

**Before the
Federal Communications Commission
Washington, D.C. 20554**

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In the Matter of	)	
	)	
Modernizing the E-rate	)	WC Docket No. 13-184
Program for Schools and Libraries	)	
	)	
_____	)	

COMMENTS OF THE URBAN LIBRARIES COUNCIL

Dated: April 7, 2014

SUMMARY

By pulling Internet access into almost every library in the nation, the E-rate has helped transform libraries for the 21st century. Libraries are now the primary free public Internet access point in civic society. They serve more people, for more hours, with more digital material than any other institution. However, bandwidth to the 17,000 public library buildings, and Wi-Fi connectivity inside these buildings has fallen woefully behind comparable commercial and residential speeds. As a result, libraries are not equipped to meet the 21st century needs of the American information society.

No federal agency provides more dollars for connectivity to and inside libraries than the FCC through the E-rate. As part of the re-imagination of this 17-year old program, the FCC has the chance to lift libraries to a much higher level of service to preschool children, afterschool K-12 children, adults without broadband at home or work, and community service providers for whom libraries are the necessary venue for their audiences. To this end, the FCC should take the following steps:

- To meet the distinct needs and challenges of libraries, administer library funding separately through an L-Rate, with funds raised in the same way as the E-rate, but with the size, contracting and networking methodology crafted for the special requirements of libraries,

- Set a goal of at least 1 Gigabit per second connectivity to every library building, and at least 5 Megabit per second downloading to every Wi-Fi user at peak hours in every library building, with the latter measurement increasing as digital media demands over time,

- Allocate L-Rate funds to libraries according to need, determining need by weighing existing bandwidth to buildings, Wi-Fi connectivity, number of users, number of potential users, and local area income.

-- Fund four pilot programs: (1) a model bidding project illustrating how libraries can obtain best available prices for networking, (2) the Digital Public Library of America proposal for helping libraries share digital material, (3) an innovation fund aimed at enhancing technology to meet the needs of the community with greatest efficiency, and (4) a diagnostic test building on the actual test done in the last two weeks by the Urban Libraries Council (see Exhibit A), showing the inadequacy of current bandwidth and Wi-Fi connectivity.

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The Urban Libraries Council (“ULC”) hereby responds to the Public Notice (“Notice”) issued on March 6, 2014 in the above-captioned proceeding seeking focused comment on several issues of critical importance to reforming the E-rate program.¹

ULC commends the Commission for issuing the Public Notice and for its continuing focus on modernizing the E-rate program for the 21st century. The Commission was correct to focus a number of inquiries in the Public Notice on the specific needs of libraries.² These include, among others, questions regarding whether libraries have specific technical needs that the Commission should address and whether library connectivity needs differ from schools. In addition, the Public Notice requested details on library-specific pilot programs, including the amount of funding needed, the goals of any such project and the data the Commission should collect.³

¹ See *Modernizing the E-rate Program for Schools and Libraries*, WC Docket No. 13-184, Public Notice, DA 14-308 (2014).

² See *Public Notice* at ¶. 59.

³ See *id.*

I. THE E-RATE PROGRAM MUST RECOGNIZE THE UNIQUE ROLE OF LIBRARIES IN THE BROADBAND ECONOMIC SOCIAL LANDSCAPE

A. Libraries Are the Number One Free Public Internet Access Point in the Country, Serving a Critical Role in Their Communities

The record in this proceeding confirms that libraries have undergone a significant transformation since the Commission first launched the E-rate 17 years ago.⁴ As Commissioner Pai recently said, "libraries are even more important [today than in 1997] because they have become a mainstay for Americans who can't get broadband at home."⁵ During the past 17 years, libraries have become "the community on-ramp to the world of information" for a vast swath of Americans.⁶ The original designers of the E-rate program could not have envisioned the significant role that libraries would play in today's Internet-enabled society. In voting to commence this proceeding, Commissioner Clyburn acknowledged this by noting that "today's cutting-edge educational tools and learning platforms were not part of the landscape when the Commission first implemented this Congressional directive."⁷ It is not surprising, therefore, that the original design of the E-rate program for libraries no longer serves the needs of public libraries given their critical role in today's broadband society.

