

CITY OF MARLBOROUGH MEETING POSTING

Meeting Name: City Council Wireless Communications Committee

Date: November 27, 2018

Time: 7:00 PM

Location: City Council Chamber, 2nd Floor, City Hall, 140 Main Street

Agenda Items to be addressed:

RECEIVED
CITY CLERK'S OFFICE
CITY OF MARLBOROUGH
2018 NOV 20 A 9 40

Continued Review:

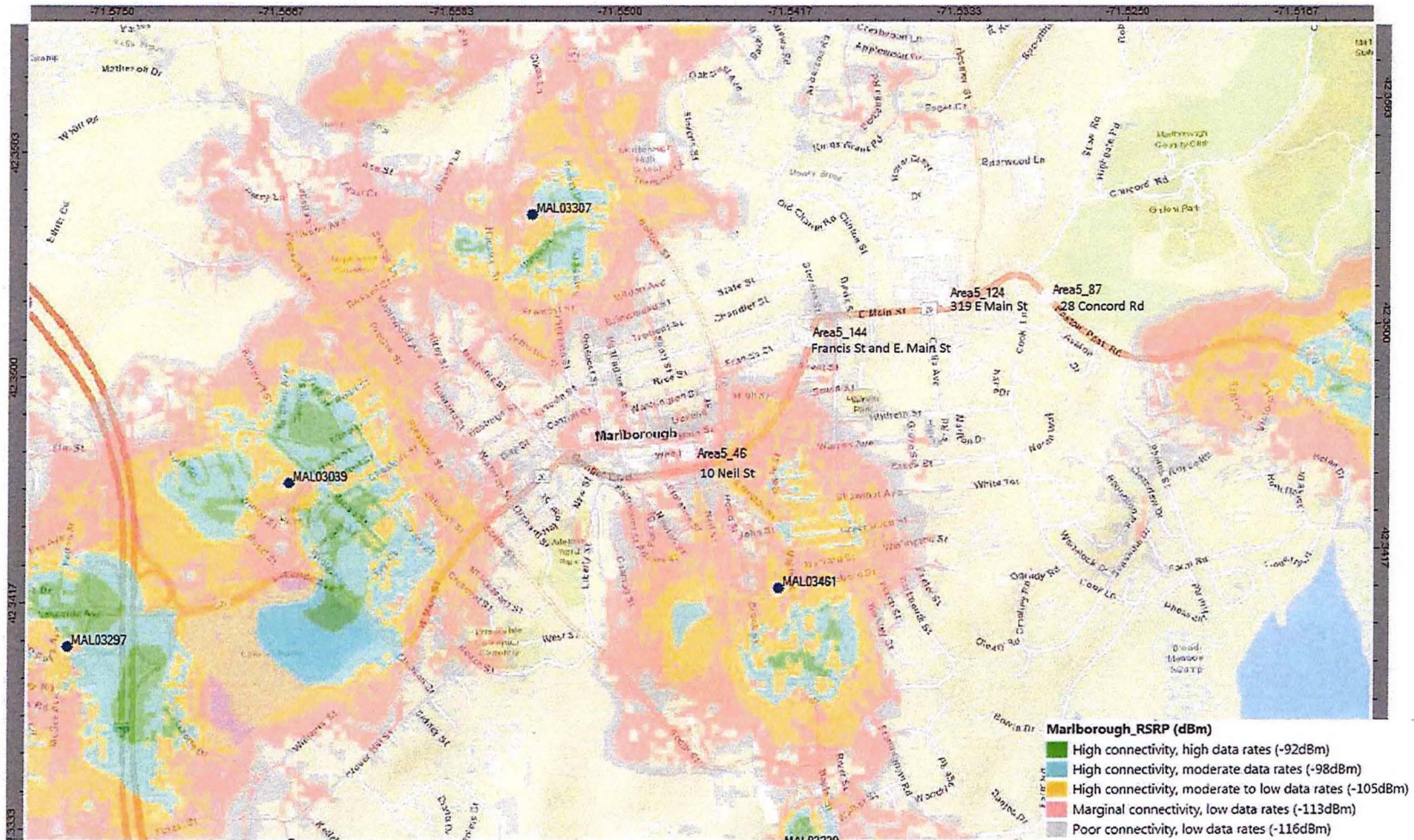
1. 06-18-2018 – **Order No. 18-1007321:** Petition of AT & T to grant a location for Telecommunication Wires and Wireless Attachments and Appurtenances, Francis Street and East Main Street, Utility Pole #11-50.
-Refer to Wireless Communications Committee
-Public Hearing: August 27, 2018
2. 06-18-2018 – **Order No. 18-1007322:** Petition of AT & T to grant a location for Telecommunication Wires and Wireless Attachments and Appurtenances, 10 Neil Street Utility Pole 1.
-Refer to Wireless Communications Committee
-Public Hearing: August 27, 2018
3. 10-16-2017 – **Order No. 17-1007055:** Petition of AT & T to deploy a small cell site which will be mounted on existing utility pole at 28 Concord Road.
-Refer to Wireless Communications Committee
-Public Hearing: November 13, 2017
4. 09-25-2017 – **Order No. 17-1007034:** Petition of AT & T to deploy one small cell site which will be mounted on existing utility poles at 319 East Main Street.
-Refer to Wireless Communications Committee
-Public Hearing: November 13, 2017

THE LISTING OF TOPICS THAT THE CHAIR REASONABLY ANTICIPATES WILL BE DISCUSSED AT THE MEETING IS NOT INTENDED AS A GUARANTEE OF THE TOPICS THAT WILL HAVE BEEN DISCUSSED. NOT ALL TOPICS LISTED MAY IN FACT BE DISCUSSED, AND OTHER TOPICS NOT LISTED MAY ALSO BE BROUGHT UP FOR DISCUSSION TO THE EXTENT PERMITTED BY LAW.

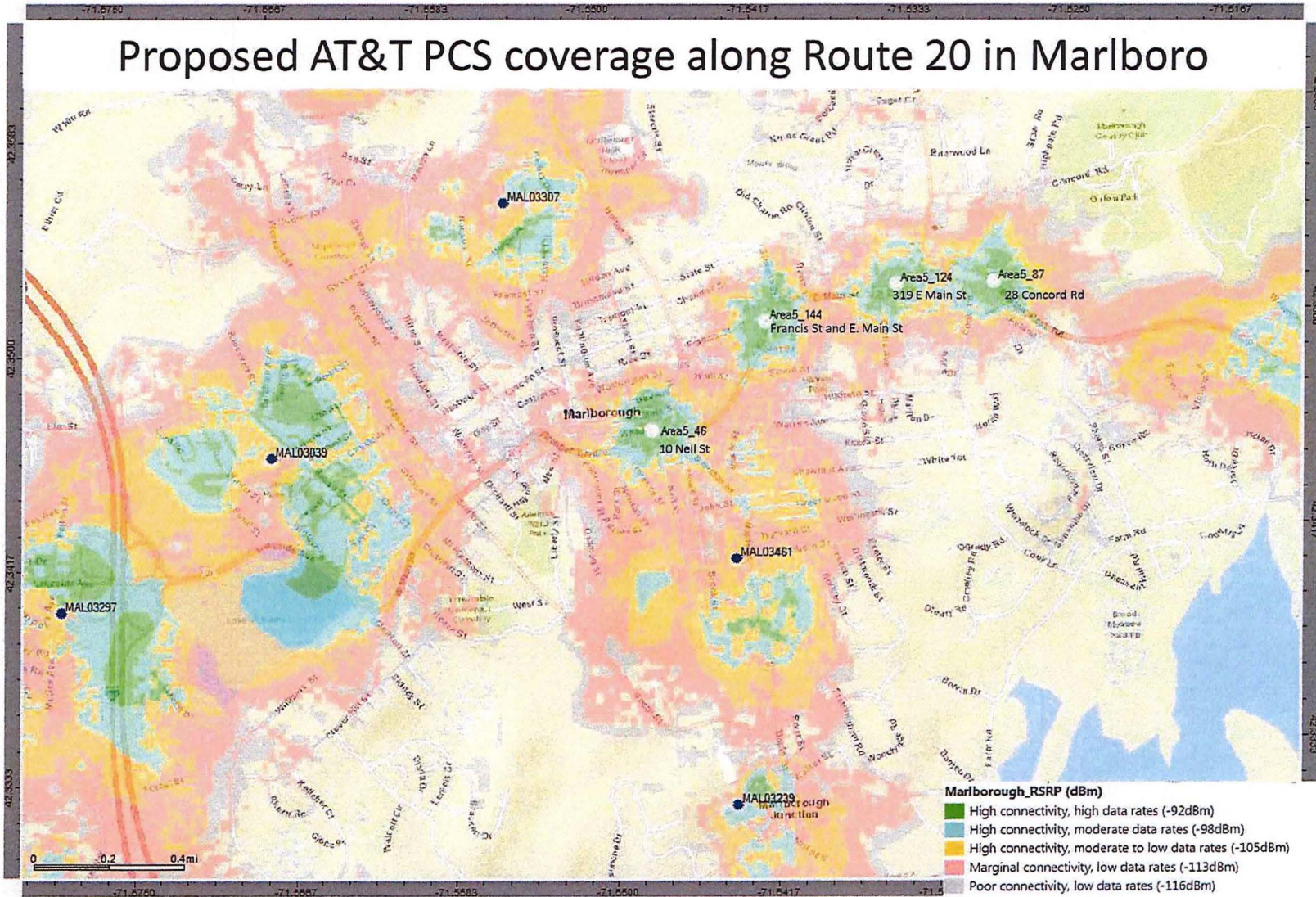
The public should take due notice that the Marlborough City Council may have a quorum in attendance due to Standing Committees of the City Council consisting of both voting and non-voting members. However, members attending this duly posted meeting are participating and deliberating only in conjunction with the business of the Standing Committee.

Electronic devices, including laptops, cell phones, pagers, and PDAs must be turned off or put in silent mode upon entering the City Council Chamber, and any person violating this rule shall be asked to leave the chamber. Express authorization to utilize such devices may be granted by the President for recordkeeping purposes.

Current AT&T PCS coverage along Route 20 in Marlboro



Proposed AT&T PCS coverage along Route 20 in Marlboro





IN CITY COUNCIL

Marlborough, Mass., **JUNE 18, 2018**

ORDERED:

That there being no objection thereto set **MONDAY AUGUST 27, 2018** as **DATE FOR PUBLIC HEARING** On the Petition of AT & T to grant a location for Telecommunication Wires and Wireless Attachments and Appurtenances, Francis Street and East Main Street, Utility Pole #11-50, be and is herewith refer to **WIRELESS COMMUNICATION COMMITTEE**.

ADOPTED

ORDER NO. 18-1007321



IN CITY COUNCIL

Marlborough, Mass., AUGUST 27, 2018
PAGE 1

ORDERED:

That the PUBLIC HEARING On the Petition of AT & T to grant a location for Telecommunication Wires and Wireless Attachments and Appurtenances, Francis Street and East Main Street, Utility Pole #11-50, Order No. 18-1007321, all were heard who wish to be heard, hearing closed at 8:12 PM.

Councilors Present: Delano, Doucette, Dumais, Tunnera, Irish, Clancy, Landers, Juaire, Oram, Ossing & Robey.

PUBLIC SPEAKING IN FAVOR

Michael Dolan from the law firm of Brown Rudnick appeared on behalf of the petitioner, AT&T. AT&T has licenses to operate a wireless network throughout the country and in Massachusetts, they proposed a small cell antennae installation on a utility pole at One Francis Street to deal with the rapidly increasing demand on their network. The small cell facility will be mounted on an existing National Grid utility pole in the public right of way. The AT&T engineers identified the proposed location due to its high data demand on its network in that area. Existing AT&T macro sites in the vicinity are unable to provide adequate coverage for AT&T customers. The facility consists of a small antennae and small equipment cabinet with some fiber optics cables connecting it. They have two other applications before the Council scheduled to be heard by the Wireless Communications Committee as well as an additional petition that evening.

There is no one else speaking in favor. That part of the Public Hearing is closed.

QUESTIONS FROM THE PUBLIC

There are no questions from the public. That part of the Public Hearing is closed.

PUBLIC SPEAKING IN OPPOSITION

There is no one speaking in opposition. That part of the Public Hearing is closed.

QUESTIONS FROM THE CITY COUNCIL

✓ Councilor Landers asked what the height from the ground of the boxes. Mr. Dolan stated the bottom of the electric meters is eight feet off the ground, but the substance of the utility is eleven and a half feet to the bottom of their equipment cabinet. Councilor Landers wondered why that height was chosen. Mr. Dolan stated National Grid dictates their location on the poles and because of existing lines and safety features this is where they are situated on poles throughout the Commonwealth.



IN CITY COUNCIL

Marlborough, Mass., _____ AUGUST 27, 2018

PAGE 2

ORDERED:

✓ Councilor Delano requested clarification on the capability of this equipment and whether it did help with cell service which Mr. Dolan confirmed it did. Councilor Delano asked the range of the equipment and Mr. Dolan approximated it to be at most a half-mile as macro sites are upwards of two- to two-and-a-half miles. These are much smaller and targeted for a specific niche where Marlborough customers are requiring more data capacity. Councilor Delano commented there are several areas within the City that have horrible cell service and he wanted to know how they could help those people get better cell service because it sounds like these will be in higher service areas and not where the service is already poor or non-existent. Mr. Dolan could not speak to those areas specifically with regards to AT&T customers and they may be other carriers with a larger customer base in those areas, but their goal is to cover all of Marlborough. Their engineers felt these locations were the ones with largest demand from AT&T Marlborough customers that need more and better coverage.

