Vodafone response to

Physical Infrastructure Market Review

Access to ducts and poles to support investment

Non Confidential version

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Contents

1. Executive summary

1.1 FTTP build is long overdue due to BT's dominance. There is no question that there is an urgent need for investment in UK infrastructure to upgrade the current copper network and enable people to access the faster speed broadband services that can only be achieved with a full fibre connection.

1.2 We agree that DPA is an important tool for facilitating FTTP build by competing networks. Duct and Pole can both speed up and reduce the costs of wide scale deployment of much needed fibre broadband. It is right that Ofcom progresses to make further improvements to the duct and pole product.

1.3 We agree that it makes sense to remove the artificial usage restrictions on DPA and allow all areas of the UK communications market to benefit where they can.

Remedies that fit the market circumstance

1.4 It is important to appreciate that the residential and enterprise fibre markets are at quite different levels of market maturity, with consumer fibre is practically non-existent today, while enterprise fibre has been widely available as a regulated service since 2004.

Enterprise already has fibre

1.5 Unlike the 4% of premises passed with FTTP, BT already has fibre penetration rates of above 75% into enterprise premises and a dominant market position with a market share of 80% across the UK.[1] Enterprises are able to access fibre at any location where they want it. Unlike for copper, enterprise fibre customers incur the full costs of that fibre installation with excess construction charges added to their service installation costs.

Enterprise switching is costly

1.6 Unsurprisingly enterprises do not want to switch after they have directly paid for fibre to be installed to their premises. In addition, they do not want and cannot afford the disruption of cease and reprovide switching, as their services are business critical. This means that there are particularly high barriers to switching, with customers not wishing to face unnecessary additional construction charges and preferring to reuse existing fibre.

An enterprise service provider needs national coverage and a compelling offer

1.7 Communications service providers wanting to compete for enterprise customers need to have national service coverage as these customers have multiple sites across a range of geographies which they need to connect. To encourage customers to switch, prospective suppliers need a compelling offer, which as Ofcom's own research shows this needs to include a lower price than the customer pays today.

[1] Upper point of range 71% - 80% published by Ofcom in BCMR A12.15

DPA will only have a role to play where there is no fibre already.

1.8 Vodafone understands the markets for Enterprise connectivity and mobile backhaul well. We are the largest retail competitor to BT supplying enterprise fibre services and we manage our own cell site backhaul connectivity. Through our direct experience we firmly believe that duct and pole will have a more limited impact on enterprise connectivity and mobile backhaul, as it does not assist with switching barriers and therefore cannot be a substitute remedy for wholesale high capacity leased lines. Duct and pole can help to improve the economics of rivals bringing fibre to sites that are not fibre served today, but will not make a difference where there is already fibre in place.

Dark fibre is the passive solution for enterprise fibre

1.9 The key regulatory remedy to address competition concerns and BT's market power in the high capacity leased lines market is a UK wide unrestricted dark fibre remedy. This in turn would open sites already served by fibre today up to competition. This would allow retail price and service competition to flourish and free customers from Openreach's artificial bandwidth gradient. It would also ensure capital for new infrastructure build is directed at sustainable projects where fibre is absent.

A Mature UK Business Fibre Market – with historic regulatory support for Openreach

1.10 Ofcom's historic support for the Openreach enterprise connectivity model has encouraged Communication Providers (CPs) to invest in connecting to the Openreach network at its deepest point. This means locating kit in BT exchanges and using Openreach as a strategic access provider to overcome the practical and economic barriers associated with digging to connect to individual business premises.

1.11 The Ofcom-endorsed 2014 changes to Openreach's Excess Construction Charge (ECC) pricing structure smooths costs over a wide pool of connection. This together with the critical mass of connections ordered over the Openreach network (not least from guaranteed orders from BT's own business), has given Openreach an entrenched and unmatched scale and cost advantage in the enterprise fibre market that no rational investor would seek to challenge. It is therefore unsurprising that, for enterprise market, no market entry at scale is planned in the years ahead – a point recognised in the evidence Ofcom present in the consultation.

Barriers to Switching in Business Connectivity

1.12 All the evidence shows that there is a significant reluctance amongst Business Connectivity customers to switch access circuit providers, prompted largely by a fear of disruption and the mission critical nature of connectivity to businesses. Customers will only consider switching provider if they can justify the risk by saving enough money to cover the switching costs and materially reducing operational costs in the future. Customers typically also require a "switching premium" to compensate them for the risks associated with switching, such as downtime. These factors have not been properly taken into account by Ofcom.

1.13 With market sentiment loaded against switching and no remedies proposed to address this, any scale investment in new infrastructure by other CPs would be left under-utilised and unable to produce a return for investors.

Procurement in a national market

1.14 Ofcom has failed to take account of the fact that procurement in the business connectivity market is not conducted on local, site by site basis. Instead, purchasing is typically carried out at a national market level in aggregate. Enterprises are looking for a provider that can offer a full range of services, nationwide. As a result, contracts are priced at a national rather than a local level. ✂

The cost to businesses of securing fibre

1.15 Unlike in the consumer market, where token connection fees are paid, enterprise customers typically bear charges which better reflect the true cost of the connection – these take the form of significant upfront connection charges and, where applicable, excess construction fees. Once they have incurred this cost to secure a fibre connection to their premises, they are understandably reluctant to pay again for another fibre connection that offers similar functionality.

BT's enduring Market Power

1.16 Ofcom's presentation of the share of new connections in 2017 highlights clearly that Openreach has a dominant presence in all the geographies it serves. Even in Central London, viewed as the UK's most competitive area for enterprise connectivity, Openreach service share was 70%, significantly above presumption of dominance levels. This underlines the fact that the presence of alternative infrastructure within a location is not in itself sufficient to demonstrate either the establishment of competition or the future prospect of it.

Network Economics and the role of Duct & Pole Access

1.17 A revised Duct and Pole remedy, while helpful in delivering fibre to the minority of remaining enterprise locations where it is absent altogether, will not promote fibre build in areas where Openreach fibre exists already. By Ofcom's own admission it is unlikely to make a material difference over the review period being considered, with Ofcom's own forecasts rightly predicting a very modest role for DPA. To believe that this remedy will make a meaningful difference to competition in this market would be a grave error. The remedy also fails to free CPs from a level of dependency on the Openreach network.

1.18 Ofcom's dig distance model does not rely on evidence from an alternative provider actually carrying out network extensions and therefore contains a number of assumptions that do not hold true and omits a number of costs that are necessarily incurred. The result is that the usefulness of Duct and Pole as a remedy is significantly overstated and the economic challenge faced by alternative providers seeking to extend their own networks to reach customer sites is significantly understated. When properly calculated, the true economic distances for network extensions highlight the enduring dominant position of the Openreach network in enterprise access connectivity.

1.19 The market circumstances of higher prices that Ofcom is seeking to create to incentivise self-build has existed, to a greater extent, in the recent past. It proved unsuccessful in stimulating any new market investment or entry. Openreach returns in business connectivity have been significant for a prolonged period, even at a time when its service levels were at an all-time low. Openreach service failure and excess returns during the previous market review period weren't enough to entice others to invest in the market due to the very significant and enduring economic and switching barriers that exist. Likewise, the failure of the initial alternative enterprise network investors in the 1990s and early 2000s to deliver sustainable returns to justify the initial capex has been ignored in Ofcom's analysis. Ofcom's failure to consider this real life market experience, due to its incompatibility with the theory of competing enterprise fibre networks, serves to undermine the integrity of what is being proposed. In short, there is zero evidence that Ofcom's policy of moving away from cost based regulated prices and artificially inflating Openreach's prices will lead to greater investment in enterprise networks. The reality is just the opposite.

Higher Prices harm UK Business but fail to incentivise build

1.20 Taken together, Ofcom's proposals fail to address BT's dominance. These proposals leave consumers of enterprise connectivity vulnerable to higher prices in a market where there are enduring and significant barriers to entry and switching. They will not entice new entrants into a mature market for UK business fibre.

1.21 Ofcom presided over the 2013-2016 Business Connectivity Charge control that resulted in BT earning significant excess returns. This was because Ofcom's predictions on both costs and volumes diverged materially from reality. This caused UK businesses to pay significantly higher prices over that period. In that market review, Ofcom did not set out to create an outcome where consumers were over-charged, it occurred as a result of a series of errors and misjudgments around Ofcom's charge control modeling. What is proposed for the period 2019 – 2021 does however represent the deliberate decision of the regulator to set aside its obligations to UK business consumers and subject them to higher prices, without a clear attempt to quantify the possibility, if any, of securing scale alternative infrastructure deployment in enterprise networks; a probability which is, based on all the evidence presented, likely to to be very low indeed (and quite possibly no higher than the counterfactual).

Cost effective Backhaul is essential for competitive 5G

1.22 The most disturbing aspect of these proposals is in the irreparable damage that will occur to the deployment of 5G and competition within that market. With higher bandwidth needed for existing and new mobile sites to support 5G within the review period, ✂

1.23 Mobile backhaul represents a separate economic market, with distinct market characteristics. 5G deployment is about to enter a critical phase and the backhaul needs of this market must be addressed as a matter of urgency. Ofcom's BCMR proposals fail to do this and do not honour the assurances Ofcom gave to the Competition and Markets Authority at the point of the BT/EE acquisition.

Securing the right Remedies

1.24 A new set of proposals is needed that will safeguard the business consumer interest, protect competitive 5G roll out and recognise the very different market characteristics of the mature business connectivity fibre market, from the needs of residential users to replace copper with fibre.

1.25 This means Ofcom should:

1.25.1 Introduce a passive Dark Fibre remedy for the mobile backhaul market, to tackle Openreach's ability to distort the bandwidth market through its artificial bandwidth gradient. This will deliver the intensive backhaul bandwidth needed in the 5G market;

1.25.2 Introduce a passive Dark Fibre remedy for the UK enterprise market, to fuel service competition and innovation. This will provide an efficient means for consumers to access competitive offerings without stranding existing fibre assets;

1.25.3 Progress with a Duct and Pole remedy to ensure that where fibre is not already in place, CPs have the means necessary to extend their networks in the most efficient way possible, using the extensive Openreach duct network to do so on cost based terms – but noting that the impact of this remedy in enterprise markets will be material only in areas which currently have no fibre;

1.26 A fit for purpose Dark Fibre remedy is the obvious solution to address Openreach's dominance, promote retail market competition and ensure a competitive 5G market while freeing UK businesses and mobile providers from the constraints of Openreach service specifications and artificial bandwidth gradients. A Dark Fibre remedy is the only realistic and viable means for delivering lasting benefit to end-users as well as promoting retail competition and sustainable investment through greater levels of innovation in otherwise mature business connectivity markets. It is complementary to an enhanced duct and pole remedy, which is likely to be directed at new sites. Dark Fibre is a proportionate remedy, being both efficient and practical to implement. Without Dark Fibre, we can expect UK businesses and mobile providers to be constrained by the limitations of the Openreach active service portfolio, which will curtail the UK's ultimate potential as a digital economy. This holds true both for enterprise and for mobile backhaul markets.