As the Commission is well aware, millions of individuals today cannot afford high-speed broadband at home, while others lack reliable access to connectivity where they live. Further, many are unable to access the Internet through their place of employment, either because they

⁴ See Comments of the American Library Association at 6-10 (filed Sept. 16, 2013) ("ALA Comments"); Comments of the Schools, Health & Libraries Coalition at 2-3 (filed Sept. 16, 2013) ("SHLB Comments").

⁵ Remarks of Commissioner Ajit Pai on Connecting the American Classroom: A Student-Centered E-rate Program at 8 (July 16, 2013) ("Commissioner Pai AEI Remarks").

⁶ Prepared Remarks of Chairman Tom Wheeler, National Digital Learning Day at 2. (Feb. 5, 2014) ("Chairman Wheeler Feb. 5 Remarks").

⁷ *Modernizing the E-rate Program for Schools and Libraries*, WC Docket No. 13-184, Notice of Proposed Rulemaking, Statement of Commissioner Mignon Clyburn, 28 FCC Rcd 11304, 11379.

are under- or unemployed. In fact, more than 90 million adult Americans are currently out of the workforce.⁸ This number is the largest in American history as a quantity or a percentage of population. For these individuals, public libraries have become the sole source of free Internet access in the community. In fact, more than 62 percent of libraries report that they are “the only provider of free public computer and Internet access in their communities.”⁹ ULC members themselves operate more than 100 library systems, serving close to 100 million Americans, approximately 40 percent of whom lack Internet access at home.

It would be difficult for many of these individuals to participate in today’s Internet-enabled society without the free broadband access provided by public libraries. At least ten percent of Americans—30 million individuals—annually use public libraries to seek “employment or career” advancement through the Internet.¹⁰ Libraries have become the destination for many adults to continue their educational pursuits, helping them to complete the General Educational Development (“GED”) process or other continuing educational programs provided online by certificate programs, technical institutes or trade programs. Without the broadband and other digital services provided by public libraries, these adult students would be unable to build the skillsets necessary for an advanced economy. Lastly, libraries play an important role for both pre-K and K-12 students, who use the free library-provided Internet access after school for homework, research activities and other school-related projects.¹¹

⁸ See Bureau of Labor Statistics, Economic News Release Employment Situation Summary Household Data at Table A (April 4, 20214) (noting that 91,030,000 are not currently in the workforce).

⁹ See *American Library Association, U.S. Public Libraries Weather the Storm* at 2.

¹⁰ See *Opportunity for All: How Library Policies and Practices Impact Public Internet Access* at page 9 (June 2011) (“Opportunity for All”).

¹¹ Many ULC members report that their busiest time of day are the after-school hours when K-12 students travel to the local library to do homework and study, often using library-provided Wi-Fi. For many of those students, public libraries are the only link to the Internet outside of school, which is critical when

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B. The E-rate Program Must Evolve to Reflect Current Library Realities

The E-rate program is critically important to the nation's libraries as public libraries provide their services through nearly 9,000 systems in approximately 17,000 buildings.¹² Public libraries draw less financial support from the federal government than any other anchor institutions in the civic landscape. The FCC—through its distribution of E-rate funds—is the primary federal agency that supports connectivity to public libraries. The FCC complements the Institute of Museum and Library Services, which funds library research and innovation projects.¹³ Contributing to libraries per year for the last 17 years through the E-rate program, the Commission has leveraged with local matching grants a fraction of overall telecommunications revenue and recycled it through libraries and back into the information and communications technology (“ICT”) sector in an amount totaling, including matching grants from libraries, nearly \$4 billion.¹⁴ By contrast, schools receive more than \$2 billion annually from the FCC and billions more in annual funding support from other federal agencies. Libraries have increasing need for E-rate funds as the severe economic downturn in 2008-2009 caused many state and

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over 75% of K-12 teachers are assigning Internet-required homework. During the summer, libraries also serve as the only place many students can go to continue their online exploration and learning.

¹² The United States has about 120,000 libraries. However, academic, school, corporate and governmental libraries have not been included in the E-rate.

