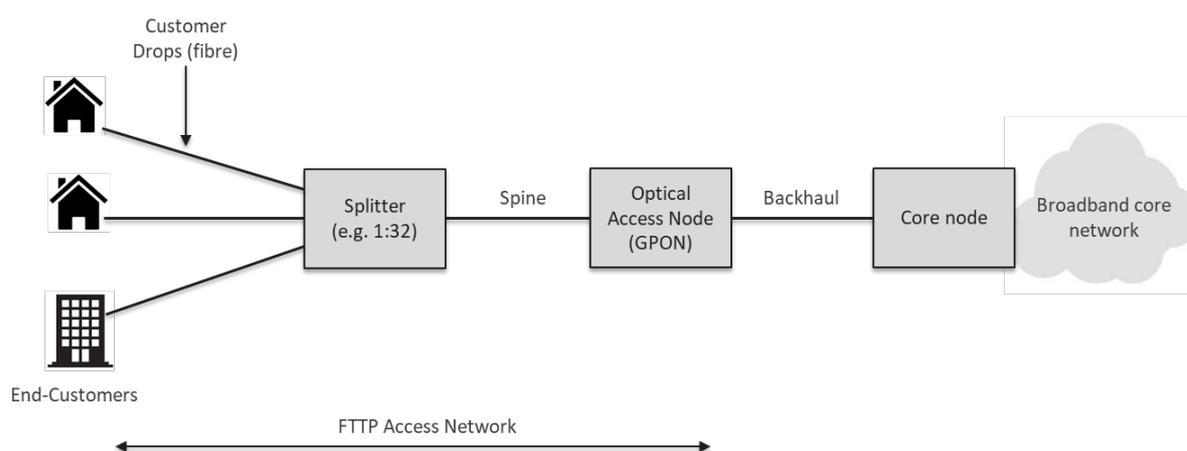
²¹³ In some access networks, the aggregation node can also perform some of the functions of the access node (e.g. DSL-based FTTC).

other services such as consumer and business broadband connections which tend to be asymmetric and contended. As explained below, leased lines are used to provide business end-to-end connectivity, business access connectivity to virtual private networks (VPNs), the internet and cloud computing; mobile network connectivity (often referred to as mobile backhaul); and broadband network connectivity (often referred to as fixed broadband backhaul).

Fixed broadband networks

- A7.11 Fixed broadband access networks share the common characteristic of using cables for their end-to-end transmission, with twisted-pair copper, fibre-optic and coaxial cables being the most common media types. Figure A7.3 below illustrates the key elements of a GPON-based FTTP access network.
- A7.12 Fixed broadband operators use leased lines to connect from their access nodes to their backhaul and core network nodes. These network connections are referred to as ‘fixed broadband backhaul’.²¹⁴ Fixed broadband operators will also connect to the internet at suitable locations to provide an end-to-end broadband service.

Figure A7.3: Generic FTTP GPON Access Network



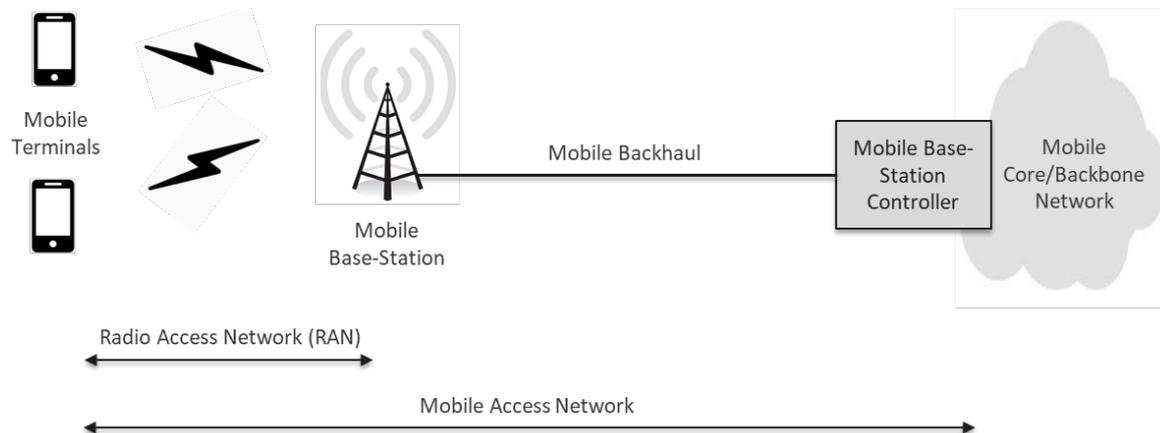
Source: Ofcom

Mobile networks

- A7.13 Mobile access networks provide the wireless connectivity from an end-customer’s mobile terminal device (e.g. a mobile phone) to the nearest base-station, and on via backhaul transmission links (fixed or wireless) to the mobile core network. Figure A7.4 below illustrates the generic elements of a mobile access network.

²¹⁴ Fixed broadband operators can build their own broadband networks using leased lines for backhaul and core, together with access connections owned and operated by BT. In this case, they will site their equipment to connect to BT’s access network (i.e. their access aggregating node) at a BT local exchange. Alternatively, an operator may choose to build their own access connections (for example Virgin Media’s network).

Figure A7.4: Generic Mobile Access Network



Source: Ofcom

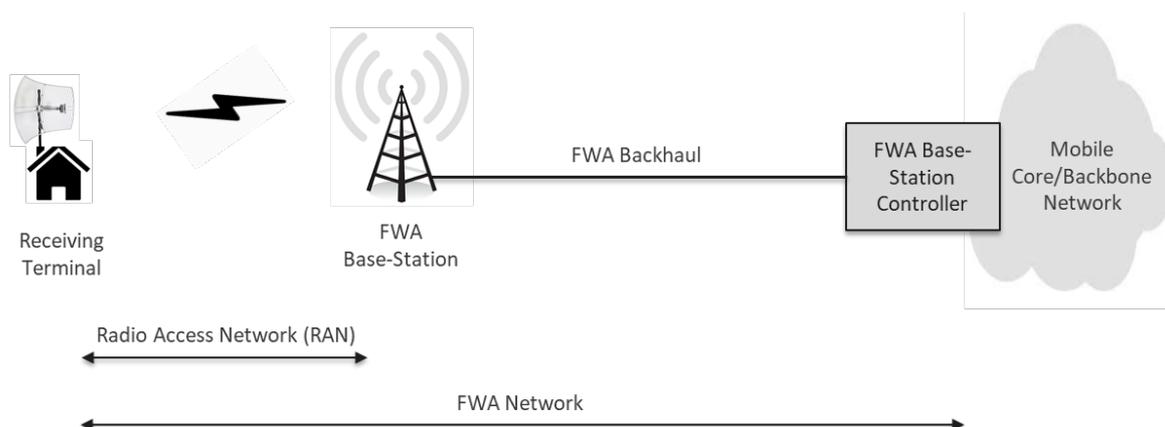
- A7.14 Mobile base-stations create one or more cells, geographic areas adjacent to the base station, offering connectivity for mobile devices located within the cell.
- A7.15 Mobile network operators (MNOs) use leased lines to connect their base stations,²¹⁵ to their core network nodes. The term ‘mobile backhaul’ is often used to refer to the combination of access and backhaul connections between the mobile base station and the mobile core node. MNOs may also use leased lines to provide connectivity between their core sites to construct the networks used to support mobile services including access to the internet and other networks.

Fixed wireless access networks

- A7.16 Fixed wireless access (FWA) networks share characteristics of both fixed broadband and mobile access networks. Figure A7.5: below characterises the basic elements of a FWA network.

²¹⁵ These are the radio masts that provide the communications between the mobile telephone handset and the fixed mobile network.

Figure A7.5: Generic FWA Network



Source: Ofcom

- A7.17 FWA designs are still evolving, and FWA networks could take a number of forms and employ different technologies (e.g. WiMax, LTE), their architecture has similarities with mobile access networks such as a RAN, base station and backhaul transmission link.
- A7.18 The key distinction between mobile access and FWA networks is that FWA does not allow for mobility of the end-customer's terminal device between cells, and in some cases within the cell.

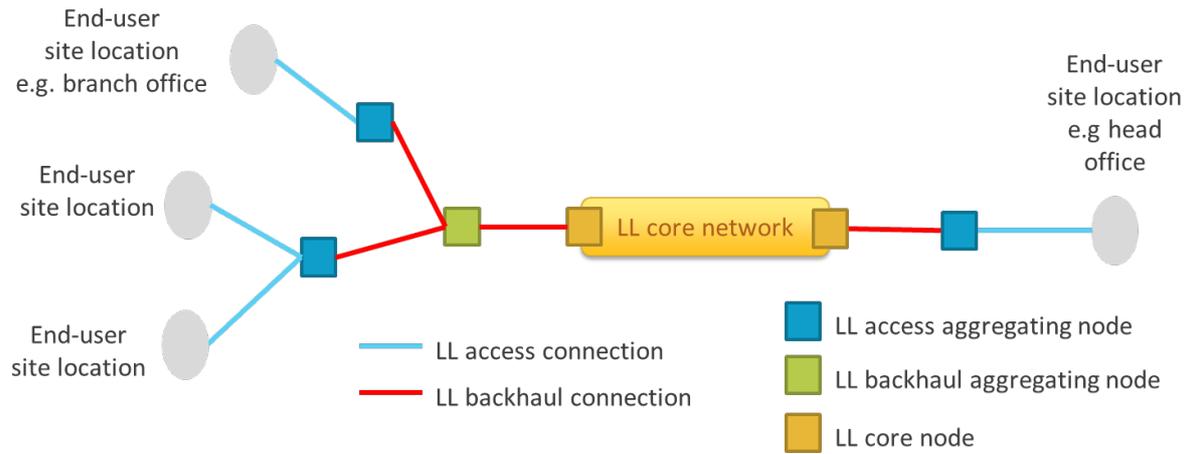
Future wireless networks (5G)

- A7.19 The topology of future 5G networks is currently unclear. However, the expectation is that there will be a greater number of cell sites, to provide greater capacity. There are many ways that these cell sites could be connected to one another and back to the core network. However, we expect that fixed/leased line connections will play a major part in providing these cell site connections.
- A7.20 However, in terms of the fixed network design connecting these cells, it is likely that we will see local area loops of various configurations, and these loops will need to offer connectivity to a large number of non-traditional locations (for example lamp posts).
- A7.21 We are likely to see more need for connections between cells in a local area to coordinate services. Such connections may require fixed lines, though some providers are considering wireless links. There is still uncertainty about the connections between cells in a local area. Nevertheless, we still expect 5G networks to need major fixed backhaul links of the form provided today by leased lines and flexible low cost routes for such backhaul links will remain a key input in the deployment of these networks.

Business connectivity networks

- A7.22 Traditionally, businesses have used leased lines to connect their sites, and sometimes to connect with other businesses. A typical end-to-end connectivity arrangement is illustrated in Figure A7.6.

Figure A7.6: Business end-to-end connectivity



Source: Ofcom

A8. Supporting evidence for market analysis

- A8.1 This annex sets out evidence in support of our market definition and SMP analysis presented in Section 3. It contains the following separate sections:
- a) Types of telecoms physical infrastructure;
 - b) Use of third party physical infrastructure;
 - c) Coverage of telecoms physical infrastructure operators;
 - d) The importance of ubiquity of coverage to access seekers;
 - e) Analysis of the contiguity of Virgin Media's coverage;
 - f) Coverage of alternative infrastructure for leased lines;
 - g) Comparison of the cost of using BT and Virgin Media's lead-in infrastructure; and
 - h) Comparison of other characteristics of BT and Virgin Media's infrastructure.

Types of telecoms physical infrastructure

- A8.2 There are different types of telecoms physical infrastructure that can be used to host fixed elements of a telecoms network.²¹⁶ The main types are ducts and chambers, and poles:
- a) Ducts and chambers are used to carry cables and associated equipment underground. Underground chambers, accessible via a lid in the ground, act as points where existing cables can be accessed, and new cables can be installed.
 - b) Telegraph poles are used to carry cables and associated equipment overhead.
- A8.3 BT's access connections are deployed using a mixture of overhead and underground physical infrastructure. This is true of the connection from the local exchange to the flexibility points, as well as the final connection between a customer's premises and the network (known as the 'lead-in'). BT's backhaul and core connections are typically deployed using underground physical infrastructure.
- A8.4 In contrast, Virgin Media's access, backhaul and core connections are deployed using only underground physical infrastructure.
- A8.5 Telecoms providers that operate only leased lines networks typically provide connections using underground physical infrastructure.

Lead-in infrastructure

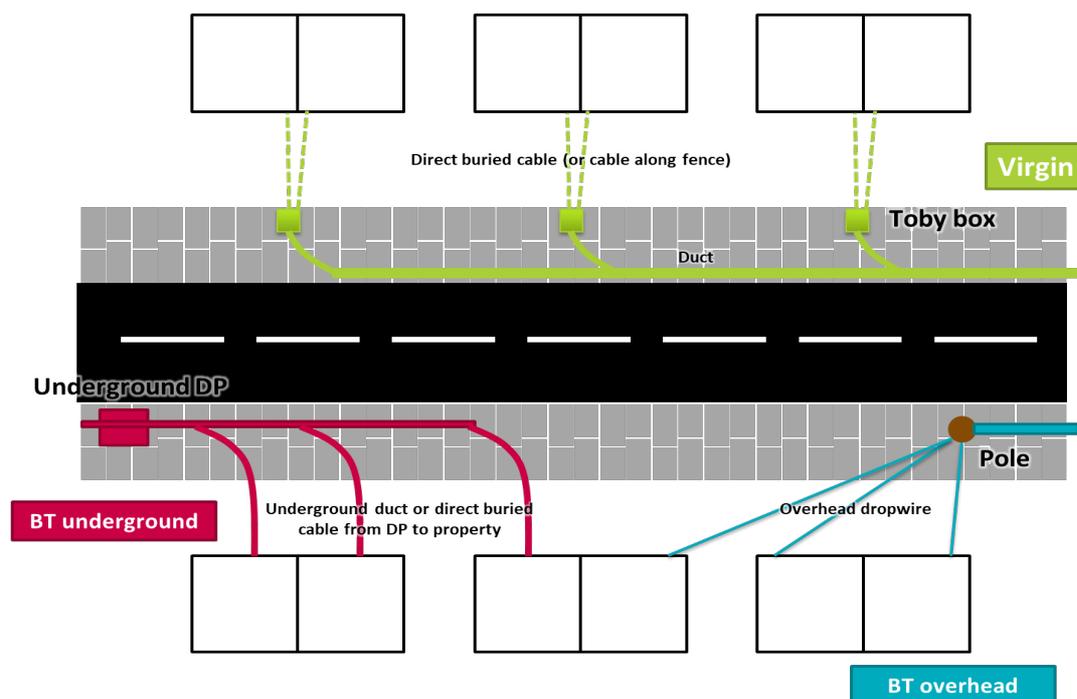
- A8.6 Lead-ins constitute the physical link from the end-customer's premise to the flexibility point in the customer's street and are typically only tens of metres in length.
- A8.7 Broadly speaking, there are three types of lead-in:

²¹⁶ Cables can also be directly buried in the ground.

- a) Overhead lead-ins in the form of dropwires attached to home from poles;
- b) Underground lead-ins installed in ducts; and
- c) Directly buried lead-ins.

A8.8 Figure A8.1 below illustrates what we understand to be the main types of lead-ins in BT and Virgin Media's networks.

Figure A8.1: Main types of lead-ins in BT's and Virgin Media's physical infrastructure



Source: Ofcom

BT's lead-in infrastructure

A8.9 Around 50% of BT's lead-ins are overhead using poles.²¹⁷ The remaining 50% of BT connections are underground lead-ins, running from an underground distribution point all the way to the premises.²¹⁸ The majority of BT's underground lead-ins are installed in ducts, with a small proportion (likely to be around 5% of total lead-ins) directly buried, although this varies geographically.²¹⁹

A8.10 We understand that most of BT's ducted lead-ins are 50mm diameter ducts, and that the majority (80%) of the cables in the 50mm lead-in duct are less than 15mm in diameter,

²¹⁷ 2018 WLA Statement, Volume 3, page 29, footnote 64.

²¹⁸ Within BT's network, some premises are served by internal or external distribution points, located inside or on the facade of customer premises respectively. These are typically business premises or blocks of flats. Such distribution points are generally served by underground ducts and by definition do not require lead-in ducts beyond the distribution points.

²¹⁹ The exact number of directly buried lead-ins is unknown. The incidence of directly buried lead-ins varies between 1% in London and 8-10% in Southern England. See 2018 WLA Statement, Volume 3, page 29, footnote 64.

leaving significant space within the duct.²²⁰ We also understand that around 85-90% of BT's poles can accommodate additional equipment.²²¹

- A8.11 Where lead-ins are directly buried, telecoms providers would need to deploy their own lead-ins from the distribution point to the customers' premises.

