

**PLANNING FOR TELECOMMUNICATION
FACILITIES IN
NEW HAMPSHIRE AND VERMONT**

Connecticut River Watershed Council

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FOREWORD

This handbook was put together to further the knowledge of citizens and officials in the Connecticut River Valley on the topic of telecommunication facilities. We feel that this topic is ever changing and that this handbook can only act as a guide to assist interested citizens and local officials who are or could be planning to address the appropriate location and design of telecommunication facilities through their local zoning ordinances. This is an abbreviated document. It is primarily intended to provide a basic overview of the technologies, laws, and environmental issues related to wireless services with references to source information.

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I. INTRODUCTION:

The technological age is ever present. New Hampshire and Vermont have not been left out. Along with the Internet comes another form of telecommunication, cellular telephones. Cell phones cannot function without cellular towers. These metal towers presently can stand 200 feet tall and the footprint can encompass roughly two acres depending on road access. Cell phone usage is ever increasing, and to meet that demand cell carriers intend to locate a cell tower every five miles in the Connecticut River valley. If towns are going to be able to address this increasing activity, the time is now. This decision process can be a win-win situation, but it rests on the shoulders of everyone involved to know all the options presently available.

Towns in both New Hampshire and Vermont have some means to control the level of local telecommunication technology. They can develop ordinances and by-laws that speak of the town as a whole and uphold local interests as the cell tower wave spreads. The following sections are laid out to assist interested persons to gain access to the informational, technological and legislative work that addresses telecommunication facilities. They include an overview of the technology involved, relevant legal documents both past and present (TCA of 1996, HB 733, HB 1552, Act 250, Vt. Act 94.); the impacts on health and the environment; present and future planning for telecommunications facilities.

II. BRIEF TECHNOLOGICAL OVERVIEW

A. Cellular Phone Technology

A cellular system operates by dividing a large geographical service area into cells and assigning the same frequencies to multiple, non-adjacent cells. This is known as "frequency reuse." As a subscriber travels across the service area the call is transferred (handed off) from one cell to another without noticeable interruption.

In 1996, the Federal Communications Commission (FCC) designated 306 Metropolitan Statistical Areas and 428 Rural Service Areas for a total of 734 cellular markets and spectrum was allocated to license two systems in each market. Cellular spectrum is allocated in the 824-849 and 869-894 MHz ranges. Cellular licensees are generally required to license only those towers that make up their outer service boundary. Additions or modifications of tower locations within an already approved service area do not require further applications to add the location to a license. However, the antenna must meet basic environmental standards as set out in the National Environmental Policy Act (NEPA).¹

B. Specialized Mobile Radio (SMR)

A traditional SMR system consists of one or more base station transmitters, one or more antennas and end user radio equipment which often consists of a mobile radio unit. SMR systems operate in two distinct frequency ranges: 806-821/851-866 MHz (800 MHz) and 896-901/935-940 MHz (900 MHz). SMR services in the 800 MHz range have been licensed by the FCC on a site-by-

¹ Federal Communications Commission Fact Sheet, April 23, 1996

site basis requiring the SMR provider to request approval for each and every tower base/site. The 900 MHz SMR services were originally licensed in only 46 areas (made up of the top 50 markets in the country). The FCC is in the process of auctioning the remainder of the United States territory for this range.²

C. Broadband Personal Communications Systems (PCS)

Broadband PCS systems are very similar to the cellular systems but operate in a higher frequency band, in the 1850-1990 MHz range. Another difference is that the FCC used different market areas for licensing purposes, based on the Rand McNally definitions for 51 Major Trading Areas (MTAs) and 493 Basic Trading Areas (BTAs).

PCS licensees are issued a blanket license for their entire market area and are not required to submit applications to license individual cell sites unless construction of the facility would be a major environmental action as defined by NEPA.³

D. Tower Siting/Antenna Technological Terms⁴

The following definitions are most commonly used in regulating and planning for personal wireless services:

- **Antenna** - The surface from which wireless radio signals are sent and received by a personal wireless service facility. "Antenna" should not be used as a synonym for "cell site".
- **Cell Site** - A generic term for a personal wireless service facility. It is acceptable to use the term "cell site" in everyday parlance, but it is unacceptable to use the term for ordinances and other official policies.
- **Co-location** - The use of a single mount on the ground by more than one carrier (vertical co-location) and/or several mounts on an existing building by more than one carrier. Some consider "clustering" (antenna farms) or placing mounts adjacent to one another (horizontal co-location) as a form of co-location.
- **Equipment Shelter** - An enclosed structure, cabinet, shed or box at the base of the mount used to contain batteries and electrical equipment. This equipment is connected to the antenna by cable. Also called "base transceiver stations" for PCS systems.
- **Guyed Tower** - A monopole or lattice tower that is tied to the ground or other surface by diagonal cables.
- **Lattice Tower** - A type of mount that is self-supporting with multiple set and cross-bracing of structural steel.
- **Location** - The area where a personal wireless service facility is located or proposed to be located. The process of determining location should not be confused with the process of "siting."

² Id.

³ Id.

⁴ Siting Criteria for Personal Wireless Service Facilities, Kreines & Kreines, Inc., and the Cape Cod Commission, June, 1997, pp. 4-9. Please refer to Attachment A, VLCT Glossary of Telecommunications Terms, for identification of telecommunication terminology.

- **Monopole** - A type of mount that is self-supporting with a single shaft of wood, steel or concrete and a platform (or racks) for panel antennas arrayed at the top.
- **Mount** - The structure or surface upon which antennas are mounted. There are four types of mounts:
 - Roof-mount - mounted on the roof of a building
 - Side-mount - mounted on the side of a building
 - Ground-mount - mounted on the ground
 - Structure-mount - mounted on a structure other than a building
- **Omnidirectional Antenna** - Often called a “whip” antenna, this thin rod beams and receives a signal in all directions. They have minimum silhouettes but also limited ranges.
- **Panel Antenna** - A flat surface antenna usually deployed in three directional “sectors” (0-120 degrees, 120-240 degrees and 240-360 degrees) and used to concentrate of beam the signal into (or from) that sector only.
- **Separation** - The distance between one carrier’s array of antennas and another carrier’s array.
- **Siting** - The method and form of placement of personal wireless service facilities on a specific area of a subject property. Siting should not be confused with the process of determining “location.”

E. Development of Wireless Service Networks

There are three parties involved in the decisions of how personal wireless service facilities are developed, they are: 1) the industry, including carriers, their consultants and vendors, 2) the Federal Communications Commission (FCC) which is responsible for licensing wireless services; and 3) state and local governments.⁵

III. REVIEW OF THE LAW

A. Federal Telecommunications Act of 1996 (TCA)

The TCA establishes a comprehensive framework for the exercise of jurisdiction by state and local zoning authorities over the construction, modification, and placement of facilities such as towers for cellular, personal communications service (PCS) and specialized mobile radio transmitters (SMR). The law preserves local zoning authority, but clarifies when the exercise of local zoning may be preempted by the FCC. The law also requires the federal government to take steps to help licensees in spectrum-based services, such as PCS and cellular, get access to preferred sites for their facilities⁶, developing a seamless web of telecommunications or “blanket coverage.”

Relevant sections of the TCA include:

SEC. 704. FACILITIES SITING; RADIO FREQUENCY EMISSION STANDARDS.

⁵ *Id.* at 2

⁶ Federal Communications Commission Fact Sheet, April 23, 1996

(a) - NATIONAL WIRELESS TELECOMMUNICATIONS SITING POLICY (governing federal, state and local government oversight of wireless facility siting).

(7) PRESERVATION OF LOCAL ZONING AUTHORITY

(A) GENERAL AUTHORITY - Except as provided in this paragraph, nothing in this Act shall limit or affect the authority of a State or local government or instrumentality thereof over decisions regarding the placement, construction, and modification of personal wireless service facilities.

(B) LIMITATIONS:

(i) The regulation of the placement, construction, and modification of personal wireless service facilities by any State or local government or instrumentality thereof:

(I) shall not unreasonably discriminate among providers of functionally equivalent services; and

(II) shall not prohibit or have the effect of prohibiting the provision of personal wireless services.

(ii) A State or local government or instrumentality thereof shall act on any request for authorization to place, construct, or modify personal wireless service facilities within a reasonable period of time after the request is duly filed with such government or instrumentality, taking into account the nature and scope of such request.

(iii) Any decision by a State or local government or instrumentality thereof to deny a request to place, construct or modify personal wireless service facilities shall be in writing and supported by substantial evidence contained in a written record.

(iv) No State or local government or instrumentality thereof may regulate the placement, construction and modification of personal wireless service facilities on the basis of the environmental effects of radio frequency emissions to the extent that such facilities comply with the FCC's regulations for such emissions.

(v) Any person adversely affected by any final action or failure to act by a State or local government or any instrumentality thereof that is inconsistent with this subparagraph may, within 30 days after such action or failure to act, commence an action in any court of competent jurisdiction. The court shall hear and decide such action on an expedited basis. Any person adversely affected by an act or failure to act by a State or local government or any instrumentality thereof that is inconsistent with clause (iv) may petition the FCC for relief.⁷

Section 704 does not contain any provisions or potential provisions that preempt local land use regulation regarding barriers to entry.

Section 253 -

§253(a) - Removal of Barriers to Entry

No state or local regulation or other legal requirement can prohibit or have the effect of prohibiting the ability of any entity to provide any interstate or intrastate telecommunications service.

⁷ Id.

§253(b) Nothing in this section shall affect the ability of a State to impose, on a competitively neutral basis . . . requirements necessary to preserve and advance universal service, protect the public safety and welfare, ensure the continued quality of telecommunications services, and safeguard the rights of consumers.

§253(d) If, after notice and an opportunity for public comment, the Commission (FCC) determines that a State or local government has permitted or imposed any statute, regulation, or legal requirement that violates subsection (a) or (b), the Commission shall preempt the enforcement of such statute, regulation, or legal requirement to the extent necessary to correct such violation or inconsistency.

The FCC interprets subsections (a), (b) and (d) as limitations on local government zoning authority outside of the provisions of §704. However, nothing in §253 restricts local governments from imposing, without discrimination, requirements necessary to protect the public health, safety and welfare.⁸ See Section V. of the this document for a discussion on the radio frequency radiation exception.

B. NEW HAMPSHIRE STATE LAW

New Hampshire has become more and more invested in the issue of telecommunication facilities. The Legislature passed HB 733 that created a committee to address local concerns, such as location of towers. A second committee created by HB 1552 is to address the topic of telecommunication facilities from the perspective of economic development and planning. The NH Office of State Planning is also in the process of developing a model ordinance for the regulation of telecommunication facilities.

1. NH House Bill 733

The HB 733 is “an act relative to a state master plan for the deployment of personal wireless service facilities and establishing a committee to study state wireless communications policy.”⁹ HB 733 was approved by the NH Legislature on June 8, 2000 and went into effect on August 7, 2000. This measure looks to the Office of State Planning to produce a set of model municipal ordinances regarding the construction of personal wireless communications facilities (PWCF). During the planning stages, it is the responsibility of the director to guide the interested parties by holding at least one, if not more, public hearings to allow questions or concerns about the issue to be raised. The Office of State Planning must also produce a map that describes the site, identifies the location and any characteristics (e.g. antenna height and diameter) the PWCF may have.

Regional notification is also necessary when the development for a PWSF is being taken into consideration. Any municipality or state authority of New Hampshire that is within a twenty-mile radius of a possible PWSF development must receive a written notification from that municipality where that PWC may stand. Local communities are also encouraged to address wireless facilities in the zoning ordinances sooner, to avoid any tower siting confusion.

⁸ Siting Criteria for Personal Wireless Service Facilities, p. 12

⁹ State of New Hampshire HB 733. Deployment of Personal Wireless Service Facilities. p.1

Specific language of HB 733 is as follows:
HB 733, 240:12-J:1 Goals, Purposes.

I. The federal Telecommunications Act of 1996 regulates the deployment of wireless services in the United States. Its purpose is to make these services available to the American people quickly and in a very competitive manner. Nothing in this chapter is intended to preempt the federal Telecommunications Act of 1996.

II. The visual effects of tall antenna mounts or towers may go well beyond the physical borders between municipalities, and should be addressed so as to require that all affected parties have the opportunity to be heard.

III. Carriers wishing to build personal wireless service facilities (PWSFs) in New Hampshire should consider commercially available alternative PWSFs to tall cellular towers, which may include the use of the following:

- (a) Lower antenna mounts which do not protrude as far above the surrounding tree canopies.
- (b) Disguised PWSFs such as flagpoles, artificial tree poles, light poles, and traffic lights, which blend in with their surroundings.
- (c) Camouflaged PWSFs mounted on existing structures and buildings.
- (d) Custom designed PWSFs to minimize the visual impact of a PWSF on its surroundings.
- (e) Other available technology.

IV. A PWSF map is necessary to allow for the orderly and efficient deployment of wireless communication services in New Hampshire, and so that local communities have adequate information with which to consider appropriate siting and options to mitigate the visual effects of PWSFs.

V. Municipalities will benefit from state guidance regarding provisions to be considered in zoning ordinances relative to the deployment of wireless communications facilities, including one or more model ordinances.

12-J:7 Regional Notification.

I.(a) Any municipality or state authority or agency which receives an application to construct a PWSF which will be visible from any other New Hampshire municipality within a 20 mile radius shall provide written notification of such application and pending action to such other municipality within the 20 mile radius.

(b) This notification shall include sending a letter to the governing body of the municipality within the 20 mile radius detailing the pending action on the application and shall also include publishing a notice in a newspaper customarily used for legal notices by such municipality within the 20 mile radius, stating the specifics of the application, the pending action, and the date of the next public hearing on the

application. Such notice shall be published not less than 7 days nor more than 21 days prior to the public hearing date.

II.(a) Any person, prior to constructing a new PWSF in any location where no approval is required but which will be visible from any other New Hampshire municipality within a 20 mile radius, shall provide written notification of such planned construction to such other municipality within the 20 mile radius.

(b) This notification shall include sending a letter to the governing body of the municipality within the 20 mile radius detailing the planned construction and shall also include publishing a notice in a newspaper customarily used for legal notices by such municipality within a 20 mile radius, outlining the planned construction.

III. Municipalities within the 20 mile radius described in paragraphs I or II and their residents shall be allowed to comment at any public hearing related to the application. Regional notification and comments from other municipalities or their residents shall not be construed to imply legal standing to challenge any decision.

12-J:8 Model Ordinances and Guidance. The director of the office of state planning shall develop a set of model municipal ordinances relative to the deployment of personal wireless communications facilities. Prior to development, the director shall hold one or more public hearings and solicit comments from interested parties. The office of state planning shall provide a copy of the set of model ordinances to any New Hampshire municipality that requests it.

2. House Bill 1552

The HBHB 1552 is “an act establishing a telecommunications planning and development initiative in New Hampshire and making an appropriation thereof.”¹⁰ HB 1552 was approved on June 21,2000 and was put into effect July 1,2000. The telecommunication infrastructure, the pros and cons, is a vital part of the state’s developmental economic activity. Addressing the planning and development of telecommunications services throughout the state would strengthen the deployment of these services.

The planning and development initiative will headed by, under the supervision of the commissioner of resources and economic development, the director of economic development. This initiative will evolve and be executed by the telecommunications planning and development advisory committee, which will address the following issues:

Specific language of HB 1552 is as follows:

HB 1552, 0298:1 Findings.

I. The status of telecommunications infrastructure in the state of New Hampshire is a critical component of New Hampshire's economic development efforts and economy. A telecommunications planning and development initiative is therefore established to identify telecommunications infrastructure strengths, weaknesses and objectives, to create a central repository of relevant information, and to promote this telecommunications infrastructure as an integral part of economic development efforts.

¹⁰ State of New Hampshire HB 1552. State of New Hampshire HB 733. Telecommunications Planning and Development. p.1

II. A secondary duty of the telecommunications planning and development initiative is to identify shortcomings in the deployment of telecommunications infrastructure throughout all parts of the state, and to assist efforts to enhance the deployment of telecommunications services.

III. The accomplishments of this initiative should be reviewed no later than the fourth year of its existence.

298:2 New Paragraph; Resources and Economic Development; Director of Economic Development,

Duties; Telecommunications Planning and Development Initiative. Amend RSA 12- A:22 by inserting after paragraph VIII the following new paragraph:

IX. Develop and implement a telecommunications planning and development initiative pursuant to RSA 12-A:45.

Specific language of HB 1552 is as follows:

HB 1552, 12-A:45 Telecommunications Planning and Development Initiative.

I.(a) The director of economic development, under the supervision of the commissioner of resources and economic development and pursuant to the director's duties under RSA 12-A:22, shall develop and implement a telecommunications planning and development initiative which will result in a telecommunications development plan to be adopted and revised regularly by the telecommunications planning and development advisory committee.

