
Promoting competition and investment in fibre networks: review of the physical infrastructure and business connectivity markets

Volume 1: market analysis, SMP findings, and remedies
for the Physical Infrastructure Market Review (PIMR)

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1. Introduction

- 1.1 This volume sets out our decisions on market definition, market power and remedies in our review of the Physical Infrastructure markets in the UK excluding the Hull Area.
- 1.2 This introduction summarises our findings and decisions in our review of the Physical Infrastructure markets, and sets out the structure of this volume.
- 1.3 In support of our aim of promoting of competition, we have analysed the barriers to entry for new networks. One of our key concerns is that the high cost of building the physical infrastructure required to deploy fibre, such as underground ducts and telegraph poles, is a barrier to large-scale network deployment by competing operators.
- 1.4 Last year, we consulted for the first time on the market for telecoms physical infrastructure, i.e. underground ducts and telegraph poles, to consider whether any undertaking had market dominance which might be inhibiting the emergence of competition in networks using this infrastructure. Today, we present our conclusions, identifying that BT has market power throughout the UK (excluding Hull) in the telecoms physical infrastructure markets.

Our key decisions are:

- We have defined a single product market for the supply of wholesale access to telecoms physical infrastructure (for example, underground ducts or telegraph poles) for deploying a telecoms network.
- We have identified four separate geographic markets, based on physical infrastructure network competition.
- We have decided that BT has SMP in physical infrastructure access services in each of the geographic markets we have identified across the UK, including in the Central London Area (CLA).
- We have decided to impose an unrestricted physical infrastructure access (PIA) remedy on BT in all of these geographic markets. This obligation requires BT to allow other telecoms providers access to deploy their own networks in BT's physical infrastructure. This PIA product has no usage or geographic scope restrictions.
- We have also decided to set price regulation on the unrestricted PIA rental services, imposing a level of maximum charges identical to those set in our 2018 WLA market review for mixed usage PIA.

This overview is a simplified high-level summary only. The decisions we have taken and our reasoning are set out in the full document.

- 1.5 Our decision to require BT to provide unrestricted DPA throughout the UK reflects our findings that BT's duct and pole network provides it with significant market power in the market for physical infrastructure access, which is fundamental in the delivery of telecoms services.

- 1.6 The high cost of building the physical infrastructure required to deploy fibre, such as underground ducts and telegraph poles, is a barrier to large-scale network deployment by competing operators. BT'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 BT's ducts and poles for rival operators can help to address this enduring advantage for BT in deploying fibre and will reduce the cost and time it takes to build new networks. We have also adopted an approach to controlling prices that gives investors the confidence to commit significant sums to the development of the UK's telecommunications infrastructure.
- 1.7 In our view, the opening of BT's duct and pole network to all potential network competitors, as part of a new regulatory structure, is central to our objective of promoting greater investment and competition in fibre networks.
- 1.8 With the availability of unrestricted PIA, we expect rivals to BT to use BT's ducts and poles to build new multi-service networks, or fill the gaps in their existing networks. We expect these rivals to then compete with BT to provide innovative services to both business and residential customers. Consequently, our decisions in this volume provide a path towards deregulation of downstream services in the future.

Structure of the document

- 1.9 The following sets out the structure of this volume:
- a) Section 2 explains the market review process and legal framework;
 - b) Section 3 defines the relevant product and geographic markets and completes the assessment of market power in these markets;
 - c) Section 4 sets out the general remedies that we are imposing, including network access, non-discrimination, transparency, regulatory financial reporting and Quality of Service;
 - d) Section 5 outlines the specific access remedies that we are imposing, including an unrestricted Physical Infrastructure Access remedy;
 - e) Section 6 details our approach to cost recovery;
 - f) Section 7 sets out our approach to price regulation, including associated regulatory reporting requirements; and
 - g) Section 8 sets out the legal tests that are relevant when imposing SMP obligations, and how our remedies satisfy these tests.

2. Background

- 2.1 This section sets out the regulatory framework under which the review has been undertaken, the legal tests for imposing regulation and how we are complying with our obligations with respect to the relevant impact assessments. We also explain why Hull has been excluded from this market review.

Regulatory framework and legal tests

- 2.2 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.
- 2.3 We set out the applicable regulatory framework in Annex 1.
- 2.4 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 decisions in this volume satisfy the relevant legal tests, are consistent with our statutory duties and how we have taken account of relevant publications.

Forward look

- 2.5 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.
- 2.6 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 imposing. 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

- 2.7 The analysis presented in the 2018 PIMR Consultation¹ constituted an impact assessment as defined in section 7 of the Act.
- 2.8 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

- 2.9 Annex 24 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.
- 2.10 We do not consider 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

- 2.11 We have always recognised that the markets in the Hull Area are 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 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

¹ Ofcom (2018) *Physical Infrastructure Market Review: Access to ducts and poles to support investment* https://www.ofcom.org.uk/_data/assets/pdf_file/0014/125420/PIMR-consultation.pdf (2018 PIMR Consultation).

² For further information about our approach to impact assessments, see Ofcom (2005) *Better policy-making: Ofcom's approach to impact assessment* https://www.ofcom.org.uk/_data/assets/pdf_file/0026/57194/better_policy_making.pdf

of competition in the Hull Area. However, we remain open to considering such obligations in the Hull Area in the future and will be undertaking a broad review of the Hull Area telecoms markets in the near future.

European consultation

- 2.12 We notified the European Commission, BEREC and other national regulatory authorities of our final proposals for our market analysis and remedies on 24 May 2019, as required under Article 7 of the Framework Directive.
- 2.13 We received the Commission's decision on 24 June 2019, providing one comment on our notification in accordance with Article 7(3) of the Framework Directive. This comment related to the geographical segmentation of the physical infrastructure market.
- 2.14 In summary, the Commission noted that competitive conditions do not appear to be very different and considered a national PIA market (excluding Hull) would be more adequate. The Commission invited Ofcom to revisit its conclusions as regards the existence of differentiated geographical markets for physical infrastructure access.
- 2.15 We explain in paragraphs 3.121 – 3.123 how we have taken utmost account of the Commission's comments.

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 identify:
- a) a single product market for the **supply of wholesale access to telecoms physical infrastructure for deploying a telecoms network**;
 - b) four distinct geographic markets for this product market, namely:³
 - **BT only areas**: areas where there is no or limited alternative telecoms physical infrastructure to BT;
 - **areas with alternative telecoms physical infrastructure that has been deployed to support multi-service networks, but excluding High Network Reach areas – which we refer to as “Alternative Multi-service Network 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 We conclude that BT has SMP in all the relevant markets identified and identify the competition concerns that arise as a result.

Approach to market analysis

Stakeholder responses

- 3.4 A number of stakeholders commented on our overall approach to market analysis.
- 3.5 Both BT Group and Openreach considered that our analysis was not sufficiently derived from downstream retail markets. Openreach considered that we had implicitly identified a retail market consisting of “retail services supplied by multi-service networks” without setting out what these services were, or why BT has SMP nationwide in those services.⁴ It

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

⁴ Openreach’s response to the 2018 PIMR Consultation, paragraph 34.

argued that we need to formally define downstream markets to define the upstream market in order to properly assess demand and supply-side substitution effects.⁵

3.6 Hyperoptic argued that the basis for assessing the market for access to physical infrastructure was flawed, as no competing products were supplied, and there was no likelihood of commercial supply in the foreseeable future.⁶

3.7 BT Group argued that in assessing substitutability between different physical infrastructures, we had focused on product characteristics, which on their own are not enough to determine market distinctions or competitive constraints – and that engaging with potential access seekers to understand different characteristics affecting the suitability of different types of physical infrastructure did not constitute a comprehensive assessment of demand.⁷ A number of stakeholders claimed that our analysis did not sufficiently reflect differences between different types of access seekers (i.e. different use cases) in its substitutability assessments.⁸ Furthermore, BT Group and Openreach claimed that our analysis was based on an unevidenced belief in a particular business model, rather than a holistic analysis of retail markets, and was not an objective basis on which to define a new upstream market.⁹

Our approach

3.8 We address these comments below in explaining our overall approach to market analysis.

Access to physical infrastructure and the retail services it supports

3.9 The starting point for our analysis is the assessment of the relevant retail markets, and whether they are prospectively competitive in the absence of regulation.¹⁰ In this review, the relevant retail services are those supported by fixed line connections, including fixed broadband services and leased lines services.¹¹

3.10 Figure 3.1 below illustrates the different levels of the value chain for these retail services. Immediately above the retail services are wholesale products, such as wholesale broadband access. Above this level of the value chain sits access to the underlying

⁵ Openreach's response to the 2018 PIMR Consultation, paragraph 36.

⁶ Hyperoptic's response to the 2018 PIMR Consultation, page 7.

⁷ BT Group's response to the 2018 PIMR and 2018 BCMR Consultations, paragraph 2.28 and footnote 28.

⁸ BT Group's response to the 2018 PIMR and 2018 BCMR Consultations, paragraph 2.28; Openreach's response to the 2018 PIMR Consultation, paragraph 35; Hyperoptic's response to the 2018 PIMR Consultation, pages 6-7.

⁹ BT Group's response to the 2018 PIMR and 2018 BCMR Consultations, paragraphs 2.13 and 2.28; Openreach's response to the 2018 PIMR Consultation, paragraph 35.

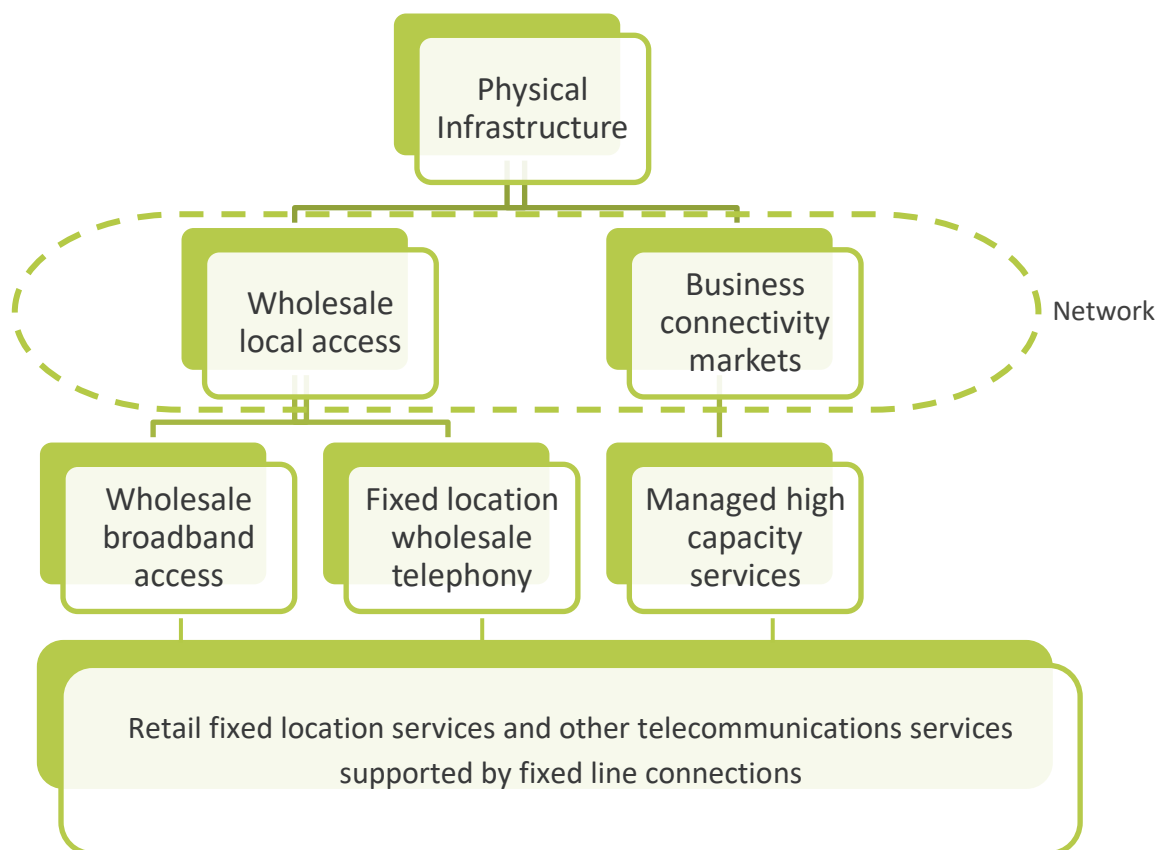
¹⁰ EC SMP Guidelines, paragraph 16 states that "NRAs should determine whether the underlying retail market(s) is(are) prospectively competitive in absence of wholesale regulation ... and whether any lack of effective competition is durable."

¹¹ Consistent with our approach in previous market reviews, we do not consider it necessary to formally define retail markets to determine whether they are prospectively competitive in the absence of regulation. In particular, we do not define a retail market of services by multi-service networks as suggested by Openreach (Openreach's response to the 2018 PIMR Consultation, paragraph 34).

network, that is, the fixed access connections.¹² The most upstream level relates to the physical infrastructure (such as ducts and poles) which is used to house the cables that make up these networks, over which the retail services are delivered to end-users.

- 3.11 Absent regulation, we conclude that the markets for services supported by fixed line connections would not be competitive over the review period:
- a) In the 2018 WLA Statement, we found BT to have SMP in the WLA market nationally.¹³ We explain later in this section that we have not identified any material changes that alter these conclusions. It follows that, absent regulation, competition in the delivery of retail fixed voice and broadband packages would not be effective absent regulation.
 - b) In the 2019 BCMR Statement (see Volume 2), we have concluded that BT has SMP in most business connectivity markets. It follows that, absent regulation, competition in the delivery of most retail leased lines services would not be effective absent regulation.

Figure 3.1: Value chain for fixed telecoms retail services



Source: Ofcom

¹² In our current regulation, we distinguish between different types of connections, such as between wholesale local access connections, and various types of leased lines connections. However, they are often part of the same network, and increasingly so.

¹³ Ofcom (2018) *Statement: Wholesale Local Access*. <https://www.ofcom.org.uk/consultations-and-statements/category-1/wholesale-local-access-market-review> (2018 WLA Statement).

- 3.12 We now explain our approach to determining the appropriate level of the value chain to intervene at to address this problem. In doing so, we explain how the physical infrastructure market review is the next evolution of our historical approach to regulation.

Our preferred approach to regulation – regulating upstream

- 3.13 Without regulatory intervention, it is likely that a vertically integrated supplier of telecoms physical infrastructure would both run the network and supply all the services to retail consumers. In this case, products and services would only be bought and sold at the downstream, retail level and if we were to analyse that level, we would likely find that the supplier holds a position of SMP. The fact that this supplier monopolises the whole value chain may be the result of the dominant supplier maintaining control over parts of the value chain that are difficult to replicate, most notably its physical infrastructure, preventing other providers from entering other parts of the value chain.¹⁴
- 3.14 The framework Ofcom was given to address this adopted an *ex ante* approach to remedies.¹⁵ This requires an overall forward-looking assessment of the structure and functioning of the market under examination. The aim of this framework is not simply to regulate the retail services that the incumbent supplies, but to use access regulation to encourage competitive entry into upstream stages of the value chain with a view to downstream markets becoming effectively competitive. This approach sought to promote competition as the driving force for delivery of services across the value chain, reducing or removing the need for regulation of downstream services as success was achieved.
- 3.15 To achieve this aim, the framework envisaged breaking down the provision of telephone, broadband and business line services into component elements where competition might be encouraged, and access remedies were formulated to support it. These access services were often led by regulation. Prior to the new access regulation being introduced there was often no active “market” in these services, merely self-supply by the vertically integrated SMP incumbent and by its smaller rivals. Local Loop Unbundling, for example, was introduced as a result of regulation over 15 years ago.¹⁶
- 3.16 This review is the latest step along this regulatory path. As in the past and consistent with this regulatory framework, we seek to intervene at the most upstream level of the value chain that we believe is necessary to enable effective and sustainable competition. Our view is that this level is now access to physical infrastructure.¹⁷ The move to fibre-based networks, and improvements in the economics of network rollout, mean that there is an

¹⁴ In reality there is more than one vertically integrated operator, but the point still stands.

¹⁵ The current Framework was derived from a package of five European Directives, including the Framework Directive (Directive 2002/21/EC) and the Access Directive (Directive 2002/19/EC), transposed into the Communications Act 2003. [<https://www.legislation.gov.uk/ukpga/2003/21/contents>]. This framework is updated under the European Electronic Communications Code (EECC) which must be transposed by 21 December 2020.

¹⁶ Ofcom (2018) *Wholesale Local Access Market Review 2018: Statement*, paragraph 3.32.

<https://www.ofcom.org.uk/consultations-and-statements/category-1/wholesale-local-access-market-review>

¹⁷ There may be circumstances where regulation at the physical infrastructure level of the value chain may not be sufficient to enable effective and sustainable competition, and so we may need to consider additional downstream regulation in reviews of downstream markets.

opportunity to encourage greater network competition based on reusing existing physical infrastructure. The new EECC also states that access to physical infrastructure should be considered as a remedy, before assessing the need to impose any other potential remedies.¹⁸

Access to physical infrastructure is the appropriate level of the value chain to analyse

- 3.17 In this 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.¹⁹
- 3.18 Although we have previously imposed DPA as a remedy to SMP findings in wholesale markets further down the value chain, we consider that the most robust way to apply such remedies is to conduct our analysis at the level of the value chain corresponding to the level of intervention, i.e. the physical infrastructure level. This is consistent with our previous approach where we have considered the potential for market power at the level of the intervention proposed²⁰ and allows us to consider more directly the intrinsic advantages that control of access to physical infrastructure may confer.
- 3.19 As we explain in paragraphs 3.222-3.229, our competition concerns extend beyond the existing downstream services. The owner of the physical infrastructure could restrict access to its physical infrastructure to prevent or hinder the emergence of competing networks, and this could stifle innovation and the introduction of new, potentially disruptive, downstream services. Further, analysis at this level allows us to consider the impact across downstream services (i.e. both WLA and Business Connectivity).
- 3.20 We also do not consider that it is desirable in the long term to regulate upstream of the level of the value chain at which we carry out our market analysis. This is because success in this regulation may make it appropriate to deregulate downstream markets, such as WLA, as they become more competitive, but that greater competition will be reliant on access to the upstream physical infrastructure level. In principle such regulation can be sustained through the principle of a modified greenfield consideration of the market (i.e. considering the downstream market in the hypothetical circumstances that the access to physical infrastructure imposed as a remedy to SMP findings in that market was not in

¹⁸ Directive 2018/1972 of the European Parliament and of the Council of 11 December 2018 establishing the European Electronic Communications Code (Recast), Recital 187. <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32018L1972&from=EN>

¹⁹ We use the modified Greenfield approach to conduct our analysis. The exercise is therefore conducted from a forward-looking perspective in the absence of any regulation that would result from a finding of SMP at the level of the market under assessment. See Sections 2.2 and 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>).

²⁰ This is similar to our previous shift to local loop unbundling, which was initially proposed as an upstream remedy to the WBA market, before being reflected in a direct market review (WLA) later.

place and then returning to whether such regulation is the best remedy to that hypothetical scenario). However, while our market analysis is rightly embedded in the understanding that absent our regulatory interventions BT would have SMP in many downstream markets, we think it preferable to focus on the infrastructure layer as the focal point for our market analysis.²¹

- 3.21 We acknowledge that supply of physical infrastructure as a commercial activity is not currently widespread and in that sense this is a “notional” market. However, our approach of analysing competition at the level where we seek to intervene necessitates the construction of notional markets where currently there is only self-supply. Indeed, the markets we observe today at the wholesale level exist only as a result of previous regulatory interventions, and so were notional when first considered (such as the wholesale local access market). Constructing such a notional market is appropriate, given that the lack of existing supply of physical infrastructure derives from the lack of incentive of vertically integrated suppliers to offer third-party access.²² We therefore disagree with Hyperoptic that such an approach to assessing competition is flawed.²³

The constraints on providers of physical infrastructure access

- 3.22 To test whether any undertaking has a position of significant market power in the market for wholesale access to physical infrastructure, we need to consider the strength of potential competitive constraints upon the behaviour of infrastructure owners in this market. We do this in two stages: first, when defining the boundaries of the market for wholesale access to physical infrastructure; and second, when evaluating whether any undertaking has significant market power within that market.
- 3.23 As we are concerned with an access service, which is used to compete in downstream services, there are two types of potential competitive constraint which we consider:
- a) Indirect constraint: telecoms operators who own physical infrastructure may face competition at the retail level from rival telecoms operators that self-supply their own physical infrastructure. This acts as an indirect constraint in upstream markets, such as the market for access to physical infrastructure.²⁴ In effect this involves an evaluation as to whether BT faces enough competition from smaller vertically integrated rivals such that there is no SMP at any point across the value chain.

²¹ BEREC (2018) *Draft BEREC Report on Access to physical infrastructure in the context of market analysis, Annex 3* https://berec.europa.eu/eng/document_register/subject_matter/berec/download/0/8323-draft-berec-report-on-access-to-physical_0.pdf (Draft BEREC Report on Access to PI).

²² 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, pages, 10-11,17, http://ec.europa.eu/newsroom/dae/document.cfm?doc_id=51927 (EC Staff Working Document on the EC SMP Guidelines); and EC SMP Guidelines, paragraph 32.

²³ Hyperoptic’s response to the 2018 PIMR Consultation, page 7.

²⁴ 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 could result in customers switching to retail services provided by Virgin Media.

- b) Direct constraint: telecoms operators who own physical infrastructure may face competition from other operators of physical infrastructure offering access to their infrastructure.²⁵ In effect this asks whether, even if BT as a vertically integrated entity would have SMP, it does not have SMP specifically in respect of the infrastructure used to support telecoms networks.²⁶
- 3.24 As rival vertically integrated telecoms providers actually compete in the provision of retail services, we can observe evidence relating to the strength of the indirect constraint. To assess the strength of these constraints, we draw upon the evidence and analysis of downstream markets presented in our 2018 WLA Statement, and that presented in Volume 2 of this statement (BCMR).
- 3.25 In relation to the direct constraint, rival networks have not generally actively supplied access to their infrastructure. Accordingly, there is no active market or effective competition that is either forcing BT to open up its infrastructure itself or offering builders of telecoms networks an alternative to using BT.²⁷ Nonetheless, and for completeness, we still examine the direct constraints on the hypothetical assumption that BT's smaller rivals did decide to actively compete in supplying access to their infrastructure.²⁸
- 3.26 Our assessment of the strength of direct constraints is focused on whether potential access seekers would view different physical infrastructures as effective substitutes for access to BT's network. This exercise is inherently forward-looking. We cannot foresee the full range of potential use cases that access seekers demand, both in terms of the downstream services provided over that network, and the network architectures they desire. We therefore assess the strength of direct constraints qualitatively based on what access seekers have told us matters to them, including the characteristics of those networks. In doing so, we acknowledge that there are likely to be multiple potential use cases for access seekers wishing to deploy telecoms networks and the degree to which rivals' infrastructure

²⁵ We consider that access seekers are only likely to consider 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 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.

²⁶ By analogy, a water company might have monopoly power in water delivery, but not in respect of the supply of bricks used to build its delivery network.

²⁷ Existing physical infrastructure built for the purpose of deploying a telecoms network is almost exclusively used for self-supply, with operators vertically integrated in the ownership of the infrastructure and the telecoms network(s) installed in that infrastructure. 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. There is no significant commercial supply of wholesale access to existing physical infrastructure. The only existing supply to third party access seekers is either small-scale, or is based on regulated access. Virgin Media, which owns by far the most extensive network of physical infrastructure after BT has no history of providing such access. See Annex 3 for an overview of telecoms provider's current use of physical infrastructure which they do not own.

²⁸ See also the EC Staff Working Document on the EC SMP Guidelines, which envisages an approach along these lines (pages 10 and 11).

is an effective alternative to BT might in principle vary for some users.²⁹ We take this into account when conducting our market analysis.

Market definition

- 3.27 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.
- 3.28 We use the hypothetical monopolist test as the tool 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 of sufficient scale to render the price increase unprofitable, then the market should be widened to include the closest substitute services. Simply observing that it is feasible to use an alternative, or indeed observing usage of such alternatives, is not sufficient in order to act as a constraint.
- 3.29 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.³⁰ In line with the EC framework and past Ofcom practice, we adopt an aggregation approach. Rather than analyse each geographic area separately, we aggregate geographic areas into areas where “the conditions of competition are similar or sufficiently homogenous”.³¹

Product market definition

- 3.30 We proposed to define our product market as the supply of wholesale access to physical infrastructure for deploying a telecoms network. Most stakeholders agreed with our product market definition.³² BT Group and Openreach disagreed, arguing that non-telecoms physical infrastructure should be included as part of the product market.³³ TalkTalk and Vodafone also disagreed, with Vodafone arguing that BT’s network was the

²⁹ For example, some access seekers may wish to connect to, and serve, the majority of both residential premises and large business sites within an area (a “multi-service network”), whereas others may wish to focus on connecting to large business sites within an area. These different types of access seeker may view the constraint imposed by different types of physical infrastructure differently.

³⁰ It is extremely unlikely that individual consumers (either residential or business) would move to a different postcode sector in response to a SSNIP, and it is unlikely that a provider will expand its network to serve a new route to an individual premise or business in response to a SSNIP.

³¹ See EC SMP Guidelines paragraph 48.

³² CWU NW Safety Forum’s response to the 2018 PIMR Consultation, question 3.1; Gigaclear’s response to the 2018 PIMR Consultation, page 2, Hyperoptic’s response to the 2018 PIMR Consultation, page 6; IIG’s response to the 2018 PIMR, 2018 BCMR and 2018 BT RFR Consultations, paragraph 9.1.2; NextGenAccess’ response to the 2018 PIMR Consultation, question 3.1; SSE’s response to the 2018 PIMR Consultation, question 3.1; Three’s response to the 2018 PIMR consultation, page 5; UKCTA response to the 2018 PIMR Consultation, page 2; Virgin Media’s response to the 2018 PIMR Consultation, page 9; Zayo’s response to the 2018 PIMR Consultation, paragraph 4.1.1; [X]; [X].

³³ BT Group’s response to the 2018 PIMR and 2018 BCMR Consultations, paragraphs 2.30-2.31; Openreach’s response to the 2018 PIMR Consultation, paragraph 44.

relevant product market³⁴, and TalkTalk arguing that there are two asymmetric product markets - a market for all ducted networks, and a market for ducted networks with frequent break-out points.³⁵ We respond to these comments in our analysis below.

Focal product

- 3.31 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.
- 3.32 We use the term physical infrastructure to refer 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.³⁶ There are a number of physical infrastructures in the UK which could potentially support the deployment of telecoms networks by third party access seekers. These vary in their geographic coverage, the type of end-users they connect, and the way in which they connect to end-users. Some of these infrastructures were built to deploy telecoms networks (such as those owned by BT and Virgin Media), whereas others were built to supply non-telecoms services such as electricity, gas, water and railways.

Our proposals

- 3.33 We proposed a focal product of wholesale access to telecoms physical infrastructure for deploying a telecoms network.

Stakeholder responses

- 3.34 A number of stakeholders agreed with our choice of focal product.³⁷
- 3.35 TalkTalk argued that we have not started from the narrowest conceivable focal products. It notes that different physical infrastructures built for the purposes of deploying telecoms networks have different network topologies – in terms of the geographic coverage of that network, the number of breakout points from that network to end-user premises, and whether the networks break out to cabinets. It therefore argued Ofcom should adopt two focal products: one for ducted passive networks with limited break-out points and one for ducted passive networks with frequent break-out points.³⁸

³⁴ It considers that the ubiquity of BT's network combined with the much higher costs of using multiple networks to match the coverage of BT's network mean that BT would be able to profitably sustain a SSNIP. Vodafone's response to the 2018 PIMR Consultation, paragraphs 6.13 - 6.14.

³⁵ This flowed from TalkTalk's argument that we had not started from a sufficiently narrow focal product. TalkTalk's response to the 2018 PIMR Consultation, paragraphs 2.12-2.18.

³⁶ 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>).

³⁷ CityFibre's response to the 2018 PIMR Consultation, paragraph 4.1.1; IIG's response to the 2018 PIMR, 2018 BCMR and 2018 BT RFR Consultations, paragraph 9.1.2; and Virgin Media's response to the 2018 PIMR Consultation, page 9.

³⁸ TalkTalk's response to the 2018 PIMR Consultation, paragraphs 2.6-2.7, 2.11-2.15.

Our reasoning and decision

3.36 We remain of the view that our focal product is wholesale access to telecoms physical infrastructure for deploying a telecoms network.

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

3.37 Our focal product includes all physical infrastructure which is:

- a) Deployed for the purposes of supporting a telecoms network (i.e. we exclude non-telecoms infrastructure), irrespective of the owner of that infrastructure; and
- b) Deployed to host fixed (or 'wired' elements) of telecoms networks (e.g. ducts, poles and chambers). We exclude physical infrastructure which is deployed to host the radio transmission and reception equipment needed for wireless connections in a telecoms network (e.g. masts and antenna installations).³⁹

3.38 We include all telecoms physical infrastructure within the focal product as the underlying product available to access seekers (e.g. space in sections of duct) is broadly similar between these different operators. This is in contrast to non-telecoms physical infrastructure and wireless alternatives, which as we explain below have quite different characteristics.⁴⁰

3.39 We recognise that there are differences between the telecoms physical infrastructures owned by different operators, most notably in terms of the geographic coverage of the network, for example, the breadth and contiguity of that coverage and the types of premises they connect to (reflecting differences in the nature of the networks they were built to support). We agree that these differences are likely to be an important determinant of the strength of the competitive constraint that different operators impose: depending on the nature of the network a specific access seeker is deploying, some operators' telecoms physical infrastructure may be better suited than others.

3.40 It might be argued that we should begin our analysis with a narrower focal product – for example, focusing on a subset of telecoms physical infrastructure operators (as suggested by TalkTalk) or just BT's telecoms physical infrastructure (as Vodafone appears to suggest) – and then considering whether other telecoms providers' infrastructures are sufficiently close substitutes to be included within the market. However, we have chosen not to evaluate the differences between different telecoms providers' infrastructure at this stage in our market analysis for the following reasons:

³⁹ We note that physical infrastructure intended to support wireless elements of telecoms networks is largely separate from physical infrastructure intended to support fixed elements of telecoms networks. For example, BT's physical infrastructure is not currently being used for radio equipment, such use is not anticipated over the review period and it is unclear to us whether it would even be possible in practice. We acknowledge that, in the longer term, innovation may lead to there being a higher degree of overlap in the use of these two infrastructures. However, we do not consider this will materialise in this review period.

⁴⁰ We consider below whether non-telecoms physical infrastructure or wireless would be a constraint on a hypothetical monopolist of telecoms physical infrastructure, and therefore whether the market should be expanded to include this.

- a) Such an approach could ultimately result in us defining a market for BT's infrastructure, in which BT is very likely to have SMP as the only supplier. While in concept this would not be unreasonable, in practice this would mean undertaking the main elements of the SMP evaluation – the extent to which rival telecoms infrastructures compete with BT – as part of the market definition exercise. We think it is more transparent to examine these matters as part of the SMP evaluation.⁴¹
- b) Given one of the key ways in which telecoms providers' infrastructure varies is by geography, the strength of the constraint posed by other telecoms providers' infrastructure on BT may vary geographically. Attempting to evaluate whether or not a rival's telecoms infrastructure is an effective constraint on BT at the stage of defining the product market is not the best way of evaluating these geographic variations. Rather, we take differences by geography into account as part of our geographic market delineations, and ultimately in our SMP assessment.⁴²

3.41 We therefore adopt a focal product that encompasses all telecoms infrastructure, and then consider each operators' position within the market – taking account of the differences between their infrastructure – in our market power analysis.⁴³ From an economic perspective, market definition is a means to the end of identifying market power. Provided all relevant constraints are identified and taken into account at some stage in the market analysis, the order in which we consider those constraints will not alter the conclusion of our market power identification.