2 The Challenge of Business Connectivity

Importance to the UK Economy

2.1 A well-functioning business connectivity market is vital to the wellbeing of the UK economy. The business connectivity market has a direct link to the success and productivity of UK enterprises. It is also a key enabler for the transition to a digital world for UK consumers, having grown in strategic importance as we progress to cloud based solutions where data is stored remotely and better connectivity is required to retrieve it in real time, and as fixed and mobile demand for bandwidth continues to grow at pace. The true measure of the market's importance to the UK economy is not represented by the £2BN+ of direct revenues generated annually, but by the hundreds of billions of pounds of commerce that it underpins and the range of vital public services it directly supports, from the NHS and blue light services, through to education, local and central government and the UK defense sector. Business connectivity services are the unseen, but vital, network that link businesses to each other, support consumer interactions and act as the circulatory system for a large part of the UK's fixed broadband and mobile infrastructure.

2.2 Demand for business connectivity is growing and as an industry we must rise to the challenge to deliver the service and bandwidth needs of our customers. Over the next two years, the backhaul provided through the business connectivity market will have a crucial role in underpinning a competitive and geographically spread 5G offering in the UK, representing perhaps the business connectivity market's biggest challenge so far. Mobile bandwidth demand to existing cell sites is expected to increase significantly to support 5G devices and the increased functionality that follows, with a large number of new cell sites to follow. Government and Ofcom's timescales for 5G deployment are ambitious, fueled in part by the economic enticement that 5G connectivity can offer, boosting innovation and productivity and helping to improve the UK's prospects within the global economy.

Market Failure

2.3 Our own market experience and Ofcom's analysis illustrates clearly that there are persistent levels of market failure within the UK's Business Connectivity Market, with Openreach dominating wholesale supply in all the geographies where it operates. Since the first wholesale regulated products were introduced in 2001, the regulatory model has taken a BT centric approach, encouraging other CPs to design their own networks around BT service locations and serving exchanges. While this has helped providers buy shorter access circuits from Openreach, it has resulted in BT being able to secure the lion's share of wholesale demand, allowing it to build out and fund, through charges (in the form of connection and excess construction charges) to industry, a business focused fibre ethernet network that dominates supply today.

2.4 Ofcom now proposes a massive step-change to Ofcom's previous regulatory approach, proposing to move to a model which has the aim of encouraging more self-build. If this model had been proposed

in 2001 or even 2004, when the first Ethernet services were introduced, it may well have resulted in very different outcomes today, with BT holding on to a much smaller proportion of the business connectivity market. However, Openreach now has an unassailable lead in the market, with a cost base that can't be replicated by its competitors.

Barriers to making use of alternative infrastructure

2.5 BT's market position has become entrenched, with fibre assets to more than 75% of UK Business Connectivity premises. At this scale BT is significantly ahead of its nearest competitors, being many times larger than its nearest rivals. Substantial economic barriers to extending alternative networks to business customers exist and there are clear business buying behaviours which work in BT's favour and discourage the use of alternative networks. Any transition to a business connectivity market with more focus on infrastructure competition, if it occurs at all, will be slow and gradual. While an enhanced Duct and Pole remedy may be useful and might assist in reducing a proportion of the economic barriers that exist, it does not overcome them for the large majority of customer connections. It would be irresponsible to believe Duct and Pole can be transformational when Openreach's business fibre position is so entrenched, cemented in over a decade of Ofcom policy. It will take a number of years for Duct and Pole to make even a modest impact on the shape of the market.

2.6 As well as the very significant economic barriers to extending networks, there are very fundamental concerns around the reluctance of business customers to switch infrastructure suppliers that need to be overcome if we are to see competition flourish. The very negative business consumer perception around switching suppliers identified by Ofcom through the Cartesian report have existed for a number of years. The Openreach service crisis, now at an end, has left a legacy of mistrust and created an even greater reluctance amongst business consumers to switch.

2.7 There is also a desire among enterprise customers to seek connectivity from just one provider. In a market where connectivity to multiple sites is procured together, this plays straight into BT's hands given its geographic dominance. Ofcom must not turn a blind eye to these concerns and behaviours. Reluctance to switch is impairing the functioning of the market and exacerbating the level of market failure we see today. Ofcom has quite properly taken the issue of consumer switching seriously in the residential sector, however it is yet to properly acknowledge the problem in business connectivity. Left unaddressed, it means that even if new infrastructure is deployed, there is little likelihood that it will be properly exploited by business users.

Acknowledging existing Fibre assets in the Business Connecting Market

2.8 Ofcom's approach to encouraging more infrastructure investment by alternative providers appears to be rooted in the consumer market. However, the consumer market is at a stage in development where fibre penetration is low and there are opportunities for others to invest and gain first mover advantage, overtaking Openreach's legacy copper network. This opportunity doesn't exist in the Business Connectivity Market. This means a different, more nuanced approach is required to tackle

the market failure and enable operators to compete. An approach that allows CPs to make the best use of their own infrastructure assets – and is realistic about the economics of deploying a fibre network over an existing one – is the most effective way to deliver retail competition, while encouraging less dependency on Openreach in the future. This approach will also enable 5G to be rolled out quickly and in a more cost-effective manner, while ensuring that BT isn't able to use its own in-house backhaul resources to give EE a 5G competitive advantage.

2.9 The market conditions – higher leased line prices than would otherwise prevail – that Ofcom is seeking to create have existed previously in the recent past, and have failed to stimulate investment and rebalance competition in the market. BT's returns in the Business Connectivity market for a successive number of years were staggering. In 2014/15 alone BT made excess returns of £352M from regulated Business Connectivity services, representing a nearly 24% return on capital during a period where charge controls were in force and aiming to align charges with cost. These sustained returns prompted Ofcom to take the unusual step of introducing immediate starting charge adjustments. Even with these levels of excessive profits (earned over a period where Openreach service quality was in crisis – forcing Ofcom to intervene to stabilise standards), there was no material market entry.

2.10 Indeed, if we look at the business focused networks in which alterative providers invested in the late 1990s and early 2000s, some of which are located within the areas identified by Ofcom as High Network Reach, the majority are massively under-utilised. ✂

2.11 As the owner of the second largest enterprise network in the UK after BT's (formed by the amalgamation of the fixed networks of Cable & Wireless, Energis, THUS and Your Communications) it gives us no pleasure to highlight these concerns. However, it would be grossly irresponsible if we didn't stress the barriers that will prevent Ofcom's infrastructure competition model from being effective within the business connectivity market.

2.12 The reality is that Openreach's decade long business fibre headstart will serve to undermine Ofcom's policy aspirations for this market. The most likely outcome of the proposed policy shift will be UK businesses and public sector customers paying more for connectivity than they have for a number of years, with no discernible benefits to infrastructure competition materialising.

A Regulatory Approach to Support UK Business & Competitive 5G Deployment

2.13 All the evidence available suggests that Ofcom's proposals as they stand will fail to address the levels of market failure identified and will be insufficient to safeguard the interests of UK business. ✂

2.14 Delivering 5G in a market that makes use of active products with uncontrolled costs is not sustainable as MNOs seek to upgrade bandwidth. The competitive dynamics in the mobile market today are different compared with the 4G roll out – for a start, EE was an independent business when 4G was launched, but now it will be able to secure backhaul in-house, with no cash outflow for BT Group. 5G is also more bandwidth hungry than 4G, with greater need for fibre and backhaul costs representing a larger share of the cost base. ✂

2.15 Ofcom need to reconsider their approach carefully to ensure it is robust and adequately addresses both the causes and symptoms of market failure within the UK business connectivity market. The difference in fibre availability when compared with the residential market is stark, as is the under-developed regulatory model for improving switching between infrastructure providers. What is clear from all the evidence presented by Ofcom is that the presence of alternative infrastructure in the vicinity of a customer site is in itself insufficient to demonstrate competition or even the potential for future competition. BT's dominance will not be addressed by these proposals due to a number of concerns:

2.15.1 **The reluctance of end users to switch infrastructure providers in the market:** This is a significant problem and Ofcom's own evidence indicates that even experienced business connectivity customers avoid switching. This is more than just an unfortunate perception. Business customers have very real concerns that act as a significant deterrent to greater alternative infrastructure usage. Ofcom has proposed no remedies to address this.

2.15.2 **The very limited scope for market entry in a mature business fibre market**: Past practical market experience has demonstrated that even in an environment where BT has been able to overcharge business customers significant sums for business connectivity, market entry was not forthcoming. In the absence of active service pricing remedies or a wider scoped Dark Fibre remedy that would allow retail suppliers to break free from Openreach's artificial bandwidth gradients, business consumers will not be protected from BT's SMP.

2.15.3 **The high bandwidth needs of MNOs for 5G roll-out:** The rapid, nationwide roll-out of 5G and establishment of a competitive 5G market risks being compromised due to Ofcom's failure to recognise the bandwidth needs of MNOs that aren't part of BT Group. ✂

2.15.4 **Failure to align prices with cost:** In the absence of a Dark Fibre remedy, Ofcom's policy direction is to raise pricing in the hope that this might encourage duplicate network investment, along with the proposed DPA remedy. This is expected to cost UK tax payers and business customers who buy Business Connectivity Services around £200M more than the status quo (keeping pricing aligned to cost in an active charge control).

2.15.5 **The limitations of Duct and Pole Access as a remedy:** The cost assumptions used by Ofcom in their analysis of the Duct and Pole product contain errors and overstate the benefits of using Duct and Pole. This is in part because the figures used by Ofcom are unrealistic and miss key costs, and as a result, they overestimate the level of competitive constraint that

arises from alternative infrastructure. Overconfidence in an unproven Duct and Pole remedy risks compromising competition in the short term. This is even apparent in Central London, the location where Ofcom cite the highest level of competitive supply, but where Openreach secured over ~70% of new orders in 2017.

2.15.6 **Barriers to alternative network use:** Ofcom proposals seek to define markets through a measure of the ability of rival networks to extend and connect customer sites. It is apparent from Ofcom's own evidence that competition in the market is not shaped at all by the ability for networks to be extended to reach customer sites, with rivals' network extensions making up just 2% of the connectivity in 2017. Market competition is enabled by something not at all considered by Ofcom – historic installed connectivity, where network capex is already sunk.

2.15.7 **The economics of overbuild**: The economics of duplicating BT's existing fibre has not been properly understood. It would make no commercial sense in many cases to replicate fibre that already exists. This is particularly true for mobile backhaul, where there is only ever likely to be one customer at that location (the MNO). Having paid connection and excess construction charges to reach that location, MNOs are unlikely to pay again for a fresh dig and in so doing stranding the existing fibre asset.

