



Esme Vos

## Second Anniversary Report

### July 2005

#### Introduction

I never thought I would make it to Year 2 but here I am still publishing reports on municipal wireless deployments around the world. This is my Second Anniversary Report and there's good reason to celebrate. When I published my First Anniversary Report, I had 466 subscribers to my weekly newsletter. Today I have 2,168. Municipal wireless has become a hot topic among municipal governments and the general public.

This report summarizes developments in municipal wireless broadband between March 2005 and August 2005, and provides a peek into what we can expect in the coming months. If you read my March 2005 Report, you will see that I have updated the list of regional and city networks in the Tables.

In this Report, there are 84 city and regional wireless broadband networks that provide public access: 34 are in the US and 50 are outside the US.

There are also 33 citywide networks used for municipal purposes: 29 are in the US and 4 outside the US.

There are 19 city hotzones in the US and 15 outside the US.

There were 35 planned projects (public access and public safety), some of which are very large scale countywide networks) in the US and 3 outside the US.

---

## **Contents**

- 1. Muniwireless 2005 Conference (September 28-29)**
- 2. More cities and counties issue RFPs**
- 3. Pending bills in US Congress**
- 4. EU opens 5GHz frequencies for unlicensed use**
- 5. Muniwireless.com statistics**
- 6. City statistics**
- 7. Muniwireless tables**
- 8. Sponsors**

### 1. Muniwireless 2005 Conference (Sept 28-29)

I am holding my first conference in San Francisco on September 28-29 to celebrate the second anniversary of Muniwireless.com. After two years, I realized that I had created an online meeting place for many wonderful people, not all of whom always agree, but who are nevertheless passionate about bringing citywide wireless broadband to their communities. I felt it was time for all of us to meet in person.

I have organized two intensive seminars on September 28: one on applications and ROI, the other on setting up county- and city-wide Wi-Fi networks. And on September 29, there are panels on how to defeat anti-municipal bills, WiMax's promise, setting up open-source community networks, the role of telcos and ISPs, and much more. I have chosen speakers who are really in the thick of things: opposing anti-municipal legislation, creating community Wi-Fi networks and helping cities plan their networks.

More than anything else, this is our opportunity to share (and challenge) ideas in a fun atmosphere.

If you want to attend, please visit the Muniwireless Conference website at: <http://muniwireless.microcast.biz>

### 2. More cities and counties issue RFPs

I thought this was going to be a quiet summer. Instead it's raining RFPs. Never in the past two years have I seen so many of RFPs in such a short period of time: five RFPs just in the third week of July 2005!

The trend is towards more RFPs from larger entities such as counties. So far counties in Michigan are leading the race, but others will catch up. In addition, it's not just Philadelphia that has plans to deploy citywide Wi-Fi. Minneapolis is about to choose a vendor and Portland will issue an RFP in August.

### 3. Pending bills in the US Congress

The battle over municipal broadband - wired and wireless - has moved from the statehouse to the US Congress. Congressman Pete Sessions from Dallas, Texas has proposed a broad prohibition on municipal broadband, while Senators McCain and Lautenberg have countered with a pro-municipal bill. Senator John Ensign also introduced a bill that is a rewrite of the Telecommunications Act of 1996. The Ensign bill does not prohibit municipalities from delivering telecommunications services, but it does place restrictions that would increase the cost of these deployments and give incumbents another powerful tool to block these alternative networks.

Municipal broadband, wired and wireless, has become a hot topic in the US. The most recent statistics (not the self-serving ones from the FCC) show that the US is falling farther behind Asia and Europe in broadband penetration. Moreover, prices in Asia and Europe continue to drop as their connection speeds increase. Many Americans are alarmed at the growing "digital divide" and consider municipalities to be the only way to get around the cable/DSL duopoly that keeps prices artificially high and stands in the way of faster broadband deployment.

## **4. EU opens up 5GHz frequencies for unlicensed use**

We could always use more frequencies for unlicensed use and it appears that the EU has granted our wish. They opened up 5 Ghz frequencies (5159-5350 MHz and 5470-5725 MHz) to unlicensed indoor and outdoor use. Member states are required to implement the decision in their national regulations no later than 31 October 2005. The decision is part of the i2010 Initiative whose goal is to speed up the development of a digital economy in Europe. Of course we would like more unlicensed spectrum in the lower frequency bands such as 700 MHz, but this is a move in the right direction. The EU has realized that opening up spectrum for unlicensed use (which is what drove the adoption of Wi-Fi) allows people to deploy alternative networks -- a way to get around the companies who own walled gardens of licensed spectrum -- and experiment.

## **5. Muniwireless.com statistics**

### **Website visitors**

The site has been getting an average of 320 visitors per day since May 2005. Sometimes I get more than 500 visitors and at times more than 800 (when I get Slashdotted or mentioned in the Wall Street Journal).

### **Weekly newsletter subscriber statistics**

As of 26 June 2004, I had 466 subscribers. As of 27 July 2005 there are 2168 subscribers.

## **6. City statistics**

Based on the tables, I counted the number of citywide networks and hotzones in the US and abroad, as well as the number of networks used exclusively for municipal/public safety purposes.<sup>1</sup> If I have left out your municipality or if there are inaccuracies in the tables, please let me know.

| <b>Public access</b> | <b>US</b> | <b>Non-US</b> |
|----------------------|-----------|---------------|
| Region- and citywide | 34        | 50            |
| City hotzones        | 19        | 15            |
| Planned deployments  | 35        | 3             |
| TOTAL                | 88        | 68            |

| <b>Municipal and public safety</b> | <b>US</b> | <b>Non-US</b> |
|------------------------------------|-----------|---------------|
| Deployed                           | 29        | 4             |

---

<sup>1</sup> Municipal includes port networks

**US regions and cities**

| Region and citywide networks     | City hotzones    |
|----------------------------------|------------------|
| Allegany County MD               | Washington DC    |
| Western Kansas                   | Spokane WA       |
| San Diego Indian tribal villages | Vancouver WA     |
| Southeast Washington state       | Baton Rouge LA   |
| Chaska MN                        | Milwaukee MN     |
| Cerritos CA                      | Fullerton CA     |
| Lompoc CA                        | San Francisco CA |
| Hermosa Beach CA                 | Culver City CA   |
| Grand Haven MI                   | Encinitas CA     |
| Buffalo MN                       | Los Angeles CA   |
| Rio Rancho NM                    | Nantucket MA     |
| Nevada MS                        | Lexington KY     |
| Vivian LA                        | Dayton OH        |
| Linden TX                        | San Antonio TX   |
| Stevenson WA                     | Santa Barbara CA |
| Benton County WA                 | Glen Cove NY     |
| Scottsburg IN                    | Burbank CA       |
| Marion IN                        | Marshalltown IA  |
| Owensboro KY                     | Alexandria VA    |
| Pasco WA                         |                  |
| Sun Prairie WI                   |                  |
| Waupaca WI                       |                  |
| Jackson WI                       |                  |
| Gladstone MI                     |                  |
| Adel GA                          |                  |
| Island Pond VT                   |                  |
| Dublin OH                        |                  |
| St. Cloud FL                     |                  |
| Granbury TX                      |                  |
| Cupertino CA                     |                  |
| Moorhead MN                      |                  |
| Addison TX                       |                  |
| Brandon VT                       |                  |
| Monticello FL                    |                  |