Our focal product is not limited to particular use cases

3.42 Our focal product is the supply of physical infrastructure access to deploy any type of telecoms network.

3.43 Analysys Mason, in a report on behalf of Openreach, argues that access seekers deploying backhaul networks will have a different view of substitutability of alternative physical infrastructures than those deploying access networks.⁴⁴

⁴¹ As a general observation, we note that since the objective of the market definition exercise is a first step in evaluating whether there is market power, our approach of adopting a broader focal product than the BT network alone is conservative.

⁴² In principle, this could also be resolved by considering the product market definition for each geography separately. However, we do not think this would be a practicable approach to the market analysis.

⁴³ We include all telecoms infrastructure regardless of whether it is being used for access or backhaul, since individual ducts can and are being used for both access and backhaul. We think this is broadly true of all telecoms physical infrastructure. 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 provide the 'backhaul' connection to an FWA transmitter installed on a lamp-post).

⁴⁴ Specifically, it argues that non-telecoms infrastructure could be a greater constraint in relation to where backhaul networks are being deployed, than for access network deployments. Openreach's response to the 2018 PIMR Consultation - Analysys Mason Report (Analysys Mason Report), page 17. The Analysys Mason report was produced for Openreach and provides commentary on the 2018 PIMR Consultation.

- 3.44 We recognise that there is likely to be a range of potential access seekers, with different requirements depending on the specific network they are deploying.⁴⁵ We take account of the different types of access seeker in the subsequent stages of our market definition analysis, and in our market power assessment.
- 3.45 We have not sought to distinguish between different types of access seeker when defining the focal product, for example, by defining focal products focused on particular use cases.⁴⁶ We do not think this would be practical or desirable because we cannot predict the full range of potential access seekers which may emerge in future, both in terms of the downstream services provided over that network, and the network architectures they desire. Moreover, an approach which involved defining a product market (or number of product markets) in relation to stylised use cases we can identify today could result in remedies which artificially restrict innovation and lock access seekers into existing markets and network topologies. This would fail to address the full extent of the market power arising from control of access to physical infrastructure.
- 3.46 We consider that our approach enables our analysis to be sufficiently forward-looking.

Demand-side substitution

- 3.47 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. As explained above, we consider both the direct and indirect constraints on telecoms physical infrastructure.

Non-telecoms physical infrastructure as a direct constraint

- 3.48 Access to non-telecoms physical infrastructure could be potentially useful in the deployment of telecoms networks. We therefore consider whether access to non-telecoms physical infrastructure would be a direct constraint on telecoms physical infrastructure.

Our proposals

- 3.49 We provisionally concluded that non-telecoms physical infrastructure is a poor substitute for telecoms physical infrastructure for the purposes of deploying telecoms networks and is therefore outside of the product market.

Stakeholder responses

⁴⁵ 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. Even within a single network deployment, an access seeker may have different requirements depending on the part of the network being deployed (e.g. access versus backhaul).

⁴⁶ In market definition, it is sometimes appropriate to identify different uses of the same product as separate markets where the hypothetical monopolist can price discriminate between the different users.

- 3.50 A number of stakeholders specifically commented on our assessment of non-telecoms physical infrastructure. Gigaclear,⁴⁷ IIG,⁴⁸ SSE,⁴⁹ TalkTalk,⁵⁰ Three,⁵¹ Virgin Media⁵² and Vodafone⁵³ agreed that non-telecoms physical infrastructure is a poor substitute for telecoms physical infrastructure, and that it is therefore outside the product market.
- 3.51 BT Group argued that the case studies presented in the Analysys Mason report shows that non-telecoms physical infrastructure may be viable more widely than we have suggested.⁵⁴ In particular, BT Group pointed to examples of low voltage electricity infrastructure being used as part of network deployments.⁵⁵
- 3.52 Openreach disagreed with our assessment of non-telecoms physical infrastructure, believing it should be included within our product market.⁵⁶ It argued that the question is not whether there can be impediments to use of non-telecoms infrastructure, but whether these are barriers that cannot be overcome without incurring unreasonable costs.⁵⁷ It argued the case studies of non-telecoms infrastructure being used as part of network deployments presented in the Analysys Mason report demonstrate that these barriers can be overcome without incurring unreasonable costs.

Our reasoning and decisions

- 3.53 In this section, we explain our decision not to include non-telecoms physical infrastructure in the product market. We consider that the evidence available to us suggests that non-telecoms physical infrastructure is not a direct competitive constraint on telecoms physical infrastructure:
- a) While non-telecoms physical infrastructure can, and is, being used as part of telecoms networks deployments, we observe that usage in the UK is very limited; it typically accounts for only a small share of a wider network deployment, and it is often used out of necessity.
 - b) In general, there are various characteristics of non-telecoms physical infrastructure which mean it is either not viable for use at scale or would lead to higher costs and operational complexity relative to telecoms physical infrastructure.
- 3.54 In what follows, we set out this reasoning in more detail.

⁴⁷ Gigaclear's response to the 2018 PIMR Consultation, question 3.1.

⁴⁸ IIG's response to the 2018 PIMR, 2018 BCMR and 2018 BT RFR Consultations, paragraph 9.1.8. IIG (Infrastructure Investors Group) is a collective of alternative infrastructure providers who have built, own and operate high-speed electronic communications networks within the UK, independently of BT. The members of the IIG are CityFibre, euNetworks and Zayo.

SSE's response to the 2018 PIMR Consultation, question 3.1.

⁵⁰ TalkTalk's response to the 2018 PIMR Consultation, paragraph 2.20.

⁵¹ Three's response to the 2018 PIMR consultation, page 4-5.

⁵² Virgin Media's response to the 2018 PIMR Consultation, pages 9-10.

⁵³ Vodafone's response to the 2018 PIMR Consultation, page 33.

⁵⁴ BT Group's response to the 2018 PIMR and 2018 BCMR Consultations, paragraph 2.30.

⁵⁵ BT Group's response to the 2018 PIMR and 2018 BCMR Consultations, paragraph 2.31.

⁵⁶ Openreach's response to the 2018 PIMR Consultation, paragraph 44.

⁵⁷ Openreach's response to the 2018 PIMR Consultation, paragraph 43.

- 3.55 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 access seekers would switch at a sufficient scale to non-telecoms physical infrastructure in response to a SSNIP. We therefore disagree with Openreach's argument that the relevant question is whether the barriers to using non-telecoms physical infrastructure in some use cases can be overcome without incurring 'unreasonable costs'. Finding that use of non-telecoms physical infrastructure to deploy a telecoms network is feasible is not sufficient to find it within the same product market as telecoms physical infrastructure.
- 3.56 We acknowledge that non-telecoms infrastructure can, and is, being used as part of telecoms network deployments.
- a) There may be specific circumstances where a 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. In this case, non-telecoms physical infrastructure may be used as a viable solution to complement the use of telecoms physical infrastructure for network deployment, by enabling network deployment where it would have otherwise been unviable.
 - b) There may be some cases where access seekers use non-telecoms physical infrastructure out of choice, rather than necessity. For example, there may be merit in using non-telecoms physical infrastructure for particular applications, such as long-distance core/backhaul connections between two points. Moreover, as Analysys Mason identifies, there are UK examples where non-telecoms infrastructure appears to play a larger role in the network deployment, typically alongside telecoms physical infrastructure, than solely overcoming isolated issues such as circumventing an object.
- 3.57 However, in general, as set out in Annex 3, current use of non-telecoms physical infrastructure in the UK is relatively limited and, in most cases, typically represents a fraction of the total network deployment. In those cases where non-telecoms infrastructure appears to have been used more widely as part of a network deployment in the UK, the total scale of rollout is very small.⁵⁸
- 3.58 Analysys Mason argued that it is not "too difficult" for potential access seekers to use non-telecoms physical infrastructure, and that the main reason for limited use of non-telecoms physical infrastructure in the UK is "the fact that FTTP is at such an early stage of its development in the UK market ... rather than it being related to any fundamentals".⁵⁹

⁵⁸ For example, TrueSpeed, which has used low voltage electricity infrastructure to deploy part of its network had covered 3,000 premises (as of May 2018), with an ambition of covering 75,000 premises by 2021. Analysys Mason noted that TrueSpeed is not exclusively deploying its network using electricity infrastructure – it has deployed its network using a mix of self-build, the Openreach PIA product and electricity poles (Analysys Mason report, pages C-1 – C-2).

⁵⁹ Analysys Mason Report, pages 19-20.

Moreover, it pointed to examples in other countries where non-telecoms physical infrastructure has been used as part of deployments at greater scale.⁶⁰

- 3.59 We do not disagree that it is possible to use some types of non-telecoms physical infrastructure at scale. However, as set out below, we consider that using non-telecoms physical infrastructure is costlier and involves higher operational complexity, relative to telecoms physical infrastructure. We believe these factors make non-telecoms physical infrastructure materially less attractive to access seekers, and that this explains the limited use in the UK.
- 3.60 In general, we continue to believe that non-telecoms infrastructure will not be an attractive alternative to infrastructure that has been specifically built for scale deployment of telecoms network.⁶¹ 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, for the following reasons:⁶²
- a) **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.
 - b) **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.⁶³ 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.⁶⁴

⁶⁰ For example, it noted Open Fiber in Italy and Telekom Deutschland in Germany (Analysys Mason report, pages C-5-C-8)

⁶¹ The Analysys Mason report suggested that we had aggregated all non-telecoms physical infrastructure into a single bucket, and that some types of non-telecoms physical infrastructure may be more suitable than other for deploying a telecoms network. We agree that certain types non-telecoms physical infrastructure may be more suitable for deploying a telecoms network, however, we do not consider that any one type of non-telecoms physical infrastructure is sufficiently substitutable to constrain telecoms physical infrastructure.

⁶² We also note that 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, and electricity poles are not typically found in urban areas in the UK.

⁶³ For example, [3<] trial using electricity pylons highlighted that access to the pylons is not feasible in winter months, since the supply can't be shut down on half the pylon as is the case in the summer. [3<] the need to shut down and re-route distribution (where possible) when using gas or drinking water assets ([3<]). Moreover, [3<]. Also, see [3<] and, in relation to the difficulty gaining access to sewers [3<].

⁶⁴ For example, [3<].

- c) **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.⁶⁵
- d) **Co-existence barriers:** Certain types of non-telecoms physical infrastructure can have a very hostile environment for network coexistence.⁶⁶ 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.⁶⁷
- e) **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.⁶⁸
- f) **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.⁶⁹
- g) **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.⁷⁰

3.61 As explained above, these issues have been identified to varying degrees by telecoms providers in their trials using non-telecoms physical infrastructure.⁷¹ 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 in the UK has so far used non-telecoms physical infrastructure for scale network deployment. Even existing builders such as CityFibre and Virgin Media (both of which have expressed interest in access to BT's infrastructure) have preferred to build their own ducts, compared to using non-telecoms physical infrastructure.⁷² This is despite access to non-

⁶⁵ Council of Europe, Deployment & Operations Committee (2018) *White Paper: Innovative FTTH Deployment Technologies*, page 6. available at http://www.ftthcouncil.eu/documents/Publications/DandO_White_Paper_2_2014.pdf (Council of Europe White Paper).

⁶⁶ [3<].

⁶⁷ Pages 6 and 10, Council of Europe White Paper. [3<] trial using a sewer duct highlighted the need to use a full liner in foul water pipes. It considers that, due to the higher cost, it would focus this type of use on obstacle avoidance ([3<]).

⁶⁸ By contrast, telecoms physical infrastructure includes buildings which have been specifically designed for interconnect purposes (for example, exchanges in the case of BT).

⁶⁹ The number of distribution networks across the gas, electricity and water industries is highlighted in [3<].

⁷⁰ For example, [3<].

⁷¹ More information on these trials can be found in Annex 3, paragraph A3.6.

⁷² [3<]. Virgin Media considers non-telecoms physical infrastructure as likely to remain a niche substitute where it is either not viable or cost effective to deploy telecoms physical infrastructure, and that the drawbacks and complicating factors severely limit the scope for significant use of non-telecoms physical infrastructure as normal build. Virgin Media Response to PIMR 2018 Consultation, page 9.

telecoms physical infrastructure being available through commercial deals arranged by the owners of such infrastructure or, if they fail, through use of the ATI Regulations.⁷³

- 3.62 In light of the evidence above, we consider that non-telecoms physical infrastructure has material disadvantages, in terms of cost and operational complexity, compared to telecoms physical infrastructure. Therefore, while non-telecoms physical infrastructure can, and is, used as part of network deployments, we do not expect it to be the core element of scale network deployment. As such, we conclude that non-telecoms physical infrastructure is a poor substitute for telecoms physical infrastructure for the purposes of deploying telecoms networks, and so we would not expect to see switching at sufficient scale in response to a SSNIP of telecoms physical infrastructure to warrant widening our product market to include it.

Wireless as a constraint

- 3.63 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 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.
- 3.64 Wireless therefore represents in principle a potential constraint on a hypothetical monopolist of access to telecoms physical infrastructure.⁷⁴ Our evaluation considers two general themes, which we apply to the various wireless services:
- a) The extent to which services provided using wireless connections compete with services provided using only 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. The technical constraints of wireless (for example, capacity limitations) mean that it will always be reliant to some degree on fixed connections and therefore access to physical infrastructure.
- 3.65 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

⁷³ 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. Notwithstanding this, it does not alter our conclusion that the ATI Regulations do not address effectively the competition concerns arising from BT's market power in Physical Infrastructure markets.

⁷⁴ 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 might have deployed fixed connections switching to using wireless connections in response to a SSNIP, or it could still be indirectly constrained by customers switching downstream from products provided using fixed telecoms physical infrastructure to products provided using wireless connections.

- c) using Fixed Wireless Access (FWA) to deliver broadband services.

Our proposals

- 3.66 We provisionally concluded that microwave links, satellite and FWA were not in the relevant product market. We considered that, based on current evidence, neither microwave links, satellite or FWA would constrain a hypothetical monopolist of access to telecoms physical infrastructure.

Stakeholder responses

- 3.67 We received broad stakeholder support for wireless technologies being outside of the product market. TalkTalk, Three and Virgin Media agreed that, while innovation may strengthen the constraint from wireless technologies, the current evidence does not support including any of these technologies in the product market.⁷⁵ Three and Virgin Media also agreed that certain wireless technologies are likely to remain reliant to some extent on access to telecoms physical infrastructure.⁷⁶
- 3.68 IIG said that it considers it is likely that masts and antennae for fixed wireless networks will become part of the product market in the future. It said that it is anticipated that, with the deployment of 5G technology, very high-speed broadband and potentially also point-to-point connectivity will be increasingly provided using FWA networks.⁷⁷

Our reasoning and decisions – microwave links

- 3.69 Microwave backhaul is widely used by mobile network operators. However, as outlined in Annex 9, there are several reasons why we consider microwave links are a poor substitute for leased line mobile backhaul products:⁷⁸
- 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.
- 3.70 In addition, microwave is only able to support lower capacities, so will be an even less viable substitute compared to leased lines given the growth in mobile data usage and corresponding increase in bandwidth requirements. We also understand that microwave is only likely to be used by mobile network operators for 5G rollout in areas where it is not cost-effective or practical to use fibre.
- 3.71 Therefore, we conclude that microwave links do not constrain access to telecoms physical infrastructure, and that these services are not included in the product market.

⁷⁵ TalkTalk's response to the 2018 PIMR Consultation, paragraph 2.20; Three's response to the 2018 PIMR consultation, page 5; Virgin Media's response to the 2018 PIMR Consultation, page 10.

⁷⁶ Virgin Media's response to the 2018 PIMR Consultation, page 10; Three's response to the 2018 PIMR consultation, page 6. Three also noted that this also applies to microwave links, which require fixed backhaul at some point. Three's response to the 2018 PIMR consultation, page 6.

⁷⁷ IIG's response to the 2018 PIMR, 2018 BCMR and 2018 BT RFR Consultations, paragraph 9.1.3.

⁷⁸ Annex 9, paragraphs A9.76-A9.78.

Our reasoning and decisions – satellite

- 3.72 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 remain of this view.
- 3.73 We pointed to the lower speeds, poorer latency, lack of a voice service, and higher prices for satellite services. Our consumer survey 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.⁷⁹
- 3.74 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 this review period will lead to satellite becoming a significant constraint.
- 3.75 Therefore, on the basis of the analysis set out in the 2018 WLA Statement, we conclude that satellite does not constrain access to telecoms physical infrastructure, and so is outside of the relevant product market.

Our reasoning and decisions – fixed wireless access

- 3.76 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.⁸⁰ We observed that while in some respects, these services can be comparable to fixed line broadband,⁸¹ take-up of these services remains fairly low.
- 3.77 We recognise that it is possible that FWA services could in future become a closer substitute for fixed line broadband connections. The 2018 WLA Statement pointed to 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

⁷⁹ 2018 WLA Statement, paragraphs 3.90-3.94.

⁸⁰ 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.

⁸¹ We note that fixed wireless access connections meet the specification of the broadband universal service obligation. Ofcom (2018) *Delivering the Broadband Universal Service*, Section 3
https://www.ofcom.org.uk/_data/assets/pdf_file/0024/129408/Consultation-Delivering-the-Broadband-Universal-Service.pdf

b) 5G standards which may lead to the availability of higher speed data services.

3.78 However, we consider it is too early to conclude it is an effective substitute, given the considerable uncertainty about how FWA might develop.⁸²

3.79 Even if FWA services were 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.⁸³ This would limit the strength of any constraint faced by a hypothetical monopolist of telecoms physical infrastructure from FWA.

3.80 Based on the evidence currently available, we conclude that FWA would not sufficiently constrain a hypothetical monopolist of telecoms physical infrastructure intended to house fixed elements of a network over this review period. Moreover, we do not think it likely that FWA networks built independently of existing telecoms infrastructure will emerge to sufficiently constrain a hypothetical monopolist in the near future. Therefore, we conclude that it should not be included in the product market.

Supply-side substitution

3.81 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.

3.82 We did not receive any stakeholder responses to our assessment of supply-side substitution.

3.83 We maintain our view that 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 conclusion on product market definition

3.84 We conclude that the product market is the supply of wholesale access to telecoms physical infrastructure for deploying a telecoms network.

⁸² Moreover, FWA will not be a substitute for all fixed line services; for example, it is unlikely to be considered a substitute for high bandwidth leased lines given capacity limitations.

⁸³ 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

- 3.85 Our geographic markets identify areas in which the conditions of competition in the product market are sufficiently homogeneous, and which can be distinguished from neighbouring areas in which the prevailing conditions of competition are significantly different.
- 3.86 As we noted above, in principle, the hypothetical monopolist test provides a framework for geographic market definition. However, in the case of fixed telecoms services this will often lead to overly narrow geographic markets.⁸⁴ In line with the EC framework and past Ofcom practice, we adopt an aggregation approach. Rather than analyse each geographic area separately, we aggregate geographic areas into areas where “the conditions of competition are similar or sufficiently homogenous” – our proposed geographic markets are therefore not based on applying the hypothetical monopolist test.⁸⁵
- 3.87 We are mindful that this is our first assessment of this market and wish to take a conservative approach to our market analysis. Our approach recognises that there are different underlying characteristics in the different geographies in terms of duct provision and downstream competitive conditions which should be recognised in our analysis.⁸⁶ Therefore, we have undertaken analysis at a disaggregated level, both in terms of the geographic unit we use, the threshold we apply to determine presence of an infrastructure within an area, and in our approach to aggregating geographic units, recognising the differing conditions of competition in each geography. This is consistent with the market definition exercise not being an end in itself, but a means to undertaking an assessment of market power.⁸⁷
- 3.88 We now explain our choice of geographic unit, and then explain the reasons for aggregating those geographic units into four geographic markets.

Relevant geographic unit

- 3.89 Our geographic market definition analysis needs to begin with an appropriate geographic unit, i.e. the geographic areas that we will analyse and then aggregate.

Our proposals

⁸⁴ As already noted, it is extremely unlikely that individual consumers (either residential or business) would move to a different postcode sector in response to a SSNIP, and it is unlikely that a provider will expand its network to serve a new route to an individual premise or business in response to a SSNIP.

⁸⁵ We therefore disagree with TalkTalk that our geographic markets should be based on SSNIP analysis (TalkTalk’s response to the 2018 PIMR Consultation, paragraph 3.4).

⁸⁶ The importance of recognising such differences in competitive conditions in our analysis was emphasised in the BCMR Judgment.

⁸⁷ This is explained in the EU Regulatory Framework. “It should be recognised that the objective of market definition is not an end in itself, but part of a process, namely assessing the degree of an undertaking’s market power.” (EC SMP Guidelines, fn 19). “In this regard, it is important for NRAs to bear 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.” (EC Staff Working Document on the EC SMP Guidelines, page 21).

3.90 We proposed using postcode sectors as the appropriate geographic unit.

Stakeholder responses

3.91 IIG favoured larger geographic units more closely reflecting potential deployment areas, citing concerns that such a disaggregated approach could lead to a fragmented patchwork of remedies within towns.⁸⁸ On the other hand, Analysys Mason noted that using a postcode sector as the unit of analysis might obscure differences within a postcode sector – which could lead to areas of high coverage at sub postcode sector not being recognised. It felt that these areas should be included to be conservative.⁸⁹

3.92 Virgin Media and [X] agreed with our approach.⁹⁰

Our reasoning and decisions

3.93 We remain of the view that postcode sectors⁹¹ are the appropriate geographic unit for our analysis.

3.94 In selecting this unit (and rejecting alternatives), we have had regard to the EC SMP Guidelines, which state that NRAs should ensure that the units for geographic analysis are:⁹²

- a) Small enough to avoid significant variations in competitive conditions within each unit yet big enough to avoid a resource intensive and burdensome micro-analysis that could lead to fragmentation of markets; and
- b) Able to reflect the network structure of all relevant providers; and
- c) Have clear and stable boundaries over time.

3.95 We consider that a geographic unit of a postcode sector strikes the right balance between avoiding significant variations in competitive conditions within each unit and seeking to avoid burdensome micro-analysis.⁹³ We also consider that the network structure of relevant operators can be mapped onto postcode sectors and note that postcode sectors have clear and stable boundaries over time.

3.96 We recognise that there may be variations in competitive conditions within a postcode sector, but we consider that a smaller geographic unit would be resource intensive.⁹⁴

⁸⁸ IIG's response to the 2018 PIMR, 2018 BCMR and 2018 BT RFR Consultations, paragraphs 10.1.3-10.1.4. TalkTalk also noted that a postcode sector would not represent the minimum geographic scale required for an alternative infrastructure operator to be an effective constraint. TalkTalk's response to the 2018 PIMR Consultation, paragraph 4.4, fn 12.

⁸⁹ Analysys Mason Report, page 11.

⁹⁰ TalkTalk's response to the 2018 PIMR Consultation, paragraph 12; [X].

⁹¹ A postcode sector is the first half of a postcode plus one digit of the second half, e.g. SE1 9. There are around 10,000 postcode sectors in the UK.

⁹² EC SMP Guidelines paragraph 49.

⁹³ We note the CAT BCMR Judgment did not rule against the use of postcode sectors in the 2016 BCMR Statement. Competition Appeal Tribunal (2017) 1260/3/3/16 *British Telecommunications v Office of Communications (BCMR)* – Judgment (Market Definition [2017] CAT 25) 10

https://www.catribunal.org.uk/sites/default/files/1260_BT_Judgment_CAT_25B_101117.pdf (CAT BCMR Judgement).

⁹⁴ We note the CAT BCMR Judgment, paragraph 424 stated that "practicality is an important consideration when conducting a geographic market analysis".

- 3.97 A smaller geographic unit would also carry a greater risk of fragmentation of markets and therefore remedies which may be impractical to implement and/or ineffective. We agree with IIG that there could be a case for a larger geographic unit than postcode sectors, such as whole towns or cities, on the basis that many access seekers are likely to prefer a single operator's infrastructure across a deployment area where possible, given the cost and complexity of combining multiple infrastructures, and so choose between different operators' infrastructure at a relatively aggregated level.
- 3.98 However, in keeping with this being the first assessment of 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. For example, in the 2019 BCMR Statement, we identify smaller areas where multiple alternative leased lines operators are present and which could exhibit competitive conditions distinct from other areas.⁹⁵

Aggregation of geographic units into geographic markets

- 3.99 Having identified the relevant geographic unit, we now look to aggregate these into areas where the conditions of competition are similar or sufficiently homogenous.

Our proposals

- 3.100 We proposed to define four geographic markets, based on the presence of alternative telecoms physical infrastructure. These were:
- a) **BT only areas** – areas where there is no or limited alternative to BT;
 - b) **areas with alternative telecoms physical infrastructure that has been deployed to support multi-service networks, but excluding High Network Reach areas** – areas where an alternative telecoms physical infrastructure has been deployed to support multi-service networks;
 - c) **High Network Reach areas excluding the Central London Area (“HNRs”)** – areas outside the Central London Area with a high presence of rival telecoms physical infrastructure deployed to connect large business and mobile sites;
 - d) **the Central London Area (“CLA”)** – an area in central London with a uniquely high presence of rival telecoms physical infrastructure deployed to support leased lines networks.

Stakeholder responses

- 3.101 A number of stakeholders commented on our approach of taking into account differences between different operators' telecoms physical infrastructure in our SMP analysis when examining each operator's position within the market. They considered that such differences should be taken into account at the product market definition stage, and would

⁹⁵ The indirect constraint could be stronger in these areas as a result of greater competition in the provision of leased lines, and the direct constraint could be stronger as a result of greater competition between infrastructure operators offering access. Using postcode sectors enables us to separately analyse these areas in this review of the upstream market.

lead to defining a narrower product market. They therefore did not consider the presence of alternative telecoms physical infrastructures to represent a significant difference in competitive conditions – and therefore considered the correct geographic markets were more aggregated, with many stakeholders arguing the correct geographic market was national.⁹⁶

- 3.102 TalkTalk further stated that we had not sufficiently explained the rationale behind the thresholds used to determine the presence of an alternative operator, and that in the absence of such a rationale, our geographic market definition was unsound. It argued that we should justify this assumption in terms of the ability to constrain a hypothetical monopolist's pricing to within 5-10% of the competitive level.⁹⁷
- 3.103 Both TalkTalk and Vodafone questioned the validity of using a buffer distance of 50m to determine the presence of an alternative infrastructure in relation to large business and mobile sites.⁹⁸
- 3.104 In addition, two stakeholders were concerned about the signal that defining four separate geographic markets gave about the direction for future regulation. Hyperoptic argued that this signalled a move towards deregulation of PIA in competitive areas.⁹⁹ Virgin Media expected the physical infrastructure markets to align more closely with the intended downstream geographic markets.¹⁰⁰

Our reasoning and decisions

- 3.105 We aggregate the individual geographic units into areas where the competitive conditions are sufficiently homogenous, and which can be distinguished from neighbouring areas in which the prevailing conditions of competition are significantly different.

⁹⁶ Hyperoptic's response to the 2018 PIMR Consultation, page 6-8; IIG's response to the 2018 PIMR, 2018 BCMR and 2018 BT RFR Consultations, paragraphs 10.1.5 – 10.1.7; TalkTalk's response to the 2018 PIMR Consultation response paragraphs 3.9, 3.11 – 3.12; Telefonica's response to the 2018 PIMR Consultation, page 2; Vodafone's response to the 2018 PIMR Consultation paragraphs 6.6, 6.12-6.14; [X]; Openreach also stated that Ofcom's logic that ubiquity is key makes any geographical segmentation irrelevant (Openreach's response to the 2018 PIMR Consultation, paragraphs 13, 73). In addition, Gamma argued for a more nuanced approach taking into account the identity of the infrastructures present, as well as the number of alternative infrastructure present (Gamma's response to the 2018 PIMR and 2018 BCMR Consultations, pages 4-5)).

⁹⁷ TalkTalk's response to the 2018 PIMR Consultation, paragraph 3.7.

⁹⁸ TalkTalk's response to the 2018 PIMR Consultation, paragraph 3.9; Vodafone's response to the 2018 PIMR Consultation paragraph 6.12.1.

⁹⁹ Hyperoptic's response to the 2018 PIMR Consultation, page 7.

¹⁰⁰ Virgin Media's response to the 2018 PIMR Consultation, page 13.

- 3.106 Given there has been limited actual supply of access to infrastructure to date, several of the metrics we might usually consider do not help us.¹⁰¹ We consider that the presence of alternative telecoms physical infrastructure could potentially act as a constraint as:¹⁰²
- a) The infrastructure could in principle be used by an access seeker to build a network, and so could potentially exert a direct constraint on behaviour in the upstream market.
 - b) Operators of telecoms physical infrastructure are vertically integrated in the ownership of the infrastructure and the networks installed in that infrastructure, so the retail services provided using that physical infrastructure could exert an indirect constraint on behaviour in the upstream market.
- 3.107 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.

Measuring presence

- 3.108 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).¹⁰³ To identify the presence of alternative telecoms physical infrastructure operators, we base our approach on the approach we have taken to measuring presence of these operators in downstream market reviews. Whereas the focus in those reviews was to measure presence of these operators only in the downstream markets, in this review we also use it as a proxy for presence upstream.¹⁰⁴
- 3.109 Broadly speaking, there are two types of fixed telecoms services provided over telecoms physical infrastructure – broadband services and leased lines services – both of which are relevant in our geographic analysis.¹⁰⁵ We have previously measured the presence of broadband operators and leased lines operators differently – reflecting both differences in the economics of supplying these products, and differences in the data available. We use a

¹⁰¹ 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.).

¹⁰² As explained above, our product market definition defers to our SMP assessment the question of strength of substitution from alternative telecoms physical infrastructures.

¹⁰³ BT covers nearly every premises in the UK (except the Hull area, which is outside the scope of this market review).

¹⁰⁴ Services can only be provided where there is physical infrastructure. We recognise that some downstream services are provided using direct buried cables, and as such there is no physical infrastructure that is accessible to third parties. We also recognise there is some sharing of physical infrastructure, but this is very limited.

¹⁰⁵ We note that in some cases these services are provided over the same network and therefore the same telecoms physical infrastructure. In measuring the presence of broadband and leased lines operators separately, we ensure that our approach does not double-count operators offering both types of service.

buffer distance when measuring presence of leased lines networks¹⁰⁶, but use premises passed when measuring presence of broadband networks.¹⁰⁷

- 3.110 In order to measure presence, we need to consider what level of coverage is necessary for an operator to be considered present. There is clearly a continuum and the EC 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.¹⁰⁸
- 3.111 The threshold must be high enough to ensure that the coverage of rival infrastructure is sufficient to be able to offer connections to a sizeable proportion of premises in the geographic area. While it is difficult to determine the specific level of coverage that would be necessary to materially affect competitive conditions, it is likely to be high given that we consider a ubiquitous infrastructure is likely to have material advantages over non-ubiquitous networks.¹⁰⁹ However, mindful that this is our first assessment of this market, we also wish to have a threshold which allows us to expose areas where alternatives are material, such that we can carry out further analysis in our market power assessment.^{110 111}

¹⁰⁶ For convenience we use the same measure of presence as in BCMR, i.e. incorporating a buffer distance. We acknowledge that, in principle, this is likely to overstate coverage of alternative infrastructures, as it includes coverage where there may not actually be a connection. However, we are limited in our ability to detect whether an infrastructure is connected to a customer site. Therefore, to account for measurement error in our methodology, we need to incorporate a buffer distance of some length. While the BCMR buffer distance may be greater than is necessary to correct for this, because it in part reflects the incentive and ability for infrastructure operators to extend their networks to supply customer sites, the evidence suggests these dig distances are likely to be shorter than 50m, and so the element of this 50m attributable to measurement error is not insignificant. We explain the rationale for the chosen buffer distance in more detail in Volume 2, Section 5, paragraphs 5.76-5.80. We do not focus on the interexchange connectivity analysis – these relate to very specific routes, and so account for a very small proportion of total infrastructure in our geographic units.

