Three
Star House
20 Grenfell Road
Maidenhead
SL6 1EH
United Kingdom

T +44(0)1628 765000
F +44(0)1628 765001
Three.co.uk

Three.co.uk

Department for Culture, Media & Sport
100 Parliament Street
London
SW1A 2BQ

Non-confidential
By email only
30 January 2018

Three's response to Department for Culture Media and Sport's Future Telecoms Infrastructure Review: Call for Evidence

1. This is Three's (Hutchison 3G Three UK Limited) response to DCMS's *Future Telecoms Infrastructure Review: Call for Evidence*, published 19 December 2017.

2. Three is the UK's challenger mobile network. Since we launched in 2003, Three has focused on ensuring that our customers can make the most of their devices and data services. This has been done through market-challenging propositions, including 4G at no extra cost to 3G. As a result, Three is the largest carrier of mobile data, carrying a third of all the UK's mobile data traffic.

3. Three supports Government's objective of ensuring the correct competitive environment and policy framework is in place to support investment in the roll-out of 5G and full-fibre infrastructure. In our recent response to DCMS' *5G Trials and Testbeds Programme: Call for Views* we explained that significant changes to the regulatory environment are needed to prepare the UK for fully commercial 5G deployment (including better access to dark fibre, better utilisation of existing infrastructure and reform to planning regulations).

4. In our response to DCMS' *Future Telecoms Infrastructure Review,* below, we highlight the main barriers to the timely deployment of FTTP infrastructure and 5G services (including a lack of widespread access to dark fibre, and high costs of network densification). We then set out where change is needed to the regulatory and planning framework to address these barriers, highlighting best practice from those countries with extensive full-fibre deployments.

Registered Office: Hutchison 3G UK Limited
Star House, 20 Grenfell Road, Maidenhead, Berkshire, SL6 1EH
Registered Number: 3885486 England and Wales

Q1: What is the existing UK telecoms market structure and policy framework able to deliver?

5. The UK fixed market is characterised by a single ubiquitous access and backhaul network, owned and operated by BT. Large fixed costs and scale economies make it too costly for rivals to replicate BT's infrastructure from scratch. As a result, almost every broadband provider and mobile operator in the UK depends on access to BT's network to provide services to customers. This lack of competition provides BT with very limited incentives to invest in network upgrades, and to roll out new technology.

6. The consequences of what is in effect a distorted market structure is reflected in the UK's relative performance in fibre connectivity. As Ofcom identified in its Strategic Review of Digital Communications, the UK currently lags behind its international peers in the roll-out of fibre networks, and in particular FTTP connections.[1]

7. Government's stated policy objective is the roll-out of full-fibre connections to at least 10 million premises over the next decade. Modelling by Analysys Mason on behalf of BT has identified significant challenges to the economic viability of FTTP roll-out.[2] In particular, it found that an operator with an existing customer base, achieving a retail market share of 20% could only viably deploy an FTTP network across 1.4m premises. Planned rollouts by alternative infrastructure operators such as Cityfibre, Gigaclear, Hyperoptic and others are only expected to connect 6 million homes by 2020.[3] Without significant new policy interventions, these projections cast doubt on the ability of the market as it is currently structured to deliver on Government's policy ambitions

8. Similarly, in mobile, the investment case for 5G is uncertain. The blanket roll-out of a 5G services requires a step change in the evolution of network architectures, and extensive densification of mobile operators' radio access networks. However, new revenue sources such IoT, autonomous vehicles are currently unproven and rely on enabling technology that is not currently available, and it is not clear that current use cases will deliver the ARPU increase required to support the investment case, given:

    - *current cost of small cell deployment*: while the costs of small cell deployment is lower than that of macro sites, the reduced propagation distances of 5G spectrum mean cost of 5G coverage per km^2 is many multiples of 4G. Deployment costs therefore need to reduce sharply for widespread deployment to become viable. Similarly, processes around deployment including planning need to be reformed to enable deployment to be as expeditious as possible. Currently planning law acts as an inhibitor to deployment;

