



Wireless Broadband

The Foundation for Digital Cities

A Cookbook for Communities

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Introduction

As wireless broadband technology has evolved, city leaders have become interested in deploying wireless broadband because of its usefulness in addressing politically important objectives at the local level and its ability to support Digital City applications.

Visionary leaders at the local level are using wireless broadband to bridge the Digital Divide, strengthen economic development, and reduce the cost of government. The City of Philadelphia, in partnership with a local non-profit agency, has deployed a pilot Wi-Fi network in a low-income, disadvantaged neighborhood. Today, neighborhood residents can subscribe to this wireless broadband network for only five dollars per month.

Athens, Georgia, deployed a downtown network and uses a splash page called The Cloud that allows users to connect with local government, businesses, and media and receive personalized emails and text messages. Many businesses tailor promotions to Cloud users and have seen their businesses grow as a result.

Often, the lack of broadband access in a rural community can mean the loss of jobs and industries. In Scottsburg, Indiana, the local Chrysler plant threatened to move its factory since the city had no broadband access. Mayor Graham led a wireless broadband initiative in his city and protected over 60 jobs.¹

Each city's wireless project has unique motivations and challenges. However, basic steps are necessary to provide a successful initiative. While working with the City of Philadelphia, the City of Houston, and Houston County, Georgia, Civitium has found that the following steps are critical to a successful project:

- Assessing community needs and the existing political environment
- Defining a project leadership strategy
- Applying technology to community needs
- Deploying pilot networks
- Developing viable business models and funding strategies and
- Enabling Digital City strategies

Assess the Community Need & Political Environment

Before a community leader can decide how to pursue deploying a wireless broadband network, he or she should understand the community's unique needs for broadband connectivity. As states pass legislation regulating or prohibiting municipalities from deploying broadband networks, local leaders also need to evaluate the current political environment.

Q Review State Law for Regulations and Restrictions

As of March, 2005, at least fifteen states have laws regulating or prohibiting municipalities from deploying, owning, and/or operating broadband and/or telecommunications networks. Eleven other states have similar legislation pending. Visit Civitium's [states](#) page for a listing of state laws and proposed legislation.

Most of these laws allow municipalities to deploy broadband networks for internal needs, but do not allow municipalities to provide broadband to citizens for a fee. Each local government should consult with their legal staff about their state's statute.

Q Check the Demographics

Determine how many homes are in the community per square mile. Using this information and knowledge about the community, select which of the following descriptions fits your city, county, or region:

- Urban and suburban-The Bureau of the Census defines an urban area as having over 1,000 people and/or 400 households per square mile.²
- Middle America-Between 500-1000 people/200-400 households per square mile.
- Rural-Between 0-500 people/0-200 households per square mile.

For urban cities, the high level of household density often makes it economical to deploy a citywide Wi-Fi network. The objective for urban initiatives is often to provide affordable broadband and support portability, the ability to take your laptop to different locations and provision broadband. The high household density in urban areas makes metro-scale Wi-Fi networks financially feasible.

Rural communities are more interested in providing universal broadband access. However, the low household density makes it challenging to justify a Wi-Fi network. Emerging (pre) WiMAX technology, though, is able to provide fixed broadband over larger distances, thereby establishing a business case for wireless in rural cities.

If the community has approximately 500 homes/square mile or less, then the city or county probably does not have universal broadband access and could benefit from deploying a wireless network. Wanchicorn and Sirbu at Carnegie Mellon University described the relationship between population density and average cost per user in the following chart³:

Line/Square Mile	Annual Cost Per Location		
	Fixed Wireless Broadband	DSL	Cable
0-5	\$250-336	\$707	\$646
6-100	\$248-308	\$364	\$292

□ Measure Existing Broadband Service & Prices

The first step should also help determine what type of broadband coverage is available in the community. Though urban areas have broadband access, it is not always universal. Thousands of businesses and citizens in Brooklyn do not have access to broadband.⁴ By understanding the current broadband footprint in a community, leaders can build their network to provide maximum coverage.