Virgin Media's lead-in infrastructure

- A8.12 Virgin Media's lead-ins tend to be predominantly underground ducted from a street cabinet to a termination box ('Toby box') located at ground level adjacent to the end customer's property boundary, through which the lead-in cables pass [redacted]. From here, the lead-in cables are directly buried from the Toby box to the outside of the customer's premise (or cable along fence) [redacted], without ducts. [redacted]. As such, telecoms providers would need to deploy their own lead-ins from Virgin Media's Toby-boxes at the boundary of customers' premises.
- A8.13 Some of Virgin Media's Toby boxes will not have spare capacity to accommodate further cables. [redacted].²²²
- A8.14 [redacted].²²³
- A8.15 New FTTP connections deployed by Virgin Media as part of its Project Lightning have primarily been built using narrow trenching techniques [redacted].²²⁴ Given the very small size of micro ducts, there is effectively no duct network for other telecoms providers to use.
- A8.16 For new estates, Virgin Media works with developers to deploy a ducted access network into customer premises.²²⁵ Overall, only a small proportion ([redacted]%) of Virgin Media's lead-ins are fully ducted.²²⁶

²²⁰ Smaller 25mm ducts may also be present in some parts of the BT network deployed before 1968, with little unoccupied capacity for additional cables. See 2018 WLA Statement, Volume 3, page 29, footnote 64.

²²¹ Around 3.3% of Openreach poles are defective and unable to have additional equipment attached to them. We assume that 12% of the remaining non-defective poles could not accommodate an additional half of the wires currently installed, based on evidence from Openreach that 7% of the current pole estate may already be at maximum capacity, and evidence from Flomatik that 12% of distribution poles could not accommodate an additional half of the wires currently installed. See 2018 WLA Statement, paragraphs A26.96-A26.97.

²²² Virgin Media response dated 7 September 2018 to question 13 of the s135 information request dated 30 August 2018. Virgin Media told us that [redacted]. See Virgin Media response dated 7 September 2018 to question 10 of the s135 information request dated 30 August 2018.

²²³ Virgin Media response dated 26 October 2018 to question 1 of the s135 information request dated 23 October 2018.

²²⁴ Virgin Media response dated 7 September 2018 to question 8 of the s135 information request dated 30 August 2018.

²²⁵ Virgin Media response dated 7 September 2018 to question 8 of the s135 information request dated 30 August 2018.

²²⁶ Virgin Media response dated 7 September 2018 to question 7 of the s135 information request dated 30 August 2018.

Basic infrastructure metrics

Table A8.1: Physical infrastructure owned by BT and Virgin Media

Self-supply shares	BT ²²⁷	Virgin Media ²²⁸
Duct route length, excluding lead-ins	c.450,000km	c.[§<]km
Number of overhead poles	c.[§<]	-
Number of chambers	c.[§<]	c.[§<]

Source: Ofcom analysis; Openreach responses to WLA s135 information requests dated 27 January 2017, 16 June 2017 and 21 December 2017; Virgin Media response dated 21 September 2018 to question 5 of the s135 information request dated 30 August 2018.

Use of third party physical infrastructure

- A8.17 Most existing telecoms networks have been deployed by operators who have also deployed their own physical infrastructure. Use of other third party physical infrastructure (both telecoms and non-telecoms) is generally limited, representing a fraction of the total network deployment. This is outlined in Table A8.2 below.
- A8.18 With the exception of a few limited cases CPs do not offer commercial access to their infrastructure and have no plans to do so.^{229 230 231}

Table A8.2: Use of third party infrastructure by telecoms providers

[§<]

- A8.19 While there are successful limited uses of non-telecoms infrastructure to support telecoms services (such as distribution links over power cables and beside railway lines), when it comes to final distribution access the examples are less positive with a number of unsuccessful trials of use of non-telecoms infrastructure to deploy access networks:²³²

²²⁷ The figure for the total length of spine duct is a modelling assumption set out in Openreach's updated PIA pricing model, which it provided in its response to the WLA s135 information request dated 27 January 2017. We report the figure for total poles. Openreach also informed us in its response to question 11b of the s135 information request dated 21 December 2017 that 3.18 million of its poles carry dropwires. The total number of chambers is sourced from Openreach's response to question 16a of the WLA s135 information request dated 16 June 2017.

²²⁸ Virgin Media response dated 21 September 2018 to question 5 of the s135 information request dated 30 August 2018.

²²⁹ [§<] confirmed that they have no plans to offer commercial access to their access networks. [§<].

²³⁰ [§<] offers a passive duct access product – however – it is small-scale and is [§<]. [§<].

²³¹ [§<] supplies [§<] of physical infrastructure for long-distance routes. [§<].

²³² We are also aware that [§<] has reviewed a broad range of potential non-telecoms physical infrastructure but found that such infrastructure creates extensive incremental challenges in comparison to using telecoms infrastructure. [§<] has considered use of electricity poles, but [§<], due to the additional wayleaves and health and safety requirements with non-telecoms infrastructure. [§<].

- a) [3<] plans to deploy an FTTP network utilising sewer networks [3<].²³³
- b) [3<] investigated the feasibility of using disused water mains to house fibre cabling [3<].²³⁴

Coverage of telecoms physical infrastructure operators²³⁵

Coverage of alternative physical infrastructure that has been deployed to support multi-service networks

A8.20 We calculate premises coverage based on the number of premises passed, using data collected for the Connections Nations report.

BT

A8.21 BT passes nearly all ([3<]%) of UK premises. [3<].

Virgin Media

A8.22 Virgin Media passes [3<]% of UK premises. Figure A8.2 shows the availability of Virgin Media's network by its coverage of individual postcode sectors.

Figure A8.2: Premises passed by Virgin Media in each postcode sector

[3<]

A8.23 For the purposes of our analysis we consider Virgin Media to be present in postcode sectors where its coverage is greater than [3<]% [30-80]%, and not present if its coverage is less than this. On this basis Virgin Media has coverage in [3<]% of postal sectors.

Table A8.3: Proportion of postcode sectors with different levels of coverage²³⁶

[3<]

Other end-to-end telecoms operators premises coverage

A8.24 We have identified a small number of postcode sectors where infrastructures other than Virgin Media cover over [3<]% [30-80]% of premises.

²³³ [3<].

²³⁴ [3<].

²³⁵ When presenting coverage figures we exclude the Hull area. As explain in Section 2 that Hull is outside the scope of this market review.

²³⁶ Excludes postcode sectors where there are no premises.

Table A8.4: Premises passed by other end-to-end telecoms providers²³⁷

[§<]

Coverage of alternative physical infrastructure that has been deployed to support business connectivity networks

A8.25 We consider that an operator covers a large business or mobile site if its infrastructure is within 50m of that the customer location. We consider an operator to be present in a postcode sector if can serve more than 65% of large business and mobile sites in a postcode sector. We describe this approach in detail in the 2018 BCMR Consultation, Section 5.

²³⁷ [§<].

Figure A8.3: Network reach of leased line networks in the UK²³⁸



Source: Ofcom network reach analysis

²³⁸ Note this map shows the number of alternative leased line infrastructures present in a particular area – these categories do not match our geographic markets.

A8.26 Figure A8.3 shows the postcode sectors with coverage by leased lines networks other than BT. This shows that most of the UK has very limited coverage by networks other than BT and that areas with high presence of rival infrastructure are concentrated in major metropolitan areas.

Table A8.5: Number of rival leased lines networks to BT

	Proportion of postcode sectors ²³⁹
0	58%
1	36%
2+	6%

Source: 2018 BCMR Consultation, Table 5.2.

- A8.27 In addition, the number of business sites to which each individual infrastructure is within 50m is relatively low:
- [<] is within 50m of [<]% of large business and mobile sites in the UK excluding Hull.
 - [<] is within 50m of [<]% of large business and mobile sites in the UK excluding Hull.
 - No other alternative infrastructure is within 50m more than [<]% of large business and mobile sites in the UK excluding Hull.

Potential entry and expansion by infrastructure operators

- A8.28 A number of alternative infrastructure operators are considering entry or expansion of their existing networks:²⁴⁰
- Virgin Media, the largest existing alternative telecoms infrastructure to BT, is continuing to expand its network via its Project Lightning, aiming to expand its network to an additional four million premises by 2020, of which two million will be full fibre. Some of this will be infill to its existing footprint areas, increasing the ubiquity of deployment within postcode sectors.
 - CityFibre has announced plans to connect five million homes to full fibre, expanding its network in 37 towns and cities where it already has fibre spine.²⁴¹
 - TalkTalk, in partnership with Infracapital, has an ambition to reach three million homes with full fibre in the medium term.

²³⁹ Excludes postcode sectors in Hull.

²⁴⁰ Leased line operators have also suggested that they would consider further expansion of their networks. [<].

²⁴¹ <https://www.cityfibre.com/news/cityfibre-announces-2-5bn-investment-plan-expand-full-fibre-network-unlock-uks-next-generation-broadband/>

d) Hyperoptic plans to expand its network to reach two million homes passed by 2022 and 5 million homes passed by 2025.²⁴²

e) Gigaclear plans to connect 500,000 premises by 2022 in rural areas.²⁴³

A8.29 Further, where operators are not reliant on DPA, they are using deployment techniques which mean infrastructure is not suitable for sharing (such as directly buried cables or micro-trenched ducts).

The importance of ubiquity of coverage to access seekers

A8.30 Telecoms networks are built to connect to premises or sites.²⁴⁴ The ability to connect to all premises within a deployment area is important, as it minimises the cost per premise passed.²⁴⁵ Even if an access seeker is planning to undertake a more limited deployment, either in terms of scale or scope, the flexibility to be able to expand in response to changes in demand, and to take advantage of economies of scale and scope, is likely to be important for access seekers. Therefore, the certainty to be able to provide any connection in future, without significant additional connection cost, is important.

A8.31 A ubiquitous infrastructure (both in terms of the overall coverage it provides, and the contiguity of that coverage within a particular area) is more likely to be able to provide any particular connection, residential or business. This is particularly critical for leased lines, where each connection requires at least two specific sites to be connected, and will also enable multiple routes between two given connection points, offering greater resilience for end users. This is also likely to reduce lead times and increase certainty of delivery dates, which end users of leased lines consider important factors when choosing a supplier.²⁴⁶

A8.32 It could be possible to connect to all premises within an area by combining multiple non-ubiquitous infrastructures, or through supplementing use of a non-ubiquitous infrastructure with partial self-build.

A8.33 Combining multiple alternative infrastructures adds costs and complexity compared to using a single infrastructure. Informed by our discussions with stakeholders, we have identified various costs associated with combining multiple infrastructures:

b) The cost and time associated with civils works required to break in and out of different infrastructures: these works would typically include installing duct to bridge between chambers in each physical infrastructure, and breaking through the walls of these chambers. Chambers in the respective infrastructures may not be located very close to

²⁴² <https://www.hyperoptic.com/press/posts/hyperoptic-raises-record-250m/>

²⁴³ <https://www.gigaclear.net/about>

²⁴⁴ For example, CityFibre has announced that its expansion programme will follow a whole-city build approach to connect nearly every home and business within the footprint. <https://www.cityfibre.com/news/cityfibre-announces-2-5bn-investment-plan-expand-full-fibre-network-unlock-uks-next-generation-broadband/>.

²⁴⁵ There are other benefits including more efficient marketing and simplifying network operations.

²⁴⁶ 2018 BCMR Consultation, paragraph 6.28.

one another, and traffic permits may be required if these are on opposite sides of the road.²⁴⁷

- c) The duplication of maintenance costs associated with multiple infrastructures; and
- d) The time, complexity and cost of developing and maintaining multiple stakeholder relationships.

A8.34 We recognise that there are a number of reasons which might prevent an access seeker from deploying an access network exclusively using a single infrastructure. For example:

- a) Access seekers may desire a different network architecture to that offered by any single existing infrastructure (for example, a number of potential access seekers require a ring architecture).²⁴⁸
- b) Capacity constraints in the existing network (including directly buried lead-ins which cannot be used by access seekers) may compel an access seeker to utilise alternatives.
- c) Local authorities may have expressed a strong preference for making use of their assets, in order to avoid disruption.²⁴⁹

A8.35 As such, access seekers do self-build and use alternative infrastructures in some cases. However, in general, such usage of self-build and mix-and-match is based on necessity, rather than preference.²⁵⁰

A8.36 Therefore, we understand that access seekers have a strong preference for using one infrastructure where possible. Given the reasons outlined above, this is likely to lead to a preference for using a single, ubiquitous infrastructure.²⁵¹

Analysis of the contiguity of Virgin Media's coverage

Contiguity of Virgin Media's residential coverage by postcode sector

A8.37 Virgin Media's network covers over 90% of all premises in around [redacted]% of all postcode sectors in the UK, and [redacted]% of postcode sectors in the BT and Virgin Media geographic market.

²⁴⁷ Openreach's PIA price list suggests that laying new duct costs between £30-120 per metre depending on the surface type, and breaking through chambers could add further costs. Where Openreach undertakes joint box breakthrough on behalf of a telecoms provider, this attracts a £566 charge for every breakthrough where less than 5 metres of duct is purchased from Openreach.

²⁴⁸ See for example [redacted].

²⁴⁹ [redacted].

²⁵⁰ [redacted] has stated that its use of third party infrastructure was in situations where it was the only available means of deploying infrastructure. See [redacted].

²⁵¹ [redacted] has noted that, even though it wishes to use its own infrastructure, Openreach's infrastructure would be an exception in part due to its ubiquity. See [redacted].

Figure A8.4: Virgin Media coverage by postcode sector in the BT and Virgin Media geographic market

[X]

- A8.38 We have assessed the extent to which the postcode sectors where Virgin Media covers over 90% of premises are contiguous – i.e. geographically adjacent to each other – by grouping the postcode sectors into clusters.²⁵² For this analysis we have included postcode sectors where Virgin Media has over 90% premises coverage which are HNRs ([X] postcode sectors) or in the CLA ([X] postcode sectors). This is a conservative assumption as including these postcode sectors ensures that the contiguity of Virgin Media coverage is as high as it can be.
- A8.39 We have calculated the number of premises and the proportion of those premises covered by Virgin Media in each cluster. We have also calculated the number of large business and mobile sites within each cluster, and the proportion of these within 50m of Virgin Media’s network.
- A8.40 Table A8.6 below shows the size and coverage available in these clusters. It shows that:
- a) [X] of these clusters contain less than [X] premises.
 - b) The coverage of large business and mobile sites is lower than the coverage of all premises.²⁵³

Table A8.6: Virgin Media coverage in clusters of postcode sectors where Virgin Media covers at least 90% of premises²⁵⁴

[X]

Source: Ofcom analysis of Connected Nations data

- A8.41 [X] where Virgin Media has contiguous high coverage which contains more than [X] premises: [X].

Figure A8.5: [X]

[X]

- A8.42 However:
- a) [X], Virgin Media’s coverage of large business and mobile sites is lower than its coverage of all premises;²⁵⁵ and
 - b) [X], it is unlikely to correspond to a desired deployment area.

²⁵² The way contiguity is estimated means there is a margin of error such that there may be postcode sectors included in a cluster which are close to each other, but not contiguous. This can arise from postcodes being used for premises located far apart (up to 300+km, in extreme cases). These may correspond to errors in the source data. This may slightly overstate the extent to which the postcode sectors where Virgin Media covers over 90% of all postcode sectors are in contiguous clusters.

²⁵³ We note that in [X]% of these clusters, large business and mobile sites coverage is less than 90%.

²⁵⁴ Including clusters of one postcode sector.

²⁵⁵ [X]% of large businesses and mobile sites business sites are within 50m of Virgin Media’s network [X].

A8.43 [redacted] containing between [redacted] and [redacted] premises. The number of premises, number of large business and mobile sites, and Virgin Media's coverage of premises and large business and mobile sites in [redacted] is outlined in Table A8.6 below.

Table A8.7: Clusters of contiguous postcode sectors with over 90% Virgin Media coverage containing [redacted] premises

[redacted]

Source: Ofcom analysis of Connected Nations data. [redacted].

A8.44 In [redacted] of these clusters, Virgin Media's coverage of large business and mobile sites is lower than the coverage of premises. In addition, in all of these clusters there are at least some large businesses with no alternatives to BT.

Coverage by deployment town / city

A8.45 The previous analysis seeks to find the geographic areas where Virgin Media's high coverage is most contiguous. In reality, these are unlikely to match the deployment areas desired by potential access seekers. As such, we have also assessed the contiguity of Virgin Media's coverage in urban areas:²⁵⁶

- a) Virgin Media's network passes some premises in [redacted]% of these urban areas, on average covering [redacted]% of premises within those clusters.
- b) Virgin Media's covers at least 90% of premises in [redacted]. This analysis suggests that the majority of clusters found by our postcode sector contiguity analysis do not map to entire urban areas, and so may not correspond to desired deployment areas from access seekers.