¹³ See http://www.ims.gov/assets/1/News/FY14_Budget_Table.pdf. A number of commenters have noted the critical role that E-rate funding plays for public libraries across the country. See ALA Comments at 3; SHLB Comments at 3.

¹⁴ In large part due to the E-rate, almost all libraries offer broadband access to connected computers and nearly 90 percent provide internal connections and Wi-Fi service. More than three-quarters offer e-books or similar forms of digital content, and more than 80% offer some form of training in technology and Internet access.

local policymakers to cut library budgets drastically, while the demand for Internet connectivity from library users escalated.¹⁵

Aside from the sizeable funding disparities noted above, libraries and schools also have different (though somewhat overlapping) user populations. Libraries also have unique governing structures. Most important for E-rate purposes, libraries have different broadband demands than schools with higher demands per user, especially for internal wireless connectivity—which has become the dominant use case in public libraries. These differences justify distinctive reform of the E-rate program to ensure that it accounts for the unique structural, operational and user environments of today’s public libraries.

As currently administered, therefore, the E-rate program does not fulfill the Congressional mandate that the Commission guarantee access to “advanced telecommunications services” to all libraries, discount the cost (such as through matching grants) and administer the program to produce that result.¹⁶ The simple fact that one-third of libraries do not apply for E-rate funds confirms that a transformational approach to E-rate reform is warranted.¹⁷

With this background in mind, ULC suggests changes that would permit the FCC and libraries to fulfill their joint mission of connecting all Americans to a high-speed society. These fixes should result in what Commissioner Rosenworcel has deemed “E-rate 2.0.”

¹⁵ See *The New Normal: Annual Library Budgets Survey 2012* at 3 (noting that “most libraries have still not recovered from the massive cuts inflicted since the financial crisis of 2008”).

¹⁶ 47 U.S.C. § 254(b)(6).

¹⁷ See *Opportunity for All*, Figure B-11, page 15.

II. THE FCC SHOULD FOCUS FUNDING ON HIGH-CAPACITY CONNECTIONS FOR ALL LIBRARIES

ULC agrees with the tentative conclusions set forth in the Notice that the Commission focus the E-rate program on funding high-capacity broadband connections.¹⁸ In refocusing the program in this manner, ULC submits that the Commission establish model network architectures and network objectives to ensure the most efficient use of scarce funds. It should also define a desired end state of network access for all libraries in the following areas: i) high-speed circuits to each library building, and ii) in-building WiFi and other internal connections.

A. The FCC Should Implement an “L-Rate” to Fund Model Library Networks

As the Commission is well aware, there is currently not a “one-size-fits-all” approach to library broadband network architectures. A recent California study of library broadband services reported more than six different forms of Internet access to libraries, more than 25 different providers, more than 40 different router providers and a multitude of other variations in wire and wireless local access networks.¹⁹ The significant technological advancements in network design during the last 17 years have contributed greatly to the numerous administrative challenges that have plagued the E-rate program in recent years, leading to lengthy application reviews and funding delays. The explosive growth in the types of ICT infrastructure that can be used to provide broadband services also has complicated library decision-making and slowed administrative reviews. In addition, the sheer number of competitors supplying such equipment has made it difficult for libraries to use their leverage and scale to wrestle price discounts and other accommodations from suppliers.

¹⁸ See *Public Notice* at ¶ 3

¹⁹ See *High-speed Broadband in California Public Libraries: Needs Assessment & Spending Plan*, California State Library (Feb. 2014)

To simplify the program, the FCC should define several model library network architectures that it will fund through a separate “L-rate” program dedicated to libraries.²⁰ These model architectures should vary according to the size, location and number of buildings in a given library system.²¹ They should not be based on the current Priority 1 and Priority 2 categories. These categories should be discarded in the L-rate program, which will favor a “whole network” funding approach based on model architectures—and model services contracts—adopted by the Commission in consultation with a broad cross section of other stakeholders (i.e., service providers, equipment manufacturers, etc.). A “whole networks” funding approach would greatly simplify funding and administrative procedures. Such an approach would provide library applicants with a clear understanding of what equipment and services are permitted in advance of submitting an application. This would enable libraries to combine purchase orders and provide volume commitments to vendors on model form contracts, allowing them to obtain lower prices. Adoption of model network architectures would also allow USAC (or whatever administrator the FCC chooses to run the L-rate) to grant very rapid and streamlined approvals of conforming equipment purchases. In time, certain equipment purchases might be automatically “deemed approved,” assuming those purchases comport with the model architecture. As an agency expert in networks, the Commission understands the architecture of state-of-the-art broadband networks and it can leverage its domain over networking and infrastructure companies to assist in developing model networks in conjunction

²⁰ If necessary, the FCC should issue a further public notice asking for input as to specific model architectures that the E-rate should fund.

