2013

Wireless Cell Towers and Antennae: Municipal and Private Relationship

James M. Collins
Dyson College of Arts and Sciences, Pace University.

WIRELESS CELL TOWERS AND ANTENNAE:

MUNICIPAL AND PRIVATE RELATIONSHIP

BY

JAMES M. COLLINS

SUBMITTED IN PARTIAL FULFILLMENT OF REQUIREMENTS FOR THE DEGREE

OF MASTER OF PUBLIC ADMINISTRATION

DEPARTMENT OF PUBLIC ADMINISTRATION

DYSON COLLEGE OF ARTS AND SCIENCES

PACE UNIVERSITY

December, 2013

APPROVED BY_____

Acknowledgement

In dedication to my Mother, Ann Collins, a retired employee of Pace University's School of Education, whose valiant and courageous battle against an advanced form of Melanoma during the creation of this Capstone Project has been inspirational. Her motto, "Drive, Direction, Motivation", inspired a strong work ethic in me that will remain with me throughout my life.

Table of Contents

List of Figures

Abstract

Americans have seemingly gone 'mobile-mad' with their demand for various mobile communications devices such as cell phones, smartphones, tablet devices and, now on the horizon, machine to machine devices and dedicated wireless home phone connect products. As a nation we have become increasingly reliant on wireless technology. Our mobile communications industry has experienced extraordinary changes that have been brought about by the introduction of new wireless technologies and the increased market demand for these new products. As technology changes within the wireless industry, providers have had to work feverously to meet the extraordinary demands caused by these changes and by the proliferation of the use of wireless product by Americans from 'eight to eighty.'

Chapter I: An Introduction to the Research Problem

If the presence of electricity can be made visible in any part of the circuit, I see no reason why intelligence may not be transmitted instantaneously by electricity.

-Samuel Morse

The telecommunications field has grown by leaps and bounds since its beginning, when Samuel Morse invented the electrical telegraph in 1837. To describe telecommunications it is really just the transmission, emission and/or reception of radio signals, whether it is in the form of voice communications, digital images, via wires and cables; or now wirelessly. They all include the same common denominator which is the transmission of voice, video, data, broadband, wireless and satellite technologies and others.

Traditional landline telephone service utilizes an extensive network of copper interconnecting lines to transmit and receive a phone call between parties. Fiber optic and T-1 data lines increase the capabilities by delivering not only traditional telephone, but also high-speed internet and, in some situations cable television, and are capable of substantially more. This technology involves an extensive network of fiber optic lines situated either above or below ground locations.

Wireless telephony, also known as wireless communications, includes mobile phones, pagers, and two-way enhanced radio systems and relies on the combination of landlines, cable and an extensive network of elevated antennae most typically found on communication towers to transmit voice and data information. The evolution of this technology is known as first; second, third, fourth and now fifth generation (1G through 5G) of wireless deployment.

The United States has seen a dramatic increase in the number of people who use cellular devices over the past fifteen years. This very significant increase has changed the way people communicate with each other and, as a result, has created a heretofore unseen demand for better and faster wireless service. This heightened demand has forced many telecommunications providers to think of new and creative ways to meet the seemingly never-ending subscriber requirement for more and more service. Today, one of the challenges that face telecommunication providers is the decision regarding where to place or locate new cellular towers and related equipment in order to meet this ever-increasing demand. Typically, cell towers have technological requirements in terms of placement. Providers must locate or place each tower in an area that will maximize its utility and purpose while, at the same time, accommodating the ever-growing number of subscribers in a given area. Cell tower placement is not much different than legacy landline requirements. The old POTS lines --- or plain old telephone service lines --- used copper wire that were laid-out through a community and, that oftentimes crossed both public and private lands to accommodate the population of that area. Although wireless communication has the same requirements, the difference is the tower's need to be placed throughout a geographical region but not necessarily connected via landlines.

Cell phones have been around since the early 1940's but, at that time, they were limited to phones installed in cars and, to some degree, those that were used in the trucking industry (AT&T, 2012). The first commercially available cell phone came to the market in 1984 from Motorola and weighed 2 pounds. It was a DynaTec 8000x which was invented by Motorola's Dr. Martin Cooper and John F. Mitchell and, was available to the public at a cost of $3,995. Although very expensive, this new device gained popularity because the character of Gordon Gecko in the movie Wall Street used it. A few years later, in 1991, when the Motorola

MicroTAC Lite was created, it was available at a dramatically reduced cost of $1,000 (Romero, 2009). In the industry, this time-period was known or as the first generation of commercially available wireless communication, an analog network that was colloquially known as 1G. It was not until the early 1990's that wireless devices began to gain acceptance among the masses of telecommunications consumers and, with the advent of the second generation devices, the digital network known as 2G was born. Beginning with the 2G era the number of wireless subscribers increased dramatically. In 1996, there were 44 million wireless subscribers in the United States and, by December, 2011 there were 332 million wireless subscribers using either 3G or the more recently launched 4G devices. In 2011, the total number of wireless device subscribers surpassed the United States population of 311 million. This is not only as a result of cellular telephone subscribers, but also due to the advent and increased use of other wireless devices such as hand held tablets, machine to machine products and dedicated home phone connect products (CTIA - The Wireless Association, 2011).

The increase in the number of people who use cellular communications has created the need for an ever increasingly reliable network of cellular related technologies built to accommodate the increased demand for its services. In December 1996 there were approximately 30,045 cell sites in the United States and, by December 2011, this number grew to approximately 283,385 (CTIA-The Wireless Association, 2011). The impact of the wireless industry has been tremendous and its economic impact has been and, by all indication, will continue to be broad and deep. In 2011, there were approximately 3.8 million jobs related to the wireless industry. That same year the industry contributed approximately $146.2 billion to the United States Gross Domestic Product or US GDP and approximately $88.6 billion in income taxes, sales taxes and fees to US, state and local governments (Entner, 2011).

Cell Towers and Antennae

Cell towers come in all different sizes and shapes. The typical cell tower is a steel pole or steel structure that rises hundreds of feet into the air. Located at the top of the tower are various radio transmitters and receivers that send signals to or receive wireless signals from the mobile devices of those subscribers that are currently physically located in that specific area. Towers are either owned by the wireless providers such as Verizon Wireless, AT&T and Sprint or they are owned by companies who are not wireless providers but whose business is dedicated to building and maintaining cell towers. Some of the larger tower companies include American Tower, SBA Communications and Crown Castle. These companies lease space to the larger telecommunications companies (or telecoms as they are known) including the three listed above. One tower can have equipment for all three companies. When someone makes a call with a wireless device it simply 'radios' via radio waves to the nearest cell tower and 'says', what amounts to 'someone is trying to connect wirelessly to a tower.' The message from an individual's cellular device is picked up by the antennae array. That signal is transmitted down to the wireless access point, connected a multi-port switch. The call along with many others or a packet is transmitted down to a backhaul device and usually sent down to either an underground wire which, most likely, is a T1 or T3 dedicated circuit or to a backhaul connection and then to a microwave dish. Either way it is sent back to the central office which is commonly referred to as the CO. When a call is directed back to an individual's wireless device it is simply the reverse process. The signal comes back up from the dedicated circuit or sent to the microwave dish to the backhaul to the transmitter and sent through a radio wave to the individual's wireless device. If the wireless device is moving between cell sites as in a car, the radio signal simply is transmitted

to the cell tower that is closest to the current location. The switching and routing happens in a fraction of a second using a combination of dedicated landline and wireless equipment.

When a wireless carrier determines that a new cell tower or antenna is required the respective provider typically performs a wireless site survey, or a RF (radio frequency) site survey, to determine the wireless solution that will best meet the required wireless demand. Site selection does include the technical aspect of proximity of the towers to each other and to their subscribers who are demanding service. Other considerations include topography, trees and other forms of natural vegetation in the area, proximity to roadways, size of the proposed site, local zoning guidelines as well as lease terms, if applicable. It should be noted that lease terms apply where a local government or local landowner is involved. In either case public sentiment might be, and often is a significant concern. In addition to cell towers, cell antennae (that transmit and receive in the same way as cell towers) are placed on top of buildings in order to serve dense populations.

Research Purpose

The purpose of this research is to examine and identify who has the most influence over wireless tower and antenna site selection in Westchester County as well as compare the site selections for two different municipalities within the County. The research will answer the following three questions:

1. What is the relationship between wireless telecommunication providers and local governments?
2. Are cell site towers and antennas placed based on technological needs or based on public or government demands?
3. What are the sentiments and opinions of the public regarding the placement of cell towers in their community?

Chapter II: Literature Review

This literature review looks at the American society's growing demand for wireless technology and the issues surrounding where cell towers are placed or located within a community.

Wireless Industry

In 2001, as the economy was heading into a recession, there were approximately 100,000 cell towers in the United States. In order to meet the growing demand, it was projected that 200,000 cell towers would be needed by 2012 (Murray, 2002). In actuality, Murray's projections were a bit under-weighted because, according to the CTIA - The Wireless Association, as of July 2012 there are approximately 283,385 cell towers (CTIA-The Wireless Association, 2011). This show how even our educated, earlier projections for the number of cell towers needed to support the increased demand, was not accurately able to project demand in 2012. With the advent of 3G and 4G technologies and the demand not only for voice and text but now data, the projections in 2002 was not able to accurately factor-in the vastly different technology and the consumer appetite for these products. A recent national survey of Americans and their communications gadgets show that 85% of all adults now own a cell phone (Zickhur, 2011) -- and that percentage is even higher for the so-called millennial generation of 18 to 35-year old adults with 95% of this group now owning a cell phone. And, today, those cell phones are being used for more than just making calls. According to the Pew Internet and American Life Project and the American Life Project, 28% of cell phone owners use their phone to get directions or other location-specific information (such as movie reviews and listings of nearby restaurants, gas stations, etc.) (Zickhur & Smith, 2011). Nearly three-fourths of American cell phone owners regularly use their cell

phone to text messages to others. More than a third of those individuals who text prefer text messages to phone conversations (Smith, 2011).

The adoption of a mobile culture in the United States seemingly crosses cultural and economic boundaries as well. Individuals in the middle income and the upper income brackets own cell phones. According to the Pew Research Center's Internet and American Life Project that was conducted in 2010, 95% of those individuals earning $75,000 or more own a cell phone and 93% of those individuals who earn between $50,000 and $74,999 own a cell phone. In addition cell phones are owned by 75% of people earning less than $30,000 annually and 90% of people earning more than $30,000 and less than $50,000 annually. 75% of the people who earn below $75,000 own a cell phone. Interestingly, only 40% of lower income individuals have broadband internet connections and, based on past research, that number seems to be decreasing (Jansen, 2010). This may be a result of the federal government's 1966 expansion of the Communications Act of 1934. The Communications Act of 1934 established the Universal Service Fund -- a fee that is assessed on communication providers so that communication services may be made available to lower income individuals at a 'reasonable cost.' In 1996, through the Telecommunications Act of 1996, this 'reasonable cost' availability was expanded this to include wireless technology (Dailey, 2009).

In recent years the American society has changed in many ways including the undeniable fact that we are becoming increasingly wireless. Telecommunication providers and local governments are trying to keep up with the rapid innovation in communication technology that is being embraced by the general public. The providers and their radio frequency engineers are constantly reviewing maps of any given area in the United States looking for ways of improving service and to ensure that they will be able to continually expand their networks which includes

wireless towers and related equipment in order to meet the increasing demand. Local governments are struggling to balance the demand for wireless service and, working in conjunction with their local zoning and planning departments, are striving to determine how and if wireless towers can be integrated into their community.

Wireless Tower Regulations

The increased demand is clearly evidenced in the paragraphs above. One of the necessary components to meet the increased demand is the effective planning and placement of cell towers throughout our country. Municipalities are struggling with how to effectively plan for and integrate these towers within their community.

Even though most cell tower sitings are regulated by local municipalities, the federal government and the Federal Communications Commission (FCC) has issued some significant rulings that impact how local planning and zoning boards and municipalities are to handle cell tower sitting applications.

The Telecommunications Act of 1996 which was signed into law by President Bill Clinton contains provisions regarding the sittings of antennae and towers for wireless service. Although it maintains local authority over such sittings, it prohibits state and local governments from unreasonably discriminating among personal wireless providers and from prohibiting the provision of the wireless service, and requires them to act on such requests with a reasonable period of time. While this law preserves local zoning authority it limits the authority of local zoning board in terms of creating zoning rules regarding prohibiting cell towers within their community (FCC, 1996). An interesting aspect of this act surrounds the fact that it prohibits the regulation on the basis of the environmental effects of radio frequency prohibitions if the facilities comply with Federal Communication Commission's guidelines (Albermarle, 2012).

In November 2009 the FCC enacted a law that was termed as the 'shot clock' ruling. The term 'shot clock' comes from basketball and is a method to run the clock with the intent of shortening the game. Essentially, local zoning authorities are required to shorten the amount of time they have to act on tower construction. They are required to act on siting requests within 90 days for a new antenna and 150 days for new tower construction. This approach ensures that wireless providers have a decision from the local zoning and planning boards within the specified time frame. If zoning authorities fail to render a decision in the appropriate time frame the wireless carriers can pursue legal action (Barnes, 2010). FCC Chairman Julius Genachowski said "Accelerating deployment of these new networks is a critical goal for the nation. Sometimes the FCC needs to act to provide rules of the road, and this is one of those times" (Eggerton, 2009). Although the Texas cities of Arlington and San Antonio both challenged this ruling, the U.S. Court of Appeals rejected the challenge and upheld the FCC's rule. (Barbagallo, 2012).

Local Planning Process

Ironically, the federal government does not traditionally get involved with local land use planning. Our federalism form of government establishes various layers of government, including federal, state and local municipalities. Interestingly, the Federal Constitution does not include local municipalities or housing, land use or planning. In New York, the State Constitution gives planning to the local municipalities. New York State's Municipal Home Rule Law enacted in 1964 found in the New York State Constitution (Article 12-a, 12-b, Section 236) grants power to local governments (counties, cities, towns and villages) over "their own property, affairs and government." It protects these local governments from interference from the state, in these matters giving local government, the power to "adopt

ordinances, resolutions, rules and regulations; acquire real and personal property; acquire, establish and maintain recreational facilities; fix, levy and collect charges and fees; and in the case of city, town or village, to adopt zoning regulations and conduct comprehensive planning" (New York State, 2009). The State's sixty-one cities, nine hundred thirty-two towns, and five hundred thirty-seven villages have specific authority given by the State Legislature to engage in local land use planning. It should be noted that while the New York State Municipal Home Rule Law specifically grants power to cities, towns and villages to adopt zoning regulations and conduct comprehensive planning to cities, towns and villages. It is not granted to counties. Municipal Home Rule acts as both a legal framework and a philosophy of governance; it lays out the legal process, through which local government can act, and it motivates a protection of this right to self-determination on the part of the local governments (New York State, 2009).