¹⁰⁷ See 2018 WBA Statement. We note that this method of measuring coverage takes account of the number of breakout points in a network, and so reflects the arguments made by TalkTalk that different telecoms physical infrastructures have different topologies. For example, if a duct runs along a street to connect to a large business site, but does not break out to the premises along that street, then it would not be considered to pass those premises.

¹⁰⁸ EC Staff Working Document on the EC SMP Guidelines, page 21.

¹⁰⁹ The threshold of coverage at which a rival network would be an effective constraint may be higher than the thresholds we ultimately apply in our geographic market delineation. Indeed, we consider a more stringent threshold in our SMP assessment of the Alternative Multi-service Network geographic area in paragraph 3.177 below, and Annex A4.14 – A4.19.

¹¹⁰ We note that areas with coverage by an alternative infrastructure which is closer to our threshold may have slightly different competitive conditions to those areas with coverage by an alternative infrastructure which is much higher (and closer to 100%). However, competitive conditions do not need to be perfectly homogenous in order to aggregate those areas. See BEREC Common Position on geographic aspects of market analysis (definition and remedies), https://berec.europa.eu/eng/document_register/subject_matter/berec/regulatory_best_practices/common_approaches_positions/4439-berec-common-position-on-geographic-aspects-of-market-analysis-definition-and-remedies, paragraphs 128-129.

¹¹¹ We also note Hyperoptic's comment that an alternative infrastructure without 60-70% ubiquitous coverage should be discounted as an alternative in the relevant geography and another provider's ([X]) comment that it might consider ducted passive access from another operator if it were able to cover 60% or more of customers across an entire town where it was considering rolling out an FTTP network (dependent on the financial and time costs of negotiating an appropriate agreement). These responses are consistent with the threshold chosen. Hyperoptic's response to the 2018 PIMR Consultation, page 7 and [X].

We consider that [X], and the threshold used in the 2019 BCMR Statement are practical and appropriate thresholds.¹¹² Specifically:

- a) in relation to broadband coverage, we consider an operator to be present if it can serve more than [X]% [30-80]% of premises in that postcode sector; and
- b) in relation to leased lines coverage, we consider an operator to be present if it can serve within 50m of more than 65% of large business and mobile sites in that postcode sector.

Grouping postcode sectors based on presence

3.112 Having identified the presence of alternative infrastructure operators in each postcode sector in relation to providing broadband services and leased lines services, we now explain how we aggregate postcode sectors into geographic markets.

3.113 We consider that the presence of an alternative infrastructure used to supply broadband services (i.e. where an alternative operator passes more than [X]% [30-80]% of premises) is likely to constitute a difference in competitive conditions between these areas and areas where there is no alternative present. In areas where an alternative is not present, access seekers will have little or no choice and are mainly dependent on BT, whereas in areas where an alternative is present, BT faces competition from at least one alternative telecoms physical infrastructure operator. We therefore separate those postcode sectors where an alternative infrastructure used to supply broadband services is present from those where it is not.¹¹³

3.114 We also consider that a high level of alternative infrastructure which connects to large business and mobile sites (irrespective of whether that infrastructure has a correspondingly large coverage of premises) constitutes a potential difference in competitive conditions from other areas because:¹¹⁴

- a) There may be access seekers looking to connect only to large business or mobile cell sites. These access seekers may therefore view the substitutability between these different infrastructures differently to access seekers with different business models.
- b) The indirect constraints posed by these infrastructures in relation to the provision of leased lines services may differ.¹¹⁵

¹¹² See [X] and Volume 2, Section 5, paragraphs 5.83-5.88.

¹¹³ In practice, our analysis focuses on where Virgin Media is present, as the only significant alternative to BT. There are a small number of instances, [X], where an operator other than Virgin Media is able to serve over [X]% [30-80]% of premises in a postcode sector, and Virgin Media does not, which we classify as BT only. Given that these operators are small scale, this has no effect on our conclusions.

¹¹⁴ We therefore disagree with IIG (IIG's response to the 2018 PIMR, 2018 BCMR and 2018 BT RFR Consultations, paragraph 10.1.6) and TalkTalk (TalkTalk's response to the 2018 PIMR Consultation, paragraph 3.12) that it is only relevant to look at overall coverage.

¹¹⁵ In the 2019 BCMR Statement, we also separately identify areas where there is on average one rival network within the buffer distance ("BT+1" areas). We do not 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 Volume 2, Section 6, paragraphs 6.81-6.89. We note that

- 3.115 We therefore aggregate those postcode sectors which have at least two alternative (non-BT) infrastructures which can serve within 50m of more than 65% of large business and mobile sites in that postcode sector. We refer to these as HNRs.¹¹⁶
- 3.116 Within these areas, the BCMR (Volume 2 of this statement) separately identifies an area of uniquely high presence of alternative infrastructures connecting to large business and mobile sites – the CLA. It also finds no operator to have SMP in this geographic area (albeit the PIA remedy is a factor in this finding). Therefore, both the direct and indirect constraint imposed by alternative infrastructure in this area may differ from other HNR areas. We therefore further separate those postcode sectors which the BCMR finds to constitute the CLA as a separate geographic market.^{117 118}
- 3.117 We recognise that presence within a geographic unit does not capture all the facets of competition – and therefore the presence of an alternative infrastructure operator may not be sufficient to act as an effective competitor. However, the purpose of geographic market definition is to examine the similarity of competitive conditions. The strength of those constraints is examined in the SMP assessment.¹¹⁹ Therefore, finding that an area constitutes a geographic market does not determine whether or not there is SMP in that area, nor does it necessarily mean that the SMP finding will be different from neighbouring areas.¹²⁰
- 3.118 Indeed, our analysis ultimately leads us to the conclusion that BT has SMP in each of these geographic markets. However, to aggregate individual markets further before undertaking our market power assessment risks us incorrectly failing to identify differences in the constraints imposed by alternative telecoms infrastructures in different markets.
- 3.119 With regards to the points raised by stakeholders surrounding the direction of future regulation, we note that networks built using PIA remedies would not be a relevant independent constraint upon the physical infrastructure market under a modified greenfield approach, and so not relevant to any future SMP assessments of this market. On the other hand, downstream market reviews will take such build into account. More

in [X] % of the BT+1 areas identified in the BCMR, the rival is Virgin Media, and [X] % of these areas overlap with the areas where Virgin Media is present; therefore, we analyse the [X] % of these areas already.

¹¹⁶ This means that where a postcode sector has both two alternative (non-BT) infrastructures which are within 50m of more than 65% of large business and mobile sites, and Virgin Media passes more than [X] % [30-80] % of premises, it is defined as an HNR area. However, this accounts only for a small minority [X] % of HNR and CLA postcode sectors.

¹¹⁷ We therefore disagree with both TalkTalk (TalkTalk's response to the 2018 PIMR Consultation, paragraphs 4.5-4.7) and Hyperoptic (Hyperoptic's response to the 2018 PIMR Consultation, page 8) which questioned the basis for defining the CLA as a separate geographic market.

¹¹⁸ The downstream BCMR also identifies six Metro areas as separate geographic markets from the HNR Areas in the rest of the UK. However, this was a conservative approach - while the six Metro areas do appear to be more competitive than the HNR areas in the rest of the UK, this distinction is less clear-cut. See Volume 2, Section 5, paragraphs 5.120- 5.122. As such, we do not distinguish between them in our geographic market definition, and define a single geographic market for all HNR areas excluding the CLA.

¹¹⁹ We note that geographic market definition is logically prior to market power assessment. See CAT BCMR Judgment, paragraphs 392-393.

¹²⁰ This is recognised in the *ERG Common Position on Geographic Aspects of Market Analysis (definition and remedies)*, October 2008, page 21. https://berec.europa.eu/doc/publications/erg_08_20_final_cp_geog_aspects_081016.pdf

generally, downstream geographic markets do not in principle need to align with upstream geographic markets.

Our decision on geographic market definition

3.120 We conclude that the geographic markets are:

- a) **BT only areas** – areas where there is no or limited alternative to BT;
- b) **areas with alternative telecoms physical infrastructure that has been deployed to support multi-service networks, but excluding High Network Reach areas.** For shorthand, we refer to these areas as ‘**Alternative Multi-service Network**’ areas in the remainder of this document. In practice, Virgin Media is expected to be the only significant operator of such infrastructure over this review period;
- c) **High Network Reach areas excluding the Central London Area (“HNRs”)** – areas outside the Central London area with a high presence of rival telecoms physical infrastructure deployed to support leased lines networks; and
- d) **the Central London Area (“CLA”)** – an area in central London with a uniquely high presence of rival telecoms physical infrastructure deployed to support leased lines networks.

Table 3.2: Postcode sectors, premises and large business and mobile sites in relevant postcode sectors

	BT only areas	Alternative Multi-service Network areas	HNR areas excluding the CLA	CLA	Total (UK excluding Hull area)
Relevant postcode sectors	5,983	3,412	304	275	9,974
% of total postcode sectors in UK excluding Hull area	60%	34%	3%	3%	100%
Premises in relevant postcode sectors	15,565,626	13,023,612	392,264	174,594	29,156,096
% of total in UK excluding Hull area	53%	45%	1%	1%	100%
Large business sites and mobile sites in relevant postcode sectors	89,033	59,006	5,438	4,229	157,706

% of total in UK excluding Hull area	56%	37%	3%	3%	100%
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Source: Ofcom

- 3.121 In its comments on the Draft Statement, the Commission noted that competitive conditions do not appear to be very different and considered a national market (excluding Hull) would be more adequate. The Commission considered that a finding of different geographical markets, in view of principally the same market failures identified throughout the entire territory, may raise uncertainty as to continued uniform regulation of PIA market(s), and therefore might deter potential access seekers to rely on it. However, the Commission also considers that the finding of differentiated geographical markets, as opposed to larger geographical units or even a single national market, would not change the SMP finding or the selected remedies and hence the regulatory outcome would be the same. The Commission invited Ofcom to revisit its conclusions as regards the existence of differentiated geographical markets for physical infrastructure access.
- 3.122 Taking utmost account of the Commission's comments, we have revisited our conclusions as regards geographic market definition. We remain of the view that it is appropriate to define four separate geographic markets in light of UK national circumstances, for the reasons set out above. In particular, in this first assessment of this market, our approach mitigates the risk that we fail adequately to identify differences in the constraints imposed by the alternative telecoms infrastructures which are observed in each different market in the UK.
- 3.123 We agree with the Commission that uncertainty as to continued uniform regulation of these market(s) might deter potential access seekers from relying on this regulation. However, we do not consider that our decision to define four separate geographic markets in this review adds materially to any uncertainty which might exist. This is because regulation of the physical infrastructure market(s) in future reviews will ultimately depend on a fresh analysis of competitive conditions over the relevant review period.

Application of the three-criteria test

Our proposals

- 3.124 We proposed that our provisional findings on market definition satisfy the three-criteria test set out in the 2014 EC Recommendation.¹²¹

¹²¹ 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.

Stakeholder responses

- 3.125 Only one stakeholder explicitly commented on our three-criteria test (IIG), which agreed with our assessment, citing in particular the insufficiency of competition law to enable competition.¹²²

Our reasoning and decisions

- 3.126 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. This recommendation lists a number of markets in which it is presumed that *ex ante* regulatory 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: ¹²³
- 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.
- 3.127 The markets we 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.¹²⁴

High and non-transitory barriers to entry

- 3.128 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.

¹²² IIG's response to the 2018 PIMR, 2018 BCMR and 2018 BT RFR Consultations, paragraphs 11.1.1 - 11.1.8.

¹²³ The three-criteria test is used to assess whether markets are susceptible to *ex ante* regulation.

¹²⁴ 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. See https://berec.europa.eu/eng/document_register/subject_matter/berec/download/0/8323-draft-berec-report-on-access-to-physical_0.pdf.

- 3.129 We have previously acknowledged these barriers to entry¹²⁵ 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.¹²⁶

A market structure which does not tend towards effective competition

- 3.130 We consider that the markets we have identified will not, in the absence of regulation, tend towards effective competition in the foreseeable future.
- 3.131 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 have decided that all of BT's physical infrastructure should be regulated.
- 3.132 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

- 3.133 We set out later in this section our 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.
- 3.134 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.
- 3.135 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

¹²⁵ See, for example, 2018 WLA Statement, Volume 1, paragraphs 4.56-4.62 and Volume 2, Section 6, paragraphs 6.94-6.95 and 6.131 of this statement.

¹²⁶ We discuss this further in our assessment of SMP.

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.

- 3.136 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

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

SMP assessment

- 3.138 Having determined that the markets we define are susceptible to *ex ante* regulation, we now consider whether there exists SMP in each of the markets we have defined.
- 3.139 In doing so, we focus on whether BT has SMP in respect of the supply of wholesale access to its physical infrastructure. This is because BT is the owner of the only ubiquitous telecoms physical infrastructure in the UK, and has been found to have SMP in fixed telecoms markets in the UK excluding Hull. Given that we conclude that BT has SMP individually, we do not go on to consider the market position of other operators.¹²⁷
- 3.140 As explained in paragraphs 3.23-3.25 we first consider BT's position in downstream markets as evidence of the indirect competition BT faces from rival networks that self-supply. We then go on to evaluate the extent to which BT would face direct competitive constraints in upstream markets. In doing so, we note that we do not expect operators would be likely to compete in this way in practice.

Our proposals

- 3.141 We provisionally concluded that BT had SMP in each of the four geographic markets we identified.

¹²⁷ We acknowledge that there may be some premises where BT's network has direct buried lead-ins where Virgin Media's network is fully ducted and so, in these cases, Virgin Media's infrastructure would have advantages over BT's. However, we expect these areas to be small and fragmented, such that access seekers would be unlikely to break-out of BT's network to use Virgin Media's network.

Stakeholder responses

- 3.142 A number of stakeholders (CityFibre, Digital Colony, Gigaclear, IIG, NGA, Telefonica, UKTCA, Vodafone, Virgin Media, Zayo and [redacted])¹²⁸ agreed that BT had SMP in each of our geographic markets.¹²⁹
- 3.143 Openreach argued that Virgin Media's physical infrastructure exercises a greater constraint than we have recognised. It also disagreed with our proposal that BT has SMP in both the CLA and HNR areas, based on its belief that the downstream BCMR markets in each of those areas were competitive.¹³⁰ BT Group suggested that Openreach will face effective competitive constraints in many cases.¹³¹ Openreach and TalkTalk questioned the legal basis for finding SMP in the upstream market for access to physical infrastructure where we have not found SMP in the downstream market for wholesale CI Access - though TalkTalk considered this resulted from an incorrect non-SMP in the downstream market, which if remedied would address this inconsistency.¹³²

BT's position downstream (indirect constraints)

- 3.144 Below, we consider the extent to which BT faces indirect constraints which arise from the ability of downstream customers to substitute to services provided over networks that use alternative infrastructure.

Our proposals

- 3.145 We provisionally concluded that SMP findings in downstream markets suggest that the indirect constraints on BT's position in the upstream market were generally weak.

Stakeholder responses

- 3.146 CityFibre, Gigaclear, IIG, Zayo and [redacted] agreed with our assessment of indirect constraints.¹³³

¹²⁸ CityFibre's response to the 2018 PIMR Consultation, paragraph 5.1.1; Digital Colony's response to the 2018 PIMR Consultation, page 1; Gigaclear's response to the 2018 PIMR Consultation, page 1; IIG's response to the 2018 PIMR, 2018 BCMR and 2018 BT RFR Consultations, paragraphs 12.3.1-12.3.2 and 12.3.4; NextGenAccess' response to the 2018 PIMR Consultation, question 3.2; Telefonica's response to the 2018 PIMR Consultation, page 2; UKTCA response to the 2018 PIMR Consultation, page 2; Virgin Media's response to the 2018 PIMR Consultation, page 29; Vodafone's response to the 2018 PIMR Consultation, page 35; Zayo's response to the 2018 PIMR Consultation, paragraph 5.1.6; [redacted].

¹²⁹ A number of these stakeholders disagreed with our approach of taking into account differences between different operators' telecoms physical infrastructure in our SMP analysis, and so disagreed with our geographic markets. However, they agreed with our proposal that BT has SMP across the UK.

¹³⁰ Openreach's response to the 2018 PIMR Consultation, paragraphs 53, 70 and 72.

¹³¹ BT Group's response to the 2018 PIMR and 2018 BCMR Consultations, paragraph 2.29.

¹³² Openreach's response to the 2018 PIMR Consultation, paragraph 37; TalkTalk's response to the 2018 PIMR Consultation, paragraph 1.6.

¹³³ CityFibre's response to the 2018 PIMR Consultation, paragraph 5.2.1; Gigaclear's response to the 2018 PIMR Consultation, page 2; IIG's response to the 2018 PIMR, 2018 BCMR and 2018 BT RFR Consultations, paragraphs 9.1.10 and 12.3.4; Zayo's response to the 2018 PIMR Consultation, paragraphs 5.1.4-5.1.5; [redacted]. We note that other stakeholders which agreed with our SMP finding implicitly agreed with our analysis that the indirect constraints on BT were likely to be weak.

- 3.147 BT Group and Openreach argued that the evidence we cited to assess the indirect constraint upon BT was flawed, because we cannot rely on analysis in the 2018 WLA Statement and 2018 BCMR Consultation, as business and residential markets should be considered together in a holistic approach.¹³⁴ Openreach further argued that the geographic markets used in the 2018 WLA Statement do not match those defined in this review.¹³⁵
- 3.148 BT Group also argued there were significant recent market developments in the wholesale local access market which invalidated the findings of the 2018 WLA Statement, arising from [X], to which Openreach responded with a fibre deal offering conditional discounts to CPs. It argued that this demonstrated a market-driven constraint on wholesale prices (and an indirect constraint on upstream physical infrastructure) as well as significant countervailing buyer power.¹³⁶

Our reasoning and decisions

- 3.149 As physical infrastructure is an input into multiple downstream services, we consider BT's position in a number of downstream markets as part of our assessment of the indirect constraints. Specifically, we draw upon the evidence and analysis of downstream markets presented in our 2018 WLA Statement, and that presented in Volume 2 of this statement (BCMR). The strength of the indirect constraint on BT in the upstream market for access to physical infrastructure will reflect the combined impact of the constraints imposed in various existing downstream markets.^{137 138}
- 3.150 We remain of the view that the evidence presented in the 2018 WLA Statement and in Volume 2 of this statement is an appropriate indicator of the indirect constraint upon BT. This evidence demonstrates that BT maintains a dominant position in most key wholesale services and, absent downstream regulation, would be likely to be dominant in all retail markets.
- 3.151 In the 2018 WLA Statement, we found BT to have SMP, reflecting among other factors:¹³⁹
- a) BT's very high and stable share of the WLA market in the UK excluding the Hull area (around 80%), consistent with a presumption of dominance.¹⁴⁰
 - 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.¹⁴¹

¹³⁴ BT Group's response to the 2018 PIMR and 2018 BCMR Consultations, paragraph 2.12, and Openreach's response to the 2018 PIMR Consultation, paragraph 33.

¹³⁵ Openreach's response to the 2018 PIMR Consultation, paragraph 33.

¹³⁶ BT Group's response to the 2018 PIMR and 2018 BCMR Consultations, paragraphs 2.15 – 2.16.

¹³⁷ We disagree with BT Group, which argued that we need to formally define downstream markets to define an upstream market, as our upstream market definition considers any indirect constraints that exist.

¹³⁸ For the avoidance of doubt, this constitutes our holistic market assessment.

¹³⁹ 2018 WLA Statement, Volume 1, Section 4.

¹⁴⁰ These market shares are outlined in 2018 WLA Statement, Volume 1, Section 4, Table 4.3 and paragraphs 4.21-4.40.

¹⁴¹ 2018 WLA Statement, Volume 1, paragraphs 4.45-4.55.

- c) The high barriers to entry in the WLA market, arising particularly from the scale of the investment needed to do so, and the large part of costs incurred which are sunk.¹⁴²
- 3.152 While SMP was found in a national geographic market, the evidence presented was consistent with BT being dominant in Virgin Media's footprint, which broadly corresponds to our Alternative Multi-service Networks geographic market. For example, we found that BT's share of local access connections within the Virgin Media footprint is at least 60%.¹⁴³
- 3.153 We have not identified any material changes that would alter these findings since the completion of the WLA Statement in April 2018. With the exception of BT Group, no other stakeholders challenged whether these findings remained correct. We disagree with BT Group that discounts provided by Openreach represent a major change in the wholesale local access market which would invalidate the findings of the 2018 WLA Statement, and explain why in paragraph 3.214 below.
- 3.154 In Volume 2, Sections 6 and 8, we find 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 Inter-exchange connectivity, with the exception of BT exchanges where two or more operators are present. These SMP findings flow from BT's control of the only ubiquitous telecoms network. BT's ubiquitous network gives it significant advantages over other operators in terms of the cost and time taken to provide a connection compared to other infrastructures, as it will more often have a physical infrastructure connection to customer sites.¹⁴⁴
- 3.155 Even where we have not found BT to have SMP, we do not consider that this means BT faces an effective indirect constraint in the upstream market. The overall strength of the indirect constraint will reflect the combined impact of the constraints imposed in various existing downstream markets. In reaching a view on the combined impact, we focus on underlying evidence rather than the binary determination of whether or not BT has SMP.¹⁴⁵
- 3.156 With respect to the CLA:
- a) Although the 2018 WLA Statement did not consider this as a separate geographic area, the findings suggest that BT does not face a significant constraint with respect to wholesale local access services in the CLA. This is supported by our own coverage analysis which shows that coverage by other broadband operators in the CLA is low.¹⁴⁶

¹⁴² 2018 WLA Statement, Volume 1, paragraphs 4.56-4.62.

¹⁴³ We further 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 this was likely to increase to around 50% as customers migrated to superfast broadband, and so was a poor proxy for its underlying market power. 2018 WLA Statement, Volume 1, paragraphs 4.34-4.40.

¹⁴⁴ See Volume 2, Section 6, paragraphs 6.47-6.53. BT's market shares in these markets are outlined in Volume 2, sections 6 and 8.

¹⁴⁵ In reality, there is a continuum of degrees of market power.

¹⁴⁶ The highest coverage of all premises by an alternative infrastructure within the CLA is [3<], which passes [3<]% of premises.

- b) Although we have concluded that BT does not have SMP in the supply of CI Access services, BT has some competitive advantage over its competitors in the provision of leased lines connections in the CLA.¹⁴⁷ We also note that the finding reflects, among other things, the imposition of a physical infrastructure access remedy in the upstream market for access to telecoms physical infrastructure.¹⁴⁸
- 3.157 These factors therefore suggest that BT is unlikely to face an effective indirect constraint in the CLA in relation to the provision of access to physical infrastructure.
- 3.158 With respect to inter-exchange connectivity, we note that the non-SMP findings relate to very specific routes which account for a very small proportion of the physical infrastructure in the corresponding markets. Moreover, the underlying infrastructure is and can be used for other telecoms services than interexchange connectivity alone. Therefore, these non-SMP findings do not materially affect our view of the indirect constraints on BT's behaviour in the upstream market.
- 3.159 We therefore conclude that the indirect constraints on BT's behaviour in the upstream market for access to physical infrastructure are likely to be weak. As physical infrastructure is the key input into the supply of downstream services, we consider that SMP findings in downstream markets are a strong indicator that BT has SMP in the upstream market, and would be sufficient to find SMP in the upstream market for wholesale access to telecoms physical infrastructure. However, as we explain in paragraph 3.25 above, for completeness, we consider the potential direct constraints on BT in the upstream physical infrastructure market.

BT's position upstream (direct constraints)

- 3.160 To evaluate the extent to which BT would face a competitive constraint in upstream markets, we assess 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.
 - 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 have **countervailing buyer power** which weakens BT's market power.

¹⁴⁷ These include BT's high market share of 2017 new customer ends, and the fact that where a rival is not duct-connected, it has to dig. See Volume 2, Section 6, paragraphs 6.146-6.147 and 6.152.

¹⁴⁸ This is consistent with the modified greenfield approach. See Volume 2, Section 6, paragraphs 6.154 and 6.163. For this review, we are interested in BT's position absent such a remedy.

Strength of competition from existing upstream competitors¹⁴⁹

3.161 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 upstream market shares as a criterion to determine whether BT has SMP. We consider that BT's shares of current downstream services, discussed above, are the best available market share indicators of BT's position upstream. It is also not straightforward to estimate upstream market shares based on self-supply.¹⁵⁰ Therefore, as explained in paragraph 3.26, we assess the strength of competition from existing upstream competitors qualitatively based on what access seekers have told us matters to them, including the characteristics of those networks. In doing so, we acknowledge that there are likely to be multiple potential types of access seeker wishing to deploy telecoms networks, which may view the constraint imposed by different types of physical infrastructure differently. We take this into account when conducting our market analysis.

Ubiquity is the key advantage for access seekers

Our proposals

3.162 We provisionally concluded that a ubiquitous infrastructure is likely to have material advantages over non-ubiquitous infrastructure for access seekers, wherever they are seeking to deploy. As such, the ubiquity of an infrastructure was a key characteristic we considered in assessing the strength of the direct constraint imposed by alternative telecoms physical infrastructure operators on BT.

Stakeholder responses

3.163 A number of stakeholders (CityFibre, Hyperoptic, IIG, Three, Vodafone and Zayo) agreed that ubiquity was the key advantage that should be assessed in this market:¹⁵¹

- a) CityFibre and Zayo agreed, citing the substantial advantages of lower cost and shorter service provision times.¹⁵²
- b) Hyperoptic agreed that the benefits of ubiquity flowed both from the overall coverage it provides and the contiguity of coverage within a particular area, which brings the

¹⁴⁹ More detail on the coverage statistics set out in the following sections can be found in Annex 4.

¹⁵⁰ Revenue-based shares of supply of physical infrastructure do not readily exist given physical infrastructure is self-supplied. In principle we could calculate shares of total existing physical infrastructure based on the amount of physical infrastructure used. However, such shares would be a poor indicator of BT's position in the market, as BT's physical infrastructure is used to supply a substantially higher proportion of downstream services. In any event, calculating such shares is difficult because of the difficulty of comparing volumes of different types of infrastructure (e.g. ducts and poles). We take account of the amount of existing physical infrastructure different operators have in our coverage analysis set out below.

¹⁵¹ CityFibre's response to the 2018 PIMR Consultation, paragraph 5.1.3; Hyperoptic's response to the 2018 PIMR Consultation, page 7; IIG's response to the 2018 PIMR, 2018 BCMR and 2018 BT RFR Consultations, paragraphs 12.1.2 and 12.5.1; Three's response to the 2018 PIMR Consultation, paragraphs 35-38. Vodafone's response to the 2018 PIMR Consultation, paragraph 6.11; Zayo's response to the 2018 PIMR Consultation, paragraph 5.1.3.

¹⁵² CityFibre's response to the 2018 PIMR Consultation, paragraph 5.1.3; Zayo's response to the 2018 PIMR Consultation, paragraph 5.1.3.

ability to connect to as many residential and business sites as possible, and so gives flexibility and certainty to be able to provide any additional connection quickly and without significant additional cost.¹⁵³

- c) IIG, TalkTalk and Vodafone agreed that it would be excessively costly to combine multiple infrastructures in a mix-and-match approach.¹⁵⁴
- d) Vodafone and [3<] noted that access seekers would require ubiquitous coverage in order to secure downstream enterprise customers, as enterprises were looking for providers that could supply a full range of services nationwide, and purchasing is typically carried out at a national market level in aggregate.¹⁵⁵

3.164 Openreach and BT Group disagreed that ubiquity was a key advantage for access seekers, arguing that we had not established that ubiquitous or near-ubiquitous coverage is required for entry. They noted evidence provided by Analysys Mason that smaller deployments would be commercially attractive, and pointed to the existence of a number of entrants (most notably Virgin Media) which do not have ubiquitous coverage, and which do not plan to cover entire urban areas.¹⁵⁶

3.165 Openreach and BT Group also argued that there were numerous examples of mix and match approach being used successfully without operational complexity or additional cost constituting barriers to entry.¹⁵⁷ Openreach's accompanying report from Analysys Mason also argued that the mix-and-match approach could potentially lead to innovation from potential access seekers.¹⁵⁸

Our reasoning and decision

3.166 We remain of the view that a ubiquitous telecoms physical infrastructure is likely to be preferred by access seekers to alternative telecoms physical infrastructure which is not ubiquitous. By ubiquitous, we mean an infrastructure which provides the ability to connect to any premises or site within a given geographic area, rather than an infrastructure which provides national coverage.¹⁵⁹

3.167 We agree with Analysys Mason that some access seekers may not be deploying a network to all residential premises and business sites within a deployment area.¹⁶⁰ However, our

¹⁵³ Hyperoptic's response to the 2018 PIMR Consultation, page 7.

¹⁵⁴ IIG's response to the 2018 PIMR, 2018 BCMR and 2018 BT RFR Consultations, paragraphs 12.1.2-12.1.3; TalkTalk's response to the 2018 PIMR Consultation, paragraph 4.4; Vodafone's response to the 2018 PIMR Consultation, paragraphs 6.13, 6.15.2.

¹⁵⁵ Vodafone's response to the 2018 PIMR Consultation, paragraphs 1.7, 1.14; and [3<].

¹⁵⁶ BT Group's response to the 2018 PIMR and 2018 BCMR Consultations, paragraph 2.34 – 2.35; Openreach's response to the 2018 PIMR Consultation, paragraphs 14, 55-57, 62.

¹⁵⁷ BT Group's response to the 2018 PIMR and 2018 BCMR Consultations, paragraphs 2.35-2.37; Openreach's response to the 2018 PIMR Consultation, paragraphs 14, 55, 71.

¹⁵⁸ Analysys Mason Report, page 24.

¹⁵⁹ For the avoidance of doubt, the advantages we outline below mainly derive from the ability to connect to any premises or site within a given geographic area. However, there are further advantages which derive from national coverage.

¹⁶⁰ However, we note that CityFibre has announced that its expansion programme will follow a whole-city build approach to connect nearly every home and business within the footprint. See <https://www.cityfibre.com/news/cityfibre-announces-2-5bninvestment-plan-expand-full-fibre-network-unlock-uks-next-generation-broadband/>.

view on the advantage that a ubiquitous infrastructure offers is not predicated on access seekers needing to connect to all premises and sites for their business model to be viable.¹⁶¹ Rather, we consider that it is the ability to connect to any premises or site within that area that is important:

- a) Most telecoms networks are built to connect to premises or sites in response to demand, and the precise location of this demand is not known at the point of network deployment. Irrespective of the business model adopted (e.g. whether targeting certain types of customers or all types of customers) the ability to provide any connection in response to future demand, quickly and without significant cost, is likely to be important.¹⁶² This is more likely to be possible if using a ubiquitous infrastructure, than one that is not ubiquitous.¹⁶³
- b) The ability to connect to any premise or site using a ubiquitous infrastructure allows an access seeker the flexibility to expand the scale and scope of its deployment beyond its initial plans without significant additional connection cost and time lags. This provides an option value to access seekers, reducing the need to pre-specify rollout plans *ex ante*. This flexibility is likely to be important for risky investments where demand may evolve over time.¹⁶⁴

3.168 Therefore, access seekers are likely to value a more ubiquitous physical infrastructure network wherever they are seeking to deploy.¹⁶⁵ Even if it is theoretically possible for an access seeker to deploy to a commercially attractive number of premises using a non-ubiquitous infrastructure, using a ubiquitous infrastructure is likely to offer material advantages, for the reasons above.¹⁶⁶

3.169 We agree with Analysys Mason that in some circumstances it may be possible to combine multiple non-ubiquitous infrastructures, or supplement use of non-ubiquitous

¹⁶¹ As such, arguments related to the level of coverage required for a deployment to be considered commercially attractive are misguided. We note Analysys Mason provided illustrative calculations which suggested that a commercially attractive deployment would only need to cover a subset of premises and large business sites in area. The advantages we consider of a ubiquitous infrastructure apply even if an access seeker was targeting a smaller proportion of premises and business sites within a deployment area.