In rural areas with low household densities, the likelihood that the citizens and businesses have access to affordable, universal broadband through a cable or DSL provider is low. Civitium can help determine what percentage of the community has broadband access in terms of populations and land mass.

□ Inventory City/County Assets

Conduct an inventory of assets that could assist in the wireless deployment including:

- Access to street lights, power lines, and traffic lights for installation
- Access to fiber to backhaul wireless nodes to Internet
- Access to rooftops and/or towers for (pre)WiMAX installation
- Access to power at street lights & traffic lights
- Access to billing systems for fee-based subscriber services
- Access to bucket trucks for installation

□ Evaluate the Community's Existing Technology Strategy

Many communities have a technology plan that has been passed by the governing authority. Review the plan to see how much focus is given to broadband access, wireless technology, and other emerging technologies.

□ Determine Community Motivations for Broadband Network

City leaders most often have a pain they are trying to address by deploying a wireless broadband network. The major drivers for a wireless project involve the desire to provide low-cost broadband for low income citizens, insure universal availability to strengthen economic development and attract new businesses, and decrease the cost the government by in-sourcing broadband needs. Some communities also want to provide

mobile broadband access for certain government agencies including public safety, public works, inspections, etc.

□ **Identify any wireless Internet service providers (WISPs) or hotspots**

Determine if there are any wireless Internet service providers (WISPs) operating in the community or area. Locate any existing Wi-Fi hotspots at coffee shops, bookstores, museums, etc. If there are no Wi-Fi hotspots in the area, target an ideal location and deploy an inexpensive pilot Wi-Fi network for customers. Such information indicates whether there is any existing competition offering wireless services and how much interaction citizens have had with wireless broadband technology.

□ **Determine How Much Government Agencies Pay for Broadband**

Government agencies require large amounts of bandwidth and they pay dearly for it with taxpayer dollars. Therefore, government agencies may consider replacing existing T1/T3 service with less expensive wireless broadband service that provides the same amount of bandwidth, security, and quality of service. In Allegany County, Maryland, the local governments deployed a wireless network for internal use and currently save government organizations over \$65,000 each month.⁵

Define Leadership Strategy

After determining that the community can benefit from a wireless broadband network, it is necessary to identify the best way to move the project forward. Careful thought is required to insure that the best approach is used, proper stakeholders and opinion leaders are involved, and a strategy exists for those groups or influential individuals who may oppose the initiative.

□ Decide the Project Scope

Different communities have different needs for a wireless network. There are four common ways to define the scope for a broadband network:

- Government use only – This closed network may cover sections of a city, the entire city, or the county, but it can only be used and accessed by local government agencies.
- Hotspot/Downtown – This network is located in high-traffic areas including downtown, public parks, tourist destinations, etc. Access may be provided for free or for a fee depending on the business model chosen.
- Citywide – This network attempts to cover the entire city. Like existing cellular networks, citywide wireless broadband networks will have spots where service is not available.
- Countywide – This network attempts to cover the entire county. Countywide networks can present unique political challenges as it is necessary to build consensus among many different government agencies.

Defining the project scope helps identify which governing bodies, agencies, community groups, and other stakeholders need to be involved in the initiative.

□ Find a Project Champion

Projects of great magnitude require a catalyst who is dedicated to seeing the project succeed. This project champion is often the central difference between successful and failing projects.

□ Choose an Approach

Cities have used two approaches to execute a wireless broadband project. The first option involves forming a committee of elected or appointed government officials, business leaders, educators, and other stakeholders to define the project objective, examine the current technology options, choose a business plan, and build a funding strategy. The second option is to have city staff drive a project and report progress to the mayor, council, or other appropriate people. The following table describes the advantages and disadvantages of each approach:

<u>Approach</u>	<u>Advantages & Disadvantages</u>
<u>Committee</u>	<ul style="list-style-type: none"> • Allows various stakeholders to be involved • Leverages business & technology knowledge • Transfers project responsibility to an independent group • Relies on volunteers who may not have necessary time to dedicate to project • Introduces numerous organizations with different interests, which can increase bureaucracy and lead to project delay • Decentralizes responsibility for project • Requires open meetings in some states
<u>Staff</u>	<ul style="list-style-type: none"> • Establishes clear chain of command & consistent project manager • Limits press exposure • Offers city officials more control of process & schedule • Limits input and influence of community stakeholders • Keeps project responsibility in city structure • Minimizes opportunity for outside ideas to impact project

Both approaches have strengths and weaknesses. Regardless of which option is chosen, careful attention must be paid to the choice of committee members or project manager.