Figure A8.6: Urban areas in the UK and where Virgin Media covers at least 90% of all premises

[redacted]

Coverage of alternative infrastructure for leased lines

A8.46 We consider three infrastructure indicators to assess the proximity of alternative infrastructure to business customer sites, each of which give an indication of the intensity of competition within an area:²⁵⁷

- a) *Proportion of businesses with X rival networks within 50m*, which provides a further indicator of the degree of choice available;

²⁵⁶²⁵⁶ We use Ordnance Survey's premises and postcodes polygons data to identify clusters of at least 20,000 premises within urban areas. We filter out non-urban areas by excluding postcode polygons that are larger than 100,000 m². We identify 183 such clusters, which are shown in grey on the map below.

²⁵⁷ All distances measured by the infrastructure indicators are radial distances. In particular, Annex 12 of the 2018 BCMR Consultation sets out how we measure the distances used in the Network Reach analysis and distance to nearest rivals and Annex 11 sets our analysis of distances dug by telecoms providers in 2017.

- b) *Proportion of 2017 new customer ends with existing duct connections*, as whether an infrastructure is already duct connected is a key factor in the cost and speed of installation;²⁵⁸
- c) *Average distance from business sites to nearest rivals*, as where rivals are not connected, the intensity of competition not only depends on the number of rival networks within 50m, but also on how close they are to the customer site.²⁵⁹

A8.47 We also consider the propensity of rival infrastructures to build when seeking to connect a customer who is not already duct connected relative to purchasing an active wholesale leased line product from BT to fulfil the connection. We refer to this as ‘build vs buy’. We calculate ‘build’ (on-net dig) as a percentage of ‘build’ (on-net dig) plus ‘buy’ (off-net) in relation to the supply of a leased line to a customer’s site outside their existing network reach.

Virgin Media’s coverage of large business and mobile sites

A8.48 In A8.7 below, we summarise these indicators for Virgin Media’s network, as well as its broadband coverage, in the HNR areas and the CLA.

Table A8.8: Indicators of the proximity of Virgin Media's infrastructure for broadband and large business and mobile sites in HNR areas and the CLA

[✕]

All alternative infrastructure operators’ leased line coverage

A8.49 To assess the proximity of alternative infrastructures for the provision of leased lines connections, we consider the same indicators explained in A8.46 above. We also consider the average number of rivals within 50m of large business and mobile sites, which provides a useful indication of the degree of rival infrastructure available close to customer sites in a particular geographic area.²⁶⁰

A8.50 In the table below, we present these metrics for the HNR and CLA geographic markets.

Table A8.9: Proximity of alternative infrastructure to business sites

	HNR areas	CLA
Average # of rivals	2.3	4.3

²⁵⁸ See 2018 BCMR Consultation, Annex 11.

²⁵⁹ As explained in Annex 12 of the 2018 BCMR Consultation, we have considered the proximity of rival telecoms infrastructure providers’ networks to customer circuit ends connected in 2017 to give an insight into the distances rivals would potentially have to dig to provide leased lines to customers. See paragraph A12.90.

²⁶⁰ For more details on the assumptions and calculations underlying the network reach analysis see 2018 BCMR Consultation, Section 5 and Annex 12.

	HNR areas		CLA
Proportion of businesses with X rival networks within 50m	X=0	3%	3%
	X=1	13%	6%
	X=2	47%	9%
	X=3	25%	17%
	X=4	7%	17%
	X=5	3%	18%
	X=6	0%	15%
	X=7		10%
	X=8		4%
	X=9		1%
% of businesses with at least 2 rival networks		83%	90%
Average distance to closest rival network		22m	16m
% of new connections already duct connected		56%	76%
Likelihood of build vs buy (where not duct connected)		22%	11%

Source: Ofcom's network reach analysis and circuit data analysis for the 2018 BCMR consultation. Annex 12 of the 2018 BCMR consultation provides a more detailed description and explanation of the analysis undertaken.

HNRs

- A8.51 The majority (68%)²⁶¹ of HNR postcode sectors have a single infrastructure within 50m of at least 80% of large business and mobile sites.
- A8.52 There are 114 HNR postcode sectors (36% of all HNR postcode sectors)²⁶² where at least one alternative infrastructure covers every large business and mobile site within 50m. In [3<] of the 114 postcode sectors where all large businesses and mobile sites are within 50m of a single infrastructure, [3<] is within 50m of every large business and mobile site.
- A8.53 We have also considered the coverage of individual alternative infrastructures within each HNR postcode sector. [3<].²⁶³ [3<]% of postcode sectors contain an infrastructure [3<] which is within 50m of at least [3<]% of large business and mobile sites.²⁶⁴

²⁶¹ 94% of HNR postcode sectors which contain large businesses or mobile sites.

²⁶² 49% of HNR postcode sectors which contain large businesses or mobile sites.

²⁶³ The second highest is [3<].

²⁶⁴ [3<]% of HNR postcode sectors which contain large businesses or mobile sites.

A8.54 Table A8.10 below shows the proportion of postcode sectors where each individual infrastructure is within 50m of a given proportion of large businesses and mobile sites. This shows that [redacted] have relatively ubiquitous coverage of large business and mobile sites within a significant proportion of HNRs.

Table A8.10: Proportion of HNR postcode sectors where operator is within 50m of at least X% business sites

[redacted]

CLA

A8.55 Each infrastructure covers a much greater proportion of businesses within the CLA. This is shown by the proportion of businesses which each infrastructure is within 50m of, and the proportion of CLA postcode sectors where each infrastructure is sufficiently proximate to a large proportion of business and mobile sites in those areas. In addition, in 70% of postcode sectors at least one alternative infrastructure is within 50m of all large business and mobile sites in the CLA; in 50% of postcode sectors at least two alternative infrastructures are within 50m of all large business and mobile sites.

A8.56 As in HNRs, we have also considered the coverage of individual alternative infrastructures.

Table A8.11: Coverage of business sites in the CLA by alternative infrastructure operators

[redacted]

Source: Source: Ofcom's network reach analysis and circuit data analysis for the 2018 BCMR consultation. Annex 12 of the 2018 BCMR consultation provides a more detailed description and explanation of the analysis undertaken.

A8.57 We also consider the effect of reducing the buffer distance necessary to consider a large business covered from 50m to 30m. As explained in BCMR Consultation Section 5, we consider that a buffer distance of 50m is conservative, and some of the evidence we have gathered there suggested that a shorter distance of 20-30m would be appropriate.²⁶⁵ We acknowledge that our network reach analysis does not measure the required dig distances with sufficient precision to use a distance shorter distance than 50m there. However, we consider this as a sensitivity here because access seekers care about the ability to use a single infrastructure to connect businesses within the CLA, rather than the aggregate infrastructure available.

A8.58 On average, large businesses have fewer rival infrastructures within 30m than within 50m. In addition, a much higher proportion of large business and mobile sites have less than two rivals – at 30m, there would be an additional 72 postcode sectors where there would not be at least two alternative networks that can reach more than 65% of large business and mobile sites within 50m of the customer location.

²⁶⁵ See 2018 BCMR Consultation, paragraphs 5.21-5.22.

Table A8.12: Proximity indicators for the CLA at 30m buffer distance

	CLA (30m)	
Average # of rivals	2.7	
Proportion of businesses with X rival networks within Y m	X=0	12%
	X=1	17%
	X=2	20%
	X=3	20%
	X=4	15%
	X=5	8%
	X=6	5%
	X=7	3%
	X=8	1%
	X=9	0%
% of businesses with at least 2 rival networks	71%	

Source: Ofcom's network reach analysis for BCMR Consultation 2018

Comparison of the cost of using BT and Virgin Media's lead-in infrastructure

A8.59 We have compared the average costs associated with using BT and Virgin Media's lead-in physical infrastructure to connect customers, in order to understand whether one offers advantages over the other.

A8.60 We describe the different types of lead-in infrastructure used in BT and Virgin Media's networks above. Based on this, the mix of BT's and Virgin Media's lead in infrastructure can be summarised as follows:

Table A8.13: BT and Virgin Media lead-in types

	BT	Virgin Media
Overhead (poles)	50%	0%
Underground - ducted	45%	[3<]%
Underground – directly buried	5%	[3<]%

Source: 2018 WLA Statement, Volume 3, page 29, fn 64; and Virgin Media response dated 7 September 2018 to questions 7 and 8 of the s135 information request dated 30 August 2018.

A8.61 We have identified the following key cost differences between these different lead-in infrastructure types:

- a) The cost of deploying the manifold, which joins blown fibre ducts from customer premises to a single upstream blown fibre duct: It costs significantly more to deploy pole-mounted manifolds than it does to deploy manifolds in underground chambers.²⁶⁶ This factor alone points to BT's mix of lead-in infrastructure being more expensive than Virgin Media's.
- b) The cost of provisioning the lead-in between customers' premises and manifolds: It is cheaper to provision overhead lead-ins than underground lead-ins. It costs more to provision a new lead-in where an existing underground lead-in is directly buried, than if the existing lead-in is ducted.²⁶⁷ These factors point to BT's mix of lead-ins being less expensive than Virgin Media's.

A8.62 In order to evaluate how these two factors affect the average cost of using BT and Virgin Media's lead-in infrastructures, we have carried out a simple, illustrative bottom-up calculation. Table A8.14 sets out our cost assumptions, for each type of lead-in infrastructure, as well as a blended average for BT and Virgin Media. We assume that the access seeker will be deploying a conventional GPON FTTP network. Such a network is suitable mainly for the delivery of broadband services. [3<].²⁶⁸

Table A8.14: Assumed cost of manifold deployment and lead-in provision, by type of lead-in infrastructure

	Overhead	Underground - ducted	Underground - directly buried
Manifold deployment, per manifold	£100	£15	£15
Lead-in provision, per connection	£160	£160	£230

Source: Ofcom

- A8.63 In the table above, we assume that the cost of provisioning overhead lead-ins is the same as using underground duct, whereas in practice we expect this to be significantly cheaper.
- A8.64 We have not included any costs associated with enabling works.²⁶⁹ Whilst the incidence of these activities is uncertain, we do not believe their inclusion would materially alter the outcome of our analysis.²⁷⁰ Moreover, we have not made any assumptions about capacity limitations into our calculation.

²⁶⁶ We assume that the cost of deploying a manifold on a pole is around £100. We assume that the cost of deploying a manifold underground is around £15.

²⁶⁷ The extent of additional cost depends on how much of the lead-in is directly buried (e.g. whether it is from the distribution point in the street, or from the toby box at the boundary of the property), and the method used to deploy a new lead-in in such a case.

²⁶⁸ Openreach's Chief Engineer's Model V12.

²⁶⁹ For example, chamber construction and pole upgrade works undertaken during network rollout to facilitate the deployment of manifolds, or duct unblocking to facilitate lead-in provisioning.

²⁷⁰ [3<].

A8.65 The overall cost per premises connected (combining the manifold deployment and lead-in provisioning costs) will depend on the number homes served by each manifold, and the penetration achieved by the telecoms provider. In Table A8.15 below, we show the blended average cost per premises connected, using BT and Virgin Media's lead-in infrastructures, under different assumptions for the number of premises served per manifold, and assuming a penetration of 40%.

A8.66 Table A8.15: Overall cost per premises connected, assuming 40% penetration

Number of premises per manifold at 100% penetration	Cost per connection			Blended average cost per connection	
	Overhead	Underground - ducted	Underground - directly buried	BT	Virgin Media
1	£410	£198	£268	£307	[3<]
2	£285	£179	£249	£235	[3<]
3	£243	£173	£243	£211	[3<]
4	£223	£169	£239	£199	[3<]
5	£210	£168	£238	£192	[3<]
6	£202	£166	£236	£187	[3<]
7	£196	£165	£235	£184	[3<]
8	£191	£165	£235	£181	[3<]
9	£188	£164	£234	£179	[3<]
10	£185	£164	£234	£178	[3<]
11	£183	£163	£233	£177	[3<]
12	£181	£163	£233	£175	[3<]

Source: Ofcom

A8.67 These illustrative calculations suggest that the overall cost of using BT's lead-in infrastructure is significantly lower than the overall cost of using Virgin Media's lead-in infrastructure. The higher costs of deploying manifolds overhead are more than offset by the lower costs associated with provisioning lead-ins using BT's mix of lead-in infrastructure. Specifically, there is a higher proportion of fully ducted lead-ins (right up to customer premises) in BT's infrastructure than Virgin Media's infrastructure. If the cost of provisioning overhead lead-ins were also assumed to be cheaper than using underground duct (as we think is the case), the difference would be larger than shown.

A8.68 As the average number of premises per manifold would probably be comparable with BT's copper distribution points at around [3<], this suggests that using Virgin Media's lead-in infrastructure could be around [3<]% more expensive than using BT's.

Comparison of other characteristics of BT and Virgin Media's infrastructure

A8.69 There are a number of other characteristics of network infrastructure that may be relevant to access seekers purchase decision. However, we have little evidence on the extent to which these characteristics are important for access seekers, and on whether either of the infrastructures has an advantage in terms of those characteristics:

- a) BT ducts are installed deeper, and may be better installed than Virgin Media's, based on the cycle of renewal, but this is uncertain.
- b) It is unclear whether either infrastructure is in a better state of repair.
- c) It is unclear whether either provider has better or more accessible duct records.
- d) BT offers greater pre-existing interexchange connectivity, and potentially more space within exchanges for hosting.
- e) BT may have scale and scope advantages from being a UK-wide vertically integrated multi-service network operator, such as being able to maintain and adjust its physical infrastructure to facilitate access.

A9. Adverse effects of proposed physical infrastructure access remedy

Introduction

- A9.1 In Section 5 we set out that we consider that in this review period any adverse effects arising from the imposition of our proposed physical infrastructure access remedy are not disproportionate to our overall aim since the benefits that accrue outweigh any such effects.
- A9.2 In this annex, we present our detailed assessment of the potential adverse effects that we considered in order to inform our assessment of the proportionality of our proposed remedy.
- A9.3 We have considered the following potential adverse effects:
- e) **Impact on dynamic efficiency:** We consider the potential for our proposed Physical Infrastructure Access (PIA) remedy to adversely affect the investment incentives of BT and other telecoms operators.
 - f) **Impact on Openreach's pricing structures:** We consider the potential for our proposed PIA remedy to collapse the bandwidth gradient which could lead to inefficient common cost recovery.
 - g) **Cost of competition:** We recognise that competition could lead to some duplication of costs which could put upward pressure on industry average costs.
 - h) **Additional costs and resource requirements imposed on Openreach:** We consider the cost and resource required for Openreach to develop the PIA product.
 - i) **Impact on competitive markets:** We consider the effect of a PIA remedy on some markets which we already deem competitive.
 - j) **Externalities caused by our approach to network adjustment costs:** We consider whether our approach to the recovery of network adjustment costs might give rise to adverse effects.

Impact on dynamic efficiency

- A9.4 In developing our PIA remedy, we have sought to enhance the investment incentives, both of BT, and of other telecoms providers. We have considered incentives to invest in both residential broadband markets and business connectivity markets.

Impact on end-to-end telecoms providers other than BT

- A9.5 An effective PIA remedy will reduce the absolute costs and time required to build ultrafast broadband networks, and we expect that this will encourage competitors to invest in their own networks. We have considered what effect this will have on existing end-to-end

competition (i.e. where competitors build their networks from scratch, including building their own physical infrastructure), for both broadband and business markets.

- A9.6 We recognise that existing end-to-end competitors which have already deployed networks by building their own physical infrastructure may face a more competitive environment in certain areas, which could affect their ability to retain some of their customers without adjusting prices. However, at the same time, an effective PIA remedy provides these telecoms providers with opportunities to expand their networks at lower cost and more quickly, allowing them to compete in other areas where it would not be viable to deploy their own physical infrastructure. Given the higher costs and time required to build a new network from scratch, the scope for end-to-end network competition is much more limited than the scope for network competition based on PIA. Therefore, to the extent our remedy displaces some end-to-end competition, this is likely to be small, and far outweighed by the significant benefits of realising network competition based on PIA in potentially many more geographic areas.
- A9.7 We observe that many existing network competitors are supportive of our intention to give operators improved access to BT's physical infrastructure and some are already exploring the role that PIA can play in their network expansions. This includes leased-lines-only operators, who have also generally been positive about the opportunities from unrestricted duct access. We discuss later the impact in already competitive markets.