**US regions and cities**

| Public safety and municipal use | Planned projects                     |
|---------------------------------|--------------------------------------|
| Montpelier, VT                  | Philadelphia PA                      |
| San Diego County CA             | Kutztown PA                          |
| San Mateo CA                    | Cleveland OH                         |
| Milpitas CA                     | Tempe AZ                             |
| Pleasanton CA                   | Pepperell MA (preliminary plans)     |
| Ripon CA                        | Brookline MA (feasibility study)     |
| Fresno CA                       | Muskegon MI                          |
| North Miami Beach FL            | Marquette MI                         |
| Sarasota County FL              | Ottawa County MI                     |
| New Orleans LA                  | Oakland County MI                    |
| Washington LA                   | Washtenaw County MI                  |
| Medford OR                      | Grand Rapids MI                      |
| Aurora CO                       | Traverse City MI                     |
| York County PA                  | Minneapolis MN                       |
| Garland TX                      | Buffalo NY                           |
| Corpus Christi TX               | Dunedin FL                           |
| Granbury TX                     | Miami Beach FL                       |
| Colleyville TX                  | Orlando FL                           |
| Buffalo MN                      | West Hollywood CA                    |
| Lewis & Clark County MO         | San Francisco CA (feasibility study) |
| Cocoa Beach FL                  | Racine County WI (feasibility study) |
| Las Vegas NV                    | Madison WI                           |
| Oklahoma City OK                | South Bend IN                        |
| Marquette WI                    | Portland OR                          |
| Jamestown NY                    | Columbia SC                          |
| Rio Rico, AZ                    | Charleston SC                        |
| Seattle WA (port)               | Marshfield-Plainfield VT             |
| Lincoln NE                      | Grand Isle VT                        |
| Sarasota County FL              | Westmore VT                          |
|                                 | Greensboro VT                        |
|                                 | -----                                |
|                                 | Cook County, IL (public safety)      |
|                                 | New York, NY (public safety)         |
|                                 | Denver CO (municipal use)            |
|                                 | Alpharetta GA (municipal use)        |
|                                 | Washington County OR (public safety) |

**Non-US regions and cities**

| Region and citywide   | City hotzones           |
|---|-------------------------|
| Vercors National Park, France                                   | Aberdeen, Scotland      |
| Lauris, France  | Auckland, New Zealand   |
| Ontario, Canada   | Wellington, New Zealand |
| Fredericton, Canada   | Ottawa, Canada          |
| Götland, Sweden   | Jerusalem, Israel       |
| Mäntsälä region, Finland  | Lisbon, Portugal        |
| Vantaa, Finland   | Hamburg, Germany        |
| Porvoo, Finland   | San Sebastian, Spain    |
| Rauma, Finland  | Lausanne, Switzerland   |
| Kotka, Finland  | Fulham (London), UK     |
| Hamina, Finland   | Preston, UK             |
| Vaasa, Finland  | Bristol, UK             |
| Bergen, Germany   | Liverpool, UK           |
| Cebu City, Philippines  | Islington (London), UK  |
| Drymen, Scotland  | Perth, Australia        |
| Cassà de la Selva, Spain<br>(plus 22 other towns in the region) |                         |
| Córdoba, Spain  |                         |
| Kent County, UK   |                         |
| Kingsclere, UK  |                         |
| Basingstoke, UK   |                         |
| Newmarket, UK   |                         |
| Langstoft, UK   |                         |
| Sheringham, UK  |                         |
| Patel Bridge & Glasshouses, UK                                  |                         |
| Garboldisham, UK  |                         |
| Dundrum, UK   |                         |
| Bridge, Canterbury, UK  |                         |
| Withernsea, UK  |                         |

| Public safety and municipal use | Planned projects |
|---------------------------------|------------------|
| Portsmouth, UK (transport)      | Taipei, Taiwan   |
| Amsterdam, Netherlands (port)   | Brighton, UK     |
| Hamina, Finland (port)          | Canterbury, UK   |
| Turku, Finland (port)           |                  |

## **7. Muniwireless tables**

The Muniwireless tables contain a list of regional and city wireless broadband networks. I selected regional and city networks that use license-exempt frequencies and are based on 802.11b/g (although a few use licensed frequency such as 3.5 GHz in addition to unlicensed).

The tables are divided into five categories:

- Regional (i.e. countywide) networks for public access, public safety and municipal use
- Citywide networks for public access
- Citywide networks for public safety and municipal use (police, transport, utilities, etc.)
- City hotzones (coverage less than citywide, e.g. downtown areas)
- Ports
- Planned projects

For each network I provide the name of the city or county, the type of network, the identity of the owner, the vendor or type of equipment, costs and business model. Because of time constraints I have not been able to get all of the information relating to each city project.

*Name of county/region or city*

I have included the population of the city or county, in addition to the area in square miles and square kilometers, to give you an idea of the place in which the network is deployed (rural versus urban). This is an important factor to consider when choosing the type of technology or equipment to be used in a network. I have tried where possible to describe the size of the hotzone.

*Type of network*

The type of network column identifies how the network is used and who can use it. *Public* means access is available to the public either for a fee or free of charge. *Municipal* means that the network is used for municipal employees, public utilities, public transport, etc. Unless *public* or *public access* is mentioned, the network is not open to the general public for access (whether free or paid). Where the network is solely for the use of public safety employees such as police, it is stated as such.

*Vendor*

This column lists the name of vendor whose equipment, software or services is used in the network. In some cases, only the type of technology is mentioned because I have been unable to find out the name of the vendor. In some projects there are several vendors but I mention only the ones known to me.

*Cost*

This column shows how much it cost the owner to deploy and run the network. I have tried as much as possible to get a breakdown of costs according to equipment, services, maintenance, and backhaul. However, this information is often difficult to obtain because private enterprises are reluctant to share their most intimate details. In some instances I say *uses city's fiber network* so that you get a rough idea of the backhaul costs.

## Tables - Muniwireless.com Report, July 2005

---

### *Business model*

This column shows how the network owner or operator plans make money or recoup its investment. Some charge for access, others save on telecommunications costs. Other network owners simply want to give away access for a variety of reasons. Municipalities want to use these networks for internal operations to save money (on telecommunications and personnel costs), to improve service and become more efficient. The municipality's "business model" would be the resulting return on investment.

### *Use (public safety and municipal use networks)*

This column shows how a municipality with a wireless broadband network that is not open for public access, uses or plans to use its network. In most cases, the network is used by the police department. But in other instances, municipalities use their networks for remote monitoring of public utility facilities, public works, building inspection, health and human services.

### *Note*

Because this is a cumulative listing, one or more of the city networks may no longer be available. **Please send me the correct information so that I can update the tables and post the correct version on the website. If I missed a network in your city, let me know.**

### Regional networks

| Region   | Type of network        | Owner  | Vendor   | Cost                                   | Business model  |
|--|------------------------|--|--|--|---|
| Allegany County, MD<br>Pop. 60,000<br>103 sq mi<br>(267 sq km)       | Public                 | AllCoNet2 (county carrier composed of 4 public sector partners: Allegany County, City of Cumberland, Allegany Board of Education, Allegany County Public Library System) | Alvarion   | \$4.9 million (estimated)              | Grant access to local ISPs; uses 6 GHz bands and unlicensed spectrum  |
| Western Kansas<br>11 counties  | Public                 | Wheatland Electric (electricity cooperative)   | Alvarion   |  | \$37 per month 512 Kbps to \$87 per month 1 Mbps; 16,000 households as electricity customers, 2000 wireless broadband customers in first 30 months; sign-up rate: 35% per town; competes with DSL and cable |
| San Diego County<br>Pop. 2.9 million<br>4200 sq mi<br>(10,878 sq km) | Police<br>600 vehicles | County   | Alvarion;<br>40-50 base stations, 70 access points |  | Gain two man hours per day in productivity  |
| Benton County, Washington<br>Pop. 142,000<br>40 sq mi<br>(103 sq km) | Public                 | Maverick Wireless (ISP)  |  | Gets fiber backhaul from local utility | Monthly fees: \$19.95 (128 kbps), \$34.95 (512 kbps), and \$49.95 (1 Mbps)  |

