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“A social vision cannot simply be declared; it must be socially enacted...and given a political embodiment. This requires...supporting institutions, treatises, technology projects and leadership” (Widmayer, 2000).

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Methodology

This report was prepared in the Fall of 2009 for the City of Detroit Mayor's Office by a group of students in the Practicum in Public Policy course at University of Michigan's Ford School of Public Policy. Our charge was to create a comprehensive policy to facilitate universal, affordable access to broadband among city residents and businesses.

The Mayor's Office asked us to deliver the following:

- Needs assessment that identifies underserved populations, the causes of their exclusion, and the means to reaching them
- Case comparisons of efforts in similar cities
- Identification of specific policy priorities to structure the provision of broadband
- Local action plan, including identification of stakeholders to be enrolled, resources to be exploited, and tools for enhancing demand

To address this request, our project team chose to focus on the current state of residential broadband access and adoption in Detroit, the reasons that many of Detroit's residents find themselves on the wrong side of the digital divide, and policy recommendations for closing this gap. In researching the problem we consulted the literature on digital divide issues, social empowerment enabled by access to key technologies, as well as numerous area organizations and individuals who have been involved in expanding broadband access in Detroit.
Executive Summary

Access to broadband is vitally important to the health of individuals and communities in 21st century society. Those lacking information such as news, health care information, and job postings (which are more frequently available almost exclusively online) are at an increasing disadvantage to those who are not. Further, digital access enables a different kind of engagement with information: one that is active, participatory, and can occur instantaneously (Knight Commission, 2009). Without home access to broadband, citizens are relegated to second-class status, and the divides that already separate people of different socioeconomic classes are amplified.

Beyond benefits to individuals, citizens’ access to information strengthens communities by increasing civic engagement, opening government and making it more transparent, and boosting economic prosperity. Calling information as "vital as clean air," the Knight Commission on the Information Needs of Communities in a Democracy has identified eight key factors in a "healthy information community," one of which is the availability of high-speed Internet access to all citizens. This and the other seven related factors work together to "maximize the availability of relevant and credible information to communities"; "strengthen the capacity of individuals to engage with information"; and promote "individual engagement with information and the public life of the community" (Knight Commission, 2009). Residents’ lack of access to this basic infrastructure weakens Detroit’s communities and the City’s health.

Our research suggests a number of ways in which the City of Detroit can help to close the digital divide in Detroit. We believe home broadband adoption can be greatly increased primarily through coordinating, supporting, and encouraging non-governmental groups that are using evidence-based approaches to expanding home broadband access in Detroit.

1. Create a Broadband Taskforce

In order to create a space within the City in which different groups can come together to work on digital divide issues and to strategically support the right efforts, we recommend that the City create a broadband taskforce. This task force would report to the Mayor and should be composed of at least one member of Detroit City Council, representatives from key community groups (such as Focus: Hope and 4C) and area non-profits (like the Knight Foundation), and CIOs in supporting organizations, such as Wayne State University and Merit Network, Inc. (see Appendix F: Potential Stakeholders and Partners). The Broadband Taskforce should be responsible for developing a best practices document to guide which broadband expansion efforts to support; conducting periodic assessments of residential broadband expansion programs to ensure that they are meeting their stated goals; organizing regular forums and/or conferences that focus on the residential broadband issue, bringing together community members, neighborhood groups, non-profits, and commercial entities; and advising the Mayor as to which programs the City should support and making reports about what strategies in the City have worked and which have not.

2. Strengthen and Support Groups Working on Broadband Access Issues in Detroit

There are already several important residential broadband initiatives underway in Detroit, and the City should focus on strengthening and supporting those programs that meet the criteria set by the Broadband Task Force. The City of Detroit can support these efforts by: writing letters of support for groups seeking grant funding and submitting regulatory paperwork; identifying aspects of the local bureaucracy that represent obstacles to these groups and work on
removing them; lending available physical office space to groups, to help defray their costs; and offering tax incentives to those corporate groups that invest in local residential broadband initiatives.

3. Develop a Property Disposition Program for Underutilized IT Equipment

The City can encourage broadband adoption at home by offering the necessary technical equipment at a reduced cost to those who need it and cannot afford it at market price. The premise of this recommendation is that while some government offices and local businesses may have unused or underutilized computers and related technologies, many people in the community have none. By developing a property disposition program, the City can get technology into the hands of residents.

4. Develop a Public Service Announcement Campaign to Promote the Value of the Broadband Internet

We know that one of the key reasons many Detroit residents have not adopted home broadband is that they do not recognize its relevance to their daily lives. In conjunction with encouraging programs that are focused on high-impact applications, the City should begin a public service campaign that presents broadband as a useful and pertinent tool for citizens. This campaign should be carried out through as many venues as is possible, including television and radio spots, through the public library, and through its own City website.

5. Support Programs That Contain a Significant Training Component and Assist with Training Where Possible

The City must address two key issues to help Detroit residents adopt broadband: the perceived irrelevance of broadband to residents’ lives and the capability of Detroit residents to utilize Internet services in meaningful ways. Currently, NGOs such as Knight and Family Place address these issues through hands-on high-tech training. The City of Detroit should support and recognize programs that contain a significant training component for the use of broadband.

The City should also encourage, support, and help coordinate community training nights. These training nights could be run through NGOs with City support and would serve to foster basic Internet skills while raising awareness of broadband. Training programs could also provide additional avenues for public-private partnerships. Oakland County’s blog events are a good example of programming that served to get residents online, increase awareness, and offer opportunities for citizen-government interaction. In one forum, residents were able to suggest cost saving measures the county could implement. An additional role the City of Detroit can play involves supporting the training of NGO staff to provide Internet training to others. JVS Detroit is one such possible organization—it has partnered with United Way to provide training support for non-profits.

6. Improve the Detroit Government Website

The Internet provides an important platform for information dissemination and access to services. The City of Detroit should strengthen its online resources and promote them for

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1 http://www.jvsdet.org/employers.htm
increased awareness. A comprehensive e-government plan, like that developed by Washtenaw County, should address constituency needs, support and implement program management, and update services when possible.

7. Create and Implement K-12 Internet Literacy Curriculum Requirements for Detroit Public Schools

Strengthening education will play a major role in helping Detroit’s youth take advantage of broadband and making it relevant to their lives. No Child Left Behind states that schools should, “assist every student in crossing the digital divide by ensuring that every student is technologically literate by the time the student completes the eighth grade, regardless of the student’s race, ethnicity, gender, family income, geographic location, or disability” (State of Michigan, 2006). The Detroit educational system needs to be strengthened to include a required computer literacy level upon graduation. The Michigan Department of Education’s Technology standards can serve as guidance as to what constitutes technological literacy by the end of grade twelve, including the completion of an online course, use of the Internet for research, and use of the Internet for high-level communication (State of Michigan, 2006).

8. Allow Clearwire Access to City Infrastructure to Implement WiMax

Clearwire, with financial assistance from the Knight Center of Digital Excellence, plans to develop a WiMax network in Detroit. Like Wi-Fi, WiMax allows customers to connect to the Internet wirelessly. However, while Wi-Fi often only extends tens of feet from a hub, WiMax can cover up to 33 kilometers. Knight financially supports this effort as part of a collaboration to provide free or very low cost broadband to key neighborhoods in the City. While this support has helped to defray some of the costs associated with building the infrastructure, the City should further assist by allowing Clearwire to set up WiMax towers using the Detroit Public School System Communication towers, municipal buildings, and water towers.

9. Conduct a Feasibility Study for a Municipally Owned Fiber Optic Network

A number of cities throughout the U.S. and overseas have started to build and maintain broadband infrastructure themselves. They then act as Internet service providers (ISPs) or lease the network to multiple Internet service providers (ISP) (see Appendices D and E). Residents of these cities have benefited by getting better service and faster transfer rates (10Mbps – 1Gbps).

While incumbent telecommunications companies have shown resistance to cities’ efforts to do this, there are a number of ways to lessen this resistance. Of the many benefits to be gained are increased competition (resulting in lower prices) and greater control over getting broadband to underserved communities.
I) Detroit Broadband Overview

Detroit, automotive capital of the world, center of manufacturing, and former symbol of working class pride, faces a crisis as its population dwindles, its unemployment rate increases, and the City deals with year after year of budget deficits. The once dependable manufacturing jobs that allowed those without an advanced education to attain a middle class lifestyle have largely disappeared, leaving a hole in the economy. While other regions, such as the "Research Triangle" in North Carolina, have managed to replace manufacturing jobs with "knowledge" jobs, Detroit has not. Detroit faces numerous challenges in transitioning its economy: lack of an educated workforce, low ranking on quality of life measures, historical racial divides, and a sprawling physical size that makes infrastructural changes difficult and costly, to name just a few.

Detroit desperately needs new economic opportunities to replace the old, and infrastructural updates will be key in any economic strategy for the City. Modern, high capacity telecommunications technologies, especially in the form of broadband, must receive the same level of governmental support that other key infrastructures (e.g. roads and water) have received. Studies have shown that investment in municipal broadband increases economic growth (Hackler, 2003; Lehr, 2005; Ford & Koutsky, 2005), but, while access to modern telecommunications is absolutely necessary to new economic development, it is not the only requirement (Hackler, 2003). Any broadband policy the City develops must be part of a comprehensive plan to attract new businesses and their jobs to the area.

While working to attract new economic opportunities to the City, partly by ensuring that its broadband capacity is sufficient for business, policymakers must be mindful of the already apparent digital divide that leaves many homes in Detroit without access to broadband and its associated personal enrichment. A recent Pew Internet and American Life Project survey demonstrates stagnant growth in home broadband access amongst African Americans, Detroit's largest demographic (Horrigan, 2009). Other studies have disputed the connection between race and Internet usage, stressing that the two most predictive factors of broadband usage are income level and educational attainment (Ross School of Business News, 2004). Detroit is also the poorest city in the U.S., with one in three residents living below the poverty line (U.S. Census, 2007). Additionally, only 37.5% of Detroit's residents graduate from high school (EPE Research Center, 2009). It should not be surprising then that adoption of broadband in Detroit is disturbingly low (as low as 0-31%) in some areas of the City. This is troubling, given the importance of high-speed access to educational opportunities, news, job listings and applications, and information resources such as those on health and government. The Internet is increasingly the place to go to for information. For instance, the Detroit Free Press and Detroit News recently ended daily home delivery. For residents without the equipment or know-how to access online versions, important sources of local news may now be unavailable.

So, on the one hand, as part of a broad plan to develop the local economy, Detroit must invest in making upgrades to its telecommunications infrastructure. And, on the other hand, it is critical that it do so without magnifying the digital divide. Increasing economic opportunities in the region is vital in bettering Detroit residents' quality of life. However, the City can no longer afford to wait for those opportunities to come before improving the lives of its citizens by equalizing access to 21st century information infrastructure. By focusing on equalizing access to the tools so vital for success in the 21st century, Detroit works toward ensuring that when economic opportunities present themselves, its residents have more equal access to those opportunities.

2 Unpublished documents provided directly from the Knight Center of Digital Excellence, 2008.
Further, more broadly accessible broadband can be used to develop a more skilled workforce: an important factor considered when businesses decide where to locate.

Unequal adoption of broadband is just one of many problems plaguing Detroit, and, with its extensively documented financial issues, we understand that any approach the City takes at this time must cost nothing or yield a net savings. Our policy report was written with this important factor in mind.