3. Model Ordinance

New Hampshire is presently in the process of developing their own statewide model ordinance for the local regulation of telecommunications facilities. Just recently, interested state, regional, and local parties met at the Office of State Planning to discuss this very issue. While the New Hampshire Model Ordinance is still under construction, municipalities and local communities can address any questions they might have to their Regional Planning Commission (RPC). They can also refer to the literature cited below and the attached Town Ordinances of Charlestown, NH.

1. The Appalachian Trail Conference put together a telecommunication towers checklist that goes into detail on how to evaluate and develop local wireless telecommunications facilities. It caters to communities in the Appalachia region but any community can use it.
Appalachian Trail Conference. Wireless Ordinance Checklist. Nov. 99
<www.atconf.org>
2. Andrew Bridge's Personal Wireless Service Facilities presents the reader with eight questions dealing with Federal, State, and local authorities regulation of telecommunication facilities.
Bridge, Andrew. Personal Wireless Service Facilities. Nov. 99
<www.bridge.amherst.tape@juno.com>

3. Issue # twenty from the NH Town & City Counsel presents a checklist to local zoning authorities over the siting of wireless telecommunications facilities. It addresses preliminary mindset issues, basic policy issues, ordinance drafting, and procedural issues.
NHMA's Municipal Law Forum. New Hampshire Town & City Counsel. January '98. Issue #20.
4. The Local and State Government Advisory Committee of the FCC recently wrote a thirty page guide entitled A Local Government Official's Guide to Transmitting Antenna RF Emission Safety: Rules, Procedures, and Practical Guidance. This guide addresses FCC's RF exposure guidelines, licensees exceeding FCC limits, how the FCC verifies compliance with and enforces its rules.
<www.fcc.gov/oet/rfsafety>

C. VERMONT STATE LAW

For the past 30 years, Vermont has relied on Act 250 to review all manner of development. The state Legislature has brought cell towers under the jurisdiction of Act 250. Act 94, amendments to Act 250, addressed the importance of providing Vermont communities with the ability to participate in the location of these wireless facilities. Based on that legislation, the Vermont League of Cities and Towns (VLCT) has developed model ordinances and by-laws for the regulation of telecommunication facilities.

1. Vermont Act 94 of 1998

Governor Dean signed Act 94 on April 15, 1998. The policy of Act 94 is to regulate the construction, alteration, development, and decommissioning or dismantling of wireless telecommunications facilities and ancillary improvements where the city, town or village has not adopted zoning or where those activities are not regulated pursuant to a duly adopted zoning bylaw. Regulations regarding the decommissioning or dismantling of telecommunications facilities and ancillary structures may include requirements that a bond or other security acceptable to the legislative body be posted in order to finance facility decommissioning or dismantling activities. These regulations are not intended to prohibit seamless coverage of wireless telecommunications services.

Act 94 provides help for towns to develop appropriate zoning for telecommunications facilities. It allows for a moratorium of 180 days for any town working on a zoning amendment to regulate tower siting, and requires the Attorney General to intervene to defend the lawfulness of a moratorium if challenged in court. Act 94 requires the service provider to pay for dismantling of any tower no longer in use, and requires the applicant for a tower permit to pay for reasonable costs of an independent technical review on the application.

Specific language of Act 94 is as follows:

Act 94 amends Sec. 4. 24 V.S.A. § 4407 by adding the following provisions:

(17) Technical Review. A bylaw enacted under this chapter may include procedures to *require an applicant to pay for reasonable costs of an independent technical review* of the application.

(18) Moratorium relating to the siting of wireless telecommunications facilities and ancillary improvements. If a municipality has *begun a process to adopt or amend regulations*

relating to the siting of wireless telecommunications facilities, a municipality *may adopt a regulation that establishes a moratorium on issuing permits* to allow the siting and construction of wireless telecommunications facilities and ancillary improvements, and, if necessary, that requires that such permits be obtained.

(A) This moratorium may be adopted by vote of the municipality's legislative body, subject to voter [approval] . . . or it may be adopted by a majority of the voters, voting at a duly warned meeting

(B) A moratorium . . . shall run for no more than *180 consecutive days* . . . and . . . shall fall between the effective date of this act [April 15, 1998] and July 1, 1999.

(C) A moratorium . . . shall terminate upon the effective date of new regulatory provisions . . . [for] wireless telecommunications facilities . . . , upon expiration of 180 days from the date of the moratorium, or [on] June 30, 1999, whichever comes first.

(D) When a moratorium is adopted . . . *any telecommunications facility-related application pending* as of the date of the adoption of the moratorium shall be entitled to a permit *only when the applicant meets the requirements of the regulations as they exist at the termination of the moratorium.*

Act 94 also amends Sec. 7.24 V.S.A. §4303 relating to the Attorney General.

Notwithstanding provisions of law to the contrary, the office of the attorney general, on request of the municipal legislative body, will intervene to defend the lawfulness of the statute when litigation is commenced that alleges as unlawful a moratorium on issuing permits to allow the siting and construction of wireless telecommunications facilities and ancillary improvements, if such a moratorium has been adopted by a municipality under authority of this act.

The scope of representation by the office of attorney general shall be limited to the issue of the lawfulness of the town's authority to impose a moratorium.

2. Vermont Act 250

Act 250 was enacted in 1970 to protect the state from the "costs" associated with substandard and environmentally unsound development. 11 Sections of Act 250, including Criteria one, eight and ten have been used to evaluate cell towers in Vermont, primarily on aesthetic grounds. In 1997, the Vermont Legislature passed Senate Bill 194 that brought any tower over 20 feet in height under the purview of Act 250. Additionally, equipment shelters associated with the towers are also to be reviewed under Act 250.

Relevant sections of Act 250 are as follows:

Criterion 1 - relates to water and air pollution, and provides in relevant part: "Before granting a permit, the board or district commission shall find that the subdivision or development . . . [w]ill not result in undue water or air pollution." 10 V.S.A. Sec. 6085(a)(1). In wireless communications and broadcast tower projects reviewed under Act 250, the forms of "air pollution" under consideration are *radio frequency radiation (RFR)* - inevitably and purposefully, since it is radiation that carries the signals to their destinations, an emission from broadcast and microwave towers - and *radio frequency interference (RFI)*, which can result from facility operation. Vermont district commissions and the Environmental Board have found air pollutants to include radiation.¹³

¹¹ Act 250: A Positive Economic Force for Vermont, 1992, p. 3

¹³ Id. at 21-22 (emphasis added).

Criterion 8 - addresses the issue of aesthetics and requires the Environmental Board, before issuing a permit, to find that a project “will not have an undue adverse effect on the scenic or natural beauty of the area . . . [and will not compromise] historic sites or rare or irreplaceable natural areas.” 10 V.S.A. 6086(a)(8). The aesthetic component of Criterion 8 is the most applicable in relation to tower siting. The Environmental Board must administer a two pronged test, as established in In re Quechee Lakes, No. 3W0411 (Vt. Env’tl Bd.) (1985) when evaluating aesthetic impacts. First, the Board must determine whether a proposed project has an *adverse* aesthetic effect i.e. whether the tower would be in harmony with its surroundings. Second, the Board must determine whether the adverse effect is *undue*. To determine the meaning of “undue,” there are three questions which must be answered:

1. Does the project violate a clear, written community standard intended to preserve scenic beauty?
2. Would the project’s impact be shocking and offensive to the average person?
3. Has the applicant taken steps to mitigate the adverse impact?

The aesthetic criteria of Act 250 may be the most elusive and subjective of the environmental standards protected by the law, but they have played a role in a number of cases involving transmission towers. In fact, it was a telecommunications tower proposal that set a precedent by being the first major project to have an Act 250 permit turned down solely on aesthetic considerations. (In 1984, the District 7 Environmental Commission forced Vermont Electric Power Co. to reduce the height of its proposed 105 foot tower (60 feet above tree line) to 76 feet because the tower would have been visible to the folks attending the annual Bread and Puppet Resurrection Circus in nearby Glover). Aesthetics have played a role in other tower projects as well. In In re Thomas, No. 2W0644 (Vt. Env’tl Bd.), the Board refused to grant a permit for a radio tower because the tower would be the first man-made break in an undisturbed ridge line. Another example was In re Stokes, No. 3RO703 (Vt. Env’tl Bd.) in which a decision requiring shields to block ground-based visibility of warning lights on a 303 foot tower was upheld by the Vermont Supreme Court.¹⁴

Criterion 10 - requires that tower-siting proposals comply with both local and regional plans, or with capital programs adopted by the citizenry. Towns without local plans will be governed by the regional plan. In cases of conflict between a local or regional plan, the regional plan generally supersedes the local plan. This criterion may serve the same purpose as **Criterion 8** if specific aesthetic values are enunciated in a town or regional planning document. For example, In re Gary Savoie d/b/d/ WLPL and Eleanor Bemis, No. 2W0991 (Vt. Env’tl Bd.) rejected a proposed 110 foot tower based on the regional plan’s specific instruction that developers first seek to co-locate new facilities at existing transmission and receiving stations, even though the proposed tower was 90 feet below the tallest summit on an undeveloped ridge.¹⁵

Other criteria of Act 250, such as **Criterion 4** pertaining to soil erosion and

¹⁴ Id. at 22

¹⁵ Id. at 23

Criterion 5, transportation, may be cited during the construction phase, relating to excavation and land disturbance. These concerns are commonly addressed with permits. Little used, but possibly relevant, in opposition to telecommunications towers are **Criterion 6** (impact on public schools) and **Criterion 9(K)** (development affecting public investments). **Criterion 6** may be invoked by officials seeking to protect their investments at local schools, including computer equipment and other educational technology. **Criterion 9(K)**, which overlaps with **Criterion 6**, may be invoked to protect land adjacent to planned projects. Examples may be hiking trails, roads, schools or other public buildings. These two criteria may give local authorities greater power to protect their investments in educational equipment and other public amenities and might be effective in an Act 250 review.¹⁶

3. Model Local Ordinances

A model local ordinance has been attached to this document to provide the town planner with some guidance. The TCA of 1996 gives towns the authority to regulate telecommunications towers. These model ordinances are designed to work within the framework of the TCA. Additionally, Vermont Act 94 allows towns to adopt an ordinance regulating tower siting even if zoning is not in place. Towns may impose a 180-day moratorium on proposed telecommunications towers if the town is in the process of developing an ordinance for towers.

Attachment C - Vermont League of Cities and Towns Model Ordinance

This document, which includes a glossary of terms, is intended for use as a boilerplate for towns which may seek to draft an ordinance regulating telecommunications towers. This model ordinance covers a town's authority, consistency with federal law, permits, site plans, co-location, tower and antenna design, amendments to existing facilities, lighting/signage, antennas mounted on existing structures, temporary facilities, interference with public safety communications, continuing obligations for the applicant and abandoned towers.

IV. HEALTH AND ENVIRONMENTAL ISSUES

It is clear that state and local governments have the authority to regulate the environmental effects of radio frequency and microwave radiation when the source is broadcast facilities such as radio and television towers. This authority is granted by the TCA of 1996, Sec. 704. However, as long as personal wireless services are in compliance with FCC requirements, state and local authorities may not regulate cell towers for health effects.

Federal courts have asserted that states and localities retain authority to protect the health, safety and welfare of their citizens. The TCA preempts that authority in regard to the placement of personal wireless facilities, which cannot be regulated at the local level on the basis of "environmental" (i.e. health) effects.

¹⁶ Id.

A. Health Issues

Subsection (iv) of Sec. 704 of the TCA states “[n]o State or local government or instrumentality thereof may regulate the placement, construction and modification of personal wireless service facilities on the basis of the *environmental effects of radio frequency emissions* (RFR) to the extent that such facilities comply with the FCC’s regulations for such emissions.” (emphasis added). The ramifications of this subsection are that a town may not deny a permit to an otherwise qualified applicant based solely on the potential effects of RFR. This is one of the most controversial and misunderstood aspects of a personal wireless service facility.

1) *What are Radio-frequency Radiation Emissions (RFR)?*

RFR includes all frequencies in the electromagnetic spectrum between roughly three kilohertz (kHz) and 300 gigahertz (GHz). Cellular phones, FM radio, AM radio, VHF and UHF TV, police and fire radios fall into this category. As a point of reference, microwave ovens produce an energy field at frequencies in excess of 1 GHz to excite the molecules in food and make it hot.¹⁸

Additionally, the electromagnetic spectrum consists of both ionizing and non-ionizing radiation. Ionizing radiation includes ultraviolet rays, X-rays, Gamma-rays and Cosmic rays from the sun. Radio frequency fields, including microwaves, fall within the non-ionizing spectrum.

The FCC guidelines set RFR standards for all personal wireless service facilities, and supersede all state and local standards on RFR. Carriers can meet these standards by using equipment rated by the FCC as “type-accepted.” Use of other than “type-accepted” equipment, or the co-location of two or more cell sites, may exceed the FCC guidelines. An environmental evaluation of RFR is required by the FCC when the guidelines are exceeded or presumed to be exceeded.¹⁹

The FCC does not consider personal wireless service facilities as health problems, per se, as they can be sited in such a way as to preclude indirect impact on humans. According to the FCC, the key to avoiding health risks from personal wireless service facilities is to minimize the human exposure to them.²⁰

2) *What is Radio-frequency Interference (RFI)?*

RFI refers to the effect that microwave signals can have on household, business, medical and institutional electronic devices, possibly causing them to malfunction, become damaged or completely disabled. For licensing purposes, the FCC considers RFI to be interference of one radio or television signal with another station’s signal which the agency tries to police through its licensing powers.²¹ However, the FCC only regulates exposure to RFI, not emissions from transmission facilities.²² In a sense, the FCC regulates RFI by

¹⁸ Id.

¹⁹ *Siting Criteria for Personal Wireless Service Facilities*, pp. 35-36

²⁰ Id.

²¹ *Telecommunications and Broadcasting Transmission Facilities in Vermont*, p13

²² *Vermont Environmental Report*, March 1997, p.9

putting the onus on manufacturers of home-use equipment to produce machines less vulnerable to interference.²³

In recent years, there have been numerous scientific studies addressing the potential connection between cell-phone non-ionizing radiation effecting human biological tissue in a harmful way. This potential connection may or may not be a reality depending on further health studies, but presently there has been no study that has shown a direct link between the use of a cell phone and any disease. These studies, although have raised concerns about the health effects of locating a telecommunication facility in or around sensitive areas in a town.

B. Action Steps

Towns can take certain measures to address both health and aesthetic concerns. A town can take actions to require co-location of multiple carriers onto one tower; the height above average terrain (HAAT) process; locating smaller towers on existing structures; the town taking responsibility to check the compliance of the specific tower(s) in their area; or having the town rank on a priority basis possible sites for locating a telecommunication tower. In more detail, a town may:

1. Require co-location. When a town faces several tower proposals, it should work with all carriers involved to encourage them to co-locate on one tower. Requiring this to happen would cut down the number of telecommunication facilities, therefore increasing the percentage of untouched viewshed.
2. Require a lower profile. The HAAT process involves determining from sea level the altitude at which a tower stands, then determining where else on the surrounding terrain that particular altitude exists. The height of the tower is not the measured height, per se, but the height above the ground surface. A tower could be placed at a lower altitude if that particular altitude offers corresponding signal strength to the height where the tower now stands or is planned to stand.
3. Require evaluation of existing structures. Another measure that might relieve the presence of towers on mountain/hill tops is to place smaller towers on top of pre-existing structures, e.g. buildings, silos. Some preexisting structures, such as steeples or water tanks, are capable of supporting smaller towers where their impact on the viewshed is kept to a minimum.
4. Monitor RFR limits locally. Towns could take on the responsibility of RFR compliance by doing the monitoring themselves. The FCC certification process for establishment of telecommunication facilities requires the applicant to comply with certain guidelines: exposure limits of frequency, field strength, power density, and averaging time. The applicant must be in compliance with these guidelines prior to receiving a FCC license. Post installation of a telecommunication facility, the FCC generally does not do regular compliance check-ups, but they have addressed high levels of radio frequency radiation (RFR) once they had been notified. Towns can check to see if a tower is continuing to be in compliance by requiring funds to be set aside to retain necessary technicians and/or equipment.
5. Towns can maximize their control over location of these towers by zoning for tower locations. A town will then be familiar with where the best and worst places for these

²³ Telecommunications and Broadcasting Transmission Facilities in Vermont, p14

structures. A town might not want a tower close to schools or residential housing but would prefer them closer to industrial sections. Ranking the best and worst places and setting the least restrictions on the best places entices the carriers to pick those places. Along with this enticement, the town has control over the aesthetics and possibly over co-location.

Towns also can mitigate exposure to the radio frequency radiation waves that telecommunication towers emit by:

- Putting antennas as high on the tower as possible, the power of the frequency decreases as the distance and object gets farther away from the antenna.
- Making sure that the antenna is high quality make. The less expensive antennas tend to emit more RFR's.