## Tables - Muniwireless.com report, July 2005

---

| Region  | Type of network  | Owner   | Vendor   | Cost  | Business model   |
|---|--|---|--|---|--|
| York County, Pennsylvania<br>Pop. 389,000<br>904 sq mi<br>(2341 sq km)    | Schools and local government   | County  | Alvarion<br>5GHz equipment   | \$400,000 in phase 1  | Saves \$200,000 in annual communications costs; replaces T1 network  |
| San Diego County Indian tribal villages<br>12,000 sq mi<br>(31,000 sq km) | Public: 18 tribal communities  | Southern California Tribal Chairmen's Association | 200 mi (322 km) of point-to-point and point-to-multipoint links; 45 Mbps Internet connection from USAC | \$5 million grant from Hewlett Packard                      | Provides access to tribal offices and schools; CPE is still high (\$300-\$500 but \$100-\$150 if purchased from BARWN) and not affordable for most households; may deliver ISP services to general public where their wireless signal can be picked up |
| Vercors National Park, southeastern France (near Grenoble)                | Public: 50 sq km indoor coverage including the towns of Saint Martin and La Chapelle; expanding to 62 villages within next 6 months) | Region  | Alvarion   | €71,921 for the St. Martin/ La Chapelle phase               | Monthly charges €25 for 256 kbps, €39 for 512 kbps, €49 for 768 kbps; clients need to put antennas on houses; 80 customers signed up   |
| Córdoba, Spain (11 towns)<br>Pop. 100,000<br>423 sq. mi<br>(1097 sq km)   | Public   | Mancomunidad de Municipios Campiña Sur de Córdoba |  |   |  |
| Houston County, Georgia<br>Pop. 120,000<br>377 sq mi<br>(976 sq km)       | Public: testing phase  | County  | Alvarion   | \$702,000 first year costs, \$340,500 recurring annual cost | Cooperative wholesale: allow ISPs to use network to deliver broadband services   |

## Tables - Muniwireless.com report, July 2005

---

| Region  | Type of network   | Owner   | Vendor  | Cost  | Business model   |
|---|---|---|---|---|--|
| <p>Southeast Washington State<br/>3700 sq mi<br/>(9583 sq km)</p>   | <p>Public Access in Walla Walla, Columbia &amp; Umatilla counties</p> | <p>Columbia Rural Electric (nonprofit coop)</p>                 | <p>Vivato; One Eight (ISP)</p>  |   | <p>Charges for access, remote monitoring and control apps for farmers; monthly fees \$40 for 256 kbps, \$260 for 1.5 Mbps</p>  |
| <p>Ontario, Canada<br/>(Nippising, Parry Sound, Sudbury)<br/>Pop. 117,000<br/>19,300 sq mi<br/>(50,000 sq km)</p> | <p>Public access for 121 rural communities</p>                        | <p>Blue Sky Net (nonprofit community network) and W3 Connex</p> | <p>Alvarion; W3 Connex (operator and partner); mmWave (design and deployment)</p> | <p>CDN\$2 million (\$1 million for equipment Alvarion 5GHz Breeze-AccessVL)</p> | <p>Funds from federal Broadband for Rural &amp; Northern Development; W3 Connex provides 2/3 CAPEX; will charge for access</p> |
| <p>Kent County, UK<br/>Pop. 500,000<br/>1442 sq mi<br/>(3735 sq km)</p>   | <p>Public access (currently in testing phase)</p>                     | <p>Telabria (ISP)</p>   | <p>Redline; SkyPilot; Alepo</p>   |   | <p>Will charge for access</p>  |
| <p>Mäntsälä region, Finland<br/>Pop. 60,000<br/>308 sq mi<br/>(800 sq km)</p>                                     | <p>Public</p>   | <p>Mäntsälän Sähkö (energy utility); ISP: MSOYNet</p>           | <p>Radionet Finland</p>   |   | <p>Charges for access; has roaming agreements with other Finnish city operators</p>  |

**Citywide wireless networks for public access**

| City  | Owner  | Vendor   | Cost   | Business model  |
|---|--|--|--|---|
| Chaska, Minnesota<br>Pop. 18,000<br>16 sq mi<br>(41 sq km)      | City (through Chaska.net, city-owned ISP)      | Tropos: 200 nodes  | \$800,000 (\$600,000 for nodes, \$100,000 for fiber lease, \$100,000 for services) | Charges \$16/mo for 1 Mbps symmetrical bandwidth  |
| Cerritos, California<br>Pop. 50,000<br>8.6 sq. mi<br>(22 sq km) | Aiirmesh (ISP)                                 | Tropos   | Slightly under \$600,000, less than one month to deploy                            | \$40/mo residential and \$300/mo business   |
| Lafayette, Louisiana<br>Pop. 193,500<br>13 sq mi<br>(34 sq km)  | Syndeo (ISP)                                   | Tropos   |  | Will offer paid-for wireless broadband service; (note: may not be "online" as of the date of this report)   |
| Grand Haven, Michigan<br>Pop. 11,000<br>15 sq mi<br>(38 sq km)  | Ottawa Wireless (ISP)                          | Proxim   | \$40,000 per square mile (2.6 sq km) to deploy                                     | Voice over Wi-Fi: starts at \$20 per month, with unlimited calling in US and Canada set at \$30 per month; wireless broadband at \$15 for 100 kbps, \$45 for 512 kbps (plus a \$100 to \$300 startup fee) |
| Buffalo, Minnesota<br>Pop. 12,000<br>6 sq mi<br>(15 sq km)      | Buffalo Wireless Internet Group                | WaveRider (900 MHz NLOS equipment, plus 2.4/5.8 GHz APs) | \$750,000 to build the network   | \$16/mo (residential) to \$40/mo (business) plus cost of antenna  |
| Gotland, Sweden<br>Pop. 21,300<br>1212 sq mi<br>(3140 sq km)    | Gotlands Energi AB (energy utility)            | Alvarion (using 2.4 and 3.5 GHz frequency bands)         |  | Charges for access; available to 500 households   |
| Vantaa, Finland<br>Pop. 200,000                                 | Vantaan Energia (energy utility); ISP: WiVANet | Radionet Finland   |  | Supports 5,000 -10,000 users and charges for access; roaming agreements with other Finnish city operators   |

## Tables - Muniwireless.com report, July 2005

---

| City   | Owner  | Vendor                                 | Cost  | Business model   |
|--|--|--|---|--|
| Porvoo, Finland<br>Pop. 46,000                                       | Porvoon Energia<br>(energy utility);<br>ISP: PBEZon                          | Radionet Finland                       |   | €59/mo + €99<br>installation cost<br>for 1 Mbps; for<br>2Mbps, €99/mo +<br>€99 installation<br>cost; roaming<br>agreements with<br>other Finnish city<br>operators |
| Rauma, Finland<br>Pop. 30,000<br>20 sq km<br>coverage                | Rauman Energia<br>(energy utility);<br>ISP: Superstrada                      | Radionet Finland                       |   | Charges for<br>access; roaming<br>agreements with<br>other Finnish city<br>operators   |
| Kotka, Finland<br>Pop. 57,000<br>15 sq mi<br>(38 sq km)              | Local energy<br>utility; ISP: KymP   | Radionet Finland                       |   | Charges for<br>access; roaming<br>agreements with<br>other Finnish city<br>operators   |
| Hamina, Finland<br>Pop. 22,000                                       | Haminan Energia<br>(energy utility);<br>ISP: Haminetti                       | Radionet Finland                       |   | Charges for<br>access; roaming<br>agreements with<br>other Finnish city<br>operators   |
| Vaasa, Finland<br>Pop. 58,000  | ISP: Netsafir  | Radionet Finland                       |   | Charges for<br>access; roaming<br>agreements with<br>other Finnish city<br>operators   |
| Rio Rancho, New<br>Mexico<br>Pop. 60,000<br>103 sq mi (267<br>sq km) | ISP: Azulstar<br>(same owner as<br>Ottawa Wireless<br>in Grand Haven,<br>MI) | Proxim; Meru<br>Networks;<br>Logisense |   | \$20/mo for<br>256kbps/<br>100kbps; \$40/mo<br>for 1.5 Mbps/<br>300kbps; \$80/mo<br>for 4Mbps/500<br>Kbps; day and<br>weekly passes<br>available                   |
| Nevada, Missouri<br>Pop. 8600<br>8.9 sq mi (23 sq<br>km)             | City (but hired<br>Neighborhood<br>Link, an ISP, to<br>deploy and run it)    |  | \$40,000 initial<br>deployment costs                              | \$35 to \$120 per<br>month plus<br>installation/CPE<br>fees of \$80 to<br>\$300  |
| Kingsclere,<br>Hampshire (UK)  | Cooperative  | Locustworld                            | £15,000   | Charges for<br>access  |
| Basingstoke,<br>North Hampshire<br>(UK)                              | W-Fi-Net (ISP)   | Locustworld                            | Cost of Aramiska<br>satellite<br>connection; six<br>mesh networks | Charges for<br>access  |