II) The Importance of Broadband

Throughout this report, we define broadband as Internet access with data transfer speeds above 768 Kbps, contrasted with dial-up access using a 56k modem. Two of the primary benefits of broadband are higher data transfer rates and the non-disruption of telephone use. The definition of broadband must adapt with time, to reflect the widening capabilities and tools accessed through high-speed Internet. For instance, high definition video streaming is not currently considered a standard application for residential broadband (slower broadband speeds do not have sufficient bandwidth to handle this application). However, the ability to stream high definition video may become an expected use of broadband in the future, and so definitions moving forward must recognize increasing data transfer needs. By 2012 basic broadband should refer to residential bandwidth speeds above 1 Mbps and institution speeds of approximately 10Mbps. By 2020, broadband should refer to forms of high-speed Internet access with a minimum data transmission speed above 5Mbps for residential and 100Mbps for institutions.

Multiple types of technologies are capable of delivering high-speed Internet. While many broadband deployment strategies focus solely on universal wireless through Wi-Fi technologies or an expansion of fiber optic pipeline infrastructure, there are many more options represented by cable, DSL, wireless, WiMax, and satellite (a glossary of technical terms can be found in Appendix A). Detroit commercial and community providers currently offer a number of high-speed Internet options, and future solutions to broadband access and adoption could embrace a variety of possible technical options.

Universal access to broadband has been a national goal in the U.S. for several years, and President George Bush declared that there should be broadband for everyone by 2007. 2007 has come and gone, and federal, state, and local governments are still struggling to make that goal a reality. Given the difficulty in achieving this goal for many municipalities, we must ask the question: why is universal access important and why should any government care about it?

Access to broadband is vitally important primarily because access to information is central to modern political, social, and economic life. Those lacking information such as news, health care information, and job postings (which are more frequently available almost exclusively online) will be at an increasing disadvantage to those who are not. Further, digital access enables a different kind of engagement with information: one that is active and participatory and which can occur instantaneously (Knight Commission on the Information Needs of Communities in a Democracy, 2009: 1).

Imagine the following scenarios played out in one case by a person with home broadband access and in the other by someone without:

- Gathering information to decide how to vote in an upcoming election
• Searching for employment opportunities
• Filling out a job application
• Keeping up with daily news
• Determining whether a sick child needs to go to the doctor
• Getting help with a homework assignment

In each of these cases, the person with a home broadband connection has the option to pull up information almost immediately, at any time of day. The person without, on the other hand, would likely need to visit numerous places to gather the same information and would be limited by her ability to travel to get it. Additionally, many resources are increasingly only available via the Internet. Newspaper classified advertisements are shrinking as websites like Craigslist, Monster.com, and LinkedIn become the places to find job listings and post resumes. If someone without home Internet access even finds the job listing in the first place, imagine the difficulty she would have getting her resume and cover letter to an employer who expects it delivered electronically. Sure, she could visit one of the Detroit Public Library’s Internet labs, but many of Detroit's branches are not open past 6pm or on the weekends. If, despite this limitation, she is able to get to the library's Internet lab, she would have to either work on her documents at the library or bring them on some kind of removable storage media. She still lacks the increasingly important ability to instantaneously do all of this from her home, causing her to be at serious disadvantage. Without home access to broadband, citizens are relegated to second-class status, and the divides that already separate people of different socioeconomic classes are only amplified.

Beyond benefits to individuals, citizens’ access to information strengthens communities by increasing civic engagement, opening government and making it more transparent, and boosting economic prosperity. Calling information as “vital as clean air,” the Knight Commission on the Information Needs of Communities in a Democracy has identified eight key factors in a "healthy information community," one of which is the availability of high-speed Internet access to all citizens. This and the other seven related factors work together to "maximize the availability of relevant and credible information to communities"; "strengthen the capacity of individuals to engage with information"; and promote "individual engagement with information and the public life of the community” (Knight Commission on the Information Needs of Communities in a Democracy, 2009). The fact that so many residents in many of Detroit's neighborhoods lack access to this basic infrastructure, means that many of its communities, so vital to the City's health, are weakened as a result.

III) Current Access to and Adoption of Broadband in Detroit

There are two primary problems in identifying current broadband penetration in any city. First of all, one must be clear about what one means by "penetration" and "access." Second, the granularity of the data should be such that one can assess differences on a neighborhood-by-neighborhood basis since this is where one often sees disparities.

One way to measure access and penetration is by the availability of broadband connections in a particular area. This is the approach the FCC uses in its collection of zip code-level data about broadband penetration. As long as a connection exists in that zip code, the FCC considers that entire zip code to have broadband access. The FCC has been criticized for this approach,
because it ignores disparities between neighborhoods within the same zip code (U.S. Government Accounting Office, 2006). Additionally it equates technological infrastructure with access, overlooking the importance of cost and training in the adoption of broadband. To address the issue of granularity, $350 million in federal government funds have been dedicated to creating a “nationwide inventory map of existing broadband service capability and availability in the United States.” If successful, the new maps promise to offer a finer and more accurate measure of broadband capability across an area. However, the proposed map is still one of capability rather than of adoption.

Another way to measure broadband penetration is by looking at the number of households that access the Internet over a home broadband connection. According to the Knight Center of Digital Excellence, the portion of Detroit residents who connect to the Internet from home using a high-speed connection is 35.8%⁴. That number is among the lowest of U.S. cities Knight has targeted in its Connect Your Communities program⁵, and the national average is around 63% (Horrigan, 2009). As part of its effort to expand residential broadband in Detroit, the Knight Center has used block-level census data to create heat maps of broadband use in Detroit homes. These data were gathered from surveys of residents and can be compared with census tract maps depicting median income and percentage of the population with a high school degree (Figures 1, 2, & 3).

Figure 1: Percentage of Households with Home Broadband

⁴ Unpublished documents provided directly from the Knight Center of Digital Excellence, 2008.
Figure 2: Median Household Income

Figure 3: Percentage of Residents with a High School Diploma
Looking at these maps, one very clearly sees a correlation between median household income, education, and home broadband use. Those blocks that are the poorest and least educated also exhibit the lowest home broadband use (<10%). Much of the northeast section of the City has broadband use of 0-30%. It is important to note that a few areas in this section of the City have home broadband use rates upwards of 50% and all the way up to 95%. Likewise, there are pockets in the generally better covered areas as low as <10%, demonstrating that there can be great disparity within a relatively small area, and certainly within a zip code. Is such low usage indicative of low broadband availability?

While it is difficult, because of the problems noted above, to say with precision what types of broadband connections are available on a neighborhood-by-neighborhood basis, we do know something about the various providers in the City. There is only one provider (Comcast) of cable broadband in Detroit, charging between $42.95 and $67.95 per month. Other residential options are AT&T, which offers DSL service, Sprint, which offers wireless, and Zingmax, offering “ultra broadband wireless.” See Table 1 for a complete listing of residential broadband service options in Detroit (Knight Center of Digital Excellence, 2008).

<table>
<thead>
<tr>
<th>Provider</th>
<th>Service</th>
<th>Cost</th>
<th>Speeds</th>
</tr>
</thead>
<tbody>
<tr>
<td>Comcast</td>
<td>Residential Cable</td>
<td>$42.95-$67.95/mo.</td>
<td>12Mbps-20Mbps/1Mbps-4Mbps</td>
</tr>
<tr>
<td>AT&amp;T</td>
<td>Residential DSL</td>
<td>$35-$55/mo.</td>
<td>1.5Mbps-6Mbps/512Kbps-768Kbps</td>
</tr>
<tr>
<td>Sprint</td>
<td>Wireless</td>
<td>$59.99/mo. plus cost of the connection card</td>
<td>600kb-1.4M/350kb-500kb</td>
</tr>
<tr>
<td>Zingmax</td>
<td>Ultra Broadband Wireless; Residential and Business</td>
<td>no cost information available</td>
<td>T1-T3</td>
</tr>
</tbody>
</table>

Table 1: Broadband Providers in Detroit
*There are also 75 identified hotspots in Detroit in the Knight report. The number of hotspots/capita is .0000815.

The consensus amongst numerous people who have been working on expanding broadband in Detroit is that low use of broadband in some areas of Detroit is a problem of adoption and not technical infrastructure. Adoption is low in these areas primarily because the cost is too high, residents do not see broadband’s applicability to their own lives, and/or they do not have the necessary skills (technical and/or literacy) to use it. This impression is backed up by evidence collected at the national level. A recent study by the FCC reports that 90% of American households have access to a high-speed, multi-megabit Internet connection (FCC, 2009), but according to recent Pew Center data only 63% of adults in the U.S. have adopted a home broadband connection (Horrigan, 2009). Further, the reason cited most often amongst dial-up users for not switching to broadband was the cost (32% said the price would have to fall for them to switch). Amongst non-Internet users, the top reason for non-use (22%) was lack of interest in getting online.

IV) Challenges in Detroit

Many cities across the nation are developing broadband plans to increase access and adoption. While several general challenges exist to increasing broadband adoption, the City of Detroit
faces some specific challenges that should be considered when developing a citywide broadband policy.

First, the City of Detroit is currently dealing with a severe financial crisis as revenue streams decrease. Detroit faces a $300 million deficit, mostly due to a decrease in property and income taxes. Though the City Council has recently passed plans to help alleviate the situation in the short-term, it has yet to develop long-term solutions. The unemployment rate in Detroit is among the highest in the nation and may remain high without new business ventures in the area. Additionally, the City has had problems for years submitting audits to the State in a timely manner, which prevents it from accessing State revenue shares. These financial issues mean that broadband policy plans for Detroit must be cost-neutral or even reduce the City’s costs.

One reason for Detroit’s financial crisis is the annual decrease in population. This also further confounds broadband efforts as the sparseness of Detroit’s population challenges technical deployment. Over a quarter of Detroit’s housing units are vacant; on some streets, all but a few houses may be legally unoccupied (U.S. Census, 2008). Until recently, many broadband providers did not offer service in areas of low population density and low income because they did not anticipate the ability to make a profit. Even though evidence suggests that most neighborhoods have access to broadband services, lack of interest amongst providers has resulted in low levels of competition. Low competition areas tend to have higher service prices, resulting in lower adoption rates (Horrigan, 2009). In order to have maximum impact, home broadband programs in Detroit must include an adoption component that focuses on procuring affordable hardware and lowering broadband subscription costs.

A third challenge for Detroit, as it is for many major cities, is the inter- and intra- neighborhood diversity in adoption and online skills among Detroit residents. Studies have demonstrated that people with fixed incomes, low levels of educational achievement, low literacy levels, and unfamiliarity with Internet benefits tend to have low broadband adoption rates (ACLPI, 2009). Today, over 30% of Detroit residents have household incomes below the poverty line, compared to 10% nationally (U.S. Census, 2007). Detroit residents also have lower rates of educational attainment than national averages (EPE Research Center, 2009). But the disparities are not seen just in comparing Detroit with the rest of the nation. There are also large disparities between different neighborhoods in Detroit and between households within the same neighborhood (Gant, 2009; Knight, 2009). Some individuals, for instance, are very adept at accessing online resources, while others are unable to use the Internet or fail to see its applicability to their lives. Many neighborhood broadband adoption programs in Detroit have struggled with such challenges. While some residents may need extensive training on basic computer and email use, other residents may be ready for more advanced training to increase their career skills. Such differences challenge efforts to provide the right training services. For instance, at Family Place, a community center that provides local Wi-Fi (discussed in further detail in section VI), technicians provided narrow, streamlined support for pre-approved software and hardware. This means that residents received support for one specified system, regardless of their technical skill level. Compounding the issue is the variance in technical skill among workers at community organizations in Detroit. Thus, policies serving residential communities must recognize these differences and provide support that extends beyond the broadband technology itself.