    - *lack of competition in mobile backhaul:* effective operation of small cells is predicated on cost-effective access to fibre backhaul to carry traffic back to

[1] Para 4.3 of Marking Communications Work for Everyone: Initial conclusions from the Strategic Review of Digital Communications, Ofcom, February 2016.
[2] Comparative analysis of the outcomes in the UK broadband market: coverage, connections and competition, Analysys Mason, October 2016.
[3] https://www.ofcom.org.uk/__data/assets/pdf_file/0024/108843/summary-report-connected-nations-2017.pdf.

Registered Office: Star House, 20 Grenfell Road, Maidenhead, Berkshire, SL6 1EH
Registered Number: 3885486 England and Wales

operators' core networks. However, the current fixed market structure is failing to deliver the dark fibre solutions required.

9. Three notes that modelling by Morgan Stanley has predicted a more gradual roll-out of 5G (compared to 4G),[4] led by FWA use cases in dense urban areas in the short-term. Those use cases requiring significant network investment (such as IoT, autonomous cars, 8K video) are not likely to be realistic until after 2025.[5]

10. In the face of this challenging investment environment, decisive action is required by government to reduce barriers to deployment, in order to meet its aim of the UK becoming a world leader in the deployment of the next generation of mobile connectivity.

Q2: What barriers exist to long term investment in the UK telecoms market (beyond work underway by the Local Full Fibre Networks programme to stimulate demand and by the Barrier Busting Taskforce to reduce build costs)?

Widespread access to dark fibre is crucial to the timely roll-out of 5G

11. Three is [redacted] Dark fibre is a key enabler of the roll-out of 5G because it is:

- *Scalable:* data consumption is forecast to continue to grow by 30% pa. To maintain low prices to customers, solutions are needed that support this growth in capacity without a corresponding escalation in cost;

- *Flexible:* a network architecture with the technical flexibility to the meet strict latency requirements for the introduction of 5G services.

12. However, there is an enduring lack of network competition in supply of mobile backhaul. Ofcom's most recent review of the Business Connectivity Market that only 20% of UK postcodes have a choice of two or more providers of leased line services (including those used for mobile backhaul, and that choice is largely concentrated in urban areas).

13. As a result [redacted] are not willing to provide a dark fibre access product, despite strong demand from the market.[6]

[4] Aggregate global investment in 5G is expected to increase at a rate of 1% pa. over the period 2019-2025 compared to 3% pa. growth in 4G over the period 2010-2014.
[5] Global Technology Insight: Learning to Ride a 5G Cycle, Morgan Stanley Research, October 2017.
[6] Most notably BT successfully appealed Ofcom's decision to impose a regulated dark fibre access remedy under its most recent review of the Business Connectivity Market.

14. While alternatives suppliers of dark fibre (Cityfibre, Hyperoptic and Gigaclear) are rolling our fibre in competition with BT, these planned deployments are only expected to connect 6m homes, or 20% of UK households by 2020, the date when commercial rollout of 5G in the UK is expected. Only regulated access to BT Openreach's dark fibre will ensure the conditions under which 5G can be deployed in a timely and cost-effective way. We therefore urge government to look to use its powers of strategic direction as clarified in the Digital Economy Act to encourage Ofcom to introduce regulated dark fibre access as soon as feasible.

Public bodies have a role to play in reducing the cost of small-cell deployment.

15. The blanket roll-out of a 5G services requires a step change in the evolution of network architectures, and extensive densification of mobile operators' radio access networks through the widespread deployment of small cells. However, the investment case to support this roll-out is not yet clear given current costs of deployment. While small cell total cost of ownership is lower than that of a macro or streetworks site, the reduced propagation distances of 5G spectrum mean the cost of 5G coverage per km^2 is significantly greater. In particular, it is installation activities (including structural assessment, enabling works, traffic management and equipment installation), rather than hardware or ongoing site opex that are the main driver of small cell costs.