¹⁶² 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. See Volume 2, Section 6, paragraph 6.53 and Annex 11.

¹⁶³ A ubiquitous infrastructure will also enable multiple routes between two given connection points, offering greater resilience for end users.

¹⁶⁴ The telecommunications sector is fast-moving and dynamic, with continually evolving demand and supply, driven by innovation in technology and end-user services and changes in consumer preferences. By their nature these changes cannot be predicted with certainty.

¹⁶⁵ We note that a number of prospective access seekers have agreed that a ubiquitous infrastructure would be preferred to a non-ubiquitous infrastructure.

¹⁶⁶ We note that as there is only one ubiquitous infrastructure in the UK, using it enables an access seeker to reach the areas where there is less existing downstream competition from retail services provided over alternative, non-ubiquitous infrastructures. On the other hand, using a non-ubiquitous infrastructure confines an access seeker to areas where there already exist at least two competing infrastructures. The level of existing competition is a relevant factor for access seekers, as it affects the expected take-up and revenue – for example [X]. This is a distinction from when Virgin Media's network was built – it did not face different levels of competitions from alternative infrastructures (there was only BT). Virgin Media's (and other alternative infrastructures') presence now means prospective access seekers face areas of differing degrees of competition.

infrastructure with partial self-build. However, we consider that access seekers will seek to minimise the number of alternative infrastructures used to deploy their network, due to the costs and uncertainty associated with combining multiple infrastructures:

- a) Informed by our discussions with stakeholders, we have identified various costs of combining multiple infrastructures, including:¹⁶⁷
 - i) The cost and time associated with civils works required to break in and out of different infrastructures.¹⁶⁸
 - ii) The duplication of maintenance costs associated with multiple infrastructures.
 - iii) The time, complexity and cost of developing and maintaining multiple stakeholder relationships.¹⁶⁹
- b) Combining multiple infrastructures creates uncertainty for investors, which given the risky nature of the investments involved is likely to increase the attractiveness of a ubiquitous infrastructure.

3.170 We recognise, and indeed expect, that an access seeker might not deploy a network exclusively using a single infrastructure and as such access seekers will mix-and-match on occasion. For example:

- a) Access seekers may desire a different network architecture to that offered by any single existing infrastructure.¹⁷⁰
- 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 to provide those connections.
- c) Local authorities may have expressed a strong preference for making use of their assets, in order to avoid disruption.¹⁷¹

3.171 However, in general, such usage of self-build and mix-and-match is based on necessity, rather than preference, and so would not constrain the behaviour of owners of ubiquitous infrastructure.¹⁷²

¹⁶⁷ Combining a non-ubiquitous infrastructure with self-build is likely to be even more costly, given the cost of digging, which forms a key barrier to entry with regards to the physical infrastructure market.

¹⁶⁸ 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 one another, and traffic permits may be required if these are on opposite sides of the road. Openreach's PIA price list suggests that laying new duct costs between £35-130 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 £581 charge for every breakthrough where less than 5 metres of duct is purchased from Openreach. Openreach, *Physical Infrastructure Pricing*, 6.1.4, *New Build, Enabling Works, Ancillary Items and Network Adjustments*, <https://www.openreach.co.uk/orpg/home/products/pricing/loadProductPrices.do?data=kKE%2F%2FCftg8LAZY%2B8EUaz9dpyYOJW58IEUJ3a1hFsXScqDWVqEbA2PDIT5Y2OhxKv> [accessed 13 May 2019].

¹⁶⁹ This has been cited by Vodafone's response to the 2018 PIMR Consultation, paragraph 6.15.2.

¹⁷⁰ See for example [3<].

¹⁷¹ [3<].

¹⁷² We note arguments from Analysys Mason and BT Group that a mix-and-match approach may lead to innovation from access seekers, or allow differentiation. However, we do not foresee that any such opportunities for access seekers would

- 3.172 We therefore consider that a ubiquitous infrastructure is likely to provide material advantages for most access seekers, regardless of scale and scope. Therefore, this is the key characteristic we test in assessing the direct constraint imposed by alternative telecoms physical infrastructure operators upon BT.

Strength of competition from existing alternative infrastructures in BT-only areas

- 3.173 In BT-only areas, BT's infrastructure passes virtually every premises and there is limited alternative infrastructure.¹⁷³ As such, BT is unlikely to face constraints from existing alternative infrastructures in BT-only areas.

Strength of competition from existing alternative infrastructures in Alternative Multi-service Network areas

- 3.174 In these areas there is one significant alternative infrastructure – that owned by Virgin Media.
- 3.175 Given the material advantages of a ubiquitous infrastructure explained above, we assess the coverage, and contiguity of that coverage, of alternative telecoms physical infrastructures. We also compare the cost, time and capacity of using BT's lead-ins compared to using those of Virgin Media.

BT has the most ubiquitous coverage in these areas

- 3.176 BT's infrastructure passes virtually every premises in these areas [X]%. Virgin Media's average coverage of premises is materially less than 100% [X]%, and is lower than BT's in virtually every postcode sector in these areas. This partly reflects our choice of geographic unit and the way we have defined these areas (i.e. if Virgin 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).¹⁷⁴
- 3.177 Within this wider geographic market, there are postcode sectors with higher Virgin Media coverage. For example, in around [X]% of postcode sectors in Alternative Multi-service Network areas,¹⁷⁵ Virgin Media has over 90% premises coverage. Although we identify the postcode sector as the most appropriate geographic unit for our market definition, we recognise that access seekers are likely to deploy over a larger geographic area. Therefore, we assess the degree to which postcode sectors where Virgin Media passes over 90% of

be sufficiently attractive to potential access seekers to overcome the costs (both monetary and time) of combining multiple infrastructures where a ubiquitous infrastructure is available to access seekers. See Analysys Mason Report, page 24; BT Group's response to the 2018 PIMR and 2018 BCMR Consultations, paragraph 2.36.

¹⁷³ The second largest infrastructure provider in these areas is Virgin Media, which only passes [X]% of all premises.

¹⁷⁴ Virgin Media's average coverage would be higher if we used a smaller geographic unit, or used a higher threshold for determining Virgin Media's presence in a postcode sector. 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 that any telecoms provider which wishes to deploy a network capable of serving all premises in a given area could not do so using Virgin Media's infrastructure.

¹⁷⁵ These postcode sectors contain [X] premises.

premises form contiguous geographic areas, and the size of those areas.¹⁷⁶ If these areas are sufficiently large, and contiguous, this may be sufficient to constraint BT. This analysis is set out in more detail in Annex 4, paragraphs A4.14-4.19. However, we do not find any areas of contiguous coverage, where Virgin Media passes over 90% of premises within each postcode sector, which are of sufficient scale to constrain BT.

- 3.178 We also note that Virgin Media's average coverage of large business sites and mobile cell sites in Alternative Multi-service Network areas is lower than its coverage of all premises.¹⁷⁷

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

Our proposals

- 3.179 We proposed that, even where both BT and Virgin Media cover the same individual premises, BT's infrastructure offers advantages in terms of connecting premises. We argued that BT's mix of lead-ins (the infrastructure used to host the final connection between the customer premises and the network) means that connecting customers using BT's infrastructure is likely to be cheaper and quicker than using Virgin Media's.

Stakeholder responses

- 3.180 Virgin Media broadly agreed that access seekers would face additional costs as a result of Virgin Media's direct bury approach within the premises boundary.¹⁷⁸ SSE also agreed that BT has a more attractive mix of lead-ins.¹⁷⁹
- 3.181 Openreach and BT Group disagreed with our assessment, based on findings presented in the Analysys Mason report. They argued that we had overstated the cost advantage of using BT's lead-ins relative to Virgin Media's lead-ins.¹⁸⁰ They further argued that were any cost difference to be substantiated, it was likely to be too small to materially affect access seekers' views of the substitutability of the two infrastructures.¹⁸¹ To support this, they made a number of comments on the methodology behind our illustrative calculation, which we explain and consider in Annex 3, paragraphs A3.22 – A3.36.

Our reasoning and decisions

- 3.182 We continue to consider that, even where both BT and Virgin Media cover the same individual premises, BT's infrastructure offers advantages in terms of connecting premises.
- 3.183 This is a result of the different mix of lead-in types used within BT and Virgin Media's networks. Lead-ins can be carried overhead, in the form of dropwires attached to premises

¹⁷⁶ In applying this threshold we take no account of coverage of large business and mobile sites within a postcode sector. We discuss arguments related to the threshold used for this analysis in Annex 4, A4.15.

¹⁷⁷ [X] % of large business and mobile sites are within 50m of Virgin Media's network in Alternative Multi-service Network areas.

¹⁷⁸ [X]. Virgin Media's response to the 2018 PIMR Consultation, pages 10-11.

¹⁷⁹ SSE's response to the 2018 PIMR Consultation, question 3.2.

¹⁸⁰ Analysys Mason Report, pages 13-16; BT Group's response to the 2018 PIMR and 2018 BCMR Consultations, paragraph 2.41; Openreach's response to the 2018 PIMR Consultation, paragraph 65

¹⁸¹ Analysys Mason report page 16; BT Group's response to the 2018 PIMR and 2018 BCMR Consultations, paragraph 2.41 Openreach's response to the 2018 PIMR Consultation, paragraph 66.

from poles, or underground, either through ducts or directly buried in the ground. Our understanding of this mix is set out in Table 3.3 below.

Table 3.3: BT and Virgin Media lead-in types

	BT	Virgin Media
Overhead (poles)	50%	0%
Underground - ducted	45%	[<]%
Underground – direct buried	5% ¹⁸²	[<]%

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.

- 3.184 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 we understand that overhead lead-ins are likely to be cheaper and/or quicker to use than underground lead-ins,¹⁸³ and fully ducted underground lead-ins are cheaper and quicker to use than direct-buried underground lead-ins (which require the access seeker to deploy their own lead-in infrastructure).
- 3.185 In the consultation, we set out an illustrative calculation comparing the average cost of lead-ins using BT and Virgin Media’s physical infrastructure. This illustration focused on the difference in cost arising from Virgin Media having a greater proportion of lead-ins which are directly buried. Our calculation was not intended to precisely quantify the cost difference – rather, it was intended only to illustrate that BT is likely to have a more attractive mix of infrastructure for connecting premises.
- 3.186 We discuss the comments on this illustrative calculation in Annex 3. In summary, while the magnitude of the cost difference is uncertain, we remain of the view that using BT’s infrastructure for lead-ins is lower cost than using Virgin Media’s.
- 3.187 In addition to being cheaper than using Virgin Media’s lead-ins, we consider that there are other factors which mean that BT’s lead-in infrastructure is likely to have advantages.
- Where the existing lead-in is direct buried, the access seeker will need to construct its own infrastructure, which will take more time. If this work needs to be carried out for a significant number of customer premises in a given deployment area, this would significantly slow down the speed of the network rollout.
 - Beyond any cost and time advantages, poles offer access seekers greater certainty over whether the existing infrastructure is useable as access seekers can more easily assess the state and capacity of a pole than they can an underground duct.

¹⁸² BT estimates around 5% of total lead-ins are likely to be 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.

¹⁸³ See Annex 3.

- c) We understand that some of Virgin Media's Toby boxes will not have spare capacity to accommodate further cables. Where this is the case, Virgin Media's lead-in infrastructure cannot readily be used by an access seeker.

3.188 Therefore, we consider that on the whole BT is likely to have a more attractive mix of infrastructure for connecting premises. Given the business case for deploying broadband networks is inherently marginal and risky, we think access seekers are likely to take into account these advantages when selecting between rival infrastructures.¹⁸⁴

We do not consider Virgin Media to be an effective constraint on BT in these areas

3.189 For the reasons outlined above, we do not consider Virgin Media to be an effective constraint on BT in these areas.

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

3.190 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.¹⁸⁵ 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.¹⁸⁶ 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

3.191 HNR areas have a high presence of alternative infrastructure used to supply leased lines i.e. at least two alternative networks that can reach more than 65% of large business and mobile sites within 50m of the customer location. However, while there may be greater competition for providing connections to large business and mobile sites, 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 infrastructure is only present in a subset of that HNR postcode sector, compared to BT's ubiquitous coverage.¹⁸⁷ In order to deploy throughout an area, or to any given set of sites within that area, an access seeker

¹⁸⁴ BT Group and Openreach argued that the cost difference we identified in our illustrative calculation was unlikely to be material for access seekers over the commercial payback period. For the avoidance of doubt, our view that BT's advantages in respect of lead-in infrastructure are material is based on an overall assessment of all the advantages identified in this section. Analysys Mason Report page 16, BT Group's response to the 2018 PIMR and 2018 BCMR Consultations paragraph 2.41, Openreach's response to the 2018 PIMR Consultation paragraphs 65-66.

¹⁸⁵ We do not expect the presence of tactical alternatives in some localised situations to materially impact on competitive conditions.

¹⁸⁶ [3<].

¹⁸⁷ In 50% of postcode sectors in the HNR areas where at least one large business or mobile site is located, there is no single alternative infrastructure that is within 50m of every large business or mobile site in the postcode sector.

would face significantly higher costs if it needs to combine multiple infrastructures, relative to using BT's ubiquitous infrastructure.¹⁸⁸

- b) As set out in Volume 2, Section 6, paragraphs 6.120 - 6.128, even where alternative infrastructure is present in these postcode sectors, on average it is further from the end customer than BT's network. This is likely to give rise to a significant cost advantage of using BT's network.¹⁸⁹ Moreover, where BT's duct is already 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.¹⁹⁰
- c) A typical deployment area is larger than an individual HNR.¹⁹¹ As such, the limited availability of alternative infrastructures in the areas surrounding the HNR means that access seekers using alternative infrastructures inside an HNR area will need to combine this with a different infrastructure outside the area, adding time, cost and operational complexity.

3.192 In addition, the proportion of all premises passed by these alternative infrastructures is much lower than the proportion of large business and mobile sites covered (indeed it is lower than the average in Alternative Multi-service Network areas).¹⁹² For example, while Virgin Media is [X] within 50m of [X]% of large business or mobile sites, it covers a smaller proportion ([X]%) of all premises in these areas.¹⁹³ Therefore, an access seeker wishing to deploy a multi-service network will find these alternative infrastructures materially less attractive than BT's ubiquitous infrastructure, for the reasons outlined above. This implies that BT would not be constrained by these infrastructures.

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

Strength of competition from existing alternative infrastructures in the CLA

3.194 We recognise that there is significantly more alternative infrastructure present, both in aggregate, and in terms of the proportion of the large business and mobile sites that any individual infrastructure covers, than in other geographic markets. We also recognise that, in one (but not all) of the downstream markets related to the upstream market for

¹⁸⁸ In response to Openreach's comment (Openreach's response to the 2018 PIMR Consultation, paragraph 71), our argument is not that ubiquity is a necessary precondition for competition, but rather that a ubiquitous infrastructure offers material advantages.

¹⁸⁹ The nearest rival is on average 21m away, which our modelling suggests would mean using BT's infrastructure would have a cost advantage of around £2,600. Further, the closest alternative network will not be the same for each business – the average proximity of a single infrastructure will be larger than this average. Calculations of infrastructure costs for different proximity scenarios are summarised in Volume 2, Section 6, Figure 6.1 and set out in Annex 10.

¹⁹⁰ Volume 2, Section 6, paragraphs 6.52-6.53.

¹⁹¹ Although we identify the postcode sector as the most appropriate geographic unit for our market definition, we recognise that access seekers are likely to deploy over a larger geographic area.

¹⁹² We note that large business sites and mobile sites represent a small proportion of the total number of premises in the HNR areas overall (see Table 3.2 above).

¹⁹³ [X].

telecoms physical infrastructure (that for CI Access services), BT has been found not to have SMP in the CLA.¹⁹⁴

3.195 Nevertheless, we remain of the view that BT will not face effective direct competitive constraints upstream from alternative infrastructures in the CLA.

3.196 In respect of connecting large business and mobile sites:

- a) We acknowledge that there are individual alternative infrastructures which cover a high proportion of large business sites and mobile cell sites (i.e. they are relatively ubiquitous within the CLA). Therefore, it is likely that an access seeker could provide coverage to the majority of business sites using a single infrastructure which is not BT.¹⁹⁵
- b) However, the evidence found in the BCMR suggests that BT maintains advantages arising from its control of access to a ubiquitous telecoms physical infrastructure, which grants it cost and time advantages in the installation of new lines:¹⁹⁶
 - i) BT has a higher proportion of on-duct connected new provisions [X]% [91-100]% than alternative infrastructures (76%).
 - ii) Alternative operators only built for 11% of the connections where they were not duct connected, preferring instead to purchase off-net.
 - iii) The single infrastructure with the closest average proximity to customer sites is on average [X]m away.¹⁹⁷ Using BT's infrastructure is likely to have a significant cost advantage (around £[X] per dig) compared to using this infrastructure.¹⁹⁸

3.197 Furthermore, in respect of connecting residential premises, coverage of alternative infrastructures is low: no single alternative infrastructure passes more than 30% of premises in the CLA.¹⁹⁹ In contrast, BT passes nearly all [X]% premises in the CLA. As such, for access seekers wishing to deploy to residential premises, alternative infrastructure is

¹⁹⁴ We note that the imposition of an unrestricted physical infrastructure access remedy is a factor in this assessment.

¹⁹⁵ We agree with Hyperoptic's response to the 2018 PIMR Consultation, page 8, that the relevant metric is coverage of a single infrastructure, rather than the aggregate coverage of multiple alternative infrastructures. We note that the most extensive leased lines network in the CLA is operated by [X], which is within 50m of [X]% of large business and mobile sites.

¹⁹⁶ We acknowledge that the BCMR ultimately finds that these advantages are not sufficient to find BT to have SMP in the downstream CI Access market. However, these advantages are particularly relevant to our upstream market review of access to physical infrastructure.

¹⁹⁷ This is greater than the average closest alternative network (16m – see Volume 2, Section 6, Table 6.9) because the closest alternative network will not be the same for each site. We noted in paragraph 3.169 above that access seekers were likely to prefer to minimise the number of alternative infrastructures used to deploy a network. If instead an access seeker was to seek to deploy its network by using the closest alternative network to each business site, it would save some dig costs, but would instead need to incur the costs of breaking in and out of multiple networks.

¹⁹⁸ Calculations of infrastructure costs for different proximity scenarios are summarised in Volume 2, Section 6, Figure 6.1 and set out in Annex 10.

¹⁹⁹ The highest coverage of all premises by an alternative infrastructure within the CLA is [X], which passes [X]% of premises. We note this is below the threshold for premises coverage used to determine between BT only and Alternative Multi-service Network areas. We also note TalkTalk's comment in its response that 30% coverage is at a level well below that which will constrain BT (TalkTalk's response to the 2018 PIMR Consultation, paragraphs 4.5-4.7).

unlikely to act as a sufficient constraint upon BT, given the material advantages of using a ubiquitous infrastructure (as outlined above).²⁰⁰

- 3.198 Indeed, over the long time horizon we are considering, we increasingly expect access seekers to deploy multi-service networks which provide a combination of telecoms services over a network, due to the economies of scale and scope that can be realised.²⁰¹
- 3.199 We also note that access seekers' desired deployment areas may include areas which span different geographic markets.²⁰² As such, access seekers are likely to consider the availability of alternative infrastructures in other parts of their deployment area. Given the costs of using different infrastructures in different geographic areas, this may reduce the attractiveness of using alternative infrastructures in the CLA if those infrastructures are not available outside the CLA.²⁰³
- 3.200 Given this broader consideration of the competitive constraints for different types of user, we consider that BT is unlikely to face effective direct competitive constraints in the CLA.

Scope for entry and expansion

- 3.201 TalkTalk [X] agreed that there are high barriers to entry given large sunk costs of entry, and the extensive time it takes for any entering operator to plan and construct a network.²⁰⁴ We received no further responses in relation to the scope for entry or expansion.
- 3.202 We continue to believe 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.²⁰⁵
- 3.203 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.²⁰⁶ We also acknowledge that such barriers to entry have not prevented the building of extensive infrastructure connecting to large business and mobile sites in the CLA.²⁰⁷

²⁰⁰ There are [X] postcode sectors within the CLA where an individual alternative infrastructure other than Virgin Media passes more than [X]% [30-80]% of premises.

²⁰¹ Once networks have been built, investors are likely to seek to monetise those networks by supplying as many downstream services as possible. Therefore, even access seekers which initially wish to deploy only to connect to existing large business sites and mobile cell sites may value the flexibility of being certain to be able to connect to premises without additional time or monetary costs.

²⁰² Although we identify the postcode sector as the most appropriate geographic unit for our market definition, we recognise that access seekers are likely to deploy over a larger geographic area.

²⁰³ BT may also be able to leverage market power from areas outside the CLA, where access seekers will be reliant on it, to more competitive areas, through volume discounts, or through tying access to infrastructure in uncompetitive areas to purchases of access in competitive areas.

²⁰⁴ TalkTalk's response to the 2018 PIMR Consultation, paragraph 4.2; [X].

²⁰⁵ 2018 WLA Statement, Volume 1, paragraphs 4.56-4.62, and 2018 BCMR Consultation, Section 6.

²⁰⁶ This entry is described in more detail in Annex 4, Table A4.16.

²⁰⁷ See Volume 2, Section 6, paragraphs 6.148-6.149.

- 3.204 However, such entry is in general either geographically limited in scale (and so is unlikely to place a sufficient constraint upon BT) 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 (and so is not relevant under a modified Greenfield approach). In addition, much new entry is direct-buried or micro-trenched, so is not suitable for use by access seekers. Such entry could therefore only exert an indirect constraint.²⁰⁸
- 3.205 In fact, the nature of the expected entry is a likely reflection of the high barriers facing potential entrants. Therefore, we conclude that the threat of entry or expansion by new or existing operators would not effectively constrain BT, in any of the markets we identify.

Countervailing buyer power

Our proposals

- 3.206 We provisionally concluded that BT is unlikely to face significant countervailing buyer power in each of the geographic markets described.

Stakeholder responses

- 3.207 CityFibre, IIG, Vodafone, Zayo and [X] agreed with our assessment of countervailing buyer power.²⁰⁹
- 3.208 BT Group claims that Openreach discounts to CPs, [X], represented a major change in the wholesale local access market since our last review, and demonstrated significant countervailing buyer power.²¹⁰

Our reasoning and decision

- 3.209 We remain of the view that BT is unlikely to face significant countervailing buyer power in each of the geographic markets described.
- 3.210 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.
- 3.211 In principle, such countervailing buyer power could be exerted directly in the upstream physical infrastructure market, or indirectly in downstream markets.
- 3.212 There are currently no such purchasers of wholesale access to BT's physical infrastructure. Furthermore, BT's involvement downstream weakens its incentive to offer supply on such a scale, absent regulation. Even if after a considerable period of time an access seeker did

²⁰⁸ We note TalkTalk's comment in its response that directly buried networks cannot offer third party access and so cannot impose a direct competitive constraint. TalkTalk's response to the 2018 PIMR Consultation, paragraphs 2.8-2.9.

²⁰⁹ CityFibre's response to the 2018 PIMR Consultation, paragraph 5.4.1; IIG's response to the 2018 PIMR, 2018 BCMR and 2018 BT RFR Consultations, paragraphs 12.4.1-12.4.2; Vodafone's response to the 2018 PIMR Consultation, paragraphs 6.15.2; Zayo's response to the 2018 PIMR Consultation, paragraph 5.1.7; [X].

²¹⁰ BT Group's response to the 2018 PIMR and 2018 BCMR Consultations, paragraphs 2.15 – 2.16.

purchase sufficient volumes of access to infrastructure, we do not consider that it would have a credible threat to switch sufficient volumes away, given the large switching costs and service disruption that would be involved in removing and re-deploying its network in alternative physical infrastructure. It is also unclear that an alternative provider would be willing to supply access to its infrastructure in such volumes.

- 3.213 There are currently purchasers of significant volumes of BT's downstream active services. For example, Sky and/or TalkTalk purchase significant volumes of MPF/GEA products, and mobile network operators purchase significant volumes of CI Access circuits. Potentially, these providers could exert a degree of countervailing buyer power by threatening to switch their purchases of active products to alternative infrastructure products. However, in the 2018 WLA Statement we concluded that BT is unlikely to face significant countervailing buyer power.²¹¹ In Section 6, Volume 2 of this statement, we conclude that there is insufficient countervailing buyer power to constrain BT's position as a supplier of CI Access services.²¹²
- 3.214 We note BT Group's claim that Openreach faces countervailing buyer power [X]. We also note more recent speculation that Virgin Media is considering providing downstream wholesale access services, and Sky is considering which networks it will use in future to deliver broadband. However, even if Virgin Media were to supply downstream products (departing from its longstanding business strategy), Virgin Media would be unable to supply all of Sky or TalkTalk's requirements (for example, due to Virgin Media's partial coverage, Sky or TalkTalk would still be reliant on BT to supply some of their customers). Other alternative networks which represent an opportunity for countervailing buyer power are currently much smaller in scale.²¹³ As such, at this stage, we have not seen evidence to suggest that any such threat to switch to an alternative supplier would be sufficient to effectively constrain BT. Therefore, we remain of the view that there is likely to be insufficient countervailing buyer power to constrain BT's position as a supplier of wholesale local access services, for the period of this review.
- 3.215 Therefore, we do not consider that there is any buyer able to exert sufficient countervailing buyer power to constrain BT in any of the markets we identify.

External Constraints

- 3.216 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

²¹¹ We also concluded that this is unlikely to vary between cable areas and non-cable areas. 2018 WLA Statement, Volume 1, paragraphs 4.63-4.67.

²¹² See Volume 2, paragraphs 6.110, 6.134-6.138.

²¹³ Moreover, to the extent that these networks which have been built using the existing mixed usage PIA remedy, they are not relevant under a modified greenfield approach.

market, constrain a firm's ability to exercise market power. We received no specific comments in respect of external constraints.

- 3.217 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.

Conclusions on SMP

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

- 3.218 We conclude that BT has SMP in this market, based on the following:
- a) BT's dominant downstream position;
 - 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; 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 Alternative Multi-service Network areas excluding the High Network Reach areas

- 3.219 We conclude that BT has SMP in this market, based on the following:
- a) BT's dominant downstream position;
 - b) the ubiquity of BT's telecoms physical infrastructure and the more attractive mix of lead in infrastructure, which suggest that the direct constraints from existing upstream competitors, even were they to supply access to their infrastructure, would be unlikely to be a sufficient constraint upon BT;
 - 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

- 3.220 We conclude that BT has SMP in this market, based on the following:
- a) BT's dominant downstream position;
 - b) alternative infrastructures cover only a subset of these areas and are oriented towards leased lines, so cannot provide the ability to connect to any premise that BT's ubiquitous infrastructure provides, which suggests that the direct constraints from existing upstream competitors, even were they to supply access to their infrastructure, would be unlikely to be a sufficient constraint upon BT;
 - 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

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

- a) evidence identified in the BCMR that BT derives cost and time advantages in the downstream market as a result of its control of a ubiquitous telecoms physical infrastructure;
- b) alternative infrastructure has very low coverage of residential premises, and so cannot provide the ability to connect to any premise that BT's ubiquitous infrastructure provides, which suggests that the direct constraints from existing upstream competitors, even were they to supply access to their infrastructure, would be unlikely to be a sufficient constraint upon BT;
- 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

3.222 Having 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.

3.223 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.

3.224 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).

3.225 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.
- 3.226 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).
- 3.227 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.
- 3.228 As explained in paragraphs 3.133-3.136, we consider that 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.
- 3.229 On 10 March 2017, BT notified Ofcom of voluntary commitments (the Commitments) to reform Openreach under section 89C of the Communications Act 2003 (Notification).²¹⁴ Although, under these Commitments Openreach has become a distinct company with its own staff, management, purpose and strategy, we do not consider that they are sufficient to address the competition concerns we identify above. This is because the Commitments do not regulate Openreach's consumption of physical infrastructure.
- 3.230 In our next sections we consider how to address these competition concerns.

²¹⁴ BT 2017, Proposals agreed with Ofcom. <https://www.btplc.com/UKDigitalFuture/Agreed/index.htm>

4. General remedies

Introduction

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

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

General 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 have decided to apply a specific form of access remedy, Physical Infrastructure Access (PIA), as explained in Section 5. We also have decided to apply pricing remedies to PIA, as explained in sections 6 and 7.
- 4.4 We first set out why we consider that the ATI Regulations do not address our competition concerns. Then, for each remedy, we set out our decisions and our reasoning.

The ATI Regulations do not address our competition concerns

- 4.5 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 other things, 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.

Our proposals

- 4.6 In the 2018 PIMR Consultation we took the view 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.

Stakeholder responses

- 4.7 Some stakeholders agreed with our analysis. They considered the ATI Regulations to be useful for one-off requests, for example when overcoming obstacles in network deployment in a particular location. However, they raised a number of issues that they consider make the regulations unsuitable for scale deployments even when used to gain access to telecoms networks: lack of appropriate transparency and anti-discrimination provisions; lack of a mechanism to establish appropriate ordering processes and tools; and lack of appropriate cost recovery regime.²¹⁵
- 4.8 Openreach disagreed with our assessment. It said that the ATI Regulations could enable viable access to the physical infrastructure of other (non-BT) infrastructure owners and thus support our policy objectives at least in part. It criticised us for not trying to address any usability issues with the ATI Regulations.
- 4.9 Openreach said our proposals, including very favourable rules on network adjustment for PIA, are likely to mean Openreach is always chosen as the preferred physical infrastructure access provider. According to Openreach this will increase the risk of distorting the competitive dynamics in relation to the Physical Infrastructure markets and result in unnecessary duplication of assets.²¹⁶

Our reasoning and decisions

- 4.10 We continue to 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.
- 4.11 We acknowledge that the ATI Regulations could support our policy objectives to the extent that, as stakeholders have indicated, they can be useful for other types of infrastructure for one-off request when overcoming obstacles to network deployment. However, as

²¹⁵ CityFibre's response to the 2018 PIMR Consultation, paragraph 6.1.1; IIG's response to the 2018 PIMR, 2018 BCMR and 2018 BT RFR Consultations, paragraphs 13.1.1-13.1.3, Virgin Media's response to the 2018 PIMR Consultation, pages 17-18; Zayo's response to the 2018 PIMR Consultation, paragraph 6.1.1; and [8].

²¹⁶ Openreach's response to the 2018 PIMR Consultation, paragraphs 83-89.

established in Section 3, the ability to access non-BT infrastructure is not an effective constraint on BT's SMP in the Physical Infrastructure markets and the consequential market power in downstream wholesale and retail markets. Consequently, access to such infrastructure under the ATI Regulations would not address our competition concerns in Physical Infrastructure markets. This subsection therefore focuses on whether the ATI Regulations can be relied upon to ensure effective access to BT's physical infrastructure.

4.12 As per our 2018 PIMR Consultation, we have identified several main reasons for why the ATI Regulations cannot be relied upon to ensure effective access to BT's physical infrastructure:

- 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. As recognised by stakeholders, such certainty is essential to ensure a network access remedy is effective.
- b) The responses from our stakeholders have reinforced our view that the rights and obligations established in the ATI Regulations are not 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, which is unlikely to be easily adaptable for telecoms purposes.
 - 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 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. This makes the cost of use significantly uncertain for widescale deployment.
 - 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 the ATI Regulations 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.²¹⁷
- 4.13 In relation to Openreach's comment that the ATI Regulations could enable viable access to the physical infrastructure of other (non-BT) infrastructure owners, we note the analysis presented in Section 3 where we demonstrate that access to BT's infrastructure and other infrastructure are not substitutable products.
- 4.14 We disagree with Openreach that our proposals increase the risk of distorting the competitive dynamics in relation to the Physical Infrastructure markets. The above shortcomings of the ATI Regulations demonstrate that this regulation is not sufficient to address the competition concerns we have identified. We therefore see the SMP regulation imposed with this statement and the ATI Regulations as complementary. In our guidance under the ATI Regulations, we explain how the ATI Regulations interact with SMP regulation.²¹⁸ We explain that the aims of the ATI Regulations and SMP regulation differ and that obligations imposed under the European framework requiring the provision of network access to physical infrastructure are not restricted by the ATI Regulations.
- 4.15 Finally, we do not consider that there is a material risk that our approach would result in unnecessary duplication of assets. BT is not being obliged to build new infrastructure where it has none under the regulation and therefore we cannot see how it would lead to duplication. Instead, our regulation seeks to reduce the need to duplicate physical infrastructure as it minimises the reliance on self-build by rival operators during their network deployments.
- 4.16 Therefore, we do not consider that the ATI Regulations address effectively the competition concerns arising from BT's market power in Physical Infrastructure markets. We consider that achieving effective competition in the context of those 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

- 4.17 For each of the markets in which we have found BT to have SMP, we proposed 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.
- 4.18 This proposal included a requirement for BT to provide network access at fair and reasonable charges where no maximum charges or basis of charges obligation applies.

