New York City
Broadband Landscape and Recommendations

Summary Overview

July 2008

DRAFT v1.0

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Project Approach
Timeline & Approach

| PHASE 1 – RESEARCH & ANALYSIS (October 2006 – July 2007) | PHASE 2 – SYNTHESIS (July 2007 – January 2008) |

1) BROADBAND NEEDS ASSESSMENT

Conduct Geographic and Demographic Analysis of Broadband Availability and Interview Stakeholders

2) PEER RESEARCH

Review Relevant Local, National and International Broadband Initiatives and Benchmark NYC Broadband Environment Against "Competitors"

3) TECHNOLOGY ROADMAP

Research Existing and Emerging Broadband Access Technologies

4) LEGAL & REGULATORY REVIEW

Define Legal and Regulatory Risks of Potential Intervention Methods

FEASIBILITY STUDY

Define Strategic Alternatives to Address Needs & Obstacles

RECOMMENDED COURSE OF ACTION

Define Strategic Approach & Potential Initiatives

Create a Fact Base That Clearly Identifies Needs and Obstacles

Develop Comprehensive Strategy & High-Level Action Plan

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Project Approach
NYC Stakeholder Interviews

City Agencies / Organizations

- Brooklyn Public Library
- City Hall
- City University of New York (CUNY)
- Mayor's Office of Comprehensive Neighborhood Economic Development (CNED)
- Metropolitan Transit Authority
- New York City Council
- NYC Center for Economic Opportunity (CEO)
- NYC Dept. for the Aging (DFTA)
- NYC Dept. of City Planning (DCP)
- NYC Dept. of Education (DOE)
- NYC Dept. of Housing Preservation & Development (HPD)
- NYC Dept. of Information Technology & Telecom (DoITT)
- NYC Dept. of Parks & Recreation
- NYC Dept. of Small Business Services (SBS)
- NYC Dept. of Youth & Community Development (DYCD)
- NYC Economic Development Corporation (EDC)
- NYC Housing Authority (NYCHA)
- NYC Law Department
- NYC & Company
- New York Public Library (NYPL)
- Queens Borough Public Library

Service & Technology Providers

- Ambient
- Bway.net
- Cablevision
- Covad Communications
- Crown Castle Solutions Corp.
- Extenet Systems
- Mobilitie
- Nokia Networks
- RCN
- Sprint
- TCC Teleplex
- Telkonet / MST
- Terabeam / Proxim Wireless
- Time Warner Cable
- T-Mobile USA
- Towerstream
- Urban Communications Transport
- Verizon
- Verizon Wireless
- Wi-Fi Salon

Additional Stakeholders

- Alliance for Downtown NY
- Andrew Rasiej (FON, MOUSE)
- Anthony Townsend (Institute for the Future)
- Baruch College School of Public Affairs
- Center for an Urban Future
- Columbia Institute for Tele-Information (CITI)
- Computers for Youth
- Dragonfly Technologies
- Empire City Subway
- Hispanic Information & Telecom Network (HITN)
- Industrial & Technology Assistance Corp. (ITAC)
- Jewish Community Council of Greater Coney Island Non-Profit Help Desk
- Jewish Home and Hospital
- Mount Hope Housing Company
- New York State Public Service Commission (PSC)
- Non-Profit Coordinating Committee of New York
- NPower NY
- NYCwireless
- NYSERNet
- Older Adults Technology Services (OATS)
- Partnership for New York City
- People's Production House (PPH)
- Per Scholas
- Rudin Management Company
- Securities Industry & Financial Markets Association (SIFMA)
- South Bronx Overall Economic Development Corp. (SoBro)
- Wireless Harlem Initiative
- Wolf Block

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Additional Interviews

Peer City Representatives

- Berkshire Connect
- Boston Digital Bridge Foundation
- Brookline, MA
- Charlie Kaylor (Connect Kentucky)
- City and County of San Francisco, CA
- City of Boston, MA
- City of Chicago, IL
- City of Grand Rapids, MI
- City of Miami, FL
- City of Philadelphia, PA
- City of Seattle, WA
- Earthlink Municipal Network Division
- Wi-Fi Long Island

Additional Subject Matter Experts

- Angela McIntee (The MITRE Corporation)
- Area Development Magazine
- Blair Levin (Stifel Nicolaus)
- Bonocore Technology Partners
- Business Facility Planning Consultants
- CB Richard Ellis Consulting
- ChicagoFIRST
- Current Technologies
- Ed Malecki (Ohio State University)
- Harris Wiltshire & Grannis
- Intel Corporation
- International Center for Advanced Internet Research (iCAIR)
- Microsoft Corporation
- MSTAR (ISP on Utah's UTOPIA network)
- One Economy
- Rahul Telang (Carnegie Mellon University)
- Regional Partnership Council (aka RPCFIRST)
- Saskia Sassen (Columbia University)
- Sean Gorman (Fortius One)
- Sharon Gillett (Formerly of MIT and the Boston Task Force)
- Tony Grubesic (Indiana University)
- Tropos Networks

Diamond also conducted interviews to gain a better understanding of broadband and digital inclusion initiatives in other cities / regions and consulted numerous subject matter experts.

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Findings
Current State Overview – Broadband for Residents

Overall, NYC residents well-served; low-income usage below average

NYC on par with other domestic cities

- **Availability:** Service is nearly universal
  - Cable service available to 98% of addresses
  - DSL available to 87% of addresses; highly variable across neighborhoods, particularly outside Manhattan

- **Adoption:** Broadband usage varies across boroughs

Area	Adoption	Area	Adoption
Bronx	38.8%	All Boroughs	46.4%
Brooklyn	41.5%		
Queens	46.4%	National	45.1%
Manhattan	55.7%		
Staten Island	57.9%		

Source: Scarborough Research phone survey conducted between February 2006 and March 2007; results represent 224,583 nationwide respondents and 4,407 New York City respondents.
Note: Broadband is defined as a DSL or cable connection.