## Tables - Muniwireless.com report, July 2005

| City  | Owner                                      | Vendor   | Cost  | Business model   |
|---|--|--|---|--|
| Bergen, Germany<br>(location of a British Army base)<br>Pop. 2000 homes | Midas Telecom and EP Scheiba (ISPs)        | Locustworld  |   | Charges for access   |
| Newmarket, Suffolk (UK)   | Comtralis (ISP)                            | Locustworld  | £15,000   | £25-£60/mo   |
| Langtoft, Yorkshire (UK)<br>Pop. 400                                    | Langtoft.net                               | Locustworld  | Cost of 1Mb Aramiska satellite connection   | £25/mo + £117.50 installation equipment                                  |
| Vivian, Louisiana<br>Pop. 4200<br>5.2 sq mi (13 sq km)                  | Fastline Internet (ISP)                    | Locustworld: 18 nodes; plus one 21-mile point-to-point link between Vivian and Linden as backup in case of outages | \$28,000 to deploy (of this the equipment cost is \$13,500), \$2000 annual maintenance; lease T-1 line \$650/mo; local backup is DSL, 1.5 Mbps \$129/mo | \$10 (64kbps) to \$60 (1 Mbps) per month; CPE: \$200<br>70 subscribers   |
| Linden, Texas<br>Pop. 2200<br>3.5 sq mi (9 sq km)                       | Fastline Internet (ISP)                    | Locustworld: 12 nodes  | \$9000 for equipment, \$1000 annual maintenance, T-1 line \$750/mo  | \$10 (64kbps) to \$60 (1 Mbps) per month<br>CPE: \$200<br>40 subscribers |
| Drymen, Scotland<br>Pop. 1000   | Drymen Broadband Group (local cooperative) | Locustworld  | £250/mo satellite connection + £7000 installation costs (7 nodes)   | £20/mo sharing 2 Mbps satellite connection; 50 users                     |
| Sheringham, Norfolk (UK)  | Barry Titmarsh                             | Locustworld  | £15,000 for equipment and installation; £600 per year 2Mb ADSL backhaul   | Free; serves 6500 people and covers 3 sq mi (7.7 sq km)                  |
| Patel Bridge and Glasshouses (UK)                                       | Local cooperative                          | Locustworld  | £5000 for equipment and installation (15 nodes); 2 x 2 Mbps Aramiska satellite subscription (£450 per month)  | £25/mo; 40 subscribers   |
| Fulham, London (UK)   | Space IP                                   | Locustworld  | £10,000 for equipment and installation; £600 per year 2Mb ADSL backhaul   | Free and paid access; serves 2500 people and covers 1 sq mi (2.6 sq km)  |

## Tables - Muniwireless.com report, July 2005

---

| City  | Owner   | Vendor                               | Cost   | Business model  |
|---|---|--------------------------------------|--|---|
| Garboldisham, Norfolk (UK)  | Space IP  | Locustworld                          | £10,000 for equipment and installation; £5000 per year 2Mb satellite backhaul  | £30 per month plus equipment and installation costs; serves 300 people and covers 2 sq mi (5.1 sq km)   |
| Stevenson, Washington<br>Pop. 1000<br>1.5 sq mi (4 sq km)                                   | City  | Locustworld                          |  | Free  |
| Lauris, France (Perigord Noir region)<br>Pop. 18,000<br>3 sq mi (8 sq km)                   | La Chaumière Haut Débit (The Broadband Cottage), a non-profit association | Linksys, Zyxel, satellite connection | €170,000 equipment and installation costs; €45/mo for backhaul; funding from the Region, French Ministry of Research, EU innovation grant, €30,000 from the Dordogne Département | €20-€30/mo 512 kbps download and 256 kbps upload  |
| Withernsea, East Yorkshire (UK)<br>Pop. 9,000 winter, 30,000 summer<br>50 sq mi (129 sq km) | Neoeon Ltd  | Locustworld                          | £100,000 to deploy (50+ nodes) using E1/T1 with two-way satellite backup   | £11.95 to £19.95 per month for residential use; business users from £29.95 to £49.95 per month, bandwidth respectively up to 256 kbps and 1 Mbps respectively |
| Dundrum, Northern Ireland<br>Pop. 200 homes<br>1 sq mi (2.6 sq km)                          | Aperture Design & Management Ltd  | Locustworld                          | £15,000 to deploy (cost of equipment and installation); £2500 annual costs (includes Aramiska satellite connection 1Mbps)  | £15 to £30 per month depending on bandwidth   |

## Tables - Muniwireless.com report, July 2005

| City  | Owner   | Vendor                 | Cost   | Business model   |
|---|---|------------------------|--|--|
| Doddington, UK<br>Pop. 600<br>3 sq mi (8 sq km)             | Telabria (ISP)  | Telabria mesh solution | Acquisition cost per customer £90-£350 (\$150-\$595) depending type of CPE. Backhaul cost: 2Mbps satellite feed £5000 (\$8500) per year; 2Mbps leased line is about £15,000 (\$25,000) per year, but can support many more customers as it's uncontented and symmetrical. They are using satellite as the first step, and as subscription rates increase, will migrate to leased line. | RuralMesh Home is £30/mo (\$50) 512Kbps Service; RuralMesh Pro is £40/mo (\$70) 1Mbps service. Both include email and web space.                 |
| Bridge, Canterbury (UK)<br>Pop. 2500<br>5 sq mi (13 sq km)  | Telabria (ISP)  | Telabria mesh solution | Same as above  | Same as above  |
| Scottsburg, Indiana<br>Pop. 6000<br>4.8 sq mi (12 sq km)    | City  | Alvarion               | \$384,000  | Saves the city \$6000 in communications costs; charges \$35/mo for 512 kbps, \$200/mo for T-1; 20% of households have subscribed (400 customers) |
| Owensboro, Kentucky<br>Pop. 54,000<br>17.4 sq mi (45 sq km) | Owensboro Municipal Utilities (largest municipal-owned utility in Kentucky) | Alvarion               |  | 2100 subscribers; largest municipal utility wireless broadband deployment in the US  |
| Pasco, Washington<br>Pop. 32,000<br>28 sq mi (72 sq km)     | Franklin PUD (city utility); service through 3 <sup>rd</sup> party ISP      |                        | Uses utility's fiber network   | \$50-\$350 CPE, charges \$25-\$75 per month  |

## Tables - Muniwireless.com report, July 2005

---

| City  | Owner   | Vendor                     | Cost   | Business model                         |
|---|---|----------------------------|--|--|
| Sun Prairie, Wisconsin<br>Pop. 22,000<br>9.5 sq mi (24 sq km)   | Sun Prairie Water & Light (city utility)                                |                            |  |  |
| Waupaca, Wisconsin<br>Pop. 5700<br>6 sq mi (15 sq km)           | City  |                            | \$100,000 for tower (city got \$320,000 loan for the deployment)           | \$40/mo plus installation fee of \$99  |
| Jackson, Wisconsin<br>Pop. 5500<br>2.5 sq mi (4.7 sq km)        | City (but it will ask an ISP to deliver the wireless broadband service) |                            |  |  |
| Gladstone, Michigan<br>Pop. 5000<br>5 sq mi (13 sq km)          | Charter Communications (ISP)  |                            |  | \$39.95/mo                             |
| Marion, Indiana<br>Pop. 32,000<br>13.3 sq mi (34 sq km)         | City  |                            | \$12,000   | Free                                   |
| Adel, Georgia<br>Pop. 5300<br>7.9 sq mi (20 sq km)              | City (contracted out ISP services to TriState Broadband)                | Navini and Motorola Canopy | Uses city fiber as backhaul  | \$24.95/mo for residential             |
| Island Pond, Vermont<br>Pop. 1350<br>4.2 sq mi (11 sq km)       | City  | Alvarion                   | \$1250/mo to lease T1 line; \$50,000-\$70,000 installation/equipment costs | \$30/mo residential; \$130/mo business |
| Cebu City, Philippines<br>Pop. 800,000<br>107 sq mi (279 sq km) | ASA Enterprise; Protocol Century  | Aperto; Tropos             |  | Charges for access                     |