□ Build the Team without Leaving Someone Out

Regardless of the approach chosen, conducting thorough stakeholder analysis requires that time is spent considering public interest groups, community organizations, political leaders, and opinion shapers who should be involved in the project. The following is a partial list of organizations that could provide value to the deployment project:

- Development Authority
- Chamber of Commerce
- Regional Development Center
- State agency focused on technology
- Newspaper editorial board
- Rotary/Optimist/Civitan/Lions Club
- Board of Education
- Representative from community college(s) and universities
- Police and fire departments, sheriff's office
- Local companies who could serve as potential customers
- State municipal association and association of counties
- Governor's office
- Regional and state economic development centers

□ Formalize Committee and Establish Written Charter

It is difficult for a loose, unofficial group of people to accomplish much without becoming an official body. Though many projects teams start as unofficial groups, they often transition to official committees sanctioned by a governing body or group of governing bodies in order to conduct official business. The only downside is that official committee status can mean that the group may be required to follow open meetings and open records laws.

After the group is formalized into an official committee and non-voting advisory group, an organizational meeting should be held. During this meeting, the committee should agree on a written charter that includes the following:

- Scope of committee's work
- Process for selecting committee leaders
- Rules for conducting meetings (e.g. Robert's Rules of Order)

□ Secure Support from Local Governments

After the committee is established, members should approach each governing body, present the project idea, answer questions, and ask for a nonbinding resolution of support.

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Apply Technology Solutions to Community Needs

With a leadership strategy in place, cities can begin to evaluate the available technology, analyze their unique radio frequency (RF) environment, and define their requirements.

□ Evaluate Available Wireless Technology

There are currently three different wireless technology solutions on the market. The following table describes each solution:

Technology Solution	About
Wi-Fi (Wireless Fidelity)	<ul style="list-style-type: none"> • Interoperable between different vendors • Transmits signal between 50-300 feet • Each Wi-Fi access point must have backhaul to the Internet • Supports portability and limited mobility • Operates on unlicensed 2.4 GHz
Wi-Fi mesh	<ul style="list-style-type: none"> • Based on Wi-Fi standard • Transmits signal between 50-300 feet • Uses proprietary mesh technology to allow access points to communicate with each other • Mesh technology decreases the number of access points that require backhaul to the Internet, decreasing backhaul costs • Supports portability and limited mobility • Operates on unlicensed 2.4 GHz
(pre) WiMAX	<ul style="list-style-type: none"> • WiMAX certified equipment will be interoperable between different vendors (on market in late 2005) • Transmits signal between 3-12 miles depending on terrain and morphology • Supports fixed broadband and will evolve to support portability and mobility • Operates on unlicensed 5.8 GHz and licensed bands.

□ Conduct RF Study

An average city has millions of devices that transmit waves on radio frequencies (garage door openers, microwaves, portable phones, existing Wi-Fi access points, etc.). In order

to insure that a metro-scale wireless broadband network can properly operate in a community, it is necessary to conduct an RF study. RF studies include the following activities:

- Conduct spectral scans throughout the city to measure existing interference
- Conduct site surveys of representative areas where network will be deployed to determine best locations for access points
- Complete propagation modeling to estimate citywide coverage based on information about a community's unique topography and morphology

The purpose of the RF study is to prove that there is no overwhelming source of interference in a community and predict the optimal density of access points to achieve the project objective.

□ Define Requirements

In order to issue an RFP, the project leadership must define a set of requirements for the network. Requirements are based on the community's unique needs and cover issues including network equipment specifications, security, warranty and maintenance, cost, service and installation, etc.

