

Broadband USA Applications Database

Applicant Name: Board of Trustees of the University of Illinois

Project Title: Urbana-Champaign Big Broadband - Below Ground (UC2B Middle Mile & Last Mile Infrastructure)

Project Type: Middle Mile

Executive Summary

Although the University of Illinois at Urbana-Champaign has an international reputation for technology leadership and innovation, within a half-mile of the campus are neighborhoods where the promise of information technology has yet to be realized. Through a three-pillar approach, the Urbana-Champaign Big Broadband (UC2B) Consortium seeks to leap frog the most vulnerable populations in our community to the head of the technology line with fiber-optic Big Broadband connectivity. We see the three proposals as both individually and collectively necessary, as they complement each other in many ways. While this proposal is primarily a Middle Mile project, it has a Last Mile, Fiber-to-the-Home (FTTH) pilot project component. The proposed funded service area for this Middle Mile fiber-optic project is the community surrounding the University. In addition to the cities of Urbana and Champaign, the service area also includes portions of Champaign County and the Village of Savoy. The Urbana-Champaign community has a rich history of making computing facilities available to the public. The Don Moyer Boys and Girls Club, the Bethel A.M.E. Church, the Independent Media Center and three local library facilities all have heavily used computer labs. However budgets have not kept up with demand for computer access and for bandwidth. The users of these and other public computing facilities deserve and require technology and bandwidth on par with what students and staff at the University take for granted. At this time, in our Age of Information, many necessary services are only available to those with access to adequate computer and networking resources: jobs require online application, payroll, benefits, banking information are on-line, healthcare resources are on-line, and the list will continue to grow. The UC2B Public Computing Center proposal is half of our "Above Ground" proposals, and the second pillar in the suite of UC2B proposals. It will address the human and technology needs for Public Computing Centers, while this Middle Mile proposal will economically deliver fast public Internet bandwidth that is guaranteed for the next five years. The third pillar of the UC2B set of proposals is for a Sustainable Broadband Adoption program in our vulnerable communities. The University of Illinois has long sponsored programs in the local community and throughout the state to help span the digital divide. In the early days of the Internet, many Champaign County residents of all income levels were first exposed to the Internet and email via a free-dial-up account on Prairienet, the groundbreaking public Internet service sponsored by the University. Throughout the last decade, the National Center for Supercomputing Applications (NCSA) - where the Mosaic web browser was created - has sponsored national and local educational outreach programs for k-12 students, teachers, and administrators. The UC2B Sustainable Broadband Adoption proposal provides the opportunity for educators and researchers from the University to collaborate with clergy and with other community leaders to craft an education

program that will ensure that no citizen lacks the skills necessary to participate in a digital society. Equipped with the newly acquired skills, potentially 2,500 underserved households within the community will be served for decades to come as a result of the FTTH component of the UC2B Middle Mile proposal. This brief overview of the two additional UC2B proposals illustrates how we intend to build upon the work defined by this proposal - the UC2B Middle Mile Below Ground proposal. The remainder of this discussion will detail this proposal. The proposed funded service areas include:

- The entire UC2B Below Ground project including Middle Mile and Last Mile: 110 contiguous census block groups in Urbana, Champaign and Savoy.
- Four Last Mile (Fiber-to-the-Home) service areas: Eleven total census blocks spanning Urbana and Champaign
- One service area comprised of eight contiguous census block groups
- Three service areas comprised of single stand-alone census block groups

We are in active discussions with four potential providers of Internet Protocol (IP)-based services over the UC2B FTTH system. While some providers are only interested in delivering Internet bandwidth, other providers are interested in Internet as well as television and phone services. We fully expect the households and businesses in the proposed service area to have competitive service plan options from commercial providers. Letters of support from two of those providers are attached in our collection of supporting letters. Thanks, in part, to a donation of \$60,000 per year for five years by the University's Office of the Vice Chancellor for Public Engagement, we will purchase public Internet bandwidth in Chicago at wholesale rates and transport it to this community with unused capacity on the University's fiber network, ICCN, which links its three campuses in Chicago, Springfield and Urbana-Champaign. As a result, we will offer a consortium-provided "Community Network Service" (CNS) for households that fall below a certain income threshold. The UC2B CNS will provide 5 Mbps of symmetrical bandwidth to the public Internet and 100 Mbps of "on net" connectivity to the targeted low income households and to all of the Critical Institutions at a monthly cost of \$19.99. The UC2B Network will be an open access network and will actively seek multiple providers of IP-based services. Our interconnection and non-discrimination policies will go beyond the minimum obligations desired by the Federal Communications Commission and NTIA. They are already posted at: www.UC2B.net

The University of Illinois has long maintained a local peering point referred to as "CMI-Hub" (named after the FAA designation for our local airport.) ISP's are able to peer with each other and with the University at the CMI-Hub via BGP4 protocols. The performance and cost efficiencies brought about by local peering are substantial. The network design for the UC2B Network will allow all ISP's to peer at layer 3 while serving their customers on the UC2B fiber infrastructure via layer 2. The UC2B Network will be an all IP network. We believe that IP will continue to be the foundation of all telecommunications and that over the next two decades more services will be developed and offered across IP-based infrastructure. The specific technology we have chosen for the delivery of IP services to homes and businesses is a Wave Division Multiplexed Passive Optical Network (WDM-PON.) This technology has already been commercially deployed in countries such as South Korea, where residents served by WDM-PON enjoy much faster speeds at much lower costs than what Americans typically have available. WDM-PON provides many of the cost and operational savings of a Gigabit Passive Optical Network (GPON) and its many variants, but offers a single solution that is both secure and scalable on a customer-by-customer basis. In order to have a sustainable business model while primarily serving low-income households, we realize reducing complexity and operating expenses is an important factor. We believe WDM-PON offers our community a technology that we will not outgrow for decades at a reasonable cost per subscriber. Future customer

electronic refreshes will be able to increase capacity without the need to change central equipment. The total cost of this proposal is \$31.2 million, which covers the cost of the Middle Mile and Last Mile fiber infrastructure, the WDM-PON electronics at both ends, and the routers, switches and other systems needed to design and install the infrastructure, maintain and support the framework, and to facilitate or provide the services utilizing the infrastructure. The UC2B Last Mile network will make fiber-to-the-home a possibility for up to 4,650 households and 218 businesses. Due to the subsidized cost of residential installation and the subsidized UC2B Internet service, we expect higher than typical residential adoption rates. By the end of the three years, we project 54% residential adoption and 29% business adoption. The construction phase of the UC2B Middle Mile project will require thirteen 3-person crews to build the seven fiber rings and the fiber to the curb over 12 months spread over the 2010 and 2011 fiber construction seasons. The final phase of bringing fiber from the curb to the home and installing the household electronics will require another 6 crews of three people each, which will also be working for 12 months spread over the two years. Operationally, this infrastructure will require 2 full-time networking professionals, and 6 full-time help-desk / customer service employees. 59 jobs will be created during construction, with at least 8 jobs continuing through operations.