16. We note that much of this installation activity is undertaken the by Wholesale Infrastructure Providers (WIPS) which operate the concessions for government street furniture.[7] Local Government and other public bodies (such as TfL) therefore have a role to play in ensuring competition between infrastructure providers is able to function as a mechanism for driving down these deployment costs. In particular, Local Authorities must consider the wider competition impacts in awarding these concessions, and prioritise the associated long-term connectivity benefits over a short-term drive for revenue.

Reform of the planning framework is required to support densification of networks.

17. Although recent reforms to the National Planning Policy Framework are welcome, further reform is required to support both incremental improvements to MNOs' existing coverage footprints and the densification of MNOs' networks for the widespread deployment of 5G services. For one, currently, the application of the National Planning Framework is inconsistent, with different approaches taken by local authorities.

Reform to Permitted Development is needed to support incremental coverage improvements

[7] For example, Arqiva currently operates the concessions for access to street furniture in Manchester, Southampton, Colchester, Eastbourne and 14 London Boroughs.

18. Although changes have been made, or are currently under review, across the UK[8] further reform of the Permitted Development regime is required to remove unnecessary planning restrictions and discrepancies in the regimes between fixed and mobile. Full details of these changes can be found in Annex A.

Wider reform of the planning framework is need to facilitate ubiquitous 5G coverage

19. Wider reform is required to support the blanket deployment of 5G services. Future connectivity needs must be embedded into the UK's planning framework to make it flexible and forward-looking enough to respond to current and future connectivity needs. In some cases, this will mean a shift to a national framework that incorporates regional and local priorities.

20. In particular, we have identified the following key areas where reform is required:

    a) *A national approach to planning and deployment, incorporating regional priorities.* Differing approaches across local authorities adds costs, slows deployment and can result in some areas of the country being left behind. Consideration should be given as to what frameworks can be put in place either on a country-wide or regional basis and examples of best practice approaches for fixed deployment should be extended to mobile and become more widely adopted.

    b) *A fully integrated approach for connectivity in large scale developments.* Changes to Building regulation and the Planning framework are required to ensure connectivity needs are hardbacked into development schemes from the outset. The creation of a 'Connectivity Consideration' for all Large Scale Major Developments or redevelopments would minimise the impact on existing mobile connectivity, and ensuring new infrastructure has the capacity and coverage to meet demand.

    c) *Facilitating the deployment of Small Cells for 5G.* We welcome Government's recently published 5G Strategy and commitment to review the current regulatory and planning regime this year, to ensure it is fit for 5G rollout. It is important that any resulting legislation allows mobile operators the flexibility to react to evolving technology, given that 5G infrastructure is yet to be fully trialled and deployed.

    Further detail of the required changes to the planning framework can be found in Annex A of this response.

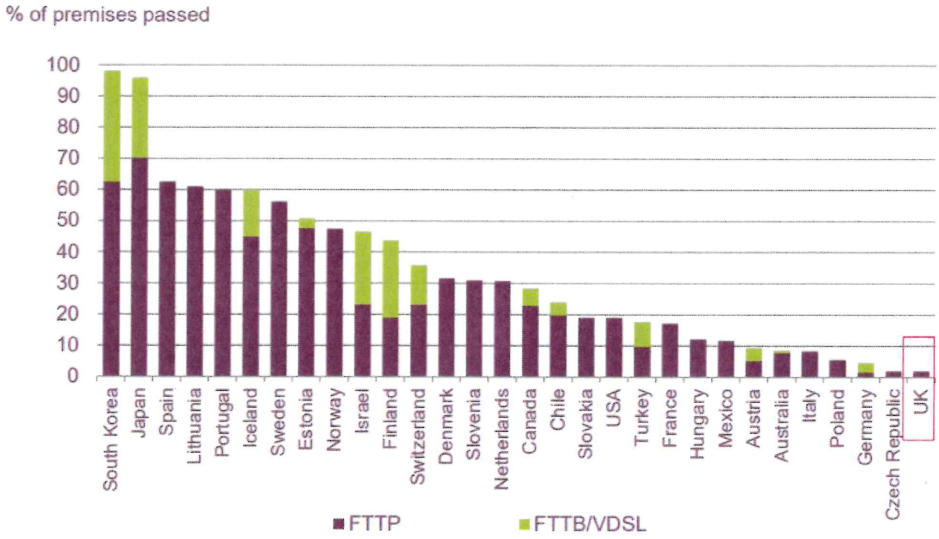
Q3: What can the UK learn from the widespread deployment of fibre networks in other countries?