2.16 We urge Ofcom to pursue a course that encourages rather than inhibits further infrastructure competition in business connectivity, and which provides the necessary remedies to equip the market to deliver for business consumers in the near term – in particular, this means tackling the urgent UK infrastructure requirements of 5G. This means Ofcom should:

2.16.1 Introduce a passive Dark Fibre remedy for both mobile backhaul and enterprise access. This would tackle Openreach's ability to distort the bandwidth market and end artificial bandwidth gradients, fueling retail competition, service innovation and the efficient use of electronics to reduce costs. An appropriately priced Dark Fibre solution would deliver for 5G and avoid discouraging efficient alternative infrastructure build. As a minimum, dark fibre should be available at all existing Business Connectivity sites (including mobile sites) where Openreach active fibre services are in situ.

2.16.2 Progress with a Duct and Pole remedy to ensure that where fibre is not already in place, CPs have the means necessary to extend their networks in the most efficient way possible, using the extensive Openreach duct network to do so on cost based terms;

2.16.3 Set accommodation services regulation in recognition of its cross market function and fully enables economies of cost and scope that would be open to Openreach and BT Enterprise.

3 Market Context

Vodafone's place in the business connectivity market

3.1 Vodafone is a significant player in the UK business connectivity market, with decades of experience as a major supplier to UK enterprises and the public sector through our substantial fixed line business. We are the second largest provider of business connectivity to the UK enterprise sector. We are also a major purchaser of connectivity in our own right, securing backhaul to our own mobile sites throughout the length and breadth of the United Kingdom. Although we are significant player, with decades of market experience, we are a distant second, with BT's market presence many times larger.

3.2 We have invested in technology that has allowed us to better understand and map our network as well as the connectivity choices open to us when we seek to connect a customer or one of our own sites. We have better insight into the economics of connecting and extending our network and a greater understanding of the decision making process undertaken by our customers when considering to switch or pay for a new connection.

3.3 These new insights have helped us to prepare this response, enabling us to better anticipate how much of a difference new remedies will or won't make. In a market where demand is growing rapidly, but barriers to infrastructure competition remain high, it is important for us to understand when existing network assets can be viably used and where the duplication of fibre is uneconomic.

The investment history and climate in UK business connectivity

3.4 The business connectivity market is responsible for the majority of the UK's existing fibre assets. Although UK fibre penetration is less than 6%, that fibre is largely concentrated in the business connectivity market, where the167,000 large enterprises that Ofcom sees as being served by the BCMR market have fibre to their sites where and when they wish.

3.5 A number of business focused telecommunication companies entered the market in the 1990s and early 2000s. Cable & Wireless, Energis, THUS, Your Communications, Torch, MCI-Worldcom, Global Crossing, COLT and Fibrenet all started to compete against BT for enterprise business, investing in new fibre networks to do so. The networks were focused on major UK cities, with trunk connections between these locations. With the exception of COLT, all these businesses have been subject to some form of takeover, asset sale or financial restructuring, prompted in most cases by an inability to sustain their original business models, taking account of the very large sunk costs incurred in laying down enterprise fibre networks.

3.6 While the fibre assets of these businesses remain in situ, they remain under-utilised and struggle to compete against the scale, cost base and ubiquity of Openreach's fibre ethernet network. ✂ In the context of the Business Connectivity Market, Virgin have focused on seeking to connect business customers who are in proximity to their traditional residential cable footprint.

3.7 In 2001, following intervention from Oftel, BT launched its first wholesale business connectivity services, Partial Private Circuits (PPCs). Prior to that, other CPs wishing to use BT tail circuits to connect clients had to buy retail services. In 2004, again after regulatory intervention[2], BT launched Wholesale ethernet services. The ubiquity of BT's network, its ability to aggregate demand from a range of retail buyers (including all BT lines of business) and its incumbency advantages in connecting buildings, allowing it to connect premises with the least amount of disruption – including greater certainty around excess construction costs – has allowed it to cement its dominance in the business connectivity market. This dominance is also evident in the mobile backhaul market, where BT's market share is in the range 80-90%[3], with BT able to use volume discount schemes and long term purchasing commitments to secure most industry demand, even in locations where alternative supply options might be present. The acquisition of EE by BT in 2016 has allowed BT to tighten its grip on the mobile backhaul market yet further.

3.8 The structure of the industry has resulted in other retail providers of business connectivity funding BT's network expansion. By our calculations, over £500M[4] has been paid by industry to Openreach in the form of Excess Construction and Connection charges to fund Openreach's business fibre footprint over the past decade. This wealth transfer from other retail providers to BT has left the alternative business connectivity networks established in the 1990s/2000s underutilised, as the cost of connecting new customers to these alternative networks remains prohibitive in comparison. This has left alternative investors ultimately unable to capture the market share necessary to justify their initial investment, even over a prolonged period when active service pricing was high.

3.9 The Openreach products sold into the wholesale market have been structured and priced based on BT's network and service architecture. This requires CPs to backhaul to BT exchanges and rent space inside those BT exchanges to serve customers in order to consume Openreach access products at the lowest regulated prices. Securing the lowest wholesale cost is essential if CPs are able to stand a chance of competing against BT lines of business in the retail market. This focus on Openreach service architecture has resulted in CPs directing their more recent investments into connecting BT exchanges and renting co-location space to lower their wholesale cost base.

3.10 The need for BT's network rivals to divert their funds – towards interconnecting to multiple BT exchanges and paying excess construction charges and connection fees to Openreach – came at the expense of investing in their own networks. Even where alternative infrastructure was available, a number of significant obstacles prevented it from being used at the scale needed to justify the cost of the original investment. Two decades later, these obstacles remain unaddressed and include:

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[2] https://www.ofcom.org.uk/about-ofcom/latest/bulletins/competition-bulletins/all-closed-cases/cw_656
[3] https://assets.publishing.service.gov.uk/media/558a835ded915d1592000001/BT-EE_full_text_decision.pdf [102]
[4] Taken from BT's Current Cost Financial Statements which recorded ECC payments of ~£50M in 2014/15 & 2015/16 and £70M in 2016/17 - £500M is a conservative extrapolation over the past decade.

3.10.1 **Business Connectivity procurement** – business connectivity is mostly procured by business customers on a national basis. Local buying is rare.

3.10.2 **Lack of rival connected premises** – The cost, time delay and disruption caused by civil works to extend/reuse the existing duct/network to new business customers, has deterred greater alternative network usage. After the contractors have left the scene during the initial roll out phase, the cost of getting them back to connect up individual premises at a later date is often prohibitive, especially if the building already has an existing Openreach fibre connection. Customers are rightly unwilling to pay a large second connection charge, when they have previously paid one to Openreach indirectly. With a copper to fibre scenario, the benefits of a new delivery technology are immediately apparent. However, this is not the case for a fibre to fibre switch.

3.10.3 **Openreach's ability to aggregate demand from multiple CPs (including uncontestably BT lines of business) –** This enables Openreach to achieve aggregation efficiencies that cannot be matched, as the density of business connectivity customers is lower than it is in the consumer market. ith a critical mass of orders in each area (secured from BT and other CPs), in most cases Openreach has the lowest cost to serve.

3.10.4 **Risks and reluctance to switch –** Business customers by necessity are risk adverse. This reflects the critical nature of many of these services and the overall importance of connectivity to the financial wellbeing of their businesses, as constant connectivity is a necessity to trade. Consequently, there is far more reluctance to switch supplier than in the consumer market, where the risk is one mostly of inconvenience rather than direct financial loss. The Openreach ethernet service crisis has magnified these consumer concerns.

3.10.5 **Significant price reductions are necessary** if customers are to switch from an Openreach-based service. Ofcom has assumed that "price matching" is good enough, but this leads to fundamental mistakes in Ofcom's contestability analysis.

3.11 Today, 20 years after that significant wave of initial investment, Openreach's market position appears as dominant as ever. Even the presence of rival infrastructure has failed to reduce Openreach's market share in a material way – Openreach has a very high share of 2017 business connectivity new customer orders in every part of the United Kingdom.

3.12 As part of our BCMR response we have spend considerable time gathering the data and calculating the cost of network extension and although it is likely that unrestricted DPA will in some cases reduce the cost for operators of extending their network we have concluded any network extension to a building that is not connected to an operator's network is not economically viable for the supply of 100Mbit/s or 1Gbit/s Ethernet services even in cases where DPA is used.

3.13 Additionally we concluded that to extend your network to provide very high bandwidth 10Gbit/s services is only economically viable for short distances. It is worth noting that the economic viability

of extending the network to serve a 10Gbit/s customer is purely driven by Openreach's current 10Gbit/s active service pricing which is not cost based. Openreach have this year reduced the price of this service by 50%. This creates uncertainty in the market and undermines future build/buy decisions for alternative network builders. If Openreach reduce the price further to a cost based price, which they have complete freedom to do, any investment now in network extension would be de-valued. This uncertainty and control of the market from Openreach is a direct result of their dominance in the market and undermines network roll-out even in cases where DPA is utilised.

The Impact of Excess Construction Charges (ECC) cost smoothing on the market

3.16 The existing Excess Construction Charge model allows the first £2800 of Excess Construction Charges to be included within the Openreach connection cost (Openreach is given headroom for this cost within its charge control cost stack, with £722 per circuit allocated to cover inclusive ECCs). Any costs arising over and above this are met by the ordering CP (and their customer). This has provided considerable certainty within the planning and purchasing process for business connectivity, taking most customers outside of the scope of additional ECCs. It allows quotes to be confirmed quickly and customers to proceed with certainty. Prior to this ECC regime being implemented, the probability of incurring an ECC on an Openreach order was 33% with an average charge billed of £4400.

3.17 Indeed, even those customers who do end up paying ECCs (whose cost of circuit delivery is in excess of £2800) are benefiting from an Openreach wide approach that sees an element of smoothing in the costs (£722 of cost contribution from the connect charge allows the customer to incur up to £2800 of costs before additional ECCs apply) with customers effectively cross subsidising each other, thus supporting market wide certainty for Openreach customers. The ability to provide near instant certainty has brought considerable benefits to Openreach. As connection volumes on the Openreach network have increased, so too have the number of connected buildings, increasing the reach of the network and therefore reducing the instances of future ECCs when new orders arise in the same or adjacent locations. This cycle of improved certainty and reduced likelihood of additional ECCs helps when customers are provisioned, making the on-boarding journey far less problematic. In the last two years alone, all the new connections to the Openreach network have contributed an enormous £78M into the general Openreach fund to reduce average fibre construction and duct construction for customers using the Openreach network.

3.18 However, it has made it much harder for CPs not using Openreach infrastructure to compete. Dig distances for using non-Openreach supply options tend to be longer, increasing the cost of excess construction charges. With no ECC smoothing and fewer aggregation of demand benefits (as a result of a far lower volume of orders processed), it means customers end up with much larger upfront costs if they choose to avoid Openreach. The instant certainty Openreach can offer is contrasted with the time required by other CPs to survey and then quote, which customers often aren't prepared to endure.

