

Donald L. Haes, Jr., Ph.D., CHP

Radiation Safety Specialist

MA Radiation Control Program Health Physics Services Provider Registration #65-0017

PO Box 368, Hudson, NH 03051

Voice: 603-303-9959

Fax: 603-386-6315

Email: donald_haes_chp@myfairpoint.net

May 15, 2012

Re: Distributed Antenna Systems mounted on existing utility poles located within Wellesley, MA.

PURPOSE

I have reviewed the information pertinent to the existing and the possibility of future Distributed Antenna Systems (DAS) installed within Wellesley, MA. To determine regulatory compliance, theoretical calculations and actual field measurements of maximal radio-frequency (RF) fields have been prepared. The physical conditions are that personal wireless services (PWS) antennas are mounted on the existing utility poles at 15 Dukes Road, and 3 Vista Road (See Figures 1 and 2, respectively), in addition to their associated radio equipment. The antennas are mounted at a centerline height of 34 feet above ground level (AGL). In the future, the Wellesley Municipal Light Plant (WMLP) may allow for future DAS sites to be utilized at additional locations. This report considers the contributions of the PWS services on the DAS sites as if they were operating at the full technologically achievable capacity. The calculated and measured values of power density are presented as a percent of current Maximum Permissible Exposures (%MPE) as adopted by the Federal Communications Commission (FCC) ^{1,2}, and those established by the Massachusetts Department of Public Health (MDPH) ³.

SUMMARY

The measured existing ambient RF field levels indicate the maximum to be less than one-half of one percent of the current exposure guidelines. These RF measurements are accurate and were obtained according to guidelines as set forth by the FCC and MDPH. Theoretical RF field calculations data for PWS services on similar DAS sites operating at full technologically achievable capacity indicate a maximal potential RF field level at ground level to be well within the RF exposure guidelines. In fact, there could be more than 100 similar installations at each location, and still be within the guidelines for RF exposure.

Based on my extensive experience with personal wireless services facilities, and the theoretical RF fields I have calculated and measured, it is my expert opinion that the existing DAS sites comply with regulatory guidelines for RF exposure to members of the public, as would any future DAS site similarly constructed.

Note: The analyses, conclusions and professional opinions are based upon the precise parameters and conditions of these particular sites; **15 Dukes Road & 3 Vista Road, and/or similarly constructed sites in Wellesley, MA.** Utilization of these analyses, conclusions and professional opinions for any personal wireless services installation, existing or proposed, other than the aforementioned has not been sanctioned by the author, and therefore should not be accepted as evidence of regulatory compliance.

RF EXPOSURE LIMITS AND GUIDELINES

The RF exposure guidelines adopted by the FCC are a combination of the standards published by the American National Standards Institute (ANSI) ⁴ and the National Council on Radiation Protection and Measurement (NCRP) ⁵. Also applicable are those published by the MDPH ³. The RF exposure guidelines are divided into two categories: "Controlled/Occupational areas" (those areas restricted to access by RF workers only) and "Uncontrolled/Public Areas" (those areas unrestricted for public access). Listed in Table 1 below are the applicable RF exposure guidelines for uncontrolled areas as they pertain to the operating frequency band of DAS facilities.

Table 1: Maximum Permissible Exposure Values for Uncontrolled/Public Areas

Frequency Band:	Maximum Permissible Exposure:
1500 - 100,000 MHz	1000 $\mu\text{W}/\text{cm}^2$ *

Note: 1 μW = 0.000001 Watt

* For equivalent plane-wave power density, where f is the frequency in MHz (10^6 Hz).

DAS (Distributed Antenna System; Excerpt from *Wikipedia*, the free encyclopedia)

DAS is a network of spatially separated antenna nodes connected to a common source via a transport medium that provides wireless service within a geographic area or structure. DAS antenna elevations are generally at or below the clutter level and node installations are compact.

The idea is to split the transmitted power among several antenna elements, separated in space so as to provide coverage over the same area as a single antenna but with reduced total power and improved reliability. A single antenna radiating at high power is replaced by a group of low-power antennas to cover the same area. These antennas have recently been employed by several service providers in many areas around the United States. The idea works because less power is wasted in overcoming penetration and shadowing losses, and because a line-of-sight channel is present more frequently, leading to reduced fade depths and reduced delay spread.

DAS is used in scenarios where alternate technologies are infeasible due to - terrain, zoning challenges for cell towers, infeasible cell tower placements, etc.