Wireless Cell Tower Revenue

Some communities are looking to incorporate cell towers in their community not only because there is a community need for additional wireless service but also because the placement of towers offer communities a new and often much-needed source of revenue. For example, in Georgia, as with a multitude of other local governments throughout the United States, the placement of wireless towers has provided their local governments and school districts with a new source of revenue. Landlords, whether they be private or government property can receive from $750 to $4,000 a month for allowing a cell phone property on a privately or publicly held property. Atlanta, Georgia, a city which is facing a budget deficit, earns more than $1 million annually for approximately 41 leased sites throughout the City" (McWilliams, 2012).

Wireless Cell Tower Concerns

Many people have concerns about cell towers in their community ranging from issues of aesthetics to various health-related concerns. While it is an undeniable fact that cell towers produce some degree of electromagnetic radiation, historically both the wireless industry and all of its wireless providers as well as the federal government have been steadfast in their position that this electromagnetic radiation does not pose a health risk. Despite this fact and our government's assurances, many communities still have the same concern about whether the electromagnetic radiation emissions from cell towers are dangerous.

Although, our federal government and the wireless industry maintain their position, there have been some rather interesting studies that are not as clear-cut. For example, the Bavarian state government in Germany published a study in 1998 suggesting that cell towers in close proximity to cow fields resulted in a measurable decrease in milk. When they relocated the cattle it restored the milk yield (Loscher & Kas, 1998). In Toronto, a wireless provider removed a cell phone antenna from the roof of a group of apartments where seven of the top floor residents were stricken with cancer (Flet, 2008). Many scientists including some from the World Health Organization refute these claims and say that cell towers produce such low levels of radiation that the impact is negligible. The State of Connecticut even has a website discussing concerns about cell towers and it states that most studies prove that cell towers radiation is too low to cause any problems. (Connecticut Department of Health, 2004) In the examination of this particular issue the studies suggest that cell phones are dangerous to humans and others which suggest that the levels of radiation are so low that there is no impact or health concern. Although here in the United States the federal government has been clear on its position -- there is not a

substantial health risk to people, it is understandable why there is some concern and why this could still present a challenge to either a municipality or to a provider.

One of the other concerns is the aesthetics of cell phone towers. Some communities have gone to a great extent to ensure that the tower is blended into the community. In the Town of Harrison in Westchester County, a cell phone tower located on the Hutchison River Parkway is designed so as to give the appearance of a tree. There have been other clever spots for locating cell towers including clock towers, flag poles and even houses of worship. As an example, in Albany, New York the Albany Jewish Community Center allowed a cell tower to be built on their property, because their esthetic concern was addressed by blending the cell tower into the natural landscape. Typically, the disguising of cell towers is expensive and could add on an additional $100,000 to $300,000 to the overall cost of construction (Grondahl, 2007). There are other methods including disguising them as palm trees, decorative towers and, for the roof top antennas, disguising them as roof-top chimneys (Grondahl, 2007).

Local Wireless Initiatives

Some examples of the expansion of wireless technology can be found in the metropolitan New York area. For example, in 1998 a tower was erected on the Fenway Golf Club in White Plains, New York (Rosenberg, 2000). The golf course is next the congregation Kol Ami synagogue. The adjacent neighborhood was in the Village of Scarsdale and this fact created an issue for some of the neighboring Scarsdale residents. As a result, Scarsdale enacted legislation that specified the distance a cell tower can be from a house of worship or a school. In northern Westchester in the Town of Pound Ridge many of the residents expressed their opposition to the placement of cell towers in their community (Brenner, 2010). There are cell sites all over the Hudson Valley area and many of them are so well disguised that, when passing them, the

untrained eye would not even know that a cell tower was there. While others, as in the case of Pound Ridge are opposed to the placement of a cell tower or cell towers within their municipal boundaries, it is certain the demographics for the Town of Pound Ridge would indicate a proportionately large number of subscribers of wireless service.

Chapter III: Methodology

Purpose of Study

The aim of this study is to observe the selection process for wireless cell towers in a community. This study will examine whether the site that is chosen is based on technical requirements and need or based on local government regulations, elected or appointed officials determination, or public opinion.

In order to reach a thorough understanding I will answer the following questions:

1. What is the relationship between wireless telecommunication providers and local governments?

2. Are cell site towers and antennas sites selected based on technological needs or based on public or government demands?

3. What is the sentiment and opinions of the public regarding the placement of cell towers in their community?

The ultimate goal of this study is to determine exactly who exerts the greatest influence over the placement of wireless cell towers and antennas in local communities. The study will focus on two communities in Westchester County, New York-- the Town of Mount Pleasant and the City of Yonkers.

The research is designed on an applied research platform that seeks to create an understanding regarding the patterns for site selection. One goal of the study is to gauge how people sentiments in a community have influence on cell site location. This research seeks to answer a practical question by testing a theory. The theory being that wireless cell tower and related equipment site selection are not made based solely on telecommunications requirements. Public sentiment and government official's opinions may influence where a cell site is located

within that given community. In order to have a narrow, manageable scope, the study will focus on two different types of communities

This study will rely heavily upon surveys. The information given by the selected respondents will be used to make observations about opinions regarding cell tower technology, understanding of how sites are selected and perception of the nature of the relationship between telecommunications providers and local municipalities.

Data Collection

The survey is designed for all individuals who are residents within the geographic areas designated in the study. Individuals under the age of 18 will be excluded from this survey because their experience in government and their understanding of the topic is not germane to this study. Although the survey will not have a minimum educational requirement, it will have educational level as one of its demographic questions. The study will exclude those respondents who do not have a cell phone as the study in part examines their usage as compared to their view of cell tower and antenna placement.

Instrument

A detailed questionnaire will be developed to gather data with respect to public opinion on this topic. The surveys will be administered online and, to a lesser extent, handed out to individuals. An online method using an online survey web tool will allow for the greatest number of targeted respondents to respond. In addition, links to the survey will be put on social interaction websites including Facebook and Twitter. The link to the survey will be emailed to known residents of the designated communities and people will be encouraged to forward it to other applicable individuals that are within their network. Additionally, demographic data will

be gathered only to categorize the backgrounds of respondents. The questionnaire will ask about their use of wireless technology, their understanding of it as well as their opinions regarding wireless equipment in their community. Some questions will focus on local government's role in site selection. After the surveys are completed they will be grouped and analyzed. They will be classified based on respondent backgrounds and communities.

The questionnaire for the respondents will include the following:

- Do you or your family use a cellular device? (Note: at this point in the survey there will be a list the various types of devices that are categorized as cellular devices.)
- Do you have a dedicated landline in your home?
- Do you understand that cell towers or antennas are used in wireless communications?
- Do you plan to increase the number of devices including tablets, smartphones, and home phone connect or M2M products over the next two years?
- What are your feelings regarding having wireless towers or antennas within your community -- or, if you are living in a building, on your roof?

Both the respondents' use of wireless telephony and their views of the equipment are essential for this survey. Additionally, they will be asked about how often they participate in their municipality's planning or legislative meetings whether live or via television. The survey's sample size will not be limited to a certain size sample group. However, the goal is to have approximately 50 respondents from each municipality respond to the survey. Ethical concerns will be mitigated as every survey respondent will remain anonymous and under no obligation to participate.

In addition to the basic survey, the research will include face to face or telephone interviews will be conducted and questions will be sent to municipal officials and

telecommunications professionals. The public officials will be located in Westchester County, New York with a focus on the Town of Mount Pleasant and the City of Yonkers. The telecommunications professionals will be selected based on their experience regarding the relationship between government and telecommunications with respect to land use and planning. Finally, members of the Westchester County Planning Federation, the Planning Commissioners and the Members of the Planning Boards of both the Town of Mount Pleasant and the City Yonkers and various planning consultants will also be interviewed.

Chapter IV: Findings

The research methods focused on residents or municipal officials from the Town of Mount Pleasant, NY and the City of Yonkers, NY. The three data collection methods follow the outline below.

- An electronic or paper survey was distributed to residents of both municipalities.
- Interviews were held with municipal officials and wireless industry experts.
- In Mount Pleasant I was able to obtain general information on some of the wireless projects within the Town. Freedom of Information Law (FOIL) was used to obtain this information. All proper procedures were followed to obtain public record information.

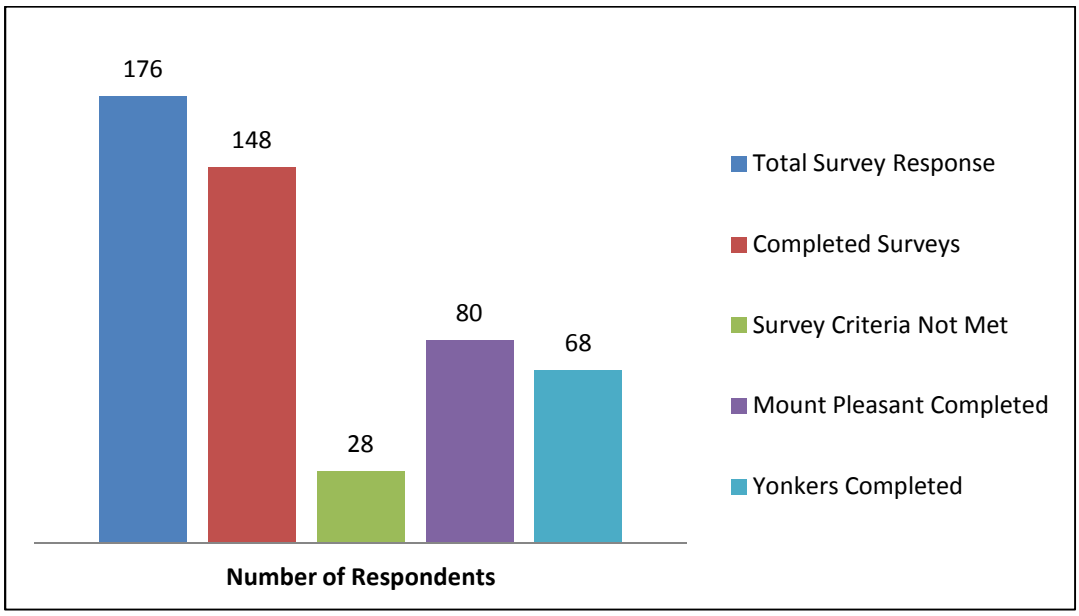
The survey was distributed to residents of the Town of Mount Pleasant and the City of Yonkers. The intent of the survey was to gather data with respect to cell phone usage, views on cell towers and antennae's and the understanding of federal legislation with respect to the siting of cell towers and antennae's within their respective community.

A. Survey Dissemination

176 surveys were returned. 28 of the 176 surveys were disqualified as they did not meet the criteria established in the methodology section. The remaining 148 survey responses were analyzed for this project. A spreadsheet of all survey responses appears as Appendix A.

The chart below is a summary of the total responses. Both the electronic and paper survey had display logic used to vet out respondents who did not qualify based on the established criteria. As a result of not qualifying, the respondent did not need to complete any of the subject matter questions and, therefore, was simply brought to the demographic section of the survey.

Figure 1: Total Respondents by Municipality



The primary method to get people to respond to the survey was an electronic survey website named Survey Monkey. This is a paid service that allows members to create a survey and select a target audience and distribute it to designated criteria. Additionally, email

distribution and social media, including Facebook and LinkedIn was used. A more traditional survey distribution method was used whereby a letter was created and attached to a paper survey. It asked potential respondents to complete the survey, and to mail the surveys back to a post office box using the enclosed stamped envelopes. To ensure anonymity, respondents were instructed to avoid putting their name or address on the survey or on the return envelope.

The paper survey was distributed through three primary channels.

- Through established professional and charitable social organizations, within the designated communities.
- It was made available at the front desk of the Mount Pleasant Planning Office.
- The letter and survey was distributed to municipal employees, former employees and civic organizations.

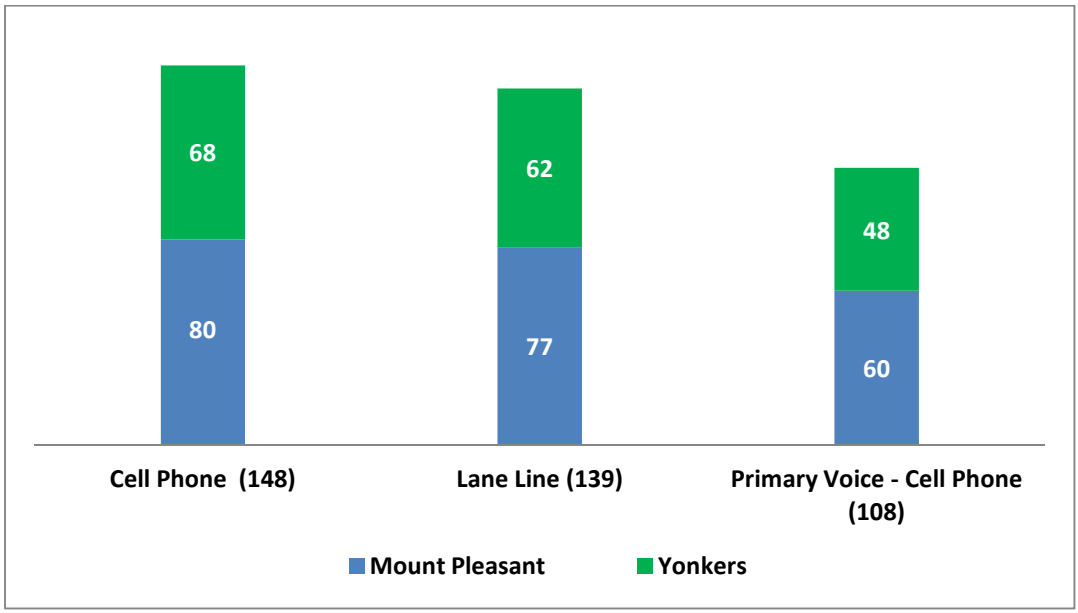
B. Survey Findings

1. Respondent Wireless Utilization Summary

- All of the 176 completed survey responses indicated that they had cell phones. The 148 qualifying respondent indicated that 63% percent of households have between two and five wireless devices, 17.5% indicated they had 7-10 wireless devices and 7% had 10 or more devices.
- Residents from both municipalities indicated that approximately 40% of respondents use their phones for surfing the web, connecting to social media and streaming audio or video. Smart Phone household ownership for Mount Pleasant was 37% and Yonkers was 29%. Both municipalities' survey results indicate 28% of the respondents own a wireless tablet.
- A landline was in 94% of households; however, 73% use cell phones for their primary voice communication. Mount Pleasant households indicate 30% foresee going completely wireless as compared to 21% of Yonkers. Mount Pleasant and Yonkers both reported households as having only wireless telecommunications with 6% and 8% of households respectively.