21. As Ofcom recently identified in its Strategic Review of Digital Communications, the UK lags behind its international peers in terms of FTTP deployments, with coverage across

[8] Changes have been implemented in England and are advanced in Scotland. Wales is currently working through a Mobile Action Plan and Northern Ireland is considering reform of its Permitted Development Rights regime.

less than 2% of premises in 2015 (see Figure 1). The outcomes in those countries where competition had been based largely on wholesale VDSL access to incumbents' networks, such as UK and Germany, are in stark contrast to those where NRAs (National Regulatory Authorities) have prioritised passive access to incumbent operators' duct and poles networks. It is through this route that countries such as Spain and Portugal have achieved FTTP coverage across 60% of households.

Figure 1: Comparison of FTTP coverage in OECD nations at end-of 2015.

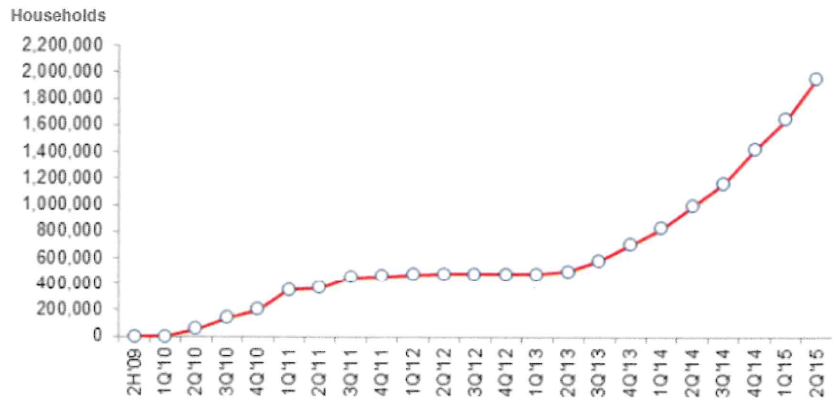


Source: Analysys Mason, September 2015. Note: Analysys Mason figures are based on actuals for 1H 2015 and forecasts for 2H 2015.FTTB/VDSL is fibre-to-the-building where in-building distribution is via VDSL (very high bit rate digital subscriber line) over copper connections.

Source: Ofcom Strategic Review of Digital Communications

22. The use of the duct and pole access remedies in Spain and Portugal is notable not only for the current level so FTTP coverage achieved, but also for the pace at which this outcome was delivered. As shown in Figure 2, below FTTH coverage increased from negligible levels in 2010 to c.2m households within five years.

Figure 2: FTTH Coverage in Portugal



Source: Vodafone Response to Ofcom's Strategic Review of Digital Communications 4, October 2015

23. Similarly, the passive infrastructure access regime employed in Spain has not only facilitated the rapid deployment of FTTP by new entrants, but also provided the incumbent operator with incentive to itself invest in FTTP deployment in the face of network competition.[9] This contrasts with the situation in the UK in which BT has prioritised NGA upgrades of its network using the copper-based G.Fast technology rather than FTTP.