²¹ These model architectures should permit libraries to exercise substantial local discretion in how they use wireless and wireline local access networks.

with library IT experts. In this way, the Commission will not only simplify the administrative processes, but will also assist the understaffed and often underfunded libraries of America.

B. The Commission Should Establish a Desired End State of Access

In designing model network architectures to be funded by the L-rate, the Commission should establish desired end state network access objectives for all libraries. ULC proposes at least 1 Gbps of broadband connectivity as an appropriate objective for all applicant library buildings. In addition, this 1 Gbps of connectivity must provide a minimum of 10 Mbps downstream connectivity and 2 Mbps upstream connectivity for each desktop workstations, as well as a minimum of 5 Mbps downstream connectivity and 1 Mbps upstream connectivity for the marginal indoor WiFi user at peak times (typically four to seven p.m.), which is the amount needed for most rich media consumption today. These speeds are consistent with the FCC's previous determination regarding the minimum acceptable broadband speeds per user. These speeds allow reasonable file download times, as well as access to video and other streaming services without significant disruption or delay.

ULC believes that network access objectives based on actual connectivity delivered to the library building and to the marginal indoor user at peak times are preferable to other alternatives. First, rather than basing funding decisions on theoretical bandwidth throughput, this approach measures the speeds actually experienced by library patrons. In this way, peak-hour bandwidth diagnostics provide the most accurate measure of how effectively libraries are using E-rate funds. Simply put, poor internal connections can waste significant E-rate funds spent on high-speed connectivity provided to a building. Second, measurement of bandwidth speeds at peak hours will help to ensure that the most efficient and cost-effective model networks are developed. It also will help to future-proof library broadband networks because network designs

will be based on actual delivered speeds and not theoretical, “perfect world” speeds. Network access objectives based on bandwidth speeds respond to the concerns previously raised by Commissioner Pai that the Commission had lost its focus of implementing an E-rate program centered around the end user (i.e., library patron, student, etc.).²² By putting the user experience first, the program will once again center on the end user.

Like other commenters in this proceeding, ULC does not believe in funding half-measures or incremental improvements that fall short of the defined end-state.²³ This would be inconsistent with Chairman Wheeler’s goal of future-proofing America’s libraries and not the best use of scarce program funds. Simply put, if libraries need a 1GB connection into their buildings, they must contract for that capacity as quickly as possible, as opposed to spending more money over a longer period to obtain the same objective.

C. The Commission Must Understand the Current Library Broadband Landscape

Prior to designing model network architectures or creating desired end state network access objectives, however, the Commission must understand the current broadband connectivity abilities of public libraries. Only then can the difference between the current state of all three parameters: i) to-the-building, ii) desktop workstations, iii) and high-speed Wi-Fi and the desired end state be transmuted into an estimated total funding cost.

To assist in this effort, ULC recently organized a team of library IT leaders, including the Seattle Public Library, to design and undertake a non-statistical diagnostic assessment of its member libraries. As part of this diagnostic, ULC member libraries were asked to perform network "speed tests" using a publicly available diagnostic tool on 1-5 public workstations and

²² See Commissioner Pai AEI Remarks at 6.

²³ See *SHLB Comments* at 3-6.

mobile devices.²⁴ This diagnostic was performed during a 5-day period in late March and early April, during which speed tests were undertaken at the following time ranges: i) before the library opened to the public; ii) between 11 a.m. – 1 p.m.; and, iii) between 4 p.m. – 6 p.m. The results of these speed test (i.e., upload/download speeds and “ping” time) were recorded by the participating ULC libraries, along with the following information: library identifiers (e.g., system name, FSCS ID, library branch name and branch zip code), the operating system of the computer(s) used in the tests, the underlying network type (e.g., Ethernet or WiFi) and the time/date stamp of the tests.