V) Broadband Initiatives in Detroit

There have been a number of programs in Detroit designed to address home broadband access and adoption issues. The FCC recognizes price as a major factor limiting broadband adoption,
since only 35% of households with incomes less than $20,000 have adopted high-speed services. Because cost of service is a major barrier to Internet adoption, many efforts aim at providing free or reduced cost wireless service by broadcasting a signal from community centers, churches, or public institutions. Along with Internet connectivity, these organizations also often provide computer access for residents to meet up-front cost challenges associated with procuring the necessary computer hardware and software. Well-developed programs have gone beyond providing technology and have also provided training and support for broadband use. The needs that go beyond simple Internet connection access are commonly referred to as “last mile” needs and include access to computers, hubs and connectivity devices, training, and technical support. A few of the major initiatives to increase residential broadband access, such as the EZLink Collaborative and Knight Center Connected Communities initiative, are described below.

V.1) EZLink Collaborative

The EZLink Collaborative has worked to establish sustainable community centers of Internet access that provide both technological solutions and last mile needs. University of Michigan partners and community organizations in Detroit, with additional support from businesses and funding agencies, compose the collaborative. EZLink grew out of Steeples to People, a program initiated by Garrett Meyers in which churches attached Wi-Fi devices to their steeple in order to blanket neighborhoods with free Internet access. Some of the churches also hosted computer labs and provided technical assistance to the surrounding community (Gant, 2009). However, one of the main issues with the Steeples to People program was a lack of sustainability. Though some churches still provide local wireless access, EZLink founder Larry Gant and his collaborators took lessons learned from Steeples to People to develop EZLink.

EZLink has focused on working with well-respected community organizations to establish community technology centers (CTCs) that provide computer training and recreation in their neighborhoods. The EZLink computer lab programs have a particular emphasis on young people, and evaluations of these programs have demonstrated that they have been successful in instilling in local youth a desire for higher education. 96% of EZLink students report attending either junior or a four-year college, as compared to 75% of their peers. Additionally, EZLink program graduates have a 98% employment rate (EZLink, 2008).

While the CTCs have filled a gap for computer and Internet access with computer labs, they cannot substitute for having computers and fast Internet access at home. Out of the need for residential broadband access, EZLink piloted a program to provide urban Wi-Fi to the neighborhood surrounding the CTC. To ensure program sustainability, EZLink assessed partnering organizations’ commitment to the program long-term, their ability to train staff and maintain continuity of programs, and their capacity to fund the broadband programs in a sustainable manner once initial grant funding expired.

EZLink used its proof-of-concept experience with distributing Wi-Fi to 200 neighborhood residents to develop the DetroitCONNECTED™ policy document, which focuses on developing CTCs (often faith-based organizations or secular community centers) to provide broadband via Wi-Fi (Myers, 2003). DetroitCONNECTED™ is a methodology by which Wi-Fi can be distributed to neighborhood communities. Though it grew out of the work of EZLink, the model of using community centers to provide broadband to residents in an urban area could be enacted by a number of organizations focused on this work.
Family Place, St. Suzanne, and Youthville Detroit are three EZLink community partners that have shown sustainable success in providing community Wi-Fi and computer lab programs to their surrounding neighborhoods and have served hundreds of residents and youth. Family Place, which works with neighborhood people and organizations to promote child and family services, has a 10-year record of success in providing Internet and computer access. It also provides auxiliary support services, including computer certification classes and technical support. EZLink chose Family Place as a partner because of its already established history of community support, and its labs have proven to be very successful. The Knight Foundation provided the grant funds to establish the computer labs and wireless services at Family Place. Participants cite the Internet services as “wonderful and convenient,” for research projects and as opportunities for self-improvement. One participant went from being nearly computer illiterate to a network administrator (Knight, 2009).

Another EZLink partner is the Don Bosco Hall Community Resource Center at St. Suzanne. It provides a number of youth and family support services, including college preparation programs, career counseling, and job placement services. While this partnership has been successful so far, it has yet to secure financial support to transition into a self-sustaining program (Gant, 2009).

Youthville Detroit is dedicated to enhancing the lives of youth and furthering positive youth development in Detroit and surrounding communities. It also strives to facilitate effective, diverse partnerships within the community and to provide collaborative programming and support for young people and youth-serving organizations. EZLink partnered with Youthville specifically to set up youth-targeted community Internet labs. Youthville has also developed a curriculum around student use of the labs, and the result has been very positive with regard to computer skill development and greater familiarity with online tools. A grant from AT&T allowed Youthville to develop a web-broadcasting studio set. The 13,000 square foot facility houses high-definition equipment and cameras, a control room, audio and editing suites, and remote camera units. Students gain training in every aspect of producing video for the web and then broadcast information to the community on employment opportunities, community service, school activities, community safety, health awareness, continuing education, politics, community projects, business news, entertainment, and more (Knight, 2009).

The DetroitCONNECTED policy document lays out a plan to utilize these CTCs to further the successes seen at Family Place, St. Suzanne, and Youthville Detroit. The policy report highlights the benefits of community centers serving as broadband dissemination hubs. Some benefits include:

- They have the physical space needed for high-tech labs.
- They are engaged with individuals and families in the neighborhood and are aware of their needs, talents, and desires.
- They have two-way credibility with the community and as a broadband partner.
- They have the ability to find and recruit tech support and train individuals.
- They often offer computer and technology literacy training courses.
- They serve as hubs of social interaction (a key component of continued computer learning and application of technology to social, education, and work situations).
- They have proven adept at hardware and software acquisition, provisioning, and support.
- They can integrate computer activities with other activities such as after-school programs, GED courses, technology-based music and art, community watch, and health
awareness.

- They serve as a physical presence for installation of a neighborhood wireless network hub with back-haul and access point antennas, electricity and protection from vandalism.

The program initially utilized a private company, GigaTrans, to provide low-cost high bandwidth back-hauls for the CTCs in Detroit. Using commercial equipment, Wi-Fi signal was broadcast from the Fisher Building to a seven-mile radius, providing nearly complete coverage to Detroit (Myers, 2003). Today, community Wi-Fi programs at Family Place utilize arrangements with AT&T for bandwidth back-haul (Gant, 2009). DetroitCONNECTED’s cost elements for a self-sustaining program serving 50 to 200 families in a neighborhood are:

- $15 to $25K one-time infrastructure investment.
- $100 per year per family for Internet access (compares to $50 per month for DSL or cable).
- $150 for a recycled Pentium computer and monitor with Wi-Fi card and software.

These costs provide a significant savings to residents in terms of up-front costs and recurring Internet access fees.

Shown below (Figure 4) is a schematic of the DetroitCONNECTED plan to provide broadband through the integration of technology, community organizations, businesses, and residents (Myers, 2003).

![Figure 4 Overview of CTC Coordination (Myers, 2003)](image-url)
Though EZLink has seen continued success in many of its CTC programs, wide scale deployment of the DetroitCONNECTED methodology has been lacking in the six years since the report’s release. Potential reasons identified in the report itself, and likely true given the dismal economic situation of Detroit and the State of Michigan, include a lack of funding and clear administrative leaders (Myers, 2003). The City, though enthusiastic about the DetroitCONNECTED vision, has faced issues of budget shortfalls, corruption, and other setbacks preventing focus on broadband. Additionally, more service providers have moved into the Detroit area, offering greater access to broadband infrastructure and slightly reducing costs. Finally, African American populations have higher utilization of advanced smartphone applications, including Mobile video and Internet, than any other demographic (33% blacks use mobile Internet compared to 18% whites) (Roucha, 2009). This may indicate that many in Detroit combine services to save costs, since they only need one piece of hardware and one service fee to access the Internet via smartphone. This combined with such a large portion see the Internet as irrelevant to their lives, further paints a picture of the difficulties Detroit has had in increasing broadband adoption.

V.2) Knight Center for Digital Excellence: Detroit Connected Community Initiative

The Knight Center has focused on bringing broadband to underserved communities across the nation. The Knight Center funds programs that are part of the EZLink Collaborative and works with other community organizations to spearhead broadband initiatives. The most extensive attempt thus far to increase residential broadband adoption in Detroit has been the Detroit Connected Community Initiative, spearheaded by the Knight Center of Digital Excellence in conjunction with Wayne State University and several prominent local community groups. The Detroit Connected Community Initiative is a program that utilizes aspects of the DetroitCONNECTED methodology, but the initiative and the policy model are not one and the same.

The Knight Center, funded by the John S. and James L. Knight Foundation, is working with 26 different communities around the country that have low or uneven adoption of broadband. Knight stresses the importance of working with local, already established powers to make broadband a tool that citizens see as useful to their day-to-day concerns.

In Detroit, Knight has met with area hospitals, non-profits, schools, and council-people to learn about possible high-impact strategies in the city. Local insiders believe that with some level of free broadband access, they could work to increase home broadband adoption in Detroit. The strategy for increasing adoption lies primarily in providing training and encouraging applications of most interest to Detroit residents. The broadband applications that Detroit organizations and citizens are most interested in are tools for community safety, health and wellness, literacy, and workforce development. By focusing on high-impact broadband applications, Knight and the area groups it is working with believe that residential broadband adoption in Detroit will increase.

However, Knight and its partners recognize that they must develop a plan that is financially and technologically sustainable beyond the initial implementation. Their strategy is to create a project that is attractive to those with the money to build it. To that end, they have recently announced a partnership with Clearwire Corp. to deploy a wireless broadband network in Detroit’s Central-Woodward, North End, Midtown, and Osborn neighborhoods. This network will provide free or low-cost broadband access to several thousand residents in these
neighborhoods in conjunction with those neighborhoods’ efforts to “promote community safety, literacy, employment, health education, and technology skills” (Knight Center Press Release, 2009). (For more information about Clearwire and WiMax in other cities see Appendix D).

Clearwire Corp. is a wireless Internet service provider currently engaged in building 4G WiMAX networks in several markets, the largest of which is in the Atlanta metro area. WiMax allows subscribers to connect wirelessly to the Internet at broadband speeds, and, unlike Wi-Fi, its coverage extends many kilometers. Clearwire benefits from this program by getting funding from Knight to build an advanced cellular network in Detroit: one that will be strongly competitive with 4G and AT&T. Detroit’s residents in the targeted areas benefit by getting access to free, or very reduced cost, wireless. But the Knight Plan extends beyond offering access to the network. It also plans to provide computer training and subsidized home computers. Additionally, Knight and its partners are focusing the technology on supporting important community applications such as “mobile video for grassroots crime prevention, home access to literacy training software, web search and social media tools for jobseekers, and “customer interaction” tools for community healthcare providers and schools” (Knight Press Release, 2009).

By creating a partnership with stakeholders who can engineer and develop the network (Clearwire), provide technical support (Wayne State University), and encourage residents to fully utilize the technology by providing training and high-impact applications (neighborhood-based organizations, Focus: HOPE, Matrix Human Services, and the Child Care Coordinating Council of Detroit/Wayne County), Knight stands a very good chance of increasing home broadband adoption in Detroit.

V.3) Lessons Learned

In some cases, private entities have set up computer labs or helped provide Internet services. Corporate support can be a great boon to securing initial equipment and the technical skills to start-up programs, but long-term sustainability must be planned for from the beginning. As an example of what can occur without long-term planning, Intel Corporation donated equipment to establish school and community computer labs in Detroit. However, these labs lacked technical support, planning and community buy-in; they subsequently fell into disuse within a few years (Gant, 2009). Any broadband program in Detroit must have a sustainability plan that goes beyond the initial procurement of technical hardware and wireless access.

The EZLink Collaborative and Knight Center Connected Communities initiative have shown the importance of community engagement, organizational collaboration, and programs that address “last mile” needs. Other NGOs such as Connected Nation, Digital Impact Group, One Economy, and Computers for Youth, which are state or national programs outside Michigan, have also been successful in improving broadband adoption on a small scale by addressing these issues. Table 2 describes some needs of a successful residential broadband program, taken from lessons learned from EZLink and Knight Foundation.