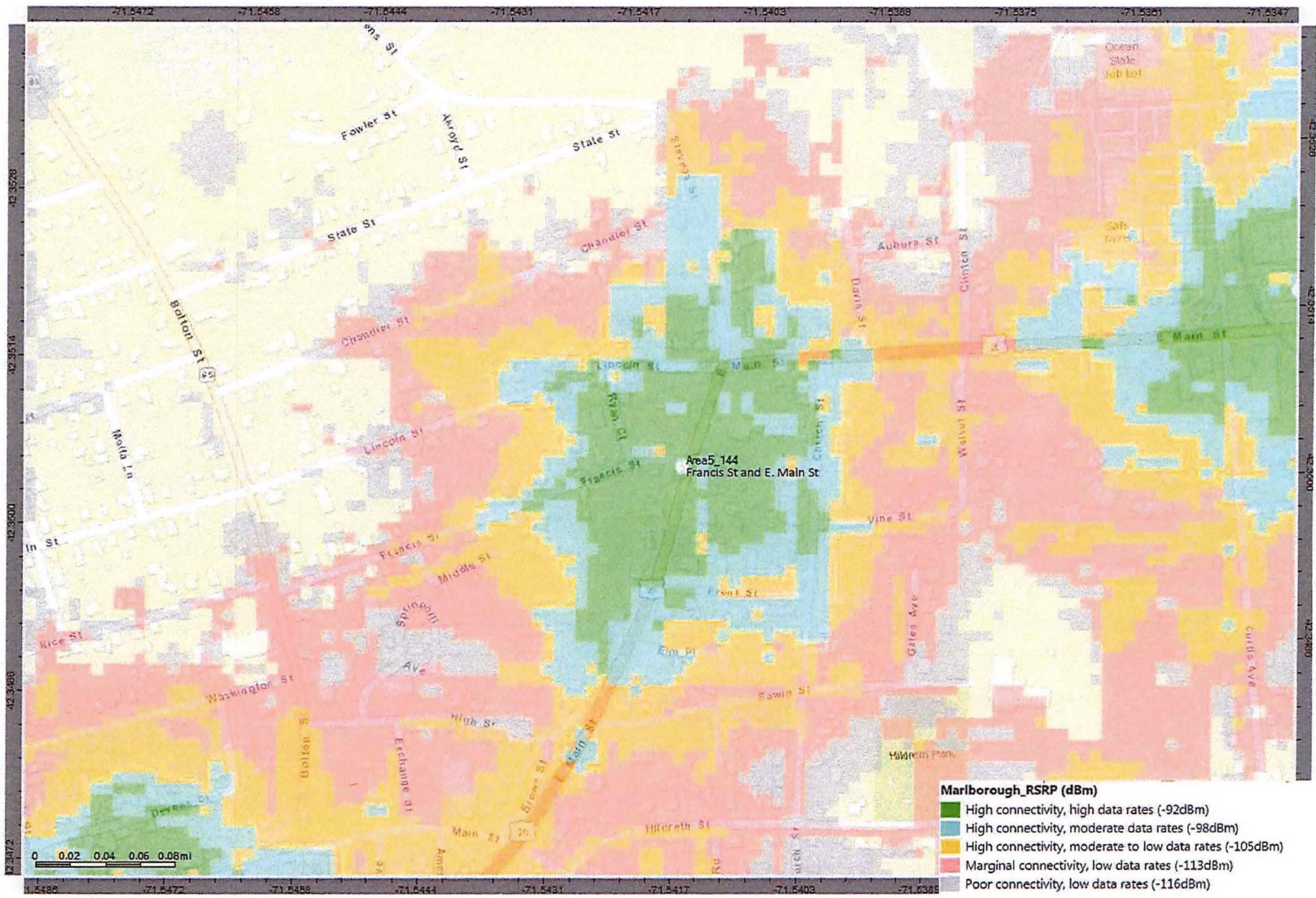
✓ Councilor Doucette stated this petition would be going to the Wireless Communications Committee and made a full disclosure of his status as a Verizon Wireless Customer. Councilor Doucette agreed with the points made by Councilor Delano but also wanted to know how these sites were determined is it an issue of traffic, customer location, dropped calls, etc. Also, he wished to understand how these stations will communicate, is fiber connected to it or is it a wireless connection to another macro station? Mr. Dolan stated there is fiber coming into each of the small cells and explained there is a group at AT&T that collects information from customer usage and traffic patterns, so they can identify where the most need is to alleviate the complaints by their customers.

There are no further questions from members of City Council. That part of the Public Hearing is closed.

That ends the entire Public Hearing. This is currently in the Wireless Communications Committee.

ADOPTED

ORDER NO. 18-1007321A



Map showing cellular service coverage for Area 5_144 (Francis St and E. Main St) in Marlborough, MA. The map displays various streets including State St, Main St, Bolton St, and Francis St. The coverage is color-coded according to the legend, ranging from high connectivity and high data rates (dark green) to poor connectivity and low data rates (grey).

Scale: 0 to 0.08 miles.

Prepared For:
CENTERLINE-AT&T
 Site Number:
AREA 5_144A
 Site Name:
AREA 5_144A
 1 FRANCIS STREET
 MARLBOROUGH, MA 01752



SITE NO: AREA 5_144A
SITE NAME: AREA 5_144A
ADDRESS: 1 FRANCIS STREET
 MARLBOROUGH, MA 01752



SITE TYPE: UTILITY POLE
DATE: 01/11/2018 **REV:** 1
DRAWN BY: KB
SCALE: N.T.S.

THIS STUDY DOES NOT CLAIM IN ANY WAY TO SHOW THE ONLY AREAS OF VISIBILITY. IT IS MEANT TO SHOW A BROAD REPRESENTATION OF AREAS WHERE THE PROPOSED INSTALLATION MAY BE VISIBLE BASED UPON THE BEST INFORMATION FOR TOPOGRAPHY AND VEGETATION LOCATIONS AVAILABLE TO DATE.

LOCUS MAP

TAKEN FROM GOOGLE.COM ON 1-11-18

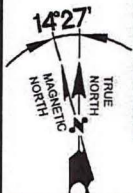
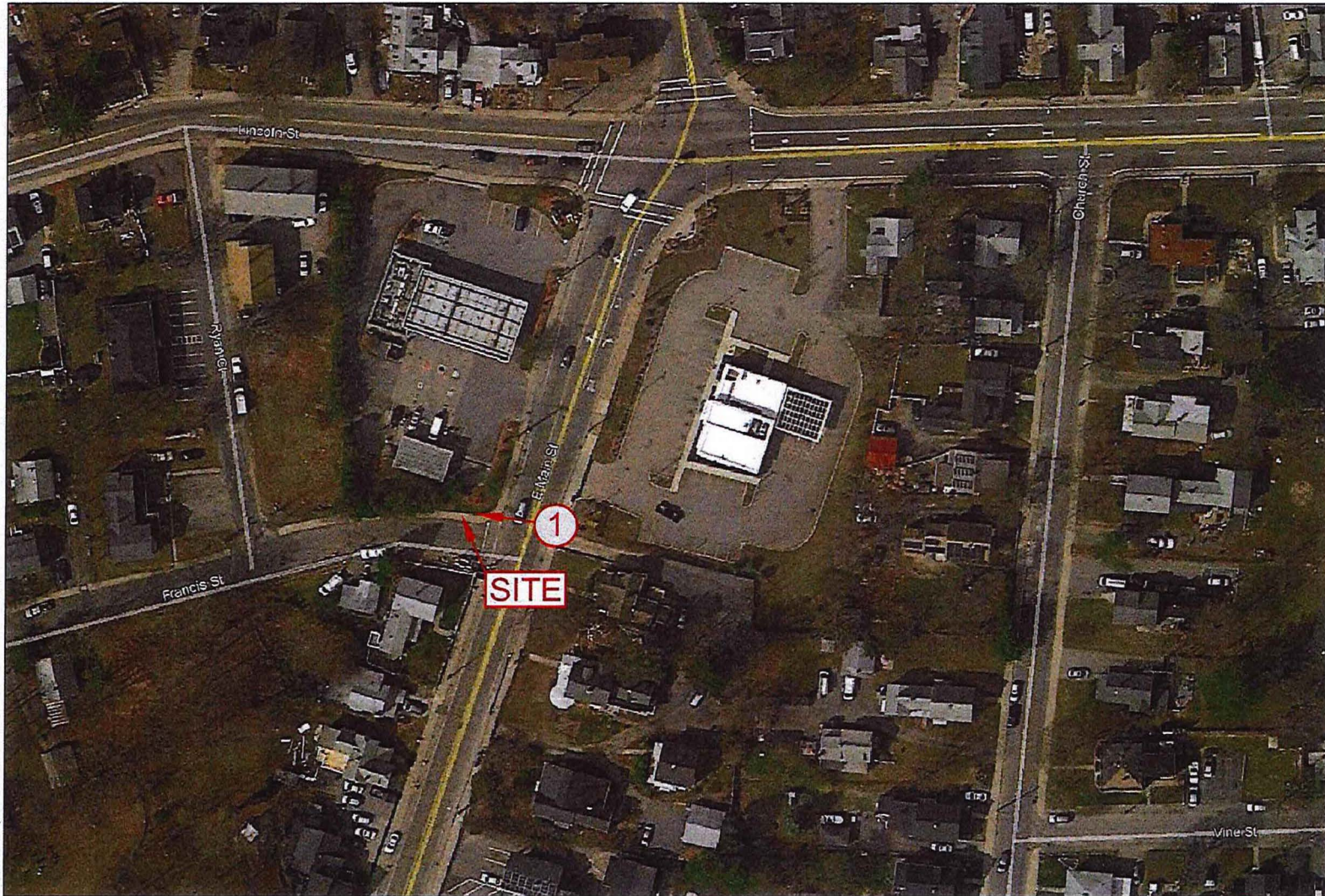


PHOTO LOCATION

SITE NO: AREA 5_144A
SITE NAME: AREA 5_144A
ADDRESS: 1 FRANCIS STREET
 MARLBOROUGH, MA 01752



PREPARED FOR:

 95 RYAN DRIVE
 RAYNHAM, MA 02767

HGD
HUDSON
 Design Group LLC
 45 BEECHWOOD DRIVE
 N. ANDOVER, MA 01845
 TEL: (978) 557-5553
 FAX: (978) 336-5586

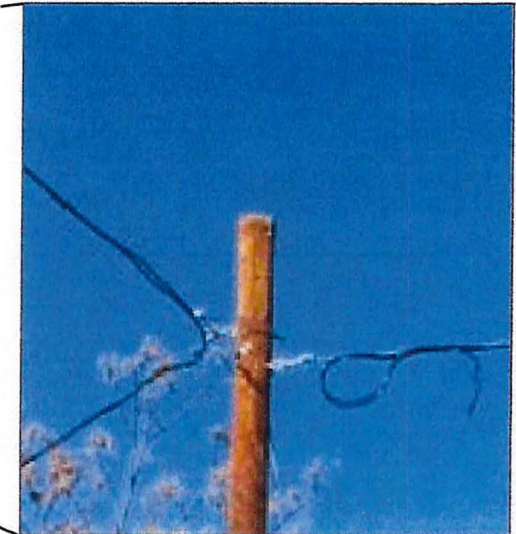
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EXISTING CONDITIONS

LOCATION # 1

DATE OF PHOTO: 12/07/2017



DETAIL OF EQUIPMENT

VIEW WEST FROM EAST MAIN STREET

SITE NO: AREA 5_144A
SITE NAME: AREA 5_144A
ADDRESS: 1 FRANCIS STREET
MARLBOROUGH, MA 01752



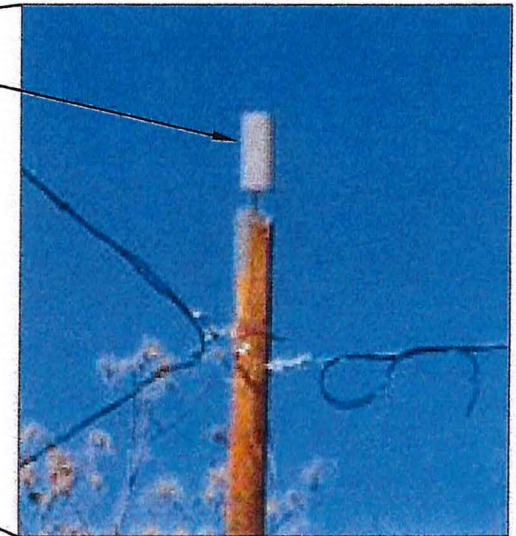
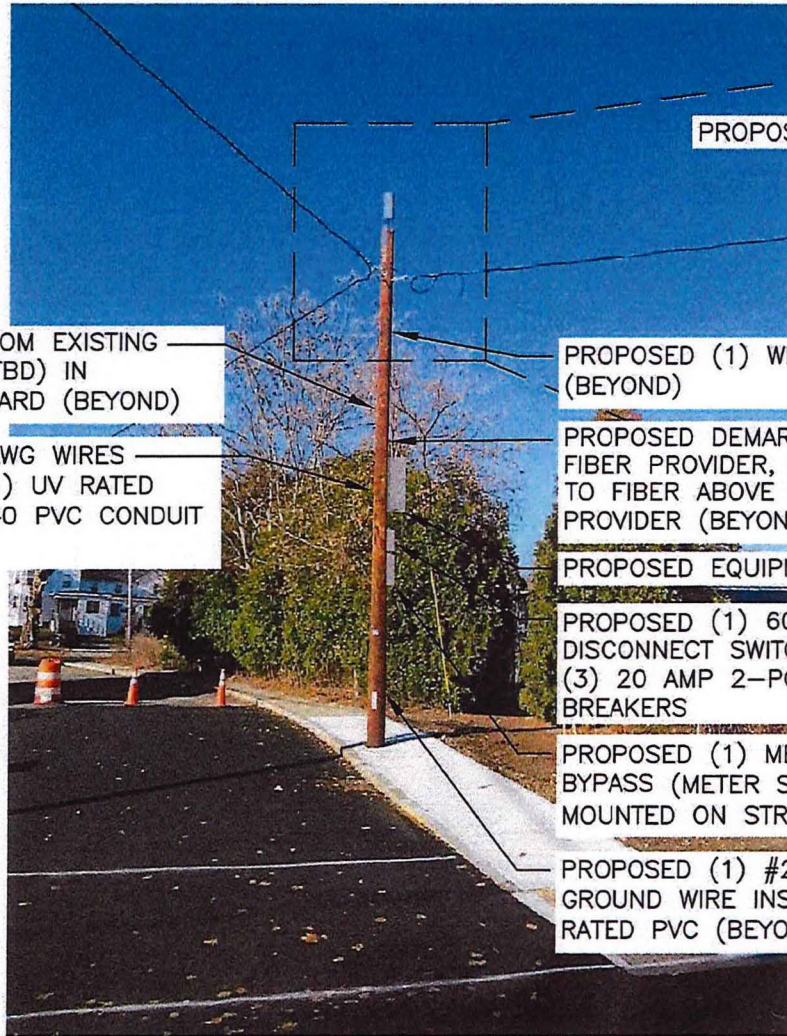
SITE TYPE: UTILITY POLE
DATE: 01/11/2018 **REV:** 1
DRAWN BY: KB
SCALE: N.T.S.

