Introduction

Thank you for the opportunity to testify today. My name is Jon Wilkins, and I am a co-founder of Quadra Partners, an advisory firm focused on the broadband sector. Prior to that, from 2013-2017 I served as the Managing Director and then the Chief of the Wireless Telecommunications Bureau at the Federal Communications Commission (FCC). In those roles I was heavily involved in the Commission's work to promote broadband and close the digital divide. Prior to serving with the FCC, I was a management consultant for more than fifteen years, working mostly with companies on different aspects of the broadband market, dating back to the dawn of the broadband era at the end of the 1990s. In short, for my entire professional career I have been involved in the growth of broadband from both private and public sector perspectives.

Of recent and specific relevance to the topic of today's hearing, over the past eighteen months I worked with a multi-state group of private and public entities to prepare for, and participate in, the recent FCC Rural Digital Opportunity Fund (RDOF) reverse auction. I will provide in my testimony today some of the lessons learned from RDOF, both from the perspective of new types of providers seeking to offer broadband as well as with respect to potential improvements to funding award processes.

U.S. telecommunications policy has recognized the importance of closing the digital divide for many years. Federal, state, and local governments have pursued a range of policies to promote universal access to broadband, and some progress has been made. Over the last decade, the FCC's high-cost fund has invested approximately $40 billion, bringing broadband to millions of locations, primarily in rural areas. Over the last five years, the FCC's E-Rate program has successfully connected over 99% of U.S. schools to the high-speed connections needed for modern digital learning. And over just the last few months, Congress has provided new support for broadband adoption and deployment that will help millions to afford broadband service now and have access in the future.

Despite this progress, however, the need for high-quality broadband is increasing and the demands on our broadband infrastructure are growing at an astonishing rate. What was good broadband, or at least good enough, just ten years ago is now evidently inadequate. And while in large parts of the country – such as middle- and high-income households in city and suburban neighborhoods – our private provider market is largely meeting this need, for a significant portion of the U.S. population the lack of access to affordable broadband infrastructure has become an increasingly dire problem. The last year of pandemic disruptions to work, school, commerce, and almost every other aspect of life have highlighted the stakes in the starkest possible terms.

What is very encouraging is the important shift now underway – as evidenced by today's hearing – to address the digital divide not simply as an issue of traditional telecom policy, but as a question of infrastructure investment and national economic development. This is an extremely important and welcome change, because both the national need to solve the broadband problem once-and-for-all, as well as the potential for successfully doing so, has never been higher. Each dollar of public investment in broadband can generate several times that amount in additional private investment, amplifying the economic benefits. In the remainder of my testimony, I will highlight several broadband-sector trends with policy implications and suggest some considerations for how best to build on the policy actions and investments of recent years.

Is $80 Billion Enough?

In January 2017, an FCC staff whitepaper calculated that a total investment of $80 billion would be sufficient to reach the U.S. residential and small-business locations then regarded by the Commission as "unserved" by robust broadband infrastructure capable of at least 25 Mbps downstream and 3 Mbps upstream (25/3 Mbps). The FCC staff went on to estimate that approximately 85% of the locations reached for this $80 billion investment would be self-sustaining and require no ongoing subsidy; for the final 15% – equivalent to about 2% of all U.S. locations – the FCC whitepaper noted the need for an ongoing subsidy of approximately $2 billion per year, or about half of current Commission annual support amounts. The $80 billion investment and annual $2 billion support figures were calculated using detailed economic information and modeling capabilities available to the FCC's expert staff and were based on reaching all such unserved locations with fiber-to-the-premise (FTTP) connections.

Some progress has been made in the interim, including ongoing deployments of projects funded by prior FCC awards, such as the 2018 Connect America Fund (CAF)-II auction, as well as ReConnect grants from USDA and various state efforts. The recent RDOF auction will also result in support for additional deployments after the FCC completes its ongoing review of long-form applications. It is important to note, however, that far from all CAF-II and RDOF awards were for the high-quality fiber networks modeled in 2017.

