City of Seattle
Edward B. Murray, Mayor

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To: National Telecommunications Information Administration and National Science Foundation
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From: Michael Mattmiller, Chief Technology Officer, City of Seattle

Subject: National Broadband Research Agenda

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Thank you for providing the opportunity for the City of Seattle to contribute to the National Broadband Research Agenda. The federal data collection, analysis, and dissemination, as well as localized research supported by the federal government, provide cities with critical information that enables connected, equitable, and smarter communities.

Strong foundational internet access research and evaluation already exists, and we hope NTIA and other agencies continue to support the collection, enhancement and distribution of the data and best practices identified by these institutions. We are also pleased that the NTIA and NSF continue to look at opportunities provided by new technologies and their implications for rural, and other unserved and underserved populations, including seniors, low-income residents, the disabled, and others who have underutilized broadband technology.

Following are our recommendations for NTIA and NSF research and support in the areas requested. Please feel free to contact us for follow-up. We look forward to continuing to work with you.

A. Broadband Technology Development and Innovation

Cities both control access to infrastructure and strive to help the public gain equitable access to the internet. Research should help cities understand how to plan for and partner with others to enable deployment of new technologies, including the alignment of regulation with desired broadband investment and equity outcomes.

- **Implications of new technology, including 5G advanced wireless and white space, in broadband deployment and adoption, especially in disadvantaged communities.**

  Cities are interested in the best possible networks, but also need better information on the requirements, opportunities, and how to maximize current infrastructure, and equitably manage access to City facilities such as utility poles and rights of way as new technologies are deployed. Research in this area could help inform to what degree new technology deployments will change how cities use fiber and how existing infrastructure can best be leveraged for these upcoming deployments. Federal support could also help inform how this can best be planned or leveraged to assist disadvantaged communities.

- **Research and evaluate models for multiple dwelling unit (MDU) competitive broadband infrastructure and technology management, especially in public, low-income, and mixed-income housing.**

  MDUs generally are not designed or easily modified to enable multiple providers or aggregated services. Public and low-income housing providers are often left on their own to negotiate broadband provider relationships and contracts without knowing best practices, or residents are often left to sort out internet options on their own. Some limited research has been conducted on costing for aggregated service, but there is no set of code or contract best practices, design principles, or central explanation of options. Federal support for research in this area could help drive planning and building for more cost efficient and resident responsive broadband service. It could inform the funder, developers, and builders on best practices and financial models to increase accessible and affordable broadband for MDU residents. It would also help cities consider financing and policy options to promote competitive broadband internet services in MDUs.

- **Research methods for improving assessment of municipal infrastructure and cost forecasting; and barriers to assessment, planning, and implementation of broadband infrastructure**.

  Tools and models for jurisdictions to forecast and model options for deploying infrastructure, especially in existing public facilities rights of way, is limited. Additional research and sharing of tools and policies could lower costs and speed infrastructure planning and development, as well as facilitating public-private partnerships.

B. Broadband Access and Adoption

Increase research on effectiveness of discount internet programs, especially the impact of enrollment barriers and other obstacles to adoption that are faced by consumers and community organizations.

- **Adoption rates, best practices, design and standards for low income internet programs.**

  There has been significant growth in pricing and design of low-income internet programs, some of which were the result of company mergers regulated by the FCC. While these programs make internet service more affordable, barriers to obtaining the service limit their adoption. The FCC Lifeline broadband program is about to launch and will rely on ISPs and community providers to enroll participants. However, there is little research and dissemination of best practices and effectiveness of pricing schemes, bandwidth provided, caps, program design and enrollment barriers and effectiveness for low income residents. It would also be helpful to have analysis of the business cost of delivering these programs.

- **The role of community-based organizations on technology access and education in broadband access and adoption**

  Many community-based organizations work alongside libraries and schools on the front lines of assisting disadvantaged residents with technology access and education. There has been regular surveying and some impact assessment of technology in libraries, but minimal collective or extensive research on the infrastructure, and important role that other community-based intermediaries play in assisting with broadband technology access and adoption. The federal Broadband Technology Opportunity Program (BTOP) supported development of many public computing centers and also has valuable data. Further investigation of the role of and barriers faced by the community-based organizations as intermediaries in fostering broadband adoption and digital literacy would help guide public-private investment and sharing of best practices, as well as facilitate further capacity building. Research of community approaches and applications of technology to foster greater adoption in a culturally competent manner with disadvantaged populations, such as seniors, limited English speakers, disabled, could greatly increase effectiveness in reaching more residents.