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PROPOSED CONDITIONS

LOCATION # 1

DATE OF PHOTO: 12/07/2017



DETAIL OF EQUIPMENT

PROPOSED FIBER FROM EXISTING SOURCE. (ROUTING TBD) IN PROPOSED 2" U-GUARD (BEYOND)

PROPOSED (3) #6 AWG WIRES INSIDE PROPOSED (1) UV RATED 1-1/4" MIN. SCH. 40 PVC CONDUIT (BEYOND)

PROPOSED ANTENNA

PROPOSED (1) WEATHERHEAD (BEYOND)

PROPOSED DEMARC BOX BY FIBER PROVIDER, CONNECTED TO FIBER ABOVE BY FIBER PROVIDER (BEYOND)

PROPOSED EQUIPMENT CABINET

PROPOSED (1) 60 AMP 2-POLE DISCONNECT SWITCH FUSED AND (3) 20 AMP 2-POLE CIRCUIT BREAKERS

PROPOSED (1) METER MAIN WITH BYPASS (METER SHALL NOT BE MOUNTED ON STREET SIDE)

PROPOSED (1) #2 AWG COPPER GROUND WIRE INSIDE 1/2" UV RATED PVC (BEYOND)

VIEW WEST FROM EAST MAIN STREET

SITE NO: AREA 5_144A
SITE NAME: AREA 5_144A
ADDRESS: 1 FRANCIS STREET
 MARLBOROUGH, MA 01752



SITE TYPE: UTILITY POLE
DATE: 01/11/2018 **REV:** 1
DRAWN BY: KB
SCALE: N.T.S.

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RECEIVED
CITY CLERK'S OFFICE
CITY OF MARLBOROUGH



2018 JUN 13 P 12:08

City Council
140 Main Street
2nd Floor
Marlborough, MA 01752

RE: Petition of New Cingular Wireless PCS, LLC ("AT&T") for Grant of Location for Telecommunication Wires and Wireless Attachments and Appurtenances: Project: Area5_144A : Location: Francis St and E. Main St, 42.350350 N 71.541444 W, Utility Pole: #11-50

Dear Honorable Members of the City Council:

Pursuant to Massachusetts General Laws Chapter 166, Sections 21, 22 and 25A, please find enclosed the petition (the "Petition") of New Cingular Wireless PCS, LLC ("AT&T") for a grant of location for telecommunication wires and wireless attachments and appurtenances to be attached to existing utility poles owned by National Grid within the City of Marlborough. Included with the Petition are detailed plans that identify the locations where AT&T's proposed attachments will be placed. This includes an area map of all locations as well as the utility pole profiles depicting the equipment attachment heights and specs.

AT&T requests that the City schedule a public hearing on this Petition, subject to the requirements of Chapter 166 of the Massachusetts General Laws. Those requirements prescribe that the City mail "written notice of the time and place of the hearing at least seven days prior to all owners of real estate abutting upon that part of the way upon, along, across or under which the line is to be constructed, as such ownership is determined by the last preceding assessment for taxation". It is my understanding that the City will be able to produce this list and I will work with the City Clerk to ensure the letters are sent per these requirements.

Project Description

AT&T proposes to deploy four (4) small cell sites in the City of Marlborough in order to deal with the rapidly increasing demand on AT&T's wireless network. All four (4) small cell sites will be mounted on existing National Grid utility poles located within the public rights of way. The small cell sites will work in conjunction with the existing macro sites installed on rooftops, towers and other structures in and around the City of Marlborough. This Petition specifically addresses the following location:

Project: Area5_144A : Location: Francis St and E. Main St, 42.350350 N 71.541444 W, Utility Pole: #11-50

AT&T's radio frequency engineers targeted the proposed location due to the high traffic and data demands on AT&T's network. AT&T's existing macro cell sites are not providing adequate data capacity in this location due to increased population, vehicular and foot traffic, multiple wireless devices used by each person and other contributing factors. This small cell site will work to offload the demand on the macro sites and allow for increased data capacity and speed within the immediate vicinity of the proposed small cell site.

The small cell site will be installed using standard commercially accepted methods in accordance with all applicable federal, state and local laws and regulations. All proposed attachments are to existing poles owned and maintained by National Grid. AT&T has entered into a Pole Attachment Agreement with National Grid.

The small cell installation on each existing utility pole will include: fiber optic cable(s); remote nodes in a small equipment cabinet H32" x W18" x D12" mounted to the pole at least 8' above ground level; an unobtrusive pole top antenna measuring 24.7" long and 10" in diameter; conduits and cable protectors; and, an electrical meter with shutoff switch. Attached please find design sketches for each site showing the proposed location, pole height, mounting height, equipment specifications and utility plan.

The Telecommunications Act of 1996 (the "Act")

Without the installation, AT&T would be unable to provide specifically established coverage and capacity objectives. The utility pole is located within the limited geographic area whereby AT&T's radio frequency engineers determined that a wireless facility is required. The Act imposes substantial restrictions affecting the standard for granting the requested relief. The ACT provides that: no laws or actions by any local government or planning or zoning board may prohibit, or have the effect of prohibiting, the placement, construction, or modification of communications towers, antennas, or other wireless facilities in any particular geographic area, see 47 U.S.C. §332(c)(7)(B)(i); local government or planning or zoning boards may not unreasonably discriminate among providers of functionally equivalent services, see 47 U.S.C. §332(c)(7)(B)(ii); health concerns may not be considered so long as the emissions comply with the applicable standards of the FCC, see 47 U.S.C. §332(c)(7)(B)(iv); and, decisions must be rendered within a reasonable period of time, see 47 U.S.C. §332(c)(7)(B)(ii) and the FCC's Declaratory Ruling commonly referred to as the "shot clock".

We have attached to this petition a generic emissions report demonstrating that the low power antenna will comply with applicable FCC standards with respect to emissions.

For the convenience of the City Council, AT&T has provided a proposed Form of Order for your consideration.

Should you have any questions, or would like any additional information prior to the public hearing please do not hesitate to contact me at (774) 261-0043 or jjacoviello@clinelc.com. AT&T will be present at the public hearing to answer any questions you may have as well.

Thank you,

Jeff Iacoviello



Jeffrey Iacoviello | Site Acquisition Consultant
 750 W Center St, Floor 3 | West Bridgewater, MA 02379
 Mobile: 774.261.0043 | Fax: 617.249.0819
jjacoviello@clinelc.com | www.centerlinecommunications.com

PETITION FOR LOCATIONS FOR TELECOMMUNICATIONS WIRES AND WIRELESS ATTACHMENTS AND APPURTENANCES**To THE CITY COUNCIL OF THE CITY OF MARLBOROUGH, MASSACHUSETTS**

Pursuant to Massachusetts General Laws, Chapter 166, Sections 21, 22 and 25A, and the City Ordinances of the City of Marlborough, Massachusetts, NEW CINGULAR WIRELESS PCS, LLC ("AT&T") requests that it be granted locations for and permission to construct and maintain telecommunications wires and wireless attachments and appurtenances, including fiber optic cable(s), remote nodes and pole top antennas to be attached to existing National Grid utility poles, located upon and along the following public ways within the City of Marlborough, as depicted on the attached plans. In addition, AT&T seeks permission to install conduit or direct bury cable(s) as depicted on the plans submitted.

Wherefore, AT&T requests that, after due notice and public hearing as provided by law, that it be granted locations for permission to construct the telecommunications wires and wireless attachments and appurtenances upon, along and under the public ways within the City of Marlborough as depicted on the plans filed herewith. AT&T also submitted additional information in support of this Petition.

Respectfully submitted,

NEW CINGULAR WIRELESS PCS, LLC ("AT&T")

By: Jeff Iacoviello
Site Acquisition Consultant
Centerline Communications, LLC

ORDER FOR LOCATION FOR TELECOMMUNICATIONS WIRES AND WIRELESS ATTACHMENTS AND APPURTENANCES

By the City Council

Of the City of Marlborough, Massachusetts, _____, 2018

ORDERED:

That pursuant to Massachusetts General Laws, Chapter 166, NEW CINGULAR WIRELESS PCS, LLC ("AT&T") is hereby granted locations for and permission to construct and maintain telecommunications wires and wireless attachments and appurtenances, including fiber optic cable(s), remote nodes and pole top antennas, to be attached to existing National Grid utility poles, located upon, along and under the public ways within the City of Marlborough, as substantially shown on the plans filed with said Petition. In addition, AT&T is hereby granted permission to install conduit or direct bury fiber cable(s) as depicted on the plans submitted.

The forgoing permission is subject to the following conditions:

1. The telecommunications wires and wireless attachments and appurtenances shall be installed and operated in compliance with all applicable federal and state laws and regulations.
2. AT&T shall indemnify and save the City harmless against all damages, costs and expense whatsoever to which the City may be subjected in consequence of the acts or neglect of AT&T or its agents or servants, or in any manner arising from the rights and privileges granted by the City.
3. AT&T shall comply with the requirements of existing City Ordinances, as may be applicable and such as may hereafter be adopted governing the construction and maintenance of said telecommunications wires and wireless attachments and appurtenances, so far as the same are not inconsistent with the laws of the United States or of the Commonwealth of Massachusetts.

I hereby certify that the foregoing was adopted at a meeting of the City Council of the City of Marlborough, Massachusetts, held on the _____ day of _____, 2018.

City Clerk

APPROVED

We hereby certify that on _____, 2017, at _____, o'clock at _____, a public hearing was held on the Petition of NEW CINGULAR WIRELESS PCS, LLC ("AT&T") for permission to construct and maintain telecommunications wires and wireless attachments and appurtenances, including fiber optic cable(s), remote nodes and pole top antennas, to be attached to existing utility poles, located upon, along and under the public ways within the City of Marlborough and to install conduit or direct bury fiber cable(s) as indicated in the plans described in the order herewith recorded, that we mailed at least seven days before said hearing a written notice of the time and place of said hearing to each of the owners of real estate (as determined by the last preceding assessment for taxation) along the ways or parts of ways upon which the Company is permitted to construct the telecommunications wires and appurtenances of AT&T under said order, and that thereupon said order was duly adopted.

City Council of the City of Marlborough

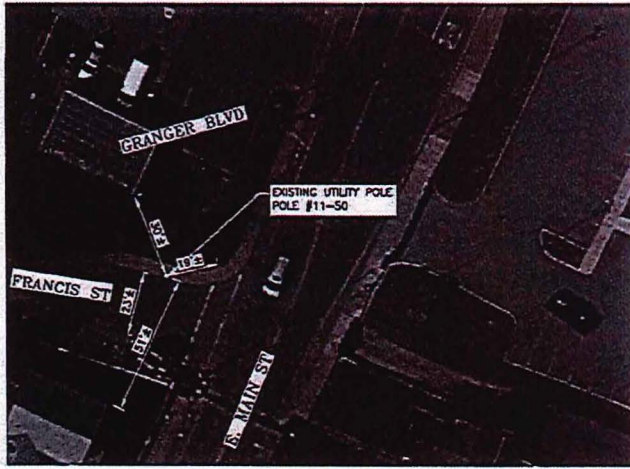
CERTIFICATE

I hereby certify that the forgoing is a true copy of a grant of location order and certificate of hearing with notice adopted by the City Council of the City of Marlborough, Massachusetts, on the _____ day of _____, 2018, and recorded with records of location orders of said City, Book _____, Page _____. This certified copy is made under the provisions of Chapter 166 of the Massachusetts General Laws, as amended.