However, despite this progress, as of March 2021, the total investment required is likely still at least $80 billion, and more likely somewhat higher. This may seem somewhat counterintuitive given investments over the recent years, but I believe it to be the case for the following reasons. First, the 2017 analysis used the FCC's best maps of broadband deployment available at the time, which are known to undercount the size of the unserved population. For example, as members of this Committee are acutely aware, the FCC's legacy approach treats all locations in a census block as served if a provider reports the

ability to provide service to just a single location in the block; this alone leads to undercount by definition. In addition, location growth in some rural areas over the last decade is of course not captured by legacy FCC data. As a result of these basic data issues alone, when the FCC completes its current work to update broadband availability maps for the entire country as mandated by the 2020 Broadband DATA Act, it is widely expected that nearly as many unserved residential and small-business locations will be identified in the new total count as was the case in 2017, even accounting for new deployments funded by private or public investments in the intervening years. The persistence of this gap is felt as a daily reality in communities across the country.

Second, end-user performance requirements have clearly increased from the 25/3 Mbps level used for the FCC's 2017 analysis. Reliance on video-intensive, two-way applications – then viewed mostly as the province of niche gaming enthusiasts, now widely understood by most Americans in the form of video-conferencing services – has skyrocketed since 2017. Recent calls for higher minimum broadband performance definitions such as 100/100 Mbps and legislative proposals urging symmetrical upload and download speeds address this reality. Raising the bar on what it means to be adequately "served" would mean that some of the locations counted by the FCC in 2017 under the 25/3 Mbps standard would not meet updated performance requirements, increasing the magnitude of the problem.

The size of the accessibility gap is therefore likely at least as large as it was assessed to be in 2017, and the $80 billion estimate remains a good, if perhaps low, one to use for policies looking forward to the rest of 2021 and beyond.

Policy Improvements To Get the Best Results from $80 Billion

Like any financial projection, the FCC's 2017 whitepaper necessarily relies on certain assumptions in arriving at its $80 billion figure. For example, the analysis assumes that the award process for such funds will be done efficiently, that is with dollars awarded that match the true subsidy need. The analysis also assumes that $80 billion will be available to awardees immediately, because a broadband project requires a significant portion of the required investment to be spent within the first two years. Finally, the analysis assumes that the networks generate customer revenues for service once they are built; in other words, the $80 billion figure is not the standalone total investment required (that amount is considerably higher), but rather reflects the difference between total customer revenues and total project costs.

The good news is that existing policy mechanisms, as well as certain proposed new policy actions, could provide a sound national strategy for addressing all of these areas.

However, I believe there are also a number of improvements that could be made to significantly enhance the likelihood that a public investment of at least $80 billion would truly close the deployment gap.

Economically Efficient Allocation: Auctions Are Not Self-Executing

Any government support for broadband deployment should ultimately flow to specific projects via a competitive award process. The policy goal should be to reveal the true economic need (subsidy) for different projects in a given area and then award the lowest possible subsidy sufficient to meet the desired performance of the network. In concept, some form of reverse auction is an excellent solution to the problem.

On the favorable side, what the RDOF-I (and earlier CAF-II) auction demonstrated was that there is interest in providing rural broadband from a wide range of entities, including traditional and nontraditional, large and small, private and public, incumbents and new entrants. More than four hundred bidding entities, representing an even greater number of underlying operating companies, participated in the RDOF-I auction, an astounding number. As one example, large numbers of rural electric co-operatives demonstrated the increasing interest of that industry in offering broadband to their members. Various other new entrants also see opportunities to serve rural markets. This in and of itself is a very positive and relatively new development, but it is not surprising. Given the increasing economic importance of broadband, these projects are of significant interest to local providers, investors, and state and local governments. The RDOF-I outcome showed that a subsidy boost is enough to persuade many types of providers to pursue building new broadband networks to unserved communities.

However, a reverse auction is just a type of allocation mechanism; the results of an auction are greatly affected by the specific auction-design choices made. Unfortunately, a number of the design choices made for the RDOF-I auction led directly to an outcome that has raised many questions, and many members of this Committee have voiced direct concerns. From a policy perspective, I would highlight three issues.