Impact on BT's incentives to invest

- A9.8 We consider that BT's SMP in physical infrastructure has been a factor in limiting network investment. As noted above, we expect that our proposed PIA remedy will encourage competitors to invest in their own networks. We observe that it has been competition which has previously incentivised BT to invest in upgrading its services and we expect competition, or the threat of competition, to continue to incentivise BT to invest.
- A9.9 In the early 2000s, one of the factors that drove BT to increase the performance of its broadband service was the availability of cable broadband. Then, following the introduction of LLU, we saw innovation around the electronic equipment deployed and the capacity of broadband connections. Research has confirmed that promoting access to LLU led to faster broadband speeds.²⁷¹ Similarly, BT announced its rollout of superfast broadband shortly after Virgin Media's upgrade to DOCSIS 3.0.²⁷² Further, BT's more recent decision to invest in G.fast was in the context of Virgin Media at the time offering a maximum service speed of 200 Mbit/s, compared to 80 Mbit/s, which is the current maximum offering on BT's FTTC connections.
- A9.10 While we have seen some benefits from the network competition that already exists between BT and Virgin Media, we consider that a greater degree of network competition – in terms of the number and geographic coverage of competing networks – will drive a material change in outcomes. Greater network competition, enabled by our PIA remedy,

²⁷¹ See Valletti T. 2015, Unbundling the incumbent: evidence from UK broadband.

²⁷² 2016 Strategic Review, paragraph 4.11.

will open up more of the value chain to more effective competition than is the case under current wholesale access remedies.

Impact on BT's cost recovery

- A9.11 By allowing telecoms providers to use PIA for business connectivity services, this should have the effect of increasing the competitive pressure on BT's business connectivity wholesale active products, especially in geographies where these are currently subject to limited or weak competition. Similar to broadband markets, we expect competition, or the threat of competition, to incentivise BT to invest in upgrading its services.
- A9.12 As a result of competition, Openreach might see a reduction in its leased lines volumes which could affect BT's ability to recover its costs from regulated products.²⁷³ If BT does not have a fair opportunity to recover the costs of its previous investments, it could undermine its incentives to make future investments.
- A9.13 In Annex 18 of the 2018 BCMR Consultation we set out our short-term projections of Openreach's leased line volumes that we anticipate may be lost to telecoms providers taking advantage of our PIA remedy. We conclude that even the upper-bound of our projected volume losses, were they to occur, would not be large enough to affect our proposed leased lines charge control in the upcoming market review period until March 2021.
- A9.14 While our short-term volume projections are small enough not to affect the leased lines charge control, over the longer term they could be more significant. However, any implications this may have for BT's cost recovery are matters that can be considered when determining the regulatory arrangements that will apply from 2021. We will consider the most appropriate approach to ensure that BT has an opportunity to recover its efficiently incurred costs as any cost recovery impacts become clearer.

Impact on Openreach's pricing structures

- A9.15 We have considered the impact that widespread use of the PIA remedy we are imposing (including for leased lines) could result in Openreach having to change its existing pricing structure. The current pricing structure set by Openreach involves it recovering its common costs across different services, with a higher share of common costs is recovered from higher bandwidth leased lines.²⁷⁴ Higher pricing of higher bandwidth services is called the bandwidth gradient. We acknowledge that in theory a bandwidth gradient can allow a more efficient recovery of common costs relative to a flat pricing structure.
- A9.16 In general, when imposing wholesale access remedies in market reviews, Ofcom has given BT flexibility in setting prices in the hope that this would lead BT to recover its common costs relatively efficiently. However, taking regulatory measures in order to encourage

²⁷³ Alternatively, it may reduce prices to maintain market share but with the same effect.

²⁷⁴ Common costs are those costs that do not vary with output and are common to two or more products or services, which cannot be avoided except by closure of all the activities to which they are common.

relatively efficient pricing in circumstances where competition is absent does not imply that it is desirable to restrict (or avoid promoting) competition simply in order to preserve BT's ability to set prices flexibly. The purpose of the PIA remedy is to subject BT and the decisions it makes to substantially greater competition and contestability. We accept that the presence of effective competition would mean Openreach will have less control over pricing; that is a natural and desirable constituent of a more competitive market.

Cost of competition

- A9.17 Our strategy is for everyone in the UK to enjoy fast, reliable broadband services. Over time, we would expect that most consumers and businesses will move from 'superfast' to 'ultrafast' broadband, based increasingly on competing networks. Inevitably, our strategy for competing networks will entail some duplication of costs, which could put upward pressure on average costs.
- A9.18 However, a competitor using PIA to deploy a competing network will most likely deploy a full-fibre network. This is not a simple duplication of the existing network that still relies partly on a copper connection, it is a new means of offering broadband that offers a number of advantages, including much higher speeds and improved service quality.
- A9.19 In any case, in this review period, we expect any impact from fixed cost duplication to be small given the natural constraints on build rates associated with mass broadband deployments and a period of familiarisation of the remedy for leased lines only operators.
- A9.20 Over the longer term the impact may become more significant if BT's competitors roll out networks on a much larger scale. However, in the long-term we expect the existing copper network will anyway need to be supplemented with new technologies, such as full-fibre, and this process of network upgrade will involve simultaneous provision of the current copper network and full-fibre. There is therefore likely to be duplication of copper and full-fibre, whether PIA is used to provide the new technologies or not. The PIA remedy helps reduce the scale of fixed cost duplication by allowing new networks to use BT's ducts and poles, significantly lowering the extent of replication of fixed costs.

Additional costs and resource requirements imposed on Openreach

- A9.21 Openreach incurs costs in setting up and managing the PIA product, and processing individual PIA orders. We refer to these costs as 'productisation' costs. In the 2018 WLA we decided that these costs should be recovered across all SMP products that use the physical infrastructure (including PIA).
- A9.22 The vast majority of these costs can therefore be considered sunk and so not relevant for this analysis of the costs and benefits of introducing unrestricted PIA in this consultation. We do not expect BT to incur any material additional costs adapting the remedy for unrestricted use. Accordingly, we expect our current proposal would require minimal, if any additional development costs beyond those already incurred.

- A9.23 We recognise our remedy includes a requirement on Openreach to make adjustments to its network where this is necessary for its physical infrastructure network to be available to telecoms providers for the purpose of deploying their own networks. In some cases, Openreach would have to undertake this work in any event to maintain its network, albeit the request under PIA may bring forward the timing of this work. Notwithstanding these cases, we recognise that the requirement could have a material impact on Openreach, both in terms of the resources required to carry out the civil works, and the costs associated with these adjustments. We already allow Openreach to recover these costs across all users of the infrastructure. With respect to the resource requirements, we recognise that over time Openreach could see a significant step up in the volume of civil works it is required to undertake or oversee. Openreach may need to expand its workforce, for example, by hiring more network planners and field engineers.
- A9.24 However, we consider that the resource burden is sufficiently predictable for Openreach to manage without any significant adverse impact, for three reasons:
- a) First, any increase in the requests for network adjustments for mass broadband deployments will be gradual, given the natural constraints on build rates and the time that it will take for telecoms providers to increase their roll-out to the maximum deployment rate.
 - b) Second, any increase in the requests for network adjustments for leased lines will be gradual as telecoms providers familiarise themselves with the remedy and the limited scope for take-up over the medium-term we highlighted in Annex 18 of the 2018 BCMR Consultation.
 - c) Thirdly, the PIA Reference Offer includes conditions for the provision of forecasts by telecoms providers in respect of their future requirements for PIA, to assist Openreach to plan its resources.
- A9.25 We also observe that requests for Openreach to relieve congested sections in its infrastructure will only arise where other telecoms providers are using PIA to deploy competing networks. Therefore, the scale of the impact on Openreach is contingent on the scale of network deployment, and so is directly linked to the scale of the benefits that result from imposing the PIA remedy.

Impact on competitive markets

- A9.26 Openreach has previously expressed concerns that PIA could impact deregulated services and areas that are already competitive, in particular business connectivity services in the Central London Area (CLA).²⁷⁵
- A9.27 Currently charges for leased lines circuits in the CLA are unregulated and are sold at a high mark-up over BT's costs. By introducing an additional means of supplying leased lines in the CLA it may be that PIA will result in some increase in downstream leased line

²⁷⁵ Openreach response to the April 2017 DPA Consultation, paragraph 91 and 92.

competition. This may have benefits for customers through lower prices and better services. It could also be argued that this same impact is detrimental to those operators who have significant sales of service in the CLA e.g. Colt, and could undermine their incentives to make future investments. However, duct access will also reduce these operator's costs of supply, enabling them to compete better where they do not have an existing connection. Our current view is that unrestricted PIA is not likely to have a large distortive impact on leased line competition in the CLA.

- A9.28 We have also considered the potential impact of the PIA remedy on some inter-exchange and backhaul markets, that we already consider competitive.
- A9.29 With respect to inter-exchange backhaul markets, we do not consider that the remedy will have a material impact on existing competition. This is because the distances between the exchanges and the existence of competing wholesale providers of backhaul means that investment in further capacity is unlikely to be commercially attractive, so to the extent there is any impact it is likely to be minimal.

Externalities caused by our approach to network adjustment costs

- A9.30 Currently, Openreach recovers network adjustment costs over all users of the infrastructure subject to a financial limit. We think this is necessary to promote competition by reducing barriers to investment in competing networks, including ensuring a level playing field with respect to the recovery of these costs.
- A9.31 Under our proposed PIA remedy, Openreach will continue to recover network adjustment costs over all users of the infrastructure.
- A9.32 We consider below whether our approach to the recovery of network adjustment costs might give rise to adverse effects which are disproportionate compared to our objectives. We have considered the following potential adverse effects:
- a) The risk of promoting inefficient entry;
 - b) The risk of encouraging inefficient network adjustments;
 - c) The risk of distorting competition;
 - d) The financial impact on Openreach; and
 - e) The impact on consumers.
- A9.33 In general, as noted above, the impact of our approach to cost recovery is likely to be limited within this market review period given the natural constraints on build rates associated with mass broadband deployments and the learning curve that builders of leased lines go through as they familiarise themselves with the remedy.
- A9.34 In the longer term, we recognise that the impact of our approach is likely to be more significant. However, any requests for network adjustments will only arise where other telecoms providers are using PIA to deploy competing networks. Therefore, the scale of any impacts is contingent on the scale of network deployment, and so is directly linked to the scale of the benefits that result from imposing the PIA remedy. As a result, we consider

that any adverse impacts are more likely to be justified by significant benefits to consumers in the longer term from greater network competition. In any event, we also have the flexibility to modify aspects of the PIA remedy in the future, in light of evidence and experience.

Risk of promoting inefficient entry

- A9.35 We recognise that our approach to cost recovery may result in competing network build occurring in circumstances where the build would not be profitable if access seekers had been charged for the network adjustments and such build may not be productively efficient.
- A9.36 However, we are requiring BT to provide access to its physical infrastructure with the aim of promoting competition and investment in rival networks, in the context of BT's substantial incumbency advantages. Our approach to the recovery of network adjustment costs is necessary to support this objective. We anticipate significant dynamic benefits to consumers where actual network competition emerges, which are not taken into account in the profit evaluations of potential entrants. This means that even if our approach does entail some degree of productive inefficiency, that does not mean our approach is inappropriate.
- A9.37 While the dynamic benefits we expect to arise as a result of promoting greater network competition cannot be readily or reliably quantified, we consider it likely that they will far exceed the likely costs of network adjustments. We have also introduced a financial limit to provide a greater degree of certainty around the costs of network adjustments.

Risk of encouraging inefficient network adjustments

- A9.38 We recognise that there is a risk that telecoms providers may have a weaker incentive to minimise requests for network adjustments than under any approach where they faced some cost of network adjustments. However, we do not consider this to be a significant risk, as the ability for telecoms providers to obtain inefficient adjustments is limited by the network access obligation. This is due to the following reasons:
- a) Openreach is only required to make network adjustments that are necessary, feasible, and where making the adjustment is more efficient than it would be for the telecoms provider to build its own network asset to circumvent the unusable section of Openreach's infrastructure.
 - b) Openreach can also suggest alternative, more efficient routings, and has the flexibility to choose the most efficient solution to meet its obligation. This also enables Openreach to take into account its own future requirements, potentially avoiding the need for further adjustments at a later date.
- A9.39 We recognise that by imposing a financial limit on the network adjustment costs to recover across all users of the infrastructure, Openreach could have a reduced incentive to keep costs under the financial limit, to dissuade telecoms providers from requesting network adjustments. However, by setting the financial limit at a level which should include the cost

of all adjustments other than those that are exceptionally high cost, and because there are some limitations on Openreach's ability to inflate costs, we are of the view that this will not be an issue in the majority of circumstances. We also consider that the risk of setting the financial limit too low is outweighed by the risk of no financial limit. In addition, we have reserved direction making powers to adjust the financial limit if it proves necessary.

Risk of distorting competition

- A9.40 We have considered if our approach to network adjustments costs would distort Openreach's competitive position, compared to other network providers which did not face the same obligation.
- A9.41 We have previously estimated that the impact of recovering network adjustment costs (including those to support BT's own deployments) over all users of infrastructure to be around 14 pence per line per year on average, which would amount to a very small increase in Openreach's prices.²⁷⁶ We set out above in Section 7 that extending the requirement for Openreach to make network adjustments for leased lines only deployment would cost around £[3<] [£0.19m – £1m]. We consider these costs are immaterial, representing less than 0.2% of Openreach's physical infrastructure cost base.
- A9.42 These small increases in prices are unlikely to affect Openreach's ability to compete, particularly given its SMP. However, the impact of our decision and objective of the PIA remedy is that other telecoms providers will be able to compete more effectively with Openreach.

Financial impact on Openreach

- A9.43 We recognise that our approach requires Openreach to recover additional costs of network adjustments over all products that use the physical infrastructure. However, we do not consider that this approach transfers significant risk to Openreach.
- A9.44 When regulating prices, we seek to ensure that Openreach has an opportunity to recover its efficiently incurred costs, including a return which reflects the associated risks of the investment. The fact that the physical infrastructure is a shared asset supporting a range of products lowers the risk associated with investment required to undertake network adjustments. We expect Openreach to have a customer base over which to recover these costs for the foreseeable future. Even if Openreach loses significant volumes of downstream customers to competing networks built using PIA, Openreach will still be able to recover these costs from charges for PIA users.

Impact on consumers

- A9.45 We recognise that an increase in the costs Openreach recovers over products which use its physical infrastructure will increase the costs to be recovered by users other than of the competing telecoms provider. However, this needs to be weighed against the significant

²⁷⁶ WLA 2018, Volume 3, paragraph 4.89.

benefits to consumers in the longer term from innovation (including innovation to increase efficiency and lower costs), choice, stronger incentives to price keenly to attract customers and higher quality of service, which will benefit a wide group of consumers.

- A9.46 Where costs are incurred, we consider there to be little risk of the costs being incurred without these benefits to consumers arising. This is because the chances of the services deployed using PIA of being withdrawn after deployment are small. Sunk costs account for a large part of the business case of network deployment, meaning that even if revenues are lower than expected, it is likely that ongoing costs would be able to be recovered and the service would continue to be provided. Even if the particular telecoms provider had to exit, we consider that it is likely that another provider could take over and run the service at a profit.

A10. Draft legal instruments

Draft legal instruments

Proposals for SMP services conditions

NOTIFICATION OF PROPOSALS UNDER SECTIONS 48A AND 80A OF THE COMMUNICATIONS ACT 2003

Proposals for identifying markets, making market power determinations and setting SMP services conditions in relation to BT under section 45 of the Communications Act 2003

Proposals for market identification and market power determinations

1. Ofcom is proposing to identify the markets listed in Column 1 of **Table A** below for the purpose of making a determination that the person specified in the corresponding row in Column 2 of that Table has significant market power in that identified services market.

Table A: Market identifications and market power determinations

Column 1: Market Identification	Column 2: Market power determination
(a) the supply of wholesale access to telecoms physical infrastructure for deploying a telecoms network in BT only Areas	BT
(b) the supply of wholesale access to telecoms physical infrastructure for deploying a telecoms network in Areas with alternative physical infrastructure that has been deployed to support multi-service networks , but excluding High Network Reach areas	BT
(c) the supply of wholesale access to telecoms physical infrastructure for deploying a telecoms network in High Network Reach areas excluding the Central London Area (CLA)	BT
(d) the supply of wholesale access to telecoms physical infrastructure for deploying a telecoms network in the CLA .	BT

Proposals to set and apply SMP services conditions

2. Ofcom is proposing to set, in relation to the markets identified in Table A above, the SMP conditions as set out in **Schedule 1** to this notification to be applied to BT to the extent specified in that Schedule, which SMP conditions shall, unless otherwise stated in that Schedule, take effect from [*one month after notification published under sections 48(1) and 79(4) of the Act*] or such other date specified in any notification under sections 48(1) and 79(4) of the Act adopting the proposals set out in this notification.
3. The effect of, and Ofcom's reasons for making, the proposals in relation to SMP conditions referred to in this notification are set out in the consultation accompanying this notification.