3.19 While the Openreach ECC regime has brought certainty and cost control to business customers, it has created a new barrier that other infrastructure providers must overcome if they are to attract new connections. This makes it less likely that that non-Openreach supply options will be selected, even where a shorter dig is required.

Market Characteristic: Reluctance to Switch infrastructure supplier or migrate to new forms of access

3.20 Cartesian's report for Ofcom[5] highlighted that "*Provisioning of fixed connectivity services was one of the major concerns for a large number of interviewees* [business connectivity customers] with a great deal of anxiety around the potential for delays caused by *construction, civils, blocked ducts and wayleaves issues, as well as the inability to plan and manage these events."* In contrast, once in situ, business connectivity products have a strong reputation for reliability and dependability. Ofcom published a survey by BDRC in 2016 that identified the importance of price, quality of service and resilience, but also the existing relationship with the incumbent supplier. Two thirds (66%) of respondents had not switched supplier in the last 5 years, suggesting a low switching rate of just 6.8% per annum.

3.21 For a procurement manager to risk disrupting his or her business, there needs to be a very compelling reason to authorise a switch of supplier/underlying infrastructure. This means for alternative providers to win market share from BT's retail lines of business, they have to price their products at a much lower level than BT or offer something genuinely innovative. Matching or even slightly undercutting the BT price with a similar offering is not enough to motivate customers to switch and justify the risk of disruption, given their very real anxieties about the potential risks associated with making the switch. Openreach's recent ethernet service crisis has exacerbated those fears.

3.22 Even when customers are staying with the same supplier, but the access circuit is being replaced or adjusted, it can be a very resource intensive process for both the customer and the CP, with the entire process requiring significant co-ordination and project planning to fit in with both the customer and CPs needs. For tail optimisation – for example, moving to a shorter Openreach access tail or on-net circuit, or migrating to the latest generation of Ethernet Circuit – an extensive process needs to be undertaken.

3.23 In a Tail Replacement (overbuilding an existing circuit): typically, this occurs when shifting from one technology to another, and involves a new circuit route with both old and new services running in parallel for a time. There needs to be sufficient space and power in all locations to parallel run, and agreement on when the cut over will occur – often out of hours, with customer support on site to reboot dependent systems.

3.24 In a Tail Shortening, you are not replacing the existing tail, but instead looking to shorten it to achieve a reduction in distance and cost. Commonly known as a B End shift, the circuit will be moved to a

[5] Cartesian: Business Connectivity Market Assessment – A report for Ofcom 2018 (Page 48)

closer serving exchange. An outage is often required and again the work needs to be fully coordinated with the customer on a circuit by circuit basis.

3.25 There are substantial commercial and operational considerations which make these activities costly and complex:

3.25.1 The costs involved in circuit shift represent considerable expense for the customer and the CP, with significant operational issues to manage. It often means co-ordination between the retail CP, the wholesale provider (typically Openreach) and the customer, with the physical presence of all three at the time the cut over is made. Aligning valuable resources and investing customer time, normally within a 3-hour window, can be challenging and requires dedicated project management support to co-ordinate. This can be even more challenging when the customer site is remote/unmanaged or if technical resources are not based at the location, requiring travel.

3.25.2 There are requirements for customer agreed outage times – in many cases CPs cannot force a customer to take an outage of their service and this must be done at a mutually agreeable time. Customers have the ability to cancel outage windows up to 24 hours prior to outage without charge, leading to the standing down and potential idle time for resources.

3.25.3 There may be very specific safeguards built into the customers' connectivity needs that need to be taken into account. For example, 'separacy', the requirement for geospatial or full carrier diversity, ensures that the new routes have no single point of failure and the main and back up circuits follow entirely different paths.

3.25.4 Sometimes a customer is unable to accommodate an outage of no more than a few minutes (or less), so full parallel running for a prolonged period is needed to ensure that the service can cut over and be sustained (with a resilient fall back in place). This often means running two circuits for 45 days or more (a cease cannot be confirmed until the replacement service is up and running). In the most sensitive cases, dual running can last over 12 months with much of the time spent awaiting agreed customer outage dates. This adds significantly to the costs.

3.26 Any systems change is likely to be disruptive and there is a higher switching risk with systems upgrades, so they are often avoided or delayed. From a CP perspective, putting customers through this additional operational headache raises concerns of churn. CPs try to keep customer disruption to a minimum and avoid changes to underlying infrastructure. If customers sense disruption is inevitable, they may seek to avoid the change or use it as an opportunity to retender (as a network change is likely under both the status quo and new supplier scenarios). There is also a finite amount of industry resource available to carry out such work (in terms of skilled staff and engineering resource). The Openreach service crisis from 2012–2016 is a stark reminder of the consequences that can occur where too many engineering tasks are placed on a limited pool of industry resource.

Meeting the Challenges of 5G Deployment

3.27 The business connectivity market's biggest challenge yet lies in the immediate future – ensuring sufficient backhaul to support 5G. Upgrades to existing sites are due to commence during 2019, and this will mean upgrading capacity to existing mobile cell sites (either upgrading existing fibre or moving off microwave links to fibre) and getting fibre to new sites.

3.28 To accommodate 5G at existing fibred 4G sites, where MNOs have already paid to connect – these sites are often in locations where the MNOs are the only customers, with no alternative re-use – and in the absence of a Dark Fibre remedy, MNOs will either have to pay for active service price bandwidth re-grade fees, or build out or buy alternative fibre infrastructure at considerable expense. The latter approaches would not make any commercial sense given the costs MNOs have made in connecting with their current supplier. It would also be inefficient from an asset utilisation perspective, as the previous fibre resource would be left unused and in most cases could not be redeployed for any other purpose.

3.29 In its evidence to the Competition and Market Authority, Ofcom emphasised the importance of a Dark Fibre remedy to resolve concerns over mobile backhaul. With BT noted as supplying approximately 80–90% of all ethernet-based fibre mobile backhaul (i.e. including third party suppliers and self-supply) in the UK, it was said to be essential that Ofcom had a remedy to combat the potential anti-competitive impact that a merged BT / EE could have on the market. In the absence of an effective Dark Fibre remedy, BT's ownership of EE could allow BT to leverage its market power into the competitive mobile market, distorting the competition which to date has driven technology investments, by further reducing investment incentives in the UK mobile sector.

4. Duct and pole – part 1

4.1 In this section we provide an overview of how we consider the FTTP/H networks will be deployed and how the unrestricted duct and pole remedy would be used. Our experience of FTTP network build in other countries and our experience of being the UK largest business connectivity rival to BT give rise to our firm views that:

4.1.1 FTTP build will not present a credible scale alternative network to the current existing networks and will not lead to a step change in demand or supply to enterprises requiring high bandwidth leased lines connectivity;

4.1.2 The maturity of the leased lines market means that where fibre is already in situ overbuild will continue at the margins as it does today. The costs of overbuild will mean that companies using or forced to use this connectivity method will not be able to effectively compete with BT businesses that have access to the Openreach fibre which has been installed under earlier regulatory regimes;

4.1.3 Unrestricted ducts' most useful application will be to serve sites that do not already have fibre serving them

4.1.4 Due to the maturity of the leased lines markets and BT's retail market power, as well as BT's access to existing Openreach fibre when competing in retail markets, duct and pole can only be a complementary remedy rather than a substitutory remedy

4.2 Ofcom sets out that it believes new networks that may be built using BT's duct network will have an effect on competitive levels in the business connectivity market.

4.2.1 Ofcom does not provide any detail or any evidence of how this will occur in practice. It is necessary to consider the new networks are being built.

4.2.2 The primary stated aim of the network builders is to install new fibre to residential premises to meet the extreme lack of such fibre in the UK.

4.2.3 The secondary purpose for one of the prospective network builders, which is also regarded as a possible business case enabler, is the provision of replacement leased lines to premises which already have fibre.

4.2.4 It is also necessary to consider if new network builders will face improved economics to those faced by rival network infrastructure owners who already have networks today. We find no evidence of a likely improvement in the economics for the future, nor do we find that these networks have the prospect of increasing competition in the mature business connectivity market.

4.3 There is therefore no justification for adjusting the approach to business connectivity regulation in the hope that network build will follow, when there is no evidence or indication to suggest that it will. On

the contrary: Ofcom should not treat DPA as being likely to have an effect in the markets considered by the BCMR during the period of this review.

FTTP network competition and high bandwidth leased lines competition

4.4 In this section we draw on our expertise of rollout of FTTP networks in other countries.

4.5 We show the typical method used to deploy residential FTTP networks and the method by which business leased line customers are connected, highlighting the differences between the two and different cost economics of each deployment method.

4.6 We consider the difference in costs of installing business sites with leased lines during FTTP rollout and the costs of returning post FTTP to add an incremental leased lines business site. This identifies that the cost of the fibre installation crew and the fibre splicing contractors, together with landlord way leaves and traffic management, lead to very high costs which are rarely justified given the lower Openreach cost base. Adding individual leased lines for business premises is a very high cost activity. Retrofitting business connectivity after initial network deployment is expensive with the task in hand not differing to the connectivity of such customers to the business focussed networks that are in existence today.

4.7 We review how leased lines market share has not changed for Telefonica in Spain following FTTH network rollout.

Rollout of FTTH networks

4.8 In the current and future digital world, higher home bandwidth demand requires the upgrading of legacy copper communications infrastructure into a higher capacity fibre one. Countries throughout the world are at varying stages of this network upgrade. In the UK some locations have been earmarked for new FTTH networks. The business plans of these investors vary from a more rural focus, a tight geographic focus, to a more wide-ranging ambition from both Openreach and CityFibre.

4.9 In the following section we explain how the build is undertaken using our experience in a variety of markets throughout Europe.

4.10 The key focus of these investments is prodominantly residential areas. In the following section we discuss the standard approach to network deployment.

Designing the network

4.11 The pre-design process is:

4.11.1 Gather the details of the properties in the area which the network intends to serve. The locations and types of buildings are important (e.g. single dwelling unit (SDU), multiple dwelling unit (MDU), offices, factory, school etc), to correctly dimension the initial fibre deployment. Add any geodemographic data if desired, such as income markers, degree of home ownership, student area etc.

4.11.2 Group the properties into cells of 2000 or so. These cells will be served by cabinets or underground equivalents, grouping into roughly 500 properties.

4.11.3 These cabinets are linked with a feeder duct route to connect them to the serving POPs for the area. The route should be designed for growth, allowing future cables to be installed without need to remove current cables first, and for resilience, allowing physical route robustness back to the POPs and minimising the impact of fibre or duct breaks.