24. Although Ofcom is now following suit through proposals to implement regulated access to BT's duct and pole network, the effectiveness of this remedy is jeopardised by proposed restrictions that would limit usage to residential broadband.[10] This is problematic because full-fibre infrastructure investors typically rely on "anchor tenants" (such as mobile operators, Internet Service Providers, public sector customers) to contract sufficient volumes upfront to make fibre deployment economically viable. Usage restrictions of the nature proposed by Ofcom would limit investor's ability to de-risk their deployments in this way.

25. As shown in Table 1 below, application of such usage restrictions is at odds with the design of duct and pole access remedies elsewhere in Europe, and in particular, the best practice that has facilitated the widespread availability FTTP is Spain and Portugal.

Table 1: Comparison of permitted usage of duct and pole access remedies

	Broadband	Mobile Backhaul	Other dedicated leased line uses	FTTP coverage at end of 2015
France	✓	✓	✓	>25%
Portugal	✓	✓	✓	>60%
Spain	✓	✓	✓	>60%
Italy	✓	✓	✓	c.10%
UK	✓	×	×	c. 2%

Source: Response to Ofcom's Wholesale Local Access Market Review – Initial proposal to develop and effective PIA remedy, Passive Access Group, January 2017

26. We therefore urge the government to ensure the regulatory framework in place allows Ofcom to take a sufficiently broad view of remedies, to avoid the current situation whereby different access remedies are mandated to the same underling BT infrastructure, via artificial usage restrictions.

[9] Shortall and Cave (2015), *Is symmetric Access Regulation a Policy Choice? Evidence from the deployment of NGA in Europe*, Digiworld Economic Journal, no,. 98, pg. 17.
[10] Technically, contended asymmetric broadband deployments.

Q4: The Government wants to consider all market models that will facilitate the next generation of technologies.

A) What different market models might work in the UK in the longer term, and what risks and opportunities do they present?

27. In its Strategic Review of Digital Communications, Ofcom identified competition between fixed networks as the most effective spur for continued investment in high quality, fibre-based networks. Three agrees that the most effective model for promoting a large-scale investment in FTTP networks is through infrastructure competition enabled by a third entrant. In the absence of a third fixed player, competition will remain service-based, with competing operators entirely reliant on BT's underlying access network. Only by exposing the whole of the value chain to competition will BT have sufficient incentive to commit to the deployment of a large-scale FTTP network.

28. 

29. Moreover, the current market structure, characterised by the presence of Virgin Media and BT as the two large retail providers of fixed broadband services, is likely to make the retail subscriber base a highly-contested asset between the incumbent network operators and a potential third entrant. The inevitable result of what is an unattractive risk profile is a delay in investment, with potential new entrants adopting a "wait-and-see" position.

30. This suggests a role for risk sharing models, to be used in conjunction with infrastructure competition, to facilitate the timely deployment of FTTP.

B) What should Government consider when assessing the potential for migration from copper to full fibre networks? Over what time period could migration occur?

31. The migration of connections on the Openreach network from copper to full fibre must carefully managed so as to prevent longer-term adverse consequences to competition, and ultimately customers. The migration of connections should occur on a demand-led basis, as and when customers are willing to upgrade. This would replicate the investment incentives and competitive dynamics faced by Virgin Media and competing FTTP providers. Alternatives such as a cut-over method, whereby all existing Openreach customers are simultaneously migrated to the FTTP platform has the potential to give rise to anti-competitive effects, allowing BT to leverage its market power in the provision of copper connections directly into the FTTP market.

32. More broadly, government must also ensure that BT employs an appropriate cost-recovery model to recover the cost of investment in its FTTP deployments. Future

regulation of BT's wholesale access charges for copper-based services must prevent BT from recovering the cost of it FTTP deployment from all Openreach connections.

33. At the end-user level this would represent a form of cross-subsidisation from customers consuming copper-based services to those using FTTP services. This could give rise to serious distributional impacts, to the extent that the former group is disproportionately representative of vulnerable consumers, such as those in rural areas and those unable to afford higher-speed services. This raises the real prospect of digital exclusion if customers are no longer able to afford access to broadband.

