Wireless Broadband Zoning Bylaw Review Project

December 2012

Support for this project was provided by
the Massachusetts Broadband Institute and
WesternMA Connect, Inc.

For more information about the *MassBroadband 123* network, go to
www.axiamassbroadband123.com

Wireless Broadband Zoning Bylaw Review Project

Section 1: Project Overview

The Massachusetts Broadband Institute (MBI) was created in August 2008 by Governor Deval Patrick and the Legislature under the Broadband Act. This Act gives the MBI the authority to invest up to $40 million of state bond funds in necessary and long-lived infrastructure assets. Since its creation, the MBI has been working to extend affordable high-speed Internet access to all homes, businesses, schools, libraries, medical facilities, police and fire stations, government offices and other public institutions across the Commonwealth. Towards this effort, and with additional federal funding secured under the American Reinvestment and Recovery Act (ARRA), the MBI is constructing the *AxiaMassBroadband123* fiber-optic network in western and north-central Massachusetts. This new "middle-mile" infrastructure will change the business model for service providers and network builders to extend broadband into previously unserved areas and to create a competitive telecommunications market in the region. This middle mile network provides the foundation for the "last mile" the connection between the end-user (i.e. homes and businesses) and the point of distribution for broadband services by service providers.

Utilizing federal funds awarded to the MBI under the State Broadband Data and Development Grant Program for broadband planning, the MBI awarded funds to WesternMA Connect, Inc. to address key issues identified in broadband planning and to support the MBI effort to bring connectivity to the unserved in the region.

Utilizing the *Axia MassBroadband123* network, it is likely that network builders and service providers will employ more than one type of last-mile technology to deploy broadband into previously unserved areas. One such technology is a fixed wireless broadband system. This system may require antennas, monopole masts or other similar type of tower facilities. These facilities are different in scale and scope to traditional cell towers. Given this relatively new and evolving technology, it was determined that a project was needed to review how fixed wireless broadband facilities relate to municipal zoning.

WesternMA Connect offered funds to the five regional planning agencies (RPAs) located in western and north-central Massachusetts, so that they could partner with an interested community to review their local zoning bylaws. Three RPAs were funded to assist four municipalities with the development and adoption of zoning bylaws that permit and reasonably

regulate the infrastructure necessary to operate a fixed wireless broadband system. The Berkshire Regional Planning Commission (BRPC) worked with the Planning Boards of the Town of Cheshire and the Town of Washington. The Franklin Regional Council of Governments (FRCOG) worked with the Town of Heath Planning Board. The Montachusett Regional Planning Commission (MRPC) worked with the Town of Athol Planning Board. WesternMA Connect appreciates the considerable time, effort and knowledge contributed by the municipal boards and committees who participated in this project.

As part of this project, the Berkshire Regional Planning Commission used their expertise to review the zoning bylaws prepared and to provide a summary of the work completed by each RPA in each municipality. Final versions of the local zoning bylaws adopted or to be presented for adoption are appended to this report.

WesternMA Connect provided overall coordination of the project and provided technical support to the RPAs and municipalities through its Chief Technology Consultant, Chip Brodeur of BNC Network Consulting Services. A copy of the PowerPoint presentation created by Chip Brodeur that reviews wireless broadband facilities and equipment is included in Appendix 5.

Questions about this report may be directed to:

Brian Domina, Planner
Berkshire Regional Planning Commission
bdomina@berkshireplanning.org
(413) 442-1521 ext.14

Questions about wireless technologies discussed in this report may be directed to:

George “Chip” Brodeur
BNC Network Consulting Services
george.brodeur@comcast.net

Section 2: Individual Project Summaries

2.1 Town: Athol, MA
RPA – Montachusett Regional Planning Commission (MRPC)

MRPC staff assisted the Town of Athol with the development of a wireless telecommunications zoning bylaw that permits and reasonably regulates fixed wireless broadband facilities. MRPC staff met with both the Athol Planning Board and the Zoning Bylaw Review Committee four times over the course of the project to provide technical assistance. In addition to the regular working meetings, MRPC staff and WesternMA Connect's Chief Technology Consultant Chip Brodeur held a public forum to discuss fixed wireless broadband technology and zoning bylaws. Although MRPC staff had originally begun developing a separate zoning bylaw to regulate fixed wireless broadband facilities, the Zoning Bylaw Review Committee decided to integrate the language regulating fixed wireless broadband facilities into an overall wireless telecommunications facilities zoning bylaw, as the Town of Athol did not have such a bylaw before this project.

Zoning Bylaw Summary:

The zoning bylaw broadly defines the term "wireless telecommunications facility" to include towers and antennae that among other technologies includes high speed broadband internet services. Wireless transceiver antenna arrays are permitted by-right after site plan review in all zoning districts, whereas other wireless telecommunication facilities are allowed in only two zoning districts. The zoning bylaw includes specific language that allows the attachment of fixed wireless transceiver antenna arrays to be located on existing structures so long as it does not exceed ten (10) feet in height above the height of the structure, although additional height is permitted after a specific showing by the applicant of the need for the additional height.

Bylaw Status:

Adopted June 11, 2012. See Appendix 1 for the Town of Athol's Wireless Telecommunication Facilities Zoning Bylaw.

2.2 Town: Cheshire, MA
RPA – Berkshire Regional Planning Commission (BRPC)

BRPC staff assisted the Town of Cheshire with the development of a wireless telecommunications zoning bylaw that permits and reasonably regulates fixed wireless broadband facilities. BRPC staff met with the Cheshire Zoning Bylaw Review Working Group six times over the course of the project. Prior to the commencement of the project, the Town of Cheshire had never developed or adopted a general wireless telecommunications zoning bylaw. The Zoning Bylaw Review Working Group requested that a single wireless telecommunications zoning bylaw be developed to address fixed wireless broadband facilities and other wireless telecommunication facilities. BRPC's work in Cheshire began shortly after the passage by Congress of the Middle Class Tax Relief and Job Creation Act of 2012 (HR 3630), which significantly altered a municipality's authority to regulate modifications to wireless communication facilities. Section 5 of the Cheshire zoning bylaw is intended to comply with and address the issues raised by this new federal legislation.

Zoning Bylaw Summary:

The zoning bylaw broadly defines the term "wireless telecommunications facility" to include any equipment that broadcasts or receives radio frequency waves in order to provide wireless telecommunication services. The term "wireless telecommunication services" includes a fixed wireless broadband internet service. The zoning bylaw allows all wireless telecommunication facilities, including fixed wireless broadband facilities, by special permit in any location in the town, subject to certain dimensional requirements. Despite BRPC encouragement that a lower level of permitting may be appropriate for fixed wireless broadband facilities, the Zoning Bylaw Review Working Group concluded that a special permit was most appropriate for its town.

Bylaw Status:

The Planning Board intends to present the bylaw for adoption in 2013. See Appendix 2 for a DRAFT of the Town of Cheshire's Wireless Telecommunication Facility Zoning Bylaw.

2.2 Town: Heath, MA
RPA – Franklin Regional Council of Governments (FRCOG)

FRCOG staff assisted the Town of Heath with the development of a zoning bylaw to permit and regulate fixed wireless broadband facilities. FRCOG staff met with the Heath Planning Board three times over the course of the project to provide technical and planning assistance. At one of these meetings, WesternMA Connect's Chief Technology Consultant presented on fixed wireless broadband technology for Planning Board members as well as other public officials and the public who were invited to attend. FRCOG staff prepared all materials required for the Public Hearing and upcoming town meeting. The Heath Fixed Wireless Broadband Facilities zoning bylaw, unlike the zoning bylaws in the other participating municipalities, is written independently of the existing wireless telecommunications facilities zoning bylaw. This approach allowed for the development of a clear, concise and well-tailored bylaw to regulate fixed wireless broadband facilities without the confusion and complexity of trying to simultaneously regulate other types of wireless telecommunication technology.

Zoning Bylaw Summary:

The zoning bylaw permits the installation of small fixed wireless antennae arrays (less than or equal to 8') on existing utility poles and existing structures by-right after site plan review. Larger fixed wireless antennae arrays (greater than 8') on existing utility poles and existing structures may be allowed by special permit with site plan review. Where the fixed wireless antennae array is to be fully concealed inside an existing structure then it is allowed by-right. The zoning bylaw also protects the historic district in town by requiring all fixed wireless antennae arrays proposed for the historic district to obtain a special permit prior to installation. For the installation of a fixed wireless antenna array on a new structure, as opposed to an existing structure, an applicant must obtain a special permit with site plan review. The zoning bylaw sets forth dimensional and design standards to address issues, such as height, setbacks, lighting, parking, etc. The zoning bylaw also requires the applicant to submit an annual report, obtain insurance on the site and submit a form of surety to protect the financial interests of the town in case the site is abandoned.

Bylaw Status:

The Planning Board intends to present the bylaw for adoption at the 2013 Annual Town Meeting. See Appendix 3 for a DRAFT of the Town of Heath's Fixed Wireless Broadband Facilities Zoning Bylaw.

2.4 Town: Washington, MA

RPA – Berkshire Regional Planning Commission (BRPC)

BRPC staff assisted the Town of Washington with the development of zoning amendments to its existing wireless telecommunications facilities zoning bylaw. BRPC met with the Washington Planning Board three times over the course of the project. The existing wireless telecommunication facilities zoning bylaw arguably defines the term "wireless telecommunication facility" to include fixed wireless broadband services. The Planning Board wanted to remove any uncertainty over this definition while at the same time removing some of the barriers to the installation of a fixed wireless broadband network.

Zoning Bylaw Summary:

One of the zoning amendments defines the terms "fixed wireless transmitter tower structure" and "fixed wireless transmitter array." A second zoning amendment states that a fixed wireless transmitter tower/array is a permitted accessory use in the town. A third zoning amendment gives the Planning Board the right to waive submittal requirements that although appropriate for other types of wireless telecommunication technologies are not necessary for permitting a fixed wireless transmitter tower/array. A fourth zoning amendment exempts fixed wireless transmitter towers/arrays from the requirement to post a form of surety where the fixed wireless transmitter tower/array is proposed as an accessory use.

Bylaw Status:

The Planning Board intends to present the bylaw for adoption at the 2013 Annual Town Meeting. See Appendix 4 for a DRAFT of the Town of Washington's Zoning Bylaw Amendments.

Section 3: Summary

The four municipalities that participated in the project are or will be (after bylaw adoption) in a better position to responsibly permit a fixed wireless broadband network if interest in such a network develops in the community.

In at least three out of the four participating municipalities, the Planning Board showed a preference for amending the existing wireless telecommunications bylaw instead of adopting an independent bylaw to regulate fixed wireless broadband facilities. As evidenced by the clarity and conciseness of the Town of Heath's Fixed Wireless Broadband Facilities zoning bylaw this may not be the desirable result. The zoning bylaws in the other three participating municipalities that integrated fixed wireless broadband facility language into the existing wireless telecommunication bylaws are unnecessarily complex and confusing. The confusion and complexity are likely the result of the towns attempting to regulate two types of wireless technology that appear at face value to be very similar, but in fact, are dissimilar especially in the size of the infrastructure needed to operate the system and the associated impacts on the community.

Based upon the experiences of the RPAs in this project, an independent zoning bylaw to solely address fixed wireless broadband facilities is preferable to integrating language into existing wireless telecommunication facilities bylaws that were oftentimes written to surreptitiously prohibit or make very difficulty the construction of traditional cellular communication towers. An independent bylaw may be more narrowly tailored to the uniqueness of the infrastructure for a fixed wireless broadband network. It may also be written in such a manner that encourages and facilitates the installation of a fixed wireless broadband network.