The chart below is a graphical representation of some of the statistics with respect to cell phone utilization. It depicts the number of people who have cell phones, how they use it and their wireless cell phone voice utilization today.

Figure 2: Cell Phone Utilization



2. Respondent Understanding of Wireless Technology Summary

- The survey results indicate 56% of respondents were concerned with how cell towers or antennae look within their community and 11% had no idea of their location. Exposure to radiation appears to be a concern to 55% of the total respondents and 9% never knew there was some concern from others with respect to radiation from cell sites.
- Mount Pleasant respondents indicated that 20% did not know how their phones transmitted communication as opposed to 7% of Yonkers respondents. 8% of Mount Pleasant respondents incorrectly thought their wireless communication transmission was transmitted by satellites.
    - 89% of all respondents are aware that as the number of wireless devices increase, the likelihood of an increase in the number of cell sites increase. Fortunately a majority of respondents indicate they support an increase in cell sites to support the growing demand with 82% of Mount Pleasant and 74% of Yonkers

responding favorably to an increase. Most respondents or 89% were aware that as devices move from place to place that the device is using a number of different cell towers or locations.

- Mount Pleasant respondents indicated 65% of respondents were concerned about health and aesthetic issues surrounding cell sites as opposed to 44% of responses from Yonkers.
- Mount Pleasant had 73% and had Yonkers 85 % of respondents understood their cell phone was dependent on cell towers or antennae in order to transmit or receive communication.

3. Municipal Involvement – Respondent Understanding Summary

- Mount Pleasant respondents indicated 70% of responses and Yonkers had 54% of responses that felt local government should not get involved with the aesthetic consideration. Additionally, 30% of Mount Pleasant and 46% of Yonkers respondents felt that cell towers and cell antennae are necessary and that government should not impede progress.
- The combined responses indicate 66 % understood that many local governments have tried to control cell site placement due to health or aesthetic considerations. Additionally, 68% of the combined responses understood that wireless providers pay an ongoing monthly fee or rent to both private and municipal landowner for the right to place their cell towers or cell antenna on their property. An interesting question asked the respondents if they supported the idea of allowing a cell tower or cell antenna, to be placed in their favorite park in order to collect lease revenue and, as a result, reduce property taxes. The results show 68% were in favor if the idea.

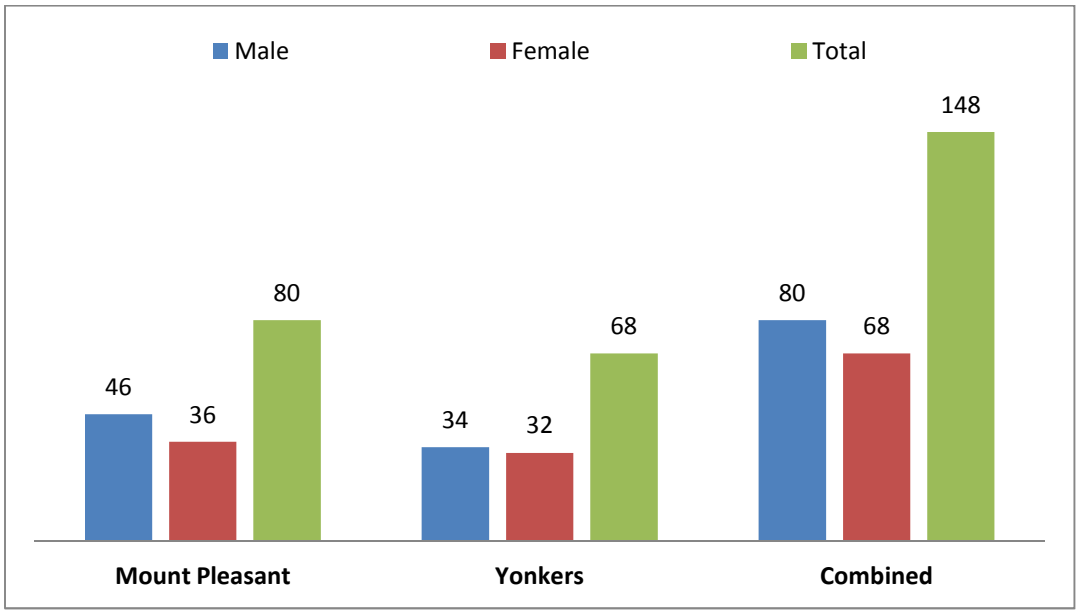
- The combined responses indicate 93% believe that having multiple providers on a cell tower will reduce the need for additional towers. Furthermore, they believe this type of partnership will improve service within their community.

4. Survey Demographics

Respondent Gender

Overall 80 or 55% of the respondents were male and 68 or 45% were female. The total count for all respondents was 148.

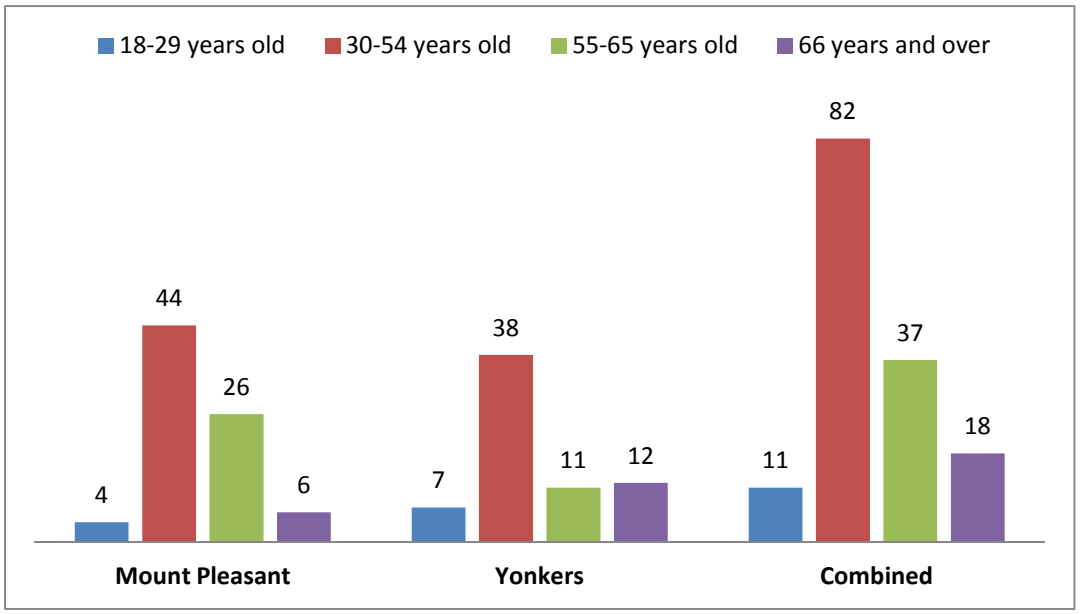
Figure 3: Gender by Municipality



Respondent Age

The typical respondent was in in the 30-54 year old age group (82 combined or 55%). The ages are similar when comparing the municipalities' respondents.

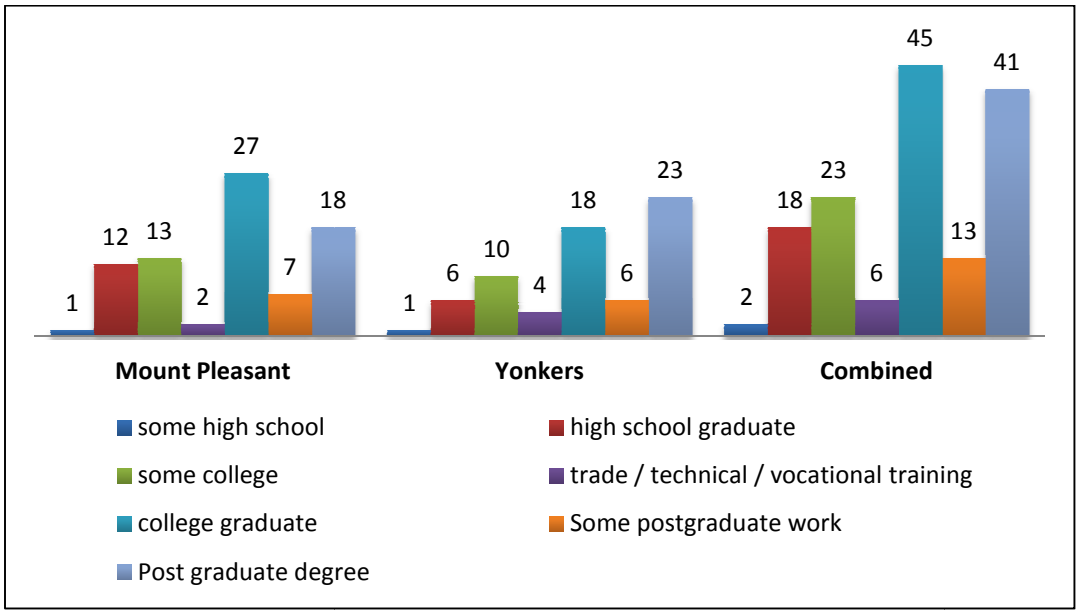
Figure 4: Age by Municipality



Respondent Educational Level

The educational level did not appear to have a significant trend when comparing the two municipalities. The majority of respondents indicated that they have a college degree or post-graduate degree.

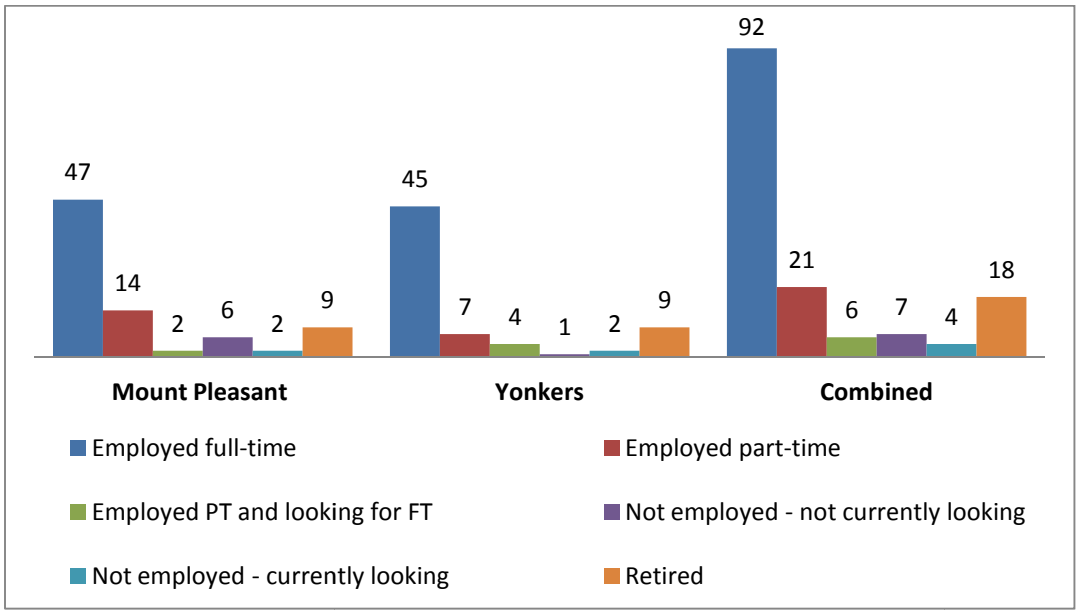
Figure 5: Educational Level by Municipality



Employment Status

The majority of respondents (92 or 62%) were employed full-time. There did not appear to be a significant trend in terms of a comparison between the two municipalities.

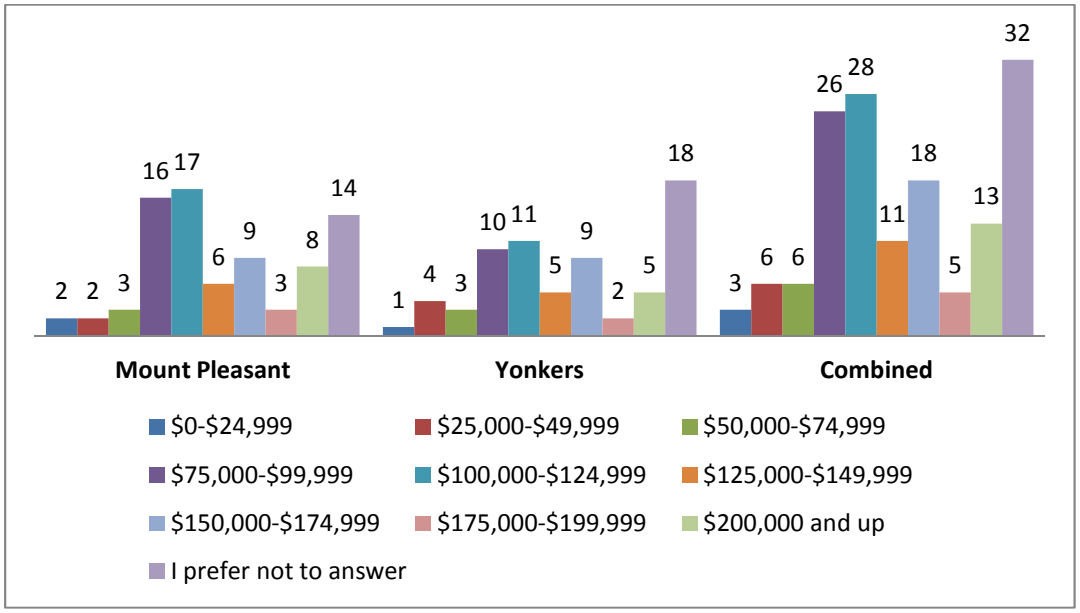
Figure 6: Employment Status by Municipality



Household Income

32 or 22% combined chose not to answer the question on household income. The largest reporting group consisted of respondents who reported a household income of $100,000-$124,999 (28 or 19% combined), followed closely by the third largest group which reported an income of $75,000-$99,000 (26 or 18% combined).