## Tables - Muniwireless.com report, July 2005

| City  | Owner                                 | Vendor   | Cost   | Business model   |
|---|---------------------------------------|--|--|--|
| Cassà de la Selva, Spain<br>Pop. 8,000<br>3 sq mi (8 sq km)       | City                                  | Self-assembled nodes running Linux   | €15,000 installation and equipment; €1000 annual maintenance; €300/mo for 2 DSL lines  | €3/mo nominal fee; serves 350 homes; city councilman responsible for network now setting up wireless networks around Catalonia                   |
| Dublin, Ohio<br>Pop. 32,000<br>21 sq mi (55 sq km)                | City                                  |  | \$2.5 million; fiber backhaul from Columbus Fiber Network  | Charges for access; deployed network because of lack of broadband service  |
| St. Cloud, Florida<br>Pop. 25,000<br>13 sq mi (34 sq km)          | City (St. Cloud CyberSpot)            | HP; MRI (consulting services)  | \$900,000 equipment; \$300,000 consulting, RF engineering, installation); \$260,000 maintenance per year; \$40,000 backhaul to city hall | Free access, may charge later; existing coverage 1 sq mi but will expand to entire city by summer; later add police and fire department          |
| Granbury, Texas<br>Pop. 6000<br>10 sq mi (26 sq km)               | City; Frontier Broadband runs network | Tropos; Motorola Canopy; Orthogon; Pronto Networks                                 | \$240,000 for 80 Tropos nodes; \$10,000 cost of deployment services; \$3000 annual maintenance   | Charges for access \$20/mo; ROI for police is \$80,000 in the first year; first municipal network to be used for public access and public safety |
| Taipei, Taiwan<br>Pop. 2.6 million<br>105 sq mi (272 sq km)       | City                                  | Q-Ware (integrator); Cisco; Nortel mesh; Aptilo Networks (management platform); HP | \$70 million to deploy network that covers 90% of the city   | Will charge for access; being deployed   |
| Lompoc, California<br>Pop. 40,000<br>5 sq mi (14 sq km)           | City                                  | Tropos (130 nodes)   | Part of the muni fiber network (total cost \$26 million)   | Will charge for access; expects to sign up 4000 customers in the first two years; being deployed   |
| Hermosa Beach, California<br>Pop. 19,000<br>1.4 sq mi (3.6 sq km) | City                                  | Strix Systems (mesh hardware), LA Unplugged (services)                             | \$75,000-85,000 cost of building network; \$18,000 annual maintenance  | Free; advertising from local businesses on log-on screen   |

**Tables - Muniwireless.com report, July 2005**

| City   | Owner                             | Vendor                                      | Cost  | Business model   |
|--|-----------------------------------|---|---|--|
| Cupertino, California<br>Pop. 50,000<br>11 sq mi (29 sq km)                  | MetroFi (private wireless ISP)    | Skypilot; Valuepoint (APs); Granite Systems | \$5 million   | charges for Internet access; rates start at \$20 per month                                       |
| Moorhead, Minnesota<br>Pop. 33,000<br>13 sq mi (34 sq km)                    | Municipality                      | Tropos; First Mile Wireless                 | not disclosed   | charges for Internet access; rates between \$20-25 per month                                     |
| Addison, Texas<br>Pop. 100,000 (day); 15,000 (night)<br>4.5 sq mi (12 sq km) | Red Moon Broadband (private wISP) | Tropos; Airpath                             | not disclosed   | charges for access (\$6 per hour for visitors, to be determined for residents);                  |
| Brandon, Vermont<br>Pop. 4000  | Municipality                      | TelJet (SI)                                 | using \$50,000 state grant  | public access  |
| Monticello, Florida<br>Pop. 2500<br>3.4 sq mi (9 sq km)                      | Municipality                      | Graybar Electric (SI), Terabeam             | \$226,000 for NOC, antennas, hardware, services; \$2000 per month to AT&T for bandwidth | public access (\$25-40 per month); save money on city operations; improve efficiency and service |

**Public safety and municipal use only**

| City  | Type of network | Vendor | Cost | Use  |
|---|-----------------|--------|------|--|
| San Mateo, California<br>Pop. 92,000<br>12.2 sq mi (31 sq km) | Police          | Tropos |      | Wi-Fi access from laptops and PDAs in vehicles and on the street |
| Milpitas, California<br>Pop. 63,700<br>13.6 sq mi (35 sq km)  | Police          | Tropos |      | Wi-Fi access from laptops and PDAs in vehicles and on the street |

## Tables - Muniwireless.com report, July 2005

---

| City  | Type of network   | Vendor   | Cost                    | Use  |
|---|---|--|-------------------------|--|
| Rio Rico, Arizona   | Police; will add public access later                      | RoamAD   |                         | Mobile VOIP multi-party calls at 80mph (130 kph); Wi-Fi access from laptops and PDAs along stretches of Canamex Interstate Highway (I-19) in Arizona; surveillance |
| Montpelier, Vermont<br>Pop. 8,000<br>10.2 sq mi (26 sq km)          | Municipal use in phase 1; public access to be added later | Sovernet (CLEC)  | \$50,000 equipment cost | Saves city \$18,000-\$20,000 per year in communications costs; municipal services in phase 1, public access in phase 2   |
| Ripon, California<br>Pop. 13,000<br>8 sq mi (20 sq km)              | Public safety and municipal use; later public access      | Motorola (equipment); Lockheed-Martin (SI)             | \$500,000               | police; monitor city wells and pump stations; vehicle tracking; GIS mapping of hazardous waste storage areas   |
| Fresno, California<br>Pop. 430,000<br>104 sq mi (270 sq km)         | Public safety   | IBM (SI)   | Phase 1: \$750,000      | surveillance, report filing from remote locations  |
| Lincoln, Nebraska<br>Pop. 226,000<br>75 sq mi (194 sq km)           | Municipal use   | AxtellTech Wholesale (SI); BelAir Networks (equipment) | not disclosed           | healthcare, waste management and city administration   |
| Colleyville, Texas<br>Pop. 21,000<br>13 sq mi (34 sq km)            | Public safety over 4 sq mi (10 sq km)                     | MeshLinx (equipment)                                   | not disclosed           | first responders; fire department; some public access  |
| Sarasota County, Florida<br>Pop. 326,000<br>572 sq mi (1,481 sq km) | Public safety   | Vivato (equipment);                                    | not disclosed           | Phase 1 covers 5 sq mi (13 sq km) downtown area  |

## Tables - Muniwireless.com report, July 2005

---

| City  | Type of network  | Vendor                                       | Cost  | Use   |
|---|--|--|---|---|
| Lewis & Clark County / Helena, Montana<br><br>70 sq mi (181 sq km)        | Public utilities, city employees' use                            | Redline                                      | \$300,000 to deploy but cost is higher due to lease for fiber capacity  | landfill, waste water treatment monitoring; VOIP, transit, city employees' use; savings on leased line costs is \$45,000 per year |
| Cocoa Beach, Florida<br><br>Pop. 13,000<br><br>6 sq mi (15 sq km)         | Police   | Motorola mesh; Scientel America (integrator) |   | mobile data and voice   |
| Las Vegas, Nevada<br><br>Pop. 510,000<br><br>113 sq mi (293 sq km)        | Traffic monitoring (over 5 sq mi)                                | Motorola mesh; Cheetah Wireless (integrator) | \$175,000 for 5 sq mi coverage; est. cost for entire city is \$6 million  | Traffic monitoring; bandwidth 500 kbps to 1.5 Mbps  |
| Oklahoma City, Oklahoma<br><br>Pop. 520,000<br><br>400 sq mi (1036 sq km) | Police and fire departments                                      | Tropos (600 fixed nodes); ACS (integrator)   | part of city's \$22 million upgrade of IT infrastructure  | Wi-Fi access from laptops and PDAs  |
| Marquette, Wisconsin<br><br>Pop. 20,000<br><br>12 sq mi (30 sq km)        | Public utilities; may partner with ISPs to deliver public access | to be determined                             | \$373,000 to build network; \$50,000 for engineering design and construction; cost of fiber lease from Marquette Board of Light & Power | Remote monitoring of waste water treatment plant, water filtration, municipal service center                                      |
| Pleasanton, California<br><br>Pop. 70,000<br><br>75 sq mi (194 sq km)     | Traffic monitoring   | 5G Wireless                                  |   | Traffic management via remote wireless video cameras  |