Section 4: Appendices

Appendix 1 – Town of Athol's Wireless Telecommunication Facilities Zoning Bylaw (adopted June 11, 2012)

Appendix 2 – Town of Cheshire's DRAFT Wireless Telecommunications Facility Zoning Bylaw

Appendix 3 – Town of Heath's DRAFT Fixed Wireless Broadband Facilities Zoning Bylaw (Town Meeting Version)

Appendix 4 – Town of Washington's DRAFT Zoning Bylaw Amendments

Appendix 5 – Wireless Technology Overview

Article 29 To see if the Town will vote to amend the Athol Zoning Bylaws by adding the following language under Article III:

3.25 Wireless Telecommunication Facilities

3.25.1 Purpose and Intent

The purpose and intent of this bylaw is to provide standards for the placement, design, construction, operation, monitoring, modification and removal of Wireless Telecommunication Facilities, Repeaters and Towers that protect public health and safety; minimize impacts on scenic, natural and historic resources; and provide adequate financial assurance for the eventual decommissioning of such facilities.

This bylaw is to be used in conjunction with other regulations adopted by the town, including site plan review and other local bylaws designed to encourage appropriate land use, environmental protection and provision of adequate infrastructure development. The provisions set forth in this bylaw shall take precedence over all other bylaws when considering applications related to the construction, operation, and/or repair of Wireless Telecommunication Facilities, Repeaters and Towers.

3.25.2 Applicability

This bylaw applies to all Wireless Telecommunication Facilities, Repeaters and Towers proposed to be constructed in designated locations after the effective date of this bylaw. This bylaw also pertains to physical modifications to existing Wireless Telecommunication Facilities, Repeaters and Towers that materially alter the type, configuration, or size of such facilities or related equipment.

Subject to the requirements of this bylaw, Wireless Telecommunication Facilities shall be permitted in the Rural Single-Family Residential (RC) and the Industrial Commercial (I) zoning districts. Wireless Transceiver Antenna Arrays shall be permitted in all zoning districts.

3.25.3 Exemptions

The provisions of this bylaw shall not apply to:

1. Wireless telecommunications facilities providing safety or emergency services for any federal, state or municipal body;
2. Amateur radio antennas licensed by the Federal Communications Commission and subject to General Laws Chapter 40A, section 3, provided that such antennas are not used for any commercial purpose and do not exceed 35 feet in height;
3. Home television or internet access antennas;
4. Medical facilities for transmittal of clinical medical information.

No Wireless Telecommunications Facility or Repeater shall be considered exempt from this bylaw for any reason whether or not said Facility or Repeater will share a Tower or other structure with such exempt uses.

3.25.4 Definitions

Building Inspector: The inspector of buildings, building commissioner, or local inspector charged with the enforcement of the state building code and zoning bylaws.

Co-location: The use of a single free-standing Wireless Telecommunications Facility by more than one carrier.

Existing Structure: Residential or commercial buildings, barns, silos, water towers, public utility transmission poles or towers, or other similar structures where wireless telecommunication technology is to be deployed.

Height: The height of a wireless transceiver tower structure measured from the grade at the base of the tower to its' highest point.

Permit Granting Authority: The Permit Authorizing Committee, as defined in section 3.17, Major Commercial Overlay District (MCOD), shall be the Permit Granting Authority for Wireless Telecommunication Facilities and Wireless Transceiver Antenna Arrays sited on lots that the town has received Chapter 43D, Expedited Permitting designation from the Commonwealth of Massachusetts. The Planning Board shall be the Permit Granting Authority for Wireless Telecommunication Facilities and Wireless Transceiver Antenna Arrays sited in all other locations throughout the Town of Athol.

Provider or Carrier: Any person, corporation or other entity engaged in the business of providing wireless telecommunication services.

Repeater: A small receiver/relay transmitter of not more than 20 watts output designed to provide service to areas which are not able to receive adequate coverage directly from a Wireless Telecommunication Facility.

Wireless Telecommunications Facility: A facility consisting of the structures, including towers and antennas mounted on towers and buildings, equipment and equipment shelters, accessory buildings and structures, involved in sending and receiving telecommunications, radio signals and high-speed (Broadband) internet service to subscribers.

Wireless Transceiver Antenna Array: Any series of antenna or array of antennas, including Repeaters, that receives and transmits telecommunications or radio signals as well as high-speed (Broadband) internet service to subscribers.

Wireless Transceiver Tower Structure: A lattice structure or framework, or monopole that is designed to support wireless transceiver antenna arrays.

3.25.5 General Requirements for all Wireless Telecommunication Facilities

The following requirements are common to all Wireless Telecommunication Facilities to be sited in designated locations.

3.25.5.1 Compliance with Laws, Bylaws and Regulations

The construction and operation of all such proposed Wireless Telecommunication Facilities shall be consistent with all applicable local, state and federal requirements, including but not limited to

all applicable safety, construction, environmental, electrical, communications and aviation requirements.

3.25.5.2 Building Permit and Building Inspection

No Wireless Telecommunication Facilities shall be erected, constructed, installed or modified as provided in this section without first obtaining a building permit from the Town building inspector. Under the state building code, work must commence within six (6) months from the date a building permit is issued, however, an applicant may request an extension of the permit and more than one extension may be granted.

3.25.5.3 Fees

The application for a building permit for a Wireless Telecommunication Facility must be accompanied by the fee required for a building permit.

3.25.5.4 Site Plan Review

No Wireless Telecommunication Facility shall be erected, constructed, installed, or modified as provided in section 3.25.5 without first complying with the Site Plan Review process.

Wireless Telecommunication Facilities, which are to be sited on lots that the town has received Chapter 43D, Expedited Permitting designation from the Commonwealth of Massachusetts, shall be subject to the MCOD Site Plan Review process as defined in section 3.17.13, MCOD Site Plan Review.

Wireless Telecommunication Facilities, which are to be sited in all other permitted locations, shall be subject to the Site Plan Review process as defined in section 3.18, Site Plan Review.

3.25.5.4.1 General

1. All plans and maps shall be prepared, stamped and signed by a professional engineer licensed to practice in the Commonwealth of Massachusetts.
2. Applicant must demonstrate the following to the satisfaction of the Permit Granting Authority:

   (a) That existing structures or towers cannot accommodate the Wireless Transceiver Antenna Array and associated equipment for the proposed project.
   (b) The location of the Wireless Transceiver Tower Structure is necessary and that the size and height of the tower structure is the minimum necessary for the purpose.

3.25.5.4.2 Required Documents

Pursuant to the site plan review process, the applicant shall also provide the following documents:

(a) A site plan showing:

   i. A locus plan prepared and certified by a professional engineer depicting all property lines, the exact location and dimension of all components of the proposed facility including all

structures, streets, landscape features, including contours, residential dwellings and all buildings within 500 feet of the proposed facility;

ii. A narrative description of the proposed facility including the location and identification of all components together with a statement describing the purpose of each component and its intended function plus photographs or other graphic illustrations fairly depicting the physical appearance of the proposed components;

iii. An itemized description of other wireless telecommunications facilities owned and/or operated by the applicant or for which the applicant is currently seeking approval and which are either located in the Town of Athol or within a two mile radius of the Town of Athol or which are capable of providing service to customers operating within the Town of Athol;

iv. A description of all federal, state and local licenses, permits, or other approvals obtained by the applicant to date or to be obtained by the applicant prior to construction of the proposed facility;

v. A statement as to whether an Environmental Assessment (EA), a Draft Environmental Impact Statement (DEIS) or Environmental Impact Statement (EIS) is or will be required under the National Environmental Protection Act or the National Historic Preservation Act, and if so, a copy of the said EA, DEIS, or EIS;

vi. A description in both geographical and radio frequency terms of the scope and quality of the service currently being provided to the Town of Athol by the applicant's existing facilities, if any;

vii. a description in both geographical and radio frequency terms as to the need to be addressed by the proposed facility;

viii. a description in both geographical and radio frequency terms as to precisely the manner in which the proposed facility addresses the needs identified in subsection vii above;

ix. A statement describing the current state of technology available to provide wireless telecommunications services, and whether any such technology is available and feasible for the purpose of addressing the proposed need described in subsection vii above. A statement as to whether the applicant considered any alternatives to a free-standing facility including but not limited to co-locating on an existing facility and, if so, the reason(s) such alternatives are not being proposed;

x. a statement as to why there exists no feasible alternative to a free-standing facility to address the need identified by the applicant in subsection vii above;

xi. A statement as to whether the need identified in subsection vii above may be adequately met by siting a facility on other property;

xii. A description of the radio frequency testing procedures conducted by the applicant in connection with the proposed facility, if any, and the results thereof;

xiii. A statement as to whether the proposed facility will have any impact on an environmentally, historically or archaeologically significant area in the vicinity of the proposed facility;

xiv. A statement setting forth the applicant's projected future needs for wireless telecommunication facilities within the Town of Athol;

xv. A description of the terms of any co-location agreements between the applicant and any other provider of wireless telecommunication services to the Town of Athol and whether the applicant is seeking approval of co-location facilities on the proposed free standing facility, and if so, a detailed description in compliance with the preceding sub-sections of all components of the co-location facility for which the applicant is seeking approval.

xvi. Location of all existing and proposed roads, both public and private, and including temporary roads or driveways, on the site parcel and adjacent parcels within 500 feet of the site parcel;

xvii. Any existing overhead utility lines;

xviii. Existing areas of tree cover, including average height of trees, on the site parcel and any adjacent parcels within a distance, measured from the Wireless Telecommunication Facility tower foundation, of 1.2 times the height of the proposed tower;

xix. Proposed changes to the landscape of the site, grading, vegetation clearing and planting, exterior lighting (other than FAA lights), screening vegetation or structures;
xx. Tower foundation blueprints or drawings signed by a Professional Engineer licensed to practice in the Commonwealth of Massachusetts;
xxi. Tower blueprints or drawings signed by a Professional Engineer licensed to practice in the Commonwealth of Massachusetts;
xxii. One or three line electrical diagram detailing the Wireless Telecommunication Facility, associated components, and electrical interconnection methods, with all National Electrical Code compliant disconnects and over-current devices;
xxiii. Documentation of the Wireless Telecommunication Facility's manufacturer and model, tower height, tower type (freestanding or guyed), and foundation type/dimensions;
xxiv. Name, address, phone number and signature of the applicant, as well as all co-applicants or property owners, if any;
xxv. The name, contact information and signature of any agents representing the applicant; and
xxvi. A maintenance plan for the Wireless Telecommunication Facility;

(b) Documentation of actual or prospective access and control of the project site (see also Section 3.25.7);
(c) Photographic representation from a suitable number of locations of a balloon or crane test, or such other reasonable equivalent, of the height of the proposed free standing facility, so as to depict the visual impact of the proposed facility on the Town, the neighborhood and the abutters to the site.
(d) An operation and maintenance plan (see also Section 3.25.8);
(e) Proof of liability insurance, in an amount, and for a duration, sufficient to cover loss or damage to persons and property occasioned by the failure of the facility;
(f) Certification of height approval from the Federal Aviation Administration;
(g) Description of financial surety that satisfies Section 3.25.13.3.

The Permit Granting Authority may waive documentary requirements as it deems appropriate.

3.25.6 Criteria for attaching a Wireless Transceiver Antenna Array or Repeater to existing structures are as follows:

(a) Attaching a Wireless Transceiver Antenna Array or Repeater to any existing public utility transmission towers or poles, or newly installed poles if adjacent to existing public utility transmission poles, shall be permitted if the height of the Wireless Transceiver Antenna Array or Repeater is not over ten (10) feet in height above the utility transmission tower or pole. If the Wireless Transceiver Antenna Array or Repeater exceeds ten (10) feet in height, the applicant must provide the Permit Granting Authority technical justification for the additional height. The Permit Granting Authority may grant the additional height if they determine that it does not have an undue visual impact on the scenic character or appearance of the area.