- **At-Risk Segments:** Low-income residents less likely to have home broadband service
  - 26% of all NYCHA households have home broadband service
  - Significant variability between NYCHA age groups (usage: 63% age 18-29 vs. 5% age 65+)

- **Domestic Competitors:** NYC is roughly on par with major domestic cities as far as broadband adoption

City	Adoption
Boston	58.3%
San Francisco	57.5%
Atlanta	53.7%
New York	52.3%
Miami	50.6%
Chicago	49.9%
Los Angeles	48.4%
Houston	47.0%

Source: Scarborough Research, 2006 – 2007.
Note: Adoption rates are for designated market areas (DMAs).

Findings: NYC Needs Assessment
Residential Broadband Penetration

NYC Comparative Computer & Internet Penetration Data				
	Computer Ownership	**Internet at home**	**DSL at home**	**Cable at home**	**Broadband at home[1]**
All Boroughs	• 67.3%	• 61.8%	• 22.7%	• 23.7%	• 46.4%
Bronx	• 57.9%	• 54.8%	• 21.6%	• 17.2%	• 38.8%
Brooklyn	• 65.2%	• 57.0%	• 21.2%	• 20.3%	• 41.5%
Manhattan	• 71.0%	• 68.4%	• 24.7%	• 31.0%	• 55.7%
Queens	• 71.1%	• 64.3%	• 22.7%	• 23.7%	• 46.4%
Staten Island	• 72.0%	• 69.7%	• 25.9%	• 32.0%	• 57.9%
National[2]	• 68.4%	• 66.9%	• 17.2%	• 19.2%	• 45.1%

Source: Scarborough Research. Data collected through a mail-based survey conducted between February 2006 and March 2007; results represent 211,468 nationwide respondents and 4,407 New York City respondents.
Notes: [1] Broadband is defined as a DSL or cable connection. [2] National average lags other numbers (February 2005- March 2006)

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Findings
NYCHA Survey Results – Summary of Findings

Major Takeaways from NYCHA Survey[1]

- Households headed by older residents (age 50+) are the most at risk
  - Nearly 70% of households headed by residents aged 50-64, and more than 90% of households headed by residents aged 65+ do not have Internet access at home

- Major obstacles are affordability of computer hardware and Internet service
  - Older residents are more likely to cite lack of computer ownership as barrier
  - Younger residents are more likely to cite cost of Internet access

- Respondents expressed relatively strong interest in training, particularly on computer use, Microsoft Office, and how to access the Internet
  - Strongest interest in training on how to use a computer is by older residents (age 50+) without Internet access at home

- However, only a small percentage of residents is participating in NYCHA computer training programs

Notes: Paper survey mailed to 6,700 NYCHA households (197 developments across the 5 boroughs). Survey was translated into 4 languages – English, Spanish, Simplified Chinese and Russian and requested the head of household to complete the survey. Received 1,140 "valid" survey responses meaning there is 95% certainty that the results are within 3% (+/-) of the result for the entire NYCHA population.

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Findings
NYCHA Survey Results – Internet & Broadband Penetration Rates

- 30.9% of NYCHA households have an Internet connection at home

- 26% of households have broadband Internet service

- Broadband penetration rates for younger NYCHA households are equivalent to the national average

- Broadband penetration rates for older NYCHA households (age 50+) are relatively low

  – Lower than national rates for same age groups

  – NYCHA households age 65+ are 12 times less likely to have broadband than younger NYCHA households

1) NYCHA Broadband Penetration Rates Compared to National Studies

Percentage with broadband Internet service at home			
	NYCHA	**Leichtman[1]**	**Pew[2]**
Overall			
Total population	26%	53%	47%
Age			
18-29	61%	N/A	63%
30-49	60%	N/A	59%
50-64	24%	N/A	40%
65+	5%	N/A	15%
Household Income			
Under $30K	N/A	29%	30%
$30K-$50K	N/A	47%	46%
$50K-$75K	N/A	58%	58%
Over $75K	N/A	76%	76%

Sources: 1) "Broadband Across the US." Leichtman Research Group, Inc. May 2007.
2) Home Broadband Adoption 2007, Pew Internet & American Life Project, June 2007.

2) NYCHA Type of Internet Access at Home by Age Group

Age Group	Dial Up	Broadband	No Internet/ Don't Know	Total Respondents
<18	0.0%	0.0%	100%	3
18-29	7.6%	60.6%	31.8%	66
30-49	8.1%	60.0%	31.9%	260
50-64	5.0%	24.1%	71.0%	303
65+	2.2%	5.0%	92.8%	403
Not Mentioned	3.0%	5.9%	91.1%	101
Total	**4.7%**	**26.0%**	**69.4%**	**1136**

Internet penetration rates for NYCHA residents are low compared to national studies; households headed by older residents (50+) are particularly at risk

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Findings
Public Library Survey Results – Summary of Findings

Major Takeaways from the Public Library Survey[1]

- More than half of all survey respondents (52.6%) do not have Internet access at home

- For roughly one third (33%) of all survey respondents, their *sole source* of Internet access is at a public library
    - Of respondents without home Internet service, 67.2% (33% of all respondents) stated that they go to a public library to access the Internet because they cannot access the Internet *anywhere else*.

- Respondents without home Internet service are heavy users of public library computer facilities
    - More than half of all respondents without Internet service (52.1%) used public library computer facilities three or more times a week.