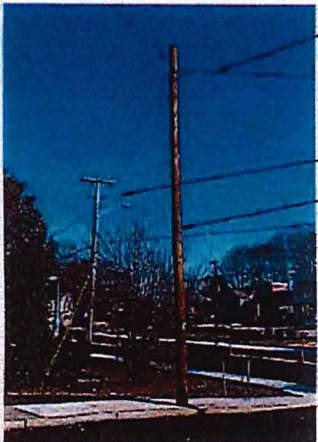
Attest:

City Clerk

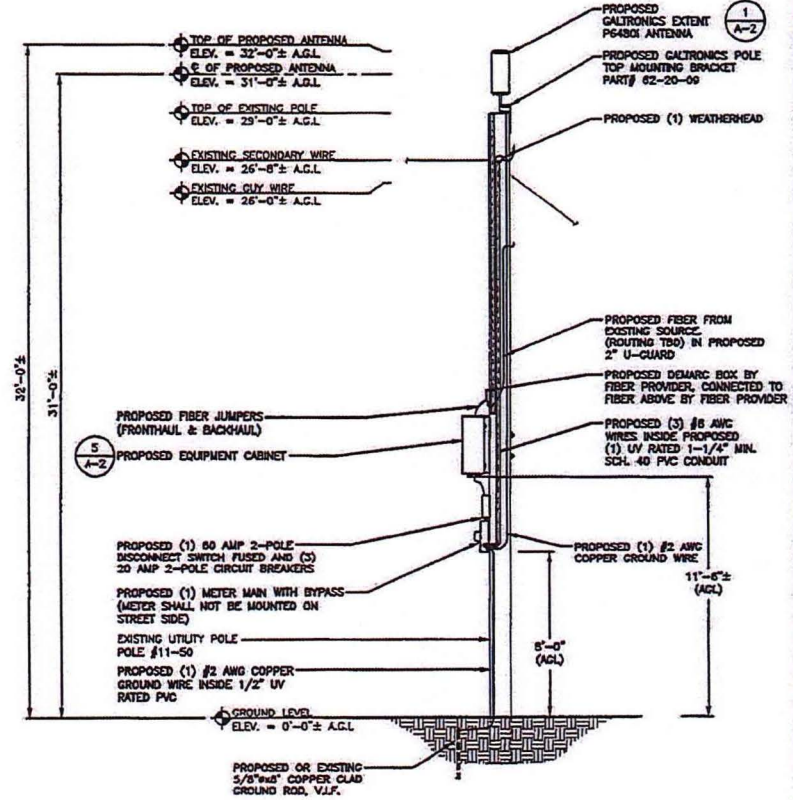
APPROXIMATE COORDINATES: LAT: 42.350350° N LONG: 71.541444° W



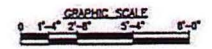
KEY PLAN
22x34 SCALE: 1"=20'
11x17 SCALE: 1"=40'



EXISTING CONDITIONS PHOTO DETAIL
SCALE: N.T.S.



ELEVATION
22x34 SCALE: 3/8"=1'-0"
11x17 SCALE: 3/16"=1'-0"



CHECKED BY: AT
APPROVED BY: DJC

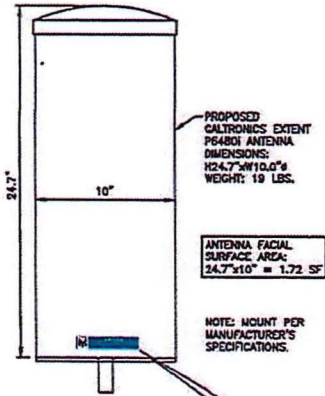
SUBMITTALS

REV.	DATE	DESCRIPTION	BY

CLUSTER AND NODE NUMBER:
AREA 5_144A
SITE ID:
AREA 5_144A
SITE ADDRESS:
**FRANCIS ST & E MAIN ST
MARLBOROUGH, MA 01752
MIDDLESEX COUNTY**

SHEET TITLE
KEY PLAN AND ELEVATION

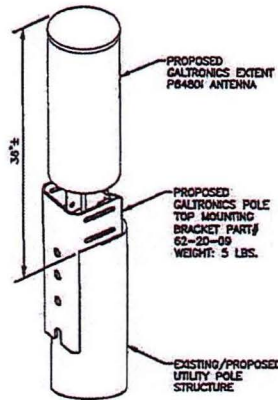
SHEET NUMBER
A-1



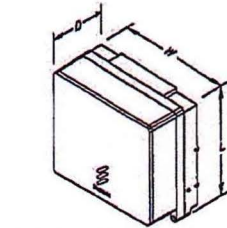
NOTICE
 NOTICE STICKERS EQUALLY SPACED AROUND THE BOTTOM OF ANTENNA RADOME

NOT-CD-16 1"x6" NOTICE DECAL
 PLACE THESE NOTICE STICKERS EQUALLY SPACED AROUND THE BOTTOM OF ANTENNA RADOME

ANTENNA DETAIL
 SCALE: N.T.S.

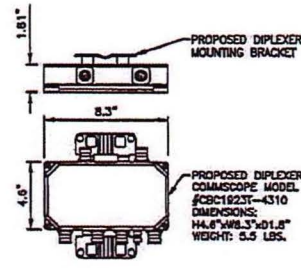


ANTENNA MOUNT DETAIL
 SCALE: N.T.S.

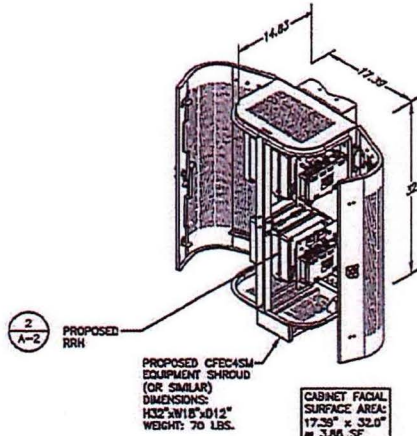


MODEL	QTY	L	W	D	WGT.
2203	3	8.0"	8.0"	4.0"	11 LB
2205	1	8.0"	8.0"	4.0"	11 LB

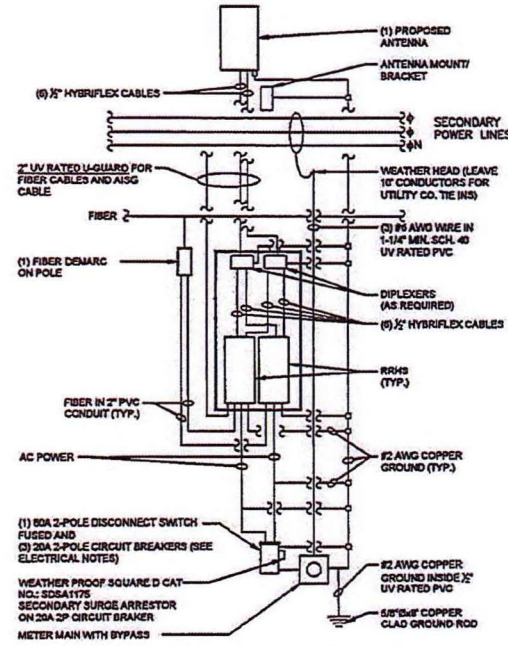
RRH (2203/2205) DETAIL
 SCALE: N.T.S.



DIPLEXER DETAIL (AS REQUIRED)
 SCALE: N.T.S.



EQUIPMENT CABINET DETAIL
 SCALE: N.T.S.



GENERAL WIRING DIAGRAM - DUAL RRHs
 SCALE: N.T.S.



CHECKED BY: AT

APPROVED BY: DJC

SUBMITTALS			
NO.	DATE	DESCRIPTION	BY

CLUSTER AND NODE NUMBER:
 AREA 5_144A
 SITE ID:
 AREA 5_144A
 SITE ADDRESS:
 FRANCIS ST & E. MAIN ST
 MARLBOROUGH, MA 01752
 MIDDLESEX COUNTY

SHEET TITLE
 EQUIPMENT DETAILS

SHEET NUMBER
 A-2

DONALD L. HAES, JR., PH.D., CHP*Radiation Safety Specialist*

Registered Health Physics Services Provider in NH and MA

PO Box 198, Hampstead, NH 03841

603-303-9959

Email: donald_haes_chp@comcast.net

January 17, 2018

I have reviewed the information pertinent to the hypothetical installation of an AT&T Personal Wireless Services (PWS) omni-directional panel antenna installation on a utility pole. I have analyzed the scenario where there would be one antenna mounted with a centerline height of 30' above ground level (AGL). This analysis considers the contributions of the AT&T PWS transmitters operating at the following supplied parameters:

PWS Service	Frequency (MHz)	Transmit Power (ERP: Watts)	Antenna Manufacturer / Model Number	Antenna Gain (dBd)
PCS LTE	1930-1950	40	EXTENT™ P6480i (See Appendix A)	7.33
5G: U-NII-1	5150-5250	1		7.53
5G: U-NII-3	5725-5850			

The calculated values of RF fields are presented as a percent of current Maximum Permissible Exposures (%MPE) as adopted by the Federal Communications Commission (FCC). Theoretical RF field calculations for the near proximity of RF source terms (in this case the AT&T transmit antennas), however, are not straight forward. For these theoretical calculations, a cylindrical model was used, where "spatially averaged plane-wave equivalent power densities parallel to the antenna may be estimated by dividing the net antenna input power by the surface area of an imaginary cylinder surrounding the length of the radiating antenna". Calculations using "far-field" formula would considerably overestimate the resultant power densities. The calculations performed for this analysis still accurately represent the "worst case" and assume 100% usage of all the antennas.

The power density estimates can be calculated by using the formula:

$$S = \frac{P_{net}}{2 \cdot \pi \cdot R \cdot h}$$

Where: P_{net} = Net power to antenna (watts)
 R = Distance (range) from antenna
 h = aperture height of the antenna

The results of the RF field calculations for a single antenna are depicted in Figure 1 showing a side view representation demonstrating the directionality of the RF energy propagating from the antenna.

Note: The analyses, conclusions and professional opinions are based upon the precise parameters and conditions of this typical AT&T "small cell" installation on a utility pole with a mounting centerline height of 30' AGL. 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.

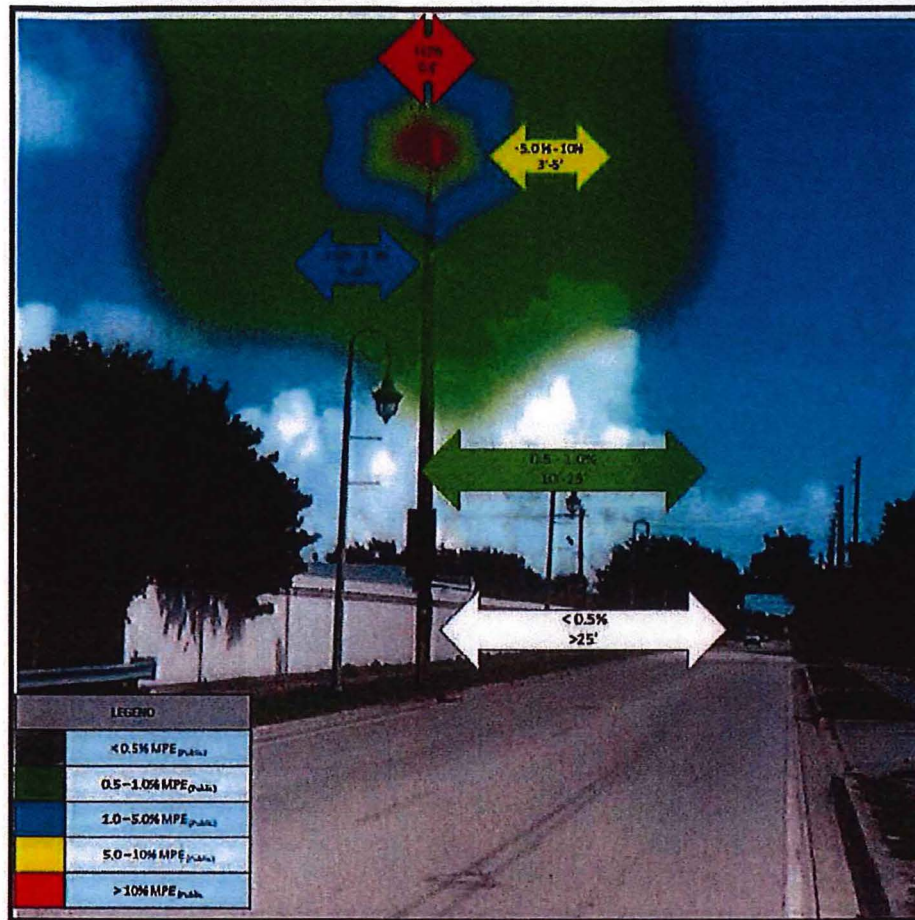


Figure 1: Results of RF field calculations for a typical AT&T antenna installation on a utility pole at 30' (AGL) showing profile view

CONCLUSION

Theoretical RF field calculations data indicate the summation of the AT&T RF contributions on a typical utility pole would be well within the established RF exposure guidelines; see Figure 1. Although the calculations assume a typically low mounting height of 30' AGL, some applications may require the antenna to be mounted higher. In these circumstances, the increased separation between the ground and antenna would result in an even lower general public exposure levels. These results indicate there could be more similar installations at these locations, and still be within Federal and State guidelines for RF exposure. This report provides written proof that the proposed facilities would comply with the FCC RF exposure guidelines. These small cell antenna installations proposed by AT&T would not produce significant changes to the ambient RF environment.

DONALD L. HAES, JR., PH.D., CHP*Radiation Safety Specialist*

Registered Health Physics Services Provider in NH and MA

PO Box 198, Hampstead, NH 03841

603-303-9959

Email: donald_haes_chp@comcast.net

STATEMENT OF CERTIFICATION

1. I certify to the best of my knowledge and belief, the statements of fact contained in this report are true and correct.
2. The reported analyses, opinions, and conclusions are limited only by the reported assumptions and limiting conditions, and are personal, unbiased professional analyses, opinions and conclusions.
3. I have no present or prospective interest in the property that is the subject of this report and I have no personal interest or bias with respect to the parties involved.
4. My compensation is not contingent upon the reporting of a predetermined energy level or direction in energy level that favors the cause of the client, the amount of energy level estimate, the attainment of a stipulated result, or the occurrence of a subsequent event.
5. This assignment was not based on a requested minimum environmental energy level or specific power density.
6. My compensation is not contingent on an action or event resulting from the analyses, opinions, or conclusions in, or the use of, this report.
7. The consultant has accepted this assessment assignment having the knowledge and experience necessary to complete the assignment competently.
8. My analyses, opinions, and conclusions were developed and this report has been prepared, in conformity with the *American Board of Health Physics (ABHP)* statements of standards of professional responsibility for Certified Health Physicists.