Over 25 ULC member library systems serving large metropolitan regions participated in the diagnostic and measured connectivity at nearly 350 separate library branches. Initial results from a sample set of representative urban, suburban and rural branches is attached as Exhibit A. These results confirm the following facts. First, even when library broadband use is at its lowest (i.e., when a library is closed to the public), the broadband connectivity provided to library buildings barely matches the connection speeds experienced by residential homeowners under widely available (and relatively inexpensive) broadband plans. Second, the connectivity speeds provided to and within library buildings slows dramatically during the day—this is especially true for internal WiFi connections. Perhaps most important, the internal WiFi connectivity provided to users at peak hours in many library locations is at unacceptable levels. Indeed, many library users experience internal connectivity download and uploads speeds at well below 1 Mbps at peak hours, with some connections experiencing speeds as low as 20 Kbps.

²⁴ The diagnostic tool used during this process is available at www.speedtest.net.

These results reinforce ULC’s view that the Commission must measure network access objectives on the actual connectivity delivered to the library building and to the marginal indoor user at peak times. ULC appreciates that the Commission may want to undertake its own diagnostic to confirm ULC’s findings and to ensure that it obtains a statistically valid data sample. As illustrated by ULC’s diagnostic, which was designed, implemented and undertaken in less than 2 weeks, to-the-building and internal connectivity (both wireless and wireline) can be easily discovered and reported. Any such diagnostic undertaken by the Commission, however, must measure in a statistically sound manner the following three network points: i) to-the-building connectivity; ii) internal LAN connectivity; and, iii) WLAN connectivity for the marginal indoor user at peak times. ULC submits that this data would greatly assist the Commission in better understanding and scoping the sizeable broadband needs of the nation’s libraries. This diagnostic would also enable the Commission to understand whether it should require funding recipients to periodically measure actual to-the-building and in-building connectivity to ensure that service providers are delivering promised speeds.

D. The FCC Should Prioritize Funding Based on a Four-Factor Need Score

The Notice asks which E-rate applicants should receive funding priority.²⁵ Commissioner Pai has drawn attention to this issue by noting the “correlation between how poor or rural a state is and the E-Rate funding it gets.”²⁶ Commissioner Pai is right to favor a hierarchy of funding weighted toward the local ability to pay—though that should be only one of the factors taken into consideration. In addition, nothing in the statute permits the FCC to fund connectivity for libraries solely according to statewide metrics.

²⁵ See *Public Notice* at ¶¶. 13-19

²⁶ *Commissioner Pai AEI Speech* at 4.

To determine funding priority, the Commission should develop a “need score” based on the following four factors: 1) a library’s number of average per hour users, 2) the number of hours a library is open per week, 3) the library’s current desktop and marginal WiFi user connectivity measured at peak hours, and 4) the BLS-defined average income of the population in the served community, or other suitable measure of community income/poverty levels. Potential users might also be taken into account, where libraries have a reasonable prospect of expanding their services and user base. The FCC can use this information to determine a quantifiable measurement of need for each library. For example, a very busy library that is open long hours serving a poor community and offering low bandwidth will have a very high “need score.” On the other hand, a library offering high bandwidth to a small number of users in an affluent community with more limited hours of operation will have a comparatively low “need score.” Using such a need score, the FCC should bring the neediest libraries up to the required minimum broadband to and within all relevant buildings as quickly possible.

In addition to funding priority issues, ULC believes the Commission should focus on funding match issues. Because income disparity in the United States is large and increasing, the local match should range between 10% and 50% of the total contract price. Increasing the contribution from local sources at a time when gaps between rich and poor are growing seems both impractical and unfair. However, libraries should be able to provide the local matching funds from any provable source, including foundations, community donations, state and local government or other federal agencies. In this regard, ULC respectfully disagrees with any assertions that libraries in especially poor areas should provide a higher proportion of the contract price for connectivity than currently is the case.