- 34.6% of respondents with home Internet service stated that they used the Internet at public libraries because the library's connection was faster than at other places where they accessed the Internet (for example, at home)

- The primary reasons respondents cited for not having home Internet service were inability to afford computer hardware and Internet service
    - A majority of respondents (53%) without Internet access at home cited lack of computer ownership as the primary reason for not having home Internet service
    - The second most commonly cited reason for not having Internet access at home was because it was too expensive (cited by 14.2% of respondents)

Note: [1]Paper survey of public library patrons at 58 branches resulting in 2,249 responses

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Findings
Current State Overview – Broadband for Businesses

Large businesses are well served; NYC market attractive vs. int'l peers[1]

- **Bandwidth availability**: NYC is in the top-tier with regard to capacity and provider options (along with London, Frankfurt, and Amsterdam)

- **Pricing**: NYC is generally the least expensive option relative to core competitors[1]
    - On average, dedicated Internet access (DIA) in NYC is $97 per Mbps[1]
    - Compared to $254 per Mbps in Tokyo and $186 per Mbps in Hong Kong[1]

Service options may be limited in some industrial/manufacturing areas

- **Small- and medium-sized enterprises (SMEs) generally well-served**
    - 82.1% of industrial businesses surveyed have a broadband connection[2]

- **Some industrial/manufacturing areas may have limited service options**
    - For example, industrial business zones such as Hunts Point, Southwest Brooklyn, East New York, and Flatlands-Fairfield

Sources: [1] Telegeography, Diamond analysis and interviews with technology/telecom decision makers at NYC-based large businesses;
[2] SBS conducted phone surveys of 1,007 industrial firms across the 5 boroughs in the first half of 2007.
Notes: [1] Competitor set includes London, Paris, Tokyo, Hong Kong, Chicago, Los Angeles and San Francisco.
[2] Dedicated internet access (DIA) is a dedicated connection to an IP network backbone, typically used by larger businesses for basic connectivity.

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Findings
Industrial Businesses Survey Results[1]

- 82.1% of all respondents had a broadband connection (88.2% had an Internet connection)

- Larger organizations were more likely to have broadband service
  - 76% of businesses with 1-4 employees had broadband service (83.3% Internet)
  - Compared to 93% of businesses with 20+ employees (96.2% Internet)

- 58.8% of respondents w/out Internet service stated they did not need it

- 18.8% of respondents w/out Internet service stated it was too expensive

- 11.2% of respondents w/out Internet service (1.9% of all respondents) stated they could not get service

1) Internet penetration rates, by organization size (# employees)

# Employees	Broadband	Dial Up	No Internet	Total (count)
1-4	76.0%	7.3%	15.9%	371
5-9	82.6%	7.2%	10.1%	207
10-19	80.6%	6.3%	10.6%	160
>=20	92.9%	3.3%	2.8%	212
Not Mentioned	84.2%	3.5%	10.5%	57
Total	82.1%	6.1%	10.8%	1007

2) Reason for not having an Internet connection, by organization size (# employees)

Organization Size	Can't Get It	Don't Need it	Other	Too Expensive	No Response	Total (count)
0-4	11.6%	53.5%	4.7%	22.1%	8.1%	86
5-9	11.1%	63.9%	0.0%	22.2%	2.8%	36
10-19	7.4%	63.0%	11.1%	14.8%	3.7%	27
>=20	15.4%	61.6%	15.4%	7.7%	0.0%	13
Not Mentioned	12.5%	75.0%	12.5%	0.0%	0.0%	8
Total	11.2%	58.8%	5.9%	18.8%	5.3%	170

Larger organizations were more likely to have Internet service than very small organizations; 60% of organizations without Internet service did not believe they need it

Source: [1] SBS conducted phone surveys of 1,007 industrial firms across the 5 boroughs in the first half of 2007.

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Enterprise Communications Assessment – Capacity

International Internet Bandwidth (2006)

Rank	City, Country	Mbps
1	London, U.K.	1,401,506
2	Paris, France	971,693
3	**New York, U.S.**	**820,226**
4	Frankfurt, Germany	793,124
5	Amsterdam, Netherlands	646,272
6	Stockholm, Sweden	293,222
7	Tokyo, Japan	268,601
8	San Francisco, U.S.	262,345
9	Copenhagen, Denmark	261,111
10	Washington, U.S.	254,933
11	Madrid, Spain	225,782
12	Hamburg, Germany	215,138
13	Los Angeles, U.S.	192,548
14	Miami, U.S.	188,915
15	Brussels, Belgium	167,789
16	Toronto, Canada	160,578
17	Milan, Italy	142,220
18	Vienna, Austria	137,236
19	Taipei, Taiwan	132,240
20	Seattle, U.S.	128,587
21	Hong Kong, China	127,027
22	Düsseldorf, Germany	126,142
23	Seoul, Korea, Rep.	121,914
24	Chicago, U.S.	102,350
25	São Paulo, Brazil	100,610

Source: TeleGeography

Observations

- Only London and Paris have higher international bandwidth capacity than New York City

- Interviews confirmed that the availability of capacity is <u>not</u> a concern in NYC or other major cities

Data Limitations

- Significant conclusions about city-level capacity cannot be drawn in the absence of data on how much capacity is "lit"/utilized

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Findings: NYC Needs Assessment
Enterprise Communications Assessment – Capacity (2002 – 2006)

International Internet Bandwidth (Mbps)

Rank	City, Country	2002	2003	2004	2005	2006
1	London, U.K.	294,996	534,694	779,507	1,079,266	1,401,506
2	Paris, France	182,476	339,192	495,800	688,852	971,693
3	**New York, U.S.**	**200,768**	**333,584**	**428,892**	**606,249**	**820,226**
4	Frankfurt, Germany	149,132	245,676	323,804	471,684	793,124
5	Amsterdam, Netherlands	154,128	250,566	331,414	454,413	646,272
6	Stockholm, Sweden	49,162	84,164	150,606	184,907	293,222
7	Tokyo, Japan	29,365	69,415	124,420	193,472	268,601
8	San Francisco, U.S.	33,873	60,754	113,931	192,420	262,345
9	Copenhagen, Denmark	82,853	113,583	180,370	185,877	261,111
10	Washington, U.S.	32,482	115,318	148,315	187,745	254,933
11	Madrid, Spain	35,781	74,593	101,291	155,153	225,782
12	Hamburg, Germany	23,102	84,440	172,312	185,376	215,138
13	Los Angeles, U.S.	16,866	29,997	59,698	101,178	192,548
14	Miami, U.S.	19,428	40,179	54,314	79,362	188,915
15	Brussels, Belgium	78,693	80,991	110,067	114,944	167,789
16	Toronto, Canada	41,523	69,944	104,454	139,281	160,578
17	Milan, Italy	43,038	67,955	83,492	109,766	142,220
18	Vienna, Austria	18,623	32,037	49,608	77,605	137,236
19	Taipei, Taiwan	11,246	18,038	41,604	82,178	132,240
20	Seattle, U.S.	24,757	53,842	57,625	83,486	128,587
21	Hong Kong, China	12,311	24,025	45,338	87,483	127,027
22	Düsseldorf, Germany	25,811	28,654	36,743	56,136	126,142
23	Seoul, Korea, Rep.	12,588	29,303	47,819	86,373	121,914
24	Chicago, U.S.	27,257	54,862	80,621	94,306	102,350
25	São Paulo, Brazil	7,301	16,815	18,474	29,369	100,610

Source: TeleGeography.