Ofcom's duties and legal tests

4. In developing proposals for identifying and analysing the markets referred to in paragraph 1 above, and in considering proposals as to whether to make the corresponding determinations set out in this notification, Ofcom has, in accordance with section 79 of the Act, taken due account of all applicable guidelines and recommendations which have been issued or made by the European Commission in pursuance of the provisions of an EU instrument and which relate to market identification and analysis or the determination of what constitutes significant market power. In so doing, pursuant to Article 3(3) of Regulation (EC) No 1211/2009, Ofcom has also taken the utmost account of any relevant opinion, recommendation, guidelines, advice or regulatory practice adopted by BEREC.
5. Ofcom considers that the proposed SMP conditions above comply with the requirements of sections 45 to 47, 87 and 88 of the Act, as appropriate and relevant to each such SMP condition.
6. In making all of the proposals referred to in this notification, Ofcom has considered and acted in accordance with its general duties set out in section 3 of the Act and the six Community requirements in section 4 of the Act. In accordance with section 4A of the Act, Ofcom has also taken due account of all applicable recommendations issued by the European Commission under Article 19(1) of the Framework Directive. Pursuant to Article 3(3) of Regulation (EC) No 1211/2009, Ofcom has also taken the utmost account of any relevant opinion, recommendation, guidelines, advice or regulatory practice adopted by BEREC.

Making representations

7. Representations may be made to Ofcom about any of the proposals set out in this notification and the accompanying consultation document by no later than 1 February 2019.
8. Copies of this notification and the accompanying Consultation have been sent to the Secretary of State in accordance with sections 48C(1) and 81(1) of the Act.

Interpretation

9. For the purpose of interpreting this notification —
 - (a) except in so far as the context otherwise requires, words or expressions shall have the meaning assigned to them in paragraph 10 below, and otherwise any word or expression shall have the same meaning as it has in the Act;
 - (b) headings and titles shall be disregarded;
 - (c) expressions cognate with those referred to in this notification shall be construed accordingly; and
 - (d) the Interpretation Act 1978 (c. 30) shall apply as if this notification were an Act of Parliament.
10. In this notification—
 - (a) “**Act**” means the Communications Act 2003 (c. 21);
 - (b) “**BT**” means British Telecommunications plc, whose registered company number is 1800000, and any of its subsidiaries or holding companies, or any subsidiary of such holding companies, all as defined by section 1159 of the Companies Act 2006;
 - (c) “**BT only areas**” means the areas consisting of the postcode sectors identified as “BT only areas” in Schedule 2 to this notification;
 - (d) “**Areas with alternative physical infrastructure that has been deployed to support multi-service networks**” means the areas consisting of the postcode sectors identified as “APIA” in Schedule 2 to this notification;

- (e) “**Central London Area**” (CLA) means the areas consisting of the postcode sectors identified as “CLA” in Schedule 2 to this notification;
- (f) “**Framework Directive**” means Directive 2002/21/EC of the European Parliament and of the Council of 7 March 2002 on a common regulatory framework for electronic communications networks and services, as amended;
- (g) “**High Network Reach areas**” means the areas consisting of the postcode sectors identified as “High Network Reach areas” in Schedule 2 to this notification;
- (h) “**Ofcom**” means the Office of Communications as established pursuant to section 1(1) of the Office of Communications Act 2002;
- (i) “**Physical Infrastructure**” means any network element which is intended to host other network elements and which is not itself active including any conduit, tunnel, subway, pipe, structure, pole, in, on, by or from which an electronic communications network is or may be installed, supported, carried or suspended. The term does not include cables (including strands of optical fibre);
- (j) “**Telecoms Physical Infrastructure**” means Physical Infrastructure that was deployed for the purposes of deploying a fixed telecommunications network;
- (k) “**United Kingdom**” has the meaning given to it in the Interpretation Act 1978 (1978 c30).

21. The Schedule to this notification shall form part of this notification.

Signed

A handwritten signature in blue ink that reads "D. Clarkson". The signature is written in a cursive style with a large initial 'D'.

David Clarkson

Competition Policy Director, Ofcom

A person duly authorised in accordance with paragraph 18 of the Schedule to the Office of Communications Act 2002

2 November 2018

Schedule 1: SMP conditions

Part 1: Application

1. The SMP conditions in Part 3 of this Schedule 1, except where specified otherwise, apply to the Dominant Provider in each of the following relevant markets:
 - (a) the supply of wholesale access to telecoms physical infrastructure for deploying a telecoms network in BT only Areas;
 - (b) the supply of wholesale access to telecoms physical infrastructure for deploying a telecoms network in Areas with alternative physical infrastructure that has been deployed to support multi-service networks, but excluding High Network Reach areas;
 - (c) the supply of wholesale access to telecoms physical infrastructure for deploying a telecoms network in High Network Reach areas excluding the Central London Area (CLA);
 - (d) the supply of wholesale access to telecoms physical infrastructure for deploying a telecoms network in the CLA.

Save as otherwise specified in any Condition, each Condition will enter into force on [*one month after notification published under sections 48(1) and 79(4) of the Act*] and have effect until the publication of a notification under section 48(1) of the Act revoking such Conditions.

2. The Conditions referred to in paragraph 1 above are entitled as follows—

Condition 1	Network access on reasonable request
Condition 2	Specific forms of network access
Condition 3	Requests for new forms of network access
Condition 4	No undue discrimination
Condition 5	Basis of charges

Condition 6	Charge control
Condition 7	Publication of a Reference Offer
Condition 8	Notification of charges and terms and conditions
Condition 9	Notification of technical information
Condition 10	Quality of service
Condition 11	Regulatory Financial Reporting

Part 2: Interpretation

1. In addition to the definitions set out above in this notification and in each Condition below (where relevant), in this Schedule 1—
 - a) **“Access Agreement”** means an agreement entered into between the Dominant Provider and a Third Party for the provision of network access in accordance with Condition 1 and, in relevant cases, Condition 2;
 - b) **“Dominant Provider”** means BT;
 - c) **“Charge”** means the charge (being in all cases the amounts offered or charged by the Dominant Provider), excluding any discounts offered by the Dominant Provider, to a communications provider for the Charge Controlled Service”;
 - d) **“Consumer Prices Index”** means the index of prices compiled by an agency or a public body on behalf of Her Majesty’s Government or a governmental department (which is the Office for National Statistics at the time of publication of this Notification) from time to time in respect of all items;
 - e) **“CPI”** means the amount of the change in the Consumer Prices Index in the period of twelve months ending on 31 October immediately before the beginning of the Relevant Year, expressed as a percentage (rounded to one decimal place) of that Consumer Prices Index as at the beginning of that first mentioned period;
 - f) **“First Relevant Year”** means the period of [12 months] beginning on [one month after notification published under sections 48(1) and 79(4) of the Act] 2019 and ending on 31 March 2020;
 - g) **“Local Access Node”** means either:
 - i. an MDF Site;
 - ii. an ODF Site;
 - iii. an operational building designated by the Dominant Provider for use as an ODF Site in future; or

- iv. an operational building of the Dominant Provider or Third Party which is reasonably equivalent to one of the above;
- h) **“Local Serving Exchange”** means the site of an operational building of the Dominant Provider, where interconnection is made available by the Dominant Provider to a Third Party for Network Termination Points served by that site for the provision of Virtual Unbundled Local Access;
- i) **“MDF Site”** means the site of an operational building of the Dominant Provider that houses a main distribution frame;
- j) **“Network Termination Point”** means the physical point at which a Relevant Subscriber is provided with access to a public electronic communications network;
- k) **“ODF Site”** means the site of an operational building of the Dominant Provider housing an optical distribution frame for optical fibre access networks;
- l) **“Physical Infrastructure Access”** means network access comprising predominantly of the provision of space, anchorage, attachment facilities and/or such other facilities as may be reasonably necessary to permit a Third Party to occupy parts of the Dominant Provider’s Physical Infrastructure ~~located between Network Termination Points and Local Access Nodes serving those Network Termination Points,~~²⁷⁷ sufficient to facilitate the establishment, installation, operation and maintenance of the electronic communications network of a Third Party at that location;
- m) **“PIA Ancillary Services”** mean an associated facility or services associated with an electronic communications network and/or an electronic communications service which enable and/or support the provision of Physical Infrastructure Access services via that network and/or service or have the potential to do so, which include at a minimum (but without limitation) the following:

²⁷⁷ Revised 28 November 2018.

- i. power;
 - ii. PIA Co-Location;
 - iii. PIA Co-Mingling;
 - iv. PIA Site Access; and
 - v. PIA Database Access;
- n) **“PIA Database Access”** means access to an electronic database of up-to-date information (as far as reasonably practicable) held by the Dominant Provider in relation to the Dominant Provider’s Physical Infrastructure, including location and capacity, for the purpose of a Third Party planning the deployment of an electronic communications network to provide electronic communications services over Physical Infrastructure Access. This database shall include any technical specifications or information related to the Dominant Provider’s Physical Infrastructure as OFCOM may from time to time direct;
- o) **“PIA Co-Location”** means the provision of space permitting a Third Party to occupy part of an MDF Site reasonably sufficient to permit the use of Physical Infrastructure Access;
- p) **“PIA Co-Mingling”** means the provision of PIA Co-Location having the following characteristics:
- i. the Third Party’s electronic communications network is situated in an area of the MDF Site which:
 - A. is a single undivided space;
 - B. after proper performance by the Dominant Provider of its obligation to provide Physical Infrastructure Access pursuant to Conditions 1 and 2, would permit the normal operation of the Third

Party's electronic communications network (or would permit if the Dominant Provider removed any object or substance whether toxic or not, which might reasonably prevent or hinder the occupation of the MDF Site for such use); and

C. if so requested by the Third Party, is not unreasonably distant from the Dominant Provider's electronic communications network within the MDF site;

ii. no permanent physical partition is erected in the space between the Third Party's electronic communications network and the Dominant Provider's electronic communications network; and

iii. the Third Party's electronic communications network is neither owned nor run by the Dominant Provider or by any person acting on the Dominant Provider's behalf;

q) **"Point of Connection"** means a point at which the Dominant Provider's electronic communications network and a Third Party's electronic communications network are connected;

r) **"PIA Site Access"** means access (including the right of entry) to the Dominant Provider's MDF Sites in order for a Third Party to install and operate an electronic communications network to provide electronic communications services over Physical Infrastructure Access;

- s) **“Prior Year”** means in relation to each Relevant Year, the period of 12 months ending on 31 March immediately preceding that Relevant Year;
- t) **“Reference Offer”** means the terms and conditions on which the Dominant Provider is willing to enter into an Access Agreement;
- u) **“Relevant Subscriber”** means any person who is party to a contract with a provider of public electronic communications services for the supply of such services;
- v) **“Relevant Year”** means each of the following two periods:
 - (1) the First Relevant Year; and
 - (2) the Second Relevant Year;
- w) **“Second Relevant Year”** means the period of 12 months beginning on 1 April 2020 and ending on 31 March 2021;
- x) **“Service Level Commitment”** means the quality standards that the Dominant Provider must meet when performing its obligations;
- y) **“Service Level Guarantees”** means a commitment specifying the amount payable proactively by the Dominant Provider to a Third Party for a failure to adhere to a Service Level Commitment;
- z) **“Third Party”** means a person providing a public electronic communications service or a person providing a public electronic communications network;
- aa) **“Working Day”** means any day other than Saturdays, Sundays, public holidays or bank holidays in England and Wales, Scotland or Northern Ireland (as applicable); and
- bb) references to the expression electronic communications network for the purposes of the expressions PIA Co-Location, PIA Co-Mingling, PIA Site Access, as they apply in Condition 2 of Part 3 shall be limited to those matters set out at section 32(1)(b)(i)-(iii) of the Act.

2. For the purpose of interpreting this Schedule, except in so far as the context otherwise requires, the terms or descriptions of products and/or services used in this Schedule shall be construed as having the same meaning as those provided by the Dominant Provider on its website for definitions and explanations of its products in addition to future product updates. These are as at 1 November 2018 found as follows:

<https://www.openreach.co.uk/org/home/products/ductandpoleaccess/ductandpoleaccess.do>

Part 3: SMP conditions

Condition 1 – Network access on reasonable request

- 1.1** Except insofar as Ofcom may from time to time otherwise consent in writing, the Dominant Provider must provide network access to a Third Party where that Third Party, in writing, reasonably requests it.
- 1.2** Except where Condition 1.3 applies, the provision of network access by the Dominant Provider in accordance with this Condition must:
- (a) take place as soon as reasonably practicable after receiving the request from a Third Party (and, in any event, in accordance with condition 10); and
- (b) be on:
- (i) fair and reasonable terms, conditions and charges; and
- (ii) such terms, conditions and charges as Ofcom may from time to time direct.
- 1.3** Where any of Conditions 5 or 6 apply the provision of network access by the Dominant Provider in accordance with this Condition must:
- (a) take place as soon as reasonably practicable after receiving the request from a Third Party (and, in any event, in accordance with Condition 10); and
- (b) be on:
- (i) fair and reasonable terms and conditions (excluding charges); and
- (ii) such terms and conditions (excluding charges) as Ofcom may from time to time direct.
- 1.4** The provision of network access by the Dominant Provider in accordance with this Condition must also include such associated facilities as are reasonably

necessary for the provision of network access and such other entitlements as Ofcom may from time to time direct.

- 1.5** The Dominant Provider must comply with any direction Ofcom may make under this Condition.

Condition 2 – Specific forms of network access

- 2.1** Without prejudice to the generality of Condition 1, except insofar as Ofcom may from time to time otherwise consent in writing, the provision of network access under that Condition must include, where the Third Party, in writing, reasonably requests, Physical Infrastructure Access, including such PIA Ancillary Services as may be reasonably necessary for the use of Physical Infrastructure Access.

Condition 3 – Requests for new forms of network access

- 3.1** The Dominant Provider must, for the purposes of transparency, publish guidelines, in relation to requests for new forms of network access made to it. Such guidelines must set out:
- (a) the form in which such a request should be made;
 - (b) the information that the Dominant Provider requires in order to consider a request for a new form of network access;
 - (c) the timescales in which such requests will be handled by the Dominant Provider; and
 - (d) any provisions directed by Ofcom.
- 3.2** The guidelines must meet the following principles:
- (a) the process for consideration of requests shall be documented end-to-end;
 - (b) the timescales for each stage of the process shall be reasonable;
 - (c) the criteria by which requests will be assessed shall be clearly identified;
 - (d) the reasons for rejecting any request shall be clear and transparent; and
 - (e) any changes to the guidelines shall be agreed between the Dominant Provider and other communications providers in an appropriate manner.
- 3.3** The Dominant Provider must, upon reasonable request from a Third Party considering making a request for a new form of network access, provide that Third Party with such information as may be reasonably required to enable that Third Party to make a request for a new form of network access. Such information must be provided within a reasonable period.
- 3.4** On receipt of a written request for a new form of network access, the Dominant Provider must deal with the request in accordance with the guidelines described in Condition 3.1 above. A modification of a request for a new form of network access

which has previously been submitted to the Dominant Provider, and rejected by the Dominant Provider, must be considered as a new request.

- 3.5** The Dominant Provider must comply with any direction Ofcom may make from time to time under this Condition requiring amendments to the guidelines.

Condition 4 – No undue discrimination

- 4.1** Except insofar as Ofcom may from time to time otherwise consent in writing, the Dominant Provider must not unduly discriminate against particular persons or against a particular description of persons, in relation to the provision of network access in accordance with Conditions 1 and 2, as applicable.
- 4.2** In this Condition, the Dominant Provider may be deemed to have shown undue discrimination if it unfairly favours to a material extent an activity carried on by it so as to place one or more Third Parties at a competitive disadvantage in relation to activities carried on by the Dominant Provider.
- 4.3** The Dominant Provider must publish all such information in relation to the provision of Physical Infrastructure Access provided by the Dominant Provider under Conditions 1 and 2 in such manner and form, and including such content, as Ofcom may from time to time direct for the purposes of providing transparency on the Dominant Provider's compliance with its obligations under this Condition 4.

Condition 5 – Basis of charges

- 5.1** Except where Condition 6 applies, unless Ofcom directs otherwise from time to time, the Dominant Provider must secure, and must be able to demonstrate to the satisfaction of Ofcom, that each and every charge offered or payable for Physical Infrastructure Access provided under Conditions 1 and 2 when averaged over each Relevant Year is reasonably derived from the costs of provision based on a forward looking long run incremental cost approach and allowing an appropriate mark up for the recovery of common costs including an appropriate return on capital employed.
- 5.2** The Dominant Provider must comply with any direction Ofcom may make from time to time under this Condition.