²¹⁷ We discuss this in detail in paragraphs 2.11-2.19, Section 2, Volume 3, 2018 WLA Statement.

²¹⁸ Ofcom (2016) *Guidance under the Communications (Access to Infrastructure) Regulations 2016*
https://www.ofcom.org.uk/_data/assets/pdf_file/0025/95191/Guidance-under-the-Communications-Access-to-Infrastructure-Regulations-2016.pdf

- 4.19 We proposed that this obligation should also 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.

Stakeholder responses

- 4.20 The majority of stakeholders agreed with our proposal.²¹⁹
- 4.21 IIG, CityFibre, Virgin Media and Zayo noted the importance of the combination of general access remedy and requesting new forms of access to allow for and encourage innovations by access seekers that meet changing consumer needs and expectations.²²⁰
- 4.22 However, some stakeholders raised concerns with the proposed requirement to provide network access on reasonable request.
- 4.23 CWU and CWU NW Safety Forum raised concerns over health, safety and environmental issues that may arise from increased access to infrastructure. They considered that we should ensure there are strict requirements for health and safety for providers working on the network and noted a range of relevant regulation operators must comply with.²²¹
- 4.24 Openreach requested that specific clauses of the ATI Regulations are included in our regulation of the Physical Infrastructure markets. Openreach said this would ensure it has the same safeguards as other physical infrastructure owners when it comes to accepting or rejecting requests for access to information and requests for network access.²²²
- 4.25 TalkTalk argued in the context of general remedies that an obligation requiring BT to provide network access for access seekers who offer leased lines only (which goes beyond the mixed usage PIA imposed in the WLA 2018) may not be required, if Ofcom mandated a comprehensive dark fibre remedy in the business connectivity markets.²²³
- 4.26 Virgin Media stated that a key complication of the requirement to provide network access on reasonable request (and requests for new forms of network access) is to ensure operators can access BT's physical infrastructure in a way that is distinct from the way BT

²¹⁹CityFibre's response to the 2018 PIMR Consultation, paragraph 6.1.2; Department for the Economy's response to the 2018 PIMR Consultation, question 4.1; Digital Colony's response to the 2018 PIMR Consultation, page 2; Gigaclear's response to the 2018 PIMR Consultation, page 3; Hyperoptic's response to the 2018 PIMR Consultation, page 5; IIG's response to the 2018 PIMR, 2018 BCMR and 2018 BT RFR Consultations, paragraph 13.1.4-6; INCA's response to the 2018 PIMR Consultation, page 1; NextGenAccess' response to the 2018 PIMR Consultation, question 4.1; SSE's response to the 2018 PIMR Consultation, question 4.1; TalkTalk's response to the 2018 PIMR Consultation, paragraph 5.2; Telefonica's response to the 2018 PIMR Consultation, page 2; UKCTA response to the 2018 PIMR Consultation, page 2; Virgin Media's response to the 2018 PIMR Consultation, pages 14-15; Vodafone's response to the 2018 PIMR Consultation, page 36; Zayo's response to the 2018 PIMR Consultation, paragraph 6.1.2; [X]; [X]; and [X].

²²⁰ CityFibre's response to the 2018 PIMR Consultation, paragraph 6.1.2; IIG's response to the 2018 PIMR, 2018 BCMR and 2018 BT RFR Consultations, paragraphs 13.1.4-13.1.6; Virgin Media's response to the 2018 PIMR Consultation, pages 14-15; and Zayo's response to the 2018 PIMR Consultation, paragraph 6.1.2.

²²¹ CWU's response to the 2018 PIMR and 2018 BCMR Consultations, page 1; and CWU NW Safety Forum's response to the 2018 PIMR Consultation, page 2.

²²² Openreach's response to the 2018 PIMR Consultation, paragraph 89.

²²³ TalkTalk's response to the 2018 PIMR Consultation, paragraph 5.2.

operates. It suggested that we make clear that divergent forms of access are inevitable and welcomed.²²⁴

Our reasoning and decisions

- 4.27 We consider that our proposed requirement to provide network access on reasonable request is appropriate and proportionate in relation to BT's market power in each of the Physical Infrastructure markets.
- 4.28 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.²²⁵
- 4.29 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.
- 4.30 TalkTalk's comment raises the question about the degree to which we should take into account existing or potential downstream remedies (e.g. dark fibre access in business connectivity markets) when designing upstream remedies. In Section 3, we explain that, under the EU framework, we first consider intervention at the most upstream level of the value chain, assuming no regulation downstream. Only then we consider what further intervention, if any, is needed downstream in light of the regulation we have imposed upstream. Accordingly, our remedies are designed to address market power in the Physical Infrastructure markets without reference to any remedies imposed in specific downstream markets such as the business connectivity markets.
- 4.31 We disagree with Openreach's argument that ATI regulations (namely Regulation 4(5) that provides reasons why requests for information can be refused and 6(3) that sets out the reasons why requests for access to infrastructure can be refused) provide a model for regulation here and that they should be included in the SMP conditions. We consider that the current drafting of the SMP conditions provide sufficient safeguards to Openreach in regard to provision of information and refusal of access. They limit the obligation to provide to access to where the request for access is reasonable and allow Openreach to set fair and reasonable conditions for access (including conditions in relation to the use of confidential information).
- 4.32 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

²²⁴ Virgin Media's response to the 2018 PIMR Consultation, pages 14-15.

²²⁵ 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.

- 4.33 To address the risk of excessive pricing, we have decided to impose on BT a maximum charges obligation for our 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.
- 4.34 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 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.
- 4.35 Consequently, we have decided 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 would 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.
- 4.36 In addition, we believe that it is appropriate for this 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 have decided that the condition for each market includes a requirement for BT to comply with any such direction(s).²²⁶
- 4.37 In addition to the direction making power, we have decided to include provision in the relevant SMP conditions to allow for Ofcom to consent to exemptions from the network access obligation in appropriate circumstances. 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 agree.²²⁷
- 4.38 We have considered the suggestion from CWU and CWU NW Safety Forum that we impose conditions on BT in regard to health, safety and environmental concerns. We note the imposition of such requirements to be outside Ofcom's remit. However, we would expect that all operators comply with the relevant legislation and regulation when it comes to safety in the workplace and protecting the environment.

²²⁶ 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).

²²⁷ Equivalent provision has also been made in the conditions on specific network access, EOI and no undue discrimination.

- 4.39 We have also considered Virgin Media's suggestion that we make clear that divergent forms of access are inevitable and welcomed. We discuss this in paragraph 4.50 below.
- 4.40 We consider that the requirement in each market for BT to provide network access on reasonable request is proportionate in that it is targeted at addressing the market power that we have 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 have also decided that 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.
- 4.41 In order to implement these decisions, we have set the SMP condition (Condition 1) published at Annex 26. 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. Specifically, 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.
- 4.42 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 requiring and we have designed the scope of our requirement with this in mind; we do not consider that our decisions will risk undermining BT's investment made by BT in its network; and we consider that our network access requirement is an important element of securing economically efficient infrastructure based competition.

Requests for new forms of network access

Our proposals

- 4.43 We proposed 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 condition requires 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.

Stakeholder responses

- 4.44 The majority of stakeholders agreed with our proposal to include a condition regarding the process by which BT must address requests for new forms of access.²²⁸
- 4.45 However, a number of stakeholders had concerns about how long the process takes in practice which has the potential to distort competition at the retail level by placing third party providers at a disadvantage compared with the downstream retail business of the vertically integrated provider.²²⁹

Our reasoning and decisions

- 4.46 We remain 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.
- 4.47 We agree with stakeholders who have noted the importance of this requirement from an innovation perspective (see paragraph 4.21) and from a non-discrimination perspective (see paragraphs 4.45).
- 4.48 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 such 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.
- 4.49 We acknowledge stakeholders' concerns about the length of time taken and quality of outcomes from the SoR process. We note that the SoR process has recently been revised to include a higher level of scrutiny. We expect that the newly separated Openreach will undertake this process more independently and transparently than in previous years. We do not yet have a body of evidence since these changes to inform our view of the updated SoR process and as such, it is difficult to determine whether the revised process is more effective at this early stage.

²²⁸ Department for the Economy's response to the 2018 PIMR Consultation, question 4.1; Digital Colony's response to the 2018 PIMR Consultation, page 2; Gigaclear's response to the 2018 PIMR Consultation, page 3; Hyperoptic's response to the 2018 PIMR Consultation, page 5; NextGenAccess' response to the 2018 PIMR Consultation, question 4.1; SSE's response to the 2018 PIMR Consultation, question 4.1; TalkTalk's response to the 2018 PIMR Consultation, paragraph 5.3; Telefonica's response to the 2018 PIMR Consultation, page 2; UKCTA response to the 2018 PIMR Consultation, page 2; Virgin Media's response to the 2018 PIMR Consultation, page 14; Vodafone's response to the 2018 PIMR Consultation, page 36; [36]; and [36].

²²⁹ CityFibre's response to the 2018 PIMR Consultation, paragraphs 6.1.2-6.1.3; Gamma's response to the 2018 PIMR and 2018 BCMR Consultations, page 9; Gigaclear's response to the 2018 PIMR Consultation, page 3; Zayo's response to the 2018 PIMR Consultation, paragraph 6.1.3; and [36].

- 4.50 As noted above, Virgin Media has suggested that we make clear that divergent forms of access are inevitable and welcomed. We consider that the SoR process has a role to play within this market to support innovation and we welcome its use as a mechanism for assessing new forms of network access that may diverge from the unrestricted PIA remedy set out in Section 5.
- 4.51 We will continue to proactively monitor the SoR process in terms of quality of outcomes and non-discrimination and are prepared to intervene if necessary to remedy any concerns we might have.
- 4.52 The form of requirement we are imposing 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 imposing for each market allows BT to implement its own process within certain parameters. In particular, we have decided 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.
- 4.53 In order to implement this decision, we have set the SMP condition (Condition 3) published at Annex 26. 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

- 4.54 We proposed 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 said that 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 proposed to impose a requirement on BT to publish such information on non-discrimination in relation to network access as we may direct.

Stakeholder responses

- 4.55 We received a range of responses to our proposals with stakeholders having mixed views on the remedy.

Some stakeholders agreed with our position²³⁰

- 4.56 Openreach agreed with our position that it should not be required to consume PIA on an EOI basis, arguing that EOI would impede its ability to deliver the benefits of ultrafast technology and innovation to the UK and have major impacts on service quality, and that no-undue discrimination is more flexible and beneficial for access seekers. It recognised and supported our historical position on the difficulties of introducing a second form of functional separation within Openreach. Openreach suggested that its ‘Fibre First’ programme is used as a benchmark to assess the no undue discrimination obligation.²³¹
- 4.57 Openreach also noted the challenges of an Internal Reference Offer (which would require it to set out its internal processes for using BT’s physical infrastructure). It said that it does not internally purchase PIA from itself and its systems are not set up to manage this.²³²
- 4.58 Virgin Media argued EOI is not appropriate or proportionate as it would delay fibre investment – it considered that the main objective of EOI is to ensure PIA is a fit for purpose product. Virgin Media considered that this can be achieved with more proportionate mechanisms. It agreed that Openreach should not have to set out all instances of non-equivalence, but emphasised the need for us to strongly investigate complaints.²³³

Other respondents considered that Ofcom should be more proactive in relation to monitoring

- 4.59 Hyperoptic argued that we should set a basic level of metrics that would serve as evidence that any differences between the processes or systems used by telecoms providers from those used by Openreach are broadly equivalent.²³⁴
- 4.60 UKCTA and Vodafone noted that it was hard at this stage to identify if telecoms providers are at a disadvantage due to the lack of EOI. They argued that we should monitor the situation and be ready to intervene.²³⁵

Some respondents argued that more stringent non-discrimination requirements are required

- 4.61 CityFibre, IIG and Zayo considered that the non-discrimination provisions contained in the 2018 WLA Statement had been largely ignored by Openreach during the negotiations for mixed usage PIA Reference Offer. They alleged that as part of these negotiations BT had argued it does not use PIA and therefore a direct comparison between BT’s own use of its

²³⁰ Department for the Economy’s response to the 2018 PIMR Consultation, question 4.1; Digital Colony’s response to the 2018 PIMR Consultation, page 2; Gigaclear’s response to the 2018 PIMR Consultation, page 3; NextGenAccess’ response to the 2018 PIMR Consultation, question 4.1; Openreach’s response to the 2018 PIMR Consultation, paragraph 90; Telefonica’s response to the 2018 PIMR Consultation, page 2; Virgin Media’s response to the 2018 PIMR Consultation, page 15; [X]; [X]; [X].

²³¹ Openreach’s response to the 2018 PIMR Consultation, paragraphs 90-100 and Annex B.

²³² Openreach’s response to the 2018 PIMR Consultation, paragraphs 100-107, and Annex B.

²³³ Virgin Media’s response to the 2018 PIMR Consultation, page 15.

²³⁴ Hyperoptic’s response to the 2018 PIMR Consultation, page 5.

²³⁵ UKCTA’s response to the 2018 PIMR Consultation, page 3; and Vodafone’s response to the 2018 PIMR Consultation, page 36.

physical infrastructure and access seekers' use of PIA is not relevant. They set out examples where they believe BT's own use of its physical infrastructure differs from the terms insisted upon by BT in the mixed usage PIA Reference Offer.²³⁶

- 4.62 CityFibre, INCA and Zayo argued that we should ensure non-discrimination by legally or functionally separating from Openreach an entity they referred to as "Duct Co" which will be responsible for the operation of BT's physical infrastructure.²³⁷
- 4.63 CityFibre and Zayo said that, until a "Duct Co" is established, we should make all efforts to strengthen the current non-discrimination provisions for PIA. In particular, they said that we should include an obligation for BT to specifically ensure that BT's terms of using its own passive infrastructure should not differ from the terms on which the PIA product is offered to other operators.²³⁸
- 4.64 CityFibre, Hyperoptic and Zayo also disagreed with our proposal that there should be no up-front obligation on Openreach to justify all instances where processes and systems used by Openreach are different to those used by other operators.²³⁹ According to Hyperoptic, without such requirement, telecoms providers would have no way to determine whether or not they are at a disadvantage.²⁴⁰
- 4.65 TalkTalk was concerned that the no undue discrimination obligation was not strong enough. Given our proposal of no undue discrimination rather than EOI obligations on the grounds of proportionality, TalkTalk considered it would be appropriate to require Openreach to identify and justify at least the most material instances of non-equivalence. It welcomed our commitment to extend the ongoing monitoring programme of the implementation of the mixed usage PIA, and requested that we take a more proactive approach to no undue discrimination compliance.²⁴¹

Our reasoning and decisions

- 4.66 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.

²³⁶ CityFibre's response to the 2018 PIMR Consultation, paragraphs 6.1.3-6.1.42; IIG's response to the 2018 PIMR, 2018 BCMR and 2018 BT RFR Consultations, paragraphs 13.1.7-13.1.26; and Zayo's response to the 2018 PIMR Consultation, paragraphs 6.1.4-6.1.42.

²³⁷ CityFibre's response to the 2018 PIMR Consultation, paragraph 6.1.31-33; INCA's response to the 2018 PIMR Consultation, page 2; and Zayo's response to the 2018 PIMR Consultation, paragraphs 6.1.28-6.1.30.

²³⁸ CityFibre's response to the 2018 PIMR Consultation, paragraph 6.1.37; and Zayo's response to the 2018 PIMR Consultation, paragraph 6.1.35.

²³⁹ CityFibre's response to the 2018 PIMR Consultation, paragraphs 6.1.5-6.1.6; Hyperoptic's response to the 2018 PIMR Consultation, page 6; and Zayo's response to the 2018 PIMR Consultation, paragraph 6.1.8.

²⁴⁰ Hyperoptic's response to the 2018 PIMR Consultation, page 6.

²⁴¹ TalkTalk's response to the 2018 PIMR Consultation, paragraph 5.4.

Reason for imposing non-discrimination obligation

- 4.67 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.
- 4.68 CityFibre and Zayo noted that the creation of the duct market now makes Openreach a vertically integrated operator, giving it the incentives to discriminate in favour of its own downstream business in a way that would harm competition and competing telecoms providers.²⁴² CityFibre, INCA and Zayo recognised that separation (either legal or functional) within Openreach would be an appropriate solution for resolving this competition problem.²⁴³
- 4.69 We appreciate the concerns of these respondents. We do not consider separation within Openreach to be within the scope of this review. However, we will proactively monitor the situation through our established monitoring programmes and take action if we consider it appropriate.

Forms of non-discrimination obligations

- 4.70 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 (EOO) (i.e. more flexibility, certain discriminatory conduct possible²⁴⁴) – 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.

²⁴² CityFibre's response to the 2018 PIMR Consultation, paragraph 6.1.9; and Zayo's response to the 2018 PIMR Consultation, paragraph 6.1.11.

²⁴³ CityFibre's response to the 2018 PIMR Consultation, paragraph 6.1.31; INCA's response to the 2018 PIMR Consultation, page 2; and Zayo's response to the 2018 PIMR Consultation, paragraphs 6.1.28-6.1.29.

²⁴⁴ Compliance with this obligation would need to establish whether the discrimination in question was undue. 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/undsmp/statement/contraventions4.pdf>.

Need for non-discrimination obligations in the Physical Infrastructure markets

- 4.71 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.
- 4.72 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 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.
- 4.73 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.
- 4.74 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 have decided to impose on BT in the context of this market review.

Equivalence of inputs

- 4.75 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.
- 4.76 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.
- 4.77 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.

- 4.78 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 network access obligation.

Requirement for no undue discrimination

- 4.79 We therefore have decided 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 have decided that that in order to ensure a level playing field in downstream markets, this non-discrimination requirement should be as close to EOI as possible.
- 4.80 Therefore, we have decided 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.
- 4.81 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.
- 4.82 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.
- 4.83 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.
- 4.84 Under this 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

- 4.85 As outlined above, although we expect Openreach to be able to justify any instances of non-equivalence, we do not consider it necessary (as suggested by some stakeholders) 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 imposing an upfront obligation on Openreach to justify all instances of non-equivalence, however we are imposing a requirement on Openreach to produce an Internal Reference Offer that will require it to set out its internal processes to some degree. This will allow Ofcom and telecoms providers to identify any differences in process.
- 4.86 We agree with TalkTalk, UKCTA and Vodafone that we should take a proactive approach to monitoring anti-discrimination compliance. We also note the range of concerns that respondents have raised in regard to compliance with the no undue discrimination proposal. As proposed, we have decided 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 evidence of non-compliance. This evidence could come from a range of sources, such as information submitted by our stakeholders, our regular review of BT's Regulatory Financial Statements, information gathered as part of our market reviews, and through use of our investigatory powers.
- 4.87 As noted above, Openreach has suggested that we use its Fibre First programme as the primary benchmark to assess compliance with the no undue discrimination obligation. We consider that, while the Fibre First programme processes may in many cases be one useful benchmark when considering process alignment, the scope of the no undue discrimination covers Openreach's full product range, including those on the copper and leased lines networks. Therefore, we would expect Openreach to consider their obligations in respect of all use of duct.
- 4.88 With respect to pricing, if Openreach undertakes network adjustments to support BT's own deployments, it should charge itself internal transfer charges which are consistent with the charges for network adjustments faced by competing telecoms providers using PIA (to the extent that a different approach cannot be justified). This means that costs of network adjustments above the financial limit which are incurred to support BT's own deployments should be attributed entirely to Openreach's downstream products, and not spread across all users of the physical infrastructure.

- 4.89 In relation to other aspects of pricing (e.g. rental charges), we consider that the specific regulation we are imposing in relation to PIA pricing is sufficient to address our concerns over price discrimination with respect to third party charges in this review period.²⁴⁵
- 4.90 Finally, we note that several stakeholders have set out examples of discrimination and other concerns around using the mixed usage PIA product and the formulation of the Reference Offer set out in the 2018 WLA Statement. We address these in Section 5.

Transparency and KPIs

- 4.91 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 have decided that an obligation on BT to provide transparency around non-discrimination in relation to network access should apply. Specifically, we impose a requirement on BT to publish such information on non-discrimination in relation to network access as we may direct.
- 4.92 We have considered whether we should impose specific KPIs on non-discrimination as part of our statement, 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. We note Hyperoptic's argument that some urgency is needed in applying transparency metrics to ensure the effective imposition of the no undue discrimination remedy. However, we consider that it is inappropriate to impose any specific transparency obligations on Openreach at this time. Following the commercial launch of the mixed usage PIA product on 1 April, work is underway to identify and implement an appropriate set of KPIs to provide the necessary transparency between PIA and Openreach's deployment of their own full-fibre networks. This work, including the gathering of appropriate data relating to the consumption of PIA, is expected to progress throughout 2019. It is not obvious to us that specific obligations at this time could be developed more quickly.
- 4.93 To implement these decisions, we have decided to set the SMP condition (Condition 4) at Annex 26. 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.

²⁴⁵ As noted in Section 7, we intend to consider the suitability of the pricing structure for any unrestricted PIA obligation we may impose beyond 2021 in the context of our wider set of market reviews which will include the reconsideration of Physical Infrastructure Access.

Consistency with EC Recommendations and the BEREC Common Position

- 4.94 We have taken due account of the EC's Costing and Non-discrimination Recommendation in imposing a no undue discrimination condition on BT.²⁴⁶ There are three recommendations particularly relevant in respect of our decision 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 EEO 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.
- 4.95 We consider that the no undue discrimination obligation which we are imposing is consistent with these recommendations.
- 4.96 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 have decided to impose a non-discrimination obligation and a power to impose KPIs. While we are not currently imposing under regulation 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, in particular in light of the work Openreach is undertaking to identify and implement an appropriate set of voluntary KPIs.
- 4.97 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.
- 4.98 Having taken due 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.

²⁴⁶ European Commission (2013) *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) http://ec.europa.eu/smart-regulation/impact/ia_carried_out/docs/ia_2013/c_2013_5761_en.pdf (September 2013 EC Recommendation on non-discrimination obligations).

- 4.99 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:²⁴⁷

“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).”

- 4.100 We have further taken due account of the EC’s 2010 NGA recommendation.²⁴⁸ 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 have decided 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

- 4.101 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 decision to impose on BT requirements to:

- a) publish a Reference Offer;
- b) notify changes to charges, terms and conditions; and
- c) notify technical information.

²⁴⁷ 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.

²⁴⁸ European Commission (2010) *Commission Recommendation 25.9.2010 on regulated access to Next Generation Access Networks (NGA)* <http://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32010H0572&from=EN> (2010 EC Recommendation on NGA)

Requirement to publish a Reference Offer

Our proposals

- 4.102 We proposed that that BT must publish a Reference Offer in relation to the provision of network access in each Physical Infrastructure market. The Reference Offer must include terms and conditions for provisioning, technical information, SLAs and SLGs, and availability of co-location. We also included a requirement on BT to publish an Internal Reference Offer.

Stakeholder responses

- 4.103 All stakeholders that responded agreed with our proposals.²⁴⁹
- 4.104 Openreach agreed with our proposals for the SLAs/SLGs but requested that Ofcom is not as prescriptive and takes account of the final industry agreement on the mixed usage PIA Reference Offer.²⁵⁰ Openreach also commented that the Internal Reference Offer should be benchmarked against their Fibre First programme.²⁵¹

Our reasoning and decisions

- 4.105 We have decided to implement our proposed obligation to publish a Reference Offer and an Internal Reference Offer. We consider imposing this obligation in each market is appropriate and proportionate.²⁵²
- 4.106 This 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.
- 4.107 The Reference Offer 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

²⁴⁹ CityFibre's response to the 2018 PIMR Consultation, paragraph, 6.1.41; Department for the Economy's response to the 2018 PIMR Consultation, question 4.1; Digital Colony's response to the 2018 PIMR Consultation, page 2; Gigaclear's response to the 2018 PIMR Consultation, page 3; Hyperoptic's response to the 2018 PIMR Consultation, page 5; IIG's response to the 2018 PIMR, 2018 BCMR and 2018 BT RFR Consultations, paragraph 13.1.30; NextGenAccess' response to the 2018 PIMR Consultation, question 4.1; SSE's response to the 2018 PIMR Consultation, question 4.1; TalkTalk's response to the 2018 PIMR Consultation, paragraph 5.7; Telefonica's response to the 2018 PIMR Consultation, page 2; UKCTA's response to the 2018 PIMR Consultation, page 2; Virgin Media's response to the 2018 PIMR Consultation, page 14; Vodafone's response to the 2018 PIMR Consultation, page 36; Zayo's response to the 2018 PIMR Consultation, paragraph 6.1.41; [X]; [X]; and [X].

²⁵⁰ Openreach's response to the 2018 PIMR Consultation, Annex B.

²⁵¹ Openreach's response to the 2018 PIMR Consultation, paragraph 105 and Annex B. Openreach made the same point in relation to the no undue discrimination requirement (see 4.87 above).

²⁵² In Annex B of its response to the 2018 PIMR Consultation, Openreach asked for clarification in relation to whether it was required to publish four reference offers, or whether a single reference offer applicable to all four markets would be sufficient. Provided that all the requirements set out in the Reference Offer SMP condition are met, it is a matter for Openreach whether it chooses to satisfy the obligations by publishing four separate documents or a single document.

are being provided on non-discriminatory terms. Without this, market entry might be deterred to the detriment of long-term competition and hence consumers.

4.108 The Reference Offer obligation specifies the information to be included in the Reference Offer and how the Reference Offer should be published. We consider that this comprises the minimum information necessary to achieve the purposes set out above.

4.109 We have decided that that the published Reference Offer 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; and
- f) service level agreements and service level guarantees.

4.110 As noted above, an Internal Reference Offer will allow us and stakeholders to identify any differences in the processes for internal use of physical infrastructure compared to third party use of unrestricted PIA. In respect of Openreach's comment that the Internal Reference Offer should be benchmarked against its Fibre First programme, we consider that it would not be consistent with the aim of the obligation (to ensure transparency) for the Internal Reference Offer to be limited to one specific programme. We have decided that, to the extent that BT uses the services set out in paragraph 4.109 in a different manner to other telecoms providers or uses similar services, BT is required to publish an Internal Reference Offer in relation to those services. The Internal Reference Offer should at a minimum set out the same matters as set out in paragraph 4.109.

4.111 In Section 5, we set out the Reference Offer requirements that specifically relate to PIA, the specific form of network access we are imposing in these markets.

SLAs and SLGs

4.112 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.

4.113 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).
- 4.114 We have therefore decided to impose on BT a requirement to include in its contractual arrangements SLAs and SLGs as set out in paragraph 4.113.
- 4.115 To give effect to these decisions, we have decided to set the SMP condition (Condition 7) at Annex 26. 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

- 4.116 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.
- 4.117 We have also taken utmost account of the BEREC Common Position.²⁵³ 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.

²⁵³ 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).

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 Reference Offer (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 Reference Offer 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 Reference Offer for a transitional period to be determined accordingly.”

4.118 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.

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.”

- 4.119 We consider that our decision is broadly consistent with the best practice set out in the BEREC Common Position.

Requirement to notify charges, terms and conditions

Our proposals

- 4.120 We proposed 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.
- 4.121 Regarding the notice period required for BT to inform its customers of changes, we proposed that 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.

Stakeholder Responses

- 4.122 All stakeholders that responded agreed with our proposals.²⁵⁴

²⁵⁴ CityFibre’s response to the 2018 PIMR Consultation, paragraph 6.1.41; Department for the Economy’s response to the 2018 PIMR Consultation, question 4.1; Digital Colony’s response to the 2018 PIMR Consultation, page 2; Gigaclear’s response to the 2018 PIMR Consultation, page 3; Hyperoptic’s response to the 2018 PIMR Consultation, page 5; NextGenAccess’ response to the 2018 PIMR Consultation, question 4.1; IIG’s response to the 2018 PIMR, 2018 BCMR and 2018 BT RFR Consultations, paragraph 13.1.38; SSE’s response to the 2018 PIMR Consultation, question 4.1; TalkTalk’s response to the 2018 PIMR Consultation, paragraph 5.8; Telefonica’s response to the 2018 PIMR Consultation, page 2; UKCTA’s response to the 2018 PIMR Consultation, page 2; Virgin Media’s response to the 2018 PIMR Consultation, page 14; Vodafone’s response to the 2018 PIMR Consultation, page 36; Zayo’s response to the 2018 PIMR Consultation, paragraph 6.1.41; [X]; [X]; and [X].

Our reasoning and decisions

- 4.123 We consider that the requirement to notify charges, terms and conditions which we are imposing in each market is appropriate and proportionate.
- 4.124 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.
- 4.125 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.
- 4.126 We also consider it appropriate 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.
- 4.127 Regarding the content of the ACCN, we have decided 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 Reference Offer;
 - 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 changes in the ACCN will take effect (the “effective date”).
- 4.128 We note that Openreach requested clarification regarding the requirement to notify Ofcom where it amends the charges, terms and conditions on which it provides itself with network access (Condition 8.7).²⁵⁵ Openreach questioned whether this requirement could be applied in any meaningful sense to Openreach’s own use of physical infrastructure, given its use of its own physical infrastructure is different to PIA and not subject to an EOI obligation. While Openreach does not consume PIA, we are imposing a requirement on

²⁵⁵ Openreach’s response to the 2018 PIMR Consultation, Annex B.

Openreach to produce an Internal Reference Offer that sets out its internal processes. In order to ensure transparency, we are requiring Openreach to notify us where these internal processes change.

Changes to prices

- 4.129 Changes to prices, terms and conditions for the provision of wholesale inputs in Physical Infrastructure markets could have material impacts on consumers. Thus, we have decided to impose a requirement on BT to give advance notice of price changes.
- 4.130 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.
- 4.131 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.
- 4.132 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.
- 4.133 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 have decided that that 28 days is an appropriate notification period for new products and services.

Changes to non-prices terms and conditions

- 4.134 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 imposing an obligation that, in general, at least 90 days' notification should be given.
- 4.135 We do not consider that, where Openreach plans service development and service launches, the 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

- 4.136 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 have decided to require Openreach to provide only 28 days' notice where it plans to amend the terms and conditions of a Special Offer.
- 4.137 We also have decided 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 have decided that 28 days' notice should apply. We have outlined the notification periods that will apply for where Special Offers are extended or amended in Table 4.2.

Table 4.2: 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

- 4.138 We consider that the 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 notification periods are the minimum required to allow changes to be reflected in downstream offers.
- 4.139 To implement these decisions, we have decided to set the SMP condition (Condition 8) at Annex 26. 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

- 4.140 We proposed 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.