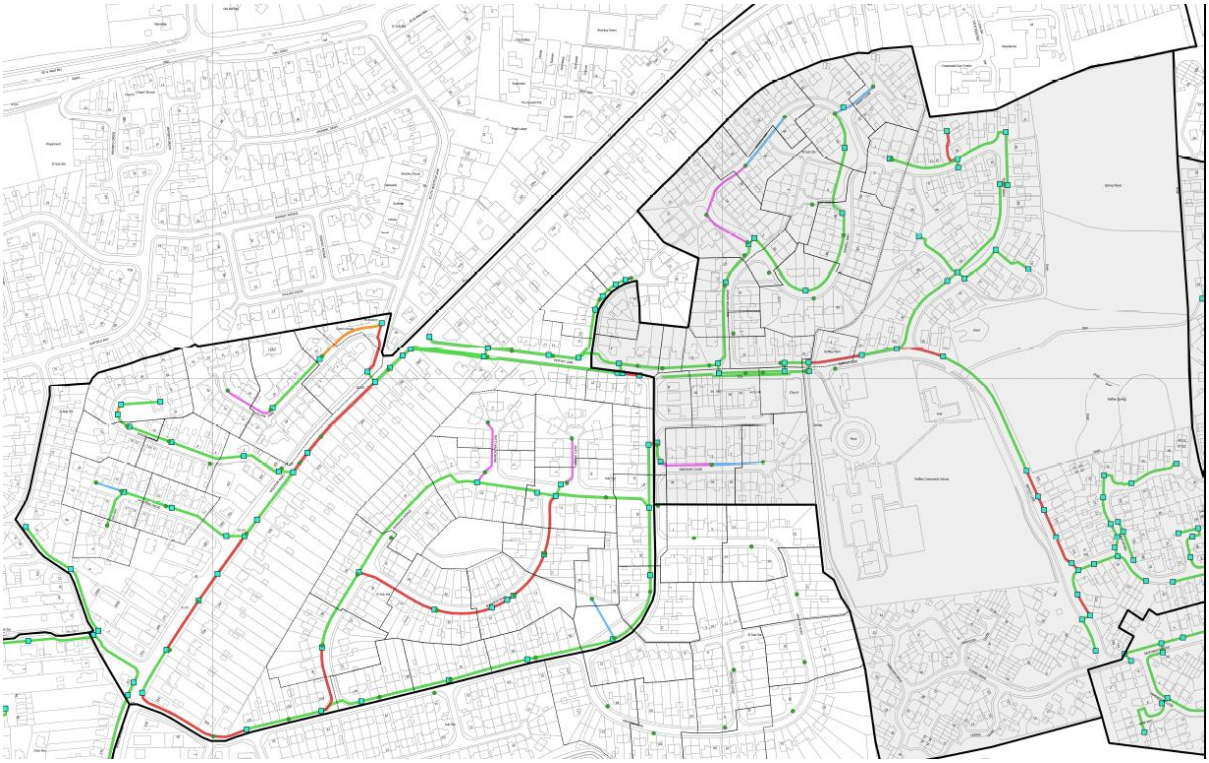
4.11.4 The cables in the feeder routes are sized to cover the desired market segments – if FTTH, then driven by residential houses; if Enterprise only, driven by SMEs and businesses; if mobile backhaul, then cellsites.

4.11.5 Cables will also need to allow spare fibres for maintenance.

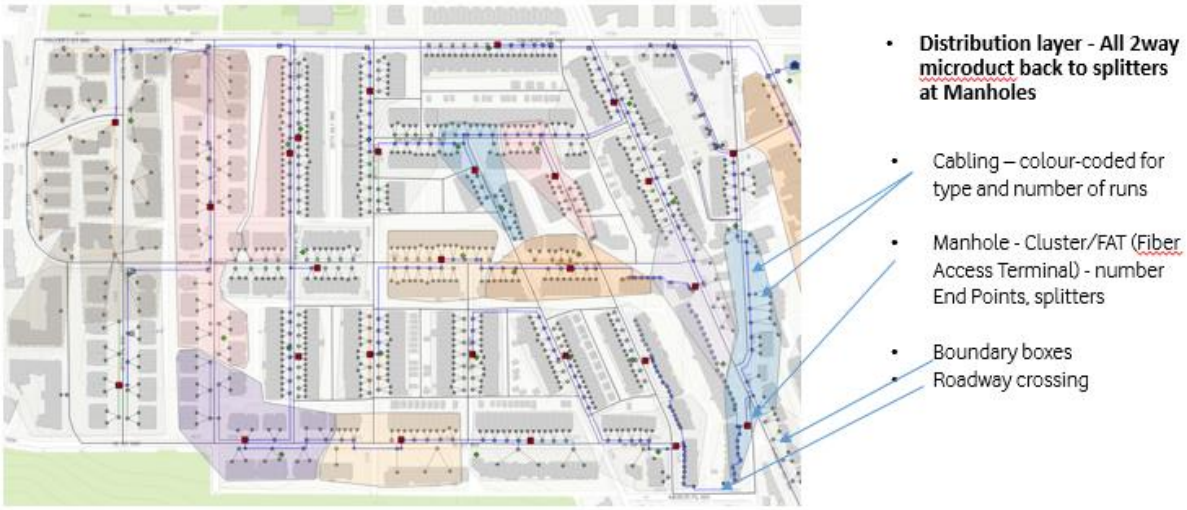
4.11.6 The cabinets can be locations for PON splitters, or straight 1-1 patching, and may be supplemented by smaller fibre housings closer to the end points, which are used to group clusters of houses or businesses.

4.11.7 The area by area build to locate feeder routes into the clusters and cells produces a design similar to that below. [From Kings Lynn Vodafone PIA trial survey returns]

4.12 The next layer of detail is the design to the premises themselves. For example, below is a suburban design showing the build needed along each side of a street to access each property. The design choice is to leave boundary boxes for every pair of properties, running fibre back to a Fibre Access



Terminal for the cluster, in a manhole local to the street. In this case, the GPON splitters are installed at the manhole, with fibres from the Boundary boxes spliced in advance to ports on the splitters.



Source: https://fiberplanit.com/_new-fiberplanit/wp-content/uploads/2017/10/image2017-10-18_11-8-45.png

4.13 This means the build phase for passing the homes has gone to the boundary of every property, leaving to a later stage the homes' connection phase to extend from the property boundary to the in-house location.

4.14 At the feeder layer design stage, adding small extra runs of duct allows for robustness to be added, closing off gaps in the network and allowing more flexibility for the build sequencing to feed fibre from either end of a loop.

Only 2,5% extra cost? Close the gaps

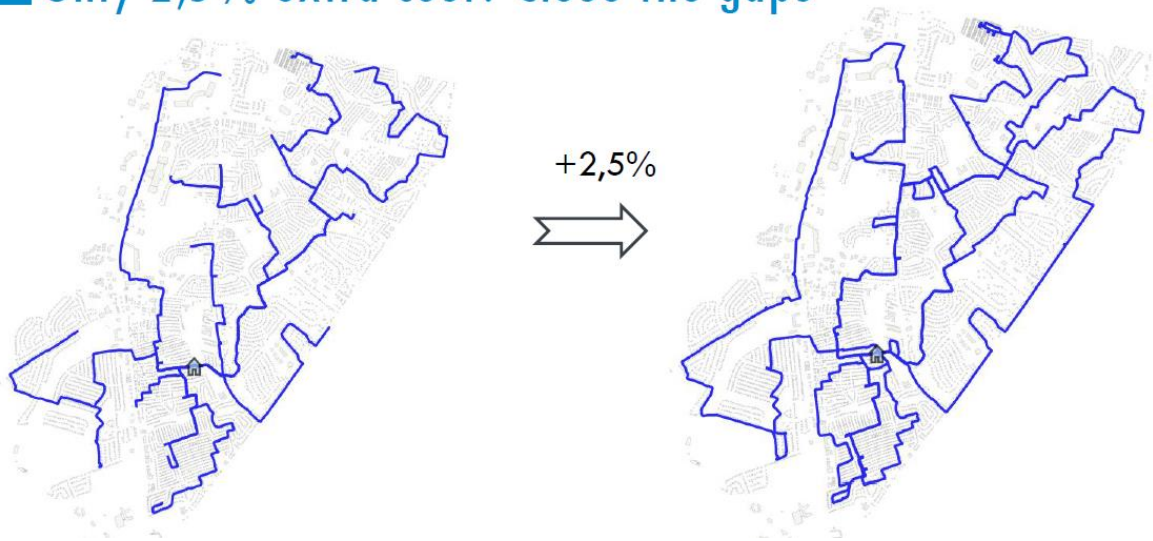


Figure 1, Influencing factors on your FTTx architecture comsof session1-final-180220103547

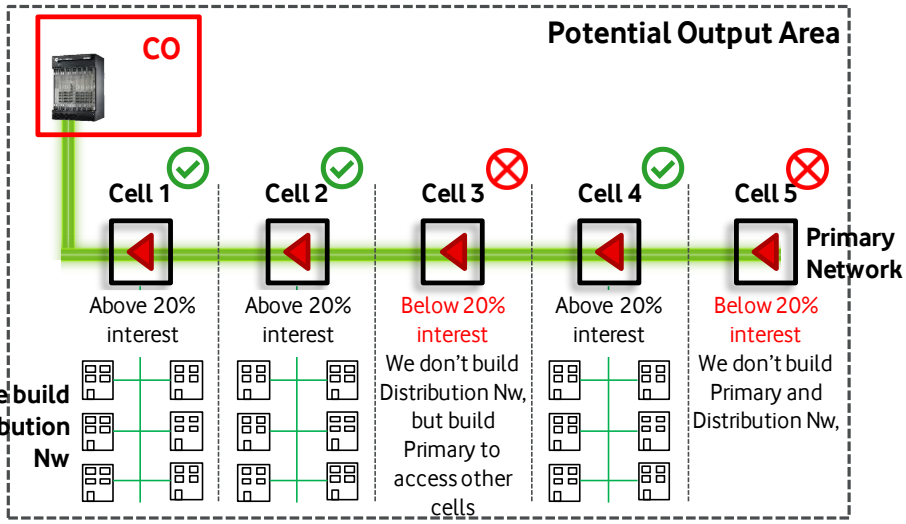
4.15 If the drops to the homes can be completed using aerial fibre from poles, then design options can look at whether to do direct drops to homes, or allow drops to be strung along between several poles, minimising the number of Homes Passed access points to build, but increasing the Homes Connected work and materials. This increases the proportion of premise that are passed quickly but passes more of the costs to the connection of customers that sign up to service provision with the network.

Scenarios

Figure 2,Influencing factors on your FTTx architecture comsof session1-final-180220103547

4.16 Deciding which areas to build can be driven by possible interest from customers, or a marketing view on ease of sales given the geodemographic factors. This can lead to prioritisation of build for the

lowest level "capillary" ducts, skipping the areas with least interest when putting the feeder route through, but with access left for future spurs and development.



4.17 This same approach can be used for the single purpose network which can expand to create a converged network – whether FTTH adding Enterprise, or mobile backhaul adding Enterprise and FTTH. To date the approach driven by cost economics has been the building of a connectivity ring around the areas a provider wishes to serve – a metropolitan ring or a business park ring and thereby extending network to the area in preparation for connection to a customer site to be added when a customer is won and brought onto the network. As such spurs from the ring to the enterprise premise are incrementally added once an enterprise service has been won.