The Martha's Vineyard Times

Up-Island officials look to Nantucket for cell phone tips



A Nantucket electrical pole outfitted with an antenna used to distribute cellular telephone signals.
Photos by Nelson Sigelman

By Nelson Sigelman - August 24, 2006

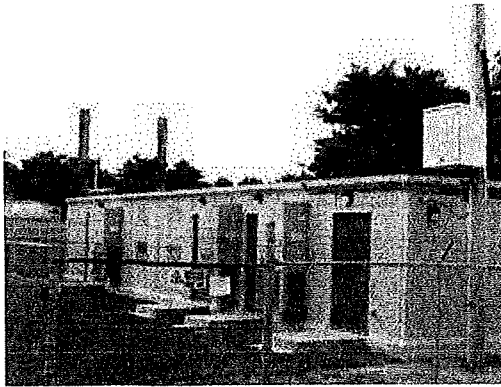
Representatives of Aquinnah and Chilmark flew to Nantucket Monday morning for a quick tour of that island's distributed antenna system (DAS), which relies on a series of small antennas set on telephone poles to distribute cellular telephone signals.

The up-Island officials wanted to see the antennas first-hand as they contemplate how best to provide improved cellular telephone service in their towns. Erected three years ago, the system used on Nantucket is attractive because it provides an alternative to high towers and could in the future provide a platform for wireless Internet service.

Camille Rose, Aquinnah selectman and chairman of the town planning board, said she wanted to see the antennas and the building used to house the signal base station so she could make a realistic assessment of how the system might lend itself to Aquinnah.

Chilmark selectman Frank Fenner said he was also interested in seeing the layout and hearing about any problems. Mr. Fenner said a DAS system might provide a solution to the problem of providing cell phone service to Menemsha, which now has little or no reception.

Referencing other well-known dead spots, Ms. Rose said a so-called DAS node, or antenna located on the north side and the south side of Aquinnah might provide cellular signal strength to town beaches.



The central base station located near the Nantucket airport houses equipment used to distribute cellular signals along the distributed antenna system.

Also making the morning tour was Aquinnah town administrator Jeff Burgoyne and a Times reporter. Nantucket's official's host was Diane O'Neil, the town's procurement officer.

"It is really not invasive," said Ms. O'Neil as she drove the Vineyard group along Nantucket's roads while pointing out the location of DAS antennas. Ms. Rose was intrigued by the location of one antenna set on top of a pole in a residential district and wondered if the abutters had objected.

They had not. As Ms. O'Neil described the history of DAS on Nantucket, she said the entire system had met with overall acceptance and there was talk about extending the system.

The history of DAS on Nantucket is intertwined with the history of electrical deregulation. National Grid, an international electrical delivery company, acquired Nantucket Electric. Soon after that, a sister company, National Grid Wireless, an infrastructure and service company that provides coverage solutions for cellular companies approached town officials about erecting a DAS system.

Nantucket does have several cellular towers, and company officials are unwilling to reveal exactly how many cellular companies use the DAS system. But island residents interviewed said that in general, cellular telephone service is good in most areas.

In a telephone interview, Alex Gamota, National Grid Wireless general manager, said the Nantucket system relies on approximately 30 miles of fiber optic cable and 26 DAS nodes. Depending on topography and equipment a DAS node may have a cellular signal range that extends from one quarter to three quarters of a mile.

For system providers like National Grid Wireless, the viability of DAS comes down to what the cellular customer wants. He said his company would not have built the Nantucket system had there not been customer demand and economic viability.

Recent changes to Aquinnah's bylaws governing cell phone towers and the interest of Chilmark in partnering in a DAS system could provide an incentive for cellular companies that would prefer to cooperate with towns rather than fight in court over a cell tower.

The federal Telecommunication Act of 1996 (TCA) limits the obstacles towns may place in the way of wireless communication companies seeking to provide service where there is a lack of coverage.

In January, Aquinnah voters mounted a multi-pronged effort to take control of the town's wireless

future by creating a wireless overlay district that would allow for the placement of equipment at the town landfill needed to operate a distributed antenna system. The town has also hired David Maxson, a wireless consultant to assist the town with wireless issues.

Other towns with similar concerns are looking to DAS systems to protect scenic vistas and provide cellular service.

In addition to Nantucket, National Grid Wireless also provides DAS in the towns of Andover, Malden, and Hull.

The town of Brookline recently awarded a lease to ClearLinx Services Ltd. to provide DAS even as the town battles T-Mobile and Verizon Wireless in federal court over the companies' plans to erect cell towers.