C. Environmental Issues

National Environmental Policy Act (NEPA) Rules and Regulations.

NEPA requires environmental review of projects capable of having a significant effect on the human environment. The FCC guidelines acknowledge NEPA-established rules to determine when a “proposed action” (approval of a personal wireless facility site) is “categorically excluded” (not subject to further testing or review). Most FCC “type-accepted” equipment is categorically excluded from NEPA review.²⁴

a) Environmental Assessment (EA)

The FCC's interpretation of NEPA requires that an applicant for a cell site prepare an EA if the site falls into one or more of the following categories, as well as if the site would exceed the FCC guidelines for RFR. The categories are:

- Facilities that are to be located in an officially designated wilderness area
- Facilities that are to be located in an officially designated wildlife preserve
- Facilities that may affect listed threatened or endangered species or designated critical habitats
- Facilities that are likely to jeopardize the continued existence of any proposed endangered or threatened species or likely to result in the destruction of adverse modification of proposed critical habitats, as determined pursuant to the Endangered Species Act
- Facilities that may affect districts, sites, buildings, structures or objects, significant in American history, architecture, archaeology, engineering or culture, that are listed, or eligible for listing, in the National Register of Historic Places
- Facilities that may affect an Indian religious site
- Facilities to be located in a floodplain
- Facilities whose construction will involve significant change to surface features (i.e., wetland fill, deforestation or water diversion)
- Antenna towers and/or support structures that are to be equipped with high intensity white lights, which are to be, located in residential neighborhoods.

b) Cumulative Impact

NEPA regulations (Sec. 1508.7) defines cumulative impact as follows:

“Cumulative impact” is the impact on the environment that results from the

²⁴ Siting Criteria for Personal Wireless Service Facilities, pp. 31-32

incremental impact of the action when added to other past, present, and reasonable foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from the individually minor but collectively significant actions taking place over a period of time.

One of the major concerns of NEPA is the measurement of impacts that are not part of a proposed action, but rather related to it in *time* or *place*. In terms of *place*, the FCC has determined that RFR is *additive*. FCC guidelines require an EA when a personal wireless service facility (or co-location) exceeds 2,000 watts effective radiation power (ERP) for Broadband PCS or 1,000 watts ERP for cellular. In terms of *time*, cell sites are not independent projects, but part of an overall system or network. The FCC is silent on whether cumulative impacts should be determined for these networks on a system-wide basis; however, towns should take note of existing facilities when reviewing applications for proposed personal wireless service facilities that could pose problems due to cumulative effects.

c) Environmental Impact Statement (EIS)

Federal agencies are required to follow NEPA at an early (proposal) stage. Sec. 1508.23 of NEPA states:

Preparation of an environmental impact statement on a proposal should be timed so that the final statement may be completed in time for the statement to be included in any recommendation or report on the proposal. A proposal may exist in fact as well as by agency declaration that one exists.

The FCC has left the obligation to meet NEPA to the carriers. The FCC and the carriers have interpreted this standard as solely requiring that EA's be prepared on selected cell sites.

D. Historic Resources

Historical resources blanket the landscapes of Vermont and New Hampshire, from an 1817 Old Town Hall in New Ipswich, NH, to an archaeological site of petra cliffs in Rockingham, VT, to a four hundred year-old black gum swamp in Vernon, VT. These along with many other historic resources give us a glimpse into the past and provide us with a connection into the way we were. These resources also bestow upon us a sense of a culture. If the process of zoning cell towers in a community is not done with sensitivity and foresight, these roots along with an attachment to the past may become permanently disfigured.

Section 106 of the National Historic Preservation Act was designed to ensure, via a federal review process, that historical and archeological resources must be taken into consideration while a federal project is being planned out. Anytime a federally funded or licensed project may encroach on a historical property, including the use of a historic town/district; the particular federal agency involved must address Advisory Council comments. The impact to historic resources, such as buildings, archeological sites, and landscape features, can be broken down into two categories, direct and indirect. Direct impacts focus on the installation of a telecommunication facility creating structural damage to historical resources. Indirect impacts address the deterioration in the character of the historical or archeological resources. Please refer to the Historical Resources handout for more details.²⁶

²⁶ New Hampshire Division of Historical Resources. Criteria for Evaluating the Effect of Telecommunications Projects on Historical Resources. Revised August '99.

An example of one town that has proposed a formalized document of their passion to take control and zone their community, taking into consideration the personal wireless service facilities is Charlestown, NH. Please refer to Attachment B, section 7.5 Historic Buildings and District from the Charlestown Zoning Ordinance: Proposed Amendment, Personal Wireless service Facilities.

VI. PLANNING FOR TELECOMMUNICATIONS FACILITIES

Evaluate Your Municipal Plan

- Review your Plan for:
 - discussion on telecommunications facilities;
 - goals and policies; and standards for review.
- How does the Plan provide for these uses?
- Is the Plan vague, ambiguous, or conflicting when it comes to telecommunications? Could the Plan benefit from a detailed plan component dealing with these new land uses?
- What are the issues and opportunities your community is likely to encounter if telecommunications facilities and towers are located in your town?

Could they be:

environmental/health;
aesthetic/scenic;
secondary land uses;
locational; and
economic development related?

NOTE: Chapter 117, Section 4382

Establishes that a municipality may plan for telecommunications facilities. A plan is to have a utilities and facilities element. Telecommunications facilities are also a type of land use. Thus, it is appropriate for your town plan to address this land use. If you do not have a clear or detailed plan component, you should seriously consider preparing an amendment dealing with telecommunications facilities.

Points To Consider In Your Plan Amendment

- (1) **inventory scenic areas** sensitive to telecommunications towers or related facilities.
Areas to be considered may be:
 - ridgetops highly visible from several public vantage points
 - highly populated or dense settlement areas, such as villages
 - historic areas
 - large open spaces visible from public highways
- (2) **describe** the characteristics of these sensitive areas; consider ranking these areas from highly sensitive to least sensitive.
- (3) **compile** a map of highly sensitive and sensitive areas in your town.
- (4) **develop** goals and policies regarding how these new land uses may effect or impact the character of these areas, including scenic/visual impacts.

- (5) **establish** objective criteria for evaluating these uses. **Develop** recommendations for action, setting out how the town, state, telecommunications industry and others can implement the policy (e.g. zoning and subdivision bylaws, agency planning, Act 250, and non-regulatory approach).

Aesthetic Issues For Towers

- lights
- tower height
- power lines to the tower
- access roads into remote areas
- secondary impacts/growth
- how the use fits in the context of its setting

Other Related Issues

- roads and power to remote areas can spawn other development. An example includes more antennas on existing towers.
- if tower becomes obsolete, what are the future uses of these facilities?

Evaluate Your Zoning Ordinance

- What does it say about telecommunications facilities and towers? Note: most ordinances are vague or silent regarding these uses; others define telecommunications facilities as public utilities or commercial uses. Generally, specific standards of review are not provided.
- Would your town benefit from an amendment to its ordinances? If so, would your ordinance amendment provide more guidance to the Planning Commission, Zoning Board, applicants and others? Would it be a more predictable process for all involved?

NOTE: Chapter 117 provides that a town can regulate telecommunications facilities as they are types of land uses (24 V.S.A. Section 4401). There are limitations to local regulations, per the Telecommunications Act of 1996 and 24 V.S.A. Section 4409(e). Others limitations may apply, also.

Points To Consider In Developing A Plan Amendment

(1) Conditional Uses

establish telecommunications facilities as conditional uses per Section 4407(2);
develop specific standards on:

- design
- location
- setback
- visibility/aesthetic impact

In certain zoning districts you may want to prohibit certain tower types. These include highly sensitive areas, densely populated and village areas.

(2) Overlay Districts/Ridgeline Zoning

- **State** Purpose of the District; **Relate** District to your Town Plan Policies
- **Define** the Character of the Area
- Develop Map of Overlay District/**Provide** a General Description
- **Establish** jurisdictional threshold for review and approval actions of certain developments in these areas, including towers
- **Define** Procedures For Application Submittal and Review
- **Set-Up** Standards For Approval
The Zoning Board of Adjustment/Development Review Board, or Planning Commission needs criteria to follow that are specific enough to enable it to find that a proposal conforms with the purpose of the overlay district.

Vague or general standards are not recommended.

(3) Site Plan Review/Approval [24 V.S.A. 4407(5)]

Planning Commission is enabled to have jurisdiction to approve site plans for towers.

Limitations placed on the review are:

- adequacy of traffic;
- parking;
- landscaping and screening; and
- utilization of renewable energy resources.

Condition Use Approval criteria contain similar standards.

VII. FUTURE DIRECTIONS

Developments which may render towers unnecessary are the advent of satellite networks revolving around the earth. These networks, while not yet entirely in place may signal a new trend in telecommunications. The networks consist of a number of satellites (roughly 50-60) orbiting the earth at a relatively low altitude. While currently expensive to own and operate a cellular phone using a satellite system, as more networks come on-line, the price may go down.

ATTACHMENT C

VLCT - MODEL ORDINANCE

The Vermont League of Cities and Towns has developed a model ordinance for the local regulation of telecommunications facilities as those facilities affect land uses. We are sending that bylaw to you under cover of this memo to provide you with some guidance should your municipality decide to adopt such a bylaw. We have also developed a stand-alone ordinance regulating telecommunication facilities for those who do not have zoning in place or who prefer adopting a stand-alone ordinance to incorporating regulations of telecommunication facilities in their zoning bylaws.

As a result of legislation passed this session, municipalities are enabled to adopt an ordinance regulating the siting of towers even if they do not have zoning in place in their towns. The authority to do so is given in Title 24, section 2291 (19).

There are a few things to keep in mind when considering adoption of the model bylaw/ordinance provided under cover of this memo.

We have provided a truly exhaustive definition list, which is a glossary of terms of the telecommunications industry. Not all of these will be relevant to your situation or the aspects of telecommunications facilities your municipality believes it is appropriate to regulate. For that reason we are attaching the definition list as a Glossary of Terms. You may want to include several or all of these definitions in your bylaw, or simply attach the list by reference.

Also included with this draft bylaw is a summary of when a wireless telecommunications application regulated under the provisions of this bylaw should be approved. You may want to include this in the actual bylaw or simply keep it as a reference for the board and the applicant.

Please note the precise language of the Telecommunications Act of 1996, included with this packet. Local governments do currently have the right to regulate the placement, construction and modification of telecommunications facilities as you will read. Do not be shy about using the authority you have!

If the town adopts this bylaw under zoning, in selecting the zoning districts in which towns are allowed (if you designate specific districts), in order to conform to the federal Telecommunications Act of 1996, the Town must designate zones where line-of sight communication will work. Relegating telecommunications towers to low-lying zones probably would be viewed by a court as an attempt to improperly zone these structures out of existence and the Town could find itself in a situation where towers are allowed in all zoning districts under 24 VSA 4409(a)(2). As an alternative, a town could purposely allow telecommunication facilities in all districts as a conditional use. Whether the town seeks to restrict these facilities to specific zones or not it should be stated clearly in the bylaws and not allowed to happen by default.

You need to be aware that all telecommunication towers over 20 feet in height are now subject to Act 250. The town has an opportunity to address applications as parties in the Act 250 process and under criteria 10, ***is in conformance with any duly adopted local or regional plan or capital program under chapter 11 7 of Title 24.*** (10 VSA 6086 (a) (10)). The municipal plan needs to be specific if it is to have relevance in the Act 250 process. That is, you need to state clearly where the town wants to locate towers, and the provisions they must comply with in order to meet the stated planning objectives of your municipality.

**NOTES TO PLANNING COMMISSION/ZONING BOARD AND APPLICANTS.
APPROVAL OF WIRELESS TELECOMMUNICATIONS FACILITIES
PROFESSIONAL CONSULTANTS**

Town of _____

Date

Generally, approval of a wireless telecommunications facility may be achieved if the following requirements are met:

1. The location of the proposed tower is compatible with the municipal master plan and zoning bylaw.
2. All efforts to locate on an existing tower have not been successful or are not legally or physically possible.
3. The submitted site plan complies with the performance criteria set in these regulations.
4. The proposed facility/tower will not unreasonably interfere with the view from any public park, natural scenic vista, historic building or district, or major view corridor.
5. The lowest six feet of the facility/tower will be visually screened by approved trees, large shrubs, solid walls or fences or nearby buildings.
6. The height and mass of the facility/tower does not exceed that which is essential for its intended use and public safety.
7. The owner of the wireless communication facility has agreed to permit other persons/providers for attach telecommunications apparatus that does not interfere with the primary purpose of the facility.
8. The color of the proposed facility will be of a light tone or color (except where otherwise required by the FAA) so as to minimize the visual impact and the facility will have a security fence around the facility base or the lot where the facility is located.
9. The facility is in compliance with any other applicable local, state or federal regulation.
10. The applicant will comply with requirements for removal of the facility when it is no longer being used for its intended purpose.

Independent Consultants

Upon submission of an application under this bylaw, the zoning board of adjustment/planning commission/development review board may hire independent consultants to advise the board on technical aspects of the application. Consultants shall be qualified professionals possessing expertise in one of the following fields: telecommunications/radio-frequency engineering; structural engineering; assessment of electromagnetic **fields**; or other associated fields. Upon submission of a complete application under the provisions of this bylaw, the zoning board of adjustment/planning commission/ development review board may provide independent consultants with the full application for their analysis and review. Applicants may be charged for the reasonable costs of an independent technical review of an application.

MODEL BYLAW

**Prepared By Vermont League of Cities and Towns
MAY 1998
Telecommunications Facilities Bylaw**

1.1 Title

This bylaw shall be known as the Telecommunications Facilities Bylaw of the Town of _____. Telecommunications facilities shall include all telecommunication service providers and associated equipment and buildings.

1.2 Purposes

The purpose of this bylaw is to protect the public health, safety and general welfare of the Town of _____ while accommodating the communication needs of residents and businesses. This bylaw shall:

- A. Preserve the character and appearance of the Town of _____ while allowing adequate telecommunications services to be developed.
- B. Protect the scenic, historic, environmental, and natural resources of the Town of _____.
- C. Provide standards and requirements for the operation, siting, design, appearance, construction, monitoring, modification, and removal of telecommunication facilities and towers.
- D. Minimize tower and antenna proliferation by requiring the sharing of existing communications facilities, towers and sites where possible and appropriate.
- E. Facilitate the provision of telecommunication services to the residences and businesses of the Town of _____.
- F. Minimize the adverse visual affects of towers through careful design and siting standards.
- G. Encourage the location of towers and antennas in non-residential areas and away from other sensitive areas such as areas with schools, hospitals or child care facilities, through performance standards and incentives.

1.3 Authority

Pursuant to 24 VSA § 4401 et seq. the planning commission [zoning board of adjustment/development review board) of the Town of _____ is authorized to review, approve, conditionally approve, and deny applications for telecommunication facilities, including sketch, preliminary and final plans, and installation. Pursuant to 24 VSA § 4407, the board is authorized to hire qualified persons to conduct an independent technical review of applications and to require the applicant to pay for reasonable costs thereof

1.4 Consistency With Federal Law

In addition to other findings required by this bylaw, the board shall find that its decision regarding an application is intended to be consistent with federal law, particularly the Telecommunications Act of 1996. The bylaw does not:

- a) prohibit or have the effect of prohibiting the provision of personal wireless services;
- b) does not unreasonably discriminate among providers of functionally equivalent services; and
- c) does not regulate personal wireless services on the basis of the environmental effects of radio frequency emissions to the extent that the regulated services and facilities comply with the FCC regulations concerning such emissions.

1.5 Definitions

(See Glossary of Terms included with this packet Select definitions your town believes are relevant to include here.)

1.6 Permits

Telecommunications towers or facilities may be permitted as conditional uses upon compliance with the provisions of this bylaw in the following zoning districts:

(town enacting bylaw should specify districts in which towers may be permitted as a conditional use unless town expects to permit them town-wide as conditional use).

An applicant for a telecommunications tower or facility permit must be a telecommunications provider or must provide a copy of its executed contract to provide land or facilities to an existing telecommunications provider to the administrative officer at the time that an application is submitted. A permit shall not be granted for a tower to be built on speculation.

No construction, alteration, modification (including the installation of antennas for new uses) or installation of any telecommunications tower or facility shall commence without a conditional use permit first being obtained from the zoning board of adjustment [planning commission/development review board].

In addition to information otherwise required in the Town of _____'s Zoning Bylaws [Subdivision Regulations/Master Plan], applicants for telecommunications towers or facilities shall include the following supplemental information,

1. The name and address of the applicant, the record landowners and any agents of the landowners or applicants as well as an applicant's registered agent and registered office. If the applicant is not a natural person, the name and address of the business and the state in which it is incorporated and has its principal office shall be provided.
2. The name, address and telephone number of the person to be contacted and authorized to act in the event of an emergency regarding the structure or safety of the facility.
3. The names and addresses of the record owners of all abutting property.