4.18 When planning for expansion for further services or service type the CP can pre-install additional fibres in the main cables from the Central Office/POP, as incremental cost of cable is much lower than installing a second cable afterwards. Today a provider of leased lines service may have to pull additional fibre from a point further in the network beyond the network flexibility point to serve a new customer requirement. The choice of how much spare fibre to install is up to the CP and will determine whether further cable needs to be pulled to meet customer demand.

4.19 Splicing locations in the network can be sized for the whole cable size, but only the necessary splices are made at day one – in which case a subsequent connection requires opening of the splicing locations along the route to join the fibres together. This is again how enterprise service provision occurs today.

Using the network

4.20 For FTTH networks, the aim is to pass homes while minimising the work for connecting each additional new end customer and providing better certainty for delivery to a target timescale when an order is taken. Costs to build out to the boundary of every property may be prohibitive, or impossible if there is a permission problem gaining access to private land, or restrictions on digging or flying aerial cable.

4.21 Similarly, Enterprise focused networks aim to build to business parks or office blocks, leaving as little work to be done to connect as practical. Initial build may be done around the business park if permission from the owner is obtained. When connecting sites that are ultimately won, additional costs to bring the connectivity from the ring to the customer site are incurred. We discuss this in the section on the cost model and duct and pole in Part 2 section 3.

4.22 In some cases, deferred deployment may be used – the plans are worked on an agreed with the relevant parties for the Build/Homes Passed stage, but work not done until the first order is received. This first order (and subsequent ones within roughly the same time frame) will require more feeder or distribution network build to reach the customers, but once built, future customer connections are in normal lead times.

4.23 Deferred build can speed initial build through an area, as more time in the initial phases is spent covering routes in more areas, just not as deeply as the full plan entails. It also risks a change in circumstances, causing problems in deploying the deferred network.

Connecting a home on FTTH

4.24 Making the "last drop" connection once the primary network is built will be limited to running fibre from the building to the boundary box or Fibre Access Terminal, making a splice if need be, or plugging up to a connector left during the Homes Passed phase and installing the home fibre connection and the Active equipment – usually an Optical Network Terminal (ONT).

Connecting an Enterprise or Mobile site

4.25 Similar work to create a route in duct or aerial fibre is needed, from the last boundary box nearest the site, and fibre work to connect to the installed network. If using PON to deliver the service, then the fibres from the end point can be connected to the splitter. If point-to-point, the fibre path from POP to end point needs to be connected along the route at the flexibility points.

4.26 Diverse routes for resilience lead to more activity in the fibre network, to avoid any pinch points on fibre routes or duct being shared in common. We discuss the cost involved in the sections on the cost model and duct and pole in Part 2 section 4.

Customer connection teams are not shared between residential and buisness

4.27 While new builders of networks will have common network components, these components will separate to serve predominantly residential areas and predominantly business areas. There will also be operational differences, particularly in the connections teams installing residential or business connections.

4.28 The feeder network that runs from POPs to Cabinets is typically built at a lower depth in the ground to be more protected, while drops and distribution to homes may be shallower, and done using individual ducts within multiway bundles. Enterprise connections may require feeder depth construction to minimise hits from civil construction carried out by others. The pre-design stage may have identified the routes where Home connections should also have a spare duct buried lower to

prepare for the enterprise and cell-site connections (or vice versa, where home access ducts or miniducts should be planned to intercept the enterprise build).

4.29 FTTH installation is usually sub-contracted out, due to the volumes of installations to fulfil the orders, and the skill sets for installing and commissioning home gateway and set-top boxes, for example.

4.30 Enterprise connections will usually be made by a different more specialised team and we discuss in the section on duct on pole the teams for civil construction, teams for cable laying and the splice contractors. In addition to these teams, there will be enterprise field engineers dedicated to meeting the stricter requirements of Enterprise service installation.

4.31 In summary, new networks being built today will have the ability to lay a proportion of the service installation required to serve residential and enterprise customers in a cost efficient manner. That said, laying the network to serve maximum customer numbers and market segments will substantially raise the cost of the network rollout.

4.32 The detail beneath the rollout plans which identifies the exact approach to the network build is important to understand the true scope needed to serve customers and premises competitively.

4.32.1 Builders have the choice of either creating dense network build in the network passing build stage and incurring more upfront costs, or they can achive achieve overall coverage more quickly and defer costs to the point at which individual customer connections are made.

4.32.2 Builders have the choice of adding the fibre capacity to serve additional markets. This could raise costs, some of which may be irrecoverable, in the event that they are not successful in penetrating maturer markets.

4.33 Frontier has estimated that the cost of installing a single FTTH network to every UK consumer could amount to £20.3BN or £32BN in the case of duplicate networks[6]. Frontier does not calculate the costs in relation to installing competing fibre networks to all business premises.

4.34 Ofcom has looked at the business models of fibre providers and the interrelationship between FTTH and leased lines. CityFibre is identified as a provider that has stated a need to improve the FTTH business case by obtaining a leased lines anchor tenant – an enterprise customer such as an MNO or local authority, whose enterprise service build (via installation, excess construction charges and rental charges) offsets the costs of CityFibre bringing its spine network to a new town. CityFibre has shown a historic pipeline of this approach, connecting a number of council and NHS projects in this manner. In our view however we do not consider that network builders will have success in finding anchor tenants as suggested:

4.34.1 Enterprise and MNO service demand timelines would need to align exactly with the network builders' time line.

[6] https://www.frontier-economics.com/media/1139/20180723_future-telecoms-infrastructure-review-annex-a_frontier.pdf

4.34.2 We know that Enterprise customers tend to purchase 3 year contracts and therefore do not change underlying connectivity outside of this timescale.

4.34.3 We know that MNOs have demand at this very moment to secure connectivity for their 5G rollout and therefore need networks that are available now rather than in the long term future.

4.34.4 We know that switching costs are substantial and that switching at the end of a contract needs to be supported by a switch to a service provider with far lower costs to offset the costs of change.

4.35 It is our view that the anchor tenant model is predominantly likely to be successful in the case where an enterprise customer is using legacy technology and can offset the switching costs against the requirement to move away from legacy services that are becoming end of life and move to higher bandwidth service provision (more likely to be required at this time). As time progresses there are fewer and fewer customers that remain on legacy service provision which are required to have been transferred to modern service provision over the coming 12 month period. We illustrate this in the chart below:

Product	Supplier	✂
WES/BES/WEES	Openreach	✂
Sub 2MB PPC	BT ENTERPRISE	✂
Sub 2MB RBS	BT ENTERPRISE	✂
Analogue	BT ENTERPRISE	✂
Sub 2MB RPC	BT ENTERPRISE	✂
>/= 2MB PPC	BT ENTERPRISE	✂
>/= 2MB RPC	BT ENTERPRISE	✂
>/= 2MB RBS	BT ENTERPRISE	✂
WES & BES 2.5G & 10G	Openreach	✂

4.36 Newer market participants will be unaware of the high switching cost barriers and the need for an overall high on-net footprint in order to price competitively across a national demand for leased lines services. Competing for leased lines service provision is highly challenging and even more so in 2019/20 when customers lack the imperative to move service provider as they are on a modern service with upgradable service features (100M to 1G upgrade).

4.37 The manner in which new networks and new competitors can make inroads into mature markets with high switching barriers can be evidenced from markets which are ahead of the UK in terms of the new network deployment.

Spain

4.38 If we look to a market place that is ahead of the UK we can evaluate the degree to which market share of the incumbent supply has changed following the FTTH build. In our view the analysis of Spain affirms our views that FTTH deployment which in the main is targeted to bring up to date fibre broadband to residential premises does not result in a change to the competition of leased lines service provisision. The high costs of physically installing incremental business premises, with high bandwidth leased lines, continues to provide the greatest advantage to the player that had a high leased lines circuit penetration prior to the roll out of new FTTH networks – the market incumbent.

Telefonica (Movistar)	2013	2014	2015	2016
Circuits revenue market share	78.5%	82%	75%	78%

Source: calculated from http://data.cnmc.es/datagraph/jsp/inf_anual.jsp

5. Duct and pole remedy – part 2

5.1 In this section we consider the economics of unrestricted DPA using Ofcom's network extension model and applying the reuse of existing duct within the model to have costs similar to duct and pole.

5.1.1 The benefits from DPA are greatest in non-fibre areas. Ofcom found in the BCMR 2016 that: "*The benefits specific to duct access are likely to be the greatest where there is little or no fibre, particularly in the mass market. However, most customers of fibre leased lines are larger businesses and public sector clients, and BT currently serves them with fibre leased lines throughout the UK*". DPA therefore has limited application for leased lines service provision where fibre is already in situ to the customer.

5.1.2 That competition in this market is driven by existing fibre, not new build. Competition in the BCM is based around the existence and leverage of connections *already in place* to customers. A very low proportion of rival service installations are made by either extending networks through the construction of new duct and fibre facilities or by augmenting duct with new external fibre (and internal fibre).

5.1.3 The availability of cost based Wholesale products drive this market, not new fibre network extensions. Competitors would not successfully win business in retail markets if they were required to incur and recover the costs of extensive fibre network extensions to customer buildings (in large part duplicating existing fibre assets). Prevailing market prices are simply too low to accommodate the costs of fibre works beyond those required within a building that already has fibre present to it. This is particularly true for the bandwidths that customer demand in the majority of supply cases for the period of this market review.

5.1.4 In most cases DPA is not economically viable in this market. The economics of DPA for single site installations are challenging. Our cost model concludes that DPA may have the potential to replace some supply for a subset of the total market. We consider the economics will confne this to the lower demanded (5% of total market demand) 10Gbit/s service installation for installation distances no more than approximately 400 metres (we have yet to fully determine the full cost and scenarios of connecting our duct to the BT duct and this will increase costs and reduce the economic replacement distance). Critically this analysis of the economics holds true only while BT chooses to keep its prices substantially above cost.

5.1.5 FTTH will not help drive competition. The nature of the BCM contracts means that FTTH rival networks will not displace the high costs of installing adhoc and incremental Enterprise sites onto the network via their FTTH network infrastructure, therefore FTTH rival networks will not bring greater competition to the business connectivity market. Furthermore, as BCM demand is national in scope, limited regional presence will not facilitate the ability to compete in the national market place.

DPA cannot change business connectivity competition

5.2 Ofcom's consultation contains a number of misunderstandings as to how the business connectivity market works. Regulation is put in place to support retail markets and prevent the need for retail regulation. Business connectivity customers are large Enterprise customers that have a demand for connectivity across regionally diverse sites. Suppliers therefore require a national footprint in order to compete effectively for these customers.

5.3 We explain in in our BCMR response that rivals to BT are able to win business when they are able to reuse pre-existing network connections (built when network economics were better in the past) as part of their customer tender. We find that where we wholesale to other market players that these market players seek connectivity that is already in situ as a primary choice.