Figure 7: Household Income by Municipality



C. Interview Findings

In total seven interviews were conducted. Municipal officials from Mount Pleasant and Yonkers were contacted and interviewed. An additional interview came as a result of my meeting with Mount Pleasant Town Supervisor Joan Maybury. During our discussion she suggested I contact Manny Vincente of Homeland Tower. His company is the owner and operator of cell towers throughout the country. Supervisor Maybury recently completed a project with him and thought he was an excellent and willing resource. An additional interview was suggested during my interview with Patrick Cleary, Planning Consultant. He provided the name of Anthony Gioffre III who is the New York State Wireless Association - Regulatory Chairman.

Each of the municipal officials was asked three primary questions: Extent of wireless tower involvement, understanding of FCC regulations and tower placement policy. The questionnaire is included as Appendix A. The industry experts had a more informal line of questioning that sought to add some clarity to the industry practices as it relates to tower and antenna placement.

1. Municipal Interviews

Interview: Mount Pleasant Town Supervisor – Joan Maybury

The first interview was conducted with the Town of Mount Pleasant Supervisor Joan Maybury. Mount Pleasant is located in Central Westchester with a population of approximately, 44,000 residents. Mount Pleasant is largely residential, without heavy industry or manufacturing but with several corporate offices. Mount Pleasant has been involved in many wireless cell tower projects. "When I was elected to the board in 1992 the wireless industry was just getting going. We had to learn fast how we were going to integrate towers into our community to meet the needs of the people" (J. Maybury, personal communication, November 8, 2013).

The town has a total of four towers with many carriers on municipal property --- producing about $350,000 in lease revenue. One tower is located on top of a water tower, the second near as a proposal for Lake Street in the Pleasantville section of town due to public opposition to the project. "We will look for alternative sites but at the end of the day that neighborhood is not adequately served by the cell phone providers" (J. Maybury, personal communication, November 8, 2013).

Maybury discussed her knowledge of the FCC regulations including the requirement to act on wireless tower application within a specified time as well as the ruling that prohibits towns from making a decision on a cell tower application based on health concerns with the proviso that the application meets the radio frequency guidelines established by the FCC.

> I learned about these laws just due to my tenure in the town. We do rely on our planning, legal and other advisors to bring us up to a cemetery and the third by a sportsman's club. Some of the projects were not successful. Such date -- but we do have to keep abreast of any legislation that affects our town. We have heard from residents

about health concerns and we are obligated to inform them of our limitations. It is a careful balancing act (J. Maybury, personal communication, November 8, 2013).

One of the concerns the town has is to meet all of the needs of all residents. She does hear from residents that various parts of town have poor wireless coverage. Her solution, to address those concerns is to maintain her working relationship with providers and tower companies.

In addition to the interview Maybury suggested that I FOIL some documents including -- leases, schematics and plans for the water tower antenna project, letters regarding decisions that were with respect to negative or positive application decisions, minutes to meeting where the subject types of projects were discussed included those that ended up being approved and some that were not approved.

Interview: Mount Pleasant Planning Board Chairman – Michael McLaughlin

Michael McLaughlin is an appointed member of the planning board and is the chairman. His term is for seven years and he has been on the board for close to twenty years and serving as the chair for eight years. He spoke about his involvement in many wireless cell tower or cell antenna applications.

The Chairman spoke about the growth of the wireless businessmen of cell towers. It is probably correct that there are ten times as many cell sites in 2011 as there were in 1996. Westchester County is affluent and is home to many 'executives' and 'professionals.' These occupations have come to rely heavily on use of cell technology to communicate and tele-commute. During the 1990s, there were many "dead" spots. Coverage has improved dramatically in the past decade (M. McLaughlin, personal communication, November 8, 2013).

During the discussion on the Telecommunications Act of 1996 he admitted that he was "not fully conversant with the act" (M. McLaughlin, personal communication, November 8, 2013). He did proceed to say:

> In our Board reviews, we often were told by applicants that our Board's opinions did not matter: that only federal concern mattered. The Planning Board of the Town of Mt. Pleasant ignored such advice and performed full reviews anyway" (M. McLaughlin, personal communication, November 8, 2013). McLaughlin did state when asked about the shot clock ruling that he not was specifically aware of the 'shot clock' law. McLaughlin said that he relied on the planning consultant to advise him of all the laws that affect an application. He spoke about health and aesthetic concerns, "Conformity with regulations and safety issues (i.e.: falling towers) were upmost considerations" (M. McLaughlin, personal communication, November 8, 2013).

Interview: Pleasantville Village Administrator – Patti Dwyer

Dwyer is an appointed official who is appointed by the Village Board to run the day-to-day operation of the Village. Dwyer is also a MPA Pace University graduate. She talked about her involvement in drafting and zoning regulations, and negotiated leases between the Village and cell carriers. An example cited was the construction a wireless tower at the Park and Bark Park in Pleasantville. The pole has five carriers and generates lease revenue for the village. The tower was put up as a response to resident complaints about cell service in the village. When asked about the Telecommunications Act of 1996 she replied "Yes, we are very familiar with the Act. Even though we have limited control over the siting of the towers and antennae we can cause them to be located in areas where they will have the least visual and physical impact" (P. Dwyer, personal communication, November 13, 2013). Dwyer was also aware of the FCC 'shot

clock' law. "We are familiar with this regulation and have not had any new applications before us that would subject us to the 'shot clock.' Regardless, we can move within the time allotted, if the applicant submits a complete application" (P. Dwyer, personal communication, November 13, 2013). In response to a question on the relationship between the municipality and the provider, Dwyer replied, "The companies and their host communities should be familiar with their respective management teams and local site conditions. Several carriers outsource the administration of their cell sites and leases. It's hard to get a handle on who's who when problems arise" (P. Dwyer, personal communication, November 13, 2013).

Interview: Yonkers former Chief of Staff for the City Council and Yonkers former Senior Assistant to the Mayor for Legislative Affairs – Anthony J. Giambruno

Mr. Giambruno was interviewed due to his expertise in the development of wireless legislation in the City of Yonkers. He provided a lot of detail with respect to his position as Chief of Staff (2000 – 2004) and Senior Assistant to the Mayor for Legislative Affairs (2006-2010). During this time, he was called upon to research issues and draft opinions and resolutions for the members of the city council. He was asked and responded about his experience and the development of the wireless industry and the impact on Yonkers from a legislative perspective.

> At that time, cell antenna were being added to a number of buildings (specifically apartment buildings) within the city and the residents of those buildings (especially those on the top two floors) were concerned for their health and, to a lesser extent to the 'look of antenna' on the rooftop. They requested and expected the council to prohibit the placement of antennae --- specifically based on their health concerns. Also, other constituents wanted restrictions based on health concerns placed so to prohibit the

placement of cell antenna on any building with a certain (unspecified) distance from hospitals, schools, nursing homes. Based on this, several council members wanted the issue researched and a resolution drafted that would place restrictions on where both Cell Antennae and Cell Towers could be sited" (A. Giambruno, personal communication, November 8, 2013).

Giambruno researched the issue and, specifically, Section 35 of the Telecommunications Act of 1996. Based on his research it was clear that the Council's hands were completely tied with respect to using health concerns to restrict siting. In addition, City Building and Zoning already incorporated ordinances for both cell towers and cell antennae. In the end, no resolution was drafted and, therefore, no City Council action was taken.

Giambruno spoke about the increase in the wireless industry and the impact on the city during his time with Yonkers. "Yes, this type of growth has been experienced in the City of Yonkers. It should be noted that since the City of Yonkers has a population of almost 200,000 people and some very heavily populated areas, often the placement of Cell Towers was not practical or possible. In these areas, the City experienced a proliferation of cell antennae" (A. Giambruno, personal communication, November 8, 2013).

Giambruno was clearly aware of the 'shot clock' ruling and discussed his experience in terms of legislative affairs in general -- and as such believed the 'shot clock' law helped move the project along.

Yes, I am familiar with the 'shot clock' ruling. While the time provided may not be ideal, I believe it is 100% appropriate. Unfortunately, local government officials -- whether elected or appointed or, appointed board members --- have a tendency to procrastinate on any type of 'hot button issues'. The 'shot clock' ruling doesn't tell or

purport to tell them what to do --- but simply require that an action be taken." (A. Giambruno, personal communication, November 8, 2013)

He also discussed how the city received calls about poor cell phone service.

Although not personally involved, I know that when such problems were reported it almost always was due a specific tower or antenna problem or outage --- which the respective provider corrected. The City of Yonkers is fortunate in so far as it doesn't appear to have any 'dead spots' which do occur in other municipalities in Westchester County" (A. Giambruno, personal communication, November 8, 2013).

He stated that Yonkers absolutely considered aesthetics as a factor in their decision making.

In most cases, to one extent or another, aesthetics are considered and, in general, cell providers are willing to try to mitigate the concerns. Over the years a number of very clever 'hiding mechanisms' have been developed and widely used to at least partially address the aesthetic concerns of local governments. However, that being said --- a Cell Tower is still a Tower and a Cell Antenna is still a Cell Antenna. Therefore, while cell providers have come a long way in being able to disguise both cell towers and cell antennae, there is simply no way to make a silk purse out of the proverbial sows ear (A. Giambruno, personal communication, November 8, 2013).

Giambruno did answer the question with respect to the inter-governmental relationship between cell phone providers and municipalities.

"One suggestion is that all cellular providers should have a specific contact in each municipality and notify that contact either by phone or email when an outage occurs in that municipality. Further, the information should not only include the location of the

problem Cell Tower or Cell Antenna, but also the impact of the outage and the expected repair time. This information would be very useful to the municipality in order to allow the municipality to appropriately reply to constituent calls/complaints about the outage" (A. Giambruno, personal communication, November 8, 2013).

In a separate discussion with Giambruno, he informed me that he checked with the Commissioner of Finance to find out how much revenue is generated for the municipality. To paraphrase, the answer was none. Since Yonkers has many heavily populated areas and limited appropriate open spaces, the use of rooftop Cell Antennae becomes the most feasible way to assure adequate coverage within the City.

Interview: Certified Professional Planner – Patrick Cleary, AICP, CEP, PP, LEED AP, CNU-A

Patrick Cleary is a professional planner for many municipalities including Northport, NY, Port Chester, NY and Mount Pleasant, NY. In this capacity Mr. Clearly has a unique inter-governmental view of planning and in his role has been the advisory for many wireless cell tower and antenna applications. His role in Mount Pleasant involves reviewing the project on behalf of the Planning Board, and providing technical comment and recommendations to that Board. I spoke to Mr. Cleary about the Telecommunications Act of 1996.

I am very familiar with the Telecom Act. I cannot say that I have detected any impact on the actual siting of telecom facilities (i.e. one location over another), but the Act has had an impact on the processing of wireless telecommunication facilities in two significant ways. First, the Act provides the basis for the board to by-pass the health impact issues, which are always at the forefront of the concerns raised by affected neighbors - and always the issue that generates the most emotion and passion. The Telecom Act allows

the Board to deflect those concerns thereby allowing it to focus on the relevant issues. Second, the "shot clock" has caused the Board to be cognizant of the timing of cognizant of the timing of the processing of the application. It has been my experience that the 90 day period provided for under the shot clock is often times insufficient to allow a board to render a decision. This is not due to any malicious intent on the part of boards to intentionally delay an application, but rather it is simply a function of the time frames built into the local land use decision-making process. Simply put, the procedural steps embedded in most local codes simply do not allow a board to act on an application particularly in the case when a variance or referral to another board or agency is required within 90 days. The monthly cycling of meeting dates, the requirement to schedule and hold public hearings, etc., often exceeds the 90 days. While, the 90-day limit is often a problem in terms of compliance with the shot clock, the wireless carriers have been --- in virtually every case I have been involved with, cooperative, and willing to agree to extensions, if in fact the Board is processing the application expeditiously" (P. Cleary, personal communication, November 12, 2013).

Mr. Cleary also spoke about the integration of wireless telecommunications into the town's master plan – which is often his suggestion as a planning consultant to the municipality.

It is recognized that a vast expansion of wireless services is expected, resulting in a significant expansion in the supportive wireless telecommunications infrastructure -- towers and antennae. Just like the provision of sewer and water lines, the provision of these wireless telecommunications services should be planned proactively rather than reactively (P. Cleary, personal communication, November 12, 2013).

2. Industry Expert Interviews

Interview: Owner and President of Homeland Towers – Manny Vincente

Manny Vincente, the Creator, Founder and President of Homeland Towers, has worked in the wireless industry for over 20 years. He reported he has managed the development of over four thousand telecommunications facilities in his career. The questions posed to Mr. Vincente were different than they municipal officials since his background is on the other side of the table than municipal officials. Understanding the difference between a cell tower and cell antenna and how they are integrated into a community was an objective of interviewing him. Mr. Vincente replied,

> A cell tower is simply steel in the air that houses carrier's equipment and radio transmitter and receiver. In areas where there are facilities or buildings tall enough such as a roof top, steeple, and water tower there is not a need for a cell tower. Towers are just a way of achieving the needed height. In areas of higher density, with higher buildings there is not as much of a need for towers. In your paper you are comparing Mount Pleasant versus Yonkers, I can tell you off the bat that there are more towers in Mount Pleasant because it is more suburban and spread out and, therefore, there is less opportunity to put an antenna on a roof top as in Yonkers. (M. Vincente, personal communication, Nov. 15, 2013).
>
> He also spoke about the attempt Homeland Tower made in Mount Pleasant to put up a cell tower. The town owned a small parcel of land on Bear Ridge Road in Pleasantville. The town would have benefited with lease revenue and corrected a

significant cellular ‘dead zone.’ Unfortunately, for Vincente the neighbors got together and successfully persuaded the town not to put up a tower.

Vincente responded to the question regarding the FCC Telecommunications Act of 1996. Specifically, the health concerns proviso and the shot clock law. Vincente replied.

Setting up a way to pre-empt both the public and local governments from denying an application was a necessity. It would be way too easy for any board to deny an application. Just so you understand, what the federal government did was to establish a minimum baseline for RF Emissions. Anything at or below that level -- could not be declared by a subordinate government as being a health risk. The way they established the level was they gathered all of the scientists who dealt with radio waves and asked them to come to a consensus on what is an unhealthy level of exposure as it relates to RF radio waves. They cut the scientists consensus in half and therefore completely mitigated any risk to the public. Our standards are very strict in the US. Cell towers and phones use non-ionizing radiation which is the same type of radiation found in a fridge or other electrical appliance (M. Vincente, personal communication, Nov. 15, 2013).