Condition 6 – Physical Infrastructure Access Charge Control

- 6.1** In the First Relevant Year the Dominant Provider shall not charge more than:
- (a) for Facility in Spine duct per metre – single bore, the amount of [£0.28];
 - (b) for Facility in Spine duct per metre – 2 bores, the amount of [£0.18];
 - (c) for Facility in Spine duct per metre – 3+ bores, the amount of [£0.13];
 - (d) for Facility in Lead-in duct per metre, the amount of [£0.55];
 - (e) for Facility in Lead-in link duct per metre (lead-in rate), the amount of [£0.55];
 - (f) for Facility in Lead-in link duct per metre (spine single bore rate), the amount of [£0.28];
 - (g) for Facility in Lead-in link duct per metre (spine 2 bore rate), the amount of [£0.18];
 - (h) for Facility in Lead-in link duct per metre (spine 3+ bore rate), the amount of [£0.13];
 - (i) for Facility on pole for Multi-end-user attachment, the amount of [£11.13];
 - (j) for Facility on pole for Single-end-user attachment, the amount of [£4.76];
 - (k) for Pole top equipment, the amount of [£3.45];
 - (l) for Cable up a pole (per cable), the amount of [£2.25];
 - (m) for Facility hosting (per manhole entry), the amount of [£8.34];
 - (n) for Facility hosting (per joint box entry), the amount of [£2.01];
 - (o) for Customer Apparatus Cable Coil Hosting – small (per manhole), the amount of [£14.61];

- (p) for Customer Apparatus Cable Coil Hosting – medium (per manhole), the amount of [£29.22];
- (q) for Customer Apparatus Cable Coil Hosting – large (per manhole), the amount of [£43.83];
- (r) for Customer Apparatus Cable Coil Hosting – small (per joint box), the amount of [£9.05];
- (s) for Customer Apparatus Cable Coil Hosting – medium (per joint box), the amount of [£18.11];
- (t) for Customer Apparatus Cable Coil Hosting – large (per joint box), the amount of [£27.16];
- (u) for Customer Apparatus In-line Splice hosting and distribution joints (per manhole splice), the amount of [£29.22];
- (v) for Customer Apparatus In-line Splice hosting and distribution joints (per joint box splice), the amount of [£18.11].

6.2 In the Second Relevant Year, for each of the services specified in Condition 6.1(a) to (v) the Dominant Provider shall not charge more than the maximum amount permitted to be charged for that service in the Prior Year multiplied by $(1 + \text{CPI})$.

6.3 In each Relevant Year the Dominant Provider shall not charge more than:

- (a) for Route Plan provision; per hour, the amount of £0.00;
- (b) for Network records administration charge; per hour, the amount of £0.00;
- (c) for Technical Validation (survey, approval, build); per hour, the amount of £0.00;
- (d) for Joint box breakthrough administration charge, the amount of £0.00;
- (e) for Overhead network data report for established Physical Infrastructure Access (PIA) CPs, the amount of £0.00.

- 6.4** Where the Dominant Provider provides PIA Adjustment Services, the Dominant Provider must not charge for such PIA Adjustment Services, unless the total amount of charges for PIA Adjustment Services in the PIA Order exceeds the PIA Adjustment Limit, in which case the Dominant Provider may only charge the Third Party, as a maximum, the amount in excess of the PIA Adjustment Limit for providing such PIA Adjustment Services for that PIA Order.
- 6.5** The charges for each separate PIA Adjustment Service for the purposes of Condition 6.4 shall be reasonably derived from the costs of provision based on a forward looking long run incremental cost approach and allowing an appropriate mark up for the recovery of common costs including an appropriate return on capital employed, except PIA Adjustment Services that are:
- a) PIA Pole Adjustment Services undertaken to provide capacity on a pole to facilitate the provision of a drop wire; and
 - b) PIA Pole Adjustment Services undertaken to replace Defective Pole used for drop wires;

where the charges for such services shall be zero.

- 6.6** Except in so far as Ofcom may otherwise direct, the PIA Adjustment Limit for the purposes of Condition 6.4 shall be calculated by multiplying the total number of kilometers of PIA Spine Duct requested as part of the PIA Order by £4,750.
- 6.7** Where:
- (i) the Dominant Provider makes a material change (other than to a charge) to any service which is subject to this Condition 6; or
 - (ii) there is a material change in the basis of the Consumer Prices Index;

Condition 6 shall have effect subject to such reasonable adjustment to take account of the change as Ofcom may direct.

For the purposes of this Condition 6.7 a material change to any service which is subject to this Condition 6 includes (but is not limited to) the introduction of a new service wholly or substantially in substitution for that existing service which is subject to this Condition 6 or a change to the billing practice for any service which is subject to this Condition 6.

6.8 The Dominant Provider must record, maintain and supply to Ofcom in an electronic format, no later than three months after the end of each Relevant Year, the data necessary for Ofcom to monitor compliance of the Dominant Provider with this Condition 6. The data must include:

- (i) the relevant published charges at the start of each Relevant Year; and
- (ii) such data as Ofcom may from time to time direct.

6.9 Ofcom may direct that Conditions 6.1 to 6.8 shall not apply to the extent specified in any such direction.

6.10 The Dominant Provider shall comply with any direction Ofcom may make from time to time under this Condition 6.

6.11 In this Condition 6:

- (a) **“Defective Pole”** means a pole that has been identified by the Dominant Provider as unsuitable for additional connections due to the pole being decayed, damaged or otherwise defective;
- (b) **“Lead-in Duct”** means duct that connects, or is intended to connect, a distribution point to a Network Termination Points;
- (c) **“PIA Adjustment Service”** means all of the products and/or services listed in Part 1 of the Annex to this Condition 6 where the product and/or service is provided for the purposes of making adjustments to physical infrastructure necessary for the provision of Physical Infrastructure Access in accordance with Conditions 1 and 2;

- (d) **“PIA Adjustment Limit”** has the meaning given to it in Condition 6.6;
- (e) **“PIA Pole Adjustment Service”** means the PIA Adjustment Services listed in Part 2 of the Annex to this Condition 6 where the product and/or service is necessary for the provision of Physical Infrastructure Access in accordance with Conditions 1 and 2;
- (f) **“PIA Order”** means:
 - (i) A request for Physical Infrastructure Access ~~between Network Termination Points and the Local Access Nodes serving those termination points,~~²⁷⁸ submitted to the Dominant Provider by a Third Party, and
 - (ii) any subsequent request for access to Lead-in Duct that facilitates the extension of the electronic communications network deployed using the Physical Infrastructure ordered in the initial request.
- (g) **“PIA Spine Duct”**; means all duct other than Lead-in Duct.

²⁷⁸ Revised 28 November 2018.

Annex to Condition 6

Part 1

Meaning of PIA Adjustment Services

For the purposes of Condition 6D, the expression “**PIA Adjustment Services**” shall be construed as including the following products and/or services, subject to such changes as Ofcom may direct following any proposal by the Dominant Provider to introduce a new product and/or service or to substitute one or more of these products or services for another:

Activity
New Small Footway Box
New Medium Footway Box
New Large Footway Box
New Small Carriageway Box
New Medium Carriageway Box
New Large Carriageway Box
New Duct - soft; per metre
New Duct - footway; per metre
New Duct - carriageway; per metre
New Pole
Replacement Carrier Pole (expedite)
Replacement Carrier Pole
Replacement DP Pole (expedite)
Replacement DP Pole
Renew and/or provide a Pole Stay
Provide pole top ring-head
Customer changeover, per pole visit
Customer changeover - hourly rate
Cable recovery (light) - per 100m
Cable recovery (heavy) - per 100m
Cable recovery (large) - per 100m
Blockage clearance (initial) - per blockage

Blockage clearance (subsequent) - per blockage
Aborted clearance of a blockage in a duct per aborted clearance
Aborted clearance of an additional blockage in a duct per aborted clearance
Pole recovery (removal) per pole
Provision of an Earth Spike for pole
Renew, provide and/or re position Pole steps on Pole - per pole
Install a lightning protection module
Provision of a 'BT 66B' for lightning protection
Lay Copper Earthing Strip in an open trench
Lay Copper Earthing Strip in Soft or Unsurfaced
Lay Copper Earthing Strip in Footway
Lay Copper Earthing Strip in Carriageway
Retention, Refix and Renewal of aerial Cable
Retention, Refix and Renewal of drop wire
Work undertaken on the British Outer Islands
Ferry travel for Scottish Islands (as per ticket price)
Local Authority fees (as per fees)
Road closures (cable works) (as per fees)

Part 2**Meaning of PIA Pole Adjustment Services**

For the purposes of Condition 6, the expression “**PIA Pole Adjustment Services**” shall be construed as including the following products and/or services subject to such changes as Ofcom may direct following any proposal by the Dominant Provider to introduce a new product and/or service or to substitute one or more of these products or services for another:

Activity
New Pole
Replacement DP Pole (expedite)
Replacement DP Pole
Renew and/or provide a Pole Stay
Provide pole top ring-head
Pole recovery (removal) per pole
Customer changeover, per pole visit
Customer changeover - hourly rate
Provision of an Earth Spike for pole
Renew, provide and/or re position Pole steps on Pole - per pole
Retention, Refix and Renewal of drop wire

Condition 7 – Publication of a Reference Offer

- 7.1** Except in so far as Ofcom may from time to time otherwise consent in writing, the Dominant Provider must publish a Reference Offer in relation to the provision of network access pursuant to Conditions 1 and 2 and act in the manner set out below.
- 7.2** Subject to Condition 7.9, the Dominant Provider must ensure that a Reference Offer in relation to the provision of network access pursuant to Condition 1 includes, where applicable, at least the following—
- (a) a description of the network access to be provided, including technical characteristics (which shall include information on network configuration where necessary to make effective use of network access);
 - (b) the locations at which network access will be provided;
 - (c) any relevant technical standards for network access (including any usage restrictions and other security issues);
 - (d) the conditions for access to ancillary, supplementary and advanced services (including operational support systems, information systems or databases for pre-ordering, provisioning, ordering, maintenance and repair requests and billing);
 - (e) any ordering and provisioning procedures;
 - (f) relevant charges, terms of payment and billing procedures;
 - (g) details of maintenance and quality as follows—
 - (i) specific time scales for the acceptance or refusal of a request for supply and for completion, testing and hand-over or delivery of services and facilities, and for provision of support services (such as fault handling and repair);
 - (ii) service level commitments, namely the quality standards that each party must meet when performing its contractual obligations;

- (iii) the amount of compensation payable by one party to another for failure to perform contractual commitments;
- (iv) a definition and limitation of liability and indemnity; and
- (v) procedures in the event of alterations being proposed to the service offerings, for example, launch of new services, changes to existing services or change to prices;
- (h) details of measures to ensure compliance with requirements for network integrity;
- (i) details of any relevant intellectual property rights;
- (j) a dispute resolution procedure to be used between the parties;
- (k) details of duration and renegotiation of agreements;
- (l) provisions regarding confidentiality of the agreements;
- (m) rules of allocation between the parties when supply is limited (for example, for the purpose of co-location or location of masts); and
- (n) the standard terms and conditions for the provision of network access.

7.3 Subject to Condition 7.9, and to the extent not already required by Condition 7.2, the Dominant Provider must ensure that a Reference Offer in relation to the provision of Physical Infrastructure Access pursuant to Conditions 1 and 2 also includes at least the following:

- (a) the location of Physical Infrastructure or the method by which Third Parties may obtain information about the location of Physical Infrastructure;
- (b) technical specifications for Physical Infrastructure Access including:
 - (i) technical specifications for permitted cables and associated equipment;
 - (ii) cable installation, attachment and recovery methods; and

- (iii) technical specifications relevant when Third Parties elect to undertake repair works on behalf of the Dominant Provider;
- (iv) technical specifications relevant when Third Parties elect to undertake build works on behalf of the Dominant Provider;
- (c) the methodology for calculating availability of spare capacity in Physical Infrastructure;
- (d) procedures for the provision of information to Third Parties about spare capacity, including arrangements for visual surveys of Physical Infrastructure to determine spare capacity;
- (e) conditions for reserving capacity that shall apply equally to the Dominant Provider and Third Parties;
- (f) conditions for the installation and recovery of cables and associated equipment;
- (g) arrangements for relieving congested Physical Infrastructure, including the repair of existing faulty infrastructure and the construction of new Physical Infrastructure
- (h) conditions for Third Parties to gain access to the Physical Infrastructure including if appropriate training, certification and authorisation requirements for personnel permitted to access and work in/on Physical Infrastructure;
- (i) the arrangements for maintenance of cables and associated equipment installed by Third Parties and of the Physical Infrastructure, including provision for the temporary occupation of additional infrastructure capacity for the installation of replacement cables;
- (j) conditions for the inspection of the Physical Infrastructure at which access is available or at which access has been refused on grounds of lack of capacity;
- (k) the information that a Third Party is required to provide to the Dominant Provider where that Third Party is requesting the repair of existing faulty infrastructure and/or the construction of new Physical Infrastructure necessary for the Service Level

Commitments and Service Level Guarantees required by Conditions 7.3B(l) and (m) below;

(l) Any reasonably necessary Service Level Commitments including in respect of at least the following:

(i) the provision by the Dominant Provider to a Third Party of a Response Notice;

(ii) the completion by the Dominant Provider of any works necessary to relieve congested Physical Infrastructure including the repair of existing faulty infrastructure and the construction of new Physical Infrastructure other than a congested Pole;

(iii) the provision by the Dominant Provider of a response to a request by a Third Party to undertake works itself to relieve congested Physical Infrastructure;

(iv) the provision by the Dominant Provider to a Third Party of a Pole Response Notice; and

(v) the completion by the Dominant Provider of any works necessary to relieve a congested Pole.

(m) Service Level Guarantees in respect of the Service Level Commitments specified in Condition 7.3(l)(i) to (l)(v) above;

(n) conditions for the provision of forecasts by a Third Parties in respect of their future requirements for Physical Infrastructure Access; and

(o) conditions on which Third Parties may elect to undertake repair or build works on behalf of the Dominant Provider.

7.4 To the extent that the Dominant Provider provides to itself network access that:

(a) is the same, similar or equivalent to that provided to any Third Party; or

(b) may be used for a purpose that is the same, similar or equivalent to that provided to any Third Party;

in a manner that differs from that detailed in a Reference Offer in relation to network access provided to any Third Party, the Dominant Provider must ensure that it publishes a Reference Offer in relation to the network access that it provides to itself which includes, where relevant, at least those matters detailed in Condition 7.2(a) to (o).

- 7.5** The Dominant Provider must, on the date that this Condition enters into force, publish a Reference Offer in relation to any network access that it is providing as at the date that this Condition enters into force.
- 7.6** The Dominant Provider must update and publish the Reference Offer in relation to any amendments or in relation to any further network access provided after the date that this Condition enters into force.
- 7.7** Publication referred to above shall be effected by the Dominant Provider placing a copy of the Reference Offer on any relevant publicly accessible website operated or controlled by the Dominant Provider.
- 7.8** The Dominant Provider must send a copy of the current version of the Reference Offer to any person at that person's written request (or such parts as have been requested).
- 7.9** The Dominant Provider must make such modifications to the Reference Offer as Ofcom may direct from time to time.
- 7.10** The Dominant Provider must provide network access at the charges, terms and conditions in the relevant Reference Offer and must not depart therefrom either directly or indirectly.
- 7.11** The Dominant Provider must comply with any direction Ofcom may make from time to time under this Condition.
- 7.12** In this Condition 7:

- (a) **“Response Notice”** means a notice responding to a request by a Third Party for Physical Infrastructure Access, including where relevant to relieve congested Physical Infrastructure, including the repair of existing faulty infrastructure and the construction of new Physical Infrastructure, other than a congested Pole which confirms either:
 - (i) that the request has been accepted by the Dominant Provider and how the Dominant Provider proposes to relieve any congestion; or
 - (ii) that the request has been refused by the Dominant Provider and the reasons for the refusal of the request.
- (b) **“Pole Response Notice”** means a notice responding to a request by a Third Party to relieve a congested Pole which confirms either:
 - (i) that the request has been accepted by the Dominant Provider and how the Dominant Provider proposes to relieve any congestion; or
 - (ii) that the request has been refused by the Dominant Provider and the reasons for the refusal of the request.
- (c) **“Pole”** means any pole forming part of the Dominant Provider’s Physical Infrastructure.

Condition 8 – Notification of charges and terms and conditions

- 8.1** Except in so far as Ofcom may from time to time otherwise consent in writing, the Dominant Provider must publish charges, terms and conditions and act in the manner set out in this Condition.
- 8.2** Where it proposes a PI Access Change, the Dominant Provider must send to every person with whom it has entered into an Access Agreement pursuant to Condition 1 or Conditions 1 and 2 (as the case may be), a WLA Access Change Notice.
- 8.3** The obligation in Condition 9.2 shall not apply where the PI Access Change is directed or determined by Ofcom or is a consequence of such direction or determination (including pursuant to the setting of an SMP services condition under the power in section 45 of the Act) or required by a notification or enforcement notification issued by Ofcom under sections 96A or 96C of the Act.