34. At a market level, such a development has the potential to give rise to anti-competitive effects. In reducing the relative wholesale price increment between its. FTTP vs copper-based services, BT would be able to ensure it acquires a larger share of wholesale customers on its FTTP network, at the expense of a third FTTP operator. This would undermine the investment case for a competing FTTP deployment, which relies on the acquisition a significant proportion of wholesale subscriptions in order achieve required scale.

Q5: The Government wants to achieve its digital infrastructure goals at the least additional cost. How should new digital infrastructure be paid for?

35. A material proportion of the investment to deploy 5G services will need to be recovered from new revenue sources as it is not expected that customers are will be willing to pay significantly more for existing mobile use cases. In the medium-term, 5G-based Fixed Wireless Access broadband presents an emerging opportunity for the recovery of 5G investment. The increase in the number connected devices from IoT will be an important new revenue source over the longer term.

36. Given the uncertainty over these new revenues sources, some of which are unproven and require enabling technology that is not yet available, there is an important role for government in de-risking the required infrastructure investment.

Tax relief on new infrastructure investments

37. Ultra-low latency is a key enabler of new 5G use cases. This requires 5G technology, deployment of small cells. access to dark fibre and localised data centres to bring MNOs' core networks closer to end-users. Government can improve the case for investment in these types of infrastructure by providing tax relief to operators committing to these investments.

Reform to rating regime for existing infrastructure

38. Business rates represent more than [redacted]. Three has [redacted] sites in our network and under the current regime, these are valued on an individual basis, and in cases of dispute on valuation, appealed on that basis. This is uneconomic and time consuming and impacts the business case for investment in marginal areas where consideration of rental is often disproportionately high.

39. By contrast, a very different mechanism is applied to BT's Openreach network, where a single cumulative valuation is made for the network's assets as a whole. The existence of a differentiated system distorts competition and confers advantage on BT. It also contributes considerably and disproportionately to the costs of network rollout in rural and remote areas. We therefore urge Government to review the current business rate valuation and appeal process to make it more appropriate to a business with a large number of relatively small value assessments.

Stimulating demand for 5G use cases

40. Finally, government also has a role to play in stimulating demand by become an early adopter of 5G use cases such a IoT devices and services, and by digitalising its infrastructure. Similarly Government also has an important role to play in the standardisation of IoT solutions and in providing infrastructure for their deployment and operation.

Annex A: Specific changes required to the planning framework

Reforms to Permitted Development

41. Permitted Development (PD) enables cheaper, faster, more certain outcomes for telecom operators and more efficient use of resources for stretched planning authorities. There needs to be a focus on adjusting the current PD regime, by re-designating developments that are currently allowed under 'PD with prior approval' to 'PD without prior approval.' This would eliminate discrepancies between the regime for fixed telephony and mobile telephony and eradicate unnecessary restrictions.

42. Ultimately, the objective should be to get to a two-tier system for telecoms, rather than the existing three tier system – PD without prior approval and PD with prior approval for the more significant deployments of apparatus. Telecoms development in protected areas that presently needs full planning should also be brought into the Permitted Development regime, with a consideration of which developments require prior approval. Prior approval should be reserved for those developments that have the greatest potential for environmental impact

Removing discrepancies between fixed and mobile

43. Current discrepancies between fixed and mobile in the planning regime, should also be eliminated. These include:

- A fixed operator can erect a 'telegraph pole' under Regulation 5, but a mobile operator erecting a monopole cannot.
- A street cabinet that is part of a fixed network deployment can be deployed under Regulation 5, but the mobile equivalent in a protected area cannot (without prior approval).

