Item No. SS 2(c)
October 16, 2006

CITY COUNCIL STUDY SESSION ITEM

SUBJECT:
Discuss Municipal Wireless Proof of Concept Pilot Project

STAFF CONTACT:
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POLICY ISSUES:
Should the City implement a pilot Wi-Fi network downtown in order to evaluate the costs and benefits for City services as well as the economic benefits for small and mid-sized business?

FISCAL IMPACT:
The equipment required for the municipal wireless proof of concept project will be provided by Cisco Systems, at no charge for a 180 day demonstration period. At the end of the 180 days the City has the option to:

1. purchase the equipment for the wireless access points for $101,529;
2. lease the equipment for 3-5 years with a $1 purchase option at the end of the lease. Lease costs would vary between $25,000 to $35,000 per year, depending on actual equipment leased and the length of the lease, or;
3. return the equipment with no additional obligations.

The City will incur $17,000 in costs to install the wireless equipment so that is works and is compatible with the City's existing network in our data center, which will lay the foundation for later implementation of wireless access within City Hall. Additionally, the City will incur approximately $40,000 in costs to deploy and install the wireless equipment on street lights and signal poles in the central business district. The fiber being pulled to these locations would serve long-term transportation system needs, such as video camera traffic monitoring.

While the costs to implement this pilot were not anticipated in the 2005-2006 budget, sufficient funding exists in the Information Technology Fund to pay these expenses. Any future expenditures related to this program, including the purchase or lease of the equipment, and ongoing maintenance estimated at $9,000 annually is contingent on Council's approval of the Municipal Wireless Mesh Network project being proposed for the 2007-2013 Capital Investment Program.

DIRECTION NEEDED FROM COUNCIL:
___ Action
_X_ Discussion
_X_ Information

BACKGROUND/ANALYSIS:
Resolution No. 5591 articulates a City Council goal of creating a "Smart City", with state-of-the-art communications and technology, to better position Bellevue to compete in the global economy.

The City of Bellevue Information Technology Department has been evaluating options for municipal wireless (Wi-Fi) deployment for a number of years, as the technology and various deployment options matured in the market place:

- In September, 2004, the Downtown Bellevue design charrette called for the creation of a "communications core" along the pedestrian corridor that includes wireless Internet access, reader boards and other high-tech features.

- In October 2004, the City completed a Telecommunications Study and Municipal Network Business Plan that recommended the development of wireless "hot spots" as an initial step towards a potential city-wide wireless network.

- In April 2005, the City completed a Wireless Assessment & Cost Estimates to study the feasibility of a potential wireless "hot zone" in the CBD.

- In March 2006, the City completed a wireless site survey and engineering study that developed a criteria for City Hall, all four Bellevue Community Centers (interior and exterior), expanded coverage in the nine Bellevue fire stations, and a proof of concept "hot zone".

- On May 1, 2006 the Bellevue Downtown Association (BDA) presented "Great Place Initiative" to Council. The BDA "Great Place Initiative" identified Wi-Fi Internet access along the pedestrian / communications corridor as priority for the realization of Bellevue's Downtown Implementation Plan.

Municipal Wireless Proof of Concept Pilot – Goals and Objectives

GOALS:

Determine feasibility of owning and operating a municipal wireless network that provides:

- Seamless, high-speed, wireless Internet access
- Enhances public safety
- Increases operational efficiency and public service delivery across many departments
- Provides remote and mobile wireless Internet access to residents, business and visitors
- Serves as an economic development tool for the City of Bellevue.

OBJECTIVES:

1. Determine the practicality and true costs of the city owning and operating a municipal network that includes leasing bandwidth to private sector providers for public service delivery.

2. Develop and evaluate actual service delivery enhancements and operational improvements.

3. Assess the desirability of this type of open network to private sector service providers.

4. Evaluate the public reaction to various business models offered by the private sector.

The "Hot Zone" Pilot

The "Hot Zone" Pilot in the central business district (CBD) will wirelessly extend the City's existing network. The "Hot Zone" would cover approximately 1.5 acres in the CBD along the pedestrian / communications corridor from City Hall and Meydenbauer Center to the downtown park and Bellevue Square area. A map showing the CBD "hot zone" coverage area is shown in Attachment A.

This is an area large enough for the City to gauge the effectiveness of the technology in a challenging urban landscape. Because of the buildings and geography the area is difficult for

mobile services to be effectively delivered. It will allow us to get an understanding of what it takes to manage a wide area wireless network. It provides a good potential market for commercial wireless Internet service providers (WISP) who would provide service to customers on the network. It matches the policy recommendations in the downtown implementation plan and responds to project requests of the BDA.