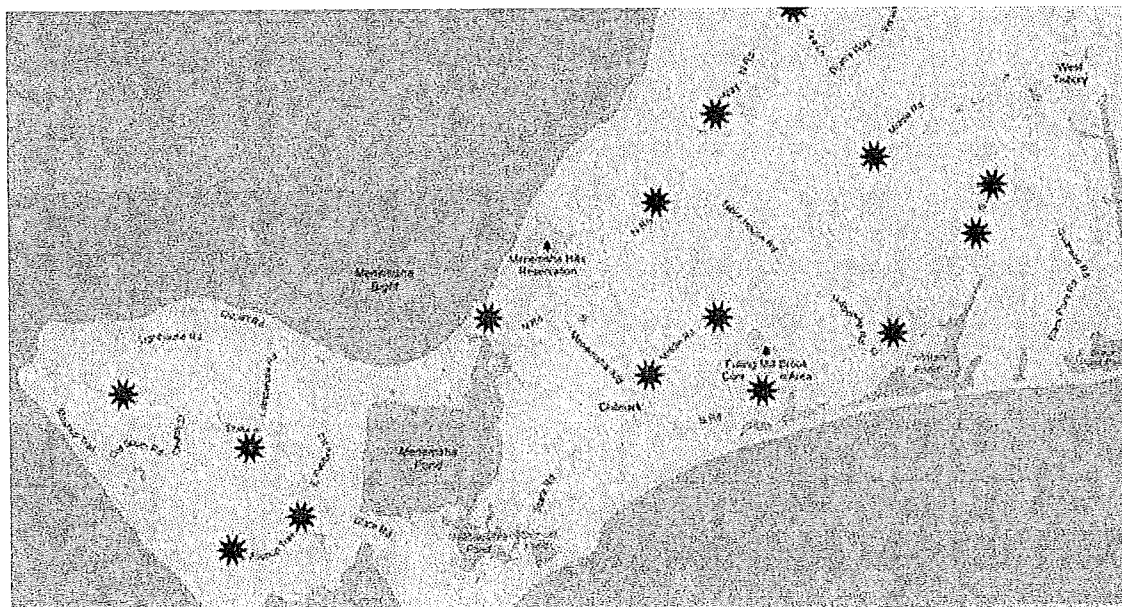
This page URL:

http://www.mvtimes.com/news/2006/08/24/up_island_cell_phones.php

This Page was generated with **web2printer 4** in: 1.366186 seconds <http://www.printer-friendly.com>

Aquinnah, Chilmark throw the switch on improved wireless service

By Nelson Sigelman - May 30, 2012



The approximate locations of the nodes that will provide wireless signals in the new up-Island distributed antenna system. — File photo by Tony Omer

On Friday, American Tower Corporation (ATC) threw the switch on its recently completed distributed antenna system (DAS). For several hours, Island residents with AT&T wireless enjoyed a level of service normally only associated with the temporary signal upgrades that went along with presidential vacations.

Just as quickly, up-Island wireless users were left muttering, “Can you hear me now?” after power to the system was switched off so ATC could resolve a system glitch.

On Wednesday, ATC told The Times that the DAS is up and running throughout the Aquinnah and Chilmark service areas. That was good news to town officials and residents who have labored for six years to improve wireless communication in an area of the Island notorious for its lack of wireless signal strength.

“I’m thrilled,” said former Aquinnah selectman Camille Rose, who helped launch the effort six years ago to fend off construction of a large tower.

DAS relies on a series of radio access nodes (RAN) connected to small antennas set on telephone poles, or poles erected for that specific purpose, to distribute cellular telephone signals. Although the range is considerably less than with taller towers, the DAS appeals to communities where a high conventional tower is unwelcome and wireless telephone service is poor.

There are 11 nodes in Chilmark and four in Aquinnah. Wireless signals are now expected to reach into the formerly dark corners of Moshup Trail and Menemsha. Depending on topography and equipment, a DAS node may have a cellular signal range that extends from one quarter to three quarters of a mile.

In April, ATC deployment manager Don Clark told Chilmark selectmen that the company had done all "make ready" work on the utility poles in collaboration with NSTAR, Comcast, and Verizon. He said the fiber network had been attached to almost 700 poles and all 15 nodes had been installed.

"We believe with this design that we are going to meet coverage objectives," Mr. Clark told selectmen.

On Wednesday afternoon, Chilmark town administrator Tim Carroll, the most recent point man in the DAS effort, said he was happy to hear that the system was up and operating. "I am hoping that it will allow people to feel more safe on the roads traveling and they will be able to call in for help when they need it, whether at home or on the road," he said.

In past years, poor communication has hindered the response of public safety officials when people were unable to call for help, or had difficulty providing locations, particularly on beaches along the south shore.

"Hopefully, it will increase our ability to get to the scene of an emergency quicker because we won't have the communication issues," Chilmark police chief Brian Cioffi said.