Vincente also addressed the ‘shot clock’ law.

The law is good as it sends a strong message to local zoning boards in terms of not delaying an application unnecessarily. However, the law is unrealistic as on any given day a normal uncomplicated application before a board can take 90 days or more. It all depends on what is on the docket and honestly depends on how preparedness of the applicant. The law is very ambiguous as well as it does not state when the ‘clock starts ticking.’ Some board’s think it is when they receive the application others think it is

when the SEQRA statement is complete. Because it is not defined -- it is very subjective. We will only file something with the FCC if we see a deliberate effort to drag the process out -- this happens rarely (M. Vincente, personal communication, Nov. 15, 2013).

I did ask him what were the factors when determining where cell towers are placed. Vincente responded:

> Land use and question of how to place cell towers needs to be well thought out. I believe cell towers need to be as least as intrusive as possible. An example is Claybird Lane which is near a sportsman club in Chappaqua. A heavily wooded property with minimal residential homes the topography was perfect for a cell tower. In order to have a successful tower installation we need to have four factors met. 1. There needs to be a technical need. 2. There needs to be an agreement or get someone agree to allow us to put it up. 3. Approval by the local zoning and planning boards. 4. It has to be constructible in that location. Getting approval can be difficult but a town has to allow for these towers and cannot drag it out. They know that if they prohibit or drag the process out that they are in violation of the Telecom Act and we can file a grievance. So the checks and balances are in place (M. Vincente, personal communication, Nov. 15, 2013).

Interview: New York State Wireless Association – Regulatory Chairman – Anthony B. Gioffre, III

The role of this Committee is to monitor, shape, and impact regulatory and legislative issues on a local, regional, and state level. As the Chairman, Gioffre's responsibilities include

organizing discussions with planning, zoning, and other governmental officials; and providing updates on wireless regulation and legislation to its members.

The interviewer asked a few questions pertaining decision making and how tower locations are chosen. Gioffre spoke of the need for more antennas and tower as a result of not only the increase in wireless devices but also the type of wireless devices.

> 63% of the cell phones today are smartphones and everyone has a wireless IPad or tablet. These data intensive devices drive exponentially increase the need for more telecommunication equipment –like antennas and towers. These devices take up more bandwidth --- so the need for municipal cooperation is only going to need to increase (A. Gioffre, personal communication, Nov. 20, 2013).

We spoke about the economic question in terms of economically disadvantaged areas shouldering the burden in terms of towers and antennas.

> I do not think so. You have to remember the telecommunications companies do not look at demographic income in deciding where and why to put up a tower. The simply want to increase their subscriber base. In lower income areas there tends to be dense populations. Despite their economically disadvantage situation, they still have cell service. Many of those folks participate in the lifeline program. I would argue that wealthier areas have worse cell service because they tend to live in spread out area and the population is not dense so it does not pay to put telecom equipment out there for really a small number of customers (A. Gioffre, personal communication, Nov. 20, 2013).

Gioffre also spoke about the areas that have poor coverage such as in some higher end suburban areas.

I have heard the argument time and time again when a tower is proposed in a neighborhood like Bear Ridge Road in Pleasantville the neighbors come out in droves and yell about their property values being reduced if they allow a tower in the neighborhood. Did they ever think that their property values would be reduced if they do not have coverage? We are now hearing about potential homebuyers walking around neighborhoods with the cell phones in hand to see how many bars they have and determining if the area has adequate coverage before even looking at homes (A. Gioffre, personal communication, Nov. 20, 2013).

Chapter V: Analysis of Findings

Through the survey and interviews, a significant amount of information was collected in regard to wireless telecommunications within our community. While the questions posed in the introduction were answered for the most part, many more questions arise as a result of this study. It was interesting to see the integration of the FCC regulations into the local municipal government and to see it in practice in the two communities being studied. It is a careful balance of federal level legislation, local level planning and zoning decision making coupled with the business decisions of the wireless telecommunications providers. Along with the analysis of the findings these questions will be discussed.

1. Survey Analysis

The intent of the survey was to get an understanding of what people from the areas being studied know (Mount Pleasant and Yonkers) and what they think of cell towers and cell antennae, how they are integrated into their respective communities and, then, compared to their wireless device utilization. Specifically, the survey is intended to analyze the third question outlined in the Introduction Section 2.3 -- "What are the sentiments and opinions of the public regarding the placement of cell towers in their community?"

The first step in any survey is to get a comprehensive understanding of the demographics of the respondents in order to ensure the external validity of the survey. Appendix A contains a comprehensive analysis of the survey respondent's demographics as well as their views and utilization of wireless devices.

Since the survey resulted in 176 respondents, (148 qualified respondents, of which 80 are from Mount Pleasant and 68 from Yonkers), it would be accurate to say the response rate exceeded the initial expectations of 50 respondents from each municipality as outlined in the

methodology section. For the most part, the respondents and corresponding results are a good representation of both populations in terms of total responses. Unfortunately, external validity was reduced as the demographics did not appear to have enough diversity in terms of respondent backgrounds. The specific example that came to mind was the question on race as 87% of the respondents were Caucasian, which would not be an accurate representation of the actual population for either municipality. Further, the percentage of males versus females could have been improved with 58% of respondents being male as compared to 46% of women. The income demographic did suggest a scattered and varied response, which improved the income external validity in the income category. Despite some limitations of the demographics the overall response was sufficient in size and did include significant socio-economic variety to assume some degree of external validity as some of the other demographic responses exhibit a scattered population distribution.

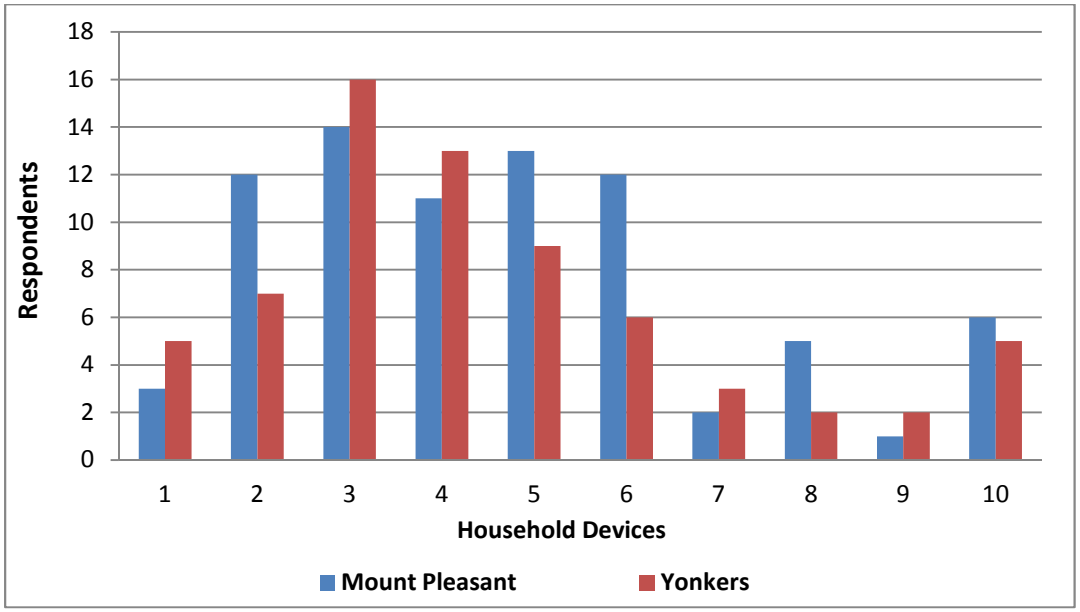
The next step in the process in terms of the survey analysis was to ascertain the respondents' use of wireless technology and how they use it in their everyday lives. An understanding of this use will be indicative of the changing social and behavioral norms. An additional aspect of querying the respondents' uses of wireless devices is to determine if there is a dichotomy between their use of wireless technology and their acceptance of wireless technology within their community.

The assumption prior to the analysis of the survey based on casual observations was that the respondent study group would show an increasing trajectory of household use of wireless technology. Prior to the analysis the belief was there would be minimal surprises when reviewing the survey results.

The first survey question was "do you own a cell phone." This was a pivotal question as it was designed with two intentions in mind. First, it was to be used to filter the total respondents and exclude those who do not have a cell phone. Those respondents that did not have a cell phone could not accurately report on the use of a device that they did not own. The second intention was to learn what percentage of the replying population own a cell phone. All respondents or 100% of the total indicate they own a cell phone. While this response is not surprising, it is indicative of the social trend of what is now normative and substantiates earlier discussion and statistics with respect to the increasing industry growth.

The chart below represents each municipality's total household wireless devices. This encompasses cell phones, smart phones, tablets and other related devices. The collective body of 148 respondents had 678 wireless devices ---Mount Pleasant 373 and Yonkers 305.

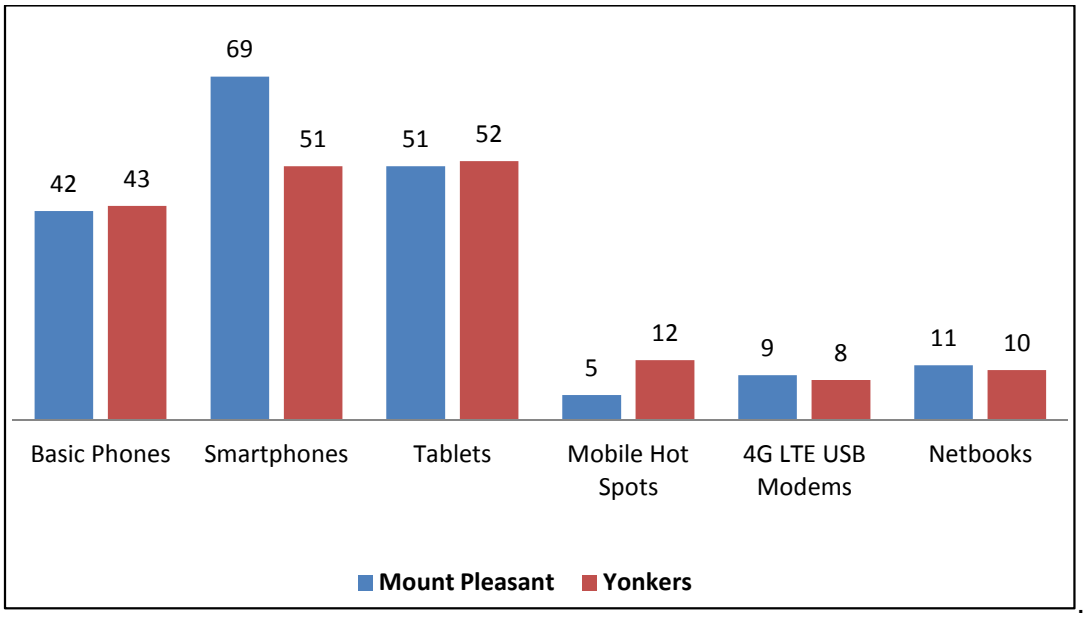
Figure 8: Number of Devices



The diversity in types of wireless devices is another indicator that suggests the expanding cultural adoption of wireless technology and as such increasing reliance on wireless towers and

antennae. Figure 9 below graphically depicts the types of wireless devices found in the respondent's households. The cultural shift from a basic phone to a smart phone has been rapidly coupled with an increased level of market adoption and acceptance of newer wireless devices such as smartphones and tablets. This increase in demand will fuel the need for more wireless towers and antennae to meet the demand.

Figure 9: Types of devices



With the exponential growth in the wireless industry, it is natural to question the effect on the more traditional telecommunications technology such as a dedicated landline. As a result, a question was included in the survey that asked "Does your household also have a Land Line (a standard home telephone)." The response to that question was surprising. While 94% of the respondents indicate their homes have a landline, 73% of them use their cell phone for their primary voice communication. A personal observation can conclude that the advantage of cellular mobility increases the amount of voice communication, as the respondent does not have to be in the immediate vicinity of a landline. That independent variable could not be guaranteed without testing the internal validity. We would need to create a well-designed and randomized

survey to substantiate the casual inference. Without that data presently, we can reflect on our own societal observations, and say to some degree and with certainty, that people have reduced their landline use and increased their wireless use for voice communications. It is apparent everywhere we go that we see people talking on their wireless devices.

Another interesting statistic relates to the question on future household wireless projections. Surprisingly, 26% of total respondents predict their home will be a completely wireless and 7% are already a wireless household.

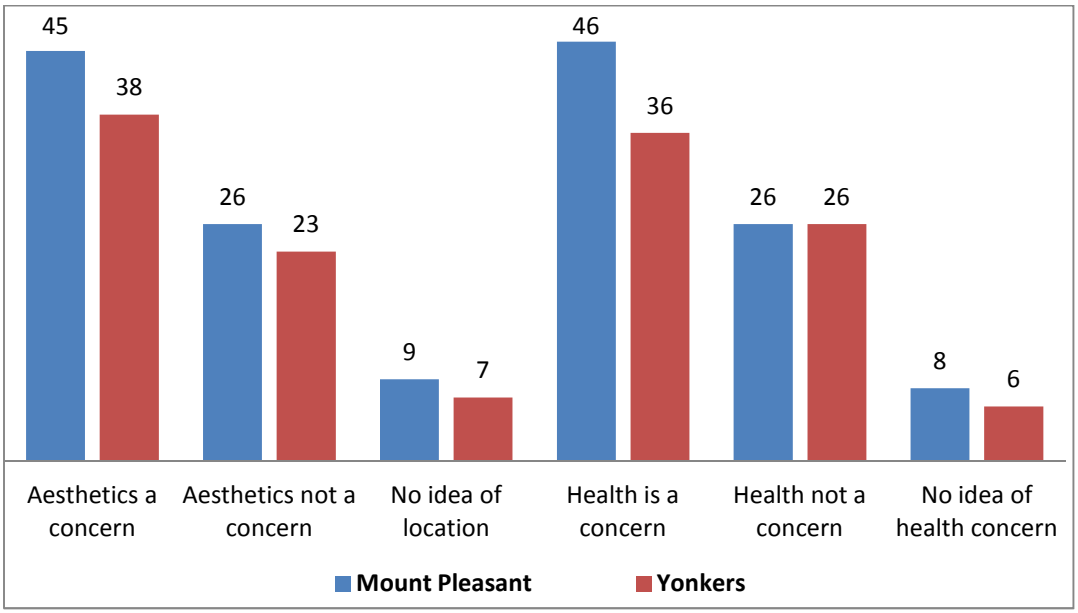
The question "How do cell phones receive and transmit voice, text and data?" did not return any surprises. Most respondents or 80% were aware that they need to have cell towers or cell antennae. Another question asked the respondent if they understood that as the technology improves that the need for wireless equipment to support the increase in demand also increases. The respondents overwhelmingly or 89% understood that due to the increase in the total number of wireless devices that there would be a need for an increase in cell towers and cell antennae.