4. A report from qualified and licensed professional engineers that:
- A. Describes the facility height, design and elevation. (May be best to specify structural engineer for this section)
 - B. Documents the height above grade for all proposed mounting positions for antennas to be co-located on a telecommunications tower or facility and the minimum separation distances between antennas. (May be best to specify radio frequency (RF) engineer for this section)
 - C. Describes the tower's proposed capacity, including the number, height and type of antennas that the applicant expects the tower to accommodate. (May be best to specify structural engineer for this section.)
 - D. Documents steps the applicant will take to avoid interference with any established public safety telecommunications. (May be best to specify RF engineer for this section)
 - E. In the case of new tower proposals, demonstrates that existing telecommunications sites and other existing structures within 30 miles of the proposed site cannot reasonably be modified to provide adequate coverage and adequate capacity to the Town of _____.
 - F. Describes potential changes to those existing facilities or sites in their current state that would enable them to provide adequate coverage. (May be best to specify RF engineer for this section)
 - G. Describes the output frequency, number of channels and power output per channel for each proposed antenna. (May be best to specify RF engineer for this section)
 - H. Includes written five-year plan for use of the proposed telecommunications facility, including reasons for seeking capacity in excess of immediate needs if applicable, as well as plans for additional development and coverage within the Town. (May be best to specify RF engineer for this section)
 - I. Demonstrates the tower's compliance with the municipality's structural standards and setbacks for towers and support structures.
 - J. Describes the radio frequency radiation (RFR) at the site, whether or not the applicant is regulated by the FCC and the basis for the statement pertaining to RFR.
 - K. Provides proof that at the proposed site, the applicant will be in compliance with all FCC regulations, standards and requirements and commits to continue to maintain compliance with all FCC regulations, standards and requirements regarding radio frequency interference (RFI). The planning commission [zoning board of adjustment/development review board] may hire independent engineers to perform evaluations of compliance with the FCC regulations, standards and requirements on an annual basis at unannounced times.
 - L. Includes other information required by the Board that is necessary to evaluate the request.
 - M. Includes an engineer's stamp and registration number. (May be best to specify structural engineer for this section)

5. For all telecommunication towers or facilities, the applicant shall provide a letter of intent committing the tower owner and his or her successors to permit shared use of the tower if the additional user agrees to meet reasonable terms and conditions for shared use, including compliance with all applicable FCC regulations, standards and requirements and the provisions of this bylaw.
6. An applicant for a permit for a facility to be installed on an existing structure shall provide a copy of its executed contract with the owner of the existing structure to the administrative officer at the time an application is submitted.
7. To the extent required by the National Environmental Policy Act (NEPA) and as administered by the FCC, a complete Environmental Assessment (EA) draft or final report describing the probable impacts of the proposed facility.
8. A copy of the application or draft application for an Act 250 permit, if applicable.
9. The permit application shall be signed under the pains and penalties of perjury.

1.7 Site Plan Requirements

In addition to site plan requirements found elsewhere in the Town of _____ Zoning Bylaws/Subdivision Regulations/Master Plan, site plans for telecommunication facilities shall include the following supplemental information:

1. Location Map: a copy of a portion of the most recent USGS Quadrangle map showing the area within at least a two mile radius of the proposed tower site;
2. Vicinity Map showing the entire vicinity within a 2500 foot radius of the tower site, including the telecommunications facility or tower, topography, public and private roads and driveways, buildings and structures, water bodies, wetlands, landscape features, historic sites and habitats for endangered species. It shall indicate the property lines of the proposed tower site parcel and all easements or rights of way needed for access from a public way to the tower.
3. Proposed Site Plans of entire development indicating an improvements including landscaping, utility lines, guy wires, screening and roads.
4. Elevations showing all facades and indicating all exterior materials and color of towers, buildings and associated facilities.
5. In the case of a proposed site that is forested, the approximate average height of the existing vegetation within 200 feet of the tower base.
6. Construction sequence and time schedule for completion of each phase of the entire project.
7. Plans shall be drawn at a minimum at the scale of one (1) inch equals 50 feet.

1.8 Co-Location Requirements

An application for a new telecommunications tower shall not be approved unless the planning commission [zoning board of adjustment/development review board] finds that the telecommunications facilities planned for the proposed tower cannot be accommodated on an existing or approved tower or structure due to one of the following reasons:

1. The proposed antennas and equipment would exceed the structural or spatial capacity of the existing or approved tower or facility, as documented by a qualified engineer licensed to practice in the State of Vermont. Additionally, the existing or approved tower cannot be reinforced, modified or replaced to accommodate planned or equivalent equipment, at a reasonable cost, to provide coverage and capacity comparable to that of the proposed facility.
2. The proposed antennas and equipment would cause interference materially impacting the usefulness of other existing or permitted equipment at the existing or approved tower or facility as documented by a qualified engineer licensed to practice in the State of Vermont and such interference cannot be prevented at a reasonable cost.
3. The proposed antennas and equipment, either alone or together with existing facilities, equipment or antennas, would create RFI in violation of federal standards or requirements.
4. The proposed antennas and equipment either alone or together with existing facilities, equipment or antennas would create RFR in violation of federal standards or requirements.
5. Existing or approved towers and structures cannot accommodate the planned equipment at a height necessary to function reasonably or are too far from the area of needed coverage to function reasonably as documented by a qualified engineer licensed to practice in the State of Vermont.
6. Aesthetic reasons make it unreasonable to locate the planned telecommunications equipment upon an existing or approved tower or building.
7. There is no existing or approved tower in the area in which coverage is sought.
8. Other unforeseen specific reasons make it unreasonable to locate the planned telecommunications equipment upon an existing or approved tower or building.

Towers must be designed to allow for future rearrangement of antennas upon the tower and to accept antennas mounted at varying heights where overall permitted height allows. Towers shall be designed structurally, electrically and in an respects to accommodate both the applicant's antennas and additional antennas where overall permitted height allows.

1.9 Tower and Antenna Design Requirements

1. Towers, antennas and any necessary support structures shall be designed to blend into the surrounding environment through the use of color camouflaging and architectural treatment, except where the Federal Aviation Authority (FAA), state or federal authorities have dictated color.
2. In order to protect public safety and to preserve the scenic character and appearance of the area, the height limit for towers, antennas and tower-related fixtures shall be not more than 20 feet above the average height of the tree line measured within 100 feet of the highest vertical element of the telecommunications facility. Notwithstanding the above, additional height may be approved upon a finding by the planning commission [zoning review board/development review board] that the additional height is necessary in order to provide adequate coverage in the Town of _____ or to accomplish co- location of facilities and that the additional height will not cause an undue visual impact on the scenic character or appearance of the area.

3. All buildings and structures accessory to a tower (except for electric power poles where specifically exempted by the Board) shall meet the minimum setback requirements of the underlying zoning district or setback requirements specified in this bylaw. If the minimum setbacks of the underlying zoning district are less than the height of the tower, including antennas or other vertical appurtenances, the minimum distance from the tower to any property line shall be no less than the height of the tower, including antennas and other vertical appurtenances.
4. Ground mounted equipment or antennas as well as buildings and structures accessory to a tower, shall be screened from view by suitable vegetation, except where a design of non-vegetative screening better complements the architectural character of the surrounding neighborhood. A planted or vegetative screen shall be a minimum of ten feet in depth with a minimum height of six feet and shall have the potential to grow to a height of at least 15 feet at maturity. Existing on-site vegetation outside the immediate site for the wireless facility shall be preserved or improved. Disturbance to existing topography shall be minimized unless the disturbance is demonstrated to result in less visual impact on the facility from surrounding properties and other vantage points.

1.10 Amendments To Existing Telecommunications Facility Permit

An alteration or addition to a previously approved telecommunications facility shall require a permit amendment when any of the following are proposed:

1. Change in the number of buildings or facilities permitted on the site;
2. Material change in technology used by the telecommunications facility; or
3. Addition or change of any equipment resulting in greater visibility or structural windloading, or additional height of the tower, including profile of additional antennas, not specified in the original application.

1.11 Tower Lighting/ Signage

Towers shall not be illuminated by artificial means and shall not display lights unless such lighting is specifically required by the FAA or other federal or state authority for a particular tower because of its height. Any lighting required solely as a result of height may be subject to review by the town of the lighting requirement. Heights may be reduced to eliminate the need for lighting or another location selected.

No commercial signs or lettering shall be placed on a tower.

Noise at the site perimeter from the operation of any machinery or equipment shall be minimized.

1.12 Antennas Mounted on Structures, Roofs, Walls, and Existing Towers Governed by 1.10

The placement of telecommunications antennas on existing buildings, structures, roofs, or walls in conformance with section 1.2 of this bylaw may be approved by the administrative officer [Selectboard if adopting a stand-alone ordinance], provided the antennas meet the requirements of this bylaw, upon submission of:

1. a final site and building plan and,
2. a report prepared by a qualified engineer, licensed to practice in the State of Vermont indicating the structure's suitability for the telecommunications facility, and that the proposed method of affixing the antenna to the structure complies with standard

engineering practices. Complete details of all fixtures and couplings and the exact point of attachment shall be indicated.

1.13 Temporary Wireless Communication Facilities

Any telecommunications facility designed for temporary use is subject to the following:

1. Use of a temporary facility is permitted only if the owner has received a temporary use permit from the Town of _____.
2. Temporary telecommunication facilities are permitted for no longer than five days use during a special event.
3. The maximum height of a temporary facility is 50 feet from grade.
4. Temporary facilities must comply with all applicable portions of these regulations.

1.14 Interference With Public Safety Telecommunications

No new telecommunications facility shall be placed or constructed in such a way as to interfere with public safety telecommunications. All applications for new telecommunication facilities shall be accompanied by an intermodulation study that predicts no Rely interference problems and certification that the study has been provided to the appropriate public safety agencies. Before testing or operating new service or changes in existing service, telecommunications providers shall notify the municipality at least ten calendar days in advance of such changes and allow the municipality to monitor interference levels during that testing process.

1.15 Continuing Obligations

Upon receiving a permit, the permittee shall annually demonstrate that he or she is in compliance with all FCC standards and requirements regarding RFR, the basis for his or her representations and the most recent time he or she took actual readings of the RFR at the site. The permittee shall provide a list of the RFR readings, their distances from the tower/transmitter, dates of the readings and the name of the person or company who took the readings.

1.16 Abandoned, Unused, Obsolete, Damaged or Dangerous Towers or Portions of Towers

Abandoned or unused towers or portions of towers and their facilities shall be removed as follows:

1. The owner of a tower shall annually, on January 15, file a declaration with the Town of _____ administrative officer certifying the continuing safe operation of every facility installed subject to these regulations. Failure to file a declaration shall mean that the tower is no longer in use and considered abandoned. An owner who has failed to file an annual declaration with the administrative officer may file a declaration of use or intended use and may request the ability to continue use of the tower.
2. Abandoned or unused towers and associated facilities shall be removed within 180 days of cessation of operations at the site unless a time extension is approved by the planning commission [zoning board of adjustment/development review board]. In the event the tower is not removed within 180 days of the cessation of operations at a site, the municipality may remove the tower and an associated facilities and the costs of removal shall be assessed against the property or tower owner.
3. Unused portions of towers shall be removed within 180 days of the time that such portion is no longer used for antennas. The replacement of portions of a tower previously removed requires the issuance of a new telecommunication facility permit.

1.17 Maintenance of Telecommunications Facilities Insurance

The telecommunications facility owner shall maintain adequate insurance on all telecommunication facilities. All facility sites shall be properly fenced and identified by signage that indicates presence of RFR and any other appropriate warnings required by permit conditions.

1.18 Enforcement and Penalties

1. 19 Fees

Fees for filing an application to build or alter a telecommunications facility shall be \$_____. Fees may include the reasonable costs of an independent technical assessment of the application.

1.20 Enforcing Agent

The Administrative Officer shall be the agent to enforce the provisions of this bylaw.

1.21 Severability

If any portion of this ordinance/bylaw is held unconstitutional or invalid by a court of competent jurisdiction, the remainder of this ordinance/bylaw shall not be affected.

1.22 Effective Date

This bylaw shall be effective on_____.

Attachment A

GLOSSARY OF TELECOMMUNICATIONS TERMS SOURCE LIST FOR DEFINITIONS SECTION OF MODEL BYLAW Vermont League of Cities and Towns June 1998

Adequate Coverage: Coverage is "adequate" within that area surrounding a base station where the predicted or measured median field strength of the transmitted signal is such that the majority of the time, transceivers properly installed and operated will be able to communicate with the base station without objectionable noise (or excessive bit- error-rate for digital) and without calls being dropped. In the case of cellular communications in a rural environment, this would be a signal strength of at least - 90dbm. It is acceptable for there to be holes within the area of adequate coverage as long as the signal regains its strength further away from the base station the outer boundary of the area of adequate coverage, however, is that location past which the signal does not regain.

Adequate Capacity: Capacity is considered to be "adequate" if the grade of service is p.05 or better for a least 50% of the days in a preceding month, prior to the date of application, as measured using direct traffic measurement of the telecommunications facility in question, where the call blocking is due to frequency contention at the antenna(s).

Affiliate: When used in relation to an operator, another person who directly or indirectly owns or controls, is owned or controlled by, or is under common ownership or common control with the operator, or an operator's principal partners, shareholders, or owners of some other ownership interest; and when used in relation to the municipality, any agency, board, authority or political subdivision affiliated with the municipality or other person in which the municipality has legal or financial interest.

Alternative Design Tower Structure: Artificial trees, clock towers, bell steeples, light poles, silos and similar alternative-design mounting structures that camouflage or conceal the presence of antennas or towers (see also *Stealth Facility*).

Antenna: A device which is attached to a tower or other structure for transmitting and receiving electromagnetic **waves**.

Antenna Height: The vertical distance measured from the base of the antenna support structure at grade to the highest point of the structure. If the support structure is on a sloped grade, then the average between the highest and lowest grades shall be used in calculating the antenna height.

Antenna Support Structure: Any pole, telescoping mast, tower tripod, or any other structure which supports a device used in the transmitting and/or receiving of electromagnetic waves.

Applicant: A person who applies for a telecommunications facility siting. An applicant can be the telecommunication service provider or the owner of the property.

Available Space: The space on a tower or structure to which antennas of a telecommunications provider are both structurally able and electromagnetically able to be attached.

Base Station: The primary sending and receiving site in a telecommunications facility network. More than one base station and/or more than one variety of telecommunications provider can be located on a single tower or structure.

Bulletin 65: Published by the FCC Office of Engineering and Technology specifying radiofrequency radiation levels and methods to determine compliance.

Cell Site: A tract or parcel of land that contains a cellular communication antenna, its support structure, accessory building(s), and parking, and may include other uses associated with and ancillary to cellular communications transmission.

Cellular Service: A telecommunications service that permits customers to use wireless, mobile telephones to connect, via low-power radio transmission sites called cell sites, either to the public switched network or to other mobile cellular phones.

Cellular Telecommunications: A commercial Low Power Mobile Radio Service bandwidth licensed by the Federal Communications Commission (FCC) to providers in a specific geographical area in which the radio frequency spectrum is divided into discrete channels which are assigned in groups to geographic cells within a service area and which are capable of being reused in different cells within the service area.

Cellular Telecommunications Facility: A cellular telecommunications facility consists of the equipment and structures at a particular site involved in receiving telecommunication or radio signals from mobile radio communications sources and transmitting those signals to a central switching computer which connects the mobile unit with the land-based telephone lines.

Channel: The segment of the radiation spectrum to or from an antenna which carries one signal. An antenna may radiate on many channels simultaneously.

Collocation: Locating wireless communications equipment from more than one provider on a single site.

Common Carrier: An entity licensed by the FCC or a state agency to supply local and/or long distance telecommunications services to the general public at established and stated rates.

Communication Equipment Shelter: A structure located at a base station designed principally to enclose equipment used in connection with telecommunications transmissions.

Communications Facility: A land facility supporting antennas and microwave dishes that sends and/or receives radio frequency signals. Communications facilities may include structures, towers or accessory buildings.

Communication Tower: A guyed, monopole, or self-supporting tower, constructed as a free standing structure or in association with a building, other permanent structure or equipment, containing one or more antennas intended for transmitting and/or receiving television, AMIFM radio, digital, microwave, cellular, telephone, or similar forms of electronic communication.

dBm: Unit of measure of the power level of a signal expressed in decibels above 1 milliwatt.

dBu unit of measure of the electric field strength of a signal, expressed in an absolute measure for describing service areas and comparing different transmitting facilities independent of the many variables (see dBm above) introduced by different receiver configurations.