Stakeholder responses

- 4.141 All stakeholders that replied agreed with our proposals.²⁵⁶

Our reasoning and decisions

- 4.142 We consider that the requirement to notify technical information which we are imposing in each market is appropriate and proportionate.
- 4.143 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.
- 4.144 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

²⁵⁶ CityFibre's response to the 2018 PIMR Consultation, paragraph 6.1.42; Department for the Economy's response to the 2018 PIMR Consultation, question 4.1; Digital Colony's response to the 2018 PIMR Consultation, page 2; Gigaclear's response to the 2018 PIMR Consultation, page 3; Hyperoptic's response to the 2018 PIMR Consultation, page 5; IIG's response to the 2018 PIMR, 2018 BCMR and 2018 BT RFR Consultations, paragraph 13.1.38; NextGenAccess' response to the 2018 PIMR Consultation, question 4.1; SSE's response to the 2018 PIMR Consultation, question 4.1; TalkTalk's response to the 2018 PIMR Consultation, paragraph 5.9; Telefonica's response to the 2018 PIMR Consultation, page 2; UKCTA's response to the 2018 PIMR Consultation, page 2; Virgin Media's response to the 2018 PIMR Consultation, page 14; Vodafone's response to the 2018 PIMR Consultation, page 36; Zayo's response to the 2018 PIMR Consultation, paragraph 6.1.41; [X]; [X]; and [X].

- any other additional information necessary to make use of the services provided in the Physical Infrastructure markets.
- 4.145 We believe that 90 days is the minimum time that competing providers would need to make modifications to their network to support changes.
- 4.146 The one exception to this is in relation to amendments to technical specifications that are developed and agreed through NICC Standards Limited.²⁵⁷ 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 necessary to impose 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 SMP condition reflects this position.
- 4.147 We consider that the requirement to notify technical information only requires information that other telecoms providers would need to know and that the notification periods are the minimum required to allow changes to be reflected in downstream offers.
- 4.148 To give effect to these decisions, we have decided to set the SMP condition (Condition 9) at Annex 26. 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

- 4.149 In the following sub-sections, we set out our decisions to impose accounting separation and cost accounting obligations on BT in Physical Infrastructure markets.
- 4.150 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.²⁵⁸ 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

²⁵⁷ <http://www.niccstandards.org.uk/>.

²⁵⁸ Ofcom (2014) *Regulatory Financial Reporting*. https://www.ofcom.org.uk/data/assets/pdf_file/0025/78460/financial-reporting-statement-may14.pdf (2014 Regulatory Financial Reporting Statement).

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.²⁵⁹

- 4.151 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.
- 4.152 For the reasons explained below and noting the benefits of applying a consistent approach across all markets, our decision 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 obligations in a forthcoming statement on regulatory financial reporting.

Accounting separation

Our proposals

- 4.153 We proposed to impose on BT an accounting separation condition in the Physical Infrastructure markets.

Stakeholder responses

- 4.154 All stakeholders that replied agreed with our proposals.²⁶⁰

Our reasoning and decisions

- 4.155 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,

²⁵⁹ 2014 Regulatory Financial Reporting Statement, paragraphs 7.15-7.19.

²⁶⁰ CityFibre’s response to the 2018 PIMR Consultation, paragraph, 6.1.41; Department for the Economy’s response to the 2018 PIMR Consultation, question 4.1; Digital Colony’s response to the 2018 PIMR Consultation, page 2; Gigaclear’s response to the 2018 PIMR Consultation, page 3; Hyperoptic’s response to the 2018 PIMR Consultation, page 5; IIG’s response to the 2018 PIMR, 2018 BCMR and 2018 BT RFR Consultations, paragraph 13.1.38; NextGenAccess’ response to the 2018 PIMR Consultation, question 4.1; Openreach’s response to the 2018 PIMR Consultation, paragraphs 177-181; SSE’s response to the 2018 PIMR Consultation, question 4.1; TalkTalk’s response to the 2018 PIMR Consultation, paragraph 5.10; Telefonica’s response to the 2018 PIMR Consultation, page 2; UKCTA’s response to the 2018 PIMR Consultation, page 2; Virgin Media’s response to the 2018 PIMR Consultation, page 14; Vodafone’s response to the 2018 PIMR Consultation, page 36; Zayo’s response to the 2018 PIMR Consultation, paragraph 6.1.43; [X]; [X]; and [X].

and in the case of vertically integrated undertakings, to prevent discrimination in favour of their own activities and to prevent unfair cross-subsidy”.²⁶¹

- 4.156 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”.²⁶² 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”.²⁶³ We consider that our decision 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.
- 4.157 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 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.
- 4.158 The 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.
- 4.159 We believe this obligation is required to monitor the overall impact and effectiveness of the remedies, and especially to monitor BT’s activities with regard to its non-discrimination obligation. The 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. We consider that the obligation we are imposing goes no further than is necessary for these purposes.

²⁶¹ European Commission (2005) *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> (EC 2005 Recommendation on accounting separation and cost accounting).

²⁶² 2014 Regulatory Financial Reporting Statement, paragraph 2.28.

²⁶³ 2014 Regulatory Financial Reporting Statement, paragraph 2.41.

- 4.160 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.²⁶⁴ Other than this, the form of the condition implements our policy decisions on regulatory financial reporting set out in that statement,²⁶⁵ 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;²⁶⁶ and
 - ensure that Ofcom and other stakeholders have the information they need.
- 4.161 To give effect to these decisions, we have decided to set the SMP condition (Condition 11) at Annex 26. 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. 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

- 4.162 We proposed to impose a cost accounting requirement on BT in the Physical Infrastructure markets.

Stakeholder responses

- 4.163 All stakeholders that replied agreed with our proposals.²⁶⁷

²⁶⁴ 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 have decided to direct BT as to the specific reporting requirements consistent with the Regulatory Accounting Principles arising from each regulatory decision. The wording of our condition reflects our decision not to issue the Regulatory Accounting Guidelines. Each condition therefore requires BT to prepare the RFS in accordance with the SMP conditions, the Regulatory Accounting Principles and the Accounting Methodology Documents.

²⁶⁵ 2014 Regulatory Financial Reporting Statement, page 1.

²⁶⁶ This included a requirement on BT to publish annual reconciliation reports that show the impact of material changes and errors.

²⁶⁷ CityFibre's response to the 2018 PIMR Consultation, paragraph, 6.1.41; Department for the Economy's response to the 2018 PIMR Consultation, question 4.1; Digital Colony's response to the 2018 PIMR Consultation, page 2; Gigaclear's response to the 2018 PIMR Consultation, page 3; Hyperoptic's response to the 2018 PIMR Consultation, page 5; IIG's response to the 2018 PIMR, 2018 BCMR and 2018 BT RFR Consultations, paragraph 13.1.38; NextGenAccess' response to the 2018 PIMR Consultation, question 4.1; Openreach's response to the 2018 PIMR Consultation, paragraphs 177-181; SSE's response to the 2018 PIMR Consultation, question 4.1; TalkTalk's response to the 2018 PIMR Consultation, paragraph 5.10; Telefonica's response to the 2018 PIMR Consultation, page 2; UKCTA's response to the 2018 PIMR Consultation, page 2; Virgin Media's response to the 2018 PIMR Consultation, page 14; Vodafone's response to the 2018 PIMR Consultation, page 36; Zayo's response to the 2018 PIMR Consultation, paragraph 6.1.43; [X]; [X]; and [X].

Our reasoning and decisions

- 4.164 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.”²⁶⁸
- 4.165 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 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.
- 4.166 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 and we consider that the obligation we are imposing goes no further than is necessary for these purposes.
- 4.167 Regarding the specific form of the cost accounting requirement, we have decided 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 us) of the Condition is to:
- give Ofcom a greater role in the way that BT prepares its regulatory financial statements;

²⁶⁸ EC 2005 Recommendation on accounting separation and cost accounting.

- improve the presentation of the published regulatory financial statements and supporting documentation; and
- ensure that Ofcom and other stakeholders have the information they need.

4.168 To give effect to these decisions, we have decided to set the SMP condition (Condition 11) set out at Annex 26. 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

4.169 We proposed 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).

Stakeholder responses

4.170 All stakeholders that replied agreed with our proposals.²⁶⁹

4.171 CityFibre and Zayo both considered that we should impose QoS standards immediately.²⁷⁰

Our reasoning and decisions

4.172 We consider that the quality of service requirements which we are imposing in each market are appropriate and proportionate.

4.173 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.

²⁶⁹ Department for the Economy's response to the 2018 PIMR Consultation, question 4.1; Digital Colony's response to the 2018 PIMR Consultation, page 2; Gigaclear's response to the 2018 PIMR Consultation, page 3; Hyperoptic's response to the 2018 PIMR Consultation, page 5; IIG's response to the 2018 PIMR, 2018 BCMR and 2018 BT RFR Consultations, paragraph 13.1.38; NextGenAccess' response to the 2018 PIMR Consultation, question 4.1; SSE's response to the 2018 PIMR Consultation, question 4.1; TalkTalk's response to the 2018 PIMR Consultation, paragraph 5.11; Telefonica's response to the 2018 PIMR Consultation, page 2; UKCTA's response to the 2018 PIMR Consultation, page 2; Virgin Media's response to the 2018 PIMR Consultation, page 14; Vodafone's response to the 2018 PIMR Consultation, page 36; [X]; [X]; and [X].

²⁷⁰ CityFibre's response to the 2018 PIMR Consultation, paragraph 6.2.3; and Zayo's response to the 2018 PIMR Consultation paragraph 7.1.2.

- 4.174 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.
- 4.175 In response to CityFibre and Zayo, we think that while PIA was introduced in 2010, a number of improvements to the product have been made (and are continued to be expected) as a result of our recent regulatory decisions. Given these changes (and the expected increase in the take-up of PIA) we consider that a period of time will be needed to understand if QoS standards are required. Therefore, we intend to monitor Openreach progress against the KPIs that have been agreed with industry. We will also monitor negotiations following the launch of the product to improve the KPI reporting regime. Based on this evidence, we will then decide if it is appropriate to impose QoS standards.
- 4.176 We consider that the form of condition we are imposing is the minimum necessary to address our concerns around QoS. We are imposing a condition which allows us to set QoS standards, although we are not for the moment specifying 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.
- 4.177 The SMP condition that we are imposing to give effect to these decisions (Condition 10) is published at Annex 26. 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

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

Stakeholder responses

- 4.179 Stakeholders commented on the implementation timeframe in the context of either the general remedies and/or specific remedies we proposed. We deal with all implementation comments in the specific remedies section.

Our reasoning and decisions

- 4.180 We believe that our general remedies would lead to minimal disruption for the industry and only require a short implementation period because the conditions are equivalent to the ones imposed in the 2018 WLA market review. We discuss the implementation timeframe in relation to our specific remedies, including price controls, in Section 5.
- 4.181 We have decided to allow BT one month from the date of publication of this statement to implement the general remedies we have set out above.

5. Specific remedies

Introduction

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

Table 5.1: Summary of specific remedies

Specific remedies
Specific access obligation to provide Physical Infrastructure Access (unrestricted PIA), including network adjustments
Specific requirement to provide unrestricted 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 identified that BT has SMP in the supply of access to physical infrastructure suitable for telecoms networks.
- 5.3 We have identified 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 mainly 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.
- 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 BT'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 (mixed usage PIA). 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 have decided to impose 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 2018 Future Telecoms Infrastructure Review, the Government 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 On 15 October 2018 BT wrote to Ofcom offering to voluntarily implement a form of unrestricted DPA. However, given that this offer falls short of what we consider is required to address the competition concerns we have identified (as set out in this statement), we consider that it is appropriate and proportionate to impose PIA. [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, in the 2018 WLA Statement we imposed an enhanced form of this physical infrastructure access obligation – mixed usage PIA.
- 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 have decided 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 adopting this approach should 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 proposed 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. This PIA product would have no usage or geographic scope restrictions.
- 5.15 We also proposed that we would not impose a specific requirement for PIA to include dark fibre access, if access to physical infrastructure is not available. We discuss this in the next section.

Stakeholder responses

- 5.16 All stakeholders agreed with our proposal to impose unrestricted PIA.²⁷¹
- 5.17 Arqiva, Telefonica, Three and [X] welcomed the removal of all usage and geographic scope restrictions from the remedy.²⁷² Three specifically argued that Ofcom must ensure that the DPA remedy is imposed nationwide since ubiquity of service is required for alternative operators to supply dark fibre transmission propositions nationwide which are attractive as an alternative to BT.²⁷³

²⁷¹ Arqiva's response to the 2018 PIMR Consultation, page 1; BT Group's response to the 2018 PIMR and 2018 BCMR Consultations, paragraphs 2.1; CityFibre's response to the 2018 PIMR Consultation, paragraph 7.1.1 and 7.1.2; Colt's response to the 2018 PIMR Consultation, page 2; CWU's response to the 2018 PIMR and 2018 BCMR Consultations, paragraph 13; Digital Colony's response to the 2018 PIMR Consultation, page 2; Gamma's response to the 2018 PIMR and 2018 BCMR Consultations, page 11; Gigaclear's response to the 2018 PIMR Consultation, pages 3-4; Hyperoptic's response to the 2018 PIMR Consultation, pages 3-4; INCA's response to the 2018 PIMR Consultation, page 1; IIG's response to the 2018 PIMR, 2018 BCMR and 2018 BT RFR Consultations, paragraphs 14.1.1-14.1.3; Openreach's response to the 2018 PIMR Consultation, paragraph 118; PAG's response to the 2018 PIMR Consultation, paragraph 4 and 11; Paul Wheelhouse MSP's response to the 2018 PIMR Consultation; TalkTalk's response to the 2018 PIMR Consultation, paragraph 5.13; Telefonica's response to the 2018 PIMR Consultation, paragraph 5 and page 2; Three's response to the 2018 PIMR Consultation, paragraphs 5 and 39; UKCTA's response to the 2018 PIMR Consultation, page 2; Virgin Media's response to the 2018 PIMR Consultation, page 30; Zayo's response to the 2018 PIMR Consultation, paragraph 8.1.1 and 8.1.2; [X]; [X]; [X].

²⁷² Arqiva's response to the 2018 PIMR Consultation, page 1; Telefonica's response to the 2018 PIMR Consultation, pages 1-2; Three's response to the 2018 PIMR Consultation, paragraphs 5 and 38.

²⁷³ Three's response to the 2018 PIMR Consultation, paragraphs 5 and 38.

- 5.18 Some stakeholders raised specific concerns in relation to the scope of the PIA remedy and its potential impact on downstream markets, which we discuss below.
- 5.19 BT Group, Colt and Openreach broadly agreed with the proposed PIA remedy. However, they argued that Ofcom should not introduce unrestricted PIA in competitive business connectivity markets as this could damage competition and investment. All three companies referred to the preliminary market findings in the 2018 BCMR Consultation that proposed the CLA is such a market. BT Group and Openreach said the HNR areas should also be included in this category.²⁷⁴
- 5.20 Gamma and [X] generally agreed with the proposed PIA remedy. However, they said that unrestricted PIA could lead to capacity constraints in areas of high demand. To address this, [X].²⁷⁵ Gamma said that Ofcom should consider remedies that apply in the event that duct is full.²⁷⁶
- 5.21 TalkTalk agreed that there should be no usage restrictions on PIA but disagreed with our proposed justification for this. In its view, the removal of usage restrictions in the CLA is justified because, contrary to what the 2018 BCMR Consultation proposed, BT has SMP in the downstream business connectivity market. TalkTalk also said that Ofcom's analysis of the potential impacts of unrestricted PIA on downstream markets is insufficient, and a detailed cost and benefit analysis is required.²⁷⁷
- 5.22 Virgin Media disagreed with Ofcom's view that any usage restrictions will render the PIA remedy ineffective because, it said, PIA users' investment cases (particularly smaller CPs) are likely to be more targeted and that the intended service offerings, geographies and customers may not be unbounded. However, Virgin Media recognised the benefits of the simplicity and flexibility created by avoiding geographic or usage restrictions on PIA. It argued that despite some variations in the competitive conditions, it is practical and necessary that a uniform remedy exists across all Physical Infrastructure markets. In its view, the benefits from applying no PIA restrictions outweigh localised issues in particular geographies or segments of product markets.²⁷⁸
- 5.23 In addition, BT Group argued the scope of unrestricted PIA should not include the use of its physical infrastructure to host radio transmission/reception equipment to provide wireless connections.²⁷⁹ By contrast, WIG said that providers of wireless infrastructure and mobile telecoms networks should be included in the scope of the remedy,²⁸⁰ and IIG considered

²⁷⁴ BT Group's response to 2018 PIMR and 2018 BCMR Consultations, paragraphs 1.2, 1.4-1.5, 2.1-2.4, 2.22-2.25; Colt's response to the 2018 PIMR Consultation, page 2; Openreach's response to the 2018 PIMR Consultation, paragraphs 37-38, 70 and 126-130.

²⁷⁵ [X].

²⁷⁶ Gamma's response to the 2018 PIMR and 2018 BCMR Consultations, page 14.

²⁷⁷ TalkTalk's response to the 2018 PIMR Consultation, paragraphs 5.13-5.19.

²⁷⁸ Virgin Media's response to the 2018 PIMR Consultation, pages 21-25, and 31.

²⁷⁹ BT Group's response to the 2018 PIMR and 2018 BCMR Consultations, paragraphs 2.47-2.51. The point was also made in Openreach's response to the 2018 PIMR Consultation, Annex B.

²⁸⁰ WIG's response to the 2018 PIMR Consultation, paragraph 3.

that masts and antennae for fixed wireless networks will become part of the product market.²⁸¹

Our reasoning and decisions

- 5.24 We have decided to impose a specific network access remedy in the form of unrestricted PIA in each of the Physical Infrastructure markets. We consider that:
- a) a specific network access requirement is necessary to address BT's SMP in the Physical Infrastructure markets;
 - b) imposing usage or geographic scope restrictions on PIA would risk undermining the effectiveness of the remedy; and
 - c) any adverse impacts of unrestricted PIA are proportionate to our overall aim.
- 5.25 We acknowledge the points made by stakeholders, but we maintain the view that the specific form of PIA that we are imposing is appropriate and proportionate in relation to BT's market power in each of the Physical Infrastructure markets. We set out our reasoning below.

A specific network access remedy is necessary to address BT's SMP in the Physical Infrastructure markets

- 5.26 Given our 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.
- 5.27 Although the general network access remedy we impose 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. On that basis, 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.

²⁸¹ IIG's response to the 2018 PIMR, 2018 BCMR and 2018 BT RFR Consultations, paragraphs 9.1.3-9.1.4.

- 5.28 A specified network access remedy in the form of PIA would directly address the identified competition problems 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 imposing 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.
- 5.29 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.²⁸²
- 5.30 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
 - b) the potential impact of PIA on downstream markets.

²⁸² 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.

Imposing usage or geographic scope restrictions on PIA would risk undermining the effectiveness of the product

- 5.31 As explained above, we have decided 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.
- 5.32 Usage restrictions would undermine the effectiveness of PIA. Limiting technological flexibility and/or limiting the scope of the PIA remedy is likely to materially increase the risk that a telecoms provider takes 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 and in response to the 2018 PIMR Consultation supports this and suggests that any usage restrictions reduce the viability of their business cases, limiting the extent that investments could be justified.²⁸³
- 5.33 This risk is increased in this context where any usage rule imposed would inevitably have a degree of complexity. For example, while the updated PIA product for the wholesale local access market was launched on the 1 April, there has been no industry agreement on how to implement the mixed usage restriction with stakeholders disagreeing on many aspects of the rule.²⁸⁴ Stakeholders have indicated to us that this is due in large part to the complexity in defining what this rule means in practice.²⁸⁵ Any uncertainty arising out of such complexity is also likely to deter investment.
- 5.34 We have considered BT's comment that the scope of unrestricted PIA should not include the use of its physical infrastructure to host radio transmission/reception equipment to provide wireless connections. In Section 3 we exclude wireless from the Physical Infrastructure markets. Given that BT's physical infrastructure is not currently being used for radio equipment, such use is not anticipated over the review period and it is unclear to us whether it would even be possible in practice, we do not consider that it is necessary to impose a usage restriction on the PIA remedy to exclude the use of BT's physical infrastructure for hosting radio equipment, in particular given the risk of regulatory failure associated with imposing such a restriction.

²⁸³ 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. See also CityFibre's response to the 2018 PIMR Consultation, paragraphs 7.1.1-7.1.2; IIG's response to the 2018 PIMR, 2018 BCMR and 2018 BT RFR Consultations, paragraphs 14.1.1-14.1.3; TalkTalk's response to the 2018 PIMR Consultation, paragraph 5.15; Virgin Media's response to the 2018 PIMR Consultation, page 22; and Zayo's response to the 2018 PIMR Consultation, paragraphs 8.1.1-8.1.2.

²⁸⁴ Areas of disagreement include measurement area, verification and rectification procedures.

²⁸⁵ See IIG's response to the 2018 PIMR, 2018 BCMR and 2018 BT RFR Consultations, paragraph 14.1.2; Virgin Media's response to the 2018 PIMR Consultation, pages 22-23 and 31.

- 5.35 Therefore, we have decided that the PIA remedy should have no usage restrictions in order 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.
- 5.36 Any restrictions placed on the geographic scope of the 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. For example, Virgin Media and Gigaclear said they have adopted different engineering design principles to Openreach and are keen to avoid being artificially constrained by BT's historical (or future) network design.²⁸⁶
- 5.37 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 strategy²⁸⁷ utilises this freedom by converging its residential and business fibre plant²⁸⁸ 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.
- 5.38 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 still undermine network investment for the reasons set out above and be unworkable in practice. We set out below examples of targeted PIA usage or geographic scope restrictions and explain why this is inappropriate for each.
- 5.39 In Section 6, Volume 2 of this statement, we find the business connectivity market in the Central London Area (CLA)²⁸⁹ to be competitive. We remain of the view that a restriction which prevents the use of PIA for leased lines in this geographic area will render the remedy ineffective.

²⁸⁶ Virgin Media's response to the 2018 PIMR Consultation, pages 11, 14 and 23; [38].

²⁸⁷ 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.

²⁸⁸ Deploying fibre optic cables that will be used to serve both residential and business customers.

²⁸⁹ 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>

- 5.40 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) Access seekers looking to deploy networks at scale 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 BT’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.
- 5.41 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 incentives for deployment of contemporary telecoms networks where the delineation between broadband and leased line services continues to lose its relevancy.
- 5.42 In Section 8, Volume 2 of this statement, we also 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.
- 5.43 Excluding the use of certain Inter-Exchange Connectivity routes for leased lines purposes²⁹⁰ from the scope of the PIA remedy would impose restrictions on the type of networks access seekers can deploy, both in term of the services they carry and their architecture. While ducts may serve inter-exchange BT routes they may be equally valuable to access seekers wishing to deploy multiservice networks and/or novel network designs. Restrictions of this nature will therefore increase the cost of alternative network deployment, while allowing BT to retain the flexible use of such duct reinforcing their SMP position

²⁹⁰ 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.

- 5.44 We therefore consider that imposing any restrictions on the PIA remedy will render it ineffective.
- 5.45 Finally, we disagree with TalkTalk's argument that it is necessary to have separate analysis of usage and geographic scope restrictions for broadband and leased lines.²⁹¹ As discussed in Section 3, the market we are reviewing is for deployment of any type of telecoms networks. Therefore, our analysis of the impact of PIA restrictions is applicable to broadband and leased lines, even if they are considered in isolation.²⁹²

Any adverse impacts of unrestricted PIA are proportionate to our overall aim

- 5.46 Given our view that the effectiveness of the PIA remedy would be undermined by imposing usage or geographic scope restrictions, we have considered the potential impact of our approach on downstream markets to assess whether there are any adverse effects arising which are disproportionate to our overall aim.
- 5.47 While our detailed assessment of the costs is set out in Annex 5, we find that both in this review period and beyond it any adverse effects arising are not disproportionate to our overall aim for the following reasons.

Impact on dynamic efficiency

- 5.48 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.
- 5.49 In relation to BT, we expect that competition, or threat of competition, under our 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.

Impact on BT's pricing structure

- 5.50 We have considered the risk that the widespread use of the PIA remedy could result in BT having to change its pricing structure, with 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.

Impact on cost of competition

²⁹¹ TalkTalk's response to the 2018 PIMR Consultation, paragraph 5.15

²⁹² This is something we also acknowledged in the 2018 WLA Statement, Volume 3, page 35-36.

- 5.51 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.

Additional costs and resource requirements imposed on Openreach

- 5.52 We have considered the effect of unrestricted PIA on BT's productisation costs and network adjustment costs.²⁹³ 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.
- 5.53 In its response to the 2018 PIMR Consultation, Openreach argued that Ofcom has underestimated the additional cost and resource requirements imposed on it with the introduction of unrestricted PIA.²⁹⁴ We disagree. As discussed above and in Annex 5, we do not expect the additional costs and resource requirements to be significant. We have not seen any evidence to the contrary.

Impact on competitive markets

- 5.54 We have considered the potential impact of unrestricted PIA on deregulated services and areas that are already competitive. As set out in Annex 5, our view is that the impact of unrestricted PIA on competitive markets, such as the business connectivity market in the CLA and the Inter-Exchange Connectivity market, will not render the remedy disproportionate.
- 5.55 We acknowledge the comments made by BT Group, Colt and Openreach that unrestricted PIA could impact competition in the provision of business connectivity in the CLA. As noted in Annex 6, we expect that some rivals may deploy infill network extensions using the unrestricted PIA remedy in the CLA.²⁹⁵ However, we do not consider that the impact of unrestricted PIA will render the remedy disproportionate, particularly when set against the benefits on an unrestricted remedy in other markets where BT has SMP. BT Group, Colt and Openreach did not provide evidence to the contrary.
- 5.56 In its response to the 2018 PIMR Consultation BT Group also argued that unrestricted PIA could adversely affect those who have already invested in competitive networks without regulatory help.²⁹⁶ As discussed above, we consider that unrestricted PIA will improve the

²⁹³ We refer to the costs Openreach incurs in setting up and managing the PIA product, and processing individual PIA orders, as 'productisation' costs.

²⁹⁴ Openreach response to the 2018 PIMR Consultation, paragraphs 126-130.

²⁹⁵ In Annex 6 we also set out that bespoke network extensions will be limited and, while using unrestricted PIA for mass rollout could begin in this review period in any area, its main competition impact is likely to be beyond the timeframe of this review period.

²⁹⁶ BT Group's response to the 2018 PIMR and 2018 BCMR Consultations, paragraph 2.4.

dynamic efficiency in the market by allowing alternative infrastructure owners to compete in potentially many more geographic areas. Therefore, we consider that even if unrestricted PIA has some detrimental impact on the ability of alternative infrastructure owners to recover their past investments in certain competitive downstream markets, this would be outweighed by the overall benefits it would bring to consumers. We also note that most of the current largest investors in rival telecoms networks supported Ofcom in its assessment:

- a) IIG said that the net impact of unrestricted PIA will be positive, including in markets where the IIG members already have substantial investment. In relation to the impact of unrestricted PIA on the Inter-Exchange Connectivity market, IIG said that in most cases operators have had substantial time to amortise their investment and that on balance such operators will benefit more from the availability of PIA to enable them to expand their networks to reach new locations than they might suffer from the potential impact of PIA on routes where they have existing infrastructure.²⁹⁷
- b) Virgin Media said the benefits from applying no PIA restrictions outweigh localised issues in particular geographies or segments of product markets.²⁹⁸

Externalities caused by our approach to network adjustment costs

5.57 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.

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

5.59 We disagree with TalkTalk's argument that Ofcom should conduct a detailed cost and benefit analysis of the potential impacts of unrestricted PIA on downstream markets.²⁹⁹ We are satisfied that our analysis as set out in this section and in Annex 5 is sufficient.

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

²⁹⁷ IIG's response to the 2018 PIMR, 2018 BCMR and 2018 BT RFR Consultations, paragraph 12.2.6.

²⁹⁸ Virgin Media's response to the 2018 PIMR Consultation, pages 21-25, 31.

²⁹⁹ TalkTalk's response to the PIMR consultation, paragraph 5.18.

Stakeholders' concerns on capacity

- 5.61 We acknowledge Gamma and [X] concern that unrestricted PIA could lead to capacity constraints in areas with high demand. Although we do not expect any such constraints in this review period, we accept that in future parts of BT's physical infrastructure will reach its maximum capacity due to deployment of rival networks, though the extent to which the points of congestion have a material impact on overall network deployment is not clear. Consumption of the physical infrastructure is a desired outcome of our regulation and a step towards achieving our strategic goal of network competition.
- 5.62 Therefore, we do not think it is appropriate, at this time, to impose additional rules to mitigate capacity issues, such as the reciprocal use of physical infrastructure amongst all telecoms providers or any usage or geographic scope restrictions on the PIA remedy. We discuss this in the network adjustment section below.

Single remedy for all geographic markets

- 5.63 While our analysis suggests for the reasons set out in Section 3 above that there are potential variations in the competitive conditions between each Physical Infrastructure market sufficient to define separate geographic markets, the form of the specific remedy we are imposing 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 have decided 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

Our proposals

- 5.64 We proposed that the unrestricted PIA remedy does not include a requirement to make available to the access seeker any existing spare unlit fibre in cases where access to physical infrastructure, including through network adjustments, is not available (dark fibre backstop).

Stakeholder responses

- 5.65 Some stakeholders agreed with our proposal.³⁰⁰

³⁰⁰ IIG's response to the 2018 PIMR, 2018 BCMR and 2018 BT RFR Consultations, paragraph 14.1.4-14.1.6; Openreach's response to the 2018 PIMR Consultation, paragraphs 135-140; Virgin Media's response to the 2018 PIMR Consultation, pages 25-26 and question 5.2; [X]; [X].

- 5.66 Most of these stakeholders, including IIG, Openreach, Virgin Media and [X], considered that dark fibre backstop would likely distort telecoms providers' incentives to invest in infrastructure.³⁰¹
- 5.67 IIG and Openreach agreed that the number of situations where dark fibre backstop would apply are likely to be few.³⁰²
- 5.68 Virgin Media said that, while the lack of dark fibre backstop may lead to higher costs where the remedy would have been used if it was available, it also provides countervailing externalities, such as increase in the aggregate stock of civil infrastructure capacity, and physically diversified routes.³⁰³
- 5.69 Other stakeholders disagreed with our proposals.³⁰⁴
- 5.70 [X].³⁰⁵
- 5.71 [X].³⁰⁶³⁰⁷
- 5.72 Hyperoptic said that the lack of dark fibre backstop would create uncertainty that undermines usefulness of the unrestricted PIA remedy. According to Hyperoptic, Ofcom's examples of dark fibre backstop in other countries are not appropriate because their network estate is not directly comparable to that of the UK. Hyperoptic also said dark fibre backstop would remove the risk of BT using up capacity with unlit fibre.³⁰⁸
- 5.73 PAG and Vodafone argued for Ofcom to impose a widespread standalone dark fibre access remedy. They considered dark fibre access to be the right remedy for addressing the competition concerns in the business connectivity markets and to facilitate 5G rollout.³⁰⁹
- 5.74 SSE acknowledged that at this time a dark fibre backstop remedy may be hard to implement and instances of use may be limited.³¹⁰ However, SSE disagreed with Ofcom's proposal, highlighting that feasible situations for using dark fibre backstop may be more common than expected, such as situations where the deployment crosses multiple ducts.

³⁰¹ IIG's response to the 2018 PIMR, 2018 BCMR and 2018 BT RFR Consultations, paragraph 14.1.4-14.1.6; Openreach's response to the 2018 PIMR Consultation, paragraphs 135-140; Virgin Media's response to the 2018 PIMR Consultation, pages 25-26 and question 5.2; [X].

³⁰² IIG's response to the 2018 PIMR, 2018 BCMR and 2018 BT RFR Consultations, paragraph 14.1.4-14.1.6; and Openreach's response to the 2018 PIMR Consultation, paragraphs 135-140.

³⁰³ Virgin Media's response to the 2018 PIMR Consultation, pages 25-26 and question 5.2.

³⁰⁴ Gigaclear's response to the 2018 PIMR Consultation, page 2 and 4; Hyperoptic response to the 2018 PIMR Consultation, page 5; PAG response to the 2018 PIMR Consultation, paragraphs 15 and 16; TalkTalk Group response to the 2018 PIMR Consultation, paragraph 5.20; Telefonica response to the 2018 PIMR Consultation, page 2; Vodafone response to the 2018 PIMR Consultation, paragraph 6.32; [X].