8.4

A PI Access Change Notice must:

- (a) in the case of a PI Access Change involving new network access, be sent not less than 28 days before any such amendment comes into effect;
- (b) in the case of a PI Access Change relating solely to a reduction in the price of existing network access (including, for the avoidance of doubt, the introduction of a Special Offer), be sent not less than 28 days before any such amendment comes into effect;
- (c) in the case of a PI Access Change relating to the end of a temporary price reduction, or an increase to a price offered as a temporary price reduction (where the increased price is still a temporary price reduction), in accordance with the terms of a Special Offer, be sent not less than 28 days before any such amendment comes into effect;
- (d) in the case of a PI Access Change relating to an amendment to the terms and conditions of a Special Offer (other than relating to price or an extension of the duration of the Special Offer), be sent not less than 28 days before any such amendment comes into effect;
- (e) in the case of a PI Access Change relating solely to an extension of the duration of a Special Offer at the same price or a lower price with no other amendments to the terms and conditions of the Special Offer, be sent at least one Working Day before such amendment comes into effect;
- (f) in the case of any other PI Access Change involving existing network access and not relating to the terms of a Special Offer,

be sent not less than 90 days before any such amendment comes into effect.

8.5 The Dominant Provider must ensure that a PI Access Change Notice includes—

- (a) a description of the network access in question;
- (b) a reference to the location in the Dominant Provider's current Reference Offer of the terms and conditions associated with the provision of that network access;
- (c) the current and proposed new charge and/or current and proposed new terms and conditions (as the case may be); and
- (d) the date on which, or the period for which, the PI Access Change will take effect (the "**effective date**").

8.6 The Dominant Provider must not apply any PI Access Change identified in a PI Access Change Notice before the effective date.

8.7 To the extent that the Dominant Provider provides to itself network access that—

- (a) is the same, similar or equivalent to that provided to any Third Party; or
- (b) may be used for a purpose that is the same, similar or equivalent to that provided to any Third Party,

in a manner that differs from that detailed in a PI Access Change Notice in relation to network access provided to any Third Party, the Dominant Provider must ensure that it sends to Ofcom a notice in relation to the network access that it provides to itself which includes, where relevant, at least those matters detailed in Conditions 8.5(a) to (d) and, where the Dominant Provider amends the charges, terms and conditions on which it

provides itself with network access, it must ensure it sends to Ofcom a notice equivalent to a PI Access Change Notice.

8.8

In this Condition 8:

- a) “**Special Offer**” means a temporary price reduction for a particular product or service, applicable to all customers on a non-discriminatory basis, which is stated to apply for a limited and predefined period and where the price immediately on expiry of that period is no higher than the price immediately before the start of that period;
- b) “**PI Access Change**” means any amendment to the charges, terms and conditions on which the Dominant Provider provides network access pursuant to Conditions 1 and 2 or in relation to any charges for new network access pursuant to Conditions 1 and 2; and
- c) “**PI Access Change Notice**” means a notice given by the Dominant Provider of a PI Access Change.

Condition 9 – Notification of technical information

9.1 Except in so far as Ofcom may from time to time otherwise consent in writing, where the Dominant Provider provides network access pursuant to Condition 1 or Conditions 1 and 2 (as the case may be) and proposes new or amended terms and conditions relating to the following—

(a) technical characteristics (including information on network configuration, where necessary, to make effective use of the network access provided);

(b) the locations at which network access will be provided; or

(c) technical standards (including any usage restrictions and other security issues),

the Dominant Provider must publish a written notice (the “**Notice**”) of the new or amended terms and conditions within a reasonable time period. Other than where the new or amended terms and conditions are a consequence of new or amended technical specifications determined by NICC Standards Limited (whose registered company number is 6613589), that reasonable notice must be not less than 90 days before either the Dominant Provider enters into an Access Agreement to provide the new network access or the amended terms and conditions of an existing Access Agreement come into effect.

9.2 The obligation in Condition 9.1 shall not apply where the new or amended charges or terms and conditions are directed or determined by Ofcom or is a consequence of such direction or determination (including pursuant to the setting of an SMP services condition under the power in section 45 of the Act) or are required by a notification or enforcement notification issued by Ofcom under sections 96A or 96C of the Act;

9.3 The Dominant Provider must ensure that the Notice includes—

(a) a description of the network access in question;

(b) a reference to the location in the Dominant Provider’s Reference Offer of the relevant terms and conditions;

(c) the date on which or the period for which the Dominant Provider may enter into an Access Agreement to provide the new network access or any amendments to the relevant terms and conditions will take effect (the “**effective date**”).

9.4 The Dominant Provider must not enter into an Access Agreement containing the terms and conditions identified in the Notice or apply any new relevant terms and conditions identified in the Notice before the effective date.

9.5 Publication referred to in Condition 9.1 must be effected by the Dominant Provider—

(a) placing a copy of the Notice on any relevant publicly accessible website operated or controlled by the Dominant Provider;

(b) sending a copy of the Notice to Ofcom; and

(c) sending a copy of the Notice to any person at that person’s written request, and where the Notice identifies a modification to existing relevant terms and conditions, to every person with which the Dominant Provider has entered into an Access Agreement pursuant to Condition 1 or Conditions 1 and 2 (as the case may be). The provision of such a copy of the Notice by the Dominant Provider may be subject to a reasonable charge.

Condition 10 – Quality of service

- 10.1** The Dominant Provider must comply with all such quality of service requirements as Ofcom may from time to time direct in relation to network access provided by the Dominant Provider pursuant to Conditions 1 and 2 (as applicable).
- 10.2** The Dominant Provider must publish all such information as to the quality of service in relation to network access provided by the Dominant Provider pursuant to Conditions 1 and 2 (as applicable), in such manner and form, and including such content, as Ofcom may from time to time direct.

Condition 11 – Regulatory Financial Reporting

General requirements

- 11.1** The Dominant Provider must maintain a separation for accounting purposes between such different matters relating to network access to the relevant network or the availability of the relevant facilities, as required by Conditions 11.3 to 11.35 including as Ofcom may from time to time direct under those Conditions 11.3 to 11.35.
- 11.2** The Dominant Provider must comply with such rules made by Ofcom about the use of cost accounting systems as required by Conditions 11.3 to 11.35 and must comply with such requirements about the description to be made available to the public of the cost accounting system as required by Conditions 11.3 to 11.35 in each case including as Ofcom may from time to time direct under Conditions 11.3 to 11.35.
- 11.3** Except in so far as Ofcom may consent otherwise in writing, the Dominant Provider shall act in the manner set out in these Conditions.
- 11.4** Ofcom may from time to time make such directions as they consider appropriate in relation to the Dominant Provider's obligations under these Conditions.
- 11.5** The Dominant Provider shall comply with any direction Ofcom may make from time to time under these Conditions.
- 11.6** Where the Dominant Provider is required to comply with:
- (i) these Conditions; and
 - (ii) the Regulatory Accounting Principles,

and it appears to the Dominant Provider that any of these requirements conflict with each other in a particular case, the Dominant Provider must

resolve such conflict by giving priority to them in the order in which they are set out above.

11.7 For the purpose of these Conditions, publication shall be effected by:

- (i) placing a copy of the relevant information on any relevant publicly available website operated or controlled by the Dominant Provider; and
- (ii) sending a copy of the relevant information to any person at that person's written request.

Requirements relating to the preparation, audit, delivery and publication of the Regulatory Financial Statements

11.8 The Dominant Provider shall in respect of the Market, Technical Areas, Products, Network Components and Network Services (as applicable), for each Financial Year:

- (i) prepare such Regulatory Financial Statements as directed by Ofcom from time to time in accordance with these Conditions, the Regulatory Accounting Principles and the Accounting Methodology Documents (the relevant Accounting Methodology Documents to be identified in the Regulatory Financial Statements by reference to their date);
- (ii) prepare a reconciliation report as set out in Condition 11.23;
- (iii) secure the expression of an audit opinion upon the Regulatory Financial Statements as notified by Ofcom from time to time and on the reconciliation report as set out in Condition 11.24;
- (iv) secure the approval of the Regulatory Financial Statements by the board of directors of the Dominant Provider and secure the signature of the Regulatory Financial Statements by a director of the Dominant Provider for and on behalf of the board of directors;

- (v) deliver to Ofcom copies of the Regulatory Financial Statements, the reconciliation report and any corresponding audit opinion, each and all of which shall be in the form in which they are ultimately to be published, at least two weeks before they are required to be published;
- (vi) publish the Regulatory Financial Statements, the reconciliation report and any corresponding audit opinion, within four months after the end of the Financial Year to which they relate;
- (vii) ensure that any Regulatory Financial Statement and corresponding audit opinion that it delivers to Ofcom and/or publishes are fit for such purpose (or purposes), if any, as notified by Ofcom in writing; and
- (viii) publish with the Regulatory Financial Statements any written statement made by Ofcom and provided to the Dominant Provider commenting on the figures in, the notes to or the presentation of any or all of the Regulatory Financial Statements, the reconciliation report and/or the Accounting Methodology Documents.

11.9 The Dominant Provider shall make such amendments to the form and content of the Regulatory Financial Statements as are necessary to give effect fully to the requirements of these Conditions. The Dominant Provider shall provide to Ofcom particulars of any such amendment, the reasons for it and its effect, when it delivers the Regulatory Financial Statements to Ofcom.

11.10 The Dominant Provider shall prepare all Regulatory Financial Statements, explanations or other information required by virtue of these Conditions on a regulatory asset value adjusted current cost basis as directed by Ofcom from time to time and shall be capable of doing so in relation to any period. Such Regulatory Financial Statements, explanations or other information shall be, in the opinion of Ofcom, meaningfully reconcilable to the Statutory Financial Statements.

11.11 Each Regulatory Financial Statement shall include Prior Year Comparatives which shall be prepared on a basis consistent with Current Year Figures. The Dominant Provider may depart from this requirement in preparing the Regulatory Financial Statements for a Financial Year if there are reasons for doing so provided that the particulars of the departure, the reasons for it and its effect are stated in a note in the Regulatory Financial Statements in accordance with the Statutory Accounting Standards.

Requirements relating to audit of the Regulatory Financial Statements

11.12 The Regulatory Auditor that the Dominant Provider from time to time appoints shall at all times be satisfactory to Ofcom having regard to such matters as Ofcom consider appropriate. The Dominant Provider shall notify Ofcom in writing of the Regulatory Auditor appointed to secure compliance with these Conditions before the Regulatory Auditor carries out any work for that purpose. The Dominant Provider shall notify Ofcom of any proposed change of Regulatory Auditor 28 days before effect is given to that change.

11.13 In the event that the Regulatory Auditor is in the opinion of Ofcom unsatisfactory, the Dominant Provider shall appoint and instruct an Alternative Regulatory Auditor that is at all times satisfactory to Ofcom having regard to such matters as Ofcom consider appropriate. The Dominant Provider shall ensure that the Alternative Regulatory Auditor:

- (i) carries out such on-going duties as are required to secure compliance with these Conditions;
- (ii) carries out work or further work, in addition to that performed by the Statutory Auditor and/or by the former Regulatory Auditor, in relation to such matters connected to compliance with these Conditions as are of concern to Ofcom and notified to the Dominant Provider in writing; and/or

- (iii) re-performs work previously performed by the Statutory Auditor and/or by the former Regulatory Auditor in relation to such matters connected to compliance with this Condition as are of concern to Ofcom and notified to the Dominant Provider in writing.

11.14 The Dominant Provider shall extend to the Alternative Regulatory Auditor such assistance and co-operation as would be extended to the Statutory Auditor and/or to the Regulatory Auditor and, to the extent similar assistance and co-operation may be required from the Statutory Auditor and/or from the former Regulatory Auditor, the Dominant Provider shall use its best endeavours to secure such assistance and co-operation.

11.15 The Dominant Provider's letter of engagement appointing the Regulatory Auditor or Alternative Regulatory Auditor shall include such provisions acknowledging the acceptance by the Regulatory Auditor or Alternative Regulatory Auditor of duties and responsibilities to Ofcom in respect of its audit work, audit report and audit opinion as are consistent with the ICAEW Guidance.

11.16 The Dominant Provider shall use its best endeavours to obtain from the Regulatory Auditor or Alternative Regulatory Auditor any further explanation and clarification of any audit opinion required under these Conditions and any other information in respect of the matters which are the subject of that audit opinion as Ofcom shall require.

11.17 The Dominant Provider shall obtain such assurance statement in the form of the Agreed Upon Procedures in relation to the Dominant Provider's obligations under these Conditions as directed by Ofcom.

Requirements relating to the Accounting Methodology Documents

11.18 The Dominant Provider must prepare, maintain and keep up-to-date the Accounting Methodology Documents in accordance with these Conditions,

with the Regulatory Accounting Guidelines, and with the Regulatory Accounting Principles.

11.19 The Dominant Provider must include in the Accounting Methodology Documents documentation setting out a description of each of the Attribution Methods, the Transfer Charge System Methodology, the Accounting Policies and the Long Run Incremental Cost Methodology, to the extent not covered in the Regulatory Accounting Guidelines.

11.20 The Dominant Provider must deliver an up-to-date version of the Accounting Methodology Documents to Ofcom when it delivers the Regulatory Financial Statements to Ofcom in accordance with Condition 11.8 and publish such up-to-date version on or before the day of publication of the Regulatory Financial Statements which have been prepared in accordance with such version.

Requirements relating to changes to the Regulatory Accounting Methodology and the correction of Material Errors

11.21 The Dominant Provider must publish and deliver to Ofcom a list of each and every change to the Regulatory Accounting Methodology, by 31 March of the Financial Year in which the change to the Regulatory Accounting Methodology is to be made (the “**Change Control Notification**”). The Change Control Notification must be accompanied by a description of each of the changes, the reason for making each of the changes (including by reference to their compliance with the Regulatory Accounting Guidelines and the Regulatory Accounting Principles), and the impact of each of the changes on the figures at the level of the Markets and Technical Areas (as applicable) by setting out the figures which were presented in the previous Financial Year alongside the figures that would have been presented had such changes been made in the previous Financial Year.

- 11.22** Where in Ofcom’s opinion any change referred to in Condition 11.21 does not comply with these Conditions or the Regulatory Accounting Principles, the Dominant Provider shall not make such change, if so directed by Ofcom.
- 11.23** The Dominant Provider must prepare a reconciliation report as referred to in Condition 11.8 and as directed by Ofcom from time to time, which sets out changes to the Regulatory Accounting Methodology and the impact of such changes on the Regulatory Financial Statements, and Material Errors corrected in the Regulatory Financial Statements and the impact of such Material Errors on the Regulatory Financial Statements.
- 11.24** The Dominant Provider must obtain an audit opinion on the reconciliation report as directed by Ofcom from time to time.

Requirements relating to the Regulatory Accounting System

- 11.25** The Dominant Provider’s Regulatory Accounting System must be able to produce the Regulatory Financial Statements as directed by Ofcom under Condition 11.8 in accordance with these Conditions, the Regulatory Accounting Principles and the Accounting Methodology Documents.
- 11.26** Where the Dominant Provider replaces the whole or part of its Regulatory Accounting System, or substantially modifies such Regulatory Accounting System, the Dominant Provider must:
- (i) notify Ofcom in a timely manner of the replacement or modification, and, where so requested by Ofcom, inform Ofcom of progress towards completion and such other information as Ofcom may reasonably request;
 - (ii) ensure, to the best of its ability, that the replacement or modification does not cause the figures contained in the Regulatory Financial Statements to be different from the figures that would have been contained in the Regulatory Financial Statements had such Regulatory

Financial Statements been prepared using the old or unmodified Regulatory Accounting System;

- (iii) in relation to the final Financial Year for which the Regulatory Financial Statements are prepared using the old or unmodified Regulatory Accounting System, prepare a systems reconciliation report, which must:
 - a. set out the difference between the Current Year Figures presented in the Regulatory Financial Statements and the Current Year Figures had such Regulatory Financial Statements been prepared on the basis of the new or modified Regulatory Accounting System, expressed as a percentage change; and
 - b. explain each and every Material Difference between the Current Year Figures presented in the Regulatory Financial Statements and the Current Year Figures had such Regulatory Financial Statements been prepared on the basis of the new or modified Regulatory Accounting System;
- (iv) publish and deliver the systems reconciliation report to Ofcom by 31 December of the Financial Year for which the figures will be prepared using the new or modified Regulatory Accounting System for the first time;
- (v) obtain an assurance statement in the form of Agreed Upon Procedures on the systems reconciliation report, which must report:
 - a. whether the figures in the systems reconciliation report referred to in Condition 11.26(iii)(a) have been properly extracted from the old or unmodified Regulatory Accounting System and the new or modified Regulatory Accounting System respectively;

- b. whether each and every difference in the systems reconciliation report referred to in Condition 11.26(iii)(a) has been correctly calculated; and
 - c. whether the explanation of each and every Material Difference in the systems reconciliation report referred to in Condition 11.26(iii)(b) is an accurate representation of the cause of each such Material Difference.
- (vi) deliver the assurance statement in the form of the Agreed Upon Procedures to Ofcom when it delivers the systems reconciliation report to Ofcom in accordance with Condition 11.26(iv).
- (vii) where the systems reconciliation report referred to in Condition 11.26(iii) indicates that the replacement or modification causes the Current Year Figures contained in the Regulatory Financial Statements to be significantly different, either individually or in aggregate, from the Current Year Figures that would have been contained in the Regulatory Financial Statements had such Regulatory Financial Statements been prepared using the new or modified Regulatory Accounting System, prepare, if so directed by Ofcom, the Regulatory Financial Statements on a basis consistent with the old or unmodified Regulatory Accounting System.