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Citywide Municipal Wireless

| *Many cities have pursued municipal wireless* | *However, it is not currently advisable for NYC[1]* |

- **Cities typically have two primary goals:**

  1. Address needs not met by the market

     – Universal availability of service

     – Affordability of service

  2. Position themselves as being technologically advanced

     – Attract and retain information-dependent companies
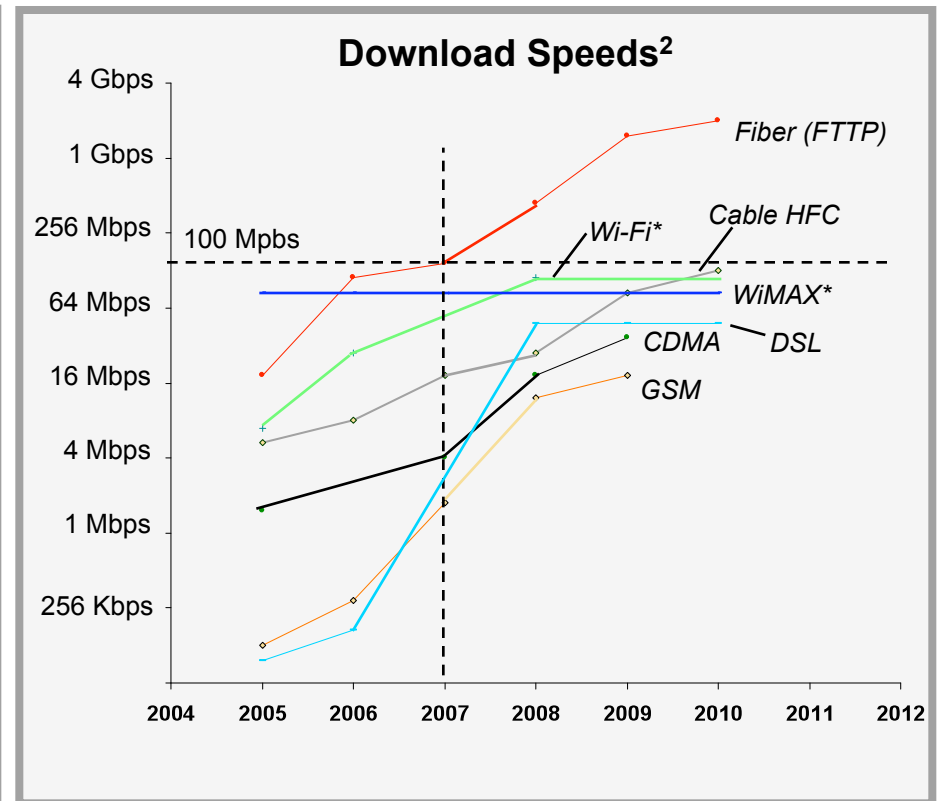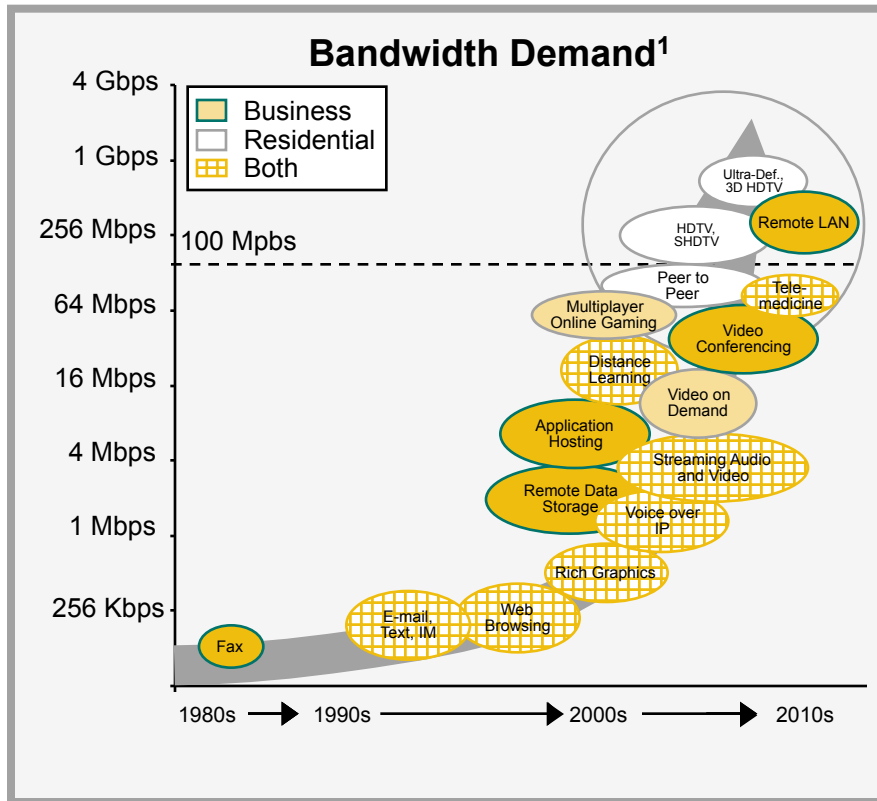
     – Enable a tech-savvy workforce

- **Lack of widespread market failure obviates need for large-scale City intervention**