Choose a Business Model & Funding Strategy

After defining the network requirements, many communities have difficulty analyzing potential business models and developing a viable funding strategy. It is important to realize that the business model, funding strategy, and network requirements are all irrevocably tied together.

□ Identify the Current Business Models

Although there are dozens of creative ways that communities have created and funded community networks, four models (some with hybrid approaches) have become the most mainstream options:

- Community Network
 - City deploys network and provides service
 - City or other entity encourages organic network build-out
- Public Utility
- Private Consortium
- Cooperative Wholesale™
 - City-owned
 - Non-profit owned

□ Evaluate the Models Based on the Community's Needs

In general, municipal leaders are looking for a business model that accomplishes the following:

- Reduces or eliminates the need to spend taxpayer dollars
- Promotes cooperation instead of competition with the private sector
- Provides sustainability and avoids technology obsolescence
- Lowers the price for broadband access to the end user
- Allows the private sector to operate and manage the network
- Provides a universally available and affordable broadband network
- Provides free cash flow for network upgrades and community technology initiatives

Community Network

There are at least two hybrid community network models. The first involves the city or a non-profit entity obtaining funding from taxpayer funds, foundation grants, donations from citizens and businesses, and advertising revenue from a splash page. The city or non-profit entity then builds the network and provides marketing and customer service. This model most often supports wireless hot zones or city-wide networks and is being used in Hermosa Beach, California.⁶

The second model involves a non-profit or government entity that acquires funding to educate business owners about the benefits of deploying a Wi-Fi hotspot. The city or non-profit acts as a catalyst to encourage the organic build-out of a Wi-Fi network in downtown areas. Since the city or non-profit organization is not funding the network deployment, the capital and operational costs that require city funds are substantially lower. The network, however, is not ubiquitous. This model is being used in Austin, Texas.⁷

Public Utility

The public utility model requires that a local government establish a new city department or combine with existing water, gas, and/or electric departments to deploy, operate, and manage broadband service for citizens. The broadband utility's capital cost is funded through the use of taxpayer dollars and revenue bonds. The public utility installs the network, markets the service, and provides customer support and billing. In addition, the local government may choose to provide both fixed and mobile broadband to its agencies. The City of Chaska, Minnesota, has used the public utility model to deploy a citywide Wi-Fi mesh network.⁸

Most states allow municipalities to form enterprise funds for utility projects. Unlike a general fund, which must be balanced each fiscal year, enterprise funds are able to show annual profits or losses.⁹

Private Consortium

The private consortium model involves one or many private sector provider(s) offering broadband service to end users. Funded by private investment, the provider offers access to both the city and to subscribers for a monthly fee. The provider is responsible for operating and maintaining the network and providing technical support, customer service and billing.

Cooperative Wholesale™

The Cooperative Wholesale™ model provides two options for local political leaders. The first is a city-owned model in which the city makes a 'build versus buy' decision regarding broadband service. The city builds a broadband network to provide its broadband and telecommunications needs.

Funding for the network comes from taxpayer dollars, state and federal grants, foundation grants, and/or bonds. After securing funds, the city issues an RFP for the design, deployment, and management of the network.

After the network is deployed and the city has completed in-sourcing its broadband needs, the excess capacity is split and sold to private providers (WISPs, ILECs, CLECs, MSOs, dial-up ISPs) at wholesale prices. The providers then compete for business and residential subscribers while providing marketing, technical support, customer care, and

billing. Free cash flow (or the total positive cash flow remaining after network upgrades and maintenance) generated from the wholesale fees can be used to fund a number of programs including economic development and digital divide initiatives.