Requirements relating to deficiencies in the Regulatory Financial Statements and the Accounting Methodology Documents

11.27 Where Ofcom have reasonable grounds to believe that any or all of the Regulatory Financial Statements and/or Accounting Methodology Documents are deficient, the Dominant Provider shall, where directed by Ofcom:

- (i) amend the Accounting Methodology Documents in order to remedy the deficiencies identified by Ofcom;

- (ii) restate the Regulatory Financial Statements identified by Ofcom as requiring restatement in accordance with the Accounting Methodology Documents which have, where necessary, been amended pursuant to Condition 11.27(i);
- (iii) prepare a reconciliation report as set out in Condition 11.23, whereby any reference to the Regulatory Financial Statements should be understood as a reference to the restated Regulatory Financial Statements;
- (iv) secure in accordance with any relevant notification of Ofcom under this Condition the expression of an audit opinion on the restated Regulatory Financial Statements;
- (v) deliver to Ofcom the restated Regulatory Financial Statements, the reconciliation report and corresponding audit opinion; and
- (vi) publish the restated Regulatory Financial Statements, the reconciliation report and corresponding audit opinion.

Requirements relating to the maintenance of sufficient accounting records

11.28 The Dominant Provider shall maintain accounting records for a period of six years from the date on which each Regulatory Financial Statement is delivered to Ofcom.

11.29 The Dominant Provider shall maintain the accounting records in accordance with these Conditions, the Regulatory Accounting Principles and the Accounting Methodology Documents.

11.30 The Dominant Provider shall maintain accounting records in a form which, on a historical cost basis and on a current cost basis:

- (i) separately identifies each of the Markets, Technical Areas, Products, Network Components and Network Services;

- (ii) separately attributes the costs, revenues, assets and liabilities of each of the Markets, Technical Areas, Products, Network Components and Network Services; and
- (iii) shows and explains the transactions underlying each of the Markets, Technical Areas, Products, Network Components and Network Services.

11.31 The Dominant Provider shall maintain the accounting records so that they are sufficient:

- (i) to provide an adequate explanation of each Regulatory Financial Statement;
- (ii) to show that charges are non-discriminatory; and
- (iii) to provide a complete justification of the Dominant Provider's charges for Network Access.

Requirement to facilitate on-demand reporting

11.32 The Dominant Provider shall ensure that its Regulatory Accounting System and accounting records are sufficient to enable the Dominant Provider, at all times, to be capable of preparing in relation to any specified calendar month or months a financial statement in accordance with the Accounting Methodology Documents.

Requirements relating to the preparation and maintenance of a Wholesale Catalogue

11.33 The Dominant Provider must prepare, maintain and keep up-to-date a Wholesale Catalogue. Such Wholesale Catalogue should separately identify and describe:

- (i) External Wholesale Services;

- (ii) Internal Wholesale Services;
- (iii) Wholesale Services supplied both externally and internally; and
- (iv) Network Services and the extent to which these activities are used in the course of supplying Wholesale Services.

11.34 The Dominant Provider must deliver an up-to-date version of the Wholesale Catalogue to Ofcom when it delivers the Regulatory Financial Statements to Ofcom in accordance with Condition 11.8 and publish such up-to-date version on or before the day of publication of the Regulatory Financial Statements which have been prepared by reference to such version.

Requirements relating to the demonstration of non-discrimination

11.35 The Dominant Provider shall ensure it is able to demonstrate that at any point in time:

- (i) where a Network Service or combination of Network Services is used by the Dominant Provider in providing Internal Wholesale Services, the amount applied and incorporated in the Transfer Charge for the Internal Wholesale Service in respect of the use of the Network Service or combination of Network Services is equivalent to the amount applied and incorporated for the use of the Network Services or combination of Network Services in the charge payable for an equivalent External Wholesale Service;
- (ii) the same amount as applied and incorporated in the Transfer Charge for the Internal Wholesale Service in Condition 11.35(i) in respect of the use of the Network Service or combination of Network Services is applied to the Network Service or combination of Network Services whenever it is or they are used by the Dominant Provider in providing that same Internal Wholesale Service; and

- (iii) the same amount as applied and incorporated in the Transfer Charge for the equivalent External Wholesale Service in Condition 11.35(i) in respect of the use of the Network Service or combination of Network Services is applied to the Network Service or combination of Network Services whenever it is or they are used by the Dominant Provider in providing that same External Wholesale Service;
- (iv) the amount applied and incorporated in the Transfer Charge for the Internal Wholesale Service in Condition 11.32(i) in respect of the use of the Network Service or combination of Network Services shall be the cost of those Network Services unless the Network Service concerned is provided from a Market which is different from the Market which comprises the Internal Wholesale Service.

12. 37

In this Condition 11:

- a) “**Accounting Methodology Documents**” means the documentation maintained by the Dominant Provider setting out in detail the rules, policies, methods, allocations, calculations, assumptions, procedures and Processes used by the Dominant Provider for the purpose of preparing Regulatory Financial Statements in accordance with the Regulatory Accounting Principles;
- b) “**Accounting Policies**” means the manner in which the Dominant Provider applies the requirements the Regulatory Accounting Principles in each of the Regulatory Financial Statements;
- c) “**Alternative Regulatory Auditor**” means any auditor not for the time being appointed as the Dominant Provider’s Regulatory Auditor;
- d) “**Agreed Upon Procedures**” means an engagement carried out in accordance with international standard (ISRS 4400) under which the Regulatory Auditor or another independent third party performs a set of audit procedures agreed by Ofcom and based on Ofcom’s specific

requirements in relation to the Regulatory Financial Statements, and reports the findings of that work to Ofcom;

- e) **“Attribution Methods”** means the practices used by the Dominant Provider to attribute revenue (including appropriate Transfer Charges), costs (including appropriate Transfer Charges), assets and liabilities to activities or, insofar as those activities have been aggregated into Wholesale Segments or Retail Segments in a given Market or Technical Area (as applicable), to each Wholesale Segment or Retail Segment;
- f) **“Current Year Figures”** means, in relation to any set of Regulatory Financial Statements, the amounts relating to the Financial Year to which the statements relate;
- g) **“External Wholesale Services”** means services supplied or offered to any Communications Provider other than the Dominant Provider;
- h) **“Financial Year”** means a financial year of the Dominant Provider in respect of which the Statutory Financial Statements are required to be (or to have been) prepared and audited in accordance with the requirements of the Companies Act 2006;
- i) **“ICAEW Guidance”** means the technical release titled “Reporting to Regulators of Regulated Entities: Audit 05/03” issued by the Audit and Assurance Faculty of the Institute of Chartered Accountants in England & Wales in October 2003;
- j) **“Internal Wholesale Services”** means services supplied within the Dominant Provider;
- k) **“Long Run Incremental Cost Methodology”** means the long run incremental cost principles, procedures and Processes which form the framework under which long run incremental costs are determined by the Dominant Provider;
- l) **“Market”** means the market to which these Conditions apply;

- m) “**Material Error**” means a deviation from accuracy or correctness which meets the materiality threshold as directed by Ofcom from time to time for the purpose of these Conditions;
- n) “**Material Difference**” means a difference identified in a systems reconciliation report which meets the materiality threshold as directed by Ofcom from time to time for the purpose of these Conditions;
- o) “**Network Component**” means an element of the network that is used to provide Wholesale Services, and, to the extent the network components are used in the Market or Technical Area (as applicable), specified in a direction given by Ofcom from time to time for the purposes of these Conditions;
- p) “**Network Services**” means those groups of Network Components used directly (or which in the absence of horizontal or vertical integration would be used directly) in the course of supplying Wholesale Services;
- q) “**Prior Year Comparatives**” means, in relation to any set of Regulatory Financial Statements, the amounts relating to the Financial Year immediately preceding the Financial Year to which the Regulatory Financial Statements relate, re-evaluated if necessary to ensure that such figures are comparable to the Current Year Figures;
- r) “**Process**” means the series of inter-related activities or actions to obtain, record or hold data or information or to carry out any operation or set of operations on the data or information, including:
 - i. organisation, storage, adaptation, or alteration of the data or information;
 - ii. retrieval, consultation, computation or use of the data or information;
 - iii. disclosure of the data or information by transmission, dissemination, or otherwise making available; or

- iv. alignment, combination, blocking, erasing or destruction of the data or information;
- s) **“Product”** means any product or service comprised in a Market or Technical Area to which these Conditions apply;
- t) **“Regulatory Accounting Methodology”** means the rules, policies, methods, allocations, calculations, assumptions and procedures used by the Dominant Provider for the purpose of preparing Regulatory Financial Statements;
- u) **“Regulatory Accounting Principles”** means the principles as directed by Ofcom from time to time for the purpose of these Conditions;
- v) **“Regulatory Accounting System”** means the set of computerised and manual accounting methods, procedures, Processes and controls established to determine and attribute the costs, revenues, assets and liabilities and summarise, interpret, and present the resultant financial data in an accurate and timely manner;
- w) **“Regulatory Auditor”** means the auditor for the time being appointed by the Dominant Provider in accordance with these Conditions;
- x) **“Regulatory Financial Statement”** means any financial statement in respect of a Financial Year prepared or required to be prepared by the Dominant Provider in accordance with these Conditions;
- y) **“Retail Products”** means services used by or offered to any End Users (including the Dominant Provider);
- z) **“Retail Segments”** means groups of Retail Products;
- aa) **“Statutory Accounting Standards”** means the accounting standards, including the requirements of the Companies Act 2006, by reference to

which the Dominant Provider is required to prepare the Statutory Financial Statements;

- bb) **“Statutory Auditor”** means the auditor for the time being appointed by the Dominant Provider in accordance with the requirements of the Companies Act 2006;
- cc) **“Statutory Financial Statements”** means any annual account required to be prepared by the Dominant Provider in accordance with the requirements of the Companies Act 2006;
- dd) **“Technical Area”** means the technical area to which these Conditions apply;
- ee) **“Transfer Charge”** means the charge or price that is applied, or deemed to be applied, within the Dominant Provider by one division or business unit of the Dominant Provider to another for the use or provision of an activity or group of activities. For the avoidance of doubt, such activities or group of activities include, amongst other things, Products provided from, to or within the Market or Technical Area (as applicable) and the use of Network Components in the Market or Technical Area (as applicable);
- ff) **“Transfer Charge System Methodology”** means the methodology of the system employed by the Dominant Provider which enables an activity to use a service or good from another activity and to account for it as though it had purchased that service or good from an unrelated party (including accounting for it at an appropriate amount);
- gg) **“Wholesale Catalogue”** means the documentation required to be produced by the Dominant Provider under Condition 12.33;
- hh) **“Wholesale Segments”** means groups of Wholesale Services; and

- ii) **“Wholesale Services”** means services related to network access on the Dominant Provider’s network used by or offered to any Communications Provider (including the Dominant Provider).

Schedule 2: List of postcode sectors for the purpose of identifying relevant markets

The list of postcode sectors for the purposes of identifying the markets set out at paragraph 1 of this notification can be accessed at the following link:

https://www.ofcom.org.uk/data/assets/excel_doc/0021/125265/Schedule-2-postcode-sectors-identifying-relevant-markets.xlsx

A11. Glossary

5G: The term used to describe the next generation of wireless networks beyond 4G LTE mobile networks. 5G is expected to deliver faster data rates and better user experience.

Access Charge Change Notice (ACCN): A contractual notification, issued by BT, of a change to the price of a regulated network access service.

Ancillary services: Services that facilitate the use of network access services.

Bandwidth: The rate at which data can be transmitted. Usually expressed in bits per second (bit/s).

BCMR: Business Connectivity Market Review.

BEREC: Body of European Regulators for Electronic Communications.

BT: British Telecommunications plc.

Common costs: Costs which are shared by multiple services supplied by a firm.

Dark Fibre: A so called 'passive' remedy which allows telecoms providers to lease unlit fibre, allowing them to attach equipment of their own choosing at either end to 'light' the fibre and use it as the basis for offering a range of leased lines products.

Distribution Point (DP): A flexibility point in BT's access network where final connections to customer premises are connected to D-side cables. Usually either an underground joint or a connection point on a pole where dropwires are terminated.

Dropwire: An overhead cable, connecting BT's access network to a customer's premises.

Duct and Pole Access (DPA): A wholesale access service allowing a telecoms provider to make use of the underground duct network and the poles of another telecoms provider.

EC: European Commission.

Exchange: The BT telephone exchange, to which customers are directly connected.

Fibre-To-The-Cabinet (FTTC): An access network topology in which optical fibre extends from the optical access node to a cabinet housing broadband equipment such as a DSLAM. The remaining part of the access network from the cabinet to the customer is usually copper wire but could use another technology, such as wireless.

Fibre-To-The-Premises (FTTP): An access network topology in which the optical fibre network runs from the optical access node to the customer's house or business premises. The optical fibre may be point-to-point – there is one dedicated fibre connection for each home – or may use a shared infrastructure such as a GPON. Sometimes also referred to as Fibre-to-the-home (FTTH), or full-fibre.

Fully allocated cost (FAC): An accounting approach under which all the costs of the company are distributed between its various products and services. The fully allocated cost of a product or service may therefore include some common costs that are not directly attributable to the service.

Generic Ethernet Access (GEA): Openreach's wholesale service portfolio providing telecoms providers with access to its FTTC and FTTP networks in order to supply higher speed broadband services. The GEA service meets BT's obligation to provide VULA.

Gigabit Passive Optical Network (GPON): A fibre access network technology where part of the network is shared by multiple customers.

Hull Area: The area defined as the 'Licensed Area' in the licence granted on 30 November 1987 by the Secretary of State under Section 7 of the Telecommunications Act 1984 to Kingston upon Hull City Council and Kingston Communications (Hull) plc (KCOM).

Internet Protocol (IP): Packet data protocol used for routing and carriage of messages across the internet and similar networks.

Lead-in: The final section of a physical infrastructure network, housing the connection between the distribution point and the Customer's Premises Equipment.

Local Loop: The access network connection between the customer's premises and the local serving exchange, usually comprised of two copper wires twisted together.

Modified Greenfield Approach: An approach to analysing markets, where we consider a hypothetical scenario in which there are no ex ante SMP remedies in the market being considered or in any markets downstream of it.

NICC: A technical forum for the UK communications sector that develops interoperability standards for public communications networks and services in the UK. It is an independent organisation owned and run by its members. Ofcom participates in NICC as an observer. NMR: Narrowband Market Review.

NRA: National Regulatory Authority.

Ofcom: The Office of Communications.

Office of the Telecommunications Adjudicator (OTA2): An independent body that facilitates discussion between telecoms providers on operational issues related to new and existing telecoms products and services.

Openreach: the line of business of BT which comprises BT's access and backhaul network assets and the products and services provided using those assets and which Openreach Limited, a wholly owned subsidiary of BT plc, has responsibility for operating and managing on behalf of BT.

Physical Infrastructure Access (PIA): A regulatory obligation under which BT is required to allow telecoms providers to deploy networks in the physical infrastructure of BT's access network with no restrictions on the telecoms provider's deployment.

Service Level Agreement (SLA): A contractual commitment provided by Openreach to telecoms providers about service standards.

Service Level Guarantee (SLG): A contractual commitment by Openreach to telecoms providers specifying the amount of compensation payable by Openreach to a telecoms provider for a failure to adhere to an SLA.

Significant Market Power (SMP): The significant market power test is set out in European Directives. It is used by National Regulatory Authorities (NRAs), such as Ofcom, to identify those telecoms providers which must meet additional obligations under the relevant Directives.

Statement of Requirements (SoR): A mechanism by which telecoms providers can request Openreach to provide a service, which should meet guidelines published by Openreach on information required for it to consider the request.

Strategic Review of Digital Communications (Strategic Review): A document Ofcom published in February 2016 which set out a ten-year vision for communications services in the UK.

Telecoms provider: A person who provides an electronic communications network or provides an electronic communications service.

The Act: The Communications Act 2003.

Wholesale Local Access (WLA): The market that covers fixed telecommunications infrastructure, specifically the physical connection between customers' premises and a local exchange.

WiFi: A short range wireless access technology that allows devices to connect to the internet. These technologies allow an over-the-air connection between a wireless client and a base station or between two wireless clients.