  – Analysis shows that majority of residential and commercial needs addressed by providers

  – Unmet needs require targeted solutions

- **Significant technological limitations**

  – Limited capacity (fiber optimal)

  – In-building penetration issues

  – Security and reliability concerns

  – Obsolescence risk

- **Peer cities' experiences highlight deployment challenges**

  – Unproven business models, cost overruns and limited demand

Although Citywide municipal wireless is currently inadvisable for NYC, targeted investments in wireless should be a component of a broader portfolio of initiatives

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Findings: Broadband Technology Assessment
Only fiber expected to meet rapidly evolving bandwidth requirements

Bandwidth Demand[1]

- Business (Business)
- Residential (Residential)
- Both (Both)

4 Gbps
1 Gbps
256 Mbps
100 Mpbs
64 Mbps
16 Mbps
4 Mbps
1 Mbps
256 Kbps

Ultra-Def., 3D HDTV
HDTV, SHDTV
Remote LAN
Peer to Peer
Tele-medicine
Multiplayer Online Gaming
Video Conferencing
Distance Learning
Video on Demand
Application Hosting
Streaming Audio and Video
Remote Data Storage
Voice over IP
Rich Graphics
E-mail, Text, IM
Web Browsing
Fax

1980s — 1990s — 2000s — 2010s

Download Speeds[2]

4 Gbps
1 Gbps
256 Mbps
100 Mpbs
64 Mbps
16 Mbps
4 Mbps
1 Mbps
256 Kbps

Fiber (FTTP)
Cable HFC
Wi-Fi*
WiMAX*
CDMA
DSL
GSM

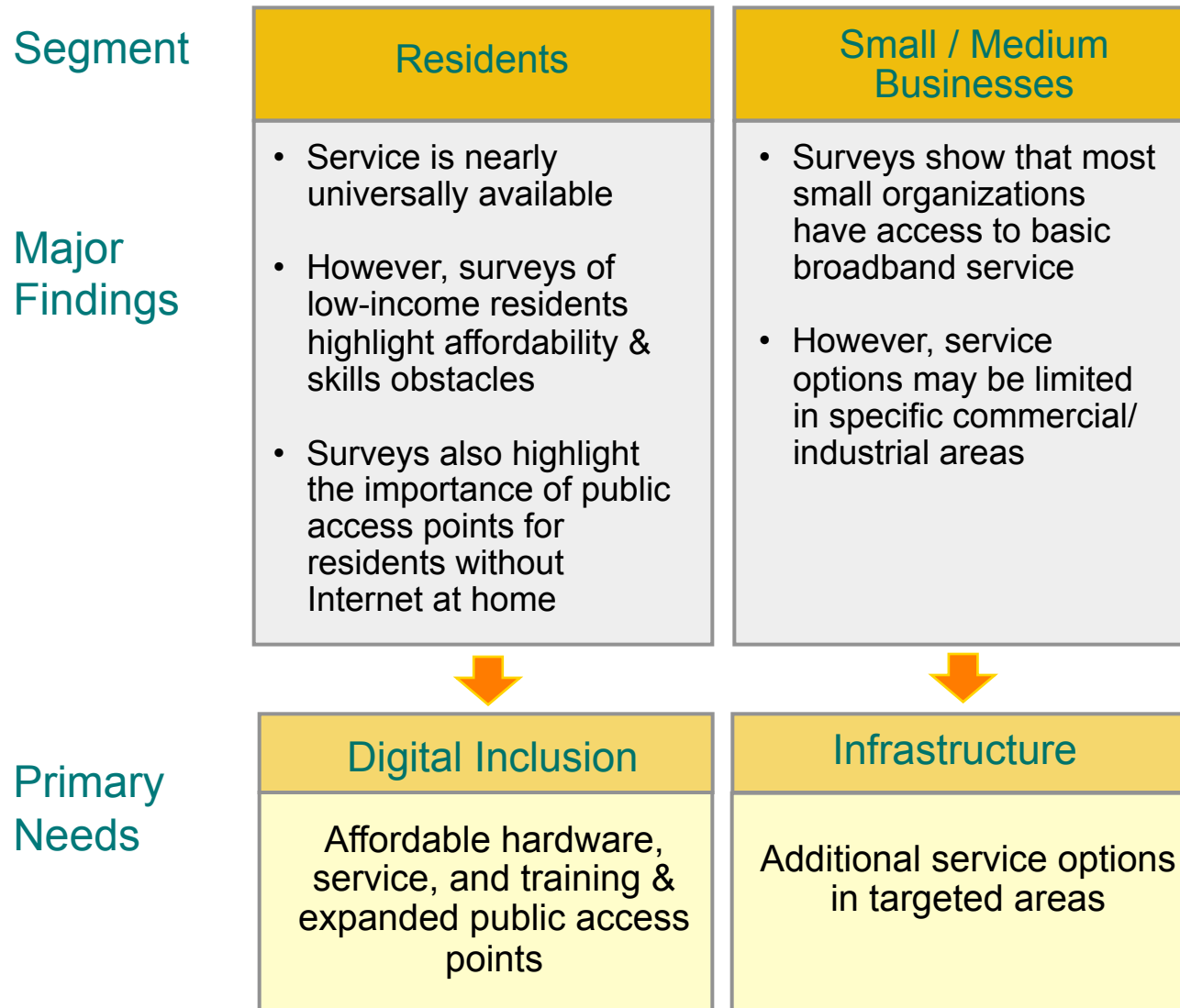2004 2005 2006 2007 2008 2009 2010 2011 2012

The City's challenges will intensify as requirements for 100 Mbps emerge by 2010

Notes: *Wi-Fi , WiMAX, CDMA and GSM speeds are theoretical; actual speeds vary greatly as function of distance to the base station and network congestion.
Sources: [1]Robertson Stevenson, Diamond analysis; [2]DOCSIS Overview – Cable Television Laboratories, FTTH Design w/ the Future in Mind (John George), Institute of Electrical and Electronics Engineers (IEEE), GSM World, www.cdmatech.com, Diamond analysis.