(b) Installation of the Wireless Transceiver Antenna Array or Repeater and associated equipment inside an existing structure and is not visible from the street shall be permitted.

(c) Installation of the Wireless Transceiver Antenna Array or Repeater on the exterior of an existing structure shall be permitted if the array or repeater is less than ten (10) feet in height above the roofline. If the exterior installation of a Wireless Transceiver Antenna Array or Repeater exceeds ten (10) feet in height above the roofline of the existing structure, the applicant must provide the Permit Granting Authority technical justification for the additional height. The Permit Granting Authority may grant the additional height if they determine that it does not have an undue visual impact on the scenic character or appearance of the area.

(d) Installation of the Wireless Transceiver Antenna Array or Repeater and associated equipment on a pre-existing HAM Operator Tower shall be permitted.

3.25.7 Site Control

The applicant shall submit documentation of actual or prospective access and control of the project site sufficient to allow for installation and operation of the proposed **Wireless Telecommunication Facility**. Control shall include the legal authority to prevent the use or construction of any structure for human habitation within the setback areas.

3.25.8 Operation & Maintenance Plan

The applicant shall submit a plan for maintenance of access roads and storm water controls, as well as general procedures for operational maintenance of the Wireless Telecommunication Facility.

3.25.9 Design Standards

3.25.9.1 Appearance, Color and Finish

Color and appearance shall comply with Federal Aviation Administration (FAA) safety requirements.

3.25.9.2 Lighting

Wireless Telecommunication Facility towers shall be lighted only if required by the FAA. Lighting of other parts of the Wireless Telecommunication Facility, such as accessory structures, shall be limited to that required for safety and operational purposes, and shall be reasonably shielded from abutting properties. Except as required by the FAA, lighting of the Wireless Telecommunication Facility towers shall be directed downward and shall incorporate full cut-off fixtures to reduce light pollution.

3.25.9.3 Signage

Signs on Wireless Telecommunication Facilities shall comply with Section 3.9, Sign Regulations. The following signs shall be required:

(a) Those necessary to identify the owner, provide a 24-hour emergency contact phone number, and warnings of any danger.

Wireless Telecommunication Facilities shall not be used for displaying any advertising except for reasonable identification of the manufacturer or operator of the facility.

3.25.9.4 Height

The height of the tower structure, antennas and all related facilities shall not exceed the lesser of 90 feet above the average height of the tree line within 200 feet from the base of the tower, or 170 feet total tower height. However, additional height may be approved upon finding by the Permit Granting Authority that the additional height is required in order to provide adequate coverage or to eliminate the need for other towers in the Town. The additional height must not have an undue visual impact on the scenic character or appearance of the area.

3.25.9.5 Utility Connections

Reasonable efforts, as determined by the Permit Granting Authority, shall be made to place all utility connections from the Wireless Telecommunication Facility underground, depending on appropriate soil conditions, shape, and topography of the site and any requirements of the utility provider. Electrical transformers for utility interconnections may be above ground if required by the utility provider.

3.25.9.6 Appurtenant Structures

All appurtenant structures to Wireless Telecommunication Facilities shall be subject to reasonable regulations concerning the bulk and height of structures, lot area, setbacks, open space, parking and building coverage requirements. All such appurtenant structures, including but not limited to, equipment shelters, storage systems, transformers, and substations, shall be architecturally compatible with each other. Whenever reasonable, structures should be shaded from view by vegetation and/or joined or clustered to avoid adverse visual impacts.

3.25.10 Safety and Environmental Standards

3.25.10.1 Emergency Services

The applicant shall provide a copy of the project summary, electrical schematic, and site plan to the police and fire departments, and/or the local emergency services entity designated by the local government. Upon request the applicant shall cooperate with local emergency services in developing an emergency response plan. The applicant or facility owner shall identify a responsible person for public inquiries or complaints throughout the life of the project.

3.25.10.2 Unauthorized Access

Wireless Telecommunication Facilities shall be designed to prevent unauthorized access. For instance, the towers shall be designed and installed so that step bolts or other climbing features are not readily accessible to the public and so that step bolts or other climbing features are not installed below the level of 8 feet above the ground. Electrical equipment shall be locked where possible.

3.25.10.3 Setbacks

Wireless Telecommunication Facility towers may not be sited within:

(a) a distance equal to the height of the tower from buildings, critical infrastructure, or private or public ways that are not part of the Wireless Telecommunication Facility;
(b) one point five times (1.5x) the height of the tower from the nearest existing residential structure; and,
(c) one point one times (1.1x) the height of the tower from the nearest property line.

3.25.10.4 Setback Waiver

The Permit Granting Authority may reduce the minimum setback distance as appropriate based on project and site-specific considerations, such as tower type, topography, tree cover, etc., to allow for consideration of factors that may mitigate the impact to abutters, e.g. topography, tree cover, or written consent of the affected abutter(s), if the project satisfies all other criteria for the granting of a building permit under the provisions of this section.

Notably, with respect to Section 3.25.10.3 (a), if a Wireless Telecommunication Facility tower is proposed as part of an integrated, multiple-use industrial commercial development, then the Permit Granting Authority may allow setbacks less than the height of the tower from buildings, critical infrastructure and/or private ways that are part of the proposed development.

3.25.10.5 Land Clearing, Soil Erosion and Habitat Impacts

Clearing of natural vegetation shall be limited to that which is necessary for the construction, operation and maintenance of the Wireless Telecommunication Facility or otherwise prescribed by applicable laws, regulations, and bylaws. Wireless Telecommunication Facility design shall minimize fragmentation of open space areas and shall avoid permanently protected open space when feasible. Wireless Telecommunication Facilities also shall be located in a manner that does not have significant negative impacts on rare species in the vicinity.

3.25.10.6 Hazardous Materials

No hazardous materials or waste shall be discharged on the site of any Wireless Telecommunication Facility. If any hazardous materials or wastes are to be used on site, there shall be provisions for full containment of such materials or waste. An enclosed containment area, designed to contain at least 110 percent of the volume of the hazardous materials or waste stored or used on the site is required.

3.25.11 Monitoring and Maintenance

3.25.11.1 Wireless Telecommunication Facility Conditions

The applicant shall maintain the Wireless Telecommunication Facility in good condition. Maintenance shall include, but not be limited to, painting, structural repairs, and integrity of security measures. Site access shall be maintained to a level acceptable to the local Fire Chief and Emergency Medical Services. The project owner shall be responsible for the cost of maintaining the Wireless Telecommunication Facility and any access road(s), unless accepted as a public way.

3.25.11.2 Reporting

Notice shall be provided to the town of any change in ownership of the Wireless Telecommunication Facility.

3.25.11.3 Modifications

All material modifications to a Wireless Telecommunication Facility made after issuance of the required building permit shall require approval by the Permit Granting Authority.

3.25.12 Provision of Independent Consultants

Upon submission of an Application for any Permit under this bylaw, the Applicant shall pay a review fee determined by the Permit Granting Authority, in accordance with MGL c.44 §53G consisting of reasonable costs to be incurred by the Permit Granting Authority for the employment of independent

consultants. These Consultants shall each be qualified professionals with a record of service to municipalities in one of the following fields:

(a) Telecommunications engineering,
(b) Structural engineering,
(c) Monitoring of electromagnetic fields, and, if determined necessary by the Permit Granting Authority.

3.25.13 Abandonment or Decommissioning

3.25.13.1 Removal Requirements

Any Wireless Telecommunication Facility which has reached the end of its useful life or has been abandoned shall be removed. The owner/operator shall physically remove the facility no more than 90 days after the date of discontinued operations. The applicant shall notify the town building inspector by certified mail of the proposed date of discontinued operations and plans for removal.

Decommissioning shall consist of:

(a) Physical removal of all towers, structures, equipment, security barriers and electrical lines from the site.
(b) Disposal of all solid and hazardous waste in accordance with local, state, and federal waste disposal regulations.
(c) Stabilization or re-vegetation of the site as necessary to minimize erosion. The Permit Granting Authority may allow the owner to leave landscaping or designated below-grade foundations in order to minimize erosion and disruption to vegetation.

3.25.13.2 Abandonment

Absent notice of a proposed date of decommissioning or written note of extenuating circumstances, the Wireless Telecommunication Facility shall be considered abandoned when the facility fails to operate for more than six months without the written consent of the building inspector. If the applicant fails to remove the facility in accordance with the requirements of this section within 150 days of abandonment or the proposed date of decommissioning, the town may enter the property and physically remove the facility.

3.25.13.3 Financial Surety

The applicant shall provide a form of surety, either through an escrow account, bond or otherwise, to cover the cost of removal in the event the town must remove the Wireless Telecommunication Facility and remediate the landscape, in an amount and form determined to be reasonable by the Permit Granting Authority, but in no event to exceed more than 125 percent of the cost of removal and compliance with the additional requirements set forth herein, as determined by the Permit Granting Authority. Such surety shall have either an automatic renewal date clause or no expiration date. Such surety will not be required for municipally- or state-owned facilities. The applicant shall submit a fully inclusive estimate of the costs associated with removal, prepared by a qualified engineer. The amount shall include a mechanism for calculating increased removal costs due to inflation.

3.25.14 Severability

If any provision of this bylaw is held invalid by a court of competent jurisdiction, the remainder of the bylaw shall not be affected thereby.

And to further see if the Town will vote to amend the Athol Zoning Bylaws Article II, Section 2.3, Use Regulation Schedule, by deleting, under the category of COMMERCIAL USES, the sub-category Communication Towers with Transfer Stations:

2.3 Use Regulation Schedule	RA	RB	RC	CA	CB	G	I
	Residence A	Residence B	Residence C	Central Commercial	Neighborhood Commercial	General Commercial	Industrial Commercial
COMMERCIAL USES							
Communication Towers with Transfer Stations	N	N	SP	N	N	N	SP

And replace it with the following:

2.3 Use Regulation Schedule	RA	RB	RC	CA	CB	G	I
	Residence A	Residence B	Residence C	Central Commercial	Neighborhood Commercial	General Commercial	Industrial Commercial
COMMERCIAL USES							
Wireless Telecommunications Facilities	N	N	Y	N	N	N	Y
Wireless Transceiver Antenna Arrays	Y	Y	Y	Y	Y	Y	Y

Article 30 To see if the Town will vote to amend the Town Bylaws by deleting Section 10 of Chapter V as follows:

Section 1. Purpose

The purpose of this bylaw is to mitigate the impacts of towers and wireless telecommunication facilities in order to preserve the character and appearance of the Town; to protect the scenic, historic, environmental, natural, and man-made resources of the Town; and to protect property values, while providing for the responsible use of wireless technologies.

Section 2. Consistency with Federal Law

This bylaw is intended to be consistent with the Telecommunications Act of 1996. In accordance with the Act, these bylaws are not intended to 1) prohibit or have the effect of prohibiting the provision of personal wireless service; 2) unreasonably discriminate among providers of functionally equivalent services; and 3) regulate personal wireless services on the basis of the environmental effects of radio frequency emission to the extent that such facilities and emissions comply with the Federal Communication Commission's (FCC) regulations concerning such emission.

Section 3. Definitions

Eligible Facilities Request: As defined in § 6409 of the Middle Class Tax Relief and Job Creation Act of 2012 (HR 3630).

Substantial Changes: The following are considered substantial changes to the physical dimensions of a tower or base station, but shall not be deemed an exclusive list:

(1) The mounting of a proposed antenna on a tower that would increase the existing height of the tower by more than 10%.
(2) Any change, addition, modification or alteration to the tower or wireless telecommunication facility that would require the installation of Federal Aviation Administration (FAA) mandated obstruction lights.
(3) The mounting of a proposed antenna that would involve adding an appurtenance to the tower that would protrude from the edge of the tower more than ten (10) feet.
(4) Any change, addition, modification or alteration to the tower or wireless telecommunication facility that would violate the property line setback requirement set forth in § 8 (b).