Date: January 17, 2018

Donald L. Haes, Jr., Ph.D

Certified Health Physicist

APPENDIX A



10" x 24" Outdoor Pseudo Omni Canister Antenna [1695-2400, 3550-3700 and 5150-5950 MHz]

EXTENT™ P6480i

Description:

- Pseudo Omni Canister Antenna for Outdoor DAS and Small Cells,
- 4x ports for AWS/PCS/WCS Band 1695-2400 MHz
- 4x ports for CBRS Band 3550-3700 MHz
- 2x ports for 5GHz Band 5150-5950 MHz



1695-2400, 3550-3700 and 5150-5950 MHz Pseudo Omni Canister Antenna

Electrical Specifications				
Frequency Band [MHz]	1695-2180	2180-2400	3550-3700	5150-5950
Input Connector Type	4x 4.3-10 DIN(F)		4x 4.3-10 DIN(F)	2x 4.3-10 DIN(F)
Isolation (typ.)	-20 dB		-25 dB	-25 dB
Inter-Band Isolation	-30 dB (typ)		-30 dB (typ)	-30 dB (typ)
VSWR/Return Loss	1.5:1(Typ.) 1.7:1(Max.) / 14.0 dB(Typ.) 11.8dB(Max.)			
Impedance	50 Ω			
Polarization	Dual slant 45° to 45°			
Horizontal Beamwidth	Omni (360°)			
Vertical Beamwidth	15°	12°	15°	19°
Max. Gain	9 dBi	9.5 dBi	8.5 dBi	6 dBi(Max.)
Avg. Gain	7.5 dBi	8 dBi	8 dBi	9 dBi
Downtilt	0°			
Max Power / Port	150 Watts		100 Watts	10 Watts
PIM @ 2x43 dBm	<-153 dBc		N/A	N/A

Mechanical Specifications	
Operating Temperature	-40° to 158°F (-40° to +70°C)
Antenna Weight	19 lbs (9 kg)
Antenna Diameter	10" (254 mm)
Antenna Height	24.7" (628 mm)
Radome Material	ASA
RoHS	Compliant
Radome Color	Gray, Brown, 3M™ Conceal Film, Custom Colors Possible
Ingress Protection	Outdoor (IP65)
Wind Survival Rating	150 mph (241 km/h)
Shipping Dimensions - L x W x D	30"x19"x19" (762x483x483 mm)
Shipping Weight (Gross Weight)	26 lbs (12 kg)

Release Date: March 02, 2017; Revision: 5.1; RFD#6480

Copyright © 2017 - Galtronics Corporation Ltd.
 Proprietary Information. All rights reserved. Galtronics reserves the right to modify or amend any antenna or specification without prior notice.

WWW.GALTRONICS.COM



IN CITY COUNCIL

Marlborough, Mass., **JUNE 18, 2018**

ORDERED:

That there being no objection thereto set **MONDAY AUGUST 27, 2018** as **DATE FOR PUBLIC HEARING** On the Petition of AT & T to grant a location for Telecommunication Wires and Wireless Attachments and Appurtenances, 10 Neil Street Utility Pole 1, be and is herewith refer to **WIRELESS COMMUNICATION COMMITTEE.**

ADOPTED

ORDER NO. 18-1007322



IN CITY COUNCIL

Marlborough, Mass., AUGUST 27, 2018

ORDERED:

That the PUBLIC HEARING On the Petition of AT & T to grant a location for Telecommunication Wires and Wireless Attachments and Appurtenances, 10 Neil Street Utility Pole 1, Order No. 18-1007322, all were heard who wish to be heard, hearing closed at 8:14 PM.

Councilors Present: Delano, Doucette, Dumais, Tunnera, Irish, Clancy, Landers, Juaire, Oram, Ossing & Robey.

PUBLIC SPEAKING IN FAVOR

Michael Dolan from the law firm of Brown Rudnick appeared on behalf of the petitioner, AT&T. This is a small cell application, from AT&T for Ten Neil Street. This is one of the four sites being pursued in the City of Marlborough. The reasons for the petition are the same as those previously mentioned in the just completed public hearing for One Francis Street.

There is no one else speaking in favor. That part of the Public Hearing is closed.

QUESTIONS FROM THE PUBLIC

There are no questions from the public. That part of the Public Hearing is closed.

PUBLIC SPEAKING IN OPPOSITION

There is no one speaking in opposition. That part of the Public Hearing is closed.

QUESTIONS FROM THE CITY COUNCIL

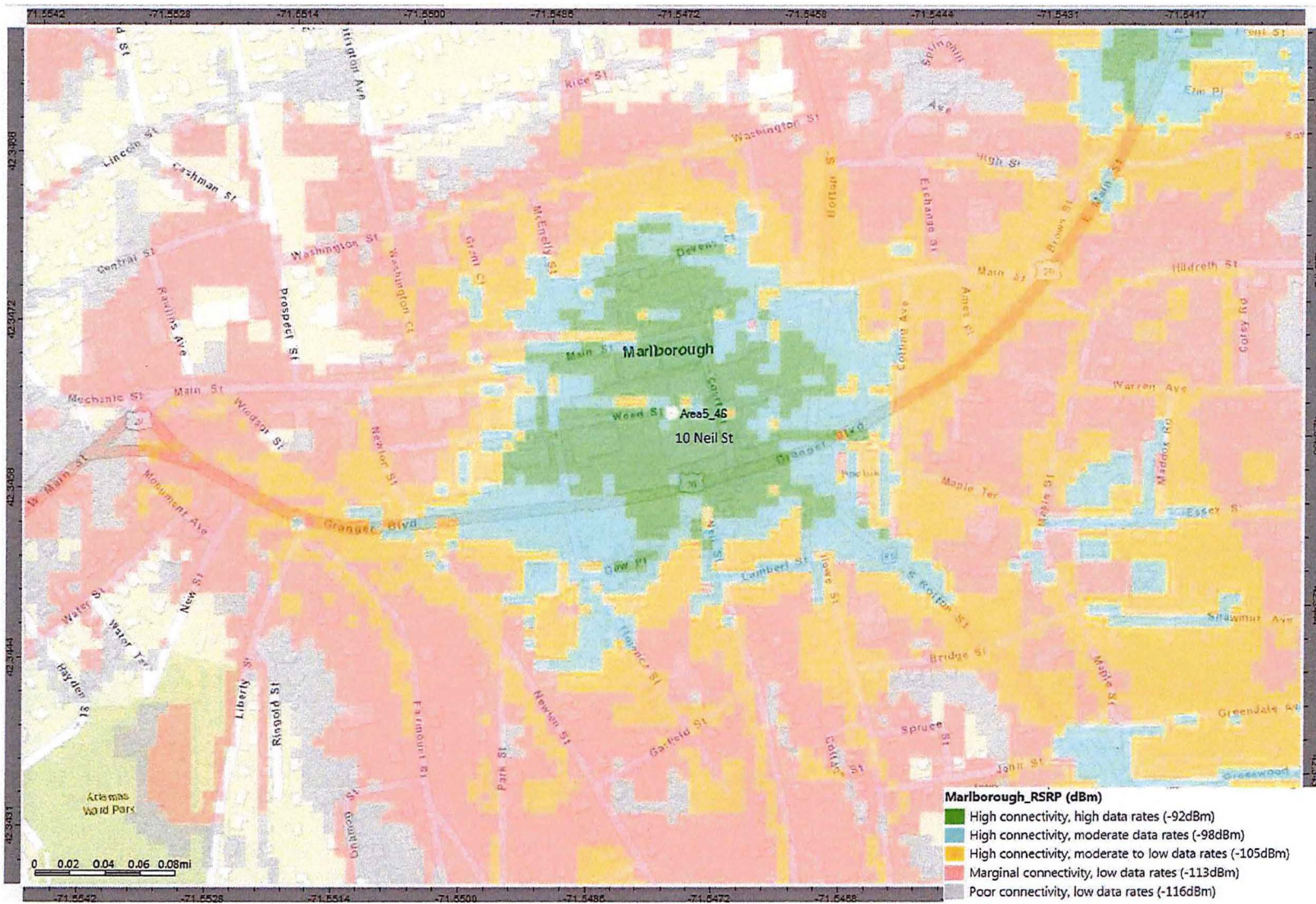
✓ Councilor Doucette asked with the small cell sites, is there a battery backup in case of a power outage. Mr. Dolan did not think that was the case but will confirm and clarify for the Wireless Communications Committee meeting.

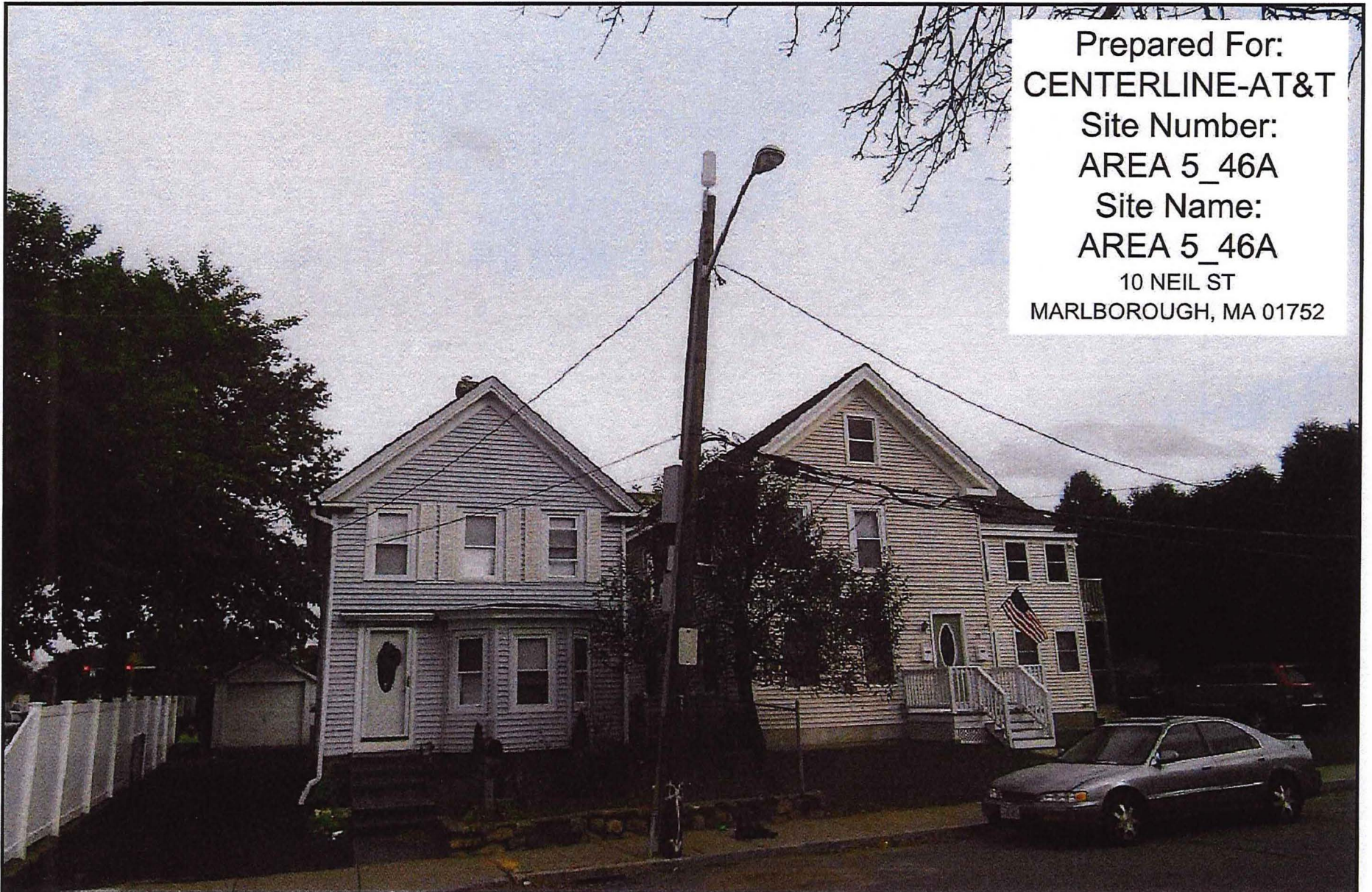
There are no further questions from members of City Council. That part of the Public Hearing is closed.

That ends the entire Public Hearing. This is currently in the Wireless Communications Committee.

ADOPTED

ORDER NO. 18-1007322A





Prepared For:
CENTERLINE-AT&T
 Site Number:
AREA 5_46A
 Site Name:
AREA 5_46A
 10 NEIL ST
 MARLBOROUGH, MA 01752

SITE NO: AREA 5_46A
SITE NAME: AREA 5_46A
ADDRESS: 10 NEIL ST
 MARLBOROUGH, MA 01752



PREPARED FOR:
CENTERLINE
 COMMUNICATIONS
 95 RYAN DRIVE
 RAYNHAM, MA 02767

HUDSON
 Design Group LLC
 45 BEECHWOOD DRIVE
 N. ANDOVER, MA 01845
 TEL: (978) 557-5553
 FAX: (978) 336-5586

SITE TYPE: UTILITY POLE
DATE: 1/11/2018 **REV:** 1
DRAWN BY: KB
SCALE: N.T.S.