First, the RDOF-I auction made distinctions among bidders on just two dimensions: network speed and latency. Though important, these are far from the only attributes of broadband infrastructure that matter to rural communities. Future auctions could consider factors such as more symmetric performance, scalability, long-term durability, resiliency, and reliability. For example, telecommunications industry veterans remember that "five-nines reliability" – 99.999% availability, meaning the network is down for less than six minutes per year – was the gold standard for the last century's networks. While promoting competition between different technologies is critical in many areas of

telecom policy, the question in a reverse auction for subsidies is not "which technology is allowed to compete in the market?" but rather "what is the performance profile of a network deserving public investment?"

Second, an auction must reveal, at least approximately, the true economic needs of bidders. Simply put, some RDOF-I auction winners will receive support for networks that, by their own public statements, would have been deployed anyway. This is a fundamental flaw in auction design that must be fixed in future award processes.

Third, an auction is fundamentally the result of competitive bidding by the entities that are allowed to participate. Though it is important not to set the table stakes for entry so high as to deter new providers, many of the concerns about the RDOF-I auction results indicate that more stringent requirements should be placed on aspiring bidders in future auctions. As an example, requirements could include more rigorous pre-auction demonstrations of actual ability to operate at the promised quality of service in a given geography, or operating experience with a given type of broadband network. States and localities could also be engaged to provide input into the qualifications of bidders seeking support in a given state.

Time Equals Money: The Capital Formation Problem

RDOF also provides a useful illustration of a critical policy issue: the difference between upfront investment required versus the duration of time over which support amounts are paid. While the largest federal programs such as RDOF win headlines for total award amounts (such as $9.2 billion for RDOF-I), those amounts are in fact paid out over ten years. This creates a "capital formation problem" for all but the largest companies, and especially for new entrants to the broadband market seeking to build larger projects.

Simply put, it can be costly for a ten-year funding stream such as RDOF to be leveraged into the up-front capital needed for construction. Just because I may receive $10 million per year for ten years (assuming I don't run into any deployment problems), does not mean that an investor or lender will give me anywhere near $100 million today. In a reverse auction, these financing costs must be incorporated into bidding strategies, potentially causing participants to drop out earlier than otherwise necessary because a material portion of the funds intended for broadband deployment must instead be spent on financing. In other words, some projects will not be built despite their inherent economic viability over the long term.

One initial improvement would be to shift to a shorter term for paying out support that better aligns with actual project needs. A ten-year period is too long. In reality, many

cable and FTTP projects can be built within two-to-three years, assuming adequate up-front planning and preparation, such as ensuring access to needed materials and labor. As one immediate upside, such a change would bring broadband to unserved areas more quickly, an important benefit in and of itself; indeed, many local stakeholders in rural areas strongly support proposals to incentivize accelerated deployment. At the same time, however, the government does have an important interest in maintaining oversight and control of projects at least until a viable network is up and running; handing over very large sums immediately is not good policy.

Current proposals to add financing support in the form of loan guarantees or other credit support mechanisms also could be very valuable in addressing this capital formation problem. The core question is one of project risk: How much will the public take on, and how much must private investors be paid to carry? By taking on some of the risk, government credit support could allow broadband projects to be financed more like traditional long-lived infrastructure.

Cash Is Cash: Synchronizing Support for Access and Adoption

While the $80 billion analysis correctly assumes that currently unserved residents have a strong demand for high-performance broadband, in many communities even reasonable commercial rates for broadband service may not be affordable for significant portions of the population. In addition, unlike broadband networks in cities and towns, rural networks typically have less opportunity to generate revenues from businesses. The financial structure of broadband deployment – large up-front capital costs but relatively moderate ongoing operating and maintenance costs – means that the economic viability of a project can be highly sensitive to adoption levels. Prospective providers must closely analyze not just the cost to build the network, but also the potential revenues. In some cases, uncertainty about the ability of local customers to afford service over time deters the pursuit of otherwise viable projects. This creates an unfortunate vicious circle, with the communities most in need of the economic development benefits of broadband least able to attract the needed investment.

Fortunately, longstanding broadband programs such as E-Rate and Rural Health Care support for anchor institutions, as well as programs designed for low-income users, including new programs such as the Emergency Broadband Benefit, all are available to support the demand side of broadband projects. Indeed, it is often overlooked that even programs such as Lifeline could be important in both rural and urban areas, and proposed efforts to strengthen Lifeline's support for broadband data services would benefit communities across the country.