Wireless Telecommunication Facility: Any equipment that broadcasts or receives radio frequency waves in order to provide wireless telecommunication services, including but not limited to antennas and repeaters.

Wireless Telecommunication Service: Any commercial mobile service, wireless service, common carrier wireless exchange service, cellular service, personal communication service, specialized mobile radio service, paging service, wireless data service, fixed wireless broadband internet service, or public or private radio dispatch.

Wireless Telecommunication Service Provider: Any person or entity providing wireless telecommunication services.

Section 4. Exemptions

The following wireless telecommunication facilities are exempt from this bylaw: municipal radio dispatch service; emergency radio dispatch service; amateur radio; citizens band radio; AM/FM radio; or broadcast

television. Otherwise non-exempt wireless telecommunication facilities shall not be considered an exempt use merely because it is installed on an exempt tower or structure.

Section 5. Eligible Facilities Request under § 6409 of the Middle Class Tax Relief and Job Creation Act of 2012 (HR 3630).

a. Eligible facilities requests for a modification of an existing wireless tower or base station that does not substantially change the physical dimension of such tower or base station requires site plan approval by the Planning Board prior to the issuance of a building permit by the Building Inspector.

b. The Planning Board shall review and act upon applications for site plan approval within ninety (90) days of the submittal of a complete application.

c. As part of the site plan approval process, the applicant shall provide all the information required by this bylaw.

d. The Planning Board shall approve an application for site plan approval for an eligible facilities request for a modification of an existing wireless tower or base station that does not substantially change the physical dimension of such tower or base station. However, the Planning Board may impose conditions on its approval of the site plan.

e. Eligible facilities requests for a modification of an existing wireless tower or base station that substantially changes the physical dimension of such tower or base station requires a special permit from the SPGA.

Section 6. Special Permit Required

No tower or wireless telecommunication facility shall be installed, constructed or substantially changed until a special permit has been issued by the Special Permit Granting Authority (SPGA) in accordance with § 6.3 "Special Permit" and the requirements set forth herein. The SPGA shall adhere to the review and decision time limits set forth in M.G.L. c. 40A § 9, except where superseded by FCC Declaratory Ruling & Order, FCC 09-99.

Section 7. General Requirements

a. Towers shall not be built on speculation. If the applicant is not a wireless telecommunications service provider then the applicant shall submit a contract or letter of intent showing that a wireless telecommunication service provider intends to install a wireless telecommunication facility on land owned or leased by the applicant.

b. Wireless telecommunication facilities shall be installed on existing towers or structures whenever feasible.

c. All towers shall be constructed and wireless telecommunication facilities installed so that the tower is able to accommodate additional wireless telecommunication facilities operated by additional carriers.

d. The wireless telecommunication facility shall comply with all FCC and Massachusetts Department of Public Health (MDPH) standards and requirements regarding radio frequency radiation.

e. The tower, wireless telecommunication facilities, access road, stormwater controls, vegetative screening and accessory storage building(s) shall be maintained in good condition.

f. The applicant and subsequent operator(s) shall submit and maintain at all times adequate liability insurance, as determined by the SPGA, against loss or damage to persons or property, including personal injury or death resulting from the wireless telecommunication facility or tower. The operator shall submit proof of a valid certificate of liability insurance on a yearly basis to the Building Inspector.

g. The applicant shall submit a removal plan prepared by a professional engineer licensed to practice in Massachusetts that includes a cost estimate and detailed plan for the removal of the tower and the wireless telecommunication facilities and for the restoration of the site to its pre-existing condition. The cost estimate must account for inflation.

h. The applicant and subsequent operator(s) shall submit and maintain at all times a form of surety in a form and amount approved by the SPGA to cover the cost of remediation of the site if damage occurs during construction and for the removal of the tower and wireless telecommunication facility should they become abandoned.

i. The applicant shall submit a letter of determination from the Massachusetts Natural Heritage & Endangered Species Program verifying that no rare or endangered species or species of special concern are present at the proposed site.

Section 8. Design Standards

a. The wireless telecommunication facility and tower shall not exceed twenty (20) feet above the average elevation of the tree line measured within a fifty (50) foot radius from the base of the proposed tower, unless the applicant proves that additional height is necessary to provide adequate coverage or capacity.

b. The minimum distance from the base of the tower to any property line shall be 150% of the total height of the tower or wireless telecommunication facility, whichever is taller.

c. Any access road to be constructed shall be constructed in a manner that minimizes cut and fill, minimizes erosion, minimizes construction on unstable soils and steep slopes, and minimizes impacts on wetlands. The access road shall be constructed to allow access to the site by emergency vehicles.

d. Stormwater controls shall be installed at the site and on the access road in accordance with the Massachusetts Department of Environmental Protection's Stormwater Policy.

e. Whenever feasible all utilities shall be located underground to minimize visual impacts.

f. The accessory storage building shall be no larger than five-hundred (500) square feet and shall not exceed twelve (12) feet in height. The accessory storage building and all other appurtenant structures and equipment shall meet the setback requirements for primary structures set forth in § 4.1 despite its designation as an accessory building.

g. A sign listing the emergency contact information of the wireless telecommunication facility operator shall be posted at all times in an easily accessible and noticeable location. The SPGA may require additional warning signs. No other signs or advertisements are allowed.

h. The SPGA shall determine the type of tower to be constructed in order to mitigate its visual impact on the community.

i. The SPGA may require that the tower and wireless telecommunication facility be camouflaged to mitigate its visual impact on the community.

j. No night lighting of the tower or wireless telecommunication facility is allowed, unless required by the Federal Aviation Administration, except for manually operated emergency lights for use only when operating personnel are on the site.

k. The tower and wireless telecommunication facility shall be constructed to prevent unauthorized persons from accessing the tower and wireless telecommunication facility.

l. Vegetative screening shall be used to screen the tower base, accessory storage building(s) and other ground level structures and equipment from abutting properties and roadways.

Section 9. Prohibited Areas

a. No tower or wireless telecommunication facility shall be located within any of the following prohibited areas:
   i. A federal, state or locally regulated wetland or vernal pool;
   ii. One-hundred (100) feet from a wetland or two hundred (200) feet from a river or perennial stream; and
   iii. A designated critical wildlife habitat area for endangered, threatened or species of special concern.

Section 10. Visual Impact Analysis

a. The applicant shall conduct a balloon test within thirty (30) days of submission of a complete special permit application. The applicant shall advertise the date, time and location of the balloon test in a newspaper with a general circulation in the Town at least seven (7) days prior to the test. The applicant shall also send notice of the balloon test via certified mail to all abutters entitled to notice of the special permit hearing.
   i. The applicant shall fly a four-foot diameter brightly colored balloon at the location and maximum elevation of the tower.
   ii. The balloon shall be flown for at least eight consecutive daylight hours on two days.
   iii. If visibility and weather conditions are inadequate for observers to clearly see the balloon, further tests may be required by the SPGA.

Section 11. Continuing Obligations for Tower and Wireless Telecommunication Facility Owners

a. Every two years, the owner of a wireless telecommunication facility shall pay for an independent consultant, hired by the Town, to determine whether the wireless telecommunication facility is in compliance with all FCC and MDPH standards and requirements for radio frequency radiation during peak operation. The independent consultant shall prepare and submit a report of the inspection results to the Building Inspector within thirty (30) days of the inspection.

b. Every five years, the owner of a tower constructed to support wireless telecommunication facilities shall pay for an independent professional engineer licensed to practice in Massachusetts, hired by the Town, to assess the structural integrity of the tower. The independent professional engineer shall prepare and submit a report of the inspection results to the Building Inspector within thirty (30) days of the inspection.

Section 12. Application Requirements

Applicants shall submit the following required information as part of its site plan approval application for an eligible facilities request or for its special permit application for a wireless telecommunication facility or tower.

a. Contact information for the applicant, including name, address and telephone number. If the applicant is not the property owner, provide the written consent of the property owner on which the proposed tower and/or wireless telecommunication facility will be located.

b. The most recent USGS Topographical Map (7.5-minute map) showing the proposed wireless telecommunication facility site and the surrounding area within at least two miles of the proposed site.

c. A vicinity map showing the entire area within a 1,000 foot radius of the proposed tower and/or wireless telecommunication facility, including topography, public and private roads, driveways, buildings and

structures, utilities, wetlands, critical wildlife habitat areas, historic sites, location of the tower and the property lines of the proposed site.

d. Site plans at a scale of 1"= 40' or similar scale, prepared, sealed and signed by a professional engineer licensed to practice in Massachusetts, which show the following information:

i. Contour intervals no greater than two feet.
ii. Existing property lines, utilities, structures, stonewalls, fences and wooded areas.
iii. Wetlands, floodplains and certified vernal pools within 200 feet from the proposed wireless telecommunication facility, tower and access road.
iv. Location of critical wildlife habitat areas, if any.
v. All proposed changes to the existing site, including but not limited to areas of temporary or permanent clearing, areas of grading and areas of cut and fill.
vi. Detailed plans for the drainage of surface water and plans to control erosion and sedimentation both during construction and as a permanent measure.
vii. Location of the proposed tower, appurtenant equipment and accessory buildings
viii. Location of proposed screening, landscaping, fencing, signage and exterior lighting.
ix. Proposed spot elevation at the base of the proposed tower
x. Proposed utilities, including the distance from the source of power and whether underground or above ground.
xi. Plans for the proposed access road, including but not limited to grading, drainage, width, depth of gravel and surface material.
xii. Plans for the accessory storage building, including a floor plan and representative elevation views, indicating the roof, facades, doors and other exterior materials.

e. A project narrative, including plans and elevations, prepared by a professional engineer licensed to practice in Massachusetts that:

i. Describes any tower's design, elevation and compliance with the state building code
ii. Describes a tower's capacity, including the number, elevation and types of antennas that the tower is proposed to accommodate.
iii. Documents the elevation above grade for all proposed mounting positions for antennas to be installed on a tower and the minimum distances between the antennas.
iv. Details the tower foundation and anchoring system
v. Details the proposed exterior finish and camouflaging of the tower and wireless telecommunication facility
vi. Demonstrates that existing towers, structures, wireless telecommunication facilities and repeaters within five miles of the proposed site cannot reasonably be modified to provide adequate coverage and capacity to the community.
vii. Describes potential changes or additions to existing towers or structures that would enable them to provide adequate coverage.
viii. Describes the output frequency, number of channels, and the power output per channel for each antenna. Include a coverage map.
ix. Demonstrates the proposed wireless telecommunication facility's compliance with the standards set forth in this bylaw.
x. Proves that the proposed wireless telecommunication facility and the cumulative effect of all the wireless telecommunication facilities at the site will be in compliance with all FCC and Massachusetts Department of Public Health (MDPH) regulations, standards and requirements and includes a

statement that the applicant commits to continue to maintain compliance with all FCC and MDPH regulations, standards and requirements for radio frequency radiation (RFR).

f. A letter of intent committing the applicant and its successors to permit shared use of any tower if the additional users agree to meet reasonable terms and conditions for shared use, including compliance with all applicable FCC and MDPH regulations, standards and requirements and the provisions of this bylaw.

g. To the extent required by the National Environmental Policy Act as administered by the FCC, a complete Environmental Assessment (EA) draft or final report describing the probable impacts of the proposed wireless telecommunication facility, or a written statement by the applicant that an EA is not required.

h. Other information as requested by the SPGA or Planning Board..

Section 13. Waiver of Application Requirements

Upon the written request of the applicant, the SPGA may waive any of the application requirements set forth in § 12 that the SPGA deems appropriate for the circumstances and type of wireless telecommunication facility or tower that is being proposed.