5.4 The key benefit of the on-net footprint is that it lowers the volume of circuits that must be purchased at a fixed cost from Openreach. ✂

5.5 A small market niche existed for a time for new entrant suppliers of very high bandwidth services that entered the market at the early stages of development to build fibre that did not already exist and provide a service that Openreach was not yet offering, The market conditions that enabled this new build have now been removed. BT is focused on supplying this now growing market, a market which now makes up 5% of bandwidth demand. BT's extensive fibre footprint can be used to serve this market at the lowest cost.

5.6 Ofcom's analysis focuses on the ability of CPs to be able to match the Openreach cost rather than beat it. This would not enable rival CPs to win business. We discuss in our BCMR response the substantial switching costs and switching barriers that are in place for Enterprise customers. In an environment where the best the alternative retailer can hope to achieve is a price match with BT, enticing a customer to face the switching barriers and costs will be unsuccessful. For this reason, in the business connectivity market where fibre penetration is very high and a minority of circuits remain to be migrated from legacy provision to modern EAD provision, DPA will prove unsuccessful in changing the levels of market competition.

5.7 The table below is taken from our BCMR response and shows that extending our network, even using duct and pole access, will only ever be economically viable for bandwidths above 1G/bits. However this is only due to Openreach's current pricing, which as Ofcom confirms is above cost. Additionally, Openreach's 10G/bits pricing has dropped by 50% in the last year, therefore any network operator putting a business case together for extending their network is entirely dependent on trying to forecast BT's future pricing of 10G/bits circuits which has been shown to be very uncertain.

Table: Vodafone's table populated with Vodafone's actual data showing the Economic radial dig distances (metres)

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4.47 Specifically as part of our BCMR response we have considered whether the 'Duct connected without tubing option' in the above table is a proxy for BT's unrestricted duct and pole product, and whether there would be any additional costs when using, instead of our own ducts, BT's duct and pole regulatory remedy. This is somewhat speculative, because the final contractual conditions are not finalised and there are many questions remaining from operators regarding costs, conditions and availability. That said, we do nevertheless consider that we would have to incur a number of additional costs if, instead of using our duct, we used Openreach's duct and pole remedy. These costs are list below:

(a) Product on-boarding costs

(b) Purchasing, planning and time requesting access from BT

(c) Additional network extension costs from extending our network into BT's ducts and poles which are likely to include a minimum labour element, a Wayleave cost, and potentially traffic management costs.

4.48 We therefore concluded in our BCMR response that the centre column in the above table could not simply be used as a proxy for using BT's proposed regulated duct and pole access product, because a number of significant additional costs are incurred when using this product that are not included or considered in Ofcom's version or in our version of the dig distance cost model. However this column does include all of the fixed costs that we added into the model to reflect the costs of network extensions using new ducts, i.e. traffic management and landlord Wayleave costs, because even if using BT's duct and pole remedy reduces in some cases the need for these at the customer connection end, it is likely that they are required at the end where we break into BT's duct and connect it to our duct network.

6. Answers to questions

6.1 In this section we explain:

6.1.1 That we agree with Ofcom that the relevant infrastructure for which the access is sought, is the telecoms specific physical infrastructure. It is the correct focal product from which to start the economic market assessment.

6.1.2 We disagree that the BCM networks are relevant substitutes for the BT network or that the proposed BCM HNR and CLA geographic markets can be transposed into this market.

6.1.3 We agree that BT has SMP in the nationwide supply of duct and pole.

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

6.2 Ofcom concludes that there is a single market for the supply of wholesale access to telecoms physical infrastructure for deploying a telecoms network and that the product market contains four geographic markets:

6.2.1 BT only passive infrastructure areas,

6.2.2 BT and Virgin passive infrastructure areas,

6.2.3 High Network Reach Areas as found in the business connectivity market analysis; and

6.2.4 The CLA as found in the business connectivity market analysis.

6.3 Ofcom sets out that its focal product is the "*physical infrastructure 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.*"

6.4 We agree that generally non-telecoms physical infrastructure is a poor substitute for telecoms physical infrastructure for the purposes of deploying telecoms networks and therefore should be outside of the relevant product market.

6.5 Having concluded the product market, Ofcom considers if there are geographical differences in the availability of telecoms physical infrastructure across the UK. Ofcom recognises that other telecoms providers have also built physical infrastructure, in addition to the physical infrastructure built and owned by BT. Ofcom progresses to consider the Virgin network, which it concludes, is a poor substitute for the BT network.

6.6 Ofcom then considers other smaller networks. We have particular concerns around the assessment of these other networks. In particular their ability to be a relevant substitute to the BT network, meaning they are not found to be in the same economic market as the BT network. These other rival infrastructures are substantially more limited in scope than that of BT and Virgin. Other rivals will have core network between UK areas, potentially metropolitan rings around a number of larger cities. These networks however will lack substantial volumes of duct connections to end user premises in comparison to the BT network, or extensive network breakout points in comparison to the BT network. As Ofcom sets out in section 3, access seekers are likely to prefer access to nationwide physical infrastructure network.

6.7 "*3.105 Before considering the constraint from access seekers switching to alternative providers in each geographic market, we make a general observation that access seekers are likely to prefer physical infrastructure that is more ubiquitous.*"

6.8 "*3.106 Telecoms networks are built to connect to premise, or sites. Therefore, the ability to connect to as many residential premises or business premises within a deployment area as possible, and the*

flexibility and certainty to be able to provide any connection in the future quickly and without significant additional connection cost, is important to access seekers."

6.9 "*3.107 A ubiquitous telecoms infrastructure (both in terms of the overall cover it provides, and the contiguity of that coverage within a particular area) provides this. Combining multiple infrastructures to provide the same level of connectivity introduces additional cost, time and operational complexity, which is likely to lead access seekers to prefer use of a single telecoms physical infrastructure where possible*."

6.10 "*3.108 As such, access seekers are likely to value a more ubiquitous physical infrastructure network wherever they are seeking to deploy. Therefore, this is a key characteristic we consider in assessing the strength of constraint imposed by alternative telecoms physical infrastructure operators on BT*".

6.11 We completely agree with the text above.

6.12 We find the inclusion of the proposed BCMR HNR and CLA geographic markets as relevant PIM geographic markets as very puzzling:

6.12.1 The proposed BCMR HNR and CLA contain geographies that do not even contain physical network as they include the "network extension buffer". Network that does not exist cannot be a relevant alternative.

6.12.2 The CLA and HNR areas includes up to 15 different rival networks[7] of very variable density, which can vary across each geographic location. This is shown in Table A12.20 of the BCMR, which reflects the high capacity connections required by Enterprises in 2017. The chart importantly shows that rival infrastructure within the CLA and HNR does not have high levels of actual duct to end users premises that DPA access seekers require.

6.12.3 It is not evident how the networks of up to ~15 alternative rival networks (with variable footprints in the CLA or HNR) could be compared against a single network that has connectivity to most end user premises.

6.12.4 An assessment of the substitutability of these ~15 alternative rival networks requires an assessment of each network and its ability to substitute for the BT network. This assessment would fail as the demand an access seekers has is for:

- *ubiquitous infrastructure*
- *ability to connect to as many residential premises or business premises within a deployment area as possible*
- *the flexibility and certainty to be able to provide any connection in the future quickly and without significant additional connection cost,*

[7] Ofcom BCMR consultation Nov 2018 Annex A11.30

- *Combining multiple infrastructures to provide the same level of connectivity introduces additional cost, time and operational complexity, which is likely to lead access seekers to prefer use of a single telecoms physical infrastructure where possible*[8]

6.13 With these findings in mind, it is clear that when Ofcom assesses which physical infrastructure networks fall within the same economic market as the BT network, by conducting a SNNIP test, it will find that the individual networks in the CLA and HNR do not. The answer to the SNNIP test, as to whether BT could raise its prices more than 10% without incurring a loss in sales, will be yes. It is quite probable that BT could raise its prices much more than 10% and its network would remain to be the network for which access is sought. The BT network is unique. To use a single network to match BT's access would fail. To use a variety of networks to try to match the BT network would also fail. It would have much higher costs due to the practicalities of physically connecting in and out of a variety of duct networks, which have fewer existing points where this connection between networks could take place.

6.14 For these reasons we consider that the product market for DPA is limited to the BT network and that a single UK wide market exists.

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

6.15 We agree with Ofcom's conclusions that BT has SMP in this market:

6.15.1 There are high entry barriers to constructing new physical infrastructure.

6.15.2 There is an absence of significant countervailing buying power, mainly because there is a lack of cost efficient alternative supply options. As Ofcom identifies, extra costs are added when a purchaser uses multiple suppliers, as their processes need to be separately adopted and contracts and relationships managed.

6.15.3 BT's has ubiquitous (residential and large enterprise / cell site coverage) duct and pole facilities across the UK, the superior positioning of its duct network compared to other infrastructure owners with a higher proportion of network within the footway than in the carriageway leading to lower costs of using the BT duct network to install new fibre compared to other networks.

6.15.4 The unique ability of BT to use the generic ECC fund, which is contributed to by all large enterprise users, to extend its duct facilities in an upfront and shared cost manner. This is derived from BT's dominance in retail markets.

[8] Selected sections from Ofcom's rationale set out in full in this response at para 6.7 – 6.10

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

6.18 We agree with the remedies that Ofcom proposes.

Non discrimination / EOI

6.16 We consider that it is necessary to consider in more detail the issue of non discrimination in particular where BT itself is not following the exact same processes which CPs are required to follow.

6.17 At this stage it is difficult to determine whether CPs are at a disadvantage due the lack of full EoI. For example, it is proposed that when infrastructure in not properly labelled there will be a penalty. Do BT's contractors have a similar penalty regime? Does BT check on its contractors in a similar manner?

6.18 Similarly, for network adjustments, it is our understanding that a degree of network adjustments can be carried out by BT's contractors within a project remit without further sign off. Where network adjustments are made and the works charged to BT by its contractors, does BT make the same audit checks that it proposes to make of CPs and their contractors?

6.19 We disagree with Ofcom that it is not necessary for Openreach to set out the entire end to end process on how passive infrastructure is used (with differences being individually identified and justified). It is important to understand these differences and, in our view, transparency on what these differences are is likely to reduce them. At the absolute minimum the Openreach Monitoring Unit should oversee the differences between the manner in which CPs and Openreach /BT obtain access to and use duct and poles.

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

Usage restrictions

6.20 We agree that product usage restrictions undermine the effectiveness of PIA.

6.21 A restricted remedy prevents the widest range of competition in markets from emerging, to the detriment of end users

6.22 A restricted remedy creates usage differences between BT and other DPA users which could result in market harm to the detriment of end users

6.23 Removing usage restrictions will present challenges in ensuring that all network builders that require duct access are able to obtain that access on an equivalent basis. This should be properly resolved via a fair network adjustment regime that ensures there is adequate duct space for all that require it, with costs of augmentation fairly distributed.