THIS STUDY DOES NOT CLAIM IN ANY WAY TO SHOW THE ONLY AREAS OF VISIBILITY. IT IS MEANT TO SHOW A BROAD REPRESENTATION OF AREAS WHERE THE PROPOSED INSTALLATION MAY BE VISIBLE BASED UPON THE BEST INFORMATION FOR TOPOGRAPHY AND VEGETATION LOCATIONS AVAILABLE TO DATE.

PAGE 1 OF 4

LOCUS MAP

TAKEN FROM GOOGLE.COM ON 01-11-18

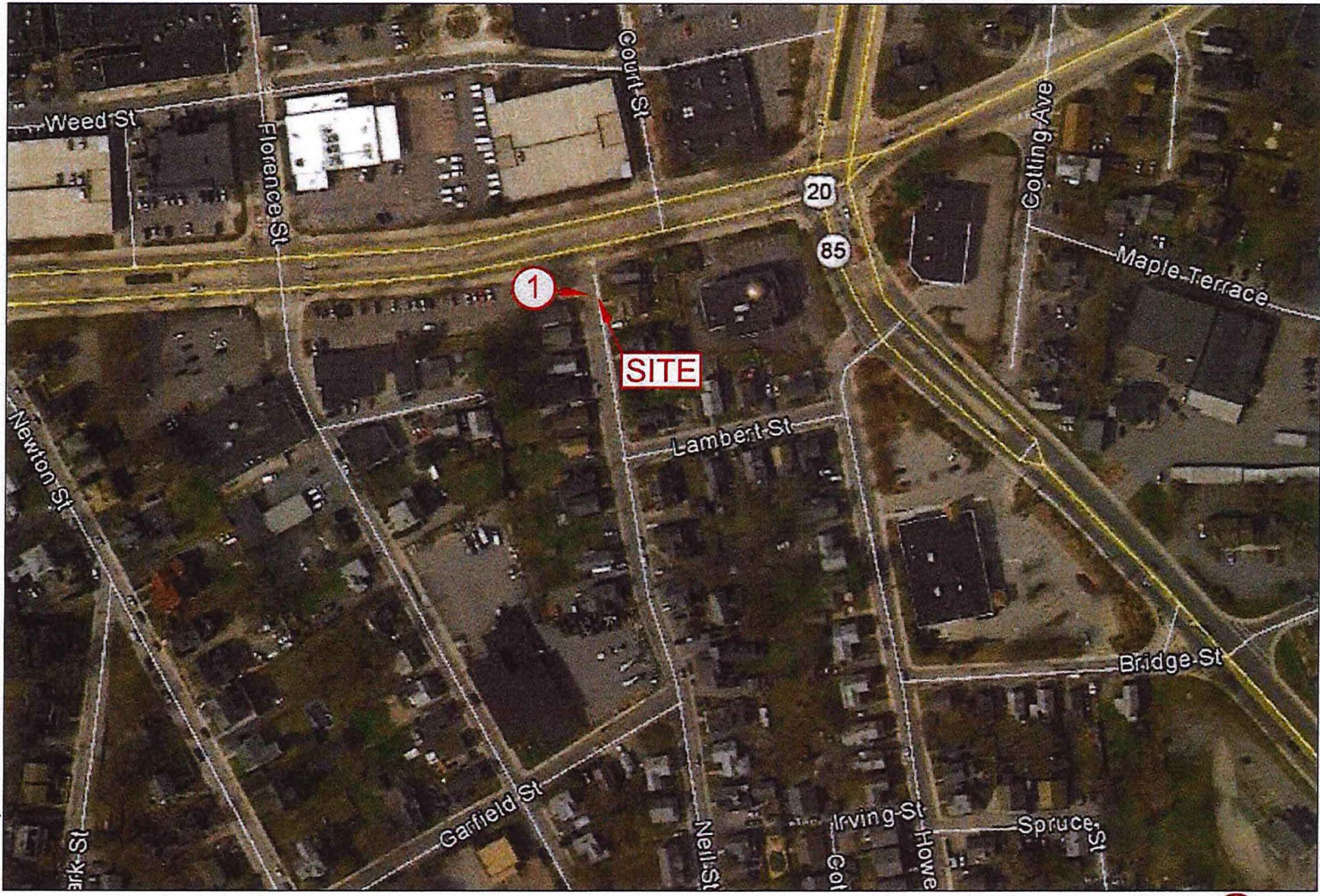


PHOTO LOCATION

SITE NO: AREA 5_46A
SITE NAME: AREA 5_46A
ADDRESS: 10 NEIL ST
 MARLBOROUGH, MA 01752



SITE TYPE: UTILITY POLE
DATE: 1/11/2018 **REV:** 1
DRAWN BY: KB
SCALE: N.T.S.

THIS STUDY DOES NOT CLAIM IN ANY WAY TO SHOW THE ONLY AREAS OF VISIBILITY. IT IS MEANT TO SHOW A BROAD REPRESENTATION OF AREAS WHERE THE PROPOSED INSTALLATION MAY BE VISIBLE BASED UPON THE BEST INFORMATION FOR TOPOGRAPHY AND VEGETATION LOCATIONS AVAILABLE TO DATE.

EXISTING CONDITIONS

LOCATION # 1

DATE OF PHOTO: 12/12/2017



DETAIL OF EQUIPMENT

VIEW EAST FROM NEIL STREET

SITE NO: AREA 5_46A
SITE NAME: AREA 5_46A
ADDRESS: 10 NEIL ST
MARLBOROUGH, MA 01752



SITE TYPE: UTILITY POLE
DATE: 1/11/2018 **REV:** 1
DRAWN BY: KB
SCALE: N.T.S.

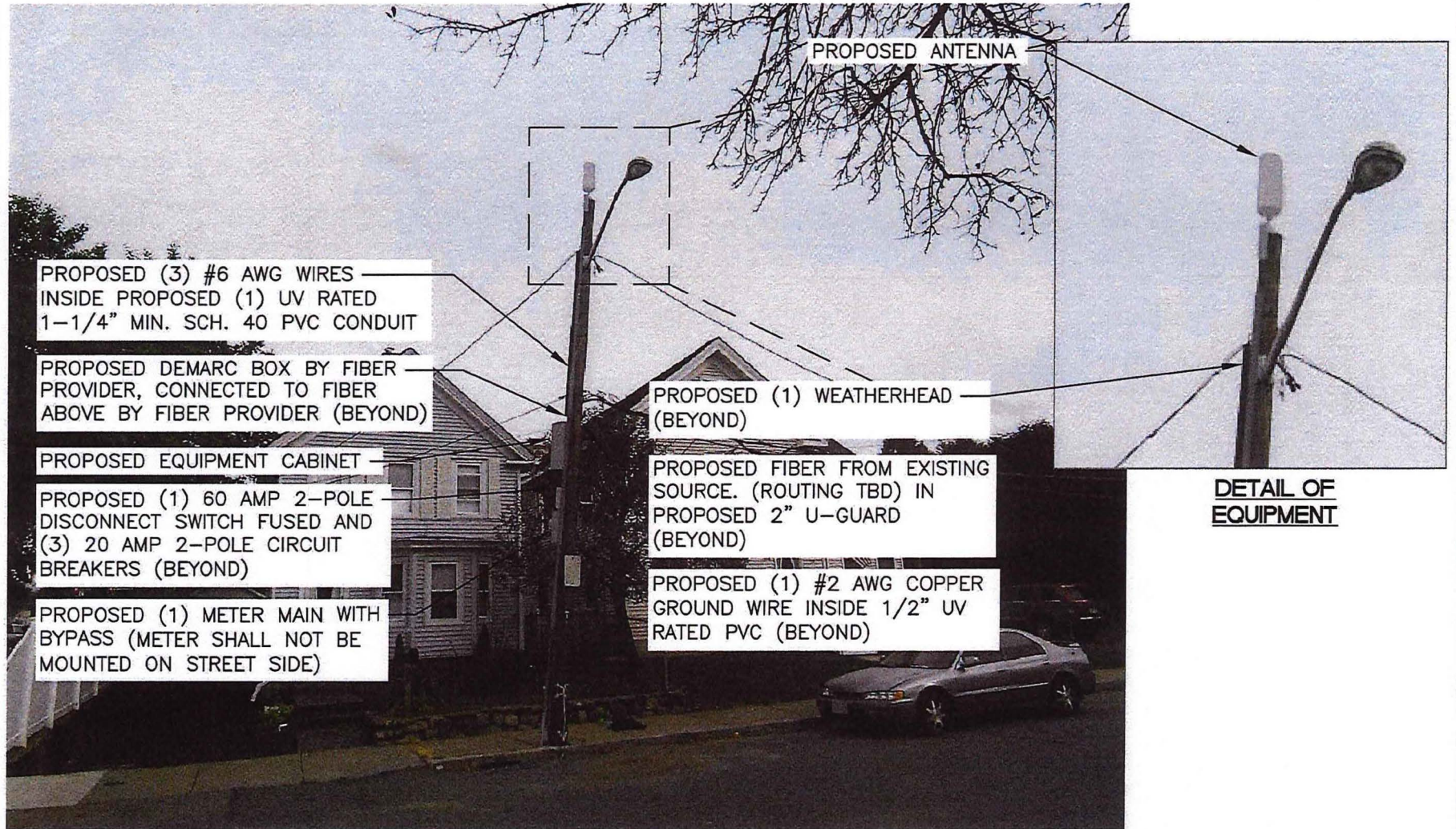
THIS STUDY DOES NOT CLAIM IN ANY WAY TO SHOW THE ONLY AREAS OF VISIBILITY. IT IS MEANT TO SHOW A BROAD REPRESENTATION OF AREAS WHERE THE PROPOSED INSTALLATION MAY BE VISIBLE BASED UPON THE BEST INFORMATION FOR TOPOGRAPHY AND VEGETATION LOCATIONS AVAILABLE TO DATE.

PAGE 3 OF 4

PROPOSED CONDITIONS

LOCATION # 1

DATE OF PHOTO: 12/12/2017



VIEW EAST FROM NEIL STREET

SITE NO: AREA 5_46A
SITE NAME: AREA 5_46A
ADDRESS: 10 NEIL ST
 MARLBOROUGH, MA 01752



PREPARED FOR:
CENTERLINE
 COMMUNICATIONS
 95 RYAN DRIVE
 RAYNHAM, MA 02767

HUDSON
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 45 BEECHWOOD DRIVE
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 TEL: (978) 557-6553
 FAX: (978) 336-5586

SITE TYPE: UTILITY POLE
DATE: 1/11/2018 **REV:** 1
DRAWN BY: KB
SCALE: N.T.S.

THIS STUDY DOES NOT CLAIM IN ANY WAY TO SHOW THE ONLY AREAS OF VISIBILITY. IT IS MEANT TO SHOW A BROAD REPRESENTATION OF AREAS WHERE THE PROPOSED INSTALLATION MAY BE VISIBLE BASED UPON THE BEST INFORMATION FOR TOPOGRAPHY AND VEGETATION LOCATIONS AVAILABLE TO DATE.

PAGE 4 OF 4

RECEIVED
CITY CLERK'S OFFICE
CITY OF MARLBOROUGH



2018 JUN 13 P 12:08

City Council
140 Main Street
2nd Floor
Marlborough, MA 01752

RE: Petition of New Cingular Wireless PCS, LLC ("AT&T") for Grant of Location for Telecommunication Wires and Wireless Attachments and Appurtenances: Project: Area5_46A: Location: 10 Neil St, 42.34594 N, -71.547100 W, Utility Pole: #1

Dear Honorable Members of the City Council:

Pursuant to Massachusetts General Laws Chapter 166, Sections 21, 22 and 25A, please find enclosed the petition (the "Petition") of New Cingular Wireless PCS, LLC ("AT&T") for a grant of location for telecommunication wires and wireless attachments and appurtenances to be attached to existing utility poles owned by National Grid within the City of Marlborough. Included with the Petition are detailed plans that identify the locations where AT&T's proposed attachments will be placed. This includes an area map of all locations as well as the utility pole profiles depicting the equipment attachment heights and specs.

AT&T requests that the City schedule a public hearing on this Petition, subject to the requirements of Chapter 166 of the Massachusetts General Laws. Those requirements prescribe that the City mail "written notice of the time and place of the hearing at least seven days prior to all owners of real estate abutting upon that part of the way upon, along, across or under which the line is to be constructed, as such ownership is determined by the last preceding assessment for taxation". It is my understanding that the City will be able to produce this list and I will work with the City Clerk to ensure the letters are sent per these requirements.

Project Description

AT&T proposes to deploy four (4) small cell sites in the City of Marlborough in order to deal with the rapidly increasing demand on AT&T's wireless network. All four (4) small cell sites will be mounted on existing National Grid utility poles located within the public rights of way. The small cell sites will work in conjunction with the existing macro sites installed on rooftops, towers and other structures in and around the City of Marlborough. This Petition specifically addresses the following location:

Project: Area5_46A: Location: 10 Neil St, 42.34594 N, -71.547100 W, Utility Pole: #1

AT&T's radio frequency engineers targeted the proposed location due to the high traffic and data demands on AT&T's network. AT&T's existing macro cell sites are not providing adequate data capacity in this location due to increased population, vehicular and foot traffic, multiple wireless devices used by each person and other contributing factors. This small cell site will work to offload the demand on the macro sites and allow for increased data capacity and speed within the immediate vicinity of the proposed small cell site.

The small cell site will be installed using standard commercially accepted methods in accordance with all applicable federal, state and local laws and regulations. All proposed attachments are to existing poles owned and maintained by National Grid. AT&T has entered into a Pole Attachment Agreement with National Grid.

The small cell installation on each existing utility pole will include: fiber optic cable(s); remote nodes in a small equipment cabinet H32" x W18" x D12" mounted to the pole at least 8' above ground level; an unobtrusive pole top antenna measuring 24.7" long and 10" in diameter; conduits and cable protectors; and, an electrical meter with shutoff switch. Attached please find design sketches for each site showing the proposed location, pole height, mounting height, equipment specifications and utility plan.