## Tables - Muniwireless.com report, July 2005

| City  | Type of network  | Vendor  | Cost   | Use  |
|---|--|---|--|--|
| Jamestown, New York<br>Pop. 31,000<br>9 sq mi (23 sq km)  | Police public safety network covers 3 sq mi; phase 2 to include public utilities, public works, housing inspectors; phase 3 to include school security | Tropos: 30 outdoor and 2 indoor mesh routers  |  | Wi-Fi access via laptops and PDAs; later use for public works and utilities employees, and school video cams   |
| Portsmouth, UK<br>Pop. 200,000<br>(includes approx. 30,000 students and staff at university)<br>20 sq mi (51 sq km) | Transport and traffic control (PORTAL Project)   | Mesh-Networks (now Motorola): 15 IAPs and 10 routers in phase 1, 350 network cards in buses | Total cost: £3.5 million (£1.5 million grant from Dept of Transport)<br>Breakdown:<br>£210,000 (\$400,000) for 15 IAP's, 350 subscriber devices, 10 routers, 1 MISC (all mesh networks);<br>£24,000 (\$46,00) for 5.8 GHz point-to-point radio links;<br>Installation:<br>£80,000 (\$144,000) includes consultancy, installation and utility costs;<br>£16,000 (\$30,000) per year for 34 ADSL lines;<br>Fibres x 5 @ £4,000.00 each = £20,000 (\$38,000) rented from British Telecom. | Saves £70,000 (\$134,000) in municipal costs each year; no plans to open up to public access but will provide Internet access through 45 street kiosks. Will open up network to other local government departments.<br>They are placing the APs and routers on existing CCTV camera poles wherever possible and adding a small amount of extra cost onto the existing CCTV contract. |
| Washington, Louisiana<br>Pop. 1067<br>1 sq mi (2.6 sq km)   | Police; will add public access   | Locustworld; will ask private ISP to run public access network                              | \$17,000 equipment cost; \$650/mo T-1 line   | Wi-Fi access from laptops and PDAs for police officers; will add public access   |

## Tables - Muniwireless.com report, July 2005

---

| City  | Type of network   | Vendor   | Cost                    | Use  |
|---|---|--|-------------------------|--|
| Rio Rico, Arizona   | Police; will add public access later                      | RoamAD   |                         | Mobile VOIP multi-party calls at 80mph (130 kph); Wi-Fi access from laptops and PDAs along stretches of Canamex Interstate Highway (I-19) in Arizona; surveillance |
| Montpelier, Vermont<br>Pop. 8,000<br>10.2 sq mi (26 sq km)          | Municipal use in phase 1; public access to be added later | Sovernet (CLEC)  | \$50,000 equipment cost | Saves city \$18,000-\$20,000 per year in communications costs; municipal services in phase 1, public access in phase 2   |
| Ripon, California<br>Pop. 13,000<br>8 sq mi (20 sq km)              | Public safety and municipal use; later public access      | Motorola (equipment); Lockheed-Martin (SI)             | \$500,000               | police; monitor city wells and pump stations; vehicle tracking; GIS mapping of hazardous waste storage areas   |
| Fresno, California<br>Pop. 430,000<br>104 sq mi (270 sq km)         | Public safety   | IBM (SI)   | Phase 1: \$750,000      | surveillance, report filing from remote locations  |
| Lincoln, Nebraska<br>Pop. 226,000<br>75 sq mi (194 sq km)           | Municipal use   | AxtellTech Wholesale (SI); BelAir Networks (equipment) | not disclosed           | healthcare, waste management and city administration   |
| Colleyville, Texas<br>Pop. 21,000<br>13 sq mi (34 sq km)            | Public safety over 4 sq mi (10 sq km)                     | MeshLinx (equipment)                                   | not disclosed           | first responders; fire department; some public access  |
| Sarasota County, Florida<br>Pop. 326,000<br>572 sq mi (1,481 sq km) | Public safety   | Vivato (equipment);                                    | not disclosed           | Phase 1 covers 5 sq mi (13 sq km) downtown area  |

### City hotzones

## Tables - Muniwireless.com report, July 2005

---

| City   | Type of network  | Owner   | Vendor  | Business model  |
|--|--|---|---|---|
| Washington DC<br>Capitol Hill                        | Public access  | Open Park<br>Project                                | Tropos  | Donated<br>equipment  |
| Spokane,<br>Washington<br>100-block<br>downtown area | Municipal and<br>public (ISP<br>services provided<br>by OneEighty) | Spokane   | Vivato: 5 VP1210<br>outdoor stations,<br>12 VA2200<br>bridge routers                                    | Equipment cost<br>\$61,000, total<br>hotzone cost<br>estimated<br>\$75,000  |
| Auckland, New<br>Zealand                             | Public access, 3<br>sq mi  | Reach Wireless<br>(ISP)                             | RoamAD: R4000<br>nodes (each<br>nodes has<br>4X802.11b<br>radios), network<br>has 80 802.11b<br>radios) | 20 node network<br>less than<br>\$100,000   |
| Ottawa, Canada                                       | Public access<br>around city hall<br>and sportsplex                | Telecom Ottawa                                      | BelAir  | Charges for<br>access   |
| Wellington, New<br>Zealand                           | Public: hotspots   | City Link (ISP)                                     |   | NZ\$95,000 (US<br>\$60,000) funding<br>from city; City<br>Link owns fiber<br>backhaul   |
| Baton Rouge,<br>Louisiana                            | Public access:<br>coverage 1 to 2<br>sq mi (5 sq km)               | Verge Wireless<br>(ISP)                             | Tropos Networks:<br>20 cells  | Equipment cost<br>\$20,000-\$30,000<br>per sq mi;<br>generally for<br>these types of<br>Tropos<br>deployments,<br>\$160,000 for<br>network<br>operations center<br>and POP and<br>\$31,000 per sq<br>mi |
| Lisbon, Portugal                                     | Public access  | City  | Unknown (100<br>access points)  |   |
| Hamburg,<br>Germany                                  | Public (hotspots)  | Hamburg@work  | Siemens, Fujitsu,<br>T-Systems<br>(subsidiary of<br>Deutsche<br>Telekom)                                | Donated<br>equipment  |
| Milwaukee,<br>Minnesota                              | Parks hotzone  | Milwaukee   | Cisco   | Cisco donated<br>\$15,000 worth of<br>equipment; SBC<br>provides service  |
| Fredericton,<br>Canada                               | Public access  | City (through e-<br>Novations, the<br>city carrier) | Cisco   | \$110,000; uses<br>city fiber as<br>backhaul  |