Section 14. Approval Criteria

A special permit to construct, install or substantially change a wireless telecommunication facility or tower shall not be issued unless the SPGA finds that the following criteria will be met:

a. The proposed wireless telecommunication facility and/or tower will not have an undue adverse impact on historic resources, scenic views, residential property values and natural and man-made resources.
b. The proposed wireless telecommunication facility and/or tower will comply will all requirements set forth in this bylaw.
c. The proposed wireless telecommunication facility and/or tower will comply with all federal, state and local laws, regulations and standards.
d. The applicant has proven that it cannot provide adequate coverage or capacity by installing its equipment on an existing tower or structure or by using repeaters in conjunction with existing facilities.
e. The proposed tower provides reasonable opportunity for collocation of other equipment
f. The applicant has agreed to implement all reasonable measures to mitigate the potential adverse impacts of the tower and/or wireless telecommunication facility.
g. The proposed wireless telecommunication facility will not generate undue noise
h. The proposed wireless telecommunication facility will comply with FCC 96-326 and 105 CMR 120 and any other applicable FCC or MDPH regulations, regarding emissions of electromagnetic radiation and that the required monitoring program is in place and will be paid for by the applicant.

Section 15. Independent Consultants

Upon submission of an application for site plan approval of an eligible facilities request or for a wireless telecommunication facility or tower special permit, the SPGA will be authorized to hire independent consultants at the applicant's expense, to assist the SPGA with the review of the application materials and to monitor the project to ensure that all work is conducted in accordance with the approved plans and conditions. The independent consultant may be hired pursuant to M.G.L. Chapter 44 § 53G.

Section 16. Removal Requirements

An abandoned or unused wireless telecommunication facility or tower shall be removed and the site restored to its pre-existing condition within 180 days of abandonment. If the wireless telecommunication facility or tower is not removed within 180 days of abandonment, the Building Inspector, to the extent it is otherwise duly authorized by law, may cause the wireless telecommunication facility and/or tower to be removed. The cost of removal shall be assessed against the owners of the wireless telecommunication facilities and tower.

Section 17. Lapse

Any special permit for a wireless telecommunication facility or tower shall lapse if the wireless telecommunication facility or tower is not installed and operating within one year from the date of approval or the wireless telecommunication facility or tower is abandoned.

6.8 Fixed Wireless Broadband Facilities

6.8.1 Purpose. The purpose of this bylaw is to facilitate the provision of wireless broadband services to the residents and business in Heath in order to:

A. To provide reliable broadband internet services which can foster rural economic development including small business growth and home-based enterprises.

B. To improve the quality of life for residents of the Town of Heath.

C. To support broadband services which are critical to education and public safety and to increase civic involvement.

6.8.2 Definitions.

A. Fixed Wireless Transceiver Antenna Array (FWTAA) - is defined as any series of antenna or array of antennas that receives and transmits fixed wireless signals to provide subscribers with high-speed (broadband) internet capabilities.

B. Existing Structure - is defined as a residential or commercial building, barn, silo, steeple, water tower, public utility transmission pole or tower, or other similar structures where fixed wireless broadband technology is to be deployed.

C. Fixed Wireless Transceiver Tower Structure (FWTTS) - is defined as a structure that supports an antenna that receives and transmits fixed wireless signals to provide customers with high-speed broadband internet access capability.

6.8.3 Requirements for Fixed Wireless Transceiver Antenna Array

A. Existing Structures - Requirements for attaching FWTAA to existing structures, as defined above, are as follows:

1. Attaching FWTAA technology to any existing public utility transmission towers or poles, or newly installed poles if adjacent to existing public utility transmission poles, shall be allowed by right with Site Plan Review (Section 6.2) if the height of the FWTAA is not over 8 feet in height above the utility transmission tower or pole. If the FWTAA installation exceeds 8 feet in height above the utility transmission tower or pole, then both Site Plan Review and a Special Permit is required in accordance with Sections 6.1 and 6.2 of this Zoning Bylaw.
2. If the FWTTA and associated equipment being installed are concealed inside an existing structure and are not visible from the street, such installation shall be allowed by-right and Site Plan Review or a Special Permit is not required.

3. If the exterior installation of a FWTAA exceeds 8 feet in height above the roofline or top of an existing residential, commercial, agricultural or other structure, both Site Plan Review and a Special Permit are required. If the exterior installation of the FWTAA is 8 feet or less above the roof line or top of the structure, then such installation shall be allowed by right with Site Plan Review, unless the installation is located within the Heath National Historic District in which case a Special Permit will also be required.

B. New Fixed Wireless Transceiver Tower Structure (FWTTS) - Requirements for new FWTTS are as follows:

1. All new FWTTSs require Site Plan Review and a Special Permit from the Planning Board and shall follow the application filing requirements in Sections 6.1 and 6.2.
2. A Special Permit and Site Plan approval for a FWTTS may be granted by the Planning Board, in accordance with Sections 6.1 and 6.2 provided that the proposed FWTTS complies with the following location and performance standards:
   (a) New FWTTSs shall be considered only upon a finding by the Planning Board that existing structures or towers cannot accommodate the fixed wireless transmitter antenna array and associated equipment.
   (b) The Applicant shall demonstrate to the satisfaction of the Planning Board that the location of the FWTTS is necessary and that the size and height of the tower structure is the minimum necessary for the purpose. The maximum height shall be 100 feet.
   (c) Setback standards, measured from the guy wire anchors, are as follows:
      i. The FWTTS shall be setback from any property line at a distance equal to 1.25x the height of the FWTTS or fifty (50) feet, whichever is greater.
      ii. The FWTTS shall be setback from any habitable structure(s) at a minimum distance equal to 1.25x the height of the FWTTS.
      iii. The Planning Board may reduce the minimum setback distance as appropriate based on site-specific considerations, if the project satisfies all other criteria for the granting of a Special Permit and Site Plan approval under the provisions of this section.
      iv. For waiver requests involving any habitable structure, such waiver shall not be granted by the Planning Board unless the request includes written permission from the entity with care and control over the affected habitable structure.
   (d) Clearing shall be performed in a manner that will maximize preservation of natural beauty and conservation of natural resources and which will minimize impacts to scenic resources. Applicants for new FWTTS shall meet the requirements of Section 2.2, Removal of Natural Materials and Section 2.3 Erosion Control.
   (e) Lighting considerations
      i. Night lighting at the top of the FWTTS shall be prohibited unless required by law (e.g., FAA).
      ii. Lighting for equipment and site access shall be minimized and installed to direct light downward with full cutoff fixtures so that there is no light visible beyond 10 feet of the footprint of the pad at the base of the FWTTS or any accessory structure.

(f) Accessory Structures shall be limited to one (1) structure per FWTTS. Such structure shall not exceed forty (40 sq. ft.) in size and ten (10') in height.
(g) Any back-up power generation shall be solar power unless a waiver is granted by the Planning Board.
(h) Utilities connections shall meet all local, state and federal requirements.
(i) There shall be no more than one (1) parking space for each FWTTS to be used in connection with the maintenance of the FWTTS. Such parking space shall not be used for the permanent storage of a vehicle.

6.8.4 Annual Reporting, Modifications, and Abandonment or Decommissioning

A. Annual Reporting & Insurance

The owner or operator of the Fixed Wireless Transceiver Antenna Array shall submit an Annual Report which certifies compliance with the requirements of this bylaw and their approved site plan and Special Permit including control of vegetation, soundness and security of the structure (condition of guy wires, etc.), and adequacy of road access. The Annual Report shall also provide information on the maintenance completed during the course of the year. The Annual Report shall be submitted to the Select Board, Planning Board, Fire Chief, Emergency Management Director, Building Inspector, Board of Health and Conservation Commission (if Wetlands Permit was issued) no later than 45 days after the end of the calendar year.

The owner or operator shall provide to the Town Clerk a certificate of insurance providing proof that the project has sufficient property and liability insurance coverage pursuant to industry standards. Such proof of insurance shall be provided on annual basis.

B. Modifications

All material modifications to an installation made after issuance of the required building permit shall require approval by the Planning Board.

C. Abandonment or Decommissioning

1. Removal Requirements

Any Fixed Wireless Transceiver Antenna Array or Fixed Wireless Transceiver Tower Structure which has reached the end of its useful life or has been abandoned shall be removed. The owner or operator shall physically remove the installation within ninety (90) days of abandonment or the proposed date of decommissioning and if not the town retains the right, after the receipt of an appropriate court order or as otherwise duly authorized by law, to enter and remove an abandoned, hazardous or decommissioned Fixed Wireless Transceiver Antenna Array or Fixed Wireless Transceiver Tower Structure. As a condition of Site Plan or Special Permit approval, an applicant shall agree to allow entry to remove an abandoned or decommissioned installation. The cost for the removal will be charged to the property owner in accordance with the provisions of M.G.L. 139, Section 3A as a tax lien on the property. The owner or operator shall notify the Planning Board by certified mail of the proposed date of discontinued operations and plans for removal. Decommissioning shall consist of:

(a) Physical removal of all Fixed Wireless Transceiver Antenna Array or Fixed Wireless Transceiver Tower Structure installations, structures, equipment, and security barriers including any materials used to limit vegetation.
(b) Stabilization or re-vegetation of the site as necessary to minimize erosion. The Planning Board may allow the owner or operator to leave landscaping or designated below-grade foundations in order to minimize erosion and disruption to vegetation.

2. Abandonment
Absent notice of a proposed date of decommissioning or written notice of extenuating circumstances, the Fixed Wireless Transceiver Antenna Array or Fixed Wireless Transceiver Tower Structure shall be considered abandoned when it fails to provide wireless services for more than one year without the written consent of the Planning Board. If the owner or operator of the Fixed Wireless Transceiver Antenna Array or Fixed Wireless Transceiver Tower Structure fails to remove the installation in accordance with the requirements of this section within 90 days of abandonment or the proposed date of decommissioning, the Town may enter the property and physically remove the installation after the receipt of an appropriate court order or as otherwise duly authorized by law.

3. Financial Surety
Proponents of Fixed Wireless Transceiver Antenna Array or Fixed Wireless Transceiver Tower Structure installations shall provide a form of surety, either through escrow account, bond or other form of surety approved by the Planning Board to cover the cost of removal in the event the Town must remove the installation and remediate the landscape, in an amount and form determined to be reasonable by the Planning Board, but in no event to exceed more than 125 percent of the cost of removal and compliance with the additional requirements set forth herein, as determined by the project proponent and the Town. Such surety will not be required for municipal or state-owned facilities. The project proponent shall submit a fully inclusive estimate of the costs associated with removal, prepared by a qualified independent engineer. The amount shall include a mechanism for calculating increased removal costs due to inflation.

SECTION 10: WIRELESS COMMUNICATIONS

I. Purpose

The purpose of this by-law is to outline the special permitting process to site a wireless communication facility anywhere in town, while minimizing potential damage and adverse visual impacts of wireless communication facilities on adjacent properties, residential neighborhoods, and areas of historic or high scenic value; to allow the provision of necessary wireless communication services in an orderly way; and to promote shared use of existing facilities to reduce the need for new facilities.

II. Definitions

DISTANCE shall be measured on a horizontal plane.

FAA shall mean the Federal Aviation Administration

FCC shall mean the Federal Communications Commission

FIXED WIRELESS TRANSMITTER TOWER STRUCTURE shall mean a structure that supports an antenna that receives and transmits fixed wireless signals to provide subscribers with high-speed internet access capabilities. A fixed wireless transmitter tower structure is a type of wireless communication structure.

FIXED WIRELESS TRANSMITTER ARRAY shall mean any series of antenna or array of antennas that receives and transmits fixed wireless signals to provide subscribers with high speed internet access capabilities. A fixed wireless transmitter array is a type of wireless communication device.