<table>
<thead>
<tr>
<th>Technology</th>
<th>Technical Support</th>
<th>Training Support</th>
<th>Sustainable Funding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Computers or device capable of Internet connection, with operating system</td>
<td>Someone trained in troubleshooting/keeping connection going</td>
<td>Enthusiastic educators to improve adoption attitudes</td>
<td>Community supported</td>
</tr>
</tbody>
</table>
Updated Hardware and Software to last 5-7 years

Broadband security

Computer literacy training, such as applying for jobs online and checking email

Develop source of revenue stream, such as small fee for use (lower than private provider)

Security Software to prevent viruses, spyware, adware

Can make periodic upgrades

Patience to work with people at many different literacy levels

Collaboration and Partnerships

Routers and modems

Residents have continued access to support and training in basic troubleshooting

Smaller classes, peer-to-peer help for supportive learning environment

Often means also sustainable discounts

Compatibility Upgrades

Table 2: Important Markers of Successful Broadband Adoption Programs

As demonstrated, a number of organizations are bringing Internet services to Detroit residents. These initiatives have addressed access and adoption issues by engaging communities and following best practices. The City could (and should) support these and other local initiatives by reducing bureaucracy, helping organization in applying for grant funds, and developing supportive policies to foster additional public-private partnerships. However, as seen by the slow advancement of the DetroitCONNECTED framework, the City’s involvement must also be realistic as it positions itself to play an important role in reducing the digital divide and taking on leadership responsibility to tackle this issue.

VI) High Impact Broadband Applications to Spur Adoption

While 90% of American households have access to a high-speed, multi-megabit Internet connection, only 63% of adults in the U.S. have adopted a home broadband connection (FCC, 2009; Pew, 2009). Though cost is one of the top reasons why Americans forgo a home broadband subscription, it is not the only reason. Many do not have home Internet access (broadband or other) because they do not consider the Internet relevant to their lives. Knight and its partners have made a strong case for the importance of using high-impact applications to encourage adoption of home broadband. It has also identified, through community group leaders, a number of major areas of application for broadband in Detroit: public safety, education, job skill and literacy development, and health. Not only are these application areas pertinent to lives of Detroit citizens, but they can also be used to make the City more effective and efficient. By utilizing any of these high-impact broadband applications, the City will demonstrate the relevance of broadband internet in day-to-day life, and encourage residents to participate and adopt home broadband Internet.

VI.1) Public Safety

Public safety issues are a primary concern to many Detroit residents. By delivering broadband applications that address this concern, the relevance of broadband to Detroit citizens’ lives is increased. These include, but are not limited to, the following:

- Public safety video surveillance. In New Orleans such a system was deployed by the City using a Wi-Fi Mesh network and motion detection. The murder rate was reduced by 57% in just six months, and citizens reported feeling safer as a result of the cameras. Neighborhood groups and their members can get involved by “adopting a camera” to monitor and report crime in their area (Sege, 2005).
• Access to gang, sex-offender, and Amber-alert databases. This benefits the City by allowing its police to do more of their work in the field rather than having to go into the office. Additionally, home broadband connection enables residents to have timely access to important information that can be used to protect their families.

VI.2) Education

The outcomes from youth training programs at Family Place and Youthville Detroit, as described in the preceding section, demonstrate how broadband can be used to improve the lives of youth. The young people in these programs used broadband to access career training and opportunities for higher education. This represents an excellent example of how broadband can be made relevant to Detroit citizens’ lives.

Students and educators can take advantage of Internet access to improve the quality of education inside and outside of schools. Online resources can help K-12 students by providing access to resources for school projects and information on enrichment programs, college and test preparation, and college programs. Nationally, 77% of teens access the Internet at school, and 71% say that the Internet was a primary source used in a recent school project (ACLPI, 2009). Over 80% of parents believe that the Internet can help their child with schoolwork (ACLPI, 2009). But for a student without home access to broadband, just one research project can translate into hours of extra work. The flexibility enabled by the ability to access information from home, instead of having to depend on library and computer labs, allows more time for learning. Additionally, when students have home broadband access, educators can offer more interactive, creative, and engaging assignments to support student learning.

Broadband also helps our educational system by improving student and teacher professional development, teacher training, and streamlining administrative tasks. It can help school districts improve accountability among educators and provide new means of educational assessment. National studies showed that in 2005, 89% of public school teachers used the Internet for instructional planning, 87% used the Internet for assessment results and data to offer more individualized instruction, and 87% provided digital learning materials to students through the Internet (ACLPI, 2009). Often, however, teachers are limited in how they can integrate technology and education because of the limited access students have at home. Thus, while more use of high-tech resources within the classroom may improve home adoption rates through increased relevancy and need, home adoption rates must also improve to take full advantage of the many service available via broadband.

Another important educational use of the Internet is in providing distance-learning opportunities for students. In K-12 education, broadband can allow students to take courses online that may not be provided at a neighboring school. In the Detroit context, which has seen annual budget cuts and school closings, online courses may help students access distributed resources that would otherwise be unavailable to them. For instance, a biology course could offer online webcasts of experiments and utilize the Internet for project research. It could also have one main instructor for students in multiple schools or sponsor virtual fieldtrips. In the Virginia Beach Public School (VBCPS) System in Virginia, a pilot program using videoconferencing over the Internet allowed students at five different area high schools to take courses only offered at one of them. Such programs break down educational barriers that often result from students’ geographical location and demographic group. As Eva Roupas, a VBCPS distance learning teacher specialist, stated, distance learning “level[s] the academic playing field between schools, provide[s] a collegiate setting for college-bound students and provide[s] an opportunity
for excellent teachers to share their capabilities with a wider student audience” (Cox
Communication, 2009).

K-12 education plays an important role in strengthening the value of broadband for Detroit’s
youth. By focusing on adoption in the classroom, students can carry a desire for Internet use
back into their home. Students also reap important benefits when they can take advantage of
distance learning. To improve the use of broadband in schools, a number of barriers and
broadband support programs are highlighted in Appendix E. Schools can also serve as
community centers for establishing broadband access points and house computer labs open to
the public for technology training courses. These efforts all aim to improve adoption by helping
residents access broadband, understand its value to their lives, and giving them the capabilities
to fully interact with Internet resources.

VI.3) Work Skill Development

The Internet plays an important role in spurring economic development (Grace, 2004). Broadband has the potential to help Detroit residents do what they currently do better and more efficiently, as well as to help them perform new tasks. Broadband can also provide Detroit communities with a resource for collaboration, innovation, and business development. Detroit citizens can take advantage of home Internet access to develop work skills, apply to jobs, and even run online businesses.

As shown by the EZLink Collaborative, broadband can provide many opportunities for workforce skill development through career training and stimulating entrepreneurship. EZLink program graduates have a 98% employment rate (EZLink, 2008). Adult and youth in these programs learn an array of technical skills that improves their chances of finding a job.

There are numerous online training and educational opportunities that residents with home broadband could take advantage of. Home broadband access can allow residents more flexible work schedules or the opportunity to start a home-based online business. One of the great benefits of the Internet is that it has low barriers to entry in forming an online business. Entrepreneurs are no longer limited to their geographic area, but can attract a global market to their goods and services. As a result, they have the potential to see a quicker return on their investment.

High adoption rates in the residential sector can positively influence local industry and business development. When businesses know that that they have access to a workforce with modern, “information” sector skills, they can feel more confident about basing their operations in Detroit.

As more services move online, people need to be familiar with the technology to take full advantage of them. Unfortunately, information technology illiteracy is very high in Detroit. Training programs that improve Internet literacy for work skill development have been used to great effect in increasing residents’ economic opportunities and demonstrating broadband’s relevance to their lives. This is why programs that follow the DetroitCONNECTED model are so valuable, by both increasing access and providing adoption support of broadband,

VI.4) Health and Wellness

Broadband access to local health resources can save area hospitals and health centers money while making them more effective at delivering information. Residents benefit by gaining instant access to health resources.
Detroit residents can take advantage of a number of online health resources that would greatly increase the relevance of broadband to their lives. For example, a patient diagnosed with liver disease can look up information on her disease and treatment, find online support groups and questions to ask her doctor, fill out insurance forms, and look up ways to make lifestyle changes to improve the quality and length of her life. Immense savings in healthcare can also result from home adoption of broadband. Robert Litant, an economist at the Brookings Institute, has projected the cumulative savings and output gains garnered by deploying high-speed Internet to seniors and people with disabilities could reach $927 billion dollars by 2030 (Ezel et al., 2009). These savings are possible because broadband health applications can postpone or even alleviate the need for institutional care.

Teleconsultations, which connect physicians and patients over a secure audio and video connection, have been shown in the U.S. and abroad to increase quality of care and decrease costs. This application is most useful in managing chronic diseases and monitoring symptoms of remote patients. Cisco’s Health Presence already connects remote patients with physicians and specialists, and the Renaissance Computing Institute uses the Outpatient Health Monitoring System to help monitor patients with chronic conditions such as asthma. Adult Care Remote Monitoring Systems can offer an alternative to institutionalized care. The Home and Community Options non-profit organization in Minnesota is able to provide remote video supervision, and two-way audio communications for patients who require care. This allows for regular care of patients who may not need the full requirements of a nursing home, but still need supervision in the event of an emergency or accident (Ezel et al., 2009). Medical devices that can obtain vital signs and diagnostic information and transmit that information to doctors are available and can further decrease costs of patient transportation. For example, UC Berkley utilizes remote instruments to perform annual retinal scanning for diabetic patients to ensure diabetes is not compromising patients’ eyesight (Ezel et al., 2009).

VI.5) E-Government

Broadband has become vital to improving city government efficiency and communications with the public. The move to online access can increase transparency, streamline some administrative functions, and reduce costs. Table 3 lists some of the advantages of e-government. Broadband greatly expands the quantity of information members of the public can access from their local government when documents such as town hall presentations, meeting minutes, and policy documents are placed online. Broadband can increase transparency by providing a public check on state and federal institutions and policymakers. As a result, many government agencies are moving their services and information online. However, they face a number of challenges to doing so.
### Table 3: Advantage of E-Government (ACLPI, 2009)

<table>
<thead>
<tr>
<th>Administrative Efficiencies</th>
<th>Enhanced Transparency</th>
<th>Civic Engagement</th>
<th>Public Collaboration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Broadband enables a variety of advanced IT systems, which provide enormous efficiencies and cost savings. <strong>Example:</strong> The federal government recently announced that it intends to use increasing amounts of cloud computing services via a new portal - Apps.gov. This is expected to result in millions of dollars in cost savings.</td>
<td>Broadband allows state and federal government to make large amounts of information available in a more real-time manner via traditional means (i.e., posting online) and via new social media (e.g., Twitter). <strong>Example:</strong> A number of federal agencies, including the FCC, have made updates available via RSS and Twitter, among other tools.</td>
<td>In addition to enhanced transparency, broadband enables the widespread use of tools like blogs to engage the public in government activities. <strong>Example:</strong> The FCC recently announced that comments submitted on its blog dedicated to the national broadband plan - Biogband - would be included in the formal record of this proceeding.</td>
<td>Broadband is also being used to solicit the input and expertise of the general public during rulemaking and decision-making processes. <strong>Example:</strong> The U.S. Patent &amp; Trademark Office has launched an initiative - Peer to Patent - that uses wiki technologies to engage the public in gathering information for use in the review of patent applications.</td>
</tr>
</tbody>
</table>

Some challenges include a lack of technical support and training to keep governmental sites functional and secure from cyber-attacks. Government agencies also face bureaucratic inertia that makes it difficult to implement changes like e-government programs. Particularly in underfunded and understaffed offices, the resistance to change may be high as a result of the added time and effort it would take to learn the technology and change processes. The initial cost required to improve online services may create additional resistance. However, we want to stress that these challenges are not insurmountable and pale in comparison to the possible cost-savings that can result from e-government. The opportunity to foster greater government transparency and thus a better relationship with the local community is especially crucial in Detroit, a city that has suffered from poor public perception for years. Detroit’s City gateway, [www.ci.detroit.mi.us/](http://www.ci.detroit.mi.us/), has fewer daily visits than many other city sites. Using Statbrain, Detroit receives approximately 3,500 daily visits; comparatively, Chicago receives 7,600 and Columbus receives 5,600 daily visits. The State of Michigan website receives approximately 170,000 daily visits.