## Tables - Muniwireless.com report, July 2005

---

| City   | Type of network   | Owner  | Vendor   | Business model   |
|--|---|--|--|--|
| Fullerton, California<br>Pop. 129,000<br>22 sq mi (57 sq km) | Public access over 2.5 sq mi (6.5 sq km); will expand to citywide if successful | City   | CDCE Mobile Computer (integrator); Tropos; Bluesocket wireless gateway | \$55,000; free access  |
| San Sebastian, Spain<br>Pop. 177,000                         | Public access downtown  | City   |  | Free access  |
| San Francisco, California                                    | Public access in Marina area  | AnchorFree (ISP)                               |  | Free access  |
| Preston, UK  | Public access downtown  | City (venture with Univ of Central Lancashire) |  | Charges £60 per year   |
| Culver City, California                                      | Public access 1 sq mi (2.6 sq km)   | City   | Firetide (4 nodes); Vernier Networks (security)                        | Free access; may add municipal applications later and expand size of network                     |
| Vancouver, Washington  | Public access   | City   | HP   | \$30,000 grant from HP; free bandwidth from Electric Lightwave; free access                      |
| Encinitas, California  | Public access 1 sq mi   | Cheetah Wireless                               | BelAir; Tropos; Cheetah (integrator, ISP)                              | Charges for access \$30/mo residential and \$40/mo 600kbps-1.3 Mbps; current coverage 1 sq mi    |
| Bristol, UK  | Public access 3 sq mi   | City ("Legible City" Project)                  | Cityspace UK   | Public access, CCTV and surveillance, transport, e-Government, use by utility and city employees |
| Nantucket, Massachusetts<br>Pop. 9000                        | Public access 1.25 sq mi (3.2 sq km)  | Wi-Blast (ISP)                                 | Tropos   | \$25,000 to deploy; charges for access   |
| Lausanne, Switzerland  | Public access downtown and port areas   | City   |  | \$12,000 to deploy, \$2400/yr to maintain; free access   |

## Tables - Muniwireless.com report, July 2005

| City                      | Type of network                            | Owner  | Vendor  | Business model   |
|---------------------------|--|--|---|--|
| Jerusalem, Israel         | Public access                              | City   |   | Phase 1 cost NIS 1 million covering business district and shopping mall; free access in year one                 |
| Liverpool, UK             | Public access 0.6 sq mi (1.5 sq km)        | Nublu  | Nublu   | Nublu refused to disclose cost; charges for access   |
| Lexington, Kentucky       | Public access downtown 3 sq mi (8 sq km)   | Lexington Wi-Fi (ISP)                              | Vivato; ICOA (managed services)   | \$18,000 to deploy, \$14,000 to maintain; charges for access \$7/day, \$15/week, \$25/mo Bandwidth 2 Mbps/1 Mbps |
| Los Angeles, California   | Public access downtown in Pershing Square  | CRA/LA   | Tropos; Verge Wireless (integrator)   | Cost less than \$25,000 to deploy; free access   |
| Dayton, Ohio              | Public access downtown 1 sq mi (2.6 sq km) | City (but run by HarborLink)                       | HarborLink (integrator and ISP)   | City provides free backhaul; free access   |
| Aberdeen, Scotland        | Public access                              | Dick Fleming Communications (ISP)                  | Locustworld   |  |
| San Antonio, Texas        | Public access in downtown area             | SA Unwired   | Pronto Networks, BelAir Networks, SA Unwired  | Charges \$3 per hour; \$10 per day   |
| Santa Barbara, California | Public access over 2 sq mi area            | Incipient  | Firetide  | Free access  |
| Glen Cove, New York       | Public access                              | Glen Cove Chamber of Commerce                      | Networked Now and Intrech Communications  | Free access  |
| Burbank, California       | Public access over 1 sq mi                 | City   | M-Gravity; Proxim   | Free access  |
| Marshalltown, Iowa        | Public access and public safety            | Marshalltown Economic Development Impact Committee | Racom (SI) ; Nortel (equipment)   | Free access  |
| Alexandria, VA            | Public access over 18 blocks               | City   | Tropos; cost of deployment is \$20,000; maintenance \$7800; \$650 per month for bandwidth | Free access  |

**Ports**

| City                   | Owner           | Vendor           | Business model                              |
|------------------------|-----------------|------------------|---|
| Seattle, Washington    | Port of Seattle | Vivato           | Port applications                           |
| Amsterdam, Netherlands | Amsterdam       | Radionet Finland | Port applications; cost of network €200,000 |
| Turku, Finland         | FinnSteve       | Radionet Finland | Port applications                           |
| Hamina, Finland        | Hamina          | Radionet Finland | Port applications                           |

Planned projects

| City  | Type   | Owner  | Vendor  | Costs  | Business model  |
|---|--|--|---|--|---|
| Philadelphia, Pennsylvania<br>Pop. 1.5 million<br>135 sq mi (350 sq km) | Public access, municipal and public safety                 | City   | Plans to issue RFP seeking partners                                 | \$10 million to deploy; \$1.5 million per year to maintain                               | No official statement from city but expect ISPs to charge for access, some free access in parts of city; applications for public safety and municipal workers to generate efficiency and productivity gains |
| Cook County, Illinois<br>Pop. 5.4 million<br>940 sq mi (2434 sq km)     | Police and other public safety (phase 1); public (phase 2) | County   | Cisco   | \$12.1 million   | Productivity gains for police and other municipal employees   |
| Cleveland, Ohio<br>Pop. 468,000<br>77.6 sq mi (200 sq km)               | Public and municipal use, citywide                         | OneCleveland: non-profit composed of public institutions | Cisco, Vivato   | Cisco donated optical networking backbone (\$1 million); will use city fiber as backhaul | Free public access; huge savings on communications costs; improve efficiency of services such as healthcare, libraries, education; connect universities, libraries, municipal government, art centers, etc. |
| New York City<br>Pop. 8,000,000<br>303 sq mi (785 sq km)                | Municipal public safety, city-wide                         | City   | Seeking one systems integrator, RFP responses were due in July 2004 | \$500 million to \$1 billion; will use city-owned fiber network as backhaul              | Productivity gains by municipal employees; public safety  |
| Tempe, Arizona<br>Pop. 160,000<br>40 sq mi (104 sq km)                  | Public, municipal, public safety                           | ISP  | Seeking wireless ISP; RFP deadline Feb 24, 2005                     |  | Will charge for access, but free in some places   |
| Muskegon and Marquette counties, Michigan                               | Public   | ISP  | Seeking wireless ISP; RFP deadline January 14, 2005                 | Maximum \$2 million grant in Muskegon, \$1 million in Marquette                          | Will charge for access  |

## Tables - Muniwireless.com report, July 2005

| City   | Type   | Owner                     | Vendor   | Costs                           | Business model   |
|--|--|---------------------------|--|---------------------------------|--|
| Dunedin, Florida<br>Pop. 37,000<br>10 sq mi (26 sq km)               | Public and municipal use                               | City (ISP to run network) | Seeking wireless ISP; RFP deadline October 14, 2004                  |                                 | Will charge for access, share revenue with city  |
| West Hollywood, California<br>Pop. 37,000<br>1.9 sq mi (5 sq km)     | Public hotzone, possible citywide                      | City                      | Seeking wireless ISP; RFP deadline Jan 21, 2005                      |                                 | Free access throughout hotzone   |
| Madison, Wisconsin<br>Pop. 215,000<br>69 sq mi (179 sq km)           | Public access in city and airport                      | City (but run by ISP)     | Seeking wireless ISP; AOL-SkyCable won initial round                 |                                 | Will charge for access; ISP must allow roaming with other municipal wireless broadband networks    |
| South Bend, Indiana<br>Pop. 110,000<br>38 sq mi (98 sq km)           | Public hotzone around library                          | St. Joseph public library | Michiana Free-Net to run network; fiber from St. Joe Valley Metronet | \$30,000 equipment and training | Free first 3 months; may charge for access later   |
| Port of Rotterdam, Netherlands                                       | Fiber and wireless access in and around port area      | Port Authority            | Seeking vendor; network launch end of 2006                           |                                 | Wholesale access to fiber and wireless network to service providers; internal port operational use |
| Buffalo, New York<br>Pop. 288,000<br>41 sq mi (106 sq km)            | Public access  | City                      | Seeking vendor   | \$800,000                       | Economic development; bridge digital divide  |
| Denver, Colorado<br>Pop. 560,000<br>153 sq mi (396 sq km)            | Municipal use  | City                      | Deadline for responses 20 Sept 2005                                  |                                 | Save money on city operations; improve efficiency and service                                      |
| Washington County, Oregon<br>Pop. 445,000<br>724 sq mi (1,987 sq km) | Public safety  | County                    | RFP issued May 2005; vendor being selected summer 2005               |                                 | Improve public safety operations, save money   |
| Portland, Oregon<br>Pop. 540,000<br>134 sq mi (347 sq km)            | Wholesale access to ISPs; public access; municipal use | ISP                       | RFP to be issued August 2005   |                                 | Open network leased out by the primary ISP to other ISPs; primary ISP can charge for service       |