C. Socioeconomic Impacts

Increase research on the economic impacts of broadband and competition in low income communities on individuals, families and neighborhoods.

- **Potential for innovation/incubator zones with enhanced broadband linked with broadband adoption efforts in disadvantaged neighborhoods**

  There is a need to conduct research and provide documentation on the economic benefit of targeted broadband adoption efforts. Alongside this, linking research on whether high tech development or incubator projects located in proximity to low income communities can help drive broadband adoption and increase skilled local workforce development. Research and analysis on how to equitably link technology industry development areas with broadband adoption for disadvantaged populations could provide both economic data and strategic planning practices that could benefit both aspects.

- **Evaluation of individual and family economic and social benefits of broadband**

  There has been limited research on the overall economic and social benefit to individuals and families resulting from connection to broadband or the impact of differences in levels of connectivity. NTIA and NSF could help foster additional modeling that would help drive further investment and focus of digital inclusion initiatives.

- **Models for aggregated internet and/or community Wi-Fi/wireless**

  It would be helpful to consider models and costs for cooperative purchase or aggregated internet offerings and/or public partnerships providing public wireless access in underserved or disadvantaged communities, including low income housing or neighborhoods.

D. Opportunities for Federal Leadership in Data Collection & Research

The following are priorities and opportunities to improve sharing of research and to enhance cross-disciplinary collaboration and data that would help facilitate research.

- **Improve federal tracking and reporting of low income internet offerings and take rates.**

  Internet providers share some information about the take rates of their low cost internet programs, however this is not consistent or detailed to a level that would facilitate cities providing targeted enrollment assistance. Through federal programs like HUD ConnectHome we have worked with providers to measure detailed low income program adoption in targeted communities. Expanding this reporting will be critical to identify and addressing areas of internet need as well as measuring adoption of programs like the Lifeline Broadband program.

- **Support a research and data consortium on broadband deployment and adoption.**

  Federal support for a research consortium of public, educational, private and non-profit sectors would help foster an inventory of research and metrics, further refine measurements and assessment tools, ensure exchange of methodologies and data tools, and could foster clearer identification of key research needs, especially as it concerns disadvantaged residents and communities. This consortium could also serve as a vehicle to partner with federal and state bodies on research seminars and partnerships. Following the NTIA BTOP grants, there was some exchange and hosting on a wiki site of evaluation methods and tools, as well as subsequent Broadband USA workshops.

- **Support further development of a repository for research, evaluation and operational tools, curriculum and other broadband adoption and digital inclusion materials.**

  The NTIA worked with leading digital inclusion experts to develop the taxonomy foundation used in DigitalLiteracy.gov. The University of Washington, City of Seattle, National Digital Inclusion Alliance members, and others worked on prototype models of a public repository of materials. Continuing the collection and

development of the materials repository will help preserve useful, public and privately funded materials and reduce costs for government, private, and non-profit organizations who are developing broadband adoption, digital equity, and similar programs. This could be done in conjunction with the research and data consortium.

- **Release existing Census tract data on household Internet access.**

  The U.S. Census currently has three years of American Community Survey data on household Internet access – adoption rates, technology shares, demographics of connected and unconnected households, etc. This valuable data has been published only at the "place" (citywide) level, and only for "places" above 20,000 population – not for all Census tracts. Releasing it on a more frequent basis and at the tract level will make this data significantly more useful for local broadband access and adoption efforts.

- **Collect and preserve the records of the NTIA's BTOP Sustainable Broadband Adoption (SBA) and Public Computing Center (PCC) projects.**

  The NTIA has significant data, best practices, and other materials created by BTOP Sustainable Broadband Adoption and Public Computer Center projects throughout the country from 2010 to 2013. We support the National Digital Inclusion Alliance priority that these get collected, safely stored and made available to researchers and practitioners. This should include the materials also posted on the NTIA wiki pages during the BTOP project.