E-government can help residents by moving services online for greater convenience and transparency, while also helping a city reduce costs. Other counties in Michigan, such as Oakland, have used online forums to gather ideas for cost reduction from residents. Additionally, online services can help with electronic record keeping, filing of regulatory paperwork, and paying fees/fines. Many of these services are already available at the City website portal; potentially raising awareness and helping residents access these services would increase usage of the Detroit website, helping the City to see greater benefits.

### VII) Recommendations
Our research suggests a number of ways in which the City of Detroit can help to close the digital divide in Detroit. We believe home broadband adoption can be greatly increased primarily through coordinating, supporting, and encouraging non-governmental groups that are using evidence-based approaches to expanding home broadband access in Detroit.

1. Create a Broadband Taskforce

In order to create a space within the City in which different groups can come together to work on digital divide issues and to strategically support the right efforts, we recommend that the City create a broadband taskforce. This task force would report to the Mayor and should be composed of at least one member of Detroit City Council, representatives from key community groups (such as Focus: Hope and 4C) and area non-profits (like the Knight Foundation), and CIOs in supporting organizations, such as Wayne State University and Merit Network, Inc. (see Appendix F: Potential Stakeholders and Partners). The Broadband Taskforce should be responsible for the following:

- Creating a best practices document that will serve as the criteria against which it judges residential broadband expansion efforts. This guide should be widely disseminated so that it can serve as a resource in guiding area efforts. The criteria in this document should be based on evidence-supported methods of spurring adoption, including, but not limited to: specialized training in applications relevant to participants' lives; a provision for providing necessary hardware at reduced or no cost (this includes routers, computers, and software) to those who would otherwise not be able to purchase it; ongoing technical support; and ongoing financial sustainability plans for programs.
- Conducting periodic assessments of residential broadband expansion programs to ensure that they are meeting their stated goals and those laid out by the City. While the City will have no direct jurisdiction over the groups' efforts, it should base its support of such efforts on whether organizations are meeting these goals.
- Organizing regular forums and/or conferences that focus on the residential broadband issue, bringing together community members, neighborhood groups, non-profits, and commercial entities.
- Advising the Mayor as to which programs the City should support and making reports about what strategies in the City have worked and which have not. This information should also be widely disseminated.

The Broadband taskforce should position itself as a coalition builder between the City, for-profit corporations, non-profits, community groups, and residents to ensure that Detroit residents take advantage of broadband in ways that are beneficial to them as individuals and as members of their communities. This means listening to the needs of residents and focusing efforts on developing and deploying applications that help meet those needs.

2. Strengthen and Support Groups Working on Broadband Access Issues in Detroit

There are already several important residential broadband initiatives underway in Detroit, and the City should focus on strengthening and supporting those programs that meet the criteria set by the Broadband Task Force. The City of Detroit can support these efforts in the following ways:
• Write letters of support for groups seeking grant funding and submitting regulatory paperwork
• Identify aspects of the local bureaucracy that represent obstacles to these groups and work on removing them
• Lend available physical office space to groups, to help defray their costs
• Offer tax incentives to those corporate groups that invest in local residential broadband initiatives

Detroit has an already strong network of community groups that are trusted by residents and have had proven success in bettering the lives of residents. By lending its support to these groups’ broadband expansion efforts, the City empowers its citizens to improve Detroit while also rebuilding its own tarnished image.

3. Develop a Technology Disposition Program for Underutilized IT Equipment

The City can encourage broadband adoption at home by offering the necessary technical equipment at a reduced cost to those who need it and can’t afford it at market price. The premise of this recommendation is that while some government offices or local businesses may have unused or underutilized computers and related technologies, many people in the community have none. By developing a technology disposition program, the City can get technology into the hands of residents. Here are some steps the City can take to create such a program:

• Conduct an inventory of technology in each government office, and determine which hardware is underused or not used at all.
• Accept hardware and software donations from local businesses and private residents, and include this equipment in the technology disposition program.
• Sell this equipment at reduced cost to key organizations working on broadband expansion so that they can get it to those who need it most. Even outdated computers can be refurbished and provided to those in need.
• Allow the Detroit Public School System to request specific technology donated to the technology disposition for use in classrooms.

This type of technology disposition program could be an excellent way to reduce program costs for broadband expansion and may even provide enough revenue to offset the small cost of running it.

4. Develop a Public Service Announcement Campaign to Promote the Value of Adopting Broadband Internet

We know that one of the key reasons many Detroit residents have not adopted home broadband is that they do not recognize its relevance to their daily lives. In conjunction with encouraging programs that are focused on high-impact applications, the City should begin a public service campaign that presents broadband as a useful and pertinent tool for citizens. This campaign should be carried out through as many venues as is possible, including television and radio spots, through the public library, and through its own City website.

5. Support Programs That Contain a Significant Training Component and Assist with Training Where Possible
The City must address two key issues to help Detroit residents adopt broadband: the perceived irrelevance of broadband to their daily lives and the capability of Detroit residents to utilize Internet services in meaningful ways. Currently, NGOs such as Knight Center of Digital Excellence and Family Place address these issues through hands-on high-tech training. The City of Detroit should support and recognize programs that contain a significant training component for the use of broadband.

The City should also encourage, support, and help coordinate community training nights, run through NGOs with city support, that serve to foster basic Internet skills while raising awareness of broadband. These training nights could be run through NGOs with City support and would serve to foster basic Internet skills while raising awareness of broadband. Training programs could also provide additional avenues for public-private partnerships. Oakland County’s blog events are a good example of programming that served to get residents online, increase awareness, and offer opportunities for citizen-government interaction. In one forum, residents were able to suggest cost saving measures the county could implement. An additional role the City of Detroit can play involves supporting the training of NGO staff to provide Internet training to others. JVS Detroit\(^6\) is one such possible organization—it has partnered with United Way to provide training support for non-profits.

6. **Improve Detroit Government Website**

The Internet provides an important platform for information dissemination and access to services. The City of Detroit should strengthen their online resources and promote them for increased awareness. Though the City websites are currently useful, they could be improved in a few ways:

- Increased information labeling
- Use of links to NGOs, state and national resources
- News feed (See City of Columbus, OH)
  - Includes News, Alerts, Notices, Events
- Update Tabs to See New Programs, Services, and Publications
- Incorporate Quick Links (See City of Ann Arbor, MI)
  - Highlight Services, such as paying parking tickets and job information
  - Include City Services, Community Resources and Property Information
- Space for a public forum
- Opportunities to share strategic visions
- “Button” linking residents to see stimulus fund spending locally (City of Miami, FL)
- Allow for and encourage connection via smartphone applications, such as email, twitter, and text updates (City of Miami, FL)

The City should develop a stronger e-government plan. An example would be that put out by Washtenaw County (eGov 2009). Any plan should also mesh with the State of Michigan IT strategic plan. Common elements of these plans are to address the constituency needs, support and implement program management, and update services when possible. The City should also make efforts to develop training programs, likely in conjunction with NGOs, to develop online government training programs and digital outreach measures to connect residents to services and the value of broadband (CWA, 2009).

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\(^6\) [http://www.jvsdet.org/employers.htm](http://www.jvsdet.org/employers.htm)
7. Create and Implement K-12 Internet Literacy Curriculum Requirements for Detroit Public Schools

Strengthening education will play a major role in helping Detroit’s youth take advantage of broadband and make it relevant to their lives. No Child Left Behind states that schools should, “assist every student in crossing the digital divide by ensuring that every student is technologically literate by the time the student finishes the eighth grade, regardless of the student’s race, ethnicity, gender, family income, geographic location, or disability” (State of Michigan, 2006). The Detroit educational system needs to be strengthened to include higher academic standards that include a required computer literacy level upon graduation. The Michigan Department of Education Technology standards can serve as guidance as to what constitutes technological literacy by the end of grade twelve, including the completion of an online course, use of the Internet for research, and use of the Internet for high-level communication (State of Michigan, 2006). In order to accomplish this higher standard, some barriers faced by schools in adopting broadband, and some initiatives to help them do so, are listed in Appendix E. Further education recommendations include:

- For Detroit Public Schools:
  - Provide educators with additional training in how to effectively use technology in the classroom. The use of technology can help students learn, but it is only one of many modern tools that can improve education.
  - Ensure that teachers can utilize requested and supplied technology to greatest effect, and ensure that the technology is applicable in the requested classroom.
  - Utilize the technology disposition program (see recommendation #3) to further provide the necessary supporting equipment needed to boost student education using broadband application.
  - Ensure a greater focus on accountability and educational outcomes

- For the City:
  - Support efforts to showcase student work, as students tend to exceed class requirements when their work is made public (Nielsen, 2009).
  - Provide some increased avenues for student and educator recognition, especially on projects that utilized online resources
  - Help strengthen educational programming that NGOs provide, and allow some of this additional programming to receive academic credit
  - Assist DPS and NGOs in receiving state and federal grant monies to expand technology efforts where possible
  - Involve students in efforts to increase broadband adoption and use

8. Allow Clearwire Access to City Infrastructure to Implement WiMax

Clearwire, with financial assistance from the Knight Center of Digital Excellence, plans to develop a WiMax network in Detroit. Like Wi-Fi, WiMax allows customers to connect to the Internet wirelessly. However, while Wi-Fi often only extends tens of feet from a hub, WiMax can cover up to 33 kilometers. Knight financially supports this effort as part of a collaboration to provide free or very low cost broadband to key neighborhoods in the City. By allowing Clearwire access to this infrastructure free of charge, the City could (and should) make the following stipulations:
• Insist that Clearwire not charge early termination fees. Currently, customers must sign a two-year service contract to use the Clearwire network. Should the customer attempt to cancel the contract for any reason (including slower speeds than advertised), they are faced with a $200 early cancellation fee. The threat of such a fee stands a good chance of scaring away potential customers.

• Stipulate that Clearwire cannot exclusively “resell” its services. Clearwire is partially owned by Time Warner, Sprint, and Comcast. In the Portland area, Comcast has begun reselling Clearwire’s WiMax services at a much higher price (See Appendix E). In order to encourage competition and keep costs down, Clearwire should not be allowed to exclusively resell its services. If Clearwire allows one service provider to utilize its infrastructure, it should allow other Internet service providers the same option.

9. Conduct a Feasibility Study for a Municipally Owned Fiber Optic Network

A number of cities throughout the U.S. and overseas have started to build and maintain broadband infrastructure themselves. They then act as Internet service providers (ISPs) or lease the network to multiple Internet service providers (ISP) (See Appendix D). Residents of these cities have benefited by getting better service and faster transfer rates (10Mbps – 1Gbps). The City should use lessons learned from these efforts as a guide in considering this option:

• The City should not act as an Internet Service Provider (ISP). Case studies show cities that act as ISPs and fiber network providers are unable to reduce prices (about $50/month for 10Mbps upload and download rates) to the same level as a city that leases its fiber optic network to multiple ISPs (Stockholm: $10/month 100Mbps upload and download rates) (Interview with Brough Turner, 2009). Since cost is such a huge barrier to broadband adoption, we recommend Detroit lease the network to produce the lowest prices and the highest transfer rates.