An additional area of improvement could be to better coordinate these "demand side" programs with "supply side" programs such as RDOF, the USDA's various programs, and other federal deployment loans and grants. As a simple example, the FCC, NTIA, and USDA could implement streamlining initiatives to allow a grant recipient from one deployment-support program to more easily be deemed eligible to participate in existing, or new, demand-support programs.

Although in policy circles these programs are generally viewed as distinct, to providers of broadband service and their investors, all of these programs feed into a simple question: Are the risk-adjusted expected customer revenues and government support enough to justify the required investment? These programs therefore need not be viewed as competing with each other, nor as serving separate constituencies. Proper coordination combined with continued, sustainable funding would allow the sum to be far larger than the individual parts.

The Need for Federal Partnership with States and Tribes

Federal support is vital, but states and Tribal governments also have a critical role to play in closing the deployment gap. The overall U.S. figure of $80 billion is of course simply the sum of the state and Tribal needs. Critically, the specific types of projects and providers best able to close the gap can vary significantly from state to state, as can state policy preferences. State and Tribal broadband programs can amplify and accelerate the impact of overall federal efforts, and recent steps to include a significant level of funding and discretion in the American Rescue Plan for state broadband efforts are well designed to meet this opportunity. States also have a major contribution to make to the FCC's broadband mapping work. Many states have been rapidly moving forward with their own mapping efforts and they should be enabled to coordinate these efforts with the FCC's mapping work and participate as partners in that process.

States and Tribes also have an important role to play in providing early planning and advance preparations of locally tailored strategies that will take greatest advantage of new federal support. For example, even before any additional action by Congress, the FCC has over $11 billion in Universal Service Fund support that can be awarded via the RDOF II process. However, even with rapid progress on mapping, the length of the required administrative process to finalize rules and auction procedures likely means that the RDOF II auction will not start until 2022, at the earliest. However, in advance of this states and Tribes can make sure that providers in their jurisdictions are fully informed about broadband mapping and community needs, are aware of federal funding opportunities and requirements, and are supported in their bidding plans by reinforcing state policies. If Congress does opt to provide additional broadband infrastructure

investments, the impact of early planning and preparations by states and Tribes will be even higher.

It will be important going forward, however, that state, Tribal, and federal efforts do not work at cross-purposes. For example, the FCC's unexpected and unfortunate decision late in the process to preclude from RDOF-I any areas receiving state funding, including for future deployment, caused significant uncertainty in many states, a problem that persists given doubts about the viability of RDOF winners in a number of states. Just as the various federal agencies such as the FCC, USDA, and NTIA should work to better coordinate on the standards, timelines, and requirements for broadband funding awards, federal entities should place greater emphasis on federal/state/Tribal coordination.

Spillover Effects, Including 5G

As the FCC's 2017 whitepaper addressed, the fundamental justification for public investment in broadband infrastructure is that high-quality broadband generates significant economic benefits not fully captured by the operators of broadband networks themselves. The widespread and growing reliance on broadband across sectors including healthcare, education, and retail clearly illustrates this issue. A final point in this context: the fiber networks deployed to serve retail customers with FTTP in rural areas would directly support the deployment of 5G mobile services as well. Just as fixed broadband has now become essential to economic activity, true high-performance mobile broadband – the essential promise of the 5G-deployment push now underway by the nation's mobile carriers – is becoming similarly essential. Upcoming FCC efforts such as the $9 billion 5G Fund reverse auction will be enhanced if participants know that essential fiber-based front-haul and back-haul connections will be in available in rural areas. Investment in fiber now will pay future dividends in the 5G arena as well.

Conclusion

Broadband communications networks are the critical infrastructure for today. Over the last ten years since the original National Broadband Plan, the federal government has put in place the policy building blocks that, with some improvements and greater financial support, could ensure access to high-performance, scalable, resilient broadband to the many millions of Americans who lack it today. I appreciate the opportunity to contribute to the Committee's consideration of this important topic, and look forward to your questions.