The Telecommunications Act of 1996 (the "Act")

Without the installation, AT&T would be unable to provide specifically established coverage and capacity objectives. The utility pole is located within the limited geographic area whereby AT&T's radio frequency engineers determined that a wireless facility is required. The Act imposes substantial restrictions affecting the standard for granting the requested relief. The ACT provides that: no laws or actions by any local government or planning or zoning board may prohibit, or have the effect of prohibiting, the placement, construction, or modification of communications towers, antennas, or other wireless facilities in any particular geographic area, see 47 U.S.C. §332(c)(7)(B)(i); local government or planning or zoning boards may not unreasonably discriminate among providers of functionally equivalent services, see 47 U.S.C. §332(c)(7)(B)(i); health concerns may not be considered so long as the emissions comply with the applicable standards of the FCC, see 47 U.S.C. §332(c)(7)(B)(iv); and, decisions must be rendered within a reasonable period of time, see 47 U.S.C. §332(c)(7)(B)(ii) and the FCC's Declaratory Ruling commonly referred to as the "shot clock".

We have attached to this petition a generic emissions report demonstrating that the low power antenna will comply with applicable FCC standards with respect to emissions.

For the convenience of the City Council, AT&T has provided a proposed Form of Order for your consideration.

Should you have any questions, or would like any additional information prior to the public hearing please do not hesitate to contact me at (774) 261-0043 or jacoviello@clinellc.com. AT&T will be present at the public hearing to answer any questions you may have as well.

Thank you,

Jeff Iacoviello



Jeffrey Iacoviello | Site Acquisition Consultant
 750 W Center St, Floor 3 | West Bridgewater, MA 02379
 Mobile: 774.261.0043 | Fax: 617.249.0819
jacoviello@clinellc.com | www.centerlinecommunications.com

PETITION FOR LOCATIONS FOR TELECOMMUNICATIONS WIRES AND WIRELESS ATTACHMENTS AND APPURTENANCES**To THE CITY COUNCIL OF THE CITY OF MARLBOROUGH, MASSACHUSETTS**

Pursuant to Massachusetts General Laws, Chapter 166, Sections 21, 22 and 25A, and the City Ordinances of the City of Marlborough, Massachusetts, NEW CINGULAR WIRELESS PCS, LLC ("AT&T") requests that it be granted locations for and permission to construct and maintain telecommunications wires and wireless attachments and appurtenances, including fiber optic cable(s), remote nodes and pole top antennas to be attached to existing National Grid utility poles, located upon and along the following public ways within the City of Marlborough, as depicted on the attached plans. In addition, AT&T seeks permission to install conduit or direct bury cable(s) as depicted on the plans submitted.

Wherefore, AT&T requests that, after due notice and public hearing as provided by law, that it be granted locations for permission to construct the telecommunications wires and wireless attachments and appurtenances upon, along and under the public ways within the City of Marlborough as depicted on the plans filed herewith. AT&T also submitted additional information in support of this Petition.

Respectfully submitted,

NEW CINGULAR WIRELESS PCS, LLC ("AT&T")

By: Jeff Iacoviello
Site Acquisition Consultant
Centerline Communications, LLC

ORDER FOR LOCATION FOR TELECOMMUNICATIONS WIRES AND WIRELESS ATTACHMENTS AND APPURTENANCES

By the City Council

Of the City of Marlborough, Massachusetts, _____, 2018

ORDERED:

That pursuant to Massachusetts General Laws, Chapter 166, NEW CINGULAR WIRELESS PCS, LLC ("AT&T") is hereby granted locations for and permission to construct and maintain telecommunications wires and wireless attachments and appurtenances, including fiber optic cable(s), remote nodes and pole top antennas, to be attached to existing National Grid utility poles, located upon, along and under the public ways within the City of Marlborough, as substantially shown on the plans filed with said Petition. In addition, AT&T is hereby granted permission to install conduit or direct bury fiber cable(s) as depicted on the plans submitted.

The forgoing permission is subject to the following conditions:

1. The telecommunications wires and wireless attachments and appurtenances shall be installed and operated in compliance with all applicable federal and state laws and regulations.
2. AT&T shall indemnify and save the City harmless against all damages, costs and expense whatsoever to which the City may be subjected in consequence of the acts or neglect of AT&T or its agents or servants, or in any manner arising from the rights and privileges granted by the City.
3. AT&T shall comply with the requirements of existing City Ordinances, as may be applicable and such as may hereafter be adopted governing the construction and maintenance of said telecommunications wires and wireless attachments and appurtenances, so far as the same are not inconsistent with the laws of the United States or of the Commonwealth of Massachusetts.

I hereby certify that the foregoing was adopted at a meeting of the City Council of the City of Marlborough, Massachusetts, held on the _____ day of _____, 2018.

City Clerk

APPROVED

We hereby certify that on _____, 2017, at _____, o'clock at _____, a public hearing was held on the Petition of NEW CINGULAR WIRELESS PCS, LLC ("AT&T") for permission to construct and maintain telecommunications wires and wireless attachments and appurtenances, including fiber optic cable(s), remote nodes and pole top antennas, to be attached to existing utility poles, located upon, along and under the public ways within the City of Marlborough and to install conduit or direct bury fiber cable(s) as indicated in the plans described in the order herewith recorded, that we mailed at least seven days before said hearing a written notice of the time and place of said hearing to each of the owners of real estate (as determined by the last preceding assessment for taxation) along the ways or parts of ways upon which the Company is permitted to construct the telecommunications wires and appurtenances of AT&T under said order, and that thereupon said order was duly adopted.

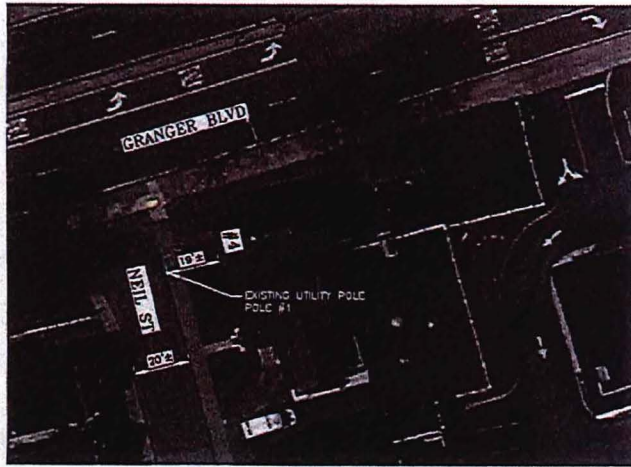
City Council of the City of Marlborough

CERTIFICATE

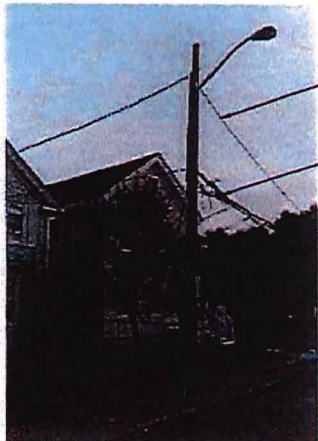
I hereby certify that the forgoing is a true copy of a grant of location order and certificate of hearing with notice adopted by the City Council of the City of Marlborough, Massachusetts, on the _____ day of _____, 2018, and recorded with records of location orders of said City, Book _____, Page _____. This certified copy is made under the provisions of Chapter 166 of the Massachusetts General Laws, as amended.

Attest:

City Clerk

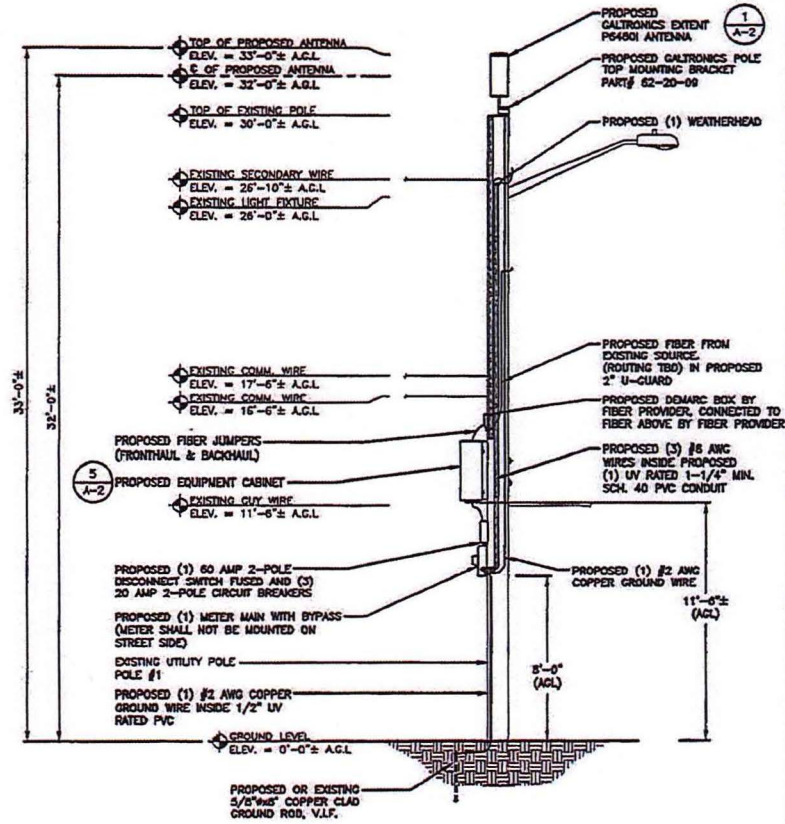


KEY PLAN
 22x34 SCALE: 1"=20'
 11x17 SCALE: 1"=40'

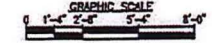


- EXISTING SECONDARY WIRE
- EXISTING COMM. WIRES
- EXISTING UTILITY POLE POLE #1

EXISTING CONDITIONS PHOTO DETAIL
 SCALE: N.T.S.



ELEVATION
 22x34 SCALE: 3/8"=1'-0"
 11x17 SCALE: 3/16"=1'-0"



550 COCHUATER ROAD
 FRAMINGHAM, MA 01701

95 RYAN DRIVE
 FRAMINGHAM, MA 02767

46 BUCKWOOD DR. TEL: 978-634-8333
 ALABAMA, MA 01846 FAX: 978-254-4384

CHECKED BY: AT
 APPROVED BY: DJC

SUBMITTALS

REV.	DATE	DESCRIPTION	BY

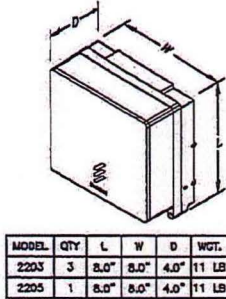
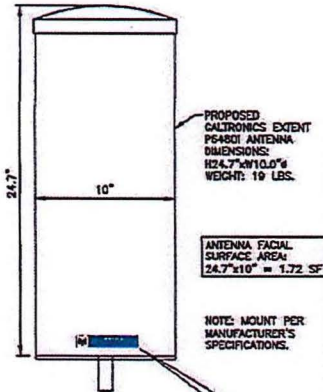
CLUSTER AND NODE NUMBER:
 AREA 5_46A

SITE ID:
 AREA 5_46A

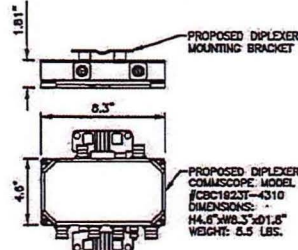
SITE ADDRESS:
 10 NEIL ST
 MARLBOROUGH, MA 01752
 MIDDLESEX COUNTY

SHEET TITLE
 KEY PLAN AND ELEVATION

SHEET NUMBER
A-1



RRH (2203/2205) DETAIL
SCALE: N.T.S.

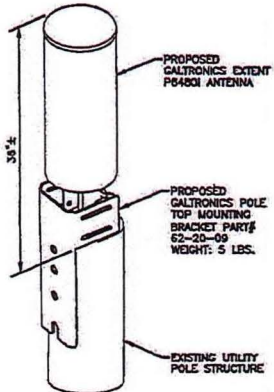


DIPLEXER DETAIL (AS REQUIRED)
SCALE: N.T.S.

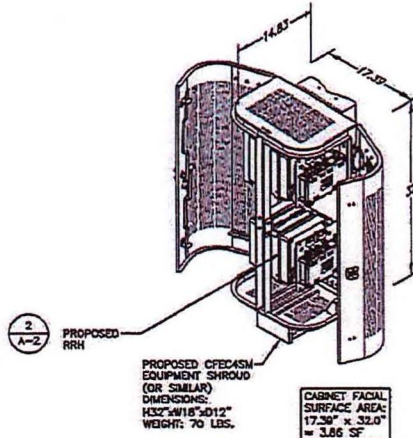
NOTICE

NOI-03-16 1"x6" NOTICE DECAL. PLACE THREE NOTICE STICKERS EQUALLY SPACED AROUND THE BOTTOM OF ANTENNA RADOME.

ANTENNA DETAIL
SCALE: N.T.S.