• The City should consider utilizing the sewer system for a fiber optic network. A number of cities have been able to reduce the cost of building and maintaining a fiber optic network by running fiber optic cable through the sewer system instead of laying the cable under roads and sidewalks, because it does not require digging. (See Appendix E)

• The City should try to create incentives for unused fiber (aka dark fiber) donation to the City. OneCommunity, a non-profit organization which maintains a fiber optic network in Cleveland, has received a donation of over 500 miles of already laid fiber (See Appendix D). Incentives that encourage the donation of this “dark fiber” include tax breaks or continued access to the network without having to pay for the associated maintenance fees. In some instances, the donor may rent the cable back at a significant discount. For instance, if Comcast should choose to donate parts of its fiber optic network, the City may lease it back to Comcast at a significant discount.

• The City should seek multiple funding sources. Some U.S. cities have been able to pay for their municipal fiber networks solely through municipal bonds, however this may not be possible in Detroit. We list several possible funding sources in Appendix F.

Incumbent telecommunications companies have shown resistance when cities have proposed rolling out their own municipally owned fiber network and acting as ISPs. Many feel that municipalities should not be competing with private corporations. However, by leasing the fiber
network, the City is not directly competing with incumbent ISPs. If multiple ISPs can be encouraged by such an effort, it will likely increase competition amongst market players and drive down prices. Additionally, by retaining some level of control over the infrastructure, the City can ensure previously underserved communities have the same level of access as those in areas with higher broadband adoption. Lastly, ISPs may benefit in a reduction of maintenance and upgrade costs because they would no longer need to go through the onerous task of obtaining rights of way from the City to maintain the infrastructure.
Appendix A: Glossary of Technical Terms

Broadband Definitions (Meyers, 2003)

3G
The term used to describe mobile network infrastructure that supports high-speed, high-bandwidth wireless services for advanced applications

4G
The term used to describe the next generation of mobile network infrastructure that supports high-speed, high-bandwidth wireless services for advanced applications

Backbone
The very high capacity Internet fibre-optic connections that interconnect and move Internet traffic rapidly to hubs around the world for further distribution to local areas.

Back-haul
The connection from a network of computers to a high bandwidth primary Internet connection

Bandwidth
The amount of information that can be sent per period of time. Usually measured in thousands or millions of bits per second (kbps/Mbps). It takes nine or so bits to define a single character of text or pixel on a display screen. The fastest dial-up modems using standard phone lines provide about 30 kbps. A T1 line provides approximately 1,500 Kbps, a DSL line about 500 Kbps, A cable Modem about 1.5Kbps (down, up is typically 200 Kbps). A fixed Wireless backhaul connected to the appropriate Internet back-bone can provide up to 200,000 Kbps per second. A WiFi connection with adequate backhaul can provide up to 11,000 Kpbs.

Broadband
High bandwidth Internet connections, delivered by various methods including T1 lines, Cable Modem, DSL line and WiFi (connected to another broadband connection). Broadband connections typically use a dedicated cable or connection and are always connected. It provides Internet access with data transfer speeds above 768 Kbps, contrasted with dial-up access using a 56k modem.

CTC
A Community Technology Center (CTC) as defined by Myers/Gant is a community service, social action, and/or educational facility that uses computers, the Internet and other information technology tools to provide a range of vital services for those who typically lack such opportunities. CTCs provide access to free or low-cost computer-based/digital applications, hardware, networks, technology training and support programs.

Dark Fiber
Dark fiber refers to previously laid fiber optic cable that is not currently be used, or is underutilized.

Dial-Up
Connecting computers together by using modems to turn voice phone lines into digital connections. This connection is limited in bandwidth by limited audio fidelity of basic phone system technology. A dial-up connection may take several minutes to establish and is typically disconnected at the end of a session. A phone line may either be used as a voice line or computer connection, but not both simultaneously.

ISP
Internet Service Provider. Any company or organization that provides a service for individuals or organizations to connect to the Internet. This service includes the Internet network connection via phone line, cable, DSL, etc as well as connection to the Internet backbone. Examples of ISPs include AT&T, Comcast
and AOL.

<table>
<thead>
<tr>
<th>Router</th>
<th>A router is a device that allows you to have more than one PC share an Internet connection such as that provided by your cable or DSL modem</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smartphone</td>
<td>A phone that has advanced capabilities, including Internet access with an accompanying data plan; the Apple iPhone is an example</td>
</tr>
<tr>
<td>Wi-Fi</td>
<td>Provides wireless Internet connections over short distances. Wi-Fi stands for wireless fidelity and is possible through a cooperative effort called The WiFi Institute, which is comprised of the US Federal Communications Commission (FCC), the Institute of Electrical and Electronic Engineers (IEEE), and a trade association of manufacturers like Cisco, Intel, Motorola, and Lucent. The FCC allocated the required radio spectrum and created a special category where the device and not the individual are licensed, the IEEE developed comprehensive standards for wireless digital devices called 802.11, and the manufacturers through the WiFi Institute have created a wide range of devices that will work with each other (“interoperable devices”).</td>
</tr>
<tr>
<td>WiMax</td>
<td>Similar to Wi-Fi but with coverage extending kilometers. Like Wi-Fi, bandwidth decreases the further you are from the transmitting tower, though it can transmit speeds faster than available through Wi-Fi.</td>
</tr>
<tr>
<td>Wireless Mesh Network</td>
<td>A network of computers that connect wirelessly to each other to obtain access to the internet. Generally, only a few computers in the mesh network have a physical connection to the internet</td>
</tr>
</tbody>
</table>
Appendix B: Broadband Speed Chart

Table B1) Bandwidth Requirements for Broadband Applications (Ezel, 2009)

<table>
<thead>
<tr>
<th>Application</th>
<th>Upstream Speed</th>
<th>Downstream Speed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medium Resolution Video-Conferencing (640x480P)</td>
<td>384-1200 Kbps</td>
<td>384-1200 Kbps</td>
</tr>
<tr>
<td>Streaming Video (720P)</td>
<td></td>
<td>1.2 Mbps</td>
</tr>
<tr>
<td>Standard-Definition Digital Television (720x480 Interlaced)</td>
<td></td>
<td>4 Mbps</td>
</tr>
<tr>
<td>Basic HD Videoconferencing (128x720 resolution)</td>
<td>1.2-4 Mbps</td>
<td>1.2-4 Mbps</td>
</tr>
<tr>
<td>Telepresence: high Resolution HD Video conferencing (1920x1080 resolution)</td>
<td>5 Mbps</td>
<td>5 Mbps</td>
</tr>
<tr>
<td>Video Home Security Service</td>
<td></td>
<td>10 Mbps</td>
</tr>
<tr>
<td>High Definition (HD) Digital Television (1440x1080 Interlaced)</td>
<td></td>
<td>15 Mbps</td>
</tr>
<tr>
<td>Telepresence: Very High Resolution HD Video conferencing (5760x1080)</td>
<td>15 Mbps</td>
<td>15 Mbps</td>
</tr>
</tbody>
</table>

Table B2) Broadband and High-Speed Wireless Speeds in Mbps.
American Libriaries Association [http://www.ala.org/];
Microsoft Corporation [www.microsoft.com/];
MoneySupMermarket [http://www.moneysupermarket.com/c/broadband/speed-guide/2/];
Information Technology and Innovation Foundation [www.itif.org/]

<table>
<thead>
<tr>
<th>Definition Basis</th>
<th>2010 High/Avg/Low</th>
<th>2015 High/Avg/Low</th>
<th>2030 High/Avg/Low</th>
</tr>
</thead>
<tbody>
<tr>
<td>National</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-Any</td>
<td>30/2/&lt;1</td>
<td>30/5/5</td>
<td>100/30/10</td>
</tr>
<tr>
<td>-Wireless</td>
<td>10/?/&lt;1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Business/High level Use (ie video conference)</td>
<td>50/10/2</td>
<td>50/20/10</td>
<td>100/50/15</td>
</tr>
<tr>
<td>Basic Internet Use (ie email)</td>
<td>2/1/&lt;1</td>
<td>5/5/2</td>
<td>10/5/5</td>
</tr>
<tr>
<td>Detroit</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-Any</td>
<td>10/&lt;1/&lt;1</td>
<td>20/10/&lt;1</td>
<td>70/20/10</td>
</tr>
<tr>
<td>International High Level Implementation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-Any</td>
<td>50/20/5</td>
<td>50/30/5</td>
<td>100/50/10</td>
</tr>
</tbody>
</table>

These charts provide a general idea of broadband needs, and can serve as a guide for current and future implementation.
Appendix C: Education

Any long-term focus on improving residential Internet adoption must address educational needs in the community to utilize the Internet in relevant ways. Additionally, to improve education through the use of new technologies, students must have access to these technologies and training inside and outside the classroom. This section has additional details on barriers to Internet use faced by K-12 schools and programs that can help ameliorate some of these barriers.

Barriers

Despite the benefits of broadband Internet in classrooms, schools face a number of challenges in utilizing available technology. The City can work with Detroit Public Schools to address these challenges and improve Internet adoption both within schools and at home. A few of these barriers are discussed below.

- **Cost:** Computer equipment, software, and tech support are expensive, and technological tools may seem a luxury when schools are struggling to find funds to support necessary items such as textbooks and toilet paper. However, technology can be a cost-saving tool. For example, there are many educational resources for teachers on the Web, and teachers may be able to provide assignments and lesson packets without requiring students to use textbooks. There are also a number of programs and charities that are willing to provide funding or donate old equipment to lacking classrooms (See Education Initiatives).

- **Incompatible equipment:** As technology evolves and new software replaces the old, it may not be practical perform upgrades. This can result in incompatible equipment, rendering both the old and new unusable. For example, a special needs teacher that uses Braille Note – a device that allows visually impaired students to perform assignments in Braille and print using a standard printer – found that the newly upgraded printers no longer used the serial connection required by Braille Note. While her classroom is set up to receive wireless Internet, computers that contain Braille to text and text to Braille software do not have wireless cards and so cannot connect. (Personal Communication with Patti Smith, 2009)

- **Overextended IT groups and Underutilized Staff and Students:** Computer literacy varies among faculty. While many teachers are fully capable of performing simple tasks such as connecting a computer to a printer or downloading a driver or patch, some faculty are not as computer proficient. To guard against a well-intentioned staff member inadvertently crashing a system, IT staff perform many of these simple tasks. The consequence of this is that IT staff often become overextended, and it may take weeks or even months before an IT request can be answered. This can be exceedingly frustrating to a teacher or student who knows how to fix a problem, but is not allowed or does not have access to the needed passwords. Some school districts have had success in training faculty and trusted students to act as light IT staff to take care of simple IT requests. This has had many benefits in that it empowers students and faculty, it provides computer literacy training, and it allows the IT staff to focus on larger problems instead of wasting their time on simple tasks such as installing software updates. (Neilson, 2009)
- **Inadequate Training for Faculty**: Just because technology is available, it does not necessarily mean it will be used. Many teachers began teaching before the Internet became mainstream and already have effective low-tech lesson plans. However, educational systems must prepare students for technologies that will be encountered in the workforce by effectively utilizing these technologies in the classroom.

- **Lack of Adequate Bandwidth in Schools**: Slow transfer rates can mean a lot of wasted time for students and faculty. In extreme cases, it may become a barrier to access. The easier it is to access the Internet and quickly utilize on-line resources, the more likely it is that students and faculty will use the Internet. Some National Programs, such as the E-rate program, provide national support to help schools provide and improve Internet services.