Key Segments' Primary Needs

Segment	Residents	Small / Medium Businesses
Major Findings	• Service is nearly universally available • However, surveys of low-income residents highlight affordability & skills obstacles • Surveys also highlight the importance of public access points for residents without Internet at home	• Surveys show that most small organizations have access to basic broadband service • However, service options may be limited in specific commercial/ industrial areas
Primary Needs	**Digital Inclusion** Affordable hardware, service, and training & expanded public access points	**Infrastructure** Additional service options in targeted areas

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Introduction

Proposed Initiatives

Digital Inclusion

- **Support technology adoption by low-income households**

- **Expand public access points**

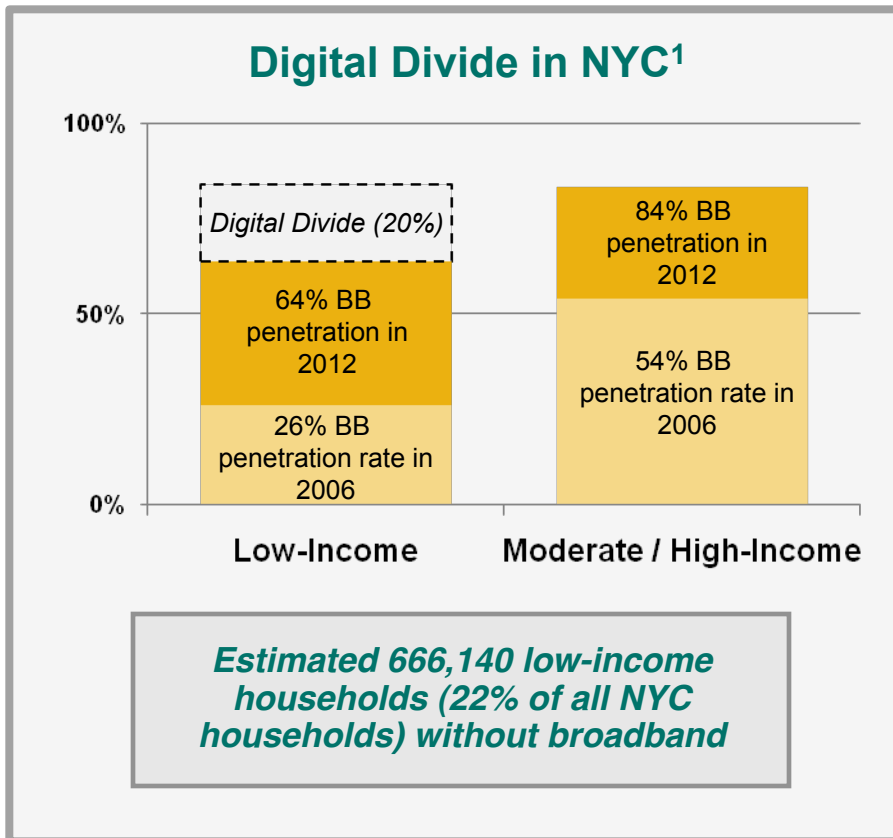- **Encourage provision of broadband service in affordable housing**

Digital Infrastructure

- **Expand service options in manufacturing/industrial areas**

- **Spur deployment of next-generation technologies**

- **Support wireless deployment in public spaces**

These Recommendations take concrete steps towards ensuring that New York is a leading- edge Digital City

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Goals for Digital Inclusion Programs

Digital Divide in NYC[1]

Estimated 666,140 low-income households (22% of all NYC households) without broadband

- **Rationale for City intervention**:
  - 21st century skills required for successful economic and social participation
  - Ensuring NYC residents are tech-literate is prerequisite for the City to successfully move services online and reduce delivery costs

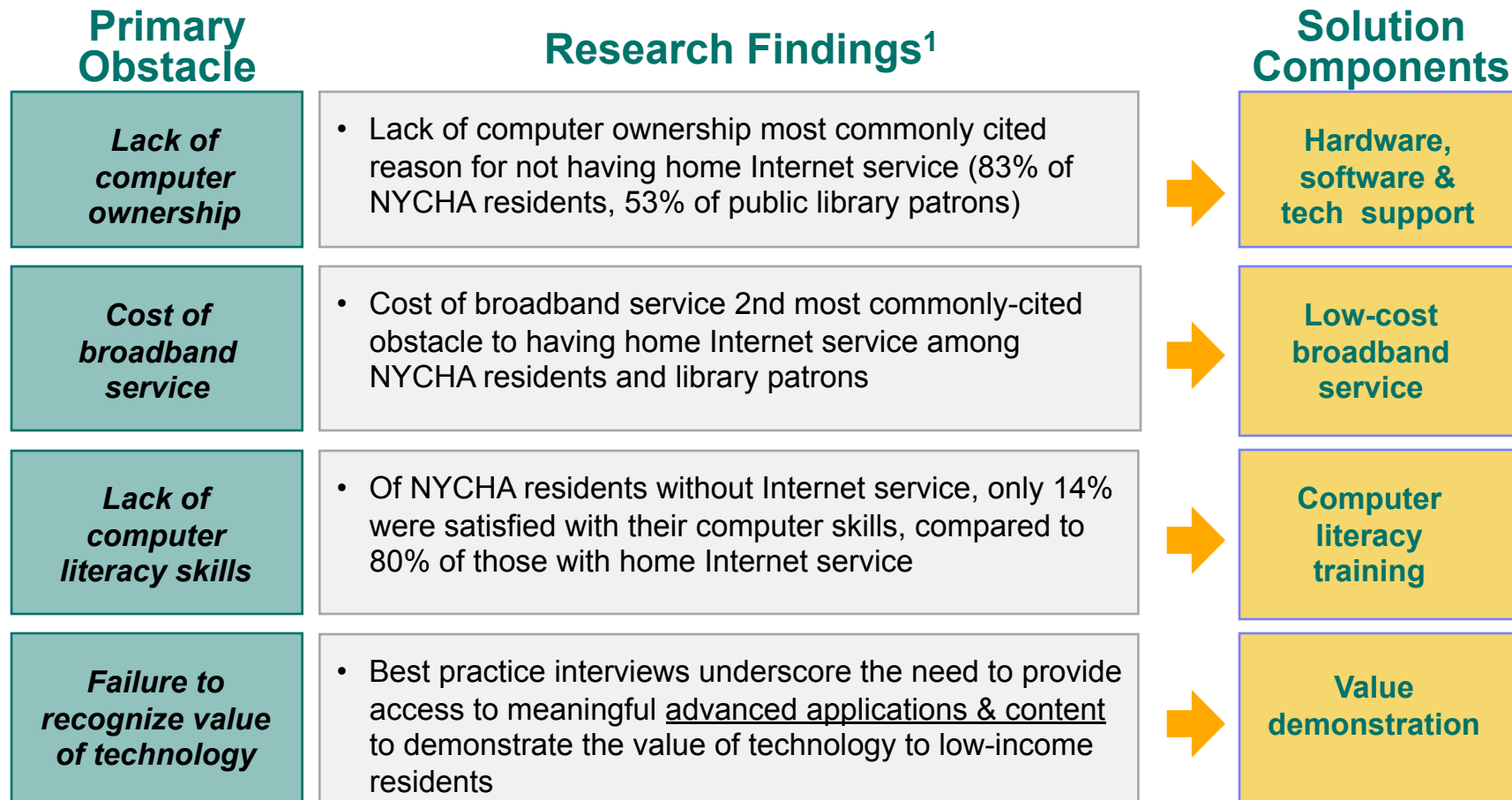- **Goals of digital inclusion initiatives**:
  1. Empower low-income residents to use technology to improve their lives
  2. Find innovative ways to lower costs of City programs and delivery of key services to low-income residents