Directional Antenna: An antenna or array of antennas designed to concentrate a radio signal in a particular area.

Dish Antenna: A dish-like antenna used to link communications sites together by wireless transmission of voice or data. Also called microwave antenna or microwave dish antenna.

Electromagnetically Able: The determination that the signal from and to the proposed new antenna will not significantly interfere with the existing signals from and to other facilities or antennas located on the same tower or structure as determined by a qualified professional telecommunications engineer. The use of available technologies to alleviate such interference shall be considered when making this determination.

Facility Site: A property, or any part thereof, which is owned or leased by one or more telecommunications facility(s) and where required landscaping is located.

FCC. Federal Communications Commission. The government agency responsible for regulating telecommunications in the United States.

FCC 97-303: A Report and Order which sets new national standards for exposure to radio frequency emissions from FCC-regulated transmitters.

Frequency: The number of cycles completed each second by an electromagnetic wave measured in Hertz (Hz).

GHz: GigaHem: One Billion Hertz

Grade Of Service: A measure of the percentage of calls which are able to connect to the base station during the busiest hour of the day. Grade of service is expressed as a number, such as

p.05 - which means that 95% of callers will connect on their first try. A lower number (p.04) indicates a better grade of service.

Hertz: One Hertz is the frequency of an electric or magnetic field which reverses polarity once each second, or one cycle per second.

Location: References to site location shall be the exact longitude and latitude, to the nearest tenth of a second. Bearing or orientation should be referenced to true North.

Modification Of An Existing Facility: Any change, or proposed change in power input or output, number of antennas, change in antenna type or model repositioning of antenna(s), change in number of channels per antenna above the maximum number approved under an existing permit.

Modification Of An Existing Tower: Any change, or proposed change in dimensions of an existing and permitted tower or other structure designed to support telecommunications transmission, receiving and/or relaying antennas and/or equipment.

Micro-Cell: A low power mobile radio service telecommunications facility used to provide increased capacity in high call-demand areas or to improve coverage in areas of weak coverage.

MHZ: Megahertz, or 1,000,000 Hertz.

Microwave: Electromagnetic radiation with frequencies approaching 1,000,000,000 Hz, including UHF, extending to infrared frequencies; highly directional signal used to transmit radio frequencies from point-to-point at a relatively low power level.

Microwave Antenna: A dish-like antenna manufactured in many sizes and shapes used to link communication sites together by wireless transmission of voice or data.

Monitoring: The measurement, by the use of instruments in the field, of non-ionizing radiation exposure from telecommunications facilities, towers, antennas or repeaters.

Monitoring Protocol: The testing protocol, such as the Cobs Protocol, (or one substantially similar, including compliance determined in accordance with the National Council on Radiation Protection and Measurements, Reports 86 and 119) which is to be used to monitor the emissions and determine exposure risk from telecommunications facilities.

Monopole: A single self-supporting vertical pole with no guy wire anchors, usually consisting of a galvanized or other unpainted metal or a wooden pole with below grade foundations.

Omnidirectional Antenna: An antenna that is equally effective in all directions and whose size varies with the frequency and gain for which it is designed.

Permit: Embodies the rights and obligations extended by the municipality to an operator to own, construct, maintain, and operate its facility within the boundaries of the municipality.

Personal Communications Services Or PCS: Digital wireless telephone technology such as portable phones, pagers, faxes, and computers. Such mobile technology may allow each consumer the same telephone number wherever he or she goes. Also known as Personal Communication Network (PCN)

Personal Wireless Services: Commercial mobile services, unlicensed wireless exchange access services. These services include: cellular services, personal communications services, specialized mobile radio services, and paging services.

Preexisting Towers And Antennas: Any tower or antenna for which a permit has been issued prior to the effective date of these regulations.

Roof and/or Building Mount Facility: A facility in which antennas are mounted to an existing structure on the roof (including rooftop appurtenances) or a building face.

Radial Plots: Radial plots are the result of drawing equally-spaced lines (radials) from the point of the antenna, calculating the expected signal and indicating this graphically on a map. The relative signal strength may be indicated by varying the size or color at each point being studied along the radial. A threshold plot uses a mark to indicate whether that point would be strong enough to provide adequate coverage - i.e., the points meeting the threshold of adequate coverage. The drawback is the concentration of points close to the antenna and the divergence of points far from the site near the ends of the radials.

Radiated-Signal Propagation Studies Or Coverage Plots : Computer generated estimates of the signal emanating, and prediction of coverage, from antennas or repeaters sited on a specific tower or structure. The height above ground, power input and output, frequency output, type of antenna, antenna gain, topography of the site and its surroundings are all taken into account to create these simulations. They are the primary tools for determining whether the telecommunications equipment will provide adequate coverage for that site.

Repeater: A small receiver/relay transmitter and antenna of relatively low power output designed to provide service to areas which are not able to receive adequate coverage directly from a base or primary station.

Scenic View: A scenic view is a wide angle or panoramic **field** of sight and may include natural and/or manmade structures and activities. A scenic view may be from a stationary viewpoint or be seen as one travels along a roadway, waterway, or path. A view may be to a far away object, such as a mountain, or a nearby object.

Self-Supporting Tower: A communications tower that is constructed without guy wires.

Stealth Facility: Any communications facility which is designed to blend into the surrounding environment. Examples of stealth facilities may include architecturally screened roof-mounted antennas, building-mounted antennas painted to match the existing structure, antennas

integrated into architectural elements, and antenna structures designed to look like light poles. (See also Alternative tower Structure)

Spectrum: Relating to any transmissions or reception of electromagnetic waves.

Structurally Able: The determination that a tower or structure is capable of carrying the load imposed by the proposed new antennas under all reasonable predictable conditions as determined by professional structural engineering analysis.

System: The communications transmission system operated by a telecommunications service provider in the municipality or region.

Telecommunications Facility: AU equipment (including repeaters) and locations of equipment with which a telecommunications provider transmits and receives the waves which carry their services. This facility may be sited on one or more towers or structure(s) owned and permitted by the provider or another owner or entity.

Telecommunications Provider: An entity licensed by the FCC to provide telecommunications services to individuals or institutions.

Temporary Wireless Communication Facility: Any tower, pole, antenna, etc., designed for use while a permanent wireless facility is under construction, or for a special event or conference where a majority of people attending are wireless users.

Tiled Coverage Plots: Tiled plots result from calculating the signal at uniformly- spaced locations on a rectangular grid, or tile, of the area of concern. Unlike radial plots tiled plots provide a uniform distribution of points over the area of interest; usually the same grid will be used as different sites are examined, and it is not necessary that the transmitter site be within the grid or area of interest. As with radial plots, the graphic display or plot can be either signal strength or adequate threshold. Thus method requires substantially more topographic data and, longer (computer) execution time than radial plots, but is preferable for comparative analysis.

Tower: A vertical structure for antenna that provide telecommunications services.

Whip Antenna: A vertical antenna that normally transmits signals in 360 degrees. Whip antennas are typically cylindrical in shape, narrow (less than 6 inches in diameter) and long (often measure 18 inches in height or more). Also called omnidirectional, stick or pipe antennas.

View Corridor: A three dimensional area extending out from a viewpoint. The width of the view corridor depends on the focus of the view. The focus of the view may be a single object, such as a mountain, which would result in a narrow corridor, or a group of objects, such as a downtown skyline, which would result in a wide corridor. Panoramic views have very wide corridors and may include a 360 degree perspective. Although the view corridor extends from the viewpoint to the focus of the view, the mapped portion of the corridor extends from the viewpoint and is based on the area where base zone heights must be limited in order to protect the view.

Attachment B

TOWN OF CHARLESTOWN, NH PROPOSED ORDINANCE PERSONAL WIRELESS SERVICE FACILITIES (2nd DRAFT - FOR PUBLIC HEARING - AUGUST 15, 2000)

1. PURPOSE AND INTENT

It is the express purpose of this Ordinance to permit carriers to locate personal wireless service facilities within the Town of Charlestown consistent with appropriate land use regulations that will ensure compatibility with the visual and environmental features of the Town. Compatibility with the visual features of Charlestown is measured based on the change in community scale and character in relation to the height, mass, materials, contrasts, or proportion within the surroundings of a proposed personal wireless service facility. This Ordinance enables review of the location and siting of personal wireless service facilities by the Town of Charlestown so as to eliminate or mitigate the visual and environmental impacts of personal wireless service facilities. This Ordinance is structured to encourage carriers to locate on existing buildings and structures whenever possible. New ground mounted personal wireless facilities are permitted, but only when the use of existing structures and buildings is found to be infeasible. Co-location is encouraged for all personal wireless service facility applications and the review of a personal wireless facility shall be on the basis of the site being built using all positions on the mount.

2. APPLICABILITY

The terms of this Ordinance and the Site Plan Review Regulations shall apply to personal wireless service facilities proposed to be located on property owned by the Town of Charlestown, on privately owned property, and on property that is owned by any other governmental entity that acts in its proprietary capacity to lease such property to a carrier.

3. DEFINITIONS

For the purpose of this Ordinance, the following terms shall have the meaning given herein:

- 3.1 Antenna: The surface from which wireless radio signals are sent and/or received by a personal wireless service facility.
- 3.2 Antenna Array: A collection of antennas attached to a mount to send and receive radio signals.
- 3.3 Average Tree Canopy Height: An average height found by inventorying the height at above ground level (AGL) of all trees over twenty (20) feet in height for a defined area, such as the area delineated in Section 7.1 (F).
- 3.4 Camouflaged: A personal wireless service facility that is disguised hidden, part of an existing or proposed structure, or placed within an existing or proposed structure.

- 3.5 Carrier: A Company that provides personal wireless services, also sometimes referred to as a provider.
- 3.6 Co-location: The use of a single mount on the ground by more than one carrier (vertical co-location) or the same carrier with multiple licenses, and/or the use of several mounts on an existing building or structure by more than one carrier or the same carrier with multiple licenses.
- 3.7 Environmental Assessment (EA): An EA is a document required by the Federal Communications Commission (FCC) and the National Environmental Policy Act (NEPA) when a personal wireless service facility is placed in certain designated areas.
- 3.8 Equipment Shelter: An enclosed structure, cabinet, shed, vault, or box near the base of the mount within which are housed equipment for personal wireless service facilities such as batteries and electrical equipment. Equipment shelters are sometimes referred to as base transceiver stations.
- 3.9 Facility: See Personal Wireless Service Facility.
- 3.10 Fall Zone: The area on the ground from the base of a ground mounted personal wireless service facility that forms a circle with a diameter equal to twice the height of the facility, including any antennas or other appurtenances, as set forth in Figure 1. The fall zone is the area within which there is a potential hazard from falling debris (such as ice) or collapsing material.

Figure I

- 3.11 Guyed Tower: A monopole or lattice tower that is secured to the ground or other surface by diagonal cables for lateral support.
- 3.12 Height: The height above ground level (AGL) from the natural grade of a site to the highest point of a structure.
- 3.13 Lattice Tower: A type of mount with multiple legs and structural cross bracing between the legs that is self-supporting and freestanding.
- 3.14 Mast: A thin pole that resembles a streetlight standard or a telephone pole. A dual-polarized antenna is typically deployed on a mast.
- 3.15 Monopole: A thicker type of mount than a mast that is self-supporting with a single shaft of wood, steel or concrete, or other material that is designed for the placement of antennas and arrays along the shaft.
- 3.16 Mount: The structure or surface upon which antennas are mounted, including the following four types of mounts:
1. Roof-mounted. Mounted on the roof of a building.
 2. Side-mounted. Mounted on the side of a building.
 3. Ground-mounted. Mounted on the ground.
 4. Structure-mounted. Mounted on a structure other than a building.
- 3.17 Personal Wireless Service Facility: Facility for the provision of personal wireless services, as defined by the Telecommunications Act of 1996, as amended.
Personal Wireless Service facilities generally include a mount, antenna, equipment shelter, and other related equipment.
- 3.18 Personal Wireless Services: The three types of services regulated by this Ordinance: Commercial mobile radio services, unlicensed wireless services, and common carrier wireless exchange access services as described in the Telecommunications Act of 1996, as amended.
- 3.19 Radio Frequency (RF) Engineer: An engineer specializing in electrical or microwave engineering, especially the study of radio frequencies.
- 3.20 Radio Frequency Radiation (RFR): The emissions from personal wireless service

facilities.

- 3.21 Security Barrier: A wall fence, or berm that restricts an area from unauthorized entry or intrusion.
- 3.22 Separation: The distance between one carrier's array of antennas and another carrier's array.

4. DISTRICT REGULATIONS

- 4.1 Location - Personal wireless service facilities shall be permitted in all Zoning Districts. Applicants seeking approval for personal wireless service facilities shall first evaluate existing structures for the siting of personal wireless service facilities. Only after finding that there are no suitable existing structures pursuant to Section 4.3 herein, shall a provider propose a new ground mounted facility.
- 4.2 Existing Structures: Policy - Personal Wireless service facilities shall be located on existing structures, including but not limited to buildings, water towers, existing telecommunication facilities, utility poles or towers, and related facilities, provided that such installation preserves the character and integrity of those structures.
- 4.3 Existing Structures: Burden of Proof - The applicant shall have the burden of proving that there are no existing structures which are suitable to locate its personal wireless service facility and/or transmit or receive radio signals. To meet that burden, the applicant shall take all the following actions to the extent applicable:
- A. The applicant shall submit to the Planning Board a list of all contacts made with owners of potential sites regarding the availability of potential space for a personal wireless service facility. If the Planning Board informs the applicant that additional existing structures may be satisfactory, the applicant shall contact the property owner (s) of those structures.
 - B. The applicant shall provide copies of all letters of inquiry made to owners of existing structures and letters of rejection. If letters of rejection are not provided, at a minimum, unanswered "Return Receipt Requested" forms from the U.S. Post Office shall be provided for each owner of existing structures that was contacted.
 - C. If the applicant claims that a structure is not capable of physically supporting a personal wireless service facility, a licensed professional civil or structural engineer must certify this claim. The certification shall at a minimum, explain the structural issues and demonstrate that the structure cannot be modified to support the personal wireless service facility without unreasonable costs. The estimated cost shall be provided to the Planning Board.
- 4.4 Ground Mounted Facilities: Policy - If the applicant demonstrates that it is not feasible to locate on an existing structure, ground mounted personal wireless service facilities shall be designed so as to be camouflaged to the greatest extent possible, including but not limited to: use of compatible building materials and colors, screening, landscaping, and placement within trees.

5. USE REGULATIONS

A personal wireless service facility shall require a building permit in all cases and may be permitted as follows:

- 5.1 Existing Tower Structures: Subject to the issuance of a building permit that includes review by the Planning Board, -which review shall be limited to issues relating to access, bonding, and security for removal structural integrity and appropriate camouflage of such siting, carriers may locate a personal wireless service facility on any guyed tower, lattice tower, mast, or monopole in existence prior to the adoption of this Ordinance, or on any personal wireless service facility previously approved under the provisions of this Ordinance so long as the co- location complies with the approved site plan. AU the Performance Standards from this Ordinance shall be met. This provision shall apply only so long as the height of the mount is not increased, a security barrier already exists, and the area of the security barrier is not increased. Otherwise, Site Plan Review is required.
- 5.2 Reconstruction of Existing Tower Structures: An existing guyed tower, lattice tower, monopole, or mast in existence prior to the adoption of this Ordinance may be reconstructed with a maximum twenty (20) foot increase in height so as to maximize co- location so long as the standards of this Ordinance are met and so long as this twenty (20) foot increase in height does not cause a facility previously existing at less than two hundred (200) feet to exceed two hundred (200) feet in height. The mount shall be replaced with a similar mount that does not significantly increase the visual impact on the community. Site Plan Review is required.
- 5.3 Existing Structures: Subject to the provisions of this Ordinance and minor site plan review and except as otherwise permitted under Section 5 (A), a carrier may locate a personal wireless service facility on an existing structure, building, utility tower or pole, or water tower. For the purpose of this section, new structures that are conforming to all other district zoning requirements shall be considered as existing structures.
- 5.4 Ground Mounted Facility: A personal wireless service facility involving construction of a ground mount shall require site plan review and be subject to the provisions of this Ordinance.

6. DIMENSIONAL REQUIREMENTS

Personal wireless service facilities shall comply with the following requirements:

- A. Height, Maximum: In no case shall a personal wireless service facility exceed two hundred (200) feet in height, unless the mount for the facility was greater than two hundred (200) feet in height prior to the adoption of this Ordinance.
- B. Height, Existing Structures and Utility Poles: Carriers that locate new personal wireless service facilities on water towers, electric transmission and distribution towers, utility poles and similar existing utility structures, guyed towers, lattice towers, masts, and monopoles may be permitted to increase the height of those structures no more than twenty (20) feet.
- C. Height, Other Existing Structures: The height of a personal wireless service facility shall not increase the height of a structure by more than fifteen (15) feet, unless the facility is completely camouflaged; for example a facility completely within a flagpole, steeple, or chimney. The increase in the height of the structure shall be in scale and proportion to the structure as originally configured. A

carrier may locate a personal wireless service facility on a building that is legally nonconforming with respect to height, provided that the provisions of this Ordinance are met.