- **Lack of a National Curriculum and State Standards for Computer Literacy**: Computer literacy and Internet literacy are now required skills in today’s job market. But unlike reading, writing, and math skills, there are no standards for computer literacy in our public schools.

### K-12 Education Initiatives to Increase Internet Adoption

- **Freedom to Learn**: Freedom to Learn was a Michigan initiative to bring 21st century technology into 6th grade classrooms. Digital packages included laptops, wireless connection at school, and software. As of 2005, approximately 21,000 students participated in this program but funding was halted in 2006 due to the State budget crisis (Classroom Connections, 2006). An evaluation of the program found the laptops did increase students’ motivation to learn, however it also found that laptops were only seen in the classroom 1/3 of the time. In addition, Internet browsing software was frequently the only software used by students (Ross & Strahl, 2005). Teachers also reported that they were not fully prepared to effectively incorporate the laptops into their learning plans and that there was little parental or community involvement in the program (Ross & Strahl, 2005). To address some of these issues, the One-to-One Institute now offers educators support and professional development to incorporate wireless technologies into classrooms.

- **E-Rate program**: The E-Rate program provides funding for qualifying schools to invest in Internet services and infrastructure. Many schools in Detroit qualify for this federal program, which uses the number of students that qualify for meal benefits as a metric for discount level. With over 80% of Detroit Public Schools (DPS) students qualifying for meal benefit programs, Detroit has been able to access E-Rate funds to help deploy broadband in schools. From 2001-2004, DPS has been able to fund more than $52 million in services and connectivity at a discount of nearly $46 million (CELT, 2005). However, the E-Rate program is currently underfunded by nearly half of the total requested amount received annually. Additionally, its preferential treatment of rural schools may limit the ability of low-income urban schools to access the technology funding and support that they need (ACLPI, 2009)

- **AOL@School**: In 2002 the City announced that Detroit public schools would integrate AOL@School City Focus Feature into the education system (Kenney, 2002). AOL@School offers on-line resources to both students and educators. These resources
include virtual field trips, subject and textbook help, tips for studying, and time management tools for students. For educators, AOL@School offers professional development on-line courses, a database of educational websites and lesson plans, as well as printable worksheets, quizzes, and ideas about how to integrate new technologies in the classroom. While AOL is no longer running this program, links to these resources are still available at the AOL@School website.

- **Dell TechKnow**: The Dell Techknow program is an after-school program for at-risk middle school and high school students. During the 40-hour program, the students put together their own computers and learn how to identify, troubleshoot, and resolve common IT problems. Students also learn what it is like to work at an IT help desk. After completion of the program, students are given the computer they have built. Over 25,000 students have completed this program since it was created in 2002, a testament to the program's success.
Appendix D: Urban Broadband Case Studies

Cleveland, Ohio

OneCommunity, a non-profit organization, is spearheading a broadband initiative in Cleveland, Ohio. Utilizing dark fiber that was laid down by telecommunications and utility companies in the 1990s, OneCommunity provides high-speed broadband Internet to governmental institutions, health care institutions, and other non-profit organizations. Broadband access is not provided to residents directly, but may be accessed through any of the above-mentioned institutions. Additionally, residents may access broadband through a pilot project called Wireless Akron, which is supported by OneCommunity and utilizes a wireless mesh network attached to the fiber optic cable infrastructure. Like Detroit, Cleveland was once a manufacturing and transportation center that has since fallen on hard economic times. Many of the aspects crucial to Cleveland’s broadband initiatives may be applicable to Detroit.

Funding: Initially, OneCleveland (the precursor to OneCommunity) did not require financial support from the City (Davis, 2006). Instead, funding was provided by large non-profit organizations and universities that wanted better broadband access. While at first OneCleveland was only appealing to large organizations, the City soon began to recognize the importance of broadband for enhancing economic growth and contributed funding (Davis, 2006).

Attracting Business: Because of the high speeds and low costs available from OneCleveland, smaller companies were soon attracted to downtown Cleveland. One such company, Platform Labs, was able to cut its networking expenses by a third (Davis, 2006). School One, which sells communication equipment to schools, was able to provide its services for 3/4th of the original cost (Davis, 2006).

Coverage: As more organizations connected and contributed to the fiber optic network, OneCleveland grew outside the bounds of the City and changed its name to OneCommunity. Currently, OneCommunity is able to provide broadband access to institutions in 22 counties of Northern Ohio through a network of 500 miles of donated fiber optic cable as shown by the map below. Despite this success, one unfulfilled promise remains – a city cloud of Wi-Fi which some believe is crucial to addressing the digital divide (Davis, 2006). There are plans to deliver Wi-Fi to Cleveland residents via a mesh network linked to the fiber pipe. This would provide wireless Internet access to residents within 10 square miles of downtown Akron (Connect Akron Phase I Press Release, 2009).
Coverage Map of OneCommunity obtained from the OneCommunity website: http://www.onecommunity.org/about/about.aspx?id=216

Lessons for Detroit

- **Detroit might also have dark fiber underneath its streets.** More investigation beyond this report will be required, however, Merit Network maintains a metropolitan fiber ring in Detroit, as well as in Grand Rapids, Lansing, and Chicago (Knight Resource Center, 2008).

- **Monetary donations as well as fiber donations were necessary for OneCommunity's success.** By collaborating with many groups, the initial high costs could be spread out among members, some of which also have a presence in Detroit. For instance, the Knight Foundation was an excellent source of support and guidance for OneCommunity and may be able to provide the same for Detroit.

- **Fiber optic infrastructure has a long lifetime while wireless hardware has a shorter useful lifetime.** Fiber optic infrastructure remains useful for a minimum of twenty years while hardware associated with wireless access quickly becomes obsolete and may only have a useful lifetime of 5 years. By investing in fiber optic infrastructure, the City of Cleveland has made a long-term investment, which has spurred economic growth.
Philadelphia, Pennsylvania

The Digital Impact Group of Pennsylvania has been very successful in bringing wireless broadband to vulnerable populations within the city of Philadelphia. The group functions by pairing with local community groups such as Vision for Equality and Philadelphia Academies to provide “TechPacks” to individuals of underserved populations. Each TechPack consists of a laptop, software, high-speed Internet service for a year (DSL connection and sometimes routers are provided), literacy-appropriate training, and local technical support. Individuals who receive these digital packages are also provided training in equipment use.

Initial Problems: The Digital Impact Group was originally created in 2005 as Wireless Philadelphia. Wireless Philadelphia encountered significant problems shortly after its inception. While Earthlink had originally agreed to provide the wireless infrastructure for the program, it backed out of this agreement leaving the program without a way to provide inexpensive internet connections. Fortunately, a new, local company called Network Acquisition was able to take the place of Earthlink and signed on to the contract. A second problem was the technical capability of the program’s digital partners. Wireless Philadelphia paired with a number of community organizations early on to increase the quantity and distribution of the digital packages. However, not all of the partners could provide adequate technical support for individuals receiving the digital packages, resulting in participants to abandon the program when they came into technical difficulties. (OMG, 2008)

Digital Partners Provide Digital Packages: In 2009, Wireless Philadelphia changed its name to the Digital Impact Group (DIG) and reassessed its program. DIG created four pilot programs, each paired with a specific local community group that provides support to a vulnerable population within Philadelphia. These community groups are referred to as “Digital Partners,” each of which created their own independent selection criteria for distributing digital packages and provided training based on the needs of each population. For instance, Maternal Child and Family Health provided training on using the Internet to find quality child care and utilizing social networking sites to keep in touch with other family members. The Philadelphia Academies provided FAFSA application training to high school students interested in applying to college. Training from all digital partners consisted of 3 to 4 sessions that focused on basic computer skills and special topics, and 85% of participants attended three or more training sessions. One of the difficulties for the digital partners was tracking down participants and organizing training sessions that fit busy schedules. The participants in the Maternal Child and Family Health Group found it especially difficult to attend training sessions unless childcare was provided. (OMG, 2009)

Lessons for Detroit:

- **Specialized training is crucial.** It is not enough to provide the hardware and software: teaching people how to effectively use broadband is also needed. It is also important to train people to do things that are useful in their daily lives as this demonstrates the internet’s relevancy and addresses one of the major barriers to internet home adoption.

- **Pairing with community groups promoted trust and ownership.** It is also an effective way to distribute the digital packages. Allowing each digital partner the freedom...
to select participants as they see fit and to provide relevant training also increased the success rate of this program.

- **Detroit should be selective when choosing which community groups to support.** One of the initial mistakes made by Wireless Philadelphia was to pair with many groups without ensuring the proper technical support or training was available. Instead, a quality over quantity approach works better, and Detroit should be careful to ensure the quality of programs it supports. Community groups that wish to participate but lack the required technical support may be placed in a role where they may supplement or provide additional support for another community group partner.

- **Upscaling will be required for significant impact.** While this program has been considered successful, it has only provided a total of 130 packages as of August 2009. This might be an initial model in Detroit, but considerations should be made as to how to increase the impact.

**Stockholm, Sweden**

Stockholm stands out among the many cities of the world as having one of the best internet connection speeds (100Mbps) for the lowest price (~$10/month). These numbers are far better than any program available in the United States. The key to Stockholm’s success is competition between Internet service providers for use of a municipally owned, citywide fiber network. This strategy may be equally effective in Detroit if properly implemented. See Recommendation 9.

*Benefits of a municipally owned network.* AB Stokab, a corporation owned by the Stockholm government, was created in 1994, and was responsible for laying fiber optic cable throughout the city of Stockholm. There are a number of advantages to allowing only one company to lay down the fiber. First, it decreased the need to continually dig up the road system for multiple companies to lay down fiber cable. Second, the City could ensure that low-income sections of the Stockholm were not left behind and had equal access to the cable ring. Third, because the corporation was owned by the City, it was easier for Stokab to pass through the bureaucracy to start laying down fiber.

*Resistance from incumbents was alleviated.* At first, the incumbent telecommunication system was afraid that the City would try to compete with it, and there was some initial resistance. However, these fears were addressed by insisting the City had no desire to compete with incumbent businesses—it only wanted to provide dark fiber infrastructure. Any ISP, including the incumbent, could then utilize this infrastructure to provide Internet services. This was beneficial to the City, as increased competition would drive down prices to residents. It was beneficial to the incumbent ISPs because the initial costs to build and expand the network are high, while revenue streams are often slow to grow. Because Stockholm took on the initial debt to build the infrastructure, incumbents could immediately gain the revenue streams from a larger portion of the city (Interview with Brough Turner, 2009).

*Leasing agreements to cover infrastructure costs.* The City charged ISPs enough to cover the costs of building and maintaining the dark fiber infrastructure. As planned, the project reached break even in its fifth year and today provides more than 5600km of cable (nearly 3500 miles) reaching every city block in Stockholm and out to 29 towns in the surrounding metropolitan area. (Interview with Brough Turner, 2009).
Lessons for Detroit

- **Leasing infrastructure to multiple ISPs kept prices low.** Increased competition is correlated with lower broadband subscription prices. By making it easier for ISPs to enter the market, competition was increased.

- **Incumbents benefited from municipally owned infrastructure.** Laying down cable infrastructure is very expensive, and customers are often slow to adopt the new services. As a result, revenue streams grow slowly, resulting in higher subscription prices. The prices remain high even after the ISPs have finished paying for the infrastructure. If a city assumes the initial expense of infrastructure-building, ISPs could reduce their initial costs, competition could increase, and prices kept low.

- **Leasing agreements may become revenue streams in the future.** Initially, Stokab charged leases that covered both maintenance fees and debt repayment. After the debt was paid off, the City used the agreements to create revenue.