If approved, we intend to operate the "Hot Zone" Pilot using a "municipal services" model, with the primary purpose to enhance public safety and increase operational efficiency and service delivery across many departments. It is intended that the network will operate at a level of coverage, speed, security and reliability sufficient to support public safety access to a variety of their existing applications and public services.

In addition to addressing significant operational needs across the organization, a city-wide wireless network (Wi-Fi) can provide remote and mobile wireless Internet access to residents, businesses and visitors and serve as a significant economic development tool for the City of Bellevue. We intend to lease bandwidth to one or more commercial WISPs. HarborLink out of Dayton, Ohio is the first WISP that has agreed to sign on to the potential network, subject to approval of a right-of-use agreement by Council. HarborLink's business model is to provide free access that is advertising supported - users get free Internet access with the insertion of advertising at points that do not interrupt the user's session. HarborLink has agreed to pay 10% of its gross revenue as a right-of-use fee. This commercial use would be securely segregated from the primary municipal services / public safety use of the network

The pilot is expected to last for a period of six months. Cisco Systems is partnering with the City to provide the necessary equipment, at no charge, for a 180-day demonstration period. This is an opportunity to test-drive evolving technology in our environment.

During the 6 month test period, ITD will survey users and monitor use, will work with departments to assess operational benefits and impacts, and evaluate true costs and benefits. ITD will return to Council near the end of the 180-day demonstration period with an update and report on the outcomes of the Municipal Wireless Pilot.

ATTACHMENTS:
Attachment A - Municipal Wireless Proof of Concept Area
Attachment B - Municipal Wireless Whitepaper

AVAILABLE IN COUNCIL OFFICE FOR REVIEW:
N/A

The Municipal Wireless Proof of Concept Area “HotZone” includes, at a minimum, the "pedestrian corridor" area (including the Downtown Park) between 112th Ave. NE on the east, 100th Ave. NE on the west, NE 4th St. on the south and NE 8th St on the north.

Why Municipal Wireless?

- **Workforce Mobility** - Mobility is becoming a key requirement in the delivery of efficient City services because much of the work we do is outside of our wired facilities. Today, when the City of Bellevue dispatches inspectors, technicians and field crews, these employees disconnect themselves from the network that supports their job function, often requiring that they return to the office and reconnect to the network to complete many job tasks started in the field. This results in a loss of productivity and efficiency.

  Public Safety Applications - Police vehicles currently have wireless dispatch and automatic vehicle location capability, with field reporting to be added soon. However, the low-bandwidth cellular coverage that enables this wireless connectivity limits the amount of data and transactions that Officers get. The higher bandwidth that a municipal wireless network provides allows faster access to richer (and therefore larger) files, such as maps, photos and videos. For example, Bellevue police would be able to do real-time video surveillance without the need to set up recording equipment or periodically change tapes in the field as they do now. The municipal wireless pilot will afford an opportunity to examine potential advantages and productivity gains from having a select group of police vehicles continuously connected to a high speed network while in the downtown area.

  Fire seeks to implement a project to provide an Integrated Mapping component to the Computer Assisted Dispatch (CAD) information for all Fire, EMS and police incidents, in the form of a visual map display of the incident address and the streets and roadways. Updating these maps and drawings would be much faster on a municipal network. Also, the ability to access standard operating procedures and other documents needed for incident command would be feasible.

- **Transportation Applications** - The City currently operates an extensive network of traffic signals and video cameras as part of our traffic control system. This system is due for replacement in 2010 and a wireless network presents potential for a significantly lower cost alternative for replacement of the existing system and for expansion of the current system into areas of the City where it is too costly to reach.

  The City's Intelligent Transportation System Plan calls for 70 video cameras at full build-out. Currently there are about 40 cameras in place. A municipal wireless network presents a significantly lower cost alternative for full implementation of the Intelligent Transportation System Plan than building additional fiber optic cable for many of these locations.

  Field inspection staff currently have no access to the City's network while in the field. The municipal wireless pilot will afford an opportunity to test the advantages and potential savings from field staff receiving updates of maps, drawings, and plans in the field when needed.

- **Utilities Applications** – Over the last four years the City of Bellevue Utilities Department has replaced approximately 5,000 meters (12% of the total residential meters) and has been ramping up to attain a goal of a 20-year replacement cycle. Over time as Utilities transitions the older meters to meters that are enabled for automated meter reading, a Wi-Fi network will allow these meters to be monitored and read from a central location rather then through field activity.