Sources: [1]American Community Survey 2006, survey of Internet and broadband availability and adoption among NYCHA residents, Scarborough Research, Pew Internet & American Life Project, Diamond analysis.

The Digital Inclusion programs will seek to eliminate the gap in broadband adoption rates between low-income and moderate- to high-income New York City residents

Primary causes of the digital divide & recommended solutions

Primary Obstacle	Research Findings[1]		Solution Components
Lack of computer ownership	• Lack of computer ownership most commonly cited reason for not having home Internet service (83% of NYCHA residents, 53% of public library patrons)	➡	**Hardware, software & tech support**
Cost of broadband service	• Cost of broadband service 2nd most commonly-cited obstacle to having home Internet service among NYCHA residents and library patrons	➡	**Low-cost broadband service**
Lack of computer literacy skills	• Of NYCHA residents without Internet service, only 14% were satisfied with their computer skills, compared to 80% of those with home Internet service	➡	**Computer literacy training**
Failure to recognize value of technology	• Best practice interviews underscore the need to provide access to meaningful <u>advanced applications & content</u> to demonstrate the value of technology to low-income residents	➡	**Value demonstration**

> *Low-income residents typically face all of these obstacles simultaneously - thus digital inclusion programs must provide a holistic solution with all 4 components*

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Summary of Digital Inclusion Components

Digital Inclusion Framework

1 Digital Literacy Training

- Basic computer / Internet literacy training

- Customized for the specific target segment

2 Computer Hardware & Software

- Free computer (refurbished or new)

- Option to purchase a discounted computer through a financing option

3 Broadband Service

- Some participants may only require low-cost introductory period to demonstrate value

- Others may require ongoing low-cost service

4 Ongoing Technical Support

- Easy access to technical support

5 Applications & Content

- Link to content that has meaningful impact on participants' lives (e.g., educational software, advanced skills training)

- Reinforces City's goals & initiatives (e.g., education, workforce development)

6 Marketing & Awareness

- Information on programs from a trusted source

- Support in understanding program benefits, etc.

Center diagram:

- **Low- Income NYC Residents** (center)
- 1 DIGITIAL LITERACY TRAINING
- 2 COMPUTER HARDWARE & SOFTWARE
- 3 BROADBAND SERVICE
- 4 ONGOING TECHNICAL SUPPORT
- 5 APPLICATIONS & CONTENT
- 6 MARKETING & AWARENESS
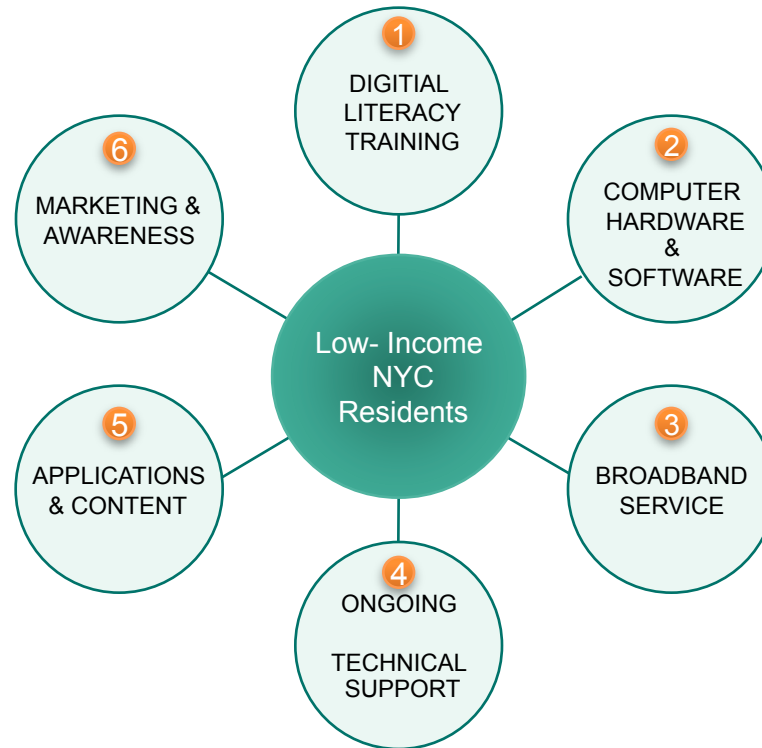
Qualitative and best practice research demonstrate that these components are required for digital inclusion programs to succeed