- **Incumbent resistance was decreased by Stockholm’s promise to not compete.** Incumbent ISPs resist municipally owned fiber networks because they feel municipalities have an unfair advantage over private business. By promising not to compete, Stockholm was able to decrease resistance to this project.

**Wilson, North Carolina**

The City of Wilson, North Carolina provides high-speed broadband Internet to its residents through a government owned initiative called Greenlight. Greenlight uses a fiber to home system (FTTH) in which each home in Wilson can be directly connected to the fiber optic network. Cable TV, high-speed Internet, and phone services may be bundled or purchased separately by residents. Though prices are comparable to those of the incumbent service providers AT&T and Time Warner, speeds are considerably faster. Unfortunately incumbent ISPs view Greenlight as an unfair competitor and proposed a legislative bill to stop government owned initiatives from competing with private business. Other cities, such as Lafayette, Louisiana, and Monticello, Minnesota, have faced similar challenges when building municipally owned fiber networks. They have had varying degrees of success in emerging from those challenges.

**Services and Prices:** The City of Wilson owns Greenlight, which is responsible for maintaining and operating the fiber optic network. Greenlight offers not just Internet service, but also HD TV and phone services to anyone within the city limits of Wilson. While residents who wished to participate were previously required to order a minimum of two services, a new Internet-only option has been made available for $59.99 a month. Speeds are available as low as 10 Mbps upload and 10Mbps download for $34.95A and as high 100Mbps for $299.95.7

**Funding and Competition:** Funding for Greenlight was raised through city bonds, not through tax revenue. However, incumbent telecommunications companies, Embarq and Time Warner, have concerns this might set a new precedent. Local governments have an unfair advantage over private companies because they can utilize tax revenues to cover costs, while avoiding the income, property, and equipment taxes private telecommunication companies must pay.

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7 Greenlight, retrieved from [http://www.greenlightnc.com/about/](http://www.greenlightnc.com/about/).
To address this disparity, the North Carolina legislature has been considering two bills, NC House Bill 1252 and NC Senate Bill 1004, both of which would require city governments providing telecommunications services to include a customer fee that reflects the increased costs private companies must pay to provide the same services (Morgan, 2009).

Other Municipal Fiber Networks: Wilson is not the only city to provide Internet to its residents in this manner. Lafayette, Louisiana is currently in the process of deploying its municipally owned fiber through the Louisiana Utilities System (LUS). As in North Carolina, a “Local Government Fair Competition Act” was proposed to the Louisiana Legislature and was approved (Huval, 2009). The incumbent telecommunication providers have subsequently filed two lawsuits: one in 2004 after the announcement of the Fiber-to-Home-and-Business initiative; and one in 2005 after the public voted 63% to 38% to continue on with the project (Huval, 2009). In 2007, the State Supreme Court ruled in favor of LUS and asserted that the initiative could continue. In July 2007, bonds were issued to support the LUS Fiber project, and residents started receiving fiber-to-the-home Internet in February of 2009 (Huval, 2009).

Monticello, Minnesota, a suburb of Minneapolis passed a referendum in 2007 approving a city-owned fiber network (Anderson, 2009). However, the incumbent telecommunications company, TDS Telecommunications, sued the City. While the City had to delay the project as it fought the lawsuit, TDS started deploying its own fiber network in Monticello. By the time the lawsuits were ruled in Monticello’s favor, TDS had nearly finished rolling out its network at high speeds and low prices, calling into question whether a city-owned fiber network was necessary (Anderson, 2009). Though Monticello was not able to successfully deploy a city-owned fiber network, its residents have benefited from TDS’s 50mbps upload and download speeds for $49.95 with no requirement to bundle services (Anderson, 2009).

Lessons for Detroit

- **Funding through municipal bonds.** In both Wilson and Lafayette, funds for the municipal network were raised through municipal bonds. This may also be a supplemental funding option for Detroit.

- **Faster Internet speeds, but prices remain high.** In all three cities, faster Internet speeds were obtained, but even prices at the lowest tier remained above $40: a price that is unaffordable for many Detroit residents.

- **Incumbent telecommunications companies resisted the municipal projects.** In all three cities the incumbent telecommunications companies actively opposed the municipal projects, mainly through legislation. However, in all three cities, the courts ruled in favor of the municipalities.

- **Competition encouraged incumbent telecommunication providers to lower their prices.** In all cases, competition mainly presented in the form of a municipally owned fiber optic network has encouraged telecommunication companies to offer higher speeds at lower prices.
Appendix E: Technological Opportunities

WiMax & Clearwire

WiMax stands for Worldwide Interoperability for Microwave Access. Like Wi-Fi, WiMax can provide an internet connection wirelessly but at faster speeds (up to 75mbps) over longer distances (up to 33km). However, it is important to note that the further one is from the WiMax tower, the lower your transfer rates will be (WiMax.com). Clearwire has already rolled out its WiMax networks in a number of cities across the US including Portland Or, Atlanta GA, and Baltimore Ma, and, as mentioned in section X, Clearwire has recently received a grant from the Knight Foundation to help ease the costs of setting up a WiMax network in Detroit.

Prices and Services: Clearwire charges $20/month (or $10 for a day pass), for initial speeds of 2-4Mbps (mark Jan 2009). Special hardware such as a WiMax-enabled USB modem is required to access the WiMax network but this can easily be purchased in local retail shops for about $50. (Mark Jan 2009). Many companies have invested into Clearwire, including Sprint, Comcast, Time Warner, Intel and Google. (Mark Jan 2009) Some of these companies, specifically Time Warner and Comcast, have started reselling the Clearwire service, meaning they are utilizing Clearwire’s WiMax network to provide their own wireless Internet at a drastically higher price.

Disadvantages of WiMax: Unfortunately, the speeds that have been advertised are not necessarily the speeds that will be seen by customers. Plaintiffs from Washington, Hawaii, Minnesota, and North Carolina have filed a lawsuit against Clearwire, stating that while Clearwire advertises reliable, high speeds, actual speed can be as slow as a dial-up modem. Further complaints in the lawsuit include Clearwire’s termination fee ($220) for canceling the two year contract early, even for reasons such as lower than advertised transfer rates. (Tycko, 2009)

Lessons for Detroit

- Distances further from a WiMax tower receive lower transfer rates. By making it easier for Clearwire to set up more WiMax towers, the city can decrease the distances between residents and the nearest WiMax tower, increasing transfer rates. See recommendation 8.

- Clearwire services have been resold by Comcast at higher prices in other US cities. This could also happen in Detroit, resulting in increased costs of WiMax to Detroit residents. See recommendation 8.

- High termination fees can decrease adoption. Termination fees discourage customers from experimenting with new technologies. In a worst case scenario, it can leave customers feeling as though they’ve been scammed. Take for instance a
consumer who cancels their service after two months and finds they must pay more in termination fees than they did for the original service contract. Thinking, they have learned their lesson, customers may now become suspicious of future internet adoption programs.

Fiber Optic Sewers

Traditionally, fiber optic cable networks were deployed underneath city streets. This strategy was often very costly, time consuming, and disruptive to traffic flow of the city. An alternative to this is to deploy the fiber network through city sewers. This practice has been successful most notably in Scotland. Three Scottish universities, Aberdeen, Bournemouth and Napier now utilize a fiber optic network, deployed by a company known as H2O Networks, that provides transfer speeds of up to 20Gbps (1Gbps = 1000Mbps). In the U.S., a few cities have pursued fiber optic sewers including Albuquerque and Portland, both of which have had their systems deployed by a company called CityNET (W&H Pacific, 2001).

Cost Comparison. Deploying fiber cable through the sewers is more than five times cheaper than deploying fiber cable beneath city roads. For instance it can cost $200-$300 per meter (calculated from £150-£200 per meter) to lay down fiber optic cable beneath a city street (Wakefield 2007). In contrast, Napier University of Edinburgh, Scotland was able to lay down a 1.2 km (~0.75 miles) in four hours for £80,000 ($120,000) (Wakefield, 2007).

Infrastructure Concerns. Concerns have been raised about the effect this deployment will have on American sewer systems. An in-depth report prepared for the city of Portland provides protocols and recommendations to alleviate problems associated with running fiber through the sewer system (W&H Pacific, 2001). This report could act as a guide for deploying fiber cable through Detroit’s sewer systems.

Lessons for Detroit

- **Deploying fiber cable through the sewer system is 5x cheaper than deploying it beneath city streets.** By making deployment cheaper, paying for such a network maybe within reach of a city with few financial resources. Experienced companies that have deployed such fiber optic sewers for include CityNet in the US and H2O Networks in Great Britain. Either company may be to deploy a similar network in Detroit.

- **Protocols and recommendations for US sewer systems have been published.** The city of Portland has already looked at the effects of deploying fiber cable through city sewers and have made these protocols available. (W&H Pacific, 2001).
Appendix F: Resources for Expanding Broadband Access and Adoption

National Funding Sources
- Governmental
  - ARRA Stimulus funding
    - Broadband
    - Educational
  - Community Development Block Grant Program – Administered by the United States Department of Urban Housing and Development
  - Educational Program Funding
    - The No Child Left Behind Title II, Part D (NCLB IID) – Enhancing Education Through Technology (EETT) Program.
    - E-Rate
- Non-Governmental
  - Knight Foundation
  - Technology Opportunity Program – Administered by National Telecommunications and Information Association
  - United Way

State Resources
- State Grants
- Fund matching programs
- Technical Support Services

Unused Resources in Detroit
- Public Schools Communication towers
- Spectrum at Wayne State/DPS
- Metro fiber optic-ring in Detroit
Appendix G: Potential Stakeholders and Partners

- **Community Organizations**
  - Detroit Public Television
  - Detroit Digital Empowerment Council – part of the Alliance for Digital Equality non-profit organization. This group seeks to bridge the digital divide in many cities throughout the US.
  - 4C’s/Family Place
  - Focus: Hope
  - Matrix Human Services
  - YMCA
  - Community Centers for Child and Family
    - Youthville, Detroit
    - Don Bosco Hall Community Resource Center

- **Educational Institutions**
  - Wayne State—Already leading way with Community Telecommunications Network
  - Detroit Public Schools
  - University of Michigan – School of Social Work – Center for Urban Innovation’s EZ link program for providing planning and technical support for Detroit’s CTCs
  - Wayne, Oakland and Macomb counties intermediate school districts

- **Technology Related Non-profit Organizations**
  - CLEARlink – refurbishing corporate computers, printers and networking equipment for non-profit organizations
  - NPower-Michigan – providing technical support and training services for Michigan’s non-profit organizations
  - Comnet – Service of Michigan United Way – providing free Internet hosting services for community and organizational building in cyberspace
  - Michigan Virtual University – Bee Freeway and Michigan Virtual High School – providing free and low-cost on-line courses. MVU’s Career Center will provide on-line career counseling for students and adults

- **Others:**
  - Healthcare Providers
  - Private Businesses
    - AT&T
    - Gigatrans
  - Units of Government
  - Religious Institutions


Interview with Larry Gant. (2009, October 16th). Conducted by Kaitlin Gallup at the University of Michigan.

Interview with Brough Turner (2009, October 13th). Conducted by Heather Claxton at the University of Michigan. (Phone Interview)

Knight Center of Digital Excellence Resource Center. (2008, December) Community Asset Inventory: Detroit


mubbimpactreport.pdf


Personal Communication with Patti Smith (2009, November 6th). E-mail to Heather Claxton at the University of Michigan.


City of Detroit Broadband Policy, Ford School of Public Policy


U.S. Government Accounting Office. (2006, May). Broadband deployment is extensive throughout the United States, but it is difficult to assess the extent of deployment gaps in rural areas.