With respect to the question on aesthetics the following question was posed to gauge any concern on aesthetics -- "Considering the fact that some communities have expressed their concern about how cell towers and cell antennae look, are you concerned with how they look?" Despite the demand for wireless bandwidth it does appear the aggregate response demonstrates some concern with aesthetics with 45 respondents in Mount Pleasant and 38 in Yonkers. Many felt that local municipalities should impact legislation to ensure aesthetics considerations are included in the approval process -- Mount Pleasant had 56 and Yonkers 37. Similar statistical results were found for the health related concerns. Mount Pleasant had 46 respondents and in Yonkers had 36 expressed some health concerns. When comparing the two municipalities, there

does not appear to be any statistical significance when comparing the results from either location.

For illustrative purposes I have included the graphical depictions of the survey results below:

Figure 10: Aesthetic and Health Related Question Results



The next group of questions attempt to gauge residents' understanding of the collaborative relationship between wireless companies and municipalities. Cell towers and antennae are placed on both municipal and private property. As discussed earlier the municipality cannot exercise efforts to prevent cell antennae and cell towers that exceed typical zoning and planning laws. They cannot specifically create legislation to prevent them from being built and could create a litigious situation if they tried to prevent them. They can exercise their rights to enforce zoning laws; however, they need to be careful with how they decline an application and substantiate the denied declaration with the FCC. Despite the stringent FCC

guidelines that minimize local government decision making, 98 of the total respondents felt that local government should impact their placement due to health and/or aesthetics considerations. This may indicate that the public may not be aware of the FCC guidelines in its entirety.

The survey results indicate that 100 of the respondents said they were aware that cell towers and cell antennae generate rental income for the real estate owner who is hosting the equipment. A majority of respondents said they would be in favor of placing a cell tower or antenna in a park if the municipality could receive lease revenue which will help reduce government costs (a total of 101 respondents, with 56 from Mount Pleasant and 45 from Yonkers). The response shows a majority of people were not concerned and actually embraced the technology when it was suggested their tax bill would be reduced.

The effort of putting together a survey and distributing it to residents in Mount Pleasant and Yonkers produced a good amount of data with wireless cell phone use and views on wireless cell towers and cell antennae. One of the respondents provided feedback and said they also learned a lot from completing the survey, "I found this survey extremely informative and now I am going to be more involved in knowing more and not just listening to wireless carriers and their decisions and statements" (Appendix A, 2013). Most of the respondents seemed to be adapting to the changing technological world that they find themselves in and they are not completely opposed to wireless towers and antennas in their community. However, it should be noted that to some degree they are also concerned about both aesthetics and health related issues. Further, they are not exhibiting extreme outrage to the towers being integrated into the community. This is confirmed from the survey question which asked the respondents "Do you support the increase in wireless cell towers to support the ever increasing demand for wireless cell devices?" There were 116 respondents or 78% who agreed they would support the increase,

which exhibits an acceptable level of statistical confidence to say people generally agree they are necessary and are needed for their community. The evidence does not suggest the respondents completely agreed on the health or aesthetic issues. The next step in the analysis of findings would be to examine the municipal or industry expert interviews conducted over the past few months.

2. Interview Analysis

The interviews with both municipalities and with the industry experts provided insight into the integration of wireless technology into communities today. It was interesting to see how the issues such as the FCC regulations were incorporated into many of the decision making models in the municipalities. The interview analysis section answers the remaining questions from the introduction section:

- Are cell site towers and antennae placed based on technological needs or based on public or government demands?
- What is the relationship between wireless telecommunication providers and local governments?

The interviews provided enough evidence to answer both questions. The first question to be addressed is -- Are cell site towers and antennae placed based on technological needs or based on public or government demands? The evidence gained from the interviews answered all of the above. Manny Vincente from Homeland Tower revealed that in large part the demand dictates the number of cell antennae or cell towers within a given region. He specifically spoke to the Mount Pleasant and Yonkers communities. Yonkers has more antennae than towers since there are many high buildings throughout the city that can accommodate antennae. Since Yonkers is densely populated, the need for cell towers or antennas increases exponentially.

> At the end of the day, all the telecommunications provider cares about is getting subscribers. In areas where the population has a large and growing subscriber base there is a push to get the best possible coverage and the way to do that is by adding antennae (M. Vincente, personal communication, Nov. 15, 2013).

The telecommunications providers are constantly looking to improve their network in the metropolitan areas where they can get the most 'bang for the buck.' Technically the equipment

must be placed in an area where it reaches a certain height. Mr. Vincente mentioned that telecom companies would not consider a site unless it can reach a height of four stories. It appears that telecommunication providers are choosing sites based on subscriber demand. Getting an antenna or tower accepted by a telecom provider is actually competitive. The lease revenue is very attractive for both municipal and private landowners. For example, Verizon Wireless has a website providing details on what to do to qualify to have a site considered for an antenna or tower. The criteria for being considered for a cell lease includes the distance from the road, permissible zoning code etc., and access 24 hours a day, 7 days a week. Mount Pleasant, as illustrated by Joan Maybury, has always taken advantage of the fact that there are not many high buildings in the town and the need for towers is greater than in a more densely populated region such as Yonkers. Mount Pleasant is receiving $350,000 in lease revenue, in contrast to Yonkers which is not receiving any lease revenue from cell equipment. The interview with Maybury revealed that Mount Pleasant has built a relationship with the wireless providers. She mentioned that it is necessary since there are residents calling town hall and about poor cell service. Since the town is largely a suburban community with minimal opportunity to place cell equipment on higher buildings, the relationship between the town and the wireless providers developed naturally to meet the needs of the people. Since the town is a largely suburban population, the opportunity to have private four-story buildings or higher host the wireless equipment is simply not available. This answers the question of "what is the relationship between wireless telecommunication providers and local governments?" Wireless customers are demanding an uninterrupted and exceptional level of service. It benefits all parties to foster a professional dialogue to ensure that the way cell sites are integrated into a community is well thought out and beneficial to all.

Pictures Depicting Sampling of Cell Towers and Antennae

Wireless Antenna's on Water Towers in Mount Pleasant where five carriers have antennas. Each one of the carriers is paying Mount Pleasant rental income.

Picture 1: Mount Pleasant Water Tower

One of the Mount Pleasant respondents said in reply to question 30 "local cemeteries may be a good place for cell towers no health issues there." Mount Pleasant actually has two towers in cemeteries. One of them is pictured on the following page next to Gate of Heaven Cemetery in Hawthorne.

Picture 2: Mount Pleasant Tower - Gate of Heaven Cemetery

Below is a photo of the entrance to the tower on Mount Pleasant Water District property. Notice the sign stating the property belongs to the Town of Mount Pleasant.

Picture 3: Mount Pleasant Water District

Below is a photo of the Park and Bark Park in Pleasantville as discussed by Patti Dwyer the Village Administrator. It demonstrates the integration of cell towers into municipal property.

Picture 4: Park and Bark Park in Pleasantville

. Below is a picture of cell antennae on a private apartment building in Yonkers. This is typical throughout Yonkers which reduces the need for cell towers

.Picture 5: Apartment Building in Yonkers

The following is a photo of the signs on all of the cell site locations I visited. The warning states that beyond this point radio frequency may exceed the limit established by the FCC and also provides guidelines for people working in the environment. It demonstrates the integration of the federal level (FCC) into local municipalities.

Picture 6: FCC Warning Signs

Chapter VI: Conclusions and Recommendations

Based on the information gathered above, some conclusions and recommendations can be drawn from the research for this project. These will lead to recommendations not only for the Town of Mount Pleasant and the City of Yonkers, but also for future studies or work that can be used for similar municipalities. The study is useful as it addresses the issue surrounding the growing wireless industry.

The study examined the understanding of the residents of the two target communities as it relates to wireless technology, how this technology fits into their current lifestyle, and how their community assesses their projected reliance on wireless technology in the future. The two municipalities being studied were chosen for a specific purpose. They are vastly different in so far as one is densely populated with a diverse socio-economic population, while the other has a more graphically dispersed and more homogenous population. The study did reveal that despite different backgrounds, the people from both municipalities had a good understanding of wireless technology. It showed that the residents had a consistent reliance on towers and antennae and, in fact their own self-assessment for wireless personal use suggests an increasing dependence on wireless technology. When comparing the two populations together, there did not appear to be any statistical difference between the two communities. They consistently demonstrated a heavy reliance and an increased dependence on wireless technology, and did not demonstrate any statistically significant opposition to the placement of wireless cell towers or cell antennae in their community.

The study also examined the views of municipal officials and industry experts. It appears that both municipalities have embraced the integration of wireless technology into their

communities. The FCC website shows the number of wireless towers and/or antennae in Mount Pleasant and Yonkers.

- Mount Pleasant relies on a network of wireless cell towers scattered throughout the town with antennae added to amplify the signal. According to the FCC, there are a total of five towers and 372 antennae registered with the FCC in the Town of Mount Pleasant.
- Yonkers has more antennae since the height of buildings that are located throughout the city are conducive to their placement. According to the FCC, the City of Yonkers has one registered tower within the city limits. It is on private property at Saint Joseph's Seminary and owned by the Archdiocese of New York. Yonkers has a total of 717 antennae.

The FCC website show how each municipality is different with respect to how the wireless infrastructure is built within the given municipality and physically demonstrates the difference in how the wireless network is designed. Mount Pleasant is geographically spread-out with less opportunity to place antennae on buildings; therefore, more towers are needed. Yonkers has plenty of multi-dwelling units, apartment dwellings and buildings that can accommodate antennae. Therefore, Yonkers has more antennae as compared to towers. Each municipality presents different opportunities to integrate wireless equipment into the community. This is based on topography, building infrastructure and population density. The wireless businesses look to increase and maintain its subscriber base by building a network in areas where the population density supports an adequate return on investment. Therefore, the wireless carriers must factor in all of these factors -- location, local architecture, and population density -- when making their decisions about where to build and expand their network.

This study also examined the municipal official's view of the wireless industry growth, and their approach to the integration of the wireless technology in their community. Both municipalities have enthusiastically accepted the development of wireless telecommunications as they understand the needs of their residents. It should be noted that this enthusiastic acceptance is in part guided and legislated by FCC regulations. This relationship between the FCC and the municipalities is an example of the inter-governmental relations in action. To illustrate, every municipality has the right to guide the development of wireless infrastructure and while they can deny an application, they cannot simply prevent wireless transmission equipment from being placed within their municipalities. However, they must factor into their decision making the FCC guidelines -- specifically the Telecommunications Act of 1996 including the 'shot clock' law and health concern restrictions. Even with the FCC guidelines local zoning laws are still enforced and given the utmost consideration in the decision making. It is a careful balancing act for the municipality to accommodate the FCC laws and local zoning and regulation laws.

As a result of the research, the assimilation of data and the project's overall efforts, four recommendations have been developed. These recommendations are not limited to the two municipalities studied and would be appropriate for most municipalities looking to devise a wireless integration planning strategy.

Recommendation 1:

One of the ways to improve the municipal planning process for wireless infrastructure is for all municipalities to take a comprehensive examination of the municipality's master plan. The master plan is a comprehensive strategy for how the community will zone and utilize both municipal and private land. The master plan would also include a strategy for the integration of the wireless cell towers and antennae into the community. This will allow for a comprehensive

examination of the overall master plan with the integration of cell towers. This type of strategic planning will help with any long term planning for cell towers.

Recommendation 2

Joan Maybury from Mount Pleasant provides an example of a municipality that enthusiastically embraces the wireless opportunity for her town. She has actively pursued developing and maintaining a relationship with the telecommunications providers. This relationship developed as result of necessity to help large areas of the town that lacked coverage. She was able to leverage these relationships by working with the providers and devise strategic ideas of where to place the towers.

It is important to develop the relationship as outlined in the paragraph above. Municipalities should have a specific contact with the cellular provider that the municipality can utilize in the event of a concern such as an outage. Invariably, despite not being a cellular point of contact, they end up receiving calls and questions from constituents. This would be useful to the municipality as they can appropriately reply to the constituent's calls/complaints or pre-empt calls from coming to the municipality to begin with.

Recommendation 3

The federal government should re-think the "shot clock" law, many of the interviewees suggested that the law was good but unrealistic. They report that most applications take longer than the FCC-allotted 90 days. It is simply the procedural steps for most applications. There are embedded local zoning laws that do not allow the board to act on a decision. For example, if the application is forwarded to another board or if a SEQRA review (NYS Environmental Quality Review Act), it would be very difficult to complete the review of the application in 90 days. Most applications tend to get extensions, since the 90 day application is impossible to meet in

many instances. The FCC should look at the typical time frame for a tower or antenna application and adjust the shot clock law accordingly.

Recommendation 4

Another recommendation is for both municipalities to encourage the development of wireless technology within their municipality by developing wireless technologies in their municipal buildings, libraries and other places the community gathers. Municipalities need to be competitive to attract business and to create a community that is attracting businesses. An innovative idea to be competitive is to consider creating a municipal wireless broadband network to promote economic development. This is a concept that has been used in some cities like Minneapolis where the municipality makes a portion of their municipality or an entire city a free wireless access zone. This would be perfect for some of the business districts in Yonkers such as the recently revitalized waterfront area. The benefit to the city is it attracts businesses, appeals to the technology crowd and helps those people who cannot afford Internet access.

Closing Comments

This project has shed light on the question of cell towers and cell antennae and how they are integrated into communities. This is a rapidly growing field and one with considerable opportunity for municipalities and constituents alike--if planned and integrated into the community correctly. Municipalities cannot sit back and let this innovative technology be developed around them. In order to best meet the needs of their community, they need to create a plan for their integration. As the demand for wireless infrastructure continues to rapidly grow, this issue is one that is facing many municipalities throughout the United States and beyond. Certainly an understanding of the issue is the first tool which the public administrator has to have in order to prepare for this growing technology.

Cited References

Albermarle County (2012). "The Albermarle County Land Use Law Handbook." Retrieved October 6, 2013, from http://www.albemarle.org/upload/images/Forms_Center/Departments/County_Attorney/Forms/LUchapter35-wirelesstelecommunications.pdf

AT&T (n.d.) "1946: First Mobile Telephone Call." Retrieved June 20th, 2012, from http://www.corp.att.com/attlabs/reputation/timeline/46mobile.html.