Removing unnecessary restrictions

44. Within the current planning regime, there are several unnecessary restrictions on telecoms applications that could be removed, facilitating coverage improvements. These include:

- Removing the 1/3 limit (i.e. a replacement/alteration must not exceed the width of an existing mast by 1/3)
- Remove the restriction on the number of antenna on a dwelling house/curtilage thereof
- Allow small cells to be above the height of the ridge line/chimney and on buildings above 15 metres
- Adjust the rules on '20 metres from a public highway' to make them more 'fit for purpose' and conducive to providing coverage on transport routes

Wider reform to support the widespread roll-out of 5G services

A national approach to planning and deployment, incorporating regional priorities.

45. There must be a more consistent and streamlined approach to planning. Differing approaches in each local authority adds costs, slows deployment and results in some areas of the country being left behind. This can inhibit rollout, especially in remote and rural areas where the business case for additional investment can be marginal. In deploying our current network, Three has found the time taken to receive permission from the fastest and slowest authorities can differ by as much as [redacted]. The Government's objective of ensuring growth across the UK cannot be achieved if densification is made unnecessarily difficult.

46. Consideration should therefore be given as to what frameworks can be put in place either on a country-wide or regional basis, to ensure specific planning decisions are subject only to an appropriate level of scrutiny. The new Regional Deals and Growth Deals with groupings of local authorities could provide the most effective means of implementing a revised planning framework. For example, planning decisions for essential economic infrastructure such as mobile sites could be considered on the combined authority level. This streamlined approach would avoid delay and unlock increased investment and coverage.

47. Steps should also be taken to ensure that examples of best practice approach, for example the City of London's standardised wayleave for broadband infrastructure, should be extended to mobile and become more widely adopted in order to ensure excellent digital connectivity for all.

Connectivity and Large Scale Developments

48. A fully integrated approach is required to large scale developments to ensure that connectivity is hard baked into schemes from the outset. Changes to Building regulation and the Planning framework to promote including quality digital infrastructure in the development will enable much more efficient deployment of mobile and wireless infrastructure. It is to note that a similar model has been to successfully increase the use of energy efficiency technologies and methods.

49. Given this need for a joined-up approach, Three believes that Government should consider the creation of a 'Connectivity Consideration' for all Large Scale Major Developments or redevelopments. This would place the responsibility for considering the delivery of connectivity on the developers at the outset of project.

50. Of course, consideration will also need to be given to ensuring in meeting this responsibility developers do not just take the 'easy' route and only promote the incumbent. There are no reasons why developers cannot, for instance, install appropriate ducting and other infrastructure necessary for comprehensive digital connectivity during the build phase, and then have an open access mechanism. It is to note that currently there is an expectation that developers can demonstrate a "planning gain", this should be extended to cover digital infrastructure.

51. Three applauds the Government's successful approach to ensuring fixed line connectivity for new build homes, through a deal reached with BT Openreach and the Home Builders Federation. A similarly innovative approach should be adopted for mobile connectivity. Such an arrangement would mean fewer instances where line of sight from a mast to a new development is obscured or capacity insufficient.

52. Such an approach will help incentivise engagement with industry at an early stage, ensuring that: i) development has minimum impact on existing mobile connectivity, and ii) ensuring that new infrastructure has the capacity and coverage to meet demand.

Facilitating the deployment of Small Cells for 5G

53. While recent reforms to the planning and regulatory regime for site rentals and continuity of communication in England are welcome, these were primarily designed to facilitate upgrades and site sharing on existing infrastructure. A major change in approach will be required if the UK is to achieve truly ubiquitous, high-speed 5G coverage. It will not be enough to tweak existing regulations.

54. We welcome Government's recently published 5G Strategy and especially the commitment to review the current regulatory and planning regime this year, to ensure it is fit for 5G rollout. However, given that new infrastructure required for 5G (especially small cell) is yet to be fully trialled and deployed, it is essential that the Government's approach is not too prescriptive. There needs to be a degree of flexibility in legislation to allow for telecoms companies to react nimbly to changing technologies.