HEIGHT shall be the distance measured from ground level to the highest point on the structure.

NON-RESIDENTIAL STRUCTURE shall mean such structures as, but not limited to, buildings, grain silos and water towers, but does not include houses or apartments.

WIRELESS COMMUNICATION BUILDING shall mean any building or shelter used to house equipment primarily for the installation and operation of equipment for generating and detecting electromagnetic radiation and is an accessory to a wireless communication structure.

WIRELESS COMMUNICATION DEVICE shall mean any antenna, appurtenance, wiring or equipment used in connection with the reception or transmission of electromagnetic radiation that is attached to a structure.

WIRELESS COMMUNICATION FACILITY shall be used as a general term to include wireless communication building, wireless communication device and wireless communication structure.

WIRELESS COMMUNICATION STRUCTURE shall mean any structure or tower intended to support equipment used for the transmission and reception of electromagnetic radiation, including the antennas, wiring or other devices attached to or mounted on a structure.

III. Exemptions

The following shall be exempt from this by-law:

A. Wireless communication facilities used for Town or State emergency services.

B. Amateur radio towers used in compliance with the terms of any amateur radio service licensed by the Federal Communication Commission and used solely for that purpose.

C. Wireless communication structures and devices used expressly for home television reception.

IV. General Guidelines

A. No wireless communication facility shall be erected, constructed, or installed without a special permit from the Planning Board.

~~A.~~B. A fixed wireless transmitter tower structure and or fixed wireless transmitter array may be permitted as an accessory use or a primary use by special permit from the Planning Board

~~B.~~C. Wherever feasible, wireless communication devices shall be located on existing towers or other non-residential structures, minimizing proliferation of new towers.

~~C.~~D. Wireless communication structures shall be built so that the structural integrity of the facility is able to accommodate devices operated by another carrier with little or no modification.

~~D.~~E. Wireless communication buildings shall be no larger than 500 square feet and 12 feet high, shall be designed to match other accessory buildings on the site, and shall be used only for the housing of equipment related to this particular site.

V. Siting and Height Requirements

A. Setbacks

1. The minimum distance from the base of the wireless communication structure to any property line or road right-of-way shall be at least 1.5 times the height of the structure.

2. The minimum distance from any guy wire, anchor or brace to any property line or road right-of-way shall be equal to the length of the guy wire.

3. The setbacks for the wireless communication building shall comply with the setback requirement for the zoning district.

4. The wireless communication structure shall be a minimum distance of three times the height from school buildings, playgrounds, athletic fields, and abutting residences to prevent the structure from appearing to ”tower” over; adversely affecting property values.

B. The height shall be the minimum height necessary to accommodate anticipated and future use.

C. Wireless communication structures are encouraged on State Lands provided that said lands are not subject to the provisions of Article 97 of the Amendments to the Constitution of the Commonwealth of Massachusetts. If facilities predating this by-law exist on such lands, the shared use of such facilities is encouraged.

D. The wireless communication structure shall, when possible, be sited off ridge lines and where their visual impact is the least detrimental to valuable historic and scenic areas.

E. No new wireless communication structure shall be permitted unless the Applicant demonstrates to the reasonable satisfaction of the Planning Board that no existing wireless communication structure can accommodate the Applicant’s proposed wireless communication device. Evidence submitted to demonstrate that no existing structure can accommodate the applicant’s proposed device may consist of any of the following:

1. No existing wireless communication structures or non-residential structures are located within the geographic area required to meet the applicant’s engineering requirements.

2. Existing wireless communication structures or non-residential structures are not of sufficient height to meet the applicant's requirements.

3. Existing wireless communication structures or non-residential structures do not have sufficient structural strength or cannot be brought up to appropriate strength to support the proposed wireless communication device.

4. The proposed wireless communication device would cause electromagnetic interference with the existing devices on the site, or the existing devices would cause interference with the proposed wireless communication device.

5. The fee, costs, or contractual provisions required by the owner in order to share an existing wireless communication structure or adapt an existing structure for use are in excess of twice the cost of building a new structure.

6. The applicant demonstrates that there are other limiting factors that render existing structures unreasonable.

VI. Design Requirements

A. Wireless communication structures shall be designed to accommodate the maximum number of users as technologically possible.

B. There shall be no signs or advertisements, except for no trespassing signs and a required sign giving a phone number where the responsible party can be reached on a 24-hour basis.

C. All wireless communication devices shall be colored, molded, and/or installed to blend into the structure and/or the landscape.

D. The facility shall be fenced to control access and shall include any structures, accessory building and the entire fall zone.

E. Night lighting of the facility shall be prohibited unless required by the FAA. If required by the FAA, a copy of the FAA permit requiring lighting should be submitted with the application.

F. There shall be a maximum of one parking space for each facility to be used in connection with the maintenance of the site and not to be used for the storage of vehicles or other equipment.

G. Existing on-site vegetation shall be preserved to the maximum extent possible.

H. Vegetative screening shall be used to screen abutting residential properties and roadways. Plants that fit in with the surrounding natural vegetation shall be used.

VII. Application Process

Application for a special permit for siting wireless communication facilities shall be filed in accordance with Section 6.2 of this Zoning By-Law. The Applicant will be required to pay for consultants hired by the Planning Board pursuant to Chapter 593 of the Acts of 1989, M.L.G. C. 44, s.53G.

In the case of proposal for siting a new wireless communication structure, the Planning Board shall hold a public hearing within sixty-five days of filing of an application and shall issue a decision within ninety days following the date of the public hearing.

A. TO SITE A NEW WIRELESS COMMUNICATION STRUCTURE, THE APPLICANT SHALL SUBMIT:

1. Site plans and engineering plans, prepared by a professional engineer licensed to practice in Massachusetts, on 24" x 36" sheets at a scale of 1"=40' or 1"=200' where appropriate, on as many sheets as necessary which show the following:

    a. north arrow, date, scale, seal(s) of the licensed professional(s) who prepare plans and space for reviewing licensed engineer's seal.

    b. Name and address of land owner and name and address of abutters.

    c. property lines and location of permanent structures or buildings, within 500-foot radius of proposed wireless communication structure.

    d. Existing (from a topographical survey completed within 2 years of application submittal date by a professional surveyor licensed to practice in Massachusetts) and proposed contour lines at a maximum of 2-foot intervals and spot elevations at base of all the proposed and existing structures.

    e. Vegetation to be removed or altered.

    f. Plans for drainage of surface water and plans to control erosion and sedimentation both during construction and as a permanent measure.

g. Delineation of wetlands, if any.

h. Location of wireless communication structure, including supports or guy wires, if any.

i. Plans for anchoring and supporting the structure, including specifications of hardware and all other building material.

j. Plans for accessory buildings.

k. Layout and details of surfacing for access road and parking.

l. Amenities such as lighting, fencing and landscaping.

m. Four view lines in a one to three-mile radius of the site, beginning at True North and continuing clockwise at ninety-degree intervals, plus additional view lines from any historic, scenic, or prominent areas of Town determined b the Planning Board.

2. A map showing the areas covered/served by the proposed wireless communication structure and device of different signal strengths and the interface with adjacent service areas.

3. A locus map at a scale 1"=1000' (or whatever is necessary to show where in town the proposed tower is sited) which shall show streets, and landscape features.

4. A description of the soil and surface geology at the proposed site.

5. A narrative report written by the carrier and licensed professional engineer which shall:

a. Describe the justification of proposed site.

b. Describe the structure and the technical, economic, and other reason for the facility design.

c. Describe the capacity of the structure, including the number and type of additional facilities it can accommodate.

d. Describe actions to be taken if electromagnetic radiation from the facility should exceed levels designated by the FCC.

e. Describe the projected future needs of the carrier, and how the proposed wireless communication facilities fit with future projections to serve the Town and adjacent towns.

f. Describe leasing agreement should another carrier desire to co-locate.

g. Describe special design features to minimize the visual impact of the proposed wireless communication facility.

h. Describe other carrier's purposes should there be co-location.

6.Proof of approval of all other necessary permits needed for construction and operation.

7. If the proposed facility is taller than the zone height restriction (and the Planning Board deems it necessary), after the application is submitted, and not more than 14 days before the public hearing, the applicant shall arrange to fly a two-foot diameter balloon at the site of the proposed wireless communication structure at the maximum height of the proposed installation. The date and location of the flight shall be advertised at least 14 days, but not more than 21 days before the flights, and again in the public hearing advertisement in a newspaper with a general circulation in the town

B. TO SITE A WIRELESS COMMUNICATION DEVICE ON EXISTING WIRELESS COMMUNICATION STRUCTURES OR NON-RESIDENTIAL STRUCTURES SUCH AS BUILDINGS, GRAIN SILO, STEEPLES, WATER TOWERS OR OTHER NON-RESIDENTIAL STRUCTURES, INCLUDING CO-LOCATION WITH ANOTHER CARRIER, PROVIDED THAT THE NEW USE DOES NOT ADD TO THE HEIGHT OF THE STRUCTURE, THE APPLICANT SHALL SUBMIT:

1. Site plans and engineering plans, prepared by a professional engineer licensed to practice in Massachusetts, on 24" x 36" sheets at a scale of 1"=40' or 1"=200' on as many sheets as necessary which shows the following:

a. north arrow, date, scale, the seal(s) of the licensed professionals who prepared the plans and a space for the reviewing licensed engineer's seal.

b. plans for supporting and attaching the device including specifications of hardware and all other building material

c. building plans for accessory buildings, if any.

d. Layout and details of surfacing for access road and parking, if it is to be altered from the existing condition.

2. A map showing the areas covered by proposed device(s) of different signal strengths and the interface with adjacent service areas.

3. A narrative report written by the carrier and licensed professional engineer which shall:

a. include a draft of the contract between the structure/building owner (whichever appropriate) and the Applicant

b. demonstrate that the wireless communication structure or non-residential structure to which the device will be mounted has the structural integrity to support such device.

c. Describe actions to be taken if electromagnetic radiation from the facility should exceed levels designated by the FCC.

d. Describe the projected future needs of the carrier, and how the proposed facility fits with future projections.

4. Proof of approval of all other necessary permits needed for construction and operation.

5. If the proposed facility adds more than five feet to the height of the structure at the effective date of this by-law and will exceed zone height restrictions, the SPGA may require a balloon test as described above in VII. A., 7.

C. The above information shall be submitted along with the regular application form to the following: one copy to the Building Inspection, one copy to the Fire Chief, 1 copy to the Chief of Emergency Services or the equivalent, and three copies to the Planning board.

~~C.~~D. Upon the written request of the applicant, the Planning Board may waive any of the application requirements set forth in this section that the Planning Board deems inapplicable to the permitting of any proposed fixed wireless transmitter tower structure and/or fixed wireless transmitter array

VIII. Approval

A. In granting a special permit for wireless communication facilities, in addition to the findings required by the town's Zoning By-Law for Special Permits**,** the Planning Board shall find:

1. That the Applicant has demonstrated to the satisfaction of the Planning Board that the requirements of this by-law have been met.

2. That the size and height of the structure is the minimum necessary.

3. That the proposed wireless communication facilities will not adversely impact historic structures or scenic views.

4. That there are no feasible alternatives to the location of the proposed wireless communication facilities, including co-location, that would minimize their impact, and the applicant has exercised good faith in permitting future co-location of facilities at the site.

B. When considering an application for a wireless communication facility, the Planning Board shall place great emphasis on the proximity of the facility to residential dwellings, its impact on these residences, and will encourage the use of existing structures.

C. Any extension, or construction of new or replacement towers or transmitters shall be subject to an amendment to the Special Permit, following the same procedure as siting a new wireless communication device on an existing structure.