Barbagallo, Paul (2012, Jan 23). "Appeals Courts backs FCC decision to speed local tower-siting approvals. *Bloomberg News*.

Barnes, Peter (2010 Feb). "FCC requires faster cell tower sitting approval." *The American City and Country.*

Brenner, Elsa (2010, Oct 24). "Keeping the Peace, Fearing for the Quiet." *The New York Times*. Section RE, Page 5

Connecticut Department of Public (2004, Jan). "Cell Phone Towers and Cell Phones. Questions and answers about safety" Retrieved on July 8, 2012 from http://www.ct.gov/dph/lib/dph/environmental_health/eoha/pdf/cell_phones.pdf

CTIA: The Wireless Association (2011). Wireless Fact Sheet. Retrieved June 25, 2012 from http://www.ctia.org/media/industry_info/index.cfm/AID/10323

Dailey, Dharma (2009, Dec 22). "Making Broadband and Cellphones Affordable For All: Proposed Reforms To The Lifeline Program Of The Universal Service Fund." Media Justice Fund of the Funding Exchange Report. Pg 9

Eggerton, John (2009, Nov 18). "FCC Adopts Shot Clock on Wireless Tower Sitings" *Broadcasting & Cable*.

Entner, Roger (2012).The Wireless Industry: The Essential Engine of US Economic Growth. Recon Analytics. Retrieved June 26, 2012 from http://reconanalytics.com/wp-content/uploads/2012/04/Wireless-The-Ubiquitous-Engine-by-Recon-Analytics-1.pdf
FCC (1996). "Federal Communications Fact Sheet). Retrieved July 1, 2012 from http://wireless.fcc.gov/siting/fact1.html

Flet, Victor (2008, 1 Feb). "Cell Phone 'Towers of Doom' that reportedly cause cancer in Britain now also threaten Toronto Communities". *Toronto Sun*. Page 1

Grondahl, Paul (2010, Dec 25). "Cell towers hide in plain sight." *The Times Union Albany* Page 16

Jansen, Jim (2010, Nov 24). "Use of the internet in higher-income households" Retrieved July 9th, 2012 from http://www.pewinternet.org/Reports/2010/Better-off-households.aspx

Loscher, W and Kas G. (1998). "Conspicuous behavioral abnormalities in a dairy cow her near a TV and Radio transmitting antenna" Institute of Pharmacology, Toxicology and Pharmacy at the Veterinary Faculty of Hannover. Retrieved on July 7, 2012 from http://briarcliffheights.org/bch/wp-content/uploads/2011/12/dairycowstudy.pdf

McWIlliams, Jeremiah (2012, Apr 28). "Cities bet on cell towers as revenue source" Retrieved July 9, 2012 from http://www.ajc.com/news/cities-bet-on-cell-1427741.html

Murray, James (2002). Wireless Nation: The frenzied launch of the cellular revolution in America. Persues Publishing, New York, NY,

Oehmke, Ted (2000, 6, Jan) "Cell Phones Ruin the Opera? Meet the Culprit". New York Times. Page 8

Raine, Lee (2013, 6, Jun) "Cell Phone Ownership Hits 91% of Adults." Pew Research Center. http://www.pewresearch.org/fact-tank/2013/06/06/cell-phone-ownership-hits-91-of-adults/

Romero, Frances. (July 6, 2009) "Biography: John F Mitchell". *Time Magazine*. P. 53

Rosenberg, Merri (2000, Jul 23). "Cell tower plan stir neighbors." *The New York Times* Section 14WC, Page 4 Column 4.

Smith, Aaron (2011). "Americans and Text Messaging: Retrieved July 4th, 2012. http://pewinternet.org/Reports/2011/Cell-Phone-Texting-2011.aspx
State of New York. Department of State. Local Government Handbook. 6th ed. (2009 Reprinted 2011) Web. Retrieved on Dec 2011 from http://www.dos.state.ny.us/lgss/pdfs/Handbook.pdf#page=35

Zickhur, Kathryn (2011). "Generations and their gadgets" Retrieved July 2, 2012 http://www.pewinternet.org/Reports/2011/Generations-and-gadgets.aspx

Zickhur, Kathryn and Smith Aaron (2011). "28% of Americans use mobile and social location-based services" Retrieved July4th, 2012 from http://www.pewinternet.org/Reports/2011/Location.aspx

Appendix A: Survey Response Summary

Introduction Letter

October 2, 2013

Re: Wireless Telecommunication Capstone Research Project

My name is James Collins and I am a graduate student pursuing my Master Degree in Public Administration at Pace University. Currently, I am working on the final class in this program which is the Capstone Seminar. The main focus of the Capstone Seminar is the completion of the Capstone Project --- a research project that provides an opportunity to examine and analyze a relevant topic and, then create a well-researched written and orally-presented project.

My choice for the Capstone Project was a study regarding the erection of cell towers and cell antennae and their impact on the community. The research looks into the history, development, planning, regulation and integration of cell towers and cell antennae in different types of communities. My Project's plan was to examine two Westchester communities and compare opinions of citizens and municipal officials with respect to Wireless Telecommunication integration into those communities.

For this project, I chose the Town of Mount Pleasant, NY, which is located in Central Westchester County and has a population of approximately 45,000 people and the City of Yonkers, NY which is located in Southern Westchester County and has a population of approximately 195,000 people.

As a part of the analysis for the Project, I need volunteers from Mount Pleasant and Yonkers, to respond to a survey which studies views of residents regarding Wireless Cell Phones and Cell Towers / Cell Antennae. The survey is available in two forms: (1) through the online survey website named survey monkey and, (2) by answering the survey questions on the paper-form survey which is attached. All answers are completely anonymous and confidential.

If you choose to answer the survey online, simply go to the hyperlink for the survey monkey website which can be found on the top of the first page of the survey below. You will be able to answer the survey and submit it directly from the website. If you choose the paper and pencil method to answer the survey, please mail your completed survey back to me in the addressed, postage-paid envelope. To ensure your anonymity and confidentially please do not put your return address on the envelope. Using either method, please complete the survey by November 16, 2013.

As I finalize my Master Degree in Public Administration, the data compiled from the survey results will be used as an integral part of my Capstone Project. Thank you in advance for your consideration and help.

Regards,

James Collins

Survey Response to Question 30

1. Do you have / own a Cell Phone?						
Answer Options	**Mount Pleasant**		**Yonkers**		**Total**	
	Count	**%**	**Count**	**%**	**Count**	**%**
Yes	80	100%	68	100%	148	100%
No	0	0%	0	0%	0	0%
Total	**80**	**100%**	**68**	**100%**	**148**	**100%**

2. Where do you live?						
Answer Options	**Mount Pleasant**		**Yonkers**		**Total**	
	Count	**%**	**Count**	**%**	**Count**	**%**
I live in the Town of Mount Pleasant	80	100%	0	0%	80	54%
I live in the City of Yonkers	0	0%	68	100%	68	46%
Total	**80**	**100%**	**68**	**100%**	**148**	**100%**

3. What is the primary use for your Cell Phone?						
Answer Options	**Mount Pleasant**		**Yonkers**		**Total**	
	Count	**%**	**Count**	**%**	**Count**	**%**
Making and receiving Phone Calls	13	16%	12	18%	25	17%
Sending and receiving E-Mails	2	3%	1	1%	3	2%
Sending and receiving Text Messages	9	11%	1	1%	10	7%
For Phone Calls, E-Mails and Text Messages	22	28%	21	31%	43	29%
In addition to the above, I also use my Cell Phone for such things as Surfing the Web, Connection to Social Media, Streaming of Audio or Video	32	40%	28	41%	60	41%
I only use my Cell Phone in important situations or for emergencies	2	3%	5	7%	7	5%
Total	**80**	**100%**	**68**	**100%**	**148**	**100%**

4. How many wireless devices does your household own -- including cell phones, tablets and other related wireless devices that require a telecommunication provider?

Answer Options	Mount Pleasant		Yonkers		Total	%
	Count	%	Count	%	Count	%
One	2	2%	5	7%	7	5%
Two	10	12%	7	10%	17	11%
Three	15	18%	16	23%	31	21%
Four	13	16%	14	20%	27	18%
Five	14	17%	9	13%	23	15%
Six	13	16%	6	9%	19	13%
Seven	2	2%	3	4%	5	3%
Eight	6	7%	2	3%	8	5%
Nine	1	1%	2	3%	3	2%
Ten	6	7%	5	7%	11	7%
Total	**82**	**100%**	**69**	**100%**	**151**	**100%**

5. What types of wireless devices can be found in your household? (choose all that apply)

Answer Options	Mount Pleasant		Yonkers		Total	
	Count	&	Count	&	Count	%
Basic Phones	42	22%	43	24%	85	23%
Smartphones	69	37%	51	29%	120	33%
Tablets	51	27%	52	30%	103	28%
Mobile Hot Spots	5	3%	12	7%	17	5%
4G LTE USB Modems	9	5%	8	5%	17	5%
Netbooks	11	6%	10	6%	21	6%
Total Wireless Devices	**187**	**100%**	**176**	**100%**	**363**	**100%**

6. Does your household also have a Land Line (a standard home telephone)?

Answer Options	Mount Pleasant		Yonkers		Total	
	Count	%	Count	%	Count	%
Yes	77	96%	62	91%	139	94%
No	3	4%	6	9%	9	6%
Total	**80**	**100%**	**68**	**100%**	**148**	**100%**

7. On average which do you use more for voice communication?						
Answer Options	**Mount Pleasant**		**Yonkers**		**Total**	
	Count	**%**	**Count**	**%**	**Count**	**%**
Landline	20	25%	20	30%	40	27%
Cell Phone	60	75%	48	70%	108	73%
Total	**80**	**100%**	**68**	**100%**	**148**	**100%**

8. According to the CTIA Wireless Association 35.8% of American households in 2012 were wireless-only households. Do you see your household going to a completely wireless household?						
Answer Options	**Mount Pleasant**		**Yonkers**		**Total**	
	Count	**%**	**Count**	**%**	**Count**	**%**
Yes	24	30%	14	21%	38	26%
No	51	64%	48	71%	99	67%
My household is already a completely wireless household	5	6%	6	9%	11	7%
Total	**80**	**100%**	**68**	**100%**	**148**	**100%**

9. How do Cell Phones receive and transmit voice, text and data?						
Answer Options	**Mount Pleasant**		**Yonkers**		**Total**	
	Count	**%**	**Count**	**%**	**Count**	**%**
Through the use of Standard Telephone Lines	0	0%	1	1%	1	1%
Through the use of Cell Towers, Cell Antennae and dedicated landline circuit or wireless backhaul	58	73%	60	88%	118	80%
Through the use of Satellites	6	8%	2	3%	8	5%
I don't really know	16	20%	5	7%	21	14%
Total	**80**	**100%**	**68**	**100%**	**148**	**100%**

10. Besides Cell Phones, there are a number of other wireless devices including Hand Held Tablets, Mobile to Mobile Products, Mobile Hot Spots and Home Phone Connect Products whose popularity and use has grown significantly in recent years and the projection is for continued growth.

Are you familiar the fact that Cell Towers and Cell Antennae are needed for these devices to work and are used to transmit and receive voice, text and data?

Answer Options	Mount Pleasant		Yonkers		Total	
	Count	%	Count	%	Count	%
Yes	69	86%	62	91%	131	89%
No	11	14%	6	9%	17	11%
Total	**80**	**100%**	**68**	**100%**	**148**	**100%**

11. In the United States alone, the use of all wireless products has grown dramatically and, therefore, the number of wireless subscribers has skyrocketed from 44 million wireless subscribers in 1996 to 326.4 million wireless subscribers in December 2012. During this same period, as the number of wireless subscribers continued on its dramatic growth-path, the number of cell sites needed to support this growth also increased from 30,045 to 283,385. (Statistics Source - CTIA Wireless Association)

Considering the fact that some communities have expressed their concern about how Cell Towers and Cell Antennae look, are you concerned with how they look?

Answer Options	Mount Pleasant		Yonkers		Total	
	Count	%	Count	%	Count	%
Yes	45	56%	38	56%	83	56%
No	26	33%	23	34%	49	33%
I have no idea where they are located so they don't look too out of place to me.	9	11%	7	10%	16	11%
Total	**80**	**100%**	**68**	**100%**	**148**	**44%**

12. Although the Federal government and the Federal Communications Commission assures us that the very small amount of radiation coming from Cell Towers and Cell Antennae does not create any health problems and is not a concern, local governments often use health concerns when considering locations for placement of Cell Towers and Cell Antennae.

Despite these assurances, do you believe that the very small amount of radiation coming from Cell Towers and Cell Antennae is a health concern?

Answer Options	Mount Pleasant		Yonkers		Total	
	Count	%	Count	%	Count	%
Yes	46	58%	36	53%	82	55%
No	26	33%	26	38%	52	35%
I had no idea that there was any health issue related Cell Towers and Cell Antennae	8	10%	6	9%	14	9%
Total	**80**	**100%**	**68**	**100%**	**148**	**100%**

13. A number of factors impact the placement of cell towers and cell antennae. The primary factor for cellular providers (companies like Verizon Wireless, AT&T and Sprint) is need. When current cell towers or cell antennae that service a particular area are overburdened by demand, it may result in an unacceptable number of problems for subscribers, such as connection delays and disconnects.

Are you aware that as the number of wireless devices increase, the number of cell towers and/or cell antennae also needs to be increased in order to maintain and improve service?

Answer Options	Mount Pleasant		Yonkers		Total	
	Count	%	Count	%	Count	%
Yes	71	89%	60	88%	131	89%
No	9	11%	8	12%	17	11%
	80	**100%**	**68**	**100%**	**148**	**100%**

14. Do you support the increase in wireless cell towers to support the ever increasing demand for wireless cell devices?

Answer Options	Mount Pleasant		Yonkers		Total	
	Count	%	Count	%	Count	%
Yes	66	83%	50	74%	116	78%
No	14	18%	18	26%	32	22%
Total	**80**	**100%**	**68**	**100%**	**148**	**100%**

15. Cell towers and cell antennae are not only needed by wireless subscribers who live in the area where the cell towers or cell antennae are physically located.

Are you aware that as wireless subscribers using portable wireless devices (such as cell phones and hand held tablets) move from place to place with their device they are using a number of cell towers or cell antennae?