"American Tower is thrilled to have had the opportunity to partner with the Towns of Aquinnah and Chilmark to deploy infrastructure that enables wireless communication networks and devices," ATC senior vice president Gerard Ainsztein said in an email to The Times on Wednesday. "We now look forward to working with wireless carriers in this market to leverage the network and assist them in improving their service levels to residents. American Tower is also now eager to partner with other towns to extend the network on the Vineyard."

Verizon short circuit

The wireless signal originates from a hub station placed at the Chilmark landfill off Tabor House Road. ATC has a contract to lease space to AT&T and is seeking other wireless carriers.

Verizon Wireless has so far indicated that it wants no part of the up-Island DAS. In a phone message left May 9 in response to a letter from a Chilmark resident that was shared with The Times, Rich Enright, a Verizon Wireless official from Westboro, said the company would not join the DAS because the ATC rent was too high, adding, however, that Verizon would be willing to create its own system.

"I suggested to Tim years ago, and I would still make the same offer, that I'm willing to go to the town of Chilmark with a map and look for locations for 40- or 50- foot wooden poles that I could put antennas in, that would be less visually obtrusive to the system that's going in now, and would provide some service, and would also have back-up power, which this thing does not have," Mr. Enright said.

"So if a storm goes through, assume this thing will be off the air, which is not the case with the six sites we have otherwise on Martha's Vineyard," he added. "And we are pursuing a permanent site at West Tisbury, along those lines. So that offer is still open to the town of Chilmark, if they want to pursue it."

Mr. Carroll said his facts are not quite accurate. "I was not involved in the project four years ago," he said.

Mr. Carroll said Verizon Wireless is on many DAS, most inside. "On outside systems they want to own the system," he said. "They do not want to be a tenant."

Mr. Carroll said the towns would continue to urge Verizon to partner up with ATC. "Verizon provides a valuable link for public safety because the way it is currently structured only Verizon Wireless can provide the linkage between police cruisers in the field and the dispatch center so they are critical to the public safety structure."

Last year, efforts to complete the system hit a snag when ATC and NSTAR were unable to reach an agreement that would allow ATC to use the power company's utility poles to string the fiber-optic cable that is the backbone of the DAS system.

Mr. Carroll, Aquinnah town administrator Adam Wilson, and selectmen from both towns attempted to break the logjam with letters sent March 4, 2011 addressed to Thomas J. May, NSTAR chief executive officer under the heading, "NSTAR collaboration to address citizen and public safety communications on Martha's Vineyard."

The letter described the need for wireless service. "Many citizens rely solely on wired phone service," they wrote. "Public safety, however, relies heavily on E911 communications from cellular service subscribers to provide rapid response to emergencies (e.g., car accidents, stroke and heart attack victims). In some cases this can make the difference between life and death."

The differences were resolved and the system moved forward. ATC began stringing wire. Where no poles existed, ATC ran the wire underground and erected a pole to mount an antenna.

Can you hear me now

The first transatlantic telephone cable was completed in September 1956. The milestone in telecommunications linked the U.S. and Canada to the United Kingdom and took three years to complete. The effort to improve up-Island wireless service took almost twice as long.

Aquinnah launched the effort to create a DAS system in December 2005 as a way to bolster the town's defense against cell towers and lawsuits brought by cell phone companies under the Telecommunication Act of 1996 (TCA), a federal law that limits the obstacles that towns may place in the way of wireless communication companies seeking to provide service where there is a lack of coverage.

In August 2006, representatives of Aquinnah and Chilmark flew to Nantucket for a quick tour of that island's distributed antenna system. The up-Island officials wanted to see the antennas firsthand as they contemplated how best to provide improved cellular telephone service in their towns.

West Tisbury joined Aquinnah and Chilmark in the discussions. But plans for a tri-town agreement were put aside when West Tisbury town officials and residents disagreed about permitting requirements and the extent of the wireless communication benefits the system would provide in a town with existing towers.

West Tisbury pulled out. Chilmark and Aquinnah forged ahead.

In February 2010, Chilmark and Aquinnah officials signed a contract with ATC to build a DAS that when fully completed could include 55 nodes.

The contract called for ATC to pay Chilmark \$14,000 in rent annually for hosting the hub station and make payments to the towns of \$600 per pole per carrier, dependent on the number of carriers and the minimum number of nodes, or antenna transmitters, used throughout the system.

One solution to poor up-Island wireless communication presented itself years ago, but public attitudes concerning cell phones were quite different. In 1999, Chilmark voters supported a request by public safety organizations, including the Coast Guard, to place antennas on Peaked Hill in order to improve radio reception. Due to existing conservation restrictions, placing the antennas required a special act of the state legislature.

At the time, voters expressed opposition to allowing cellular companies to share antenna space and language was inserted specifically barring commercial use.

.....
.....