IX. Conditions of Use

A. The applicant shall post an initial bond to cover construction costs and an annual maintenance bond to cover maintenance for the access road, site and structure(s) and to cover the removal of facility in the event of non-operation. (*(See C. below)* in an amount approved by the Planning Board. An access road may include existing town roads not designed for heavy traffic. The bond requirements shall not apply to fixed wireless transmitter tower structures and fixed wireless transmitter arrays permitted as an accessory use.

B. Regulatory Compliance

1. Annual certification demonstrating structural integrity and continuing compliance with current standards of the FCC, FAA and the American National Standards Institute shall be filed with the Building Inspector by the Special Permit Holder and shall be reviewed by a licensed professional engineer hired by the town and paid for by the Special Permit Holder.

2. If the FCC or the FAA regulations are changed, the owner or operator shall bring the facilities into compliance within six months or earlier if a more stringent compliance schedule is included in the regulation.

3. Failure to comply with any regulation shall be grounds for removal of non-complying structures, buildings, and devices at the owner's expense.

4. If the device is moved lower on the structure and the top of the structure is no longer needed, then the non-operational part of the structure shall be removed within 120 days.

C. Removal and Repair

1. An applicant must execute a covenant with the Planning Board agreeing to remove, within 180 days of notice from the town, the wireless communication facility not in operation for a period of twelve months, unless the reason for non-operation is the result of major damage.

2. If the facility is not removed within 180 days, the Town will remove said facility at the owner's expense.

3. In the event of major damage, repair must begin within six months of damage. Major damage shall mean damage to the facility caused by no fault of the owner or operator.

Wireless Technology Overview

George "Chip" Brodeur

BNC Network Consulting Services

Chief Technology Consultant
for
WesternMA Connect, Inc.

Project funded by a Broadband Planning Grant
from the Massachusetts Broadband Institute & WesternMA Connect

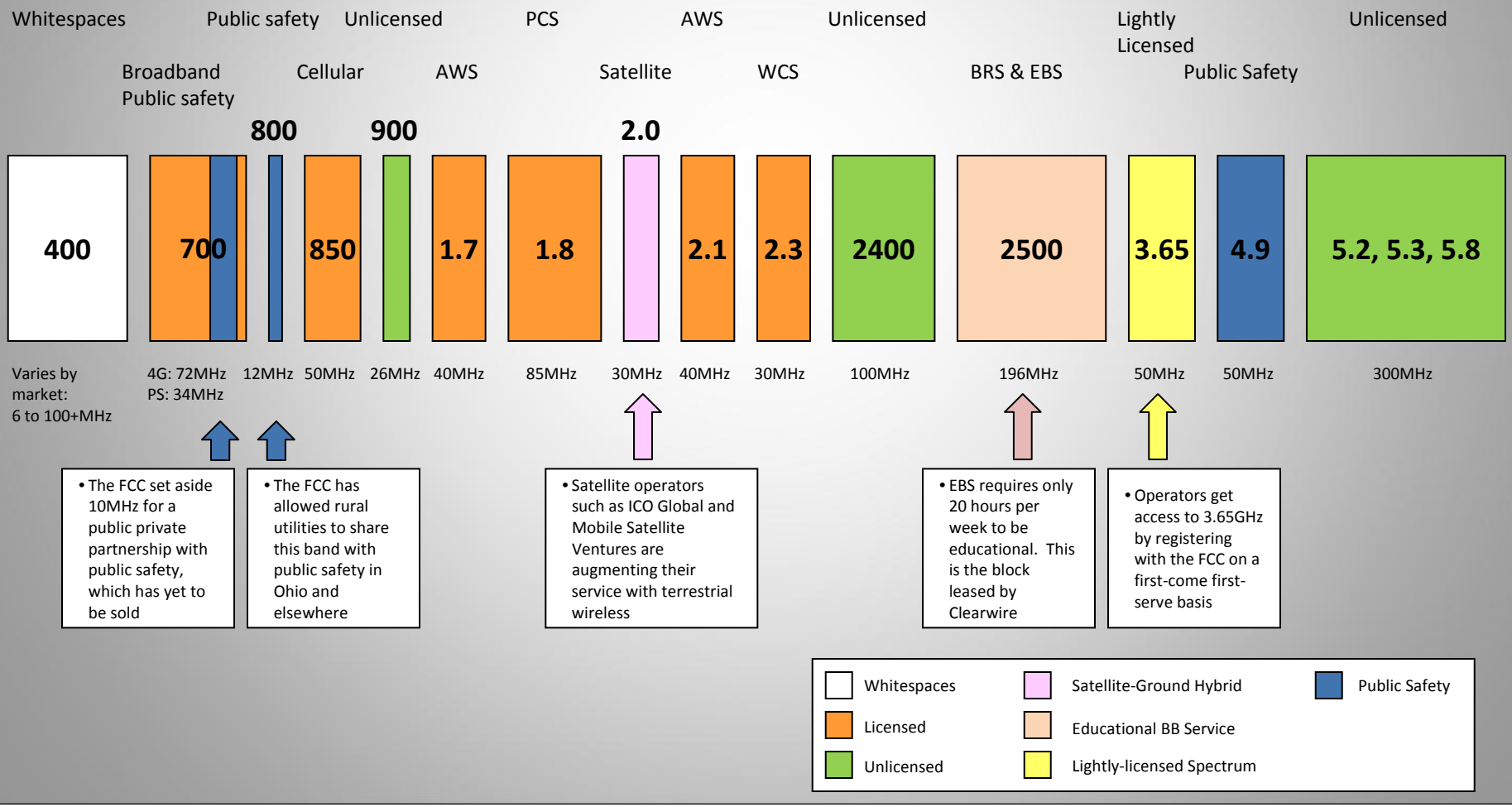
Sections

- Wireless Spectrum
- Wireless Technology Elements
- Types of Wireless Networks
- Towers / Masts
- Secondary Access Point / Repeater Configurations
- End User Configurations

Wireless Technology Frequencies

The radio spectrum is divided up into unique spectrum blocks. These blocks are then licensed to specific carriers under specific conditions

- The majority of available broadband spectrum is held by commercial providers
- Spectrum holdings are typically described as a block of a certain size (15Mhz) in a certain band (850Mhz). So a carrier would be able to say that they have the right to use 15Mhz of spectrum in the 850Mhz range



Wireless Technology Elements

Key Components of a Wireless System:

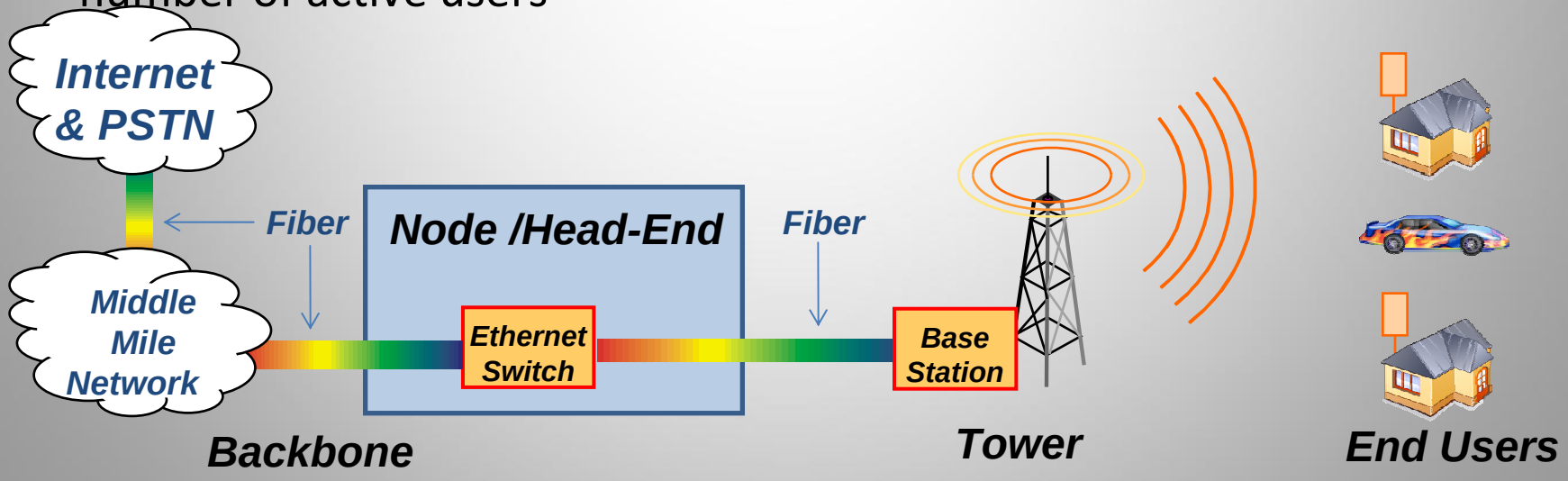
- Radio / Transceiver
  - Electronics to transmit & receives signals to remote devices or to other tower site
- Antenna
  - Connects to radio, mounted on a tower or other high ground
- Tower and Hub Site
  - This is the physical location that houses radios, antennas, etc.
  - Usually needs to have good line of sight (high ground and/or tower)
  - Typically leased from a land-owner
- Backhaul
  - Data connection to connect hub site to the outside world
  - Wireless or Wireline (fiber)

Types of Wireless Networks

- Point-to-Point Microwave
- WiFi Hot-Spot
  - Private or Open Access (or by subscription, ex. Starbucks)
- Super WiFi , WiMAX, and White Space Systems
  - New un-licensed spectrum available for longer range WiFi
- Fixed Wireless
  - Small to large ISPs typically serving fixed premises (ex. Galaxy Internet, Clearwire)
  - Municipal operators as well
- Mobile Carriers
  - (iPhones, smartphones, ex. AT&T, Verizon, Sprint, T-mobile)

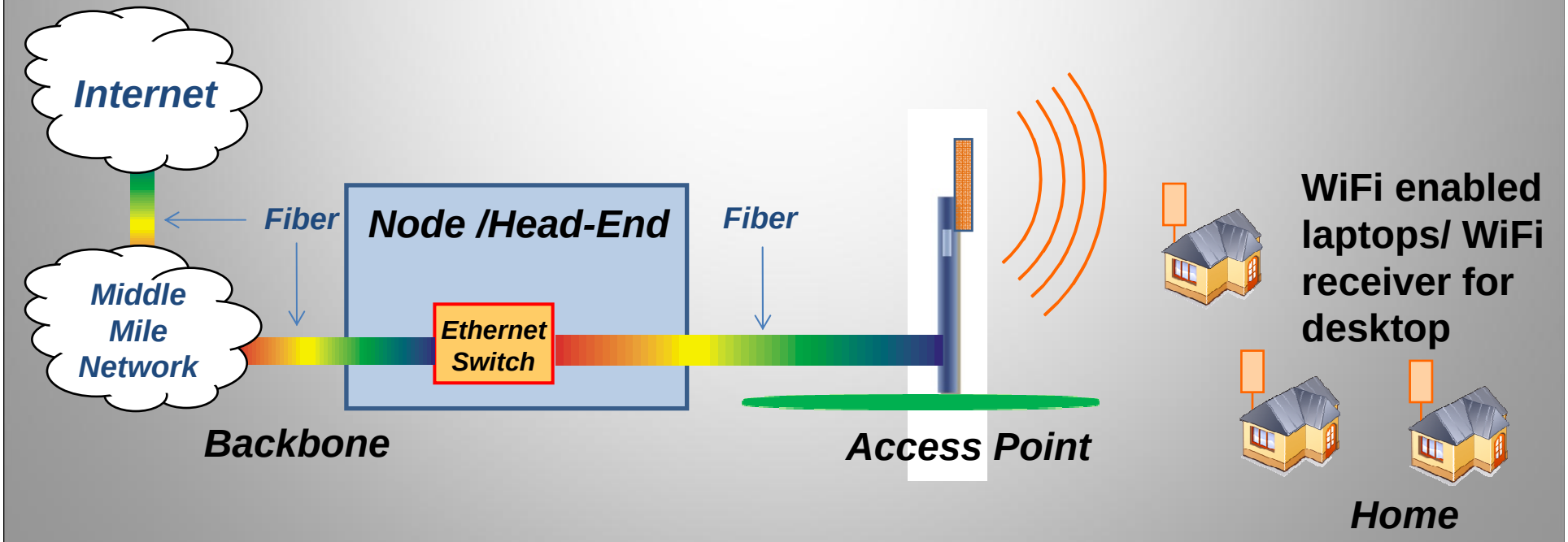
LTE – Long Term Evolution (4G)