Furthermore, ULC respectfully disagrees with Commissioner O’Rielly’s recent statement that “any increase in the budget for E-rate must be offset by reductions elsewhere within the federal universal service fund.”²⁷ If other aspects of USF should be reformed, they are not part of the pending proceeding and they should not be taken into account. No such tradeoff is required by the Communications Act as Congress did not ask the FCC to make unfair and unnecessary choices between students, the unemployed, and residential homeowners in high-cost areas each of whom has a just, enforceable, and legitimate right of access to advanced telecommunications and information services.

III. THE FCC SHOULD ENCOURAGE EFFICIENT ADMINISTRATION.

ULC already has proffered numerous suggestions for ways in which the Commission can simplify and streamline program administration.²⁸ In addition to these proposals, ULC provides the following additional considerations.

First, the L-rate “whole networks” funding approach described above in Section II.A. would greatly simplify the funding and administrative procedures for libraries. This approach would simplify the negotiation and application processes because applicant libraries would use form service contracts pre-approved by the Commission. These would permit very rapid and streamlined funding approvals. Reviews of equipment purchases that conform to the model network architectures would also be streamlined and equipment purchases that confirm to pre-defined specifications might be “deemed approved” in advance.

In addition, commercial providers receiving L-rate funds should provide their comparable analogous commercial rates on a region-by-region basis to applicant libraries. The Commission

²⁷ See Commissioner O’Rielly’s Blog Introduction and Views on E-Rate Reform (Feb 12, 2014).

²⁸ See Reply Comments of the Urban Libraries Council at 9 (filed Nov. 9, 2013).

could then use this data to provide applicant libraries with cost benchmarks for a variety of L-rate supported services and hardware in each specific region. This would allow library applicants to ensure that they are receiving reasonable rates for broadband services and speed USAC review of service proposals that are at or below comparable commercial rates.

IV. THE FCC SHOULD FUND FOUR PILOT PROGRAMS

In response to the Notice's request for demonstration projects aimed at identifying and testing different approaches to meeting the connectivity needs of applicants, ULC describes below four proposals for the Commission's consideration. These pilot programs should be conducted in a transparent, open manner, with all data made available to the public for review and audit.

Under the first pilot proposal, the Commission should define small geographic regions in both a rural and urban setting. In these two regions, the Commission should implement a collective bidding process for an upgrade to a new fiber-workstation-Wi-Fi model architecture by late 2014. Participation by public libraries in each region would be voluntary, but participating libraries would be required to contribute no more than 20% of the required buildout funds. The winning bidder would then be required to upgrade all of the participating libraries in the two regions to the model architectures as soon as possible. This demonstration project would provide the Commission with information regarding the costs and deployment issues associated with upgrading an entire region of public libraries to next-generation model architectures. This pilot would also allow the Commission to test a new regional administrator approach to funding and administration. The administrators in each selected region would be responsible for all issues, including applications, funding and network design. Decentralizing the administrative processes in this manner may help to speed application approvals and funding awards. Regional

administrators would also acquire more detailed knowledge about the specific issues in their territories, allowing them to make more informed decisions to enable more efficient funding and administration.

Second, the FCC should fund the Digital Public Library of America proposal known as DPLA Local and DPLA Books, as well as the completion of its regional hub system. As set forth in more detail in the DPLA submissions in this proceeding, these projects will instruct both libraries and the FCC on the problems and the possibilities of inter-library connectivity and digital access. The pursuit of a national platform that libraries can use for a variety of purposes could also provide individual libraries affordable access to advanced information services that they are currently unable to access either because of technical limitations or funding constraints. Such a platform could greatly assist libraries in significantly broadening the availability and accessibility of digital and innovative materials to their communities.

Third, the FCC should create a library innovation fund. Upon application, libraries would seek matching grants from this fund to test emerging, library-distinct use cases to address their to-the-building and internal connectivity needs. All such tests would be publicly reported, and be open for public comment before and after implementation. Such an initiative could help to create new frameworks that allow libraries to draw upon lessons learned from successful testbed projects to expand broadband services in their communities.