**Tables - Muniwireless.com report, July 2005**

---

| City  | Type                         | Owner | Vendor  | Costs | Business model                                      |
|---|------------------------------|-------|---|-------|---|
| Orlando, Florida<br>Pop. 186,000<br>94 sq mi (243 sq km)                | Public access                | ISP   | RFP to be reissued                                    |       | Economic development; will charge for public access |
| Minneapolis, MN<br>Pop. 376,000<br>55 sq mi (142 sq km)                 | Public access; municipal use | ISP   | RFP issued, ISP being chosen                          |       | Will charge for access                              |
| Ottawa County, Michigan<br>Pop. 238,000<br>566 sq mi (1,465 sq km)      | Public access                | ISP   | Vendor to be announced end of July                    |       | Will charge for access                              |
| Oakland County, Michigan<br>Pop. 1.2 million<br>873 sq mi (2,261 sq km) | Public access; municipal use | ISP   | RFQ sent out; vendor being chosen                     |       | Will charge for access                              |
| Washtenaw County, Michigan<br>Pop. 323,000<br>710 sq mi (1,839 sq km)   | Public access; municipal use | ISP   | RFI sent out; vendor being chosen                     |       | Will charge for access                              |
| Grand Rapids, Michigan<br>Pop. 197,000<br>45 sq mi (117 sq km)          | Public access; municipal use | ISP   | RFP sent out; vendors' pilot projects being evaluated |       | Will charge for access                              |
| Traverse City, Michigan<br>Pop. 14,500<br>8.5 sq mi (22 sq km)          | Public access                | ISP   | RFP sent out; vendor being chosen                     |       | Will charge for access                              |
| Columbia, South Carolina<br>Pop. 117,000<br>125 sq mi (324 sq km)       | Public access                | City  | RFP sent out; vendor being chosen                     |       | Will charge for access                              |

## Tables - Muniwireless.com report, July 2005

---

| City  | Type                                     | Owner                   | Vendor                                  | Costs                  | Business model   |
|---|--|-------------------------|---|------------------------|--|
| Charleston,<br>South<br>Carolina<br>Pop. 100,000<br>97 sq mi (251<br>sq km) | Public<br>access                         | ISP                     | RFP sent out;<br>vendor being<br>chosen |                        | Will charge for access   |
| Marshfield-<br>Plainfield,<br>Vermont<br>Pop. 1500                          | Public<br>access                         | Cloud<br>Alliance       | Cloud<br>Alliance                       | Not<br>disclosed       | Will charge for access   |
| Grand Isle,<br>Vermont<br>Pop. 2000   | Public<br>access                         | Soundtivity             | Soundtivity                             | Not<br>disclosed       | Will charge for access   |
| Westmore,<br>Vermont<br>Pop. 350  | Public<br>access                         | Island Pond<br>Wireless | Island Pond<br>Wireless                 | Not<br>disclosed       | Will charge for access   |
| Greensboro,<br>Vermont<br>Pop. 1000   | Public<br>access                         | Wireless<br>Vermont     | Wireless<br>Vermont                     | Not<br>disclosed       | Will charge for access   |
| San<br>Francisco,<br>California<br>Pop. 760,000<br>47 sq mi (122<br>sq km)  | Public<br>access                         | San<br>Francisco        | Feasibility<br>study RFP<br>sent out    | \$300,000<br>for study | Explore city's<br>participation in creating<br>citywide Wi-Fi for public<br>access and municipal<br>use                        |
| Racine<br>County,<br>Wisconsin<br>Pop. 189,000<br>333 sq mi<br>(862 sq km)  | Public<br>access                         | County                  | Feasibility<br>study                    | \$60,000               | Explore making county<br>wireless for public and<br>municipal use  |
| Pepperell,<br>Massachu-<br>setts<br>Pop. 11,000                             | Municipal<br>use and<br>public<br>access | City                    |   | \$120-160,<br>000      | Save money on<br>telecommunications<br>costs (\$25,000 per<br>year); earn \$60,000 per<br>month by delivering<br>public access |
| Alpharetta,<br>Georgia<br>Pop. 36,000<br>21 sq mi (54<br>sq km)             | Municipal<br>use                         | City                    | RFQ sent out<br>July 2005               |                        | Save money and<br>improve services   |
| Miami Beach,<br>Florida<br>Pop. 88,000<br>7 sq mi (18<br>sq km)             | Public<br>access and<br>municipal<br>use | City                    | RFP to be<br>sent out Aug<br>2005       |                        |  |

**Tables - Muniwireless.com report, July 2005**

---

| City  | Type                            | Owner    | Vendor                                       | Costs | Business model   |
|---|---------------------------------|----------|--|-------|--|
| Brookline, Massachusetts<br>Pop. 57,000                     | Public access and municipal use | City     | RFP for feasibility study sent out           |       | Explore need for citywide network and how it would help the city |
| Kutztown, Pennsylvania<br>Pop. 5,000<br>1.6 sq mi (4 sq km) | Public access                   | City     | RFP sent out July 2005                       |       | Will charge for public access                                    |
| Brighton, UK  | Municipal use                   | City     | Not known (pre-WiMax equipment)              |       | Save money and improve efficiency                                |
| Canterbury, UK  | Public access                   | Telabria | Redline Communications (pre-WiMax); Skypilot |       | Testing phase  |

## **8. Sponsors**

I would like to thank the following sponsors for their financial support and assistance in finding the information for this report. The companies listed below have [Company Profile Pages](http://www.muniwireless.com/company-profiles/) on Muniwireless.com at <http://www.muniwireless.com/company-profiles/>. Their profile pages give detailed information about their products and services, as well as their wireless broadband projects in cities and regions around the world.

### **Chip manufacturers**

Intel (Paul Butcher)

### **Wireless mesh vendors**

Tropos Networks (Ron Sege, Bert Williams, Brad Day, François Le)

Firetide (Ike Nassi and Barbara Cardillo)

Telabria (Jim Baker)

SkyPilot (Kerry Haley)

BelAir (Phil Belanger and Stephen Rayment)

RoamAD (Martyn Levy)

MeshDynamics (Francis daCosta and Bob Osann)

Strix Systems

### **Point to multipoint and bridge vendors**

Alvarion (Benny Glazer, Jasper Bruinzeel, Bridget Fishleigh)

Vivato (Glenn Booth)

### **Hotzone management software and services**

Pronto Networks (Mary Malecki Roach)

Airpath Wireless (Jeff Manning, Olivia Hecht and Vaishali Mehta)

### **Public access and roaming gateways**

Nomadix (Kurt Bauer, Scott Zumbahlen and Kevin Jaskolka)

### **Security**

Network Chemistry (Rob Markovich)

### **Consulting firms**

Civitium (Greg Richardson and Matt Stone)

## Contact information

Esme Vos, Founder  
[esme@muniwireless.com](mailto:esme@muniwireless.com)

Landline: +31 20 420 2649  
EU Mobile: +31 622 199 480  
US Mobile: +1 415 341 2150  
Skype ID: muniwireless  
iChat: [isolde100@mac.com](mailto:isolde100@mac.com)

Office address:  
Lemon Cloud BV  
Hartenstraat 5A  
1016 BZ Amsterdam  
Netherlands

Copyright © 2005, Lemon Cloud BV. All rights reserved. Muniwireless, Muniwireless.com and Lemon Cloud are trademarks or registered trademarks of Lemon Cloud BV. Other names and brands may be claimed as the property of others.