- LTE provides significant improvements in throughput and spectral efficiency over current 3G networks
- Fiber connects to base stations which each cover a few square miles (area depends on spectrum and topography); Point-to-Point microwave can also play a role in backhaul
- Radio signal are received by a mobile broadband device – can be indoors or outdoors, static or mobile
- Cell capacity is shared between users, performance determined by number of active users



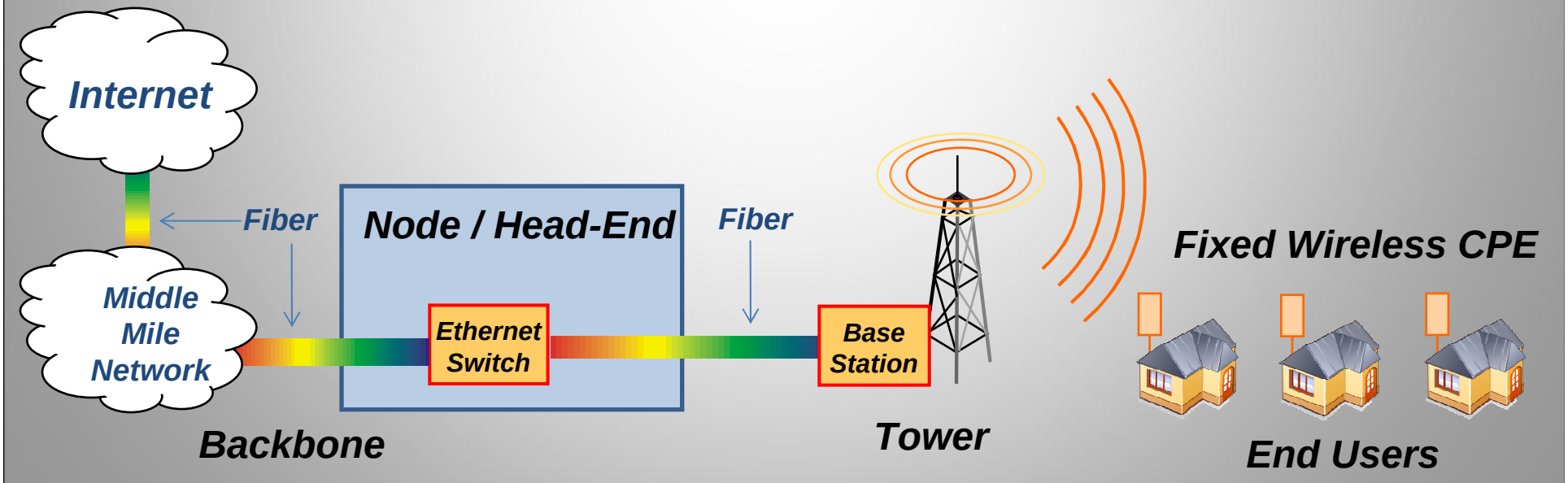
FTTC – Cellular (DAS) or WiFi

- Fiber is deployed from a node on utility poles, and provides access points to a backhaul connection
- WiFi enabled devices use radio technologies based on the IEEE 802.11 standard to communicate data anywhere within the range of access point
- Access points can offer a range of up to 95m; However strength of signal diminishes with distance, especially if there is interference or obstructions

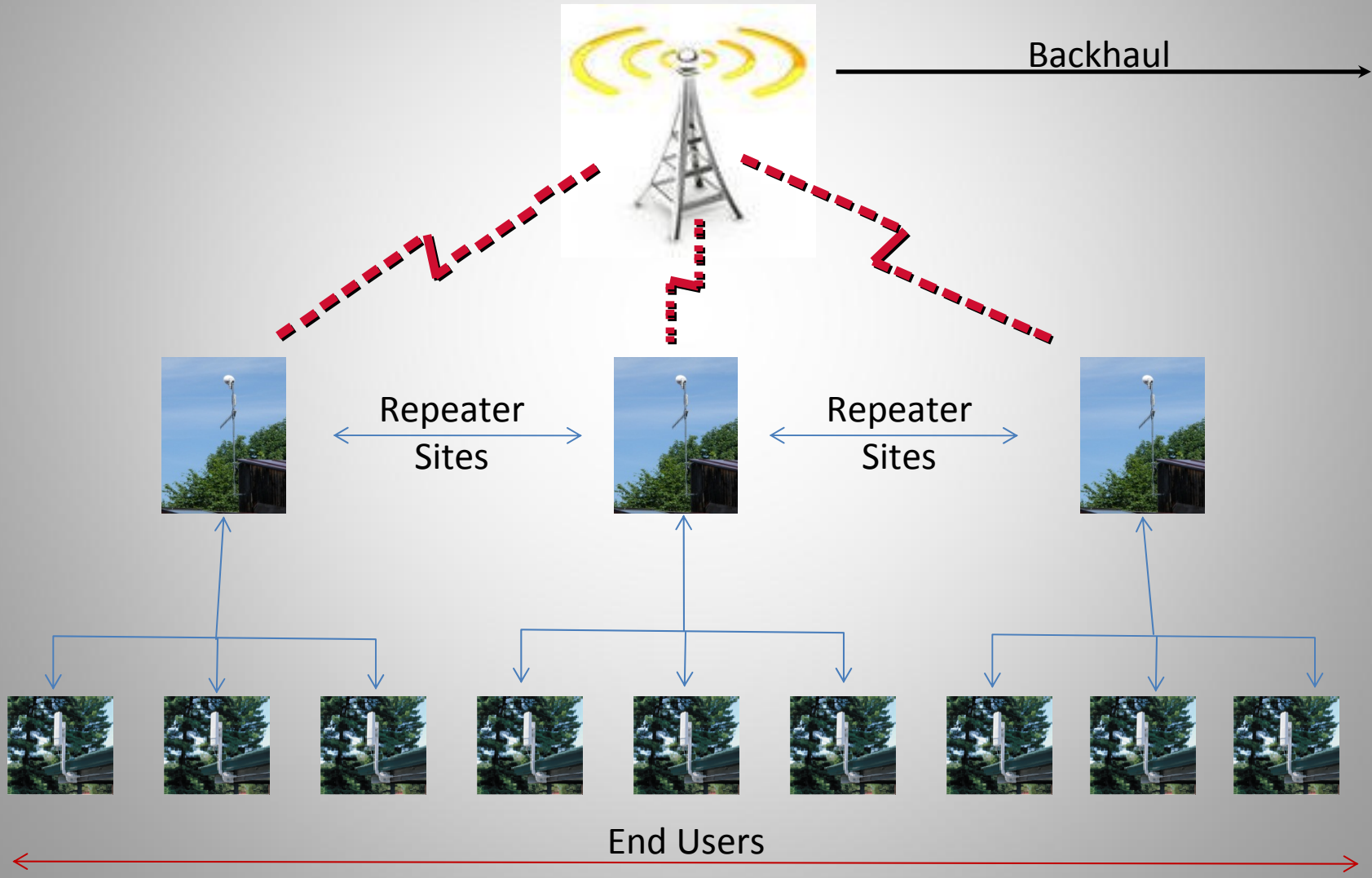


Fixed Wireless – WISP Model

- Base stations are connected to the node by fiber, Point-to-Point microwave can also play a role in backhaul
- Base Stations transmit data wirelessly
- Option to use WiMAX or proprietary wireless technology

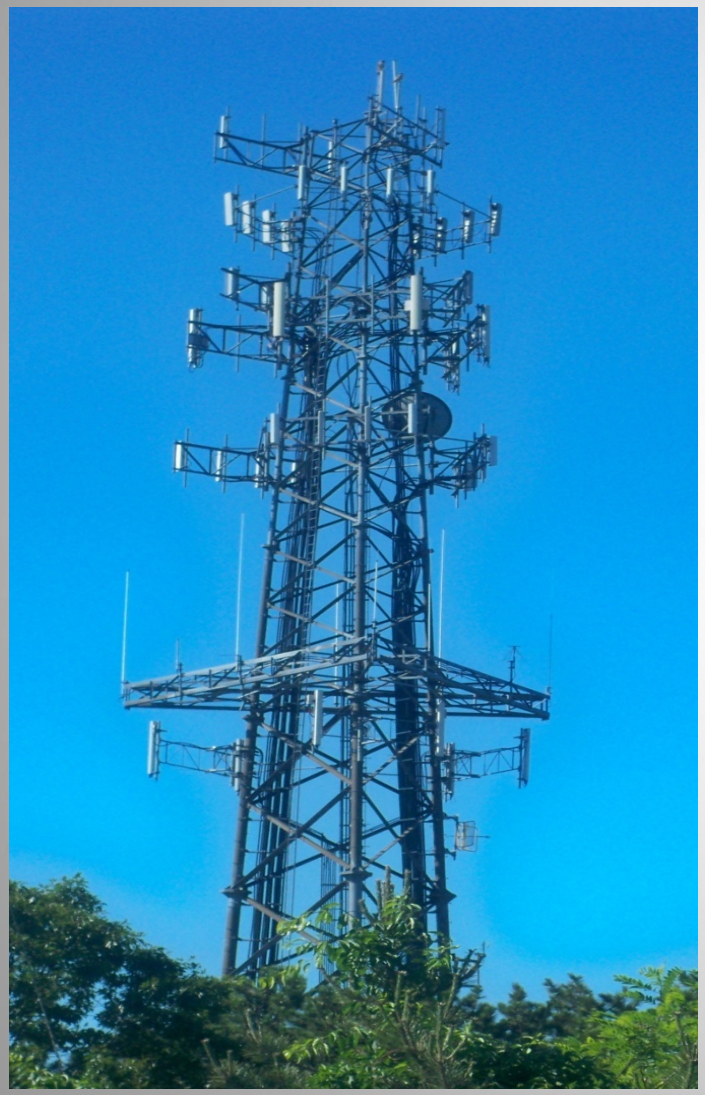


Wireless Broadband Network Design
WISP Model



Typical Cell Tower Installation

Truro, MA



- Multi Tennant
- Dedicated Microwave
- Public Safety
- Private Wireless Networks

Other Cell Tower Structures

Communications Tower Installation

Mt. Grace

- Multi Tennant
- No Cellular Networks
- Dedicated Microwave
- Public Safety
- Private Wireless Networks

Wireless Internet Service Providers
Mast / Tower Installation

Wireless Internet Service Provider (WISP) Fire Tower Installation

Typical Heights

Typical height of a
Cell Tower or Base Station

Ranges from 120’ to 200”+

Typical height for a
Mast Tower

Ranges from 80” 120”

Wireless Broadband
Secondary Access Point / Repeater
Installations

Wireless Broadband Secondary Access Point –Tripod Installation

End User Antenna Equipment
Motorola Canopy-900 MHz

Typical Heights & Sizes

Typical height of a repeater installation

< 10’

Typical size of an antenna unit

Pringles Can

Typical height of a tripod installation

~ 10’

Typical size of a ground post

Pool Noodle