Fourth, the FCC should fund a diagnostic report discussed in more detail above in Section II.C. Such a report would build on, and extend ULC's findings as reported herein and provide the Commission with statistically valid data on the complete library broadband landscape. With this information, the Commission would be in a more informed position regarding the L-rate funding of libraries. ULC submits that such a pilot would be fairly

inexpensive as the diagnostic tools are not expensive or complicated and the test could be undertaken in short order.

V. CONCLUSION

ULC commends the Commission for issuing the Notice and requesting additional comment on issues of particular importance to reimagining the E-rate program for libraries. ULC respectfully submits that only transformational and bold reforms will sustain the program as was intended by Senators Rockefeller, Snowe and the other progenitors back in the late 20th century: a way to pave a path into the future that is open and free for all the public.

Respectfully submitted,

URBAN LIBRARIES COUNCIL

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EXHIBIT A

SAMPLE ULC DIAGNOSTIC DATA

Library Branch Type	Date	Time	Ping Result (inms)	Download Speed Result (in Mbps)	Upload Speed Result (in Mbps)	WiFi or Desktop
Library 1 (Suburban)	3/28/2014	10:30 AM	14.00	82.27	94.71	WiFi
	3/28/2014	1:02 PM	14.00	40.52	93.90	WiFi
	3/28/2014	4:37 PM	13.50	0.03	0.20	WiFi
Library 2 (Urban)	3/29/2014	9:02 AM	5.00	37.04	8.35	WiFi
	3/29/2014	1:11 PM	582.00	0.49	0.31	WiFi
	3/29/2014	4:13 PM	256.00	0.24	0.91	WiFi
Library 3 (Urban)	3/27/2014	8:00 AM	12.00	0.28	0.29	WiFi
	3/27/2014	1:00 PM	7.00	0.32	0.29	WiFi
	3/27/2014	4:00 PM	8.00	0.30	0.28	WiFi
Library 4 (Urban)	3/29/2014	9:30 AM	4.00	31.23	8.40	WiFi
	3/29/2014	12:42 PM	4.00	17.03	7.25	WiFi
	3/29/2014	3:51 PM	260.00	1.04	0.95	WiFi
Library 5 (Suburban)	3/29/2014	9:45 AM	9.00	2.39	1.84	Desktop
	3/29/2014	9:45 AM	15.00	2.47	1.66	Desktop
	3/29/2014	9:45 AM	146.00	0.31	0.57	WiFi
	3/29/2014	2:36 PM	51.00	0.49	0.72	Desktop
	3/29/2014	2:37 PM	61.00	0.43	1.84	Desktop
	3/29/2014	2:40 PM	49.00	0.08	0.34	WiFi
	3/29/2014	4:08 PM	30.00	0.20	1.69	WiFi
	3/29/2014	4:29 PM	9.00	1.14	2.53	Desktop
	3/29/2014	4:30 PM	6.00	0.96	2.66	Desktop
Library 6 (Suburban)	3/28/2014	9:24 AM	19.00	1.33	1.53	WiFi
	3/28/2014	1:14 PM	29.00	0.49	0.40	WiFi
	3/28/2014	4:05 PM	101.00	1.09	0.42	WiFi

Library Branch Type	Date	Time	Ping Result (inms)	Download Speed Result (in Mbps)	Upload Speed Result (in Mbps)	WiFi or Desktop
Library 7 (Urban)	4/1/2014	9:30 AM	53.00	1.35	0.56	WiFi
	4/1/2014	12:00 PM	21.00	1.41	1.22	WiFi
	4/1/2014	5:00 PM	53.00	0.56	1.35	WiFi
Library 8 (Suburban)	4/1/2014	1:00 AM	98.00	2.31	8.31	WiFi
	4/1/2014	6:00 AM	98.00	2.22	8.27	WiFi
	4/1/2014	8:00 AM	99.00	2.98	7.71	WiFi
Library 9 (suburban)	03/29/2014	10:10 AM	15:00	2.02	2.99	WiFi
	03/29/2014	10:14 AM	20:00	6.98	3.23	Desktop
	03/29/2014	3:28 PM	26:00	4.87	2.47	Desktop
	03/29/2014	3:29 PM	22:00	0.66	2.76	WiFi
	03/19/2014	3:31 PM	25:00	0.67	3.02	WiFi