6.24 Where there is a limited supply of duct services, coupled with an inability to effectively increase the available space, a methodology to provide space to users who can achieve highest use of the space may be necessary. For example, in such situations it would not be appropriate to prevent the building of a multi-use FTTP broadband network or the connectivity of a multi-use cell site/ small cell due to the duct being used to supply a single user leased line.

6.25 Efficient usage of the duct space is important as the cost savings derived from reusing the existing duct will be rapidly wiped out if it is frequently necessary to build additional duct capacity (especially where this duct is not built with costs apportioned to be shared going forward). It is our view that the duct should support primarily the building of services that do not exist today such as FTTP services and high capacity services to new premises. Where fibre already exists to a premise, efficient use of duct space points to a dark fibre remedy and ongoing reuse of the existing fibre rather than replication of the fibre.

6.26 We completely agree with the proposal that Ofcom makes for dark fibre to be made available where there are duct space limitations. We consider that the availability of dark fibre is likely better suited to meeting the needs of single site connections for leased lines, and in that case should be provided for the entire leg of the requirement, rather than just the leg of the congestion. Where a CP is building an FTTP network a leg of dark fibre is unlikely to be as usefully incorporated as it could be for the provision of a single user leased line. This is because the use of dark fibre requires the provision of space and hand over / demarcation equipment such as a patch panel and further active equipment to then make use of the dark fibre provided.

Use of DPA beyond the access network

6.27 The May 2018 DPA regime enables the use of DPA within the area of the rival fibre provider's access network. This consultation proposes to allow the use of DPA to install fibre to any network area belonging to the rival fibre provider, access, trunk or core. By enabling the use of DPA generically, it is Ofcom's hope that more markets will be open to increased competition.

6.28 However we note that Ofcom does not consider DPA to be a credible alternative to current in situ fibre provision for backhaul services

6.29 "A9.28 We have also considered the potential impact of the PIA remedy on some inter-exchange and backhaul markets, that we already consider competitive.

6.30 A9.29 With respect to inter-exchange backhaul markets, we do not consider that the remedy will have a material impact on existing competition. This is because the distances between the exchanges and the existence of competing wholesale providers of backhaul means that investment in further capacity is unlikely to be commercially attractive, so to the extent there is any impact it is likely to be minimal."

6.31 We note that this is exactly the point that we make with respect to Enterprise and MNO cell sites where fibre is already insitu and therefore investment in further capacity is commerically unattractive.

PIA Ancillary services

6.34 Accommodation services and the ability to share the costs of accommodation across services is a key component for enabling competition across markets. CPs have established accommodation areas within BT exchange buildings for the collection of regulated services and the siting of their aggregation

equipment. It is fundamental to the economics of these services that accommodation can be accessed and shared across the breadth of services.

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

6.32 It is our view that Ofcom should put in place a dark fibre remedy, but that it should be a more widespread passive remedy, rather than a backstop remedy to deal with duct capacity issues in limited situations.

6.33 In the following paragraphs we set out that Dark Fibre is the optimal remedy for the business connectivity market. Dark Fibre is the only solution that that can address BT's market power and bring greater competition to the market. In the current market context it is the remedy that best meets Ofcom's statutory duties.

6.33.1 High fibre penetration means little gain from further network build; Openreach has very high fibre presence to Enterprise buildings (and customer floors), with +75% of customers able to achieve a quick fibre service activation with Openreach.

6.33.2 Openreach's business fibre reach and entrenched position is driven by past regulation. Openreach's position in the Enterprise fibre has been supported by past regulation and the Ofcom endorsed excess construction fund which has been paid into by all customers/suppliers to cover a variety of costs: the full material and labour costs of new duct, fibre extensions that are internal and external to the premises, traffic management charges and landlord wayleaves.

6.33.3 High fibre penetration increases barriers to switching; where customers are connected with modern fibre services, potentially with futureproof bandwidth (100Mbit/s with path to 1Gbit/s upgrade), incentives to switch supplier will be quashed with costs to do so heavily outweighing the cost savings that could be offered for new services. Why would customers pay again for a new fibre connection when they have already incurred this expense?

6.33.4 Dark Fibre is technically and economically an enabler for 5G services. In the case of mobile backhaul there is now increasing urgency to make networks 5G ready[9]. This need is best met by upgrading existing fibre connections. Unlike multi-tenanted enterprise buildings, fibre at cell sites cannot be reused to serve other customers at the site or in the building.

Dark Fibre has been and still is the right remedy

6.34 Ofcom has in recent market reviews set out its views of the benefits of Dark Fibre for the business connectivity market. Until Spring 2018 – following the CAT decision which required Ofcom to reconsider its approach to bandwidth market definition – Ofcom considered that Dark Fibre was the

[9] https://www.gov.uk/government/publications/next-generation-mobile-technologies-a-5g-strategy-for-the-uk

correct remedy to address BT's market power in at least 1Gbit/s and below connectivity demand for most of the UK. Ofcom has also now reconsidered its approach to market definition and found that a single market for leased lines fibre does indeed exist. The updated and corrected market analysis deals with the concerns raised by the CAT and enables the implementation of the Dark Fibre remedy across that product market.

6.35 A broader, more effective Dark Fibre remedy is clearly justified as a regulatory remedy for the business connectivity market for the period 2019 – 2021 given:

6.35.1.1 Ofcom's previous analysis that Dark Fibre would work to address BT's market power, enabling greater competition in business connectivity;

6.35.1.2 Ofcom's misunderstanding about the impact of DPA including unrestricted DPA; and

6.35.1.3 In relation to mobile backhaul, Ofcom's errors in relation to the differences between the market for mobile backhaul and that for enterprise circuits[10].

6.36 When setting market remedies Ofcom have to assess how good each of the prospective remedies are at achieving Ofcom's strategic goals:

6.36.1 Active products do absolutely nothing for Ofcom's strategic goals, in fact they work against them because they eliminate network innovation possibilities and are highly unsuitable for such things as 5G backhaul.

6.36.2 Dark Fibre products, (limited to BCMR because no LLU type product is available for GEA) does meet Ofcom's objectives for network innovation. Any impact that access to Dark Fibre has on new fibre roll-out will be limited to this market where fibre penetration is extremely high.

6.36.3 Duct and poles access could provide network innovation if it made network extension viable in this market, but it is not economically viable as shown in section 5 and thus is not a valid option within the next review period.

6.37 Dark Fibre and Duct and Pole could be complementary remedies. With Duct and Pole, unfibred Business Connectivity customers stand a greater chance of securing a non-Openreach connection. However, those customers with existing Openreach fibre – and for whom another fibre connection is not economically viable – will be able to benefit from innovation and better priced competition by using Dark Fibre.

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[10] Even if mobile backhaul sits in the same market as enterprise connections in a formal sense, the characteristics of the customer base, the supply side economics and the different product requirements are such that a separate set of remedies, including Dark Fibre, are required.

Cost recovery and price regulation

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

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

6.38 Ofcom proposes that network adjustments are limited to adjustments that make permanent changes that facilitate access to the physical infrastructure but could include the removal of redundant equipment or cables.

6.39 To enable full and transparent consultation on this issue we require greater information on the market experience of participants, the type of cost recovery allowed, the discretion BT has on allocating costs to this activity and ongoing evaluation of the data during the early years of DPA usage.

6.40 As we discussed in our recent regulatory reporting consultation response we understand that Ofcom is proposing specific regulatory financial reporting requirements related to network adjustments carried out by Openreach. The purpose of these requirements is to allow us as stakeholders to monitor BT's compliance with our proposals for how network adjustments costs should be recovered, and the proposed requirement for no-undue discrimination, as set out in the 2018 PIMR Consultation.

6.41 In the 2018 WLA statement Ofcom allowed BT to recover additional costs of between £100m and £150m (precise amounts were not disclosed) from WLA regulated services to cover the cost of network adjustments required to BT's network to enable operators access to BT's ducts. In this current review period CP's pay more for BT's WLA wholesale products to enable BT to develop its ducts to enable access.

6.42 In the WLA statement Ofcom forecast the amount of users of PIA services and thus the amount of costs BT is lightly to incur: [11]

"In terms of the total cost of network adjustments, we estimate that approximately 1.4 million premises will be passed by other telecoms providers using a mixture of PIA-based and end-to-end build. This equates to around 0.6 million premises passed using 100% PIA, by the end of this review period, 0.5 million of these being passed in the final two years. The financial limit therefore implies a maximum cost of network adjustments associated with these network deployments by other telecoms providers of less than 50m over this review period. If as many as 1 million premises were passed using 100% PIA, this would imply a maximum cost of network adjustments of less than £100m over this review period."

6.43 And Ofcom go on to say: [12]

[11] Paragraph 4.69, https://www.ofcom.org.uk/__data/assets/pdf_file/0023/112469/wla-statement-vol-3.pdf
[12] Paragraph 5.91b, https://www.ofcom.org.uk/__data/assets/pdf_file/0023/112469/wla-statement-vol-3.pdf

"To estimate[13] the total network adjustment costs incurred by Openreach over this review period, we multiply the per premises passed figure by an estimate of the number of premises passed by new networks built using Openreach's physical infrastructure (by other telecoms providers or Openreach itself) in 2019/20 and 2020/21. In total, we estimate that between 1.5 to 2 million ([ ]) premises will be passed by networks built using Openreach's physical infrastructure in 2019/20 and 2020/21, giving a total cost incurred by Openreach of between £100m to £150m (£[ ])."

6.44 We consider that it is appropriate for CPs and purchasers of BT's wholesale products that contribute to BT's network adjustment fund to have visibility of the number of households that are actually passed by PIA consumers and the amount of the funding pot (between £100 and £150m) that has been used to improve BT's duct and pole network. For example it is very worrying that Ofcom in this consultation state that:[14]

"While we appreciate that network adjustment costs in total are unlikely to be significant in 2019/20....."

6.45 It seems that at the time of the WLA statement that PIA use was forecast to be higher than we are now forecasting in 2019/20, if this is the case then it could be that purchasers of BT's wholesale services have overpaid for these services and in effect contributed more to the network adjustment fund than necessary, thus the importance of monitoring and providing transparency of these costs.

6.46 Our recent work on Ofcom's cost model for network extension as part of the BCMR has identified that the charges from Openreach ECCs are oddly high for an entity that one would expect to have substantial purchasing power due to the high volume of contractor services used. It is questionable whether appropriate value is being achieved from the network adjustment allowance.

6.47 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 current WLA market review period.

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

6.44 We agree that productisation costs should be distributed to avoid competition distortions between BT and CPs.

[13] Paragraph 5.91b, https://www.ofcom.org.uk/__data/assets/pdf_file/0023/112469/wla-statement-vol-3.pdf
[14] Paragraph 4.15, https://www.ofcom.org.uk/__data/assets/pdf_file/0018/129060/Consultation-BT-regulatory-financial-reporting.pdf

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

6.45 We have very little data or information regarding these charges, they are currently not reported in the RFS and for the next review period Ofcom is only proposing that BT provide very limited high level reporting, therefore we do not have enough information currently to respond to this question.