While the first model meets many municipal leaders' needs, it still requires taxpayer dollars and city employees to be successful. For communities interested in deploying wireless broadband networks but adverse to spending public dollars, another approach can be used. Instead of the city funding and managing the network, the community creates a non-profit organization to accomplish the following tasks:

- Raise funding for the wireless broadband network deployment
- Outsource network design, deployment, and management to a private sector company
- Provide broadband service directly to city agencies and employees (fixed and mobile)
- Market wholesale service to WISPs, ILECs, CLECs, MSOs, and dial-up ISPs
- Develop social and/or economic development programs that are funded by free cash flow

The local government provides low cost access to light poles and other assets for the network deployment and acts as an anchor tenant for the network. With a social and/or economic development charter, the non-profit is able to secure funding for the network deployment from state and federal grants and private foundation donations. Additional monies can be obtained through bank loans, which are easier to obtain with a secure anchor tenant like a city government.

The non-profit partners with private companies to both build and manage the network, resulting in a smaller staff. The non-profit's focus is to monitor network management, develop effective social and/or economic development programs, and attract and develop relationships with retail providers.

C Identify Sources of Funding for the Chosen Model

The business model often dictates the funding strategy and next steps for the project:

<u>Model</u>	<u>Funding Strategy</u>
<u>Community Network</u>	<ol style="list-style-type: none"> Potential funding sources include: <ul style="list-style-type: none"> State and federal grants & loans Foundation grants Fundraising efforts in the community Obtain the funding and either deploy the network or educate local business owners on the advantages of deploying a Wi-Fi hotspot, depending on the hybrid model selected.
<u>Public Utility</u>	<ol style="list-style-type: none"> Potential funding sources include: <ul style="list-style-type: none"> Local government taxes (general funds) State and federal grants & loans Revenue bonds Obtain the funding and deploy the network.
<u>Private Consortium</u>	<ol style="list-style-type: none"> Potential funding sources and partners include: <ul style="list-style-type: none"> Private Investors Existing WISPs Dialup ISPs Established businesses Wholesale long-haul providers Target potential investors and partners that are familiar with technology investments and have the necessary financial ability to invest. Meet with potential investors and partners and share the project plan, financial and technological requirements, investment opportunity, projected revenue and expenses, and risk factors. Build a consortium of investors to provide different services in the value chain and support them throughout the deployment process.

Cooperative Wholesale™

1. Potential funding sources include:
 - State and Federal grants & loans
 - Private foundation grants
 - Bank loans
2. Conduct an aggregate demand study to determine how many government agencies will use the wireless network. The results can indicate how long it will take to break even on the initial capital investment.
3. Establish a timeline for deployment.
4. Identify and approach potential retailers who can purchase the excess capacity to market to businesses and residential users.
5. Fund and deploy the network.

q Identify Grant Opportunities

Depending on the Digital City applications the community chooses to use, there are a number of federal agencies that offer funding that the project could qualify for. The following is a list of some of the more popular grant programs for wireless broadband deployments:

- **Rural Utility Service (RUS)**: The U.S. Department of Agriculture's Rural Broadband Access Loan and Loan Guarantee Program made \$1.4 billion in loans and loan guarantees available in 2003 to provide broadband services in rural communities. These loans can be used to facilitate deployment of technologies to provide two-way data transmission of 200 kbps or more, in communities with populations up to 20,000.¹⁰
- **Technology Opportunities Program (TOP)**: The U.S. Department of Commerce's TOP Program gives grants to state, local and tribal governments, health care providers, schools, libraries, police departments, and community-based non-profit organizations. Projects must demonstrate how they can, through the use of technology, support lifelong learning, help public safety officials protect the public, assist in the delivery of health care and public health services, and foster communication, resource-sharing, and economic development within rural and urban communities. To date, the TOP program has awarded 583 grants, totaling \$218.9 million and leveraging \$297 million in local matching funds.¹¹

- **SAFECOM Program:** The U.S. Department of Homeland Security's SAFECOM Program provides grant funding to improve the effectiveness of public safety communications systems and to resolve interoperability issues. The program was established in 2002 to address the wireless communication needs of public safety organizations. SAFECOM serves as the umbrella program within the Federal government to help local, tribal, state and Federal public safety agencies to improve public safety response through more effective and efficient interoperable wireless communications.¹²

Q Identify Steps Local Government Can Take to Encourage Deployment

Regardless of whether the network is being funded with public or private funds, local governments can take some steps to provide assistance during deployment and in the first critical months of operation by:

- Leasing government owned tower access at lower rates in exchange for a discount on monthly service.
- Allowing the deployment team to use government resources including bucket trucks, vehicles, computers, etc.
- Subscribing to the wireless service as an anchor tenant.
- Promoting the service via public information channels, government websites, and announcements at public meetings.
- Waiving or decreasing business license fees.
- Crafting favorable tower ordinances.