- D. Height, Ground-Mounted Facilities: Ground-mounted personal wireless service facilities shall not project higher than (20) twenty feet above the average tree canopy height within a one hundred and fifty (150) foot perimeter of the mount, security barrier, or designated clear area for access to equipment, whichever is greatest.
- E. Setbacks: All personal wireless service facilities and their equipment shelters shall comply with the building setback provisions of the zoning district in which the facility is located. Fences shall comply with the setback provisions of the zoning district in which the facility is located if the fence is six (6) feet or more in height, in accordance with the appropriate Zoning Ordinances.
- F. Fall Zone for Ground Mounts: In order to ensure public safety, the minimum distance from the base of any ground-mount of a personal wireless service facility to any property line, public road, habitable dwelling, business or institutional use, or public recreational area shall be, at a minimum, the distance equal to the fall zone, as defined in this Ordinance. The fall zone **may** cross property lines, so long as the applicant secures a fall zone easement from the affected property owner(s). The area of the easement shall be shown on all applicable plans submitted to the Town, and the terms of the easement shall be provided as part of the site plan review.
- G. Fall Zone for Non-Ground Mounts: In the event that an existing structure is proposed as a mount for a personal wireless service facility, a fall zone shall not be required, but the setback provisions of the zoning district shall apply. In the case of pre-existing nonconforming structures, personal wireless service facilities and their equipment shelters shall not increase any non-conformities.

7. PERFORMANCE AND DESIGN STANDARDS

7.1 Visibility

- A. Visual impacts are measured on the basis of:
 - 1. Change in community scale, as exhibited in relative height, mass or proportion of the personal wireless service facility within their proposed surroundings.
 - 2. New visible elements proposed on a contrasting background.
 - 3. Different colors and textures proposed against a contrasting background.
 - 4. Use of materials that are foreign to the existing built environment.
- B. Enhancements are measured on the basis of:
 - 1. Conservation of opportunities to maintain community scale, e.g. buffering areas and low-lying buildings should not be compromised so as to start a trend away from the existing community scale.
 - 2. Amount and type of landscaping and /or natural vegetation.
 - 3. Preservation of view corridors, vistas, and view sheds.
 - 4. Continuation of existing colors, textures, and materials.
- C. Visibility focuses on:

1. Eliminating or mitigating visual impact.
2. Protecting, continuing, and enhancing the existing environment.

7.2 Camouflage

- A. Camouflage for Facilities on Existing Buildings or Structures - Roof Mounts:
When a personal wireless service facility extends above the roof height of a building on which it is mounted, every effort shall be made to conceal or camouflage the facility within or behind existing or new architectural features to limit its visibility from public ways. Facilities mounted on a roof shall be stepped back from the front facade in order to limit their impact on the building's silhouette.
- B. Camouflage for Facilities on Existing Buildings or Structures - Side Mounts:
Personal wireless service facilities which are side mounted shall blend with the existing building's architecture and, if individual antenna panels are over five (5) square feet, the panels shall be painted or shielded with material consistent with the design features and materials of the building.
- C. Camouflage for Ground Mounted Facilities: All ground-mounted personal wireless service facilities shall be surrounded by a buffer of dense tree growth that extends continuously for a distance of one hundred and fifty (150) feet from the mount, security barrier, or designated clear area for access to equipment, whichever is greatest, and screens views of the facility in all directions, as set forth in Figure 2. These trees must be existing on the subject property, planted on site, or be within a landscape easement on an Adjoining site. The Planning Board shall have the authority to decrease, relocate, or alter the required buffer based on-site conditions. The one hundred and fifty (150) foot vegetative buffer area shall be protected by a landscape easement or be within the area of the carrier's lease. The easement or lease shall specify that the trees within the buffer shall not be removed or topped, unless the trees are dead or dying and present a hazard to persons or property.

Figure 2

7.2 Color - To the extent that any personal wireless service facilities extend above the height of the vegetation immediately surrounding it they shall be of a color, which blends with the background or surroundings.

7.3 Equipment Shelters - Equipment shelters for personal wireless service facilities shall be designed consistent with one of the following design standards:

- A. Equipment shelters shall be located in underground vaults; or
- B. Equipment shelters shall be designed so that the shelters are architecturally consistent, with respect to materials and appearance, with the buildings in the area of the personal wireless service facility, or
- C. Equipment shelters shall be camouflaged behind an effective year- round landscape buffer, equal to the height of the proposed building, and/or wooden fence. The Planning Board shall determine the style of fencing and/or landscape buffer that is compatible with the neighborhood; or

- D. If mounted on a rooftop, the equipment shelter shall be concealed or camouflaged so that the shelter either is not visible at grade or appears to be a part of the original structure.

7.4 Lighting, Signage, and Security

- A. Lighting: The mounts of personal wireless service facilities shall be lighted only if required by the Federal Aviation Administration (FAA). Lighting of equipment structures and any other facilities on site shall be shielded from abutting properties. Foot-candle measurements at the property line shall be 0.0 initial foot-candies.
- B. Signage: Signs shall be limited to those needed to identify the property and the owner and warn of any danger. All signs shall comply with the requirements of the Section 8.6 of the Charlestown Zoning Ordinance.
- C. Security Barrier: The Planning Board shall have final authority on whether a ground mounted personal wireless service facilities should be surrounded by a security barrier.

7.5 Historic Buildings and Districts

- A. Any personal wireless service facility located on or within an historic structure shall not alter the character-defining features, distinctive construction methods, or original historic materials of the building.
- B. Any alteration made to an historic structure to accommodate a personal wireless service facility shall be fully reversible.
- C. Personal wireless service facilities authorized by this subsection shall be concealed within or behind existing architectural features, or shall be located so that they are not visible from public roads and viewing areas.

7.6 Scenic Landscapes and Vistas - Ground-mounted facilities shall not be located within open areas that are clearly visible from public roads, recreational areas, or abutting properties. A buffer of dense tree growth as per Section 7.1 (F) shall surround all ground-mounted personal wireless service facilities.

7.7 Driveways - If available, existing entrances and driveways to serve a personal wireless service facility shall be utilized, unless the applicant can demonstrate that a new entrance and driveway will result in less visual, traffic, and environmental impact. New driveways to serve a personal wireless service facility shall not exceed twelve (12) feet in width, A gravel or crushed stone surface is encouraged. The construction and/or reconstruction of any new driveways shall conform to the Erosion Control and Sedimentation provisions of the Site Plan Review Regulations.

7.8 Antenna Types - Any antenna array placed upon an existing or proposed ground- mount, utility pole, or transmission line mount shall have a diameter of no more than four (4) feet, exclusive of the diameter of the mount. The Planning Board may permit a larger diameter antenna array after a finding that the visual impacts of a larger antenna array are negligible.

7.9 Ground and Roof Mounts - AU ground mounts shall be of a mast type mount. Lattice towers, guyed towers, and roof-mounted monopoles are expressly prohibited, unless constructed as part of a reconstruction project permitted under Section 5 (B).

7.10 Hazardous Waste - No hazardous waste shall be discharged on the site of any personal wireless service facility. If any hazardous materials are to be used on site, there shall be provisions for full containment of such materials. An enclosed containment area shall be

provided with a sealed floor, designed to contain at least one hundred and ten percent (110%) of the volume of the hazardous materials stored or used on the site.

- 7.11 Noise - Personal wireless service facilities shall not generate noise in excess of that permitted under the Charlestown Site Plan Review Regulations.
- 7.12 Radio Frequency Radiation (RFR) Standards - All equipment proposed for a personal wireless service facility shall be fully compliant with the FCC Guidelines for Evaluating the Environmental Effects of Radio Frequency Radiation (FCC Guidelines), under Report and Order, FCC 96-326, published on August 1, 1996, and all subsequent amendments.

8. MONITORING AND MAINTENANCE

- 8.1 Maintenance - The owner of the facility shall maintain the personal wireless, service facility in good condition. Such maintenance shall include, but shall not be limited to, painting, structural integrity of the mount and security barrier, and maintenance of the buffer areas and landscaping.
- 8.2 Monitoring - As part of the issuance of the site plan approval or building permit, the property owner shall agree that the Town of Charlestown may enter the subject property to obtain RFR measurements and noise measurements at the expense of the carrier. The Town shall provide reasonable written notice to the carrier and landowner and provide them the opportunity to accompany the Town representatives when the measurements are conducted.
- 8.3 Security for Removal - Recognizing the hazardous situation presented by abandoned and unmonitored telecommunications facilities, the Planning Board shall set the form and amount of security that represents the cost for removal and disposal of abandoned telecommunications facilities in the event that a facility is abandoned and the facility owner is unwilling or unable to remove the facility in accordance with Section 9.2. The amount of the security shall be based upon the removal cost plus, fifteen percent (15%), provided by the applicant and certified by a professional civil or structural engineer licensed in New Hampshire every five (5) years from the date of the Planning Board's approval of the site plan. If the cost has increased more than fifteen percent (15%), the owner of the facility shall provide additional security in the amount of the increase.

9. ABANDONMENT OR DISCONTINUATION OF USE

- 9.1 Notification - At such time that a carrier plans to abandon or discontinue operation of a personal wireless service facility, such carrier will notify the Town by certified U.S. mail of the proposed date of abandonment or discontinuation of operations. Such notice shall be given no less than thirty (30) days prior to abandonment or discontinuation of operations. In the event that a carrier fails to give such notice, the personal wireless service facility shall be considered abandoned upon such discontinuation of operations.
- 9.2 Removal - Upon abandonment or discontinuation of use, the owner of the facility shall physically remove the personal wireless service facility within ninety (90) days from the date of abandonment or discontinuation of use. "Physically remove" shall include, but not be limited to:
- A. Removal of antennas, mount, equipment shelters and security barriers from the subject property.

- B. Proper disposal of the waste materials from the site in accordance with local and state solid waste disposal regulations.
- C. Restoring the location of the personal wireless service facility to its natural condition, except that any landscaping and grading shall remain in the after-condition.

9.3 Failure to Remove - If the owner of the facility does not remove the facility upon the Zoning Administrator's order, then the Selectboard shall, after holding a public hearing with notice to the owner and abutters, issue a declaration of abandonment. The owner of the facility shall dismantle and remove the facility within ninety (90) days of receipt of the declaration of abandonment by the Selectboard. If the abandoned facility is not removed within ninety (90) days, the Town may execute the security to pay for this action.

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Section _____ **Wireless Communication Facilities**

A. Legislative Findings

Technological developments in the telecommunications and broadcast industries have resulted in demands for development of property to accommodate these land uses. Wireless communication facilities have become increasingly important to the security and economic needs of residents and businesses in the Town. This trend will continue, creating new opportunities for commerce, reducing demand for travel by conventional modes. Given the potential impacts, these facilities may have on the public good, safety and welfare of _____ citizens, it is, therefore, in the Town's interest to plan for and regulate the orderly development of such facilities.

B. Purpose

The purpose of this section shall be to regulate the placement, design, construction and modifications of wireless communication facilities so as to promote the economic viability of the Town and to protect its historic, cultural, natural, and aesthetic resources.

C. Conditional Use Approval for Wireless Communication Facilities

No permit for the development of a wireless communication facility shall be granted by the Administrative Officer without Conditional Use Approval from the Zoning Board of Adjustment [Development Review Board]. Prior to granting such approval, the Board shall make affirmative findings for each of the following criteria in addition to the other applicable provisions set forth in these Regulations:

- (1) Yard Requirements - Equipment, buildings, and other structures shall conform to the minimum front, side, and rear setbacks for the district in which they are located;
- (2) Height Limitations - The height limit for towers, antenna, and tower related fixtures in all districts shall not exceed twenty (20) feet above the average height of the tree line measured within one hundred (100) feet of the highest vertical element of the wireless communication facility. Notwithstanding the above, additional height may be approved upon finding by the Board that it is necessary to provide adequate coverage to the Town, or to accomplish collocation as outlined in sub-section (7) below and does not have an undue adverse visual impact on scenic or natural beauty as outlined in sub-section (9) below.
- (3) Setbacks - All wireless communications facilities shall comply with the setback provisions of the zoning districts in which facilities are located. Notwithstanding, the above, in order to ensure public safety, the minimum distance of any wireless communication facility to any property line, dwelling, or occupied structure shall be no less than the height of the tower, including antennas or other vertical appurtenances. This setback shall be referred to as a fall zone. In the event that an existing structure such as a barn silo, church steeple, or utility pole is proposed as a mounting for a wireless communication facility, a fall zone setback shall not be required;
- (4) Lighting - Towers requiring lighting shall not be permitted unless deemed necessary by the Board as the only viable alternative to meet reasonable facility requirements of a

communications service provider. The only tower lighting to be permitted by the Board shall be required by FAA regulation or by special necessity to ensure aviation safety where FAA standards apply. All tower lighting shall be shielded to minimize glare and impact on neighboring properties;

- (5) Bulk, Height, and Glare - All wireless communication facilities shall be designed in such a manner as to minimize the visual impact of height, mass, guy wire supports, and disruption of existing vegetation. Materials utilized for the exterior of any structure shall be of a type, style, color and location so as to minimize glare and not result in an undue adverse visible impact on any scenic or historic viewshed, public vantage point or abutting properties;
- (6) Screening - Screening shall be required at the perimeter of the site unless it can be demonstrated that existing natural foliage is adequate. A planted or natural vegetative screen shall be a minimum of ten(10) feet in depth with a minimum height of six (6) feet and shall have a potential to grow to a height of at least 15 feet at maturity. Existing on-site vegetation outside the site for the wireless facility shall be preserved or improved. Disturbance to existing topography shall be minimized, unless the disturbance is demonstrated to result in less visual impact on the wireless facility on surrounding properties and vantage points;
- (7) Collocation - The principle of collocation shall be employed, where feasible, to minimize the number of towers necessary to provide competition by FCC licensed providers. This shall impose a burden upon the applicant to demonstrate that there are no existing sites within a 20 mile radius of the proposed site which are suitable to the applicants needs despite a due diligence search, and that if such facilities do exist, that they are either technically inadequate or that the owner, after a process of good faith negotiation, will not allow collocation. The duration and terms of the offer shall be disclosed to the Board. It shall be the burden of the applicant to perform an analysis of technical feasibility. The applicant shall be required by permit condition to allow other wireless service providers to collocate on any new or existing tower subject to reasonable terms and conditions. Notwithstanding, there shall be no affirmative obligation on the applicant to increase the height or width of a tower in order to accommodate the equipment or facilities of another user nor shall the applicant be required to engineer the tower to accommodate another potential user. The applicant shall provide evidence in writing on how it intends to comply with this requirement and to provide copies of any such proposed agreements for proposed collocation or new tower construction;
- (8) Access Roads and Above Ground Utilities - Where new wireless communication facilities require construction of or improvement to access roads, to the extent practicable, roads shall follow contour of the land. Access roads, when consistent with the purposes of this section and economically feasible, shall be constructed or improved within existing forest or forest fringe areas and not in open fields. Utility or service lines shall be designed and located so as to minimize or prevent disruption to the scenic character or beauty of the area; and
- (9) Protection of Scenic Ridges and Hillsides - Where, the Board, after consultation with the Zoning Administrator and the applicant, determines that a proposed wireless communication facility will likely be visible against the skyline from at least one vantage

point on a State highway or Class 1 or II highway, or at least two vantage points on a Class III town highway no less than 1000 feet apart, the applicant shall prepare a report identifying the duration and frequency for which the tower would be visible to a passing motorist or a boater in feet and the distance to the proposed facility from the vantage points. The Board may require the report to include the elevation of the ground level of the facility site, the average elevation of vegetation within 100 feet of the facility within the affected viewshed, the slope of the facility site, the vertical height of the facility, appropriate design measures and recommendations to minimize any impact on scenic quality.

To assist the Board in its review of a likely visual impact of proposed facility under this subsection, the Board may require the applicant to fly or raise a three foot diameter balloon at the maximum height of the proposed facility at a location within fifty (50) horizontal feet of the center of the proposed facility. The applicants shall provide at least seven (7) days written notice to the Board the date and time of the test. The applicant shall provide to the Board photographs of the balloon test taken from at least four vantage points previously designated by the Board.

Upon review of the applicant's report, supporting materials, testimony from the parties, and inspections from the designated vantage points, the Board shall find that the proposed wireless communication facility shall not have an undue adverse visual impact on the scenic or natural beauty of the land proposed to be developed as viewed from public highway or water body within the Town.