Answer Options	Mount Pleasant		Yonkers		Total	
	Count	%	Count	%	Count	%
Yes	73	91%	58	85%	131	89%
No	7	9%	10	15%	17	11%
Total	**80**	**100%**	**68**	**100%**	**148**	**100%**

16. In many areas, local governments have expressed their concerns regarding health issues and aesthetics (how cell towers and cell antennae look) through planning, zoning and legislative measure and, in doing so have impacted or, in some cases, even blocked the placement of cell towers and cell antennae.

Are you concerned with either health issues or aesthetics?

Answer Options	Mount Pleasant		Yonkers		Total	
	Count	%	Count	%	Count	%
Yes, both health issues and aesthetics are a concern for me	52	65%	30	44%	82	55%
Yes, but I am only concerned about the health issues	12	15%	17	25%	29	20%
Yes, but I am only concerned about aesthetics	3	4%	5	7%	8	5%
No, I am not concerned about health issues or aesthetics	13	16%	16	24%	29	20%
Total	**80**	**100%**	**68**	**100%**	**148**	**100%**

17. Considering the fact that both the Federal Government and the Federal Communications Commission continue to assure the public that there are no adverse health problems caused by cell towers and cell antennae.

Do you feel that local governments should impact their placement due to aesthetic considerations?

Answer Options	Mount Pleasant		Yonkers		Total	
	Count	%	Count	%	Count	%
Yes, how things look are important to me	56	70%	37	54%	93	63%
No, we need cell towers and cell antennae to communicate and local governments should not slow down progress.	24	30%	31	46%	55	37%
Total	**80**	**100%**	**68**	**100%**	**148**	**100%**

18. Are you aware that many local governments have used health concerns and/or aesthetic considerations in an attempt to control the placement of cell towers and cell antennae?

Answer Options	Mount Pleasant		Yonkers		Total	
	Count	%	Count	%	Count	%
Yes	51	64%	47	69%	98	66%
No	29	36%	21	31%	50	34%
Total	**80**	**100%**	**68**	**100%**	**148**	**100%**

19. Are you aware that wireless providers pay an ongoing monthly fee to land owners (both local government and private owners) in order to place cell towers or cell antennae on their property?

Answer Options	Mount Pleasant		Yonkers		Total	
	Count	%	Count	%	Count	%
Yes	55	69%	45	66%	100	68%
No	25	31%	23	34%	48	32%
Total	**80**	**100%**	**68**	**100%**	**148**	**100%**

20. If your municipality could receive substantial revenue to place a cell tower or cell antennae in your favorite park and as a result substantially reduce all homeowner's property taxes, would you be in favor of the proposed project?

Answer Options	Mount Pleasant		Yonkers		Total	
	Count	%	Count	%	Count	%
Yes	56	70%	45	66%	101	68%
No	24	30%	23	34%	47	32%
Total	**80**	**100%**	**68**	**100%**	**148**	**100%**

21. Recently, wireless providers have addressed some aesthetic concerns by sharing cell towers and cell antennae. By having one cell tower or cell antenna rather than two or three in any given area, any negative aesthetic impact is lessened and, the building costs are reduced for the providers.

Do you think that this partnership will allow wireless providers to build more cell towers and cell antennae and, therefore, maintain and improve service for wireless subscribers?

Answer Options	Mount Pleasant		Yonkers		Total	
	Count	%	Count	%	Count	%
Yes	74	93%	64	94%	138	93%
No	6	8%	4	6%	10	7%
Total	**80**	**100%**	**68**	**100%**	**148**	**100%**

22. What is your gender?						
Answer Options	**Mount Pleasant**		**Yonkers**		**Total**	
	Count	**%**	**Count**	**%**	**Count**	**%**
Male	46	58%	36	53%	82	55%
Female	34	43%	32	47%	66	45%
Total	**80**	**100%**	**68**	**100%**	**148**	**100%**

23. What is your age?						
Answer Options	**Mount Pleasant**		**Yonkers**		**Total**	
	Count	**%**	**Count**	**%**	**Count**	**%**
Under 18 years of age	0	0%	0	0%	0	0%
18-29 years old	4	5%	7	10%	11	7%
30-54 years old	44	55%	38	56%	82	55%
55-65 years old	26	33%	11	16%	37	25%
66 years and over	6	8%	12	18%	18	12%
Total	**80**	**100%**	**68**	**100%**	**148**	**100%**

24. What is the highest level of education that you have completed?						
Answer Options	**Mount Pleasant**		**Yonkers**		**Total**	
	Count	**%**	**Count**	**%**	**Count**	**%**
some high school	1	1%	1	1%	2	1%
received a G.E.D.	0	0%	0	0%	0	0%
high school graduate	12	15%	6	9%	19	13%
some college	13	16%	10	15%	23	15%
trade / technical / vocational training	2	3%	4	6%	6	4%
college graduate	27	34%	18	26%	45	30%
Some postgraduate work	7	9%	6	9%	13	9%
Post graduate degree	18	23%	23	34%	41	28%
Total	**80**	**100%**	**68**	**100%**	**149**	**100%**

25. What is your race?

Answer Options	Mount Pleasant		Yonkers		Total	
	Count	%	Count	%	Count	%
African-American	2	3%	4	6%	6	4%
Asian-American	1	1%	5	7%	6	4%
Hispanic	3	4%	3	4%	6	4%
Caucasian (White)	74	93%	55	81%	129	87%
Other (please specify)	0	100%	1	1%	1	1%
Total	**80**	**200%**	**68**	**100%**	**148**	**100%**

26. What is your marital status?

Answer Options	Mount Pleasant		Yonkers		Total	
	Count	%	Count	%	Count	%
single / never married	9	11%	13	19%	22	15%
married	61	76%	46	68%	107	72%
separated	3	4%	1	1%	4	3%
divorced	4	5%	7	10%	11	7%
widowed	3	4%	1	1%	4	3%
Total	**80**	**100%**	**68**	**100%**	**148**	**100%**

27. What is your employment status

Answer Options	Mount Pleasant		Yonkers		Total	
	Count	%	Count	%	Count	%
Employed full-time	47	59%	45	66%	92	62%
Employed part-time	14	18%	7	10%	21	14%
Employed part-time and looking for full-time employment	2	3%	4	6%	6	4%
Not employed - not currently looking for employment	6	8%	1	1%	7	5%
Not employed - currently looking for employment	2	3%	2	3%	4	3%
Retired	9	11%	9	13%	18	12%
Total	**80**	**100%**	**68**	**100%**	**148**	**100%**

27. What is your appropriate average household income?

Answer Options	Mount Pleasant		Yonkers		Total	
	Count	%	Count	%	Count	%
$0-$24,999	2	3%	1	1%	3	2%
$25,000-$49,999	2	3%	4	6%	6	4%
$50,000-$74,999	3	4%	3	4%	6	4%
$75,000-$99,999	16	20%	10	15%	26	18%
$100,000-$124,999	17	21%	11	16%	28	19%
$125,000-$149,999	6	8%	5	7%	11	7%
$150,000-$174,999	9	11%	9	13%	18	12%
$175,000-$199,999	3	4%	2	3%	5	3%
$200,000 and up	8	10%	5	7%	13	9%
I prefer not to answer	14	18%	18	26%	32	22%
Total	**80**	**100%**	**68**	**100%**	**148**	**100%**

29. Who is your cellular wireless provider? - (Choose all that apply to your household)

Answer Options	Mount Pleasant		Yonkers		Total	
	Count	%	Count	%	Count	%
Verizon Wireless	58	73%	38	56%	96	65%
AT&T Mobility	10	13%	13	19%	23	16%
Sprint	10	13%	14	21%	24	16%
T-Mobile	1	1%	0	0%	1	1%
Other	1	1%	3	4%	4	3%
Total	**80**	**100%**	**68**	**100%**	**148**	**100%**

30. Do you have any other comments or statements that would be useful in this Wireless Telecommunications Research Study Survey -- any thoughts regarding the industry, cell towers, household use or any other thoughts or concerns? (optional)

Answer Options	Mount Pleasant		Yonkers		Total	
	Count	%	Count	%	Count	%
Total Responses By Municipality – Optional Question	18	12%	20	13%	38	25%
Total	**80**	**12%**	**20**	**13%**	**148**	**25%**

Question 30: Respondent Free Form Responses	
Mount Pleasant	**Yonkers**
If town officials are considering allowing cell towers 'for a price', even though this revenue would significantly reduce my taxes, I would be dead set against it!	If any health related concerns then they should not be in site of where people frequent. They also need to be less conspicuous!
The cell towers are located on the water towers in Mt. Pleasant, and although I live less than 2 miles away, my Verizon cell reception are poor. I don't want to live closer because I don't believe government or the industry that there are no health threats associated with cell towers.	If more of the cell towers are designed to look like trees & blend in with the landscape I feel more people would be acceptable if them & not have the abnormal fear of the low radiation levels. They wouldn't focus on them
I found this survey extremely informative and now I am going to be more involved in knowing more and not just listening to wireless carriers and their decisions and statements	We need another way! Towers are not pretty and the risk of radiation is significant - we need to find another way!!!
Long term health risks, e.g.: exposure to increasing levels of radiation similar to health issues caused by proximity to high voltage overhead electrical wires	Health issues are a major concern as I feel no one wants to look closely. I would support antennae in a park rather than close to houses as exposure is lessened.
I do not think it is a good idea to have towers in public places in or around public property or homes.	Happy I had enough service to complete the survey on my wireless device!
Safety of technicians servicing Towers should also be a concern; stricter training & certification programs should be required to meet demand - there have been too many accidents with the explosive growth of Cell Towers.	With respect to aesthetic considerations, the newer cell antennae are considerably smaller than the original ones and are, therefore, less obtrusive. Also, when care is taken to find an appropriate location (functional and aesthetically acceptable), the objections are considerably lessened. I've seen it done both ways. Some people will never be satisfied but a little effort to work with reasonable people goes far.
Wireless companies and local municipalities need a 'trusting' relationship to make sure the placement of cell towers 1. Do the job for the wireless company and 2. disrupt the local environment/esthetics as little as possible	You discussed the appearance and health concerns regarding the towers, but what about the environmental impact?

Mount Pleasant	Yonkers
Some of the questions were yes/no and could have used a "depends on" kind of choice. I think potentially cell towers could be dangerous as I think the same for use of devices. I just think the jury is still out.	While understanding the need for cell towers/antennae and the growing use of wireless devices, I would think -- with all the advances made in the industry and products - that technology would find a way to deliver service without aesthetic or health concerns - real or perceived. That's where your survey should be directed - not in how to make people feel stupid because they love their cell phones but hate the mode of cellphone delivery and what such delivery implies.
The wireless companies are hauling in tremendous profits and more research should be done to educate the public about health safety of radiation emitted from the towers and antennas	Attention should be given to tower technology so that towers are as small and unobtrusive as possible. My concern with the industry is primarily the cost of wireless service. I strictly limit my cell phone use because of its cost. Were it more affordable, I'd use it far more frequently and would upgrade both my phone and my service plan.
The primary concern should be HEALTH. The appearance of cell towers should be secondary.	We need another way! Towers are not pretty and the risk of radiation is significant - we need to find another way!!!
With all the cell phones the prices should be lower	Health issues are a major concern as I feel no one wants to look closely. I would support antennae in a park rather than close to houses as exposure is lessened.
Cell towers and antennae are a necessary evil for progress and service for wireless companies. But they have to limit the impact, especially health concerns for the public.	Happy I had enough service to complete the survey on my wireless device!
The one question that got me was the one asking if I'd support a tower in my favorite local park. The answer for that would stay no, but why not investigate other nearby solutions, like on the tops of buildings that are tall enough, and on the tops of taller/hilltop telephone poles and power lines?	With respect to aesthetic considerations, the newer cell antennae are considerably smaller than the original ones and are, therefore, less obtrusive. Also, when care is taken to find an appropriate location (functional and aesthetically acceptable), the objections are considerably lessened. I've seen it done both ways. Some people will never be satisfied but a little effort to work with reasonable people goes far.
VZW is expensive as compared to other carriers- if using same cell towers, same phone manufacturers why isn't cost approx. same-	While understanding the need for cell towers/antennae and the growing use of wireless devices, I would think -- with all the advances made in the industry and products - that technology would find a way to deliver service without aesthetic or health concerns - real or perceived. That's where your survey should be directed - not in how to make people feel stupid because they love their cell phones but hate the mode of cellphone delivery and what such delivery implies.

Mount Pleasant	Yonkers
The Cell tower off of the Hutch that they tried to make look like a tree is uglier than the basic cell tower. There has to be a better way to disguise them.	Attention should be given to tower technology so that towers are as small and unobtrusive as possible. My concern with the industry is primarily the cost of wireless service. I strictly limit my cell phone use because of its cost. Were it more affordable, I'd use it far more frequently and would upgrade both my phone and my service plan.
local cemeteries may be a good place for cell towers no health issues there	People have to understand we are not turning back. There are very few blacksmith shops left.
I would like to technological advances in the areas of the "micro" cell networks that I've read about which are "repeater" type and can be mounted on existing telephone poles and buildings.	As with everything else, the future technology will provide smaller towers / antennae
I found this survey extremely informative and now I am going to be more involved in knowing more and not just listening to wireless carriers and their decisions and statements	While it is nice to make them look like trees, flagpoles, etc., if this cannot be done at a reasonable rate, we need the cell towers so they must be installed.
From a firefighter's perspective - installing towers and antennae on roof tops can have an impact on the outcome of an operation. Strategies and tactics at fire operations will be affected by these obstacles on a roof. Access and egress points may be restricted. Coaxial cable and the protective trays create a tripping hazard, especially at night or in a smoke condition. At a top floor fire, the need for vertical ventilation is paramount; we need to open/cut the roof. This technology will prevent/delay this opening. Delays in opening the roof can cause the fire to extend. When antennae mounting hardware is exposed to fire, a collapse of the antennae and support system can occur. Fortunately, I personally have not experienced a fire that involved a cell site. However, I've been on many roof tops of multiple dwellings that have cell towers; conducting a drill or to do an inspection. The mobility of the firefighter is greatly restricted and operating on the roof is severely impacted. PS: there is a cell site in Valhalla on a 3 sty bldg. (Bdwy & N Kensico)	No. Survey was well thought
	I am concerned with the health part of the towers. They say one thing and then year's later people are diagnosed with cancer.
	While it is nice to make them look like trees, flagpoles, etc., if this cannot be done at a reasonable rate, we need the cell towers so they must be installed.
	While it is nice to make them look like trees, flagpoles, etc., if this cannot be done at a reasonable rate, we need the cell towers so they must be installed.