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Digital Inclusion: Expand Public Access Points

Locations of Public Access Points

ILLUSTRATIVE
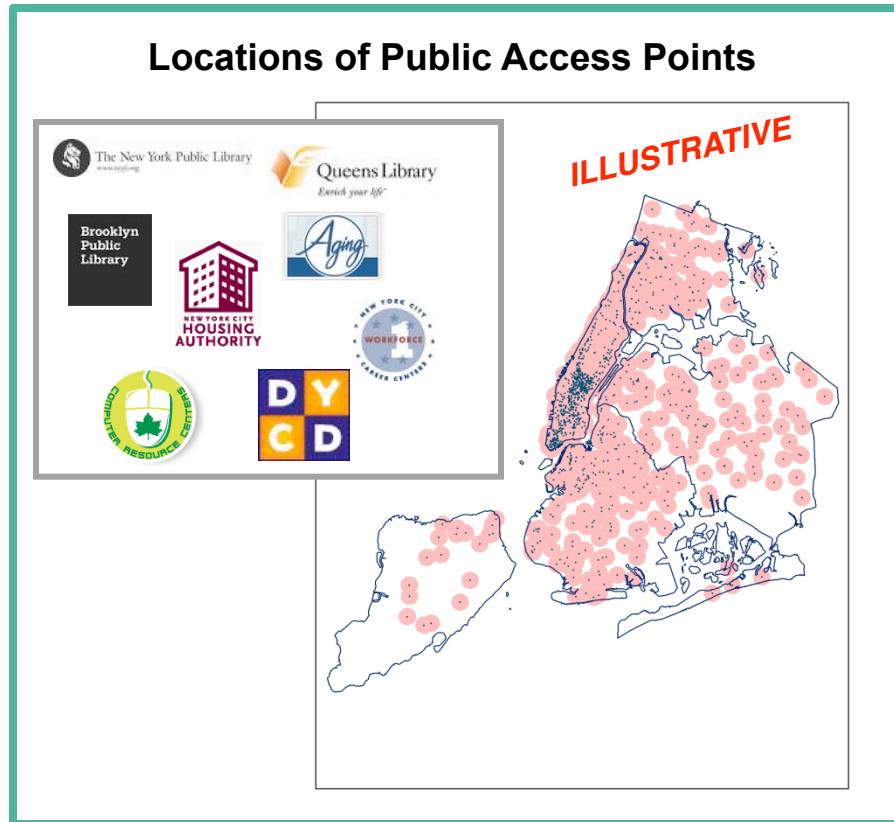
- **Public access points fulfill a critical need, as demonstrated by a survey[1] of public library patrons which found:**

  - 53% of all survey respondents did not have Internet access at home

  - For 33% of all respondents their sole source of Internet access was at a public library

  - More than 50% of respondents without home Internet service used public library computer facilities 3 or more times a week

- **In addition to 210 library locations, more than 100 centers are currently in operation across the City (e.g., NYCHA, DFTA and SBS WF1 centers)**

- **Additional locations exist, but are in need of additional funds to create centers that can provide public Internet access and support for technology literacy training programs**

Note: [1] Paper survey of public library patrons at 58 branches across the five boroughs resulting in 2,249 responses

Public access points fulfill a critical need for New Yorkers without computers and Internet access at home, and as a venue for technology literacy training

Digital Infrastructure: Expand Service Options in Commercial / Industrial Areas

Targeted Commercial / Industrial Areas
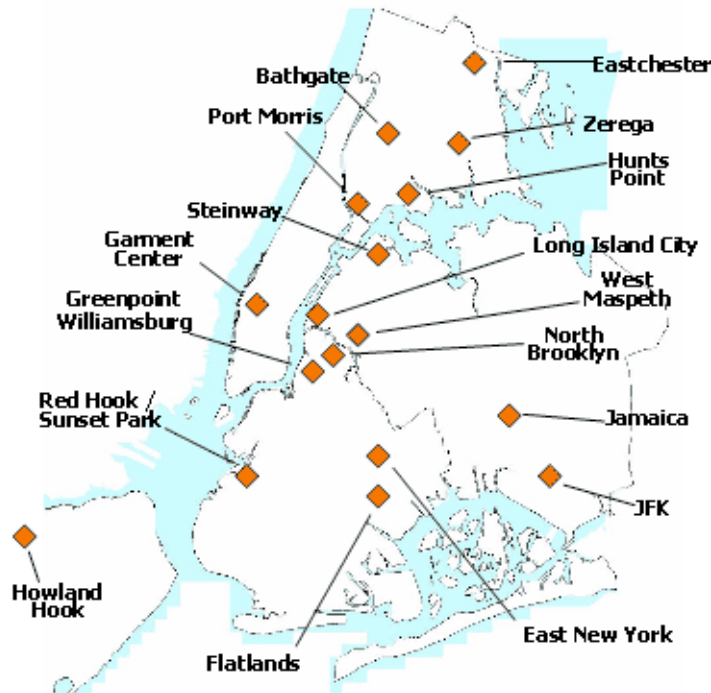
- While needs vary from business to business and block to block, small businesses in specific manufacturing / industrial areas (e.g., IBZs) may have limited broadband service options and/or require additional information and support to adopt and make use of technology

- The City should collaborate with local community organizations to further define needs in IBZs and surrounding areas, expand / improve service options, and promote technology usage

Ensuring that businesses in at-risk commercial and industrial areas are adopting and making use of technology is critical for continued economic development

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Digital Infrastructure: Support Wireless Deployment in Public Spaces

- **The City should continue to expand the availability of wireless in public spaces**
    - Solicit vendor and community input on deploying wireless in parks and other public spaces
    - Consider additional ways to assist community organizations (e.g., BIDS and community wireless organizations) to deploy and operate wireless networks

Wireless in public spaces provides an important amenity to residents, mobile workers and visitors

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