³⁰⁵ [X].

³⁰⁶ [X].

³⁰⁷ [X].

³⁰⁸ Hyperoptic's response to the 2018 PIMR Consultation, page 5.

³⁰⁹ PAG response to the 2018 PIMR Consultation, paragraphs 15 and 16; Vodafone response to the 2018 PIMR Consultation, paragraph 6.32-37.

³¹⁰ SSE's response to the 2018 PIMR Consultation, question 5.2.

- 5.75 TalkTalk suggested that Ofcom should carry out a costs and benefits analysis of a dark fibre backstop remedy before proposing a course of action.³¹¹
- 5.76 Telefonica said a dark fibre backstop remedy would make better use of existing assets and would seem to impose no additional costs on BT.³¹²

Our reasoning and decisions

- 5.77 We have decided that it is not appropriate or proportionate at this time to specify that the unrestricted PIA remedy must include a dark fibre backstop.
- 5.78 A dark fibre backstop 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). We have not seen any evidence that the number of instances when such a product would be necessary would be significant enough to warrant the imposition of the remedy. Therefore, our current view is that the lack of dark fibre backstop would not create uncertainty that undermines the usefulness of the unrestricted PIA remedy, as Hyperoptic argued. For the same reason, at this time we also consider that dark fibre backstop will not make better use of existing assets, as Telefonica argued.
- 5.79 We also 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 agree with Hyperoptic that there are differences between the UK and European countries in terms of network development and the competitive environment moreover, a cost and benefit analysis is not necessary here, given the limited scope of the potential remedy and the analysis we have undertaken here and for network adjustments.
- 5.80 We remain open to reconsidering our position on 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.

Network adjustments

Our proposals

- 5.81 In the 2018 PIMR Consultation, we said that 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, we said that the unrestricted PIA obligation includes a requirement on BT to make adjustments to its physical infrastructure network in certain specific circumstances, and set out our

³¹¹ TalkTalk's response to the 2018 PIMR Consultation, paragraph 5.20.

³¹² Telefonica's response to the 2018 PIMR Consultation, page 2.

assessment of the level of adjustment that is appropriate and proportionate to make BT's physical infrastructure network available in the context of BT's SMP in this market.

Stakeholder responses

- 5.82 All stakeholders that commented on this aspect of our proposals broadly agreed with our proposals³¹³.
- 5.83 Openreach supported our proposals in broad terms but said that many of its concerns in relation to mixed usage PIA remain relevant here.³¹⁴ Openreach said it needs at a minimum to have strong financial and budgetary controls and authority over any costs incurred (per job and in total), and it should be expected that it will not accept requests or pay for invalid network amendments. Openreach also suggested that the definitions relevant to network adjustments in the draft legal instruments³¹⁵ ("PIA Adjustment Service" and "PIA Pole Adjustment Service") be amended to be in line with our guidance on the scope of the obligation as set out in the 2018 PIMR Consultation.³¹⁶ Openreach further disagreed with the inclusion of "new pole" in the list of services that can be a network adjustment (set out in the annex to Condition 6) as a new pole is extending the network as opposed to providing capacity.
- 5.84 Virgin Media was concerned that there is no mechanism to assess whether Openreach had imminent need to make the same network adjustment that an access seeker is requesting. It said the proposed guidance could lead to a bias in assessments where more expensive network adjustment choices are systematically selected when responding to an access seeker's request in order to take into account BT potential future need.³¹⁷
- 5.85 As noted above BT Group argued that the scope for unrestricted PIA should not include the use of its physical infrastructure to host radio transmission/reception equipment to provide wireless connections. BT Group also said that it would not be proportionate to expect Openreach to undertake potentially costly network adjustments for mobile networks given the large number of sites which 5G might require, and the fact that such network enhancements would not be of shared value to other users (as it claimed Ofcom

³¹³ Digital Colony's response to the 2018 PIMR Consultation, page 3; IIG's response to the 2018 PIMR, 2018 BCMR and 2018 BT RFR Consultations, paragraphs 14.2.4; SSE's response to the 2018 PIMR Consultation, page 3; TalkTalk's response to the 2018 PIMR Consultation, paragraph 5.6; UKCTA's response to the 2018 PIMR Consultation; page 2; Virgin Media's response to the 2018 PIMR Consultation, pages 26-27 and 31; Vodafone's response to the 2018 PIMR Consultation, paragraph 6.23; [X].

³¹⁴ Openreach's response to the 2018 PIMR Consultation, paragraphs 120-125. These concerns are: 1) PIA customers need to have incentives to build cost effectively when Openreach are paying for it; 2) the network adjustment validation process needs to be strengthened; 3) customers need to commit and provide reasonable forecasts with sufficient lead times; 4) there may be lack of sufficient civil engineering resource available to Openreach; 5) beyond a certain level of demand Openreach will not be able to further adjust the physical infrastructure and parallel infrastructure build will be required; 6) efficient overhead final drop processes needs to be agreed; and 7) pragmatic and proportionate approaches on SLA/SLGs is needed.

³¹⁵ 2018 PIMR Consultation, Annex 10.

³¹⁶ Openreach's response to the 2018 PIMR Consultation, paragraph 124 and Annex B.

³¹⁷ Virgin Media's response to the 2018 PIMR Consultation, pages 27-28.

has argued is the case for network adjustments required for the deployment of fixed networks).³¹⁸

- 5.86 Stakeholders also raised a number of specific concerns related to the industry negotiations on the network adjustment regime that applies to mixed usage PIA which were still ongoing at the time of the 2018 PIMR Consultation. We discuss these in the subsection below on the specific requirements for the publication of a Reference Offer.

Our reasoning and decisions

- 5.87 We consider the scope of the unrestricted PIA obligation we are deciding to impose includes a requirement on BT to make adjustments to its physical infrastructure network in the circumstances explained below.

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

- 5.88 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 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.
- 5.89 Our reason for requiring 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.
- 5.90 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.³¹⁹ 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.
- 5.91 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

³¹⁸ BT Group's response to the 2018 PIMR and 2018 BCMR Consultations, paragraph 2.51.

³¹⁹ 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.

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.

- 5.92 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.
- 5.93 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.
- 5.94 Therefore, we have decided 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 will 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 benefits resulting from other telecoms providers deploying ultrafast networks at scale are unlikely to be realised in full.

The requirement to make adjustments is limited

- 5.95 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 have therefore decided to supplement the general and specific network access requirements with guidance on where this obligation would apply.
- 5.96 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.

- 5.97 When designing our 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.
- 5.98 In refining our guidance, we have set out more clearly the criteria we expect to apply. 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 imposing 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 imposing unrestricted 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 imposing unrestricted 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.
- 5.99 Specifically, our view is that the following three criteria should be applied to determine whether a particular network adjustment falls within the scope of the unrestricted 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.

- 5.100 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 ensure that Openreach has a fair opportunity to recover the costs of any network adjustments.
- 5.101 We consider that the package of measures we are imposing, including the three criteria and the guidance we provide below on their application, will ensure that Openreach has sufficient scope to implement any appropriate financial and budgetary controls and authority over any costs incurred (per job and in total). The application of these criteria and guidance will determine whether a network adjustment request is valid and, therefore, which network adjustments requests Openreach will have to accept and/or pay for.

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

- 5.102 Network adjustments involve facilitating access to existing infrastructure, rather than the construction of new infrastructure. Since the network access obligation requires 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 Openreach is never required to construct new physical infrastructure assets (e.g. new ducts, chambers or poles), but where it is required to do so, this will be for the purposes of facilitating access to existing physical infrastructure. Therefore, 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 amounts to an extension of the infrastructure network rather than making use of existing infrastructure assets and will therefore always fall outside the scope of our 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.
- 5.103 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.³²⁰ Our 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 is provided for by virtue of the requirement on BT to provide certain ancillary services, but we do not regard them as

³²⁰ 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.

network adjustments.³²¹ In contrast, we regard network adjustments as involving permanent changes which are required to facilitate access to the physical infrastructure. Generally, this will 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.³²²

- 5.104 Below, we explain how we intend 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?

- 5.105 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. 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.³²³

Is the requested adjustment feasible?

- 5.106 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.
- 5.107 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?

- 5.108 We 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 requiring 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.

³²¹ The practical effect of this is that these ancillary activities are not subject to our decisions regarding the recovery of network adjustment costs.

³²² 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. The latter is not part of the PIA remedy (although under our regulation 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).

³²³ For further discussion please see paragraph 2.52 of Section 2, Volume 3, 2018 WLA Statement.

- 5.109 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 have decided 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).
- 5.110 Given the risk that telecoms providers request network adjustments which would be inefficient, we consider that Openreach should only be required to make adjustments to its physical infrastructure where this improves efficiency.³²⁴
- 5.111 We would 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).
- 5.112 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.³²⁵
- 5.113 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).
- 5.114 Moreover, the factual and counterfactual scenarios should be based on Openreach's own engineering practices applicable at the time. This ensures 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 will also

³²⁴ This reflects our aim in requiring 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 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).

³²⁵ We note that time and difficulty (or operational complexity) can be thought of as drivers of additional costs.

provide greater certainty to Openreach and competing telecoms providers in cases where a range of engineering solutions might exist.

- 5.115 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.
- 5.116 In response to BT Group’s comment that it would not be proportionate to expect Openreach to undertake network adjustments for mobile networks, we consider that Openreach should provide all network adjustments falling within the scope of the network access requirement we are imposing, irrespective of the use underlying the network being installed using unrestricted PIA. We address BT’s comments on scope more broadly at paragraph 5.34 above.
- 5.117 In response to Openreach’s comments in relation to the draft legal instruments, we have set out above the circumstances in which we consider that the access obligation we are imposing includes a requirement to make adjustments and that this requirement is limited. This guidance applies to PIA Adjustment Services and PIA Pole Adjustment Services by virtue of them being network adjustments and therefore, we do not consider that it is necessary to amend the definitions of “PIA Adjustment Service” and “PIA Pole Adjustment Service” (which include “New Pole”) as suggested by Openreach.

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

- 5.118 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.³²⁶ 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 imposed in this statement.

³²⁶ 2018 WLA Statement, paragraphs 2.63-2.88.

Openreach should choose how to undertake network adjustments

- 5.119 We remain of the view 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 provides Openreach with the flexibility to choose the most efficient solution possible, and allows it to take account of its own future requirements.
- 5.120 We note Virgin Media's concerns in relation to Openreach's ability to choose how to undertake network adjustments. 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 regulation prevents Openreach from doing this in the following ways:
- a) The non-discrimination requirements we are imposing 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 decision on 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)
- 5.121 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).³²⁷

Breaking in and out of BT's network infrastructure

- 5.122 Telecoms providers are likely to deploy hybrid networks, using a mixture of Openreach's infrastructure and their own infrastructure.³²⁸ 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.³²⁹ In addition, the ability of telecoms providers to overcome unusable sections of Openreach's physical

³²⁷ As network adjustments are made to Openreach's physical infrastructure, Openreach will retain ownership of the relevant assets.

³²⁸ We expect most deployments to be hybrid designs.

³²⁹ 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.³³⁰

- 5.123 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 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 BT's network ready for use.

Specific requirement to provide PIA ancillary services

Our proposals

- 5.124 We proposed that BT should be required to provide such unrestricted PIA ancillary services as may be reasonably necessary for the use of unrestricted 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.

Stakeholder responses

- 5.125 Stakeholders generally welcomed this element of the remedy.³³¹
- 5.126 IIG, TalkTalk and Virgin Media argued that Ofcom should specify that ancillary services should be subject to SLAs and SLGs.³³²

Our reasoning and decisions

- 5.127 We consider that it is appropriate and proportionate to require BT to provide PIA ancillary services.
- 5.128 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 unrestricted PIA. For example, having access to sites where a telecoms provider locates its electronic equipment for the purposes of deploying a network using unrestricted PIA.

³³⁰ 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).

³³¹ Digital Colony's response to the 2018 PIMR Consultation, page 2; TalkTalk's response to the 2018 PIMR Consultation, paragraph 5.6; and Vodafone's response to the 2018 PIMR Consultation, paragraph 6.34.

³³² IIG's response to the 2018 PIMR, 2018 BCMR and 2018 BT RFR Consultations, paragraphs 13.1.34 and 14.2.1-14.3.4; TalkTalk's response to the 2018 PIMR Consultation, paragraph 5.7; and Virgin Media's response to the 2018 PIMR Consultation, page 29.

- 5.129 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 unrestricted PIA remedy ineffective.
- 5.130 We believe it is appropriate to limit such an obligation to only those unrestricted PIA ancillary services as may be reasonably necessary for such use of unrestricted 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.
- 5.131 We also consider that it is necessary to impose certain specific ancillary services in relation to unrestricted PIA. Our starting point for these is the specific physical infrastructure access services we imposed on BT in the wholesale local access market which we think are equally necessary in the Physical Infrastructure markets. Therefore, we are imposing a requirement on BT to provide PIA power, PIA Co-Location, PIA Co-Mingling, PIA Site Access and PIA Database Access, by specifying these in the unrestricted PIA condition.
- 5.132 In relation to the points raised in consultation responses on SLAs and SLGs, we already require the unrestricted PIA Reference Offer to include any reasonably necessary SLAs and SLGs. Since the unrestricted PIA requirement includes the provision of ancillary services, there is therefore, already a requirement on BT to provide any reasonably necessary SLAs and SLGs in relation to ancillary services. Therefore, we do not consider it necessary to amend the SMP conditions in that regard.
- 5.133 To give effect to our decisions in respect of a specific access remedy and supporting ancillary services set out in paragraphs 5.14 to 5.132 above, we set the SMP conditions at Annex 26. As set out in Section 8, section 87(3) of the Act authorises Ofcom to set SMP services conditions in relation to network access.
- 5.134 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 requiring and we have designed the scope of our requirement with this in mind; we do not consider that our decision will risk undermining BT's investment made by BT in its network; and we consider that our network access requirement is an important element of securing economically efficient infrastructure based competition.

Specific requirements for the publication of a Reference Offer

Our proposals

- 5.135 We proposed to impose a requirement on BT to publish a reference offer in relation to unrestricted PIA in each Physical Infrastructure market. We proposed to do so by imposing the same set of specific requirements for the publication of a Reference Offer in relation to

unrestricted PIA as those we have already imposed on BT in relation to the mixed usage PIA obligation in the wholesale local access market.

Stakeholder responses

5.136 Stakeholders generally agreed that BT should be required to publish an unrestricted PIA Reference Offer.³³³

5.137 However, stakeholders also suggested a number of specific requirements to be added to the ones we proposed.

- 1) **PIA ordering process:** a number of stakeholders commented on the specific procedures Openreach included in the mixed usage PIA Reference Offer relating to PIA ordering. In view of that, they argued we should include specific provisions relating to the unrestricted PIA ordering process, including increased flexibility in relation to the forecasting of unrestricted PIA use;³³⁴ ability for access seekers to reserve capacity;³³⁵ and ability for access seekers to submit larger PIA orders.³³⁶
- 2) **Network deployment process:** stakeholders commented extensively on the specific procedures Openreach included in the mixed usage PIA Reference Offer relating to network deployment processes. They argued we can improve the PIA process by including specific network adjustment provisions, such as ability for access seekers to link unrestricted PIA orders;³³⁷ ability for access seekers to carry out network adjustments as they come across them and submit network adjustment requests retrospectively;³³⁸ shorter deadlines for Openreach to confirm whether work required qualifies as a network adjustment;³³⁹ ability for access seekers to commission third parties to evaluate and complete network adjustment requests;³⁴⁰ and a mechanism for addressing changes to PIA orders after their validation (for example in network adjustment expenditure) beyond the reasonable control of Openreach's management.³⁴¹ Stakeholders also argued that access seekers should be able to connect customers during network deployment.³⁴²

³³³ Digital Colony's response to the 2018 PIMR Consultation, page 2; Gigaclear's response to the 2018 PIMR Consultation, page 3; TalkTalk's response to the PIMR Consultation, paragraph 5.7; UKCTA's response to the 2018 PIMR Consultation, page 3; Virgin Media's response to the PIMR Consultation, page 30, question 5.1; [X]; [X].

³³⁴ CityFibre's response to the 2018 PIMR Consultation, paragraphs 6.1.39-6.1.40; Zayo's response to the 2018 PIMR Consultation, paragraphs 6.1.37-40.

³³⁵ Gamma's response to the 2018 PIMR and 2018 BCMR Consultations, page 14. SSE's response to the 2018 PIMR Consultation, question 5.1.

³³⁶ IIG's response to the 2018 PIMR, 2018 BCMR and 2018 BT RFR Consultations, paragraph 14.2.5 and 14.2.7.

³³⁷ IIG's response to the 2018 PIMR, 2018 BCMR and 2018 BT RFR Consultations, paragraphs 13.1.17-13.1.19 and 14.2.7; Virgin Media's response to the 2018 PIMR Consultation, pages 26-7.

³³⁸ CityFibre's response to the 2018 PIMR Consultation, paragraph 6.1.37.2; Hyperoptic's response to the 2018 PIMR Consultation, page 4; Zayo's response to the 2018 PIMR Consultation, paragraph 6.1.35.2.

³³⁹ IIG's response to the 2018 PIMR, 2018 BCMR and 2018 BT RFR Consultations, paragraph 14.2.3 and 14.2.7.

³⁴⁰ Digital Colony's response to the 2018 PIMR Consultation, pages 3 and 4.

³⁴¹ BT Group's response to the 2018 PIMR and 2018 BCMR Consultations, paragraph 2.56.

³⁴² CityFibre's response to the 2018 PIMR Consultation, paragraph 6.1.37.1; Hyperoptic's response to the 2018 PIMR Consultation, page 5; IIG's response to the 2018 PIMR, 2018 BCMR and 2018 BT RFR Consultations, paragraphs 13.1.14-13.1.16; Zayo's response to the 2018 PIMR Consultation, paragraph 6.1.35.1.

- 3) **Transparency, SLAs and SLGs:** Stakeholders also raised concerns in respect of the requirements on Openreach in relation to transparency, SLAs and SLGs. Stakeholders' proposals on transparency included that Ofcom should impose specific KPIs associated with unrestricted PIA.³⁴³ In relation to SLAs and SLGs, stakeholders argued, among other things, that Ofcom should impose high SLGs to compensate appropriately the party that did not receive the contracted service on time and incentivise the provider of the contracted service to deliver it on time;³⁴⁴ a maximum time for completion of network adjustments and associated SLAs/SLGs;³⁴⁵ and that Ofcom should also specify that network adjustments should be completed within a reasonable period.³⁴⁶
- 4) **Compliance, penalties and termination of contract:** stakeholders argued that penalties for non-compliance with Openreach engineering rules should be lower and apply to both telecoms providers and BT. In their view, only material breaches should be a reason for Openreach to refuse provision of unrestricted PIA.³⁴⁷ In relation to non-payment of unrestricted PIA charges, stakeholders argued that minor non-payment incidents should not constitute a material breach and therefore allow Openreach to refuse service and terminate agreement.³⁴⁸
- 5) **Lead-ins migration:** CityFibre raised a specific concern that when a customer changes provider, there should be an industry wide process for transferring the asset from the losing provider to the gaining provider.³⁴⁹
- 6) **Openreach compliance with its engineering rules:** some stakeholders argued that Openreach should be obliged to comply with its engineering rules in the same way as telecoms providers are.³⁵⁰
- 7) **Wayleaves information:** finally, some stakeholders said the unrestricted PIA product should include all available relevant wayleave information, including start and termination dates.³⁵¹

Our reasoning and decisions

- 5.138 We have decided to maintain the specific requirements for the publication of a Reference Offer in relation to unrestricted PIA proposed in the 2018 PIMR Consultation.

³⁴³ Hyperoptic's response to the 2018 PIMR Consultation, pages 5-6; IIG's response to the 2018 PIMR, 2018 BCMR and 2018 BT RFR Consultations, paragraphs 13.1.27-13.1.29; TalkTalk's response to the 2018 PIMR Consultation, paragraph 5.5; [X].

³⁴⁴ IIG's response to the 2018 PIMR, 2018 BCMR and 2018 BT RFR Consultations, paragraph 13.1.36.

³⁴⁵ IIG's response to the 2018 PIMR, 2018 BCMR and 2018 BT RFR Consultations, paragraph 13.1.35; Hyperoptic's response to the 2018 PIMR Consultation, page 4.

³⁴⁶ TalkTalk's response to the 2018 PIMR Consultation, paragraph 5.7.

³⁴⁷ CityFibre's response to the 2018 PIMR Consultation, paragraph 6.1.37.4; Zayo's response to the 2018 PIMR Consultation, paragraph 6.1.35.4.

³⁴⁸ CityFibre's response to the 2018 PIMR Consultation, paragraph 6.1.37.5; Zayo's response to the 2018 PIMR Consultation, paragraph 6.1.35.5.

³⁴⁹ CityFibre's response to the 2018 PIMR Consultation, paragraphs 7.2.1-7.2.4.

³⁵⁰ IIG's response to the 2018 PIMR, 2018 BCMR and 2018 BT RFR Consultations, paragraphs 13.1.20-13.1.23; Zayo's response to the 2018 PIMR Consultation, paragraph 6.1.35.3; [X].

³⁵¹ CityFibre's response to the 2018 PIMR Consultation, paragraphs 7.4.1-7.4.4; IIG's response to the 2018 PIMR, 2018 BCMR and 2018 BT RFR Consultations, paragraph 14.4.1-14.4.3; Zayo's response to the 2018 PIMR Consultation, paragraph 10.1.4.

- 5.139 As explained in Section 4, a requirement to publish a Reference Offer 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.
- 5.140 We consider that these purposes apply as much to unrestricted PIA as they do to other forms of network access, such that a specific PIA reference offer is required in Physical Infrastructure markets.
- 5.141 In terms of the content of this obligation, we remain of the view that it is appropriate to model our 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. Therefore, we have decided 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 unrestricted 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 unrestricted 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 unrestricted 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 unrestricted PIA, including:
 - 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.

5.142 We consider that these requirements comprise the minimum information necessary to achieve the purposes set out above in relation to unrestricted PIA.

5.143 Our reasons for imposing each of the above requirements in the Physical Infrastructure markets are the same as those relied on in relation to the wholesale local access market. Therefore, our reasons for imposing these specific reference offer requirements are as set out in Section 6, Volume 3 of the 2018 WLA Statement.

5.144 In relation to the specific requirements that stakeholders argued in response to the 2018 PIMR Consultation should be added to the unrestricted PIA Reference Offer, we are comfortable that the requirements we specify in the Reference Offer SMP condition remain appropriate. We do not consider that it is appropriate to put in place more specific requirements as we consider that the industry is best placed to resolve these. We have already seen significant progress as part of the industry negotiations for the final PIA Reference Offer in the WLA market which was published on 4 March 2019 and which we expect to form the basis of the unrestricted PIA Reference Offer.³⁵² We consider that these

³⁵² Openreach, *Physical Infrastructure Access*.

<https://www.openreach.co.uk/orpg/home/products/ductandpoleaccess/ductandpoleaccess.do> [Accessed 07/05/2019].

discussions have either resolved the points raised with us or there is a roadmap to address these. Specifically:

- a) Issues under paragraph 5.137, points 1-3 above have been included in industry negotiations for further improvement of the mixed usage PIA Reference Offer.³⁵³ We support these further negotiations and expect the outcomes to also be incorporated in the unrestricted PIA Reference Offer.
- b) Issues under paragraph 5.137, point 4 above have already been included in the mixed usage PIA Reference Offer. We expect these provisions to be incorporated in the unrestricted PIA Reference Offer.³⁵⁴

- 5.145 We will continue to monitor the effectiveness of industry negotiations and to work with stakeholders to make sure the unrestricted PIA product, including the network adjustments framework and ancillary services, is fit for purpose. If we identify unresolved issues that prevent the remedy from being effective, we will consider using our direction powers to specify additional obligations on BT. We are also ready to intervene if telecoms providers raise a dispute with us.
- 5.146 In relation to the stakeholder comments on lead-ins migration, we accept the potential desirability of creating an industry wide process for transferring assets from a losing provider to a gaining provider. However, there are also significant challenges related to such transfer of assets and we are currently considering their implications outside the scope of this review.
- 5.147 In relation to Openreach's compliance with its engineering rules, we consider that the non-discrimination rules set out in Section 4 of this volume will ensure equivalence between the engineering rules applied to both Openreach and access seekers.
- 5.148 Finally, we note that many of the issues raised in the PIMR Consultation relating to wayleaves fall outside of the current review of the Physical Infrastructure markets and Ofcom's remit. To the extent it is appropriate for us to do so, we will assist telecoms providers in trying to resolve such issues in the most appropriate manner.
- 5.149 To give effect to the above decisions, we set the SMP conditions at Annex 26. 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.

³⁵³ See letter from [X] (Openreach) to [X] (OTA) dated 4 March 2018. The additional industry negotiations include Openreach's "Day 2 process" which is due to conclude by September 2019 and the "bedding in period" which will continue until March 2020.

³⁵⁴ Relevant provisions can be found in Schedule 3 (Accreditation) and section 11 of the Contract Conditions document to the final mixed usage PIA Reference Offer. Information relating to circumstances when CP PIA orders are suspended and the consequences of non-payment incidents is set out in Section 13 of the product description, Schedule 7 (Service Levels) and Schedule 9 (Licence) to the final mixed usage PIA Reference Offer.

Implementation timeframe

Our proposals

- 5.150 We proposed 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.

Stakeholder responses

- 5.151 Many respondents agreed with our proposal.³⁵⁵
- 5.152 PAG, Telefonica, Three and WIG stressed the importance of making unrestricted PIA available to access seekers as fast as possible to support upcoming 5G rollout.³⁵⁶
- 5.153 Paul Wheelhouse MSP, Minister for Energy, Connectivity and the Islands welcomed the intention to implement our remedies within one month from the PIMR statement in spring 2019. He considered that this would enable the successful R100 suppliers to take advantage of this remedy when deploying their networks.³⁵⁷
- 5.154 Gamma, Hyperoptic, IIG, TalkTalk and Virgin Media all suggested that the implementation period should be extended. Broadly speaking they considered that this would allow further time to resolve any outstanding issues from the mixed usage PIA Reference Offer negotiations.³⁵⁸
- 5.155 Openreach also suggested that the implementation period is extended to enable further negotiations with the industry. Openreach said that if time is of essence then an alternative approach would be to state that it is required to implement the changes by agreement with the OTA and its customers and/or as Ofcom may direct.³⁵⁹
- 5.156 Openreach also considered that it would be sensible to delay the introduction of unrestricted PIA so that it aligned with the 'Day 2' Reference Offer and similar product enhancements that Openreach are currently working on. It proposed that unrestricted PIA be implemented by the end of September 2019. It also noted that it did not intend to police the mixed usage PIA product in its first twelve months – and therefore the delay

³⁵⁵ CityFibre's response to the 2018 PIMR Consultation, paragraph 6.1.41; Department for the Economy's response to the 2018 PIMR Consultation, question 4.1; Digital Colony's response to the 2018 PIMR Consultation, page 2; Scot Gov Energy's response to the 2018 PIMR Consultation, page 2; Three's response to the 2018 PIMR Consultation, paragraphs 7-18 and 42-43; Zayo's response to the 2018 PIMR Consultation, paragraph 6.1.41; [X].

³⁵⁶ PAG's response to the 2018 PIMR Consultation, paragraph 3; Telefonica's response to the 2018 PIMR Consultation, paragraph 5; Three's response to the 2018 PIMR Consultation, paragraphs 7-18 and 42-43; [X].

³⁵⁷ Paul Wheelhouse MSP, Minister for Energy, Connectivity and the Islands, response to the 2018 PIMR Consultation, page 2.

³⁵⁸ Gamma's response to the 2018 PIMR and 2018 BCMR Consultations, page 8; Hyperoptic's response to the 2018 PIMR Consultation, pages 3, 5 and 8; IIG's response to the 2018 PIMR, 2018 BCMR and 2018 BT RFR Consultations, paragraph 13.1.25; TalkTalk's response to the 2018 PIMR Consultation, paragraph 5.12; Virgin Media's response to the 2018 PIMR Consultation, page 16-17;

³⁵⁹ Openreach's response to the 2018 PIMR Consultation, paragraphs 109-115.

would make no practical difference to access seekers ability to use unrestricted PIA for standalone business connectivity.³⁶⁰

Our reasoning and decisions

- 5.157 We continue to believe that the specific remedies we impose will lead to minimal disruption for the industry and only require a short implementation period because the 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.
- 5.158 We have therefore decided to allow BT one month from the date of publication of this statement to implement the specific remedies, including the unrestricted 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).
- 5.159 We consider that a similar approach should be taken with Openreach's Internal Reference Offer and we expect that this would also be ready within a month of this statement.
- 5.160 We acknowledge respondents' concerns that refinements are needed for the mixed usage PIA Reference Offer. As noted above, we support Openreach's initiative for further improvement of the mixed usage PIA Reference Offer (the "Day 2" process) and expect the outcomes from this process to be incorporated in future versions of the unrestricted PIA Reference Offer. As with the mixed usage PIA Reference Offer negotiations, we will continue to monitor the Day 2 negotiations closely.
- 5.161 We would encourage our stakeholders to come forward with evidence of non-compliance if they have concerns during the Day 2 process. This will enable Ofcom to investigate any potential non-compliance, using information gathering and/or investigatory powers if appropriate.

Consistency with EC Recommendations and the BEREC Common Position

- 5.162 In developing our measures, we have taken due account of the NGA Recommendation and utmost account of the BEREC Common Position. We consider that our decisions are consistent with these measures.
- 5.163 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 imposing allows telecoms providers to access BT's physical infrastructure.
- 5.164 Recommendation 16 of the NGA Recommendation recommends that NRAs should, in accordance with market demand, encourage (or where legally possible under national law,

³⁶⁰ Email from [X] (Openreach) to [X] (Ofcom), dated 2 April 2019.

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 require BT to install additional capacity, our approach to relieving congested infrastructure gives BT the incentive to do so.

5.165 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 imposing 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 imposing.

5.166 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.”

5.167 We consider that our decisions are consistent with this best practice set out in the BEREC Common Position.

6. Cost recovery

Introduction

- 6.1 In this section we set out our decisions regarding the recovery of network adjustment and productisation costs. These are:
- 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 In addition, we set out our decision with respect to the level of the financial limit on the recovery of network adjustment costs.

Cost recovery of network adjustments

Our proposals

- 6.3 In our 2018 PIMR Consultation we laid out our provisional view that Openreach should recover network adjustment costs over all users of the infrastructure, subject to a financial limit.

Stakeholder responses

- 6.4 In general, stakeholders supported our proposal. However, some stakeholders raised the issue of uncertainty around the level of network adjustments and suggested mechanisms for dealing with this.
- a) BT Group highlighted the need for greater clarity on how allowances for network adjustment costs are established, as well as for mechanisms (such as a regulatory asset base price control) that could deal with the uncertainty on the level of these expenditures which is beyond Openreach's reasonable control.³⁶¹
 - b) Openreach and BT Group suggested that Ofcom could consider explicit triggers to ensure that Openreach is not left exposed to forecast errors on network adjustments given that forecasts will be made with limited experience.³⁶²
 - c) Vodafone noted that Ofcom should put in place detailed reporting processes and mechanisms to allow for the monitoring and rollover of the network adjustment allowance where the allowance has not been used during the market review period.³⁶³

³⁶¹ BT Group's response to the 2018 PIMR and 2018 BCMR Consultations, paragraphs 1.9 and 2.56.

³⁶² Openreach's response to the 2018 PIMR Consultation, paragraph 176; and BT Group's response to the 2018 PIMR and 2018 BCMR Consultations, paragraph 2.56.

³⁶³ Vodafone's response to the 2018 PIMR Consultation, paragraph 6.47.