Where a tower would break or cross the skyline when viewed from the identified vantage points, the Board may designate an alternative location for the tower to be evaluated by the applicant. In consideration of this, the applicant may revise its application to include such a site, assuming it is available to the applicant and reasonably technically feasible to meet the applicant's broadcast objectives.

For the purposes of this sub-section, a wireless communication facility shall be presumed likely to be visible against the skyline when the facility is more than eight (8) inches wide or in diameter at the point where it intersects the treeline or forest canopy.

In determining whether or not a tower would have an undue adverse visual impact on the scenic or natural beauty of a ridge or hillside, the Board shall consider:

- (1) the period of time during which the proposed tower would be viewed by the traveling public on a public highway;
- (2) the frequency of the view of the proposed tower as experienced by the traveling public;
- (3) the degree to which the view of the tower is screened by existing vegetation, the topography of the land, and existing structures;
- (4) background features in the line of sight to the proposed tower that obscure the facility or make it more conspicuous;
- (5) the distance of the proposed tower from the viewing

- vantage point and the proportion of the facility that is visible above the skyline;
- (6) the number of vehicles traveling on a public highway or water at or near the critical vantage point;
 - (7) the sensitivity or unique value of the particular view affected by the proposed tower;
 - (8) significant disruption of a viewshed that provides context to a historic or scenic resource.

The Board shall have the authority to impose conditions consistent with the purpose of this Section in approving a proposed plan for the development of a wireless communication facility. A notice of decision with conditions shall be promptly recorded or filed with the Town by the Board of Adjustment [Development Review Board] or Administrative Officer. It shall be the obligation of the permittees and subsequent assigns to remain in compliance with all conditions.

D. Application Requirements

As required under this Section, an application shall include at least the following information:

- (1) Name and address of the record landowners and any duly appointed agents of the parties;
- (2) Names and addresses of the record owners of all abutting property;
- (3) A map or sketch on mylar of the property proposed to be developed, professionally drawn to scale and with the area to be developed clearly indicated.
- (4) A description of the proposed development;
- (5) The location of the proposed structure on a USGS Topographic Map or Survey with 20' elevations or a GIS generated map compatible with VCGI standards;
- (6) A utility and access road plan located on a USGS Topographic Map;
- (7) Where the wireless communication facility is located on a parcel that is forested, the approximate average height of the existing vegetation within 100 feet of the tower base;
- (8) A design or plan for all structures, buildings, or facilities proposed for the site;
- (9) The proposed locations of all existing and proposed wireless service facilities in __ and within 20 miles of the proposed site for all licensed carriers seeking approval under this application;
- (10) To the extent required by the National Environmental Policy Act (NEPA) and as administered by the FCC, an Environmental Assessment (EA) draft or final report outlining the probable impacts of the proposed facility on wildlife habitats, endangered species, historic and archeological resources, wetlands, and other resources;
- (11) A cumulative radio frequency radiation study demonstrating compliance with FCC standards at the site;
- (12) Existing wireless communication facility for any competitor providing functionally equivalent service to _____ and the estimated coverage area; and
- (13) Construction sequence and time schedule for completion of each phase of the entire project shall be provided by the applicant to the Board.

E. Provision for Independent Consultants

To assist the Board in its review of applications for Conditional Use Approval under this section, the Board may employ or contract with consultants whose services shall be paid for by the Town. Any or all final reports or documents prepared by the consultant shall be made available to the applicant and other parties to the proceeding.

F. Amendments

An amendment to a prior approved wireless communications facility may be considered by the Board and shall require Conditional Use Approval from the Board when any of the following are proposed:

- (1) change in the number of facilities permitted on the site;
- (2) changes in technology used for the facility; or
- (3) addition of any equipment or additional height not specified in the original application.

G. Fees

A schedule of fees for wireless communications facilities to cover project review, permitting, and monitoring costs shall be established by the Selectboard and may from time to time be amended.

H. Removal of Abandoned Antennas and Towers

Any wireless communications facility that is not operated for a continuous period of twelve (12) months shall be considered abandoned and hazardous to the public health and safety, unless the owner of said tower provides proof to the contrary through quarterly inspections. The owner shall remove the abandoned structure within 90 days of receipt of a declaration of abandonment from the Board notifying the owner of such abandonment. A declaration of abandonment shall only be issued following a noticed public hearing conducted by the Board with notice to the last known owner/operator and occupants of the tower. If the abandoned tower is not removed within 90 days, the Town may bring action to have the tower removed. The Board as a condition to approval, may require the applicant to provide a performance bond, or similar form of surety payable to the Town at an amount sufficient to cover the full costs of removal of a tower antenna in the event that the facility is declared abandoned.

I. Consistency with Federal Law

These regulations are intended to be consistent with Section 704 of the 1996 Telecommunications Act. Accordingly, they shall not prohibit or have the effect of prohibiting the provision of personal wireless communications services; shall not unreasonably discriminate among providers of functionally equivalent services; and shall not regulate personal wireless services based on the environmental effects of radio frequency emissions to the extent that these facilities comply of the Federal Communications Commission Regulations concerning such emissions.

J. Separability

If any part or provision of this section or the application of this section is adjudged invalid by a court of competent jurisdiction, the judgment shall be confined in its operation to this section, or application directly involved in the controversy in which the judgment has been rendered. Accordingly, it shall not affect or impair the validity of the remainder of this section or the application thereof to other service providers or circumstances.

ARTICLE ___ DEFINITIONS

ANTENNA: A device attached to a tower or other structure for transmitting or receiving electromagnetic waves.

FAA: Federal Aviation Administration

FCC: Federal Communications Commission

TOWER: A structure more than 20 feet in height above the ground elevation built for the purpose of supporting, elevating, or placement of antennas for broadcast services or wireless services.

WIRELESS COMMUNICATION FACILITY: A tower, pole, antenna, guy wire, or related fixtures or equipment intended for use in connection with transmission or receipt of radio or television signals or any other electromagnetic spectrum-based transmissions/reception and for which a license is sought or has been granted by the FCC; the construction; or improvement of a road, trail, building, or structure incidental to a communications facility.

VANTAGE POINT: A point located on a public highway or public water body in _____ from which a proposed wireless communication facility will be visible.

MODEL BYLAW

Prepared By Vermont League of Cities and Towns
MAY 1998

Telecommunications Facilities Bylaw

1.1 Title

This bylaw shall be known as the Telecommunications Facilities Bylaw of the Town of _____.

Telecommunications facilities shall include all telecommunication service providers and associated equipment and buildings.

1.2 Purposes

The purpose of this bylaw is to protect the public health, safety and general welfare of the Town of _____ while accommodating the communication needs of residents and businesses. This bylaw shall:

- H. Preserve the character and appearance of the Town of _____ while allowing adequate telecommunications services to be developed.
- I. Protect the scenic, historic, environmental, and natural resources of the Town of _____.
- J. Provide standards and requirements for the operation, siting, design, appearance, construction, monitoring, modification, and removal of telecommunication facilities and towers.
- K. Minimize tower and antenna proliferation by requiring the sharing of existing communications facilities, towers and sites where possible and appropriate.

- L. Facilitate the provision of telecommunication services to the residences and businesses of the Town of _____.
- M. Minimize the adverse visual affects of towers through careful design and siting standards.
- N. Encourage the location of towers and antennas in non-residential areas and away from other sensitive areas such as areas with schools, hospitals or child care facilities, through performance standards and incentives.

1.3 Authority

Pursuant to 24 VSA § 4401 et seq. the planning commission [zoning board of adjustment/development review board] of the Town of _____ is authorized to review, approve, conditionally approve, and deny applications for telecommunication facilities, including sketch, preliminary and final plans, and installation. Pursuant to 24 VSA § 4407, the board is authorized to hire qualified persons to conduct an independent technical review of applications and to require the applicant to pay for reasonable costs thereof

1.5 Consistency With Federal Law

In addition to other findings required by this bylaw, the board shall find that its decision regarding an application is intended to be consistent with federal law, particularly the Telecommunications Act of 1996. The bylaw does not:

- a) prohibit or have the effect of prohibiting the provision of personal wireless services;
- d) does not unreasonably discriminate among providers of functionally equivalent services; and
- e) does not regulate personal wireless services on the basis of the environmental effects of radio frequency emissions to the extent that the regulated services and facilities comply with the FCC regulations concerning such emissions.

1.5 Definitions

(See Glossary of Terms included with this packet Select definitions your town believes are relevant to include here.)

1.6 Permits

Telecommunications towers or facilities may be permitted as conditional uses upon compliance with the provisions of this bylaw in the following zoning districts:

(town enacting bylaw should specify districts in which towers may be permitted as a conditional use unless town expects to permit them town-wide as conditional use).

An applicant for a telecommunications tower or facility permit must be a telecommunications provider or must provide a copy of its executed contract to provide land or facilities to an existing telecommunications provider to the administrative officer at the time that an application is submitted. A permit shall not be granted for a tower to be built on speculation.

No construction, alteration, modification (including the installation of antennas for new uses) or installation of any telecommunications tower or facility shall commence without a conditional use permit first being obtained from the zoning board of adjustment [planning commission/development review board].

In addition to information otherwise required in the Town of _____'s Zoning Bylaws [Subdivision Regulations/Master Plan], applicants for telecommunications towers or facilities shall include the following supplemental information,

1. The name and address of the applicant, the record landowners and any agents of the landowners or applicants as well as an applicant's registered agent and registered office. If the applicant is not a natural person, the name and address of the business and the state in which it is incorporated and has its principal office shall be provided.
2. The name, address and telephone number of the person to be contacted and authorized to act in the event of an emergency regarding the structure or safety of the facility.
3. The names and addresses of the record owners of all abutting property.
4. A report from qualified and licensed professional engineers that:
 - N. Describes the facility height, design and elevation. *(May be best to specify structural engineer for this section)*
 - O. Documents the height above grade for all proposed mounting positions for antennas to be co-located on a telecommunications tower or facility and the minimum separation distances between antennas. *(May be best to specify radio frequency (RF) engineer for this section)*
 - P. Describes the tower's proposed capacity, including the number, height and type of antennas that the applicant expects the tower to accommodate. *(May be best to specify structural engineer for this section.)*
 - Q. Documents steps the applicant will take to avoid interference with any established public safety telecommunications. *(May be best to specify RF engineer for this section)*
 - R. In the case of new tower proposals, demonstrates that existing telecommunications sites and other existing structures within 30 miles of the proposed site cannot reasonably be modified to provide adequate coverage and adequate capacity to the Town of _____.
 - S. Describes potential changes to those existing facilities or sites in their current state that would enable them to provide adequate coverage. *(May be best to specify RF engineer for this section)*
 - T. Describes the output frequency, number of channels and power output per channel for each proposed antenna. *(May be best to specify RF engineer for this section)*
 - U. Includes written five-year plan for use of the proposed telecommunications facility, including reasons for seeking capacity in excess of immediate needs if applicable, as well as plans for additional development and coverage within the Town. *(May be best to specify RF engineer for this section)*
 - V. Demonstrates the tower's compliance with the municipality's structural standards and setbacks for towers and support structures.
 - W. Describes the radio frequency radiation (RFR) at the site, whether or not the applicant is regulated by the FCC and the basis for the statement pertaining to RFR.
 - X. Provides proof that at the proposed site, the applicant will be in compliance with all FCC regulations, standards and requirements and commits to continue to maintain compliance with all FCC regulations, standards and requirements regarding radio frequency interference (RFI). The planning commission [zoning board of adjustment/development review board]

may hire independent engineers to perform evaluations of compliance with the FCC regulations, standards and requirements on an annual basis at unannounced times.

- Y. Includes other information required by the Board that is necessary to evaluate the request.
 - Z. Includes an engineer's stamp and registration number. *(May be best to specify structural engineer for this section)*
10. For all telecommunication towers or facilities, the applicant shall provide a letter of intent committing the tower owner and his or her successors to permit shared use of the tower if the additional user agrees to meet reasonable terms and conditions for shared use, including compliance with all applicable FCC regulations, standards and requirements and the provisions of this bylaw.
 11. An applicant for a permit for a facility to be installed on an existing structure shall provide a copy of its executed contract with the owner of the existing structure to the administrative officer at the time an application is submitted.
 12. To the extent required by the National Environmental Policy Act (NEPA) and as administered by the FCC, a complete Environmental Assessment (EA) draft or final report describing the probable impacts of the proposed facility.
 13. A copy of the application or draft application for an Act 250 permit, if applicable.
 14. The permit application shall be signed under the pains and penalties of perjury.

1.7 Site Plan Requirements

In addition to site plan requirements found elsewhere in the Town of _____

Zoning Bylaws/Subdivision Regulations/Master Plan, site plans for telecommunication facilities shall include the following supplemental information:

8. Location Map: a copy of a portion of the most recent USGS Quadrangle map showing the area within at least a two mile radius of the proposed tower site;
9. Vicinity Map showing the entire vicinity within a 2500 foot radius of the tower site, including the telecommunications facility or tower, topography, public and private roads and driveways, buildings and structures, water bodies, wetlands, landscape features, historic sites and habitats for endangered species. It shall indicate the property lines of the proposed tower site parcel and all easements or rights of way needed for access from a public way to the tower.
10. Proposed Site Plans of entire development indicating an improvements including landscaping, utility lines, guy wires, screening and roads.
11. Elevations showing all facades and indicating all exterior materials and color of towers, buildings and associated facilities.
12. In the case of a proposed site that is forested, the approximate average height of the existing vegetation within 200 feet of the tower base.
13. Construction sequence and time schedule for completion of each phase of the entire project.
14. Plans shall be drawn at a minimum at the scale of one (1) inch equals 50 feet.

1.8 Co-Location Requirements

An application for a new telecommunications tower shall not be approved unless the planning commission [zoning board of adjustment/development review board] finds that the telecommunications facilities planned for the proposed tower cannot be accommodated on an existing or approved tower or structure due to one of the following reasons:

9. The proposed antennas and equipment would exceed the structural or spatial capacity of the existing or approved tower or facility, as documented by a qualified engineer licensed to practice in the State of Vermont. Additionally, the existing or approved tower cannot be reinforced, modified or replaced to accommodate planned or equivalent equipment, at a reasonable cost, to provide coverage and capacity comparable to that of the proposed facility.
10. The proposed antennas and equipment would cause interference materially impacting the usefulness of other existing or permitted equipment at the existing or approved tower or facility as documented by a qualified engineer licensed to practice in the State of Vermont and such interference cannot be prevented at a reasonable cost.
11. The proposed antennas and equipment, either alone or together with existing facilities, equipment or antennas, would create RFI in violation of federal standards or requirements.
12. The proposed antennas and equipment either alone or together with existing facilities, equipment or antennas would create RFR in violation of federal standards or requirements.
13. Existing or approved towers and structures cannot accommodate the planned equipment at a height necessary to function reasonably or are too far from the area of needed coverage to function reasonably as documented by a qualified engineer licensed to practice in the State of Vermont.
14. Aesthetic reasons make it unreasonable to locate the planned telecommunications equipment upon an existing or approved tower or building.
15. There is no existing or approved tower in the area in which coverage is sought.
16. Other unforeseen specific reasons make it unreasonable to locate the planned telecommunications equipment upon an existing or approved tower or building.

Towers must be designed to allow for future rearrangement of antennas upon the tower and to accept antennas mounted at varying heights where overall permitted height allows. Towers shall be designed structurally, electrically and in an respects to accommodate both the applicant's antennas and additional antennas where overall permitted height allows.

1.10 Tower and Antenna Design Requirements

5. Towers, antennas and any necessary support structures shall be designed to blend into the surrounding environment through the use of color camouflaging and architectural treatment, except where the Federal Aviation Authority (FAA), state or federal authorities have dictated color.
6. In order to protect public safety and to preserve the scenic character and appearance of the area, the height limit for towers, antennas and tower-related fixtures shall be not more than 20 feet above the average height of the tree line measured within 100 feet of the highest vertical element of the telecommunications facility. Notwithstanding the above, additional height may be approved upon a finding by the planning commission [zoning review board/development review board] that the additional height is necessary in order to provide adequate coverage in the Town of _____ or to accomplish co- location of facilities and that the additional height will not cause an undue visual impact on the scenic character or appearance of the area.
7. All buildings and structures accessory to a tower (except for electric power poles where specifically exempted by the Board) shall meet the minimum setback requirements of the underlying zoning district or setback requirements specified in this bylaw. If the minimum setbacks of the underlying zoning district are less than the height of the tower, including antennas or other vertical appurtenances, the minimum distance from the tower to any property line shall be no less than the height of the tower, including antennas and other vertical appurtenances.

8. Ground mounted equipment or antennas as well as buildings and structures accessory to a tower, shall be screened from view by suitable vegetation, except where a design of non-vegetative screening better complements the architectural character of the surrounding neighborhood. A planted or vegetative screen shall be a minimum of ten feet in depth with a minimum height of six feet and shall have the potential to grow to a height of at least 15 feet at maturity. Existing on-site vegetation outside the immediate site for the wireless facility shall be preserved or improved. Disturbance to existing topography shall be minimized unless the disturbance is demonstrated to result in less visual impact on the facility from surrounding properties and other vantage points.