  A municipal wireless network would allow enhanced monitoring and telemetry for the City's water and sewer system including video monitoring of critical drinking water

facilities, wireless telemetry of sewer flush stations, monitoring and control of sewer pump stations and water valves.

Utilities crews and field inspection staff currently have no access to the City's network while in the field. A municipal wireless network will allow field staff and crews to receive updates of maps, drawings, plans and work orders when needed in the field.

- **Public Access and Revenue Development** - The city-wide wireless network will provide capacity to one or more commercial Internet Service Providers (ISP) that will provide Internet access to residents and businesses. Leasing capacity and carriage to commercial ISP providers can develop revenue stream(s) to support deployment, operation and management of the city-wide municipal wireless network.

- **Economic Development** - Many municipalities have implemented city-wide municipal wireless as an economic development tool. Economic Development initiatives promoting municipal wireless can result in increased business activities for cafes, bookstores, restaurants, and technology companies. Deployment of municipal wireless can encourage promotion of technology at the local level and demonstrate that local government is keeping up with the advances in technology to keep pace with a technologically savvy population.

In February 2006, Government Technology magazine conducted a survey of subscribers and determined that the following uses are most likely to deliver the greatest public value through an outdoor wireless network and mobile workforce:

- Police, Fire and Emergency Response Reporting 60%
- Messaging and Communication Infrastructure 46%
- Video Surveillance 28%
- Automated Meter Reading (Gas, water, parking, and electric meters) 26%
- Citizen and Volunteer Coordination for Disaster Preparedness 26%
- Traffic Management and Control 26%
- Land Management (Licensing, permitting, inspections) 25%
- Tourism 19%
- Social Services Mobile Case Management 19%
- Parking Enforcement 15%
- Asset Management 15%
- Port Security 10%

THE GROWTH OF MUNICIPAL WIRELESS

It is currently estimated that there are over 300 municipal wireless systems either currently deployed or in the planning stages in the United States.

The February 2006, Government Technology survey found significant local government interest in deploying wireless and mobile technologies:

- 52% of localities are either actively involved or evaluating solutions for the future
- Only 18% do not have future deployments on their immediate radar
- 38% of localities are currently evaluating the opportunities wireless has to offer
- 20% are live and have deployed
- 16% are intending to run pilots in the next 6-12 months
- Only 8% of localities have no intention to use wireless as part of their local government strategy.

Locally, there are a number of communities that are much further ahead of Bellevue in developing and deploying municipal wireless networks and wireless service delivery applications. These include:

The City of Renton has deployed a municipal wireless network the covers approximately 85% of the city. The network was developed to address two critical business problems: vehicle patrol officers couldn't access information they needed at critical times, and officers were spending far too much time in the stations rather than spending time in the community. The problems stemmed from the department's low-speed public safety communications network. The Renton wireless network now provides:

- Online access to the police records management system
- Online crime bulletins to keep officers fully apprised on major crime incidents
- Online significant incident logs replace handwritten postings in the police briefing room.
- Internet access to secure FBI and Washington State patrol Web sites
- Online timecard reporting
- Firefighters have on-scene access to their incident records system
- Renton Parks can control or troubleshoot park irrigation systems in the field

The City of Everett has deployed a public safety wireless network system to extend access to mug shots, critical incident checklists, and the department's records management system to officers in the field in real time, enhancing their ability to identify and apprehend suspects. Everett estimates the average police officer spends about four hours per 12-hour shift in a police station and since most of those four hours per shift at the police station are spent writing reports, Everett expects the public safety wireless network system could feasibly add a large number of hours to officers time on patrol.

The City of Federal Way is running a municipal wireless pilot project in the downtown business corridor and surrounding area to provide public safety officers access to the City network and other technology capabilities at lower costs and higher bandwidth than current cellular data services and to determine the feasibility of providing subscription-based wireless broadband internet service to the public.

The City of Spokane has deployed a high-speed broadband wireless network that is available in a 100-block area in the downtown core. The municipal wireless network is divided into a private network for use by the city and an open network for the public that users can connect to for two hours a day at no charge.

The City of Seattle is providing free wireless Internet access in the Columbia City and the University District business districts. The City's Wi-Fi pilot project also includes four downtown Seattle parks and the City Hall lobby area. The goals of the City's Wi-Fi pilot project are to attract more customers to local business districts, support small businesses, encourage the use of public parks and facilities, and enable more citizens to access City services online.

The City of Kirkland has deployed a taxpayer-funded pilot project for free wireless in public spaces, primarily in key parks (Peter Kirk and Marina Parks) and within the core of their downtown. The wireless pilot project is intended to evaluate user demand, associated costs to support public wireless and provide a benchmark to analyze potential future expansion.