The committee, at the request of the organization conducting the network deployment, can help coordinate this cooperation with local government agencies, especially if the project team has liaisons to each governing body.

Deploy Pilot Networks

After collecting requirements and choosing a business model, cities often find it useful to deploy pilot wireless broadband networks to examine how different technology solutions perform in real world environments.

□ Develop a Pilot Network Plan

Depending on the project budget and deployment strategy, pilot network deployments can occur in a number of ways:

- Before or after the RFP
- Free vs. paid pilots
- Residential area, commercial area, or mixed use area deployments
- Wi-Fi, mesh, and/or (pre) WiMAX solutions
- Free or fee access for Internet users during pilot

One of the biggest decisions in developing a pilot network plan is whether to conduct pilots before or after the RFP. Some cities have chosen to do both. Pre-RFP pilots are usually done by vendors to build goodwill with the city and insure that city officials understand how the technology works. Post-RFP pilots are often required of the vendors whose proposals are short listed. Cities require these pilots to further evaluate and test the solution in order to make a final decision. In both cases, the vendors most often donate or discount the equipment necessary for the trial.

□ Develop Relationships with Vendors

Regardless of when and how the pilots are conducted, it is necessary to have connections with equipment vendors who are interested in the community's initiative. Usually, vendors will reach out to cities after a public announcement about a wireless broadband initiative is made. It is important to learn about different technology solutions to maximize the available options for the network. However, the technical complexity can be challenging for government officials and they may wish to engage a consultant who is familiar with the technology but neutral and objective about different solutions and companies.

□ Think Through Pilot Deployment Logistics

Depending on how involved the city wants to be in the pilot deployments, they can provide project management services and leverage their community relationships to speed up the process. Here are some issues that cities can assist with during the pilot deployment process:

- Backhaul to the Internet, which can often take between 45-60 days to provision
- Access to rooftops for (pre) WiMAX backhaul for Wi-Fi or mesh networks

- Access to street lights, traffic lights, or power lines for Wi-Fi or mesh node installation
- Access to city-owned bucket trucks and other heavy equipment for installation
- Development of a splash page with local content and required legal language

Q Develop a Process to "Stress Test" Pilot Networks

In order to fairly compare different solutions, cities should develop a test suite for pilot networks to understand how the networks will perform under normal circumstances, how they scale, how much capacity they can tolerate before service levels substantially drop, and how one network compares with competing solutions. Since wireless broadband is still an emerging technology, building the appropriate test suite can be complex and highly technical. The test suite should include the following tools and information:

- Network use profiles
- Predicted schedule of network use
- Ability to execute use profiles on a regular schedule during the test period
- Ability to test throughput speeds while user profiles are occurring
- Ability to monitor network up-time and other reliability measurements

Through this process, cities are able to evaluate different technology solutions with the same information and process, thereby adding great legitimacy to the test results.

Enhance the Value of the Network

A wireless broadband network is only as valuable as the information and applications that it enables. Throughout the deployment process, leaders should focus on the Digital City applications that will provide better government services in the areas of public safety, transportation, education, healthcare, e-government, and public works.

C Conduct a Formal Assessment of Technology Use in Local Governments

An assessment should be conducted to understand how the community governments currently use technology to provide services to the public and to recommend new applications. The government's technology plan and/or strategy should be reviewed to make sure that it includes wireless broadband and mobile Internet access for citizens, businesses, and government employees in the appropriate timeframe. It may be necessary to update the plan to include the community wireless network.

The assessment should also include interviews with government department heads and other community leaders about what needs currently exist within each government department. The committee and local governing bodies can then focus on finding technology solutions to address those challenges.