- 6.5 In addition, some respondents raised concerns with respect to:
- a) The pooling and size of PIA orders.
 - i) CityFibre, IIG, and Zayo argued that the implementation of the financial limit suffers from being an average amount per kilometre, which could lead to BT over-recovering its costs as network adjustments may vary significantly across areas.³⁶⁴
 - ii) Virgin Media referred to the current imposition of a limit on the size of PIA orders by Openreach, stating that it did not consider it appropriate for Openreach to constrain its obligation to fund permanent improvements to its network by the scale of PIA orders.³⁶⁵
 - b) The basis of financial limit. [36].³⁶⁶
- 6.6 On the level of the financial limit, Virgin Media stressed that it was too early to determine if this level was set appropriately and believed that an effective mechanism would be needed to reassess and adjust the limit if found inadequate.³⁶⁷ It also argued that the financial limit should be adjusted annually to reflect CPI, in line with maximum charges.³⁶⁸
- 6.7 TalkTalk added that it is important that the financial limit is the same for adjustments required or requested by BT downstream in order to ensure a level playing field.³⁶⁹
- 6.8 Although Openreach did not object to our proposals, it stated that Ofcom should reassess its approach to cost recovery (both the overall regime and financial limits) in our next round of market reviews concluding in 2021.³⁷⁰
- 6.9 Openreach noted that they had notified Ofcom regarding some changes to PIA products and prices and that these changes were likely to have an impact on Condition 6 that specifies the services that can be subject to the financial limit (these services are listed in the annex to Condition 6). They requested that Ofcom review the services listed in the condition in light of these recent changes.³⁷¹
- 6.10 Openreach further stated that Condition 6 should be amended to give clarity that Openreach are only required to fund the costs of “Retention and Renewal of a drop wire” where the product is required to provide capacity or replace an unusable pole and noted that what constitutes a PIA Order and how this interacts with the financial limit may need amending following industry discussions for the PIA Reference Offer in the WLA market.³⁷²

³⁶⁴ CityFibre’s response to the 2018 PIMR Consultation, paragraph 7.3.2; IIG’s response to the 2018 PIMR, 2018 BCMR and 2018 BT RFR Consultations, paragraph 14.2.5; and Zayo’s response to the 2018 PIMR Consultation, paragraph 9.1.2.

³⁶⁵ Virgin Media’s response to the 2018 PIMR Consultation, page 25.

³⁶⁶ [36].

³⁶⁷ Virgin Media’s response to the 2018 PIMR Consultation, page 32.

³⁶⁸ Virgin Media’s response to the 2018 PIMR Consultation, page 33.

³⁶⁹ TalkTalk’s response to the 2018 PIMR Consultation, paragraph 6.1.

³⁷⁰ Openreach’s response to the 2018 PIMR Consultation, page 4.

³⁷¹ Openreach’s response to the 2018 PIMR Consultation, paragraph 124 and Annex B

³⁷² Openreach’s response to the 2018 PIMR Consultation, Annex B.

Our reasoning and decisions

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

- 6.11 We continue to consider that Openreach should recover the costs of network adjustments over all users of the physical infrastructure, in the same way as it does for BT, to ensure a level playing field between BT and competing telecoms providers.
- 6.12 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. 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. 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.
- 6.13 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 the recovery of network adjustment costs is necessary to encourage network deployment.
- 6.14 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) 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.
 - b) Reduce Openreach's ability to exploit any flexibility it has to increase the costs of network adjustments to competing telecoms providers.
 - c) Promote investment by reducing the upfront costs of network deployment, and reducing the uncertainty that competing telecoms providers face over the level of expenditure required to make the physical infrastructure useable.

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

- 6.15 Although we can estimate the cost of network adjustments that would be required as a result of unrestricted PIA, the incidence of network adjustments is uncertain and variable, and may be higher than we expect.
- 6.16 The higher the cost and incidence of these adjustments, the greater the risk of promoting investment where the benefits to consumers are outweighed by the costs of deployment.

- 6.17 To mitigate this risk, we remain 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. No respondent objected to this proposal.
- 6.18 We have decided that, as proposed in our 2018 PIMR Consultation, this 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.
- 6.19 As mentioned above, some respondents raised concerns around the implementation of this particular form of financial limit. However, we consider that these concerns have either i) already been addressed as part of the discussions on Openreach's Reference Offer in the WLA market (i.e. basis of financial limit³⁷³); or ii) form part of the plans for subsequent negotiations (Day 2 process) for improving this reference offer (i.e. pooling and size of PIA orders).
- 6.20 In general, and as explained in Section 5, we believe that industry is better placed to deal with issues regarding the implementation of the PIA remedy. We will monitor and may consider intervening if there are still issues unresolved by 2021.

Recent changes to Openreach's product list

- 6.21 Having considered the PIA product changes made by Openreach we have amended the annex to Condition 6 to remove products that have been withdrawn³⁷⁴ and to add new products where appropriate.³⁷⁵ Openreach's changes include removing some detailed itemised price list entries in the price list where these are rarely ordered.³⁷⁶ As these products and services are still available to order, these remain in the annex to Condition 6 as in the event that they are ordered they could still be subject to the financial limit.³⁷⁷ At Annex 26 we also set out a direction making the same changes to Condition 7D of our wholesale local access market conditions. This is necessary to ensure that Condition 7D continues to accurately reflect the PIA products offered by Openreach and the amendments made by the direction are the minimum necessary to achieve this.

³⁷³ The network adjustment fund operates for lengths of spine duct of less than 1 kilometre, on a pro-rata basis. Although there is currently a lower limit of 126 meters due to a current limitation in Openreach's systems, it will be removed when the new project code-based ordering process is implemented.

³⁷⁴ The following products have been removed from the annex to Condition 6: "Aborted clearance of a blockage in a duct per aborted clearance" and "Aborted clearance of an additional blockage in a duct per aborted clearance".

³⁷⁵ The following product has been added to Part 1 of the annex to Condition 6: "Demolish Chamber". The following products have been added to Part 2 of the annex to Condition 6: "Work Point Set-Up (Overhead and Cabling); per day"; "Block and tail renewal (rationalise copper blocks)"; and "Erect Fibre Drop Cable/Tube".

³⁷⁶ "Provision of an Earth Spike for pole", "Ferry travel for Scottish islands", "Local Authority fees", "Road Closures (Cable works)", "Install a lightening protection module per 25 pairs", "Provision of a 'BT 668' 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".

³⁷⁷ In reviewing Openreach's PIA product changes it came to our attention that one of the products in this list "Non-standard civils work" was not included in the annex to Condition 6 when it is a product that could be a network adjustment, we have therefore added this product to Part 1 and Part 2 of the annex to Condition 6.

- 6.22 In respect of Openreach's comments in relation to "Retention and Renewal of a drop wire", Condition 6.5 already states that this product is excluded from the financial limit and Openreach prohibited from charging for this service only where it is undertaken to provide capacity on a pole to facilitate the provision of a drop wire or to replace defective pole used for drop wires; therefore, we do not consider further clarity is necessary.
- 6.23 We note Openreach's comments in relation to the definition of PIA Order. We do not consider that the outcome of the industry negotiations in relation to the PIA Reference Offer and the definition of PIA Order are inconsistent, but we recognise that additional clarity could be added. We have therefore made a clarificatory change to the definition of PIA Order in Condition 6 of the PIMR legal instruments. As this is not a substantive change we do not consider it necessary to amend the corresponding definition in the SMP condition that applies to the WLA market.

Level of the financial limit

- 6.24 We have concluded that the financial limit should be set at the same level (£4,750) as for the physical infrastructure access requirement imposed in the WLA market.
- 6.25 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.
- 6.26 We have considered whether there are any specific reasons in the context of this review for departing from this approach and have concluded that:
- a) A financial limit of £4,750 is likely to be sufficient to cover adjustments typically in scope of the unrestricted PIA remedy.
 - i) 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 were satisfied that 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.
 - ii) 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 for leased line deployments than for residential 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,³⁷⁸ as leased lines typically serve customer sites which have

³⁷⁸ 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.

dedicated full size lead-in duct connections rather than the lead-in duct arrangements used for connecting residential premises.³⁷⁹

- b) Setting the level of the financial limit at the same level as for mixed usage PIA will not lead to disproportionate risks for Openreach for the period of this review. As established in Section 7, we expect additional PIA volumes because of unrestricted PIA to be modest over this review period; therefore, we consider that any risks that Openreach may face because of this new PIA remedy are also likely to be modest during this period.
- 6.27 Therefore, our view is that the level of the financial limit for mixed usage PIA is appropriate for unrestricted PIA for the period of this review. For this reason, we find that a mechanism for adjusting the level of the financial limit, as suggested by Virgin Media, is not necessary.
- 6.28 We also disagree with Virgin Media that the level of the financial limit requires annual updating with CPI inflation to ensure consistency with the approach to setting maximum charges that we set out in Section 7 for the following reasons.
- The financial limit is only a mechanism for protecting against the risks from too high network adjustments.
 - The level of network adjustments is still uncertain, and so a CPI based adjustment is unlikely to make the level of the financial limit more or less accurate, particularly given the short length of the review period.
 - We will look again at the level of the financial in our next round of market reviews concluding in 2021.
- 6.29 Regarding TalkTalk's point that the financial limit should be the same that BT applies to its own downstream division, we agree with this principle, as noted in paragraphs 4.84 and 4.88. We will also take this into account when implementing detailed regulatory financial reporting obligations which we will publish in a forthcoming statement.

Conclusion on our approach to recovering network adjustment costs

- 6.30 For the reasons stated above we have concluded that Openreach should recover the costs of network adjustments over all users of the physical infrastructure, subject to a financial limit of £4,750 per kilometre of spine duct.
- 6.31 We acknowledge that there is still uncertainty around the level and incidence of network adjustments and that this could pose risks for both Openreach and access seekers. However, our view is that these risks will be minimal during this review period given the modest take-up of PIA and the protection provided by our decision to impose a financial limit. Moreover, this uncertainty should diminish over time as access seekers gain experience in the consumption of PIA, and the state of Openreach's physical infrastructure becomes clearer.

³⁷⁹ 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).

- 6.32 We will monitor the process of identification and cost recovery of network adjustments and remain open to modifying the obligations and financial limit in the future if we consider that they impose a disproportionate burden on BT or, alternatively, unduly disadvantage access seekers.

Cost recovery of productisation costs

Our proposals

- 6.33 In our 2018 PIMR Consultation we proposed that to enable a level playing field between Openreach and competing telecoms providers, Openreach should recover certain costs incurred when telecoms providers use PIA (which we referred to as ‘productisation’ costs) over all users of the physical infrastructure.

Stakeholder responses

- 6.34 Stakeholders broadly agreed with our proposal. In particular, Vodafone stated that this proposal would prevent distortions to competition between BT and telecoms providers.³⁸⁰

Our reasoning and decisions

- 6.35 Productisation 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.
- 6.36 These costs 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.
- 6.37 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 infrastructure on a comparable basis to BT.
- 6.38 Therefore, we consider that productisation costs incurred when telecoms providers use PIA should be pooled with those that are incurred when BT uses the infrastructure and recover these costs over all users of the infrastructure.

³⁸⁰ Vodafone’s response to the 2018 PIMR Consultation, paragraph 6.44.

- 6.39 It is our view that this approach is unlikely to promote inefficient investment as most productisation costs are not incremental to the decision of a particular telecoms provider to invest but are costs that are necessary to create an effective PIA remedy overall.
- 6.40 Moreover, our decision to spread these costs over all users of infrastructure reduces Openreach's ability to exploit any flexibility it may have to increase the costs to competing telecoms providers by incurring higher productisation costs.

7. Price regulation of unrestricted PIA

Introduction

- 7.1 In this section we set out our decisions on pricing remedies with respect to unrestricted PIA. We first explain why price regulation of unrestricted PIA is required. We then consider our approach to the following 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 unrestricted PIA.

Need for price regulation on unrestricted PIA

Our proposals

- 7.2 In our 2018 PIMR Consultation we set out our provisional view that price regulation is required to support the obligation to provide unrestricted PIA.

Stakeholder responses

- 7.3 The majority of stakeholders did not comment on this issue. Those who commented agreed on the need for price regulation.³⁸¹

Our reasoning and decisions

- 7.4 Given our 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 unrestricted 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.
- 7.5 The adverse price effects could undermine the effectiveness of the obligation to provide unrestricted PIA, and also result in higher retail prices, all of which is ultimately against the interests of consumers.

³⁸¹ TalkTalk's response to the 2018 PIMR Consultation, paragraph 6.2; Three's response to the 2018 PIMR Consultation, paragraph 39; [3<].

- 7.6 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.
- 7.7 Price regulation guards against the risk that BT engages in such behaviour. Therefore, we have concluded that price regulation is required to support the obligation to provide unrestricted PIA and guard against the risk of excessive prices.

Rental charges

Our proposals

- 7.8 In our 2018 PIMR Consultation we proposed to impose maximum charges on unrestricted PIA rental services at the same levels as those set in our 2018 WLA market review for mixed usage PIA.
- 7.9 We also proposed to update the levels of the maximum charges each year in line with CPI inflation, consistent with our approach in the WLA market.

Stakeholder responses

- 7.10 Respondents broadly agreed with our proposals; however, some raised concerns with regards to:
- a) our future approach to setting PIA charges;
 - b) the extent of take-up of unrestricted PIA; and
 - c) the relationship between prices for unrestricted PIA and dark fibre (we address this point in paragraphs 7.40 and 7.41).

Future approach to PIA pricing

- 7.11 Openreach accepted our proposals provided that we clarify the principles underpinning the pricing regime and announce a review of the methodology to be undertaken before 2021 to create a stable, predictable and enduring long-term regime.³⁸²
- 7.12 Specifically, Openreach requested confirmation that any price levels/structures for unrestricted PIA set beyond 2021 will always be designed to (a) provide a fair opportunity for Openreach to recover efficient costs and (b) ensure a level playing field for the provision of all active services between network providers.³⁸³
- 7.13 Similarly, BT Group said that we must establish PIA pricing principles to ensure fair cost recovery in the long term.³⁸⁴ It argued that an enduring pricing regime should ensure that

³⁸² Openreach's response to the 2018 PIMR Consultation, page 4.

³⁸³ Openreach's response to the 2018 PIMR Consultation, paragraph 176.

³⁸⁴ BT Group's response to the 2018 PIMR and 2018 BCMR Consultations, paragraph 1.8.

Openreach does not bear risks from fluctuations in active volumes and that there should be a fair opportunity for Openreach to recover the efficiently incurred costs of providing shared access to its physical infrastructure.³⁸⁵

- 7.14 Conversely, IIG thought that BT could absorb the impact of a reduced downstream market share because of unrestricted PIA in the longer-term, while still being able to recover its efficiently incurred costs. It explained that this was due to a combination of BT having enough headroom in the prices it charges for downstream services and the potential for substantial operational cost savings.³⁸⁶
- 7.15 Other respondents highlighted the importance of maintaining price stability in the long term. Virgin Media said that this would help telecoms providers develop long-term business cases associated with PIA usage and argued that if we were to reassess the basis for deriving PIA charges in future, it would be important to avoid material changes, positive or negative, to the quantum of charges.³⁸⁷ It explained that if pricing of PIA were to fall significantly, the market could arrive at downstream price equilibriums that make self-build unattractive.³⁸⁸
- 7.16 UKCTA and [redacted] highlighted the risk of BT revaluing its regulatory asset base by a material amount in future and the impact this would have on the level of PIA charges.³⁸⁹ They argued that this would remove certainty and harm the usage of PIA over the long-term. They requested mechanisms that would prevent this from happening at least over a minimum timeframe.

Take-up of DPA

- 7.17 BT Group said that we were wrong to provisionally conclude that there will be little take-up of unrestricted PIA during this review period.³⁹⁰ It argued that:
- a) unrestricted PIA provides telecoms providers with strong incentives to get high value customers quickly;
 - b) customers are already delaying procurement decisions pending the outcome of PIMR and BCMR ([redacted]³⁹¹); and
 - c) active engagement of telecoms providers in mixed usage PIA implementation meetings suggests high degree of interest and readiness, stressing that [redacted].³⁹²
- 7.18 Conversely, other respondents agreed with our analysis.

³⁸⁵ BT Group's response to the 2018 PIMR and 2018 BCMR Consultations, paragraph 2.54.

³⁸⁶ IIG's response to the 2018 PIMR, 2018 BCMR and 2018 BT RFR Consultations, paragraph 14.1.21.

³⁸⁷ Virgin Media's response to the 2018 PIMR Consultation, page 33.

³⁸⁸ Virgin Media's response to the 2018 PIMR Consultation, page 27.

³⁸⁹ UKCTA's response to the 2018 PIMR Consultation, page 3; and [redacted].

³⁹⁰ BT Group's response to the 2018 PIMR and 2018 BCMR Consultations, paragraphs 1.13 and 3.8.

³⁹¹ BT Group's response to the 2018 PIMR and 2018 BCMR Consultations, paragraph 3.17.

³⁹² BT Group's response to the 2018 PIMR and 2018 BCMR Consultations, paragraph 3.35.

- a) Openreach accepted that in this market review period, although PIA volumes will grow rapidly, they are likely to remain at relatively modest levels.³⁹³
- b) TalkTalk and [X] stressed that the loss of leased lines because of unrestricted PIA will be modest or insignificant over the review period.³⁹⁴

Our reasoning and decisions

Our approach to setting PIA charges in this market review

- 7.19 In our 2018 WLA market review we set maximum charges for mixed usage PIA for the period from April 2018 to March 2021.
- 7.20 For the reasons set out in Section 5, we are now imposing unrestricted PIA in the Physical Infrastructure market for the period ending in March 2021. We have specified this remedy in an equivalent way to the mixed usage PIA remedy in the WLA market, but without use or geographic scope restrictions, recognising that this addresses the competition concerns that we have identified in our assessment.
- 7.21 Our main objective in setting the price for unrestricted PIA in this market review is to provide certainty and stability for those having invested, or thinking of investing, in alternative network infrastructure. We are concerned that imposing charges for unrestricted PIA that are different to those for mixed usage PIA would risk undermining the certainty that we have established in the WLA market review. Imposing a maximum charge different to the level of PIA charges in the WLA market would risk undermining this certainty for those having invested, or thinking of investing, in infrastructure.
- 7.22 Our view is that this would be undesirable unless we consider that the level of maximum charges for mixed usage PIA is clearly inadequate for unrestricted PIA. We have examined this by looking at the impact that setting maximum charges for unrestricted PIA at the same level as those for mixed usage PIA would have on the ability of BT to recover efficiently incurred costs during the period of this review.

Impact on BT's cost recovery

- 7.23 We have identified the following two impacts of unrestricted PIA on BT's cost recovery:
 - **higher unit costs in the business connectivity markets** due to leased line customers switching to unrestricted PIA; and
 - **additional network adjustment and productisation costs** due to further PIA take-up, over and above that forecasted under mixed usage PIA.
- 7.24 On the first impact, in our 2018 PIMR Consultation we referred to Openreach forecasts indicating a modest loss of Openreach leased lines of around [X] [0 – 4,000] circuits under

³⁹³ Openreach's response to the 2018 PIMR Consultation, paragraph 172.

³⁹⁴ TalkTalk's response to the 2018 PIMR Consultation, paragraph 6.2; and [X].

mixed usage PIA and a further [3] [1,000 – 5,000] circuits under unrestricted PIA, over the period from 2019/20 to 2020/21.

- 7.25 The majority of respondents who commented on this (including Openreach) agreed with our assessment. As mentioned above, BT Group was the only respondent who showed disagreement but did not provide concrete evidence that would suggest that Openreach's volume forecasts were too low. Therefore, we remain of the view that the overall loss of Openreach leased lines because of unrestricted PIA is likely to be modest over the review period.
- 7.26 We also remain of the view that the impact of this volume loss on Openreach's unit costs in the supply of leased lines is already captured by our leased lines charge control decisions. In Volume 3 (LLCC), we conclude that our leased lines charge control decisions are appropriate even in the unlikely scenario that Openreach were set to lose 24,000 leased lines over the same review period.³⁹⁵
- 7.27 On the second impact, we recognise that unrestricted PIA will drive additional network adjustment and productisation costs to the extent that it leads to incremental PIA take-up, over and above that estimated under mixed usage PIA. We continue to consider that these additional costs are likely to remain small during this review period.
- a) **Network adjustments.** As mentioned above, Openreach forecasts suggests that circa [3] [1,000 – 5,000] leased lines will switch to unrestricted PIA during this review period. In our 2018 PIMR Consultation, we considered a conservative estimate of the average level of network adjustment costs for a leased line deployment of £2,880³⁹⁶ per PIA line. We did not receive comments on the level of this cost estimate. Based on this assumption and Openreach's volume forecasts, we anticipate incremental network adjustment costs for Openreach in the order of £[3]m £[3 – 14]m (£2,880 x [3] [1,000 – 5,000] circuits) for the period of this review. Once asset depreciation and the corresponding cost of capital is taken into account, these costs translate to £[3]m £[0.24 – 1.3]m.
- b) **Productisation costs.** We consider that incremental productisation costs are unlikely to be significant over this review period (i.e. less than 1 million).
- Set-up costs are likely to remain unchanged given that we do not expect substantial changes to the scale and functionality of PIA systems because of unrestricted PIA.

³⁹⁵ Volume 3, Annex 18.

³⁹⁶ This is derived by assuming network adjustment costs of £2,400 per kilometre and an estimated average length of a vulnerable leased line of 1.2 km. We consider the 1.2km distance figure to be conservative as this reflects the actual average distance of all vulnerable leased lines, without accounting for the fact that some of these lines share portions of the same physical infrastructure. Therefore, the average infrastructure length required to connect these leased line customers is likely to be shorter. The £2,400 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. It also captures our view that fewer network adjustments are likely to be required for leased line deployments than for residential deployments due to fewer likely pinch points arising in spine (rider) duct when connecting business customers as set out in Section 6.

- S&G costs to support mixed usage are relatively small (£400,000 per annum), so any additional costs because of unrestricted PIA are also likely to be small, particularly given the scale of incremental PIA volumes.
- We anticipate additional per order processing costs to be minimal given a combination of new systems being put in place, which will reduce the cost per order by 2020/21, and modest incremental PIA take-up.

7.28 Therefore, we continue to expect additional network adjustment and productisation costs in the order of £2m for the period of this review.³⁹⁷

7.29 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, in our Volume 3 we estimate that our leased lines charge control decisions are likely to lead to BT over-recovering around £15m to £25m over the period from 2019/20 to 2020/21.³⁹⁸ Given this over-recovery and the importance of stability in PIA charges, for this review period we are not adjusting charges to recover these costs.

7.30 For the reasons stated above, we consider 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 for the period of this review.

Conclusion on our approach to setting PIA charges

7.31 Given the above and that we are giving particular importance to stability of charges in this market review, we have decided to impose maximum charges on PIA rental services at the same levels as those for corresponding products in the WLA market.

Our future approach to setting PIA charges

7.32 In our 2018 WLA Market review we noted that we would be revisiting the appropriateness of our approach to PIA pricing in the context of any renewal of the mixed usage PIA remedy in the new market review period from 2021. We noted that by the time of our next WLA market review we were likely to be in a position to draw on more evidence on how telecoms providers consume PIA.

7.33 We similarly intend to consider the suitability of the pricing structure for any unrestricted PIA obligation we may impose beyond 2021 in the context of our wider set of market reviews which will include the reconsideration of Physical Infrastructure Access.

7.34 While we cannot anticipate our future decisions, we agree with Openreach and BT that any price remedies we may impose beyond 2021 should ensure that:

- Openreach has the opportunity to recover efficiently incurred costs; and

³⁹⁷ 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.

³⁹⁸ Volume 3, Annex 18.

- a level playing field exists between Openreach and competing telecoms providers.
- 7.35 We consider that these principles are consistent with those which we generally adopt when designing price controls. In particular, it is our standard practice to set price controls such that Openreach has the expectation that it will be able to recover its efficiently incurred costs over the review period.
- 7.36 These principles are also compatible with the broader objectives that we have set out for our upcoming review of wholesale fixed telecoms markets.³⁹⁹ For example, establishing a level playing field between Openreach and rival networks would be important for ensuring that BT and its competitors have appropriate conditions to support their investments. In addition, providing Openreach with the opportunity to recover its efficiently incurred costs would support Openreach's incentives to invest more generally.
- 7.37 Regarding the concerns raised by some respondents about the possibility of BT revaluing its physical infrastructure asset base in future and the impact that this could have on the level of PIA charges, we note that we cannot anticipate the nature of any adjustments that BT could propose. Therefore, we are of the view that any adjustments that BT may submit would have to be considered at that time in the context of our general policy aim to avoid abrupt changes and to support stable prices for users.

Maximum charges

- 7.38 We set out the level of maximum charges for the period from 1 August 2019 to 31 March 2020 in the table below. To derive these maximum charges for the start year of the control we have applied the rate of CPI inflation over the 12 months prior to 31 October 2018⁴⁰⁰ to the WLA maximum charges applicable for 2018/19.
- 7.39 The level of maximum charges should be updated each year in line with CPI inflation to allow for changes in the underlying costs due to inflationary pressure over the review period.

Table 7.1: Maximum charges for the period from 1 August 2019 to 31 March 2020

	Maximum charge (£ per year)
Facility in Spine duct per metre - single bore	0.29
Facility in Spine duct per metre - 2 bores	0.18
Facility in Spine duct per metre - 3+ bores	0.13
Facility in Lead-in duct per metre	0.56

³⁹⁹ Consultation on our approach to remedies, https://www.ofcom.org.uk/data/assets/pdf_file/0018/142533/consultation-promoting-competition-investment-approach-remedies.pdf.

⁴⁰⁰ According to ONS data as at 20 March 2019, the CPI inflation rate over the 12 months prior to 31 October 2018 is 2.40%.

	Maximum charge (£ per year)
Facility on pole for Multi-end-user attachment	11.40
Facility on pole for Single-end-user attachment	4.87
Pole top equipment	3.53
Cable up a pole (per cable)	2.30
Facility hosting (per manhole entry)	8.54
Facility hosting (per joint box entry)	2.06
Customer Apparatus In-line Splice hosting and distribution joints (per manhole splice)	29.92
Customer Apparatus In-line Splice hosting and distribution joints (per joint box splice)	18.54
Customer Apparatus Cable Coil Hosting - small (per manhole)	14.96
Customer Apparatus Cable Coil Hosting - medium (per manhole)	29.92
Customer Apparatus Cable Coil Hosting - large (per manhole)	44.88
Customer Apparatus Cable Coil Hosting - small (per joint box)	9.27
Customer Apparatus Cable Coil Hosting - medium (per joint box)	18.54
Customer Apparatus Cable Coil Hosting - large (per joint box)	27.81

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 the period from 1 August 2019 to 31 March 2020. In the subsequent year, the maximum charge will be updated for inflation, measured using the Consumer Prices Index (CPI).

Relationship between charges for unrestricted PIA and dark fibre

- 7.40 In response to our 2018 PIMR Consultation, CityFibre suggested that our pricing proposals for unrestricted PIA were not consistent with the pricing for inter-exchange dark fibre proposed in our 2018 LLCC Consultation.
- 7.41 As the dark fibre remedy is related to the downstream BCMR market we address this concern in Section 4 of Volume 3 (LLCC).

Ancillary services

Our proposals

- 7.42 In our 2018 PIMR Consultation we proposed to cap ancillary service charges at the same levels as the corresponding caps set under our 2018 WLA market review. For those ancillary service charges not subject to a cap, we proposed a basis of charges condition.

Stakeholder responses

- 7.43 Respondents did not comment on these proposals.

Our reasoning and decisions

- 7.44 Consistent with our approach to PIA rental charges, we have decided 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 decisions with respect to the recovery of network adjustment and productisation costs. Namely:
- a) We have decided to cap ancillary charges related to network adjustments undertaken to provide capacity on poles or to make poles useable for dropwires at zero, reflecting our decision 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 have decided to allow Openreach to charge only the amount that exceeds the financial limit.⁴⁰¹ This reflects our decision that the costs of network adjustments should be recovered from all users of the infrastructure up to the financial limit. As with our WLA decisions, we have decided 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 have decided to cap the charges for ancillary activities that represent productisation activities at zero, reflecting our decision that the costs of these activities should be recovered across all users of the physical infrastructure.
- 7.45 With respect to all other charges, including any new PIA products introduced in this review period, and consistent with our WLA decisions, we have decided to impose a basis of charges condition which requires that charges are cost oriented.

⁴⁰¹ We discuss the level of the financial limit in Section 6.

8. Legal tests

- 8.1 In Sections 4 to 7 we set out our decision to require BT to provide network access and associated remedies designed to support and make effective that network access. In summary we have decided to impose:
- 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 decisions we propose to set the SMP conditions set out in Annex 26.

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 SMP condition set out in this statement, we consider that the conditions we have decided to impose satisfy the tests set out in section 47 of the Act, namely that the 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 imposing is objectively justifiable. The remedies that we are imposing 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 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 imposing, 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 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 imposed conditions seek to address that market position.

Proportionate

- 8.6 We consider that each of the conditions we are imposing is proportionate to what those conditions are intended to achieve. In each case, we are imposing 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 imposed remedy is proportionate in sections 4 to 7 above. In Annex 5 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 imposing.

Transparent

- 8.7 We consider that each of the conditions is transparent in relation to what is intended to be achieved. The text of the conditions is published in Annex 26 and the operation of those conditions is aided by our explanations in this document. This statement sets out our analysis of responses to 2018 PIMR Consultation and the basis for the decisions we are taking.

Section 49 tests

- 8.8 In section 6 we set out our decision to issue a direction in relation to section 7D of the SMP conditions in the Wholesale Local Access market. The direction is necessary to ensure that the Wholesale Local Access SMP conditions continue to accurately reflect the PIA products offered by BT following changes to BT's products and that the relevant conditions continue

to operate in the way set out in the 2018 WLA Statement. We are satisfied that this direction complies with the requirements of section 49(2) of the Act. It is objectively justifiable and proportionate for the reasons set out in section 6 and above. It does not discriminate unduly as BT is the only telecoms provider to hold SMP in the WLA market and our direction seeks to address that market position. It is transparent in relation to what is intended to be achieved and the text of the direction is published in Annex 26.

Section 88 tests

8.9 In sections 4, 6 and 7 we have set out our decisions in relation to regulatory financial reporting, cost recovery and PIA pricing. In summary, we have decided to:

- impose cost accounting obligations on BT in Physical Infrastructure markets;
- 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.

8.10 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 distortion⁴⁰² 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.

8.11 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.

8.12 In our opinion, conditions 1, 5, 6 and 11 satisfy section 88 of the Act.

8.13 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

⁴⁰² 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.

electronic communications services. Specifically, given our 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.

- 8.14 In relation to the conditions we are imposing, 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 to increase efficiency and lower costs), choice, stronger incentives to price keenly to attract consumers and higher quality of services.

Rental charges

- 8.15 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.
- 8.16 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.
- 8.17 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).⁴⁰³
- 8.18 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.

⁴⁰³ 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.

Charges for ancillary activities related to productisation

- 8.19 Condition 6.3 requires BT not to charge separately for ancillary services related to order processing. This gives effect to our decision that productisation costs should be pooled and recovered from all users of the physical infrastructure.
- 8.20 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.
- 8.21 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 decision 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.
- 8.22 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

- 8.23 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 decision 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.
- 8.24 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.

- 8.25 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.
- 8.26 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

- 8.27 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.
- 8.28 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

- 8.29 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). 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. However, 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. This 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.
- 8.30 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. 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.

- 8.31 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

- 8.32 The obligations we have imposed will promote network competition by incentivising commercial investment in fibre networks in as much of the UK as possible.
- 8.33 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.
- 8.34 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.
- 8.35 Given this, we consider the package of SMP conditions that we are imposing 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 in carrying out our functions the availability throughout the UK of a wide range of electronic communications services.
- 8.36 In performing those duties 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. 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.
- 8.37 We also consider that the obligations we are imposing 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.

8.38 In 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 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.