1.10 Amendments To Existing Telecommunications Facility Permit

An alteration or addition to a previously approved telecommunications facility shall require a permit amendment when any of the following are proposed:

1. Change in the number of buildings or facilities permitted on the site;
2. Material change in technology used by the telecommunications facility; or
3. Addition or change of any equipment resulting in greater visibility or structural windloading, or additional height of the tower, including profile of additional antennas, not specified in the original application.

1.11 Tower Lighting/ Signage

Towers shall not be illuminated by artificial means and shall not display lights unless such lighting is specifically required by the FAA or other federal or state authority for a particular tower because of its height. Any lighting required solely as a result of height may be subject to review by the town of the fighting requirement. Heights may be reduced to eliminate the need for lighting or another location selected.

No commercial signs or lettering shall be placed on a tower.

Noise at the site perimeter from the operation of any machinery or equipment shall be minimized.

1.12 Antennas Mounted on Structures, Roofs, Walls, and Existing Towers Governed by 1.10

The placement of telecommunications antennas on existing buildings, structures, roofs, or walls in conformance with section 1.2 of this bylaw may be approved by the administrative officer [Selectboard if adopting a stand-alone ordinance], provided the antennas meet the requirements of this bylaw, upon submission of:

1. a final site and building plan and,
2. a report prepared by a qualified engineer, licensed to practice in the State of Vermont indicating the structure's suitability for the telecommunications facility, and that the proposed method of affixing the antenna to the structure complies with standard engineering practices. Complete details of all fixtures and couplings and the exact point of attachment shall be indicated.

1.13 Temporary Wireless Communication Facilities

Any telecommunications facility designed for temporary use is subject to the following:

5. Use of a temporary facility is permitted only if the owner has received a temporary use permit from the Town of _____.
6. Temporary telecommunication facilities are permitted for no longer than five days use during a special event.
7. The maximum height of a temporary facility is 50 feet from grade.
8. Temporary facilities must comply with all applicable portions of these regulations.

1.14 Interference With Public Safety Telecommunications

No new telecommunications facility shall be placed or constructed in such a way as to interfere with public safety telecommunications. All applications for new telecommunication facilities shall be accompanied by an intermodulation study that predicts no Rely interference problems and certification that the study has been provided to the appropriate public safety agencies. Before testing or operating new service or changes in existing service, telecommunications providers shall notify the municipality at least ten calendar days in advance of such changes and allow the municipality to monitor interference levels during that testing process.

1.15 Continuing Obligations

Upon receiving a permit, the permittee shall annually demonstrate that he or she is in compliance with all FCC standards and requirements regarding RFR, the basis for his or her representations and the most recent time he or she took actual readings of the RFR at the site. The permittee shall provide a list of the RFR readings, their distances from the tower/transmitter, dates of the readings and the name of the person or company who took the readings.

1.16 Abandoned, Unused, Obsolete, Damaged or Dangerous Towers or Portions of Towers Abandoned or unused towers or portions of towers and their facilities shall be removed as follows:

4. The owner of a tower shall annually, on January 15, file a declaration with the Town of _____ administrative officer certifying the continuing safe operation of every facility installed subject to these regulations. Failure to file a declaration shall mean that the tower is no longer in use and considered abandoned. An owner who has failed to file an annual declaration with the administrative officer may file a declaration of use or intended use and may request the ability to continue use of the tower.
5. Abandoned or unused towers and associated facilities shall be removed within 180 days of cessation of operations at the site unless a time extension is approved by the planning commission [zoning board of adjustment/development review board]. In the event the tower is not removed within 180 days of the cessation of operations at a site, the municipality may remove the tower and an associated facilities and the costs of removal shall be assessed against the property or tower owner.
6. Unused portions of towers shall be removed within 180 days of the time that such portion is no longer used for antennas. The replacement of portions of a tower previously removed requires the issuance of a new telecommunication facility permit.

1.17 Maintenance of Telecommunications Facilities Insurance

The telecommunications facility owner shall maintain adequate insurance on all telecommunication facilities. All facility sites shall be properly fenced and identified by signage that indicates presence of RFR and any other appropriate warnings required by permit conditions.

1.18 Enforcement and Penalties

1. 19 Fees

Fees for filing an application to build or alter a telecommunications facility shall be \$ _____. Fees may include the reasonable costs of an independent technical assessment of the application.

1.20 Enforcing Agent

The Administrative Officer shall be the agent to enforce the provisions of this bylaw.

1.21 Severability

If any portion of this ordinance/bylaw is held unconstitutional or invalid by a court of competent jurisdiction, the remainder of this ordinance/bylaw shall not be affected.

1.22 Effective Date

This bylaw shall be effective on_____.

**GLOSSARY OF TELECOMMUNICATIONS TERMS
SOURCE LIST FOR DEFINITIONS SECTION OF MODEL BYLAW
Vermont League of Cities and Towns
June 1998**

Adequate Coverage: Coverage is "adequate" within that area surrounding a base station where the predicted or measured median field strength of the transmitted signal is such that the majority of the time, transceivers properly installed and operated will be able to communicate with the base station without objectionable noise (or excessive bit-error-rate for digital) and without calls being dropped. In the case of cellular communications in a rural environment, this would be a signal strength of at least - 90dbm. It is acceptable for there to be holes within the area of adequate coverage as long as the signal regains its strength further away from the base station the outer boundary of the area of adequate coverage, however, is that location past which the signal does not regain.

Adequate Capacity: Capacity is considered to be "adequate" if the grade of service is p.05 or better for a least 50% of the days in a preceding month, prior to the date of application, as measured using direct traffic measurement of the telecommunications facility in question, where the call blocking is due to frequency contention at the antenna(s).

Affiliate: When used in relation to an operator, another person who directly or indirectly owns or controls, is owned or controlled by, or is under common ownership or common control with the operator, or an operator's principal partners, shareholders, or owners of some other ownership interest; and when used in relation to the municipality, any agency, board, authority or political subdivision affiliated with the municipality or other person in which the municipality has legal or financial interest.

Alternative Design Tower Structure: Artificial trees, clock towers, bell steeples, light poles, silos and similar alternative-design mounting structures that camouflage or conceal the presence of antennas or towers (see also *Stealth Facility*).

Antenna: A device which is attached to a tower or other structure for transmitting and receiving electromagnetic waves.

Antenna Height: The vertical distance measured from the base of the antenna support structure at grade to the highest point of the structure. If the support structure is on a sloped grade, then the average between the highest and lowest grades shall be used in calculating the antenna height.

Antenna Support Structure: Any pole, telescoping mast, tower tripod, or any other structure which supports a device used in the transmitting and/or receiving of electromagnetic waves.

Applicant: A person who applies for a telecommunications facility siting. An applicant can be the telecommunication service provider or the owner of the property.

Available Space: The space on a tower or structure to which antennas of a telecommunications provider are both structurally able and electromagnetically able to be attached.

Base Station: The primary sending and receiving site in a telecommunications facility network. More than one base station and/or more than one variety of telecommunications provider can be located on a single tower or structure.

Bulletin 65: Published by the FCC Office of Engineering and Technology specifying radiofrequency radiation levels and methods to determine compliance.

Cell Site: A tract or parcel of land that contains a cellular communication antenna, its support structure, accessory building(s), and parking, and may include others uses associated with and ancillary to cellular communications transmission.

Cellular Service: A telecommunications service that permits customers to use wireless, mobile telephones to connect, via low-power radio transmission sites called cell sites, either to the public switched network or to other mobile cellular phones.

Cellular Telecommunications: A commercial Low Power Mobile Radio Service bandwidth licensed by the Federal Communications Commission (FCC) to providers in a specific geographical area in which the radio frequency spectrum is divided into discrete channels which are assigned in groups to geographic cells within a service area and which are capable of being reused in different cells within the service area.

Cellular Telecommunications Facility: A cellular telecommunications facility consists of the equipment and structures at a particular site involved in receiving telecommunication or radio signals from mobile radio communications sources and transmitting those signals to a central switching computer which connects the mobile unit with the land-based telephone lines.

Channel: The segment of the radiation spectrum to or from an antenna which carries one signal. An antenna may radiate on many channels simultaneously.

Collocation: Locating wireless communications equipment from more than one provider on a single site.

Common Carrier: An entity licensed by the FCC or a state agency to supply local and/or long distance telecommunications services to the general public at established and stated rates.

Communication Equipment Shelter: A structure located at a base station designed principally to enclose equipment used in connection with telecommunications transmissions.

Communications Facility: A land facility supporting antennas and microwave dishes that sends and/or receives radio frequency signals. Communications facilities may include structures, towers or accessory buildings.

Communication Tower: A guyed, monopole, or self-supporting tower, constructed as a free standing structure or in association with a building, other permanent structure or equipment, containing one or more antennas intended for transmitting and/or receiving television, AMIFM radio, digital, microwave, cellular, telephone, or similar forms of electronic communication.

dBm: Unit of measure of the power level of a signal expressed in decibels above 1 milliwatt.

dBu unit of measure of the electric field strength of a signal, expressed in an absolute measure for describing service areas and comparing different transmitting facilities independent of the many variables (see dBm above) introduced by different receiver configurations.

Directional Antenna: An antenna or array of antennas designed to concentrate a radio signal in a particular area.

Dish Antenna: A dish-like antenna used to link communications sites together by wireless transmission of voice or data. Also called microwave antenna or microwave dish antenna.

Electromagnetically Able: The determination that the signal from and to the proposed new antenna will not significantly interfere with the existing signals from and to other facilities or antennas located on the same tower or

structure as determined by a qualified professional telecommunications engineer. The use of available technologies to alleviate such interference shall be considered when making this determination.

Facility Site: A property, or any part thereof, which is owned or leased by one or more telecommunications facility(s) and where required landscaping is located.

FCC: Federal Communications Commission. The government agency responsible for regulating telecommunications in the United States.

FCC 97-303: A Report and Order which sets new national standards for exposure to radio frequency emissions from FCC-regulated transmitters.

Frequency: The number of cycles completed each second by an electromagnetic wave measured in Hertz (Hz).

GHz: GigaHem: One Billion Hertz

Grade Of Service: A measure of the percentage of calls which are able to connect to the base station during the busiest hour of the day. Grade of service is expressed as a number, such as p.05 - which means that 95% of callers will connect on their first try. A lower number (p.04) indicates a better grade of service.

Hertz: One Hertz is the frequency of an electric or magnetic field which reverses polarity once each second, or one cycle per second.

Location: References to site location shall be the exact longitude and latitude, to the nearest tenth of a second. Bearing or orientation should be referenced to true North.

Modification Of An Existing Facility: Any change, or proposed change in power input or output, number of antennas, change in antenna type or model repositioning of antenna(s), change in number of channels per antenna above the maximum number approved under an existing permit.

Modification Of An Existing Tower: Any change, or proposed change in dimensions of an existing and permitted tower or other structure designed to support telecommunications transmission, receiving and/or relaying antennas and/or equipment.

Micro-Cell: A low power mobile radio service telecommunications facility used to provide increased capacity in high call-demand areas or to improve coverage in areas of weak coverage.

MHZ: Megahertz, or 1,000,000 Hertz.

Microwave: Electromagnetic radiation with frequencies approaching 1,000,000,000 Hz, including UHF, extending to infrared frequencies; highly directional signal used to transmit radio frequencies from point-to-point at a relatively low power level.

Microwave Antenna: A dish-like antenna manufactured in many sizes and shapes used to link communication sites together by wireless transmission of voice or data.

Monitoring: The measurement, by the use of instruments in the field, of non-ionizing radiation exposure from telecommunications facilities, towers, antennas or repeaters.

Monitoring Protocol: The testing protocol, such as the Cobs Protocol, (or one substantially similar, including compliance determined in accordance with the National Council on Radiation Protection and Measurements, Reports 86 and 119) which is to be used to monitor the emissions and determine exposure risk from telecommunications facilities.

Monopole: A single self-supporting vertical pole with no guy wire anchors, usually consisting of a galvanized or other unpainted metal or a wooden pole with below grade foundations.

Omnidirectional Antenna: An antenna that is equally effective in all directions and whose size varies with the frequency and gain for which it is designed.

Permit: Embodies the rights and obligations extended by the municipality to an operator to own, construct, maintain, and operate its facility within the boundaries of the municipality.

Personal Communications Services Or PCS: Digital wireless telephone technology such as portable phones, pagers, faxes, and computers. Such mobile technology may allow each consumer the same telephone number wherever he or she goes. Also known as Personal Communication Network (PCN)

Personal Wireless Services: Commercial mobile services, unlicensed wireless exchange access services. These services include: cellular services, personal communications services, specialized mobile radio services, and paging services.

Preexisting Towers And Antennas: Any tower or antenna for which a permit has been issued prior to the effective date of these regulations.

Roof and/or Building Mount Facility: A facility in which antennas are mounted to an existing structure on the roof (including rooftop appurtenances) or a building face.

Radial Plots: Radial plots are the result of drawing equally-spaced lines (radials) from the point of the antenna, calculating the expected signal and indicating this graphically on a map. The relative signal strength may be indicated by varying the size or color at each point being studied along the radial. A threshold plot uses a mark to indicate whether that point would be strong enough to provide adequate coverage - i.e., the points meeting the threshold of adequate coverage. The draw back is the concentration of points close to the antenna and the divergence of points far from the site near the ends of the radials.

Radiated-Signal Propagation Studies Or Coverage Plots : Computer generated estimates of the signal emanating, and prediction of coverage, from antennas or repeaters sited on a specific tower or structure. The height above ground, power input and output, frequency output, type of antenna, antenna gain, topography of the site and its

surroundings are all taken into account to create these simulations. They are the primary tools for determining whether the telecommunications equipment will provide adequate coverage for that site.

Repeater: A small receiver/relay transmitter and antenna of relatively low power output designed to provide service to areas which are not able to receive adequate coverage directly from a base or primary station.

Scenic View: A scenic view is a wide angle or panoramic **field** of sight and may include natural and/or manmade structures and activities. A scenic view may be from a stationary viewpoint or be seen as one travels along a roadway, waterway, or path. A view may be to a far away object, such as a mountain, or a nearby object.

wires.

Self-Supporting Tower: A communications tower that is constructed without guy

Stealth Facility: Any communications facility which is designed to blend into the surrounding environment. Examples of stealth facilities may include architecturally screened roof-mounted antennas, building-mounted antennas painted to match the existing structure, antennas integrated into architectural elements, and antenna structures designed to look like light poles. (See also Alternative tower Structure)

Spectrum: Relating to any transmissions or reception of electromagnetic waves.

Structurally Able: The determination that a tower or structure is capable of carrying the load imposed by the proposed new antennas under all reasonable predictable conditions as determined by professional structural engineering analysis.

System: The communications transmission system operated by a telecommunications service provider in the municipality or region.

Telecommunications Facility: AU equipment (including repeaters) and locations of equipment with which a telecommunications provider transmits and receives the waves which carry their services. This facility may be sited on one or more towers or structure(s) owned and permitted by the provider or another owner or entity.

Telecommunications Provider: An entity licensed by the FCC to provide telecommunications services to individuals or institutions.

Temporary Wireless Communication Facility: Any tower, pole, antenna, etc., designed for use while a permanent wireless facility is under construction, or for a special event or conference where a majority of people attending are wireless users.

Tiled Coverage Plots: Tiled plots result from calculating the signal at uniformly- spaced locations on a rectangular grid, or tile, of the area of concern. Unlike radial plots tiled plots provide a uniform distribution of points over the area of interest; usually the same grid will be used as different sites are examined, and it is not necessary that the transmitter site be within the grid or area of interest. As with radial plots, the graphic display or plot can be either signal

strength or adequate threshold. Thus method requires substantially more topographic data and, longer (computer) execution time than radial plots, but is preferable for comparative analysis.

Tower: A vertical structure for antenna that provide telecommunications services.

Whip Antenna: A vertical antenna that normally transmits signals in 360 degrees. Whip antennas are typically cylindrical in shape, narrow (less than 6 inches in diameter) and long (often measure 18 inches in height or more). Also called omnidirectional, stick or pipe antennas.

View Corridor: A three dimensional area extending out from a viewpoint. The width of the view corridor depends on the focus of the view. The focus of the view may be a single object, such as a mountain, which would result in a narrow corridor, or a group of objects, such as a downtown skyline, which would result in a wide corridor. Panoramic views have very wide corridors and may include a 360 degree perspective. Although the view corridor extends from the viewpoint to the focus of the view, the mapped portion of the corridor extends from the viewpoint and is based on the area where base zone heights must be limited in order to protect the view.