C Prioritize Digital City Applications Based on Community Needs

<u>Government Responsibilities</u>	<u>Digital City Solutions</u>	
<u>Public Safety</u>	<u>Police</u> <ul style="list-style-type: none"> • Mobile broadband access in police cars to allow real-time intelligence sharing and remote access to records. • In-car video to allow real-time streaming back to police station. • Remote controlled cameras placed in high crime areas. • Use Voice Over IP (Internet Protocol) to replace costly cell phone/push to talk services. • Easily set up a mobile command station with wireless connectivity during emergencies. 	<u>Fire</u> <ul style="list-style-type: none"> • RFID technology to track firefighters in burning buildings. • Mobile, high throughput broadband to download GIS, building maps in route to emergency calls. • Computer Aided Dispatch to coordinate proper and timely emergency unit response.

<u>Education</u>	<ul style="list-style-type: none"> • Create anytime, anywhere learning environments in schools and throughout the community. • Track buses and install streaming video cameras in buses to monitor safety and student behavior. • Use wireless network to provide inexpensive backhaul to schools.
<u>Healthcare</u>	<ul style="list-style-type: none"> • High bandwidth allows telemedicine programs for rural communities who need specialists. • Wireless cameras in ambulances so ER doctors can monitor patient in transit to hospital. • Mobile access allows nurses and EMTs to enter vital information into networked patient database in real-time. • Replace expensive T1 broadband service.
<u>Intelligent Transportation</u>	<ul style="list-style-type: none"> • Provide mobile connectivity to buses and trains. • Monitor buses during the day and wirelessly share real-time schedules over wireless network. • Install wireless remote controlled cameras at high traffic intersections for monitoring and information sharing. • Wirelessly control stop lights and other traffic controls during emergencies or evacuations.
<u>E-Government</u>	<ul style="list-style-type: none"> • Provide online bill pay for citizens • Increase transparency of government by allowing anytime, anywhere access to government meeting agendas, minutes, studies, and city/county government information. • Allow local government workers to use mobile technology in the field.
<u>Public Works</u>	<ul style="list-style-type: none"> • Install wireless meter reader technology that saves time and increases accuracy. • Wirelessly monitor water and sewer plants and major pipeline infrastructure.

The above list is not exhaustive, but rather serves as a sample of Digital City applications that can be used in a wireless community.

q Implement the Digital City Solutions

After deciding which solutions best suit the community, work with corporate partners to find the appropriate vendors and begin implementing the solutions. As community leaders evaluate which Digital City solutions to adopt, engage neighboring cities and counties to develop a regional technology strategy. Work with multiple governments to adopt solutions that are interoperable across jurisdictional lines. As new solutions are introduced, develop a training program for employees and citizens who will use the products to insure that the technology is fully leveraged.

Summary

Today, wireless broadband technology provides many communities with high-speed Internet access at affordable prices. Wireless broadband networks can then be used by city leaders as a component to bridge the Digital Divide and strengthen economic development.

Wireless broadband also enables Digital City applications that provide more efficient government services, safer communities, and anytime, anywhere access to the Internet. In the next three to five years, wireless broadband will allow users mobile access to the Internet, changing the way society accesses information and allowing government to leverage the network in new ways.

For these reasons, cities across America have worked to deploy wireless broadband networks and have established best practices and lessons learned for other communities seeking to deploy such technology:

- Assess the community's need for wireless broadband and the existing political and regulatory landscape
- Define a leadership strategy that meets the city's needs and allows for community stakeholders to be involved
- Apply technology to community needs
- Select a business model and funding strategy
- Deploy pilot networks
- Maximize the network's value by implementing Digital City applications that provide solutions for the community's government agencies

As a municipality or county begins this exciting, challenging project, Civitium can assist with the pre-deployment planning process and provide partnerships that link communities with some of the largest, most successful technology firms in the world. Through proper planning and passionate leadership, efforts to deploy a wireless network and enable Digital City applications will make your community the place where businesses and citizens will always want to do business and call home.

Endnotes

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