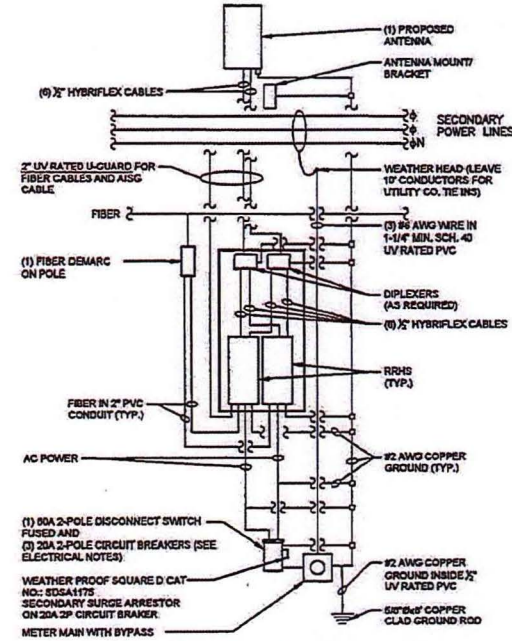


ANTENNA MOUNT DETAIL
SCALE: N.T.S.



NO BATTERY BACKUP OR AUXILIARY OUTLETS FOR BACKUP POWER ARE BEING PROVIDED IN THIS DESIGN.

NOTE: MOUNT PER MANUFACTURER'S SPECIFICATIONS.
EQUIPMENT CABINET DETAIL
SCALE: N.T.S.



GENERAL WIRING DIAGRAM - DUAL RRHs
SCALE: N.T.S.

at&t
550 COCHITUATER ROAD
FRAMINGHAM, MA 01701

CENTERLINE
05 RYAN DRIVE
RAYNHAM, MA 02767

H2G HUDSON Design Group LLC
45 BIRCHWOOD DRIVE
WILMINGTON, MA 01897
TEL: 978.654.6233
FAX: 978.234.6844

CHECKED BY: AT
APPROVED BY: DJC

SUBMITTALS

NO.	DATE	DESCRIPTION	BY

CLIENT AND AISC NUMBER:
AREA 5_46A

SITE ID:
AREA 5_46A

SITE ADDRESS:
10 NEIL ST
WARLBOROUGH, MA 01752
MIDDLESEX COUNTY

SHEET TITLE:
EQUIPMENT DETAILS

SHEET NUMBER:
A-2

DONALD L. HAES, JR., PH.D., CHP

Radiation Safety Specialist

Registered Health Physics Services Provider in NH and MA

PO Box 198, Hampstead, NH 03841

603-303-9959

Email: donald_haes_chp@comcast.net

January 17, 2018

I have reviewed the information pertinent to the hypothetical installation of an AT&T Personal Wireless Services (PWS) omni-directional panel antenna installation on a utility pole. I have analyzed the scenario where there would be one antenna mounted with a centerline height of 30' above ground level (AGL). This analysis considers the contributions of the AT&T PWS transmitters operating at the following supplied parameters:

PWS Service	Frequency (MHz)	Transmit Power (ERP: Watts)	Antenna Manufacturer / Model Number	Antenna Gain (dBd)
PCS LTE	1930-1950	40	EXTENT™ P6480i (See Appendix A)	7.33
5G: U-NII-1	5150-5250	1		7.53
5G: U-NII-3	5725-5850			

The calculated values of RF fields are presented as a percent of current Maximum Permissible Exposures (%MPE) as adopted by the Federal Communications Commission (FCC). Theoretical RF field calculations for the near proximity of RF source terms (in this case the AT&T transmit antennas), however, are not straight forward. For these theoretical calculations, a cylindrical model was used, where "spatially averaged plane-wave equivalent power densities parallel to the antenna may be estimated by dividing the net antenna input power by the surface area of an imaginary cylinder surrounding the length of the radiating antenna". Calculations using "far-field" formula would considerably overestimate the resultant power densities. The calculations performed for this analysis still accurately represent the "worst case" and assume 100% usage of all the antennas.

The power density estimates can be calculated by using the formula:

$$S = \frac{P_{net}}{2 \cdot \pi \cdot R \cdot h}$$

Where: P_{net} = Net power to antenna (watts)
 R = Distance (range) from antenna
 h = aperture height of the antenna

The results of the RF field calculations for a single antenna are depicted in Figure 1 showing a side view representation demonstrating the directionality of the RF energy propagating from the antenna.

Note: The analyses, conclusions and professional opinions are based upon the precise parameters and conditions of this typical AT&T "small cell" installation on a utility pole with a mounting centerline height of 30' AGL. 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.

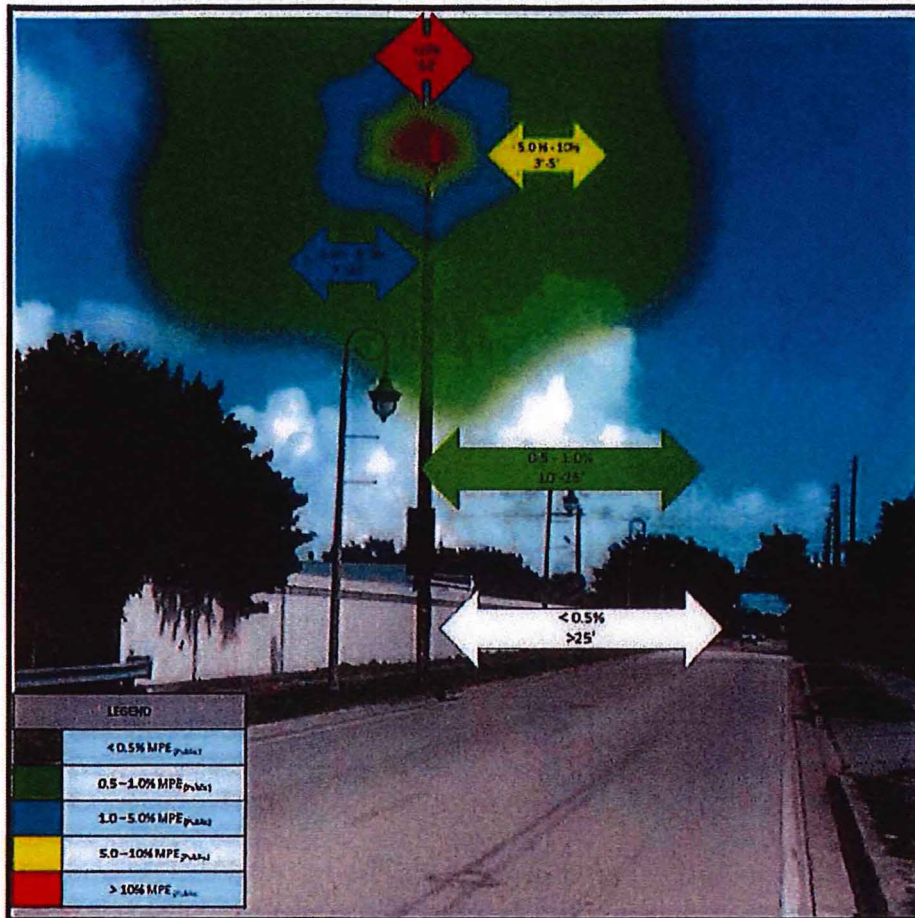


Figure 1: Results of RF field calculations for a typical AT&T antenna installation on a utility pole at 30' (AGL) showing profile view

CONCLUSION

Theoretical RF field calculations data indicate the summation of the AT&T RF contributions on a typical utility pole would be well within the established RF exposure guidelines; see Figure 1. Although the calculations assume a typically low mounting height of 30' AGL, some applications may require the antenna to be mounted higher. In these circumstances, the increased separation between the ground and antenna would result in an even lower general public exposure levels. These results indicate there could be more similar installations at these locations, and still be within Federal and State guidelines for RF exposure. This report provides written proof that the proposed facilities would comply with the FCC RF exposure guidelines. These small cell antenna installations proposed by AT&T would not produce significant changes to the ambient RF environment.

DONALD L. HAES, JR., PH.D., CHP*Radiation Safety Specialist*

Registered Health Physics Services Provider in NH and MA

PO Box 198, Hampstead, NH 03841

603-303-9959

Email: donald_haes_chp@comcast.net

STATEMENT OF CERTIFICATION

1. I certify to the best of my knowledge and belief, the statements of fact contained in this report are true and correct.
2. The reported analyses, opinions, and conclusions are limited only by the reported assumptions and limiting conditions, and are personal, unbiased professional analyses, opinions and conclusions.
3. I have no present or prospective interest in the property that is the subject of this report and I have no personal interest or bias with respect to the parties involved.
4. My compensation is not contingent upon the reporting of a predetermined energy level or direction in energy level that favors the cause of the client, the amount of energy level estimate, the attainment of a stipulated result, or the occurrence of a subsequent event.
5. This assignment was not based on a requested minimum environmental energy level or specific power density.
6. My compensation is not contingent on an action or event resulting from the analyses, opinions, or conclusions in, or the use of, this report.
7. The consultant has accepted this assessment assignment having the knowledge and experience necessary to complete the assignment competently.
8. My analyses, opinions, and conclusions were developed and this report has been prepared, in conformity with the *American Board of Health Physics (ABHP)* statements of standards of professional responsibility for Certified Health Physicists.

Date: January 17, 2018

Donald L. Haes, Jr., Ph.D

Certified Health Physicist

APPENDIX A



10" x 24" Outdoor Pseudo Omni Canister Antenna [1695-2400, 3550-3700 and 5150-5950 MHz]

EXTENT™ P6480i

Description:

- Pseudo Omni Canister Antenna for Outdoor DAS and Small Cells.
- 4x ports for AWS/PCS/WCS Band 1695-2400 MHz
- 4x ports for CBRS Band 3550-3700 MHz
- 2x ports for 5GHz Band 5150-5950 MHz



1695-2400, 3550-3700 and 5150-5950 MHz Pseudo Omni Canister Antenna

Electrical Specifications

Frequency Band (MHz)	1695-2180	2180-2400	3550-3700	5150-5950
Input Connector Type	4x 4.3-10 DIN(F)		4x 4.3-10 DIN(F)	2x 4.3-10 DIN(F)
Isolation (typ.)	-20 dB		-25 dB	-25 dB
Inter-band Isolation	-30 dB (typ)		-30 dB (typ)	-30 dB (typ)
VSWR/Return Loss	1.5:1(Typ.) 1.7:1(Max.) / 14.0 dB(Typ.) 11.8dB(Max.)			
Impedance	50 Ω			
Polarization	Dual slant 45° (±45°)			
Horizontal Beamwidth	Omni (360°)			
Vertical Beamwidth	15°	12°	15°	19°
Max. Gain	9 dBi	9.5 dBi	9.5 dBi	6 dBi(Max.)
Avg. Gain	7.5 dBi	8 dBi	8 dBi	3 dBi
DownTilt	0°			
Max Power / Port	150 Watts		100 Watts	10 Watts
PIM @ 2x43 dBm	<-153 dBc		N/A	N/A

Mechanical Specifications

Operating Temperature	-40° to 158°F (-40° to +70°C)
Antenna Weight	19 lbs (9 kg)
Antenna Diameter	10" (254 mm)
Antenna Height	24.7" (628 mm)
Radome Material	ASA
RoHS	Compliant
Radome Color	Gray, Brown, 3M™ Conceal Film, Custom Colors Possible
Ingress Protection	Outdoor (IP65)
Wind Survival Rating	150 mph (241 km/h)
Shipping Dimensions - L x W x D	30"x19"x19" (762x483x483 mm)
Shipping Weight (Gross Weight)	26 lbs (12 kg)

Release Date: March 02, 2017; Revision: 5.1 : RFD06589

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 Proprietary Information. All rights reserved. Galtronics reserves the right to modify or amend any antenna or specification without prior notice.

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IN CITY COUNCIL

Marlborough, Mass., OCTOBER 16, 2017

ORDERED:

That there being no objection thereto set **MONDAY NOVEMBER 13, 2017** as **DATE FOR PUBLIC HEARING** On the Petition of AT & T to deploy a small cell site which will be mounted on existing utility pole at 28 Concord Rd., be and is herewith refer to **WIRELESS COMMUNICATION COMMITTEE.**

ADOPTED

ORDER NO. 17-1007055



IN CITY COUNCIL

Marlborough, Mass., NOVEMBER 13, 2017

PAGE 1

ORDERED:

That the Public Hearing on the Petition of AT & T to deploy a small cell site which will be mounted on existing utility pole at 28 Concord Rd., Order No. 17-1007055, hearing recessed at 8:28 p.m.

Councilors Present: Doucette, Tunnera, Irish, Clancy, Landers, Juaire, Oram, Ossing & Robey.

PUBLIC SPEAKING IN FAVOR

Michael Dolan from the law firm of Brown Rudnick appeared on behalf of the petitioner, AT&T. AT&T proposed another wireless facility at this location and deferred to the Council for its location. President Clancy noted is it located across from Firefly's parking lot on Concord Road and it cannot be missed as it is at a severe angle.

There is no one else speaking in favor. That part of the Public Hearing is closed.

QUESTIONS FROM THE PUBLIC

There are no questions from the public. That part of the Public Hearing is closed.

PUBLIC SPEAKING IN OPPOSITION

There is no one speaking in opposition. That part of the Public Hearing is closed.

QUESTIONS FROM THE CITY COUNCIL

✓ Councilor Juaire requested in all three petitions, that they reference the pole number and provide the information to the City Council Office.

✓ Councilor Doucette noted in consideration of the current angle of the pole and the proposed additional weight that it should be straightened prior to the installation of the hardware. Carly Cowher, Project Manager at Centerline Communications, explained when an application is submitted for a specific pole, if it is existing, when National Grid does their survey for the pole, they will mock up their make ready cost which is any existing attachment on that pole or any pole next to it. They will return and confirm the hardware to be placed on the pole, note what the pole can structurally support, and whether it needs to be re-guided or straightened as part of the make ready process. That pole will be not crooked when work is complete. President Clancy asked if power is needed at the pole. Ms. Cowher stated no as they can drop secondary power from the pole next to it or across from it because this pole is a guide pole.



IN CITY COUNCIL

Marlborough, Mass., NOVEMBER 13, 2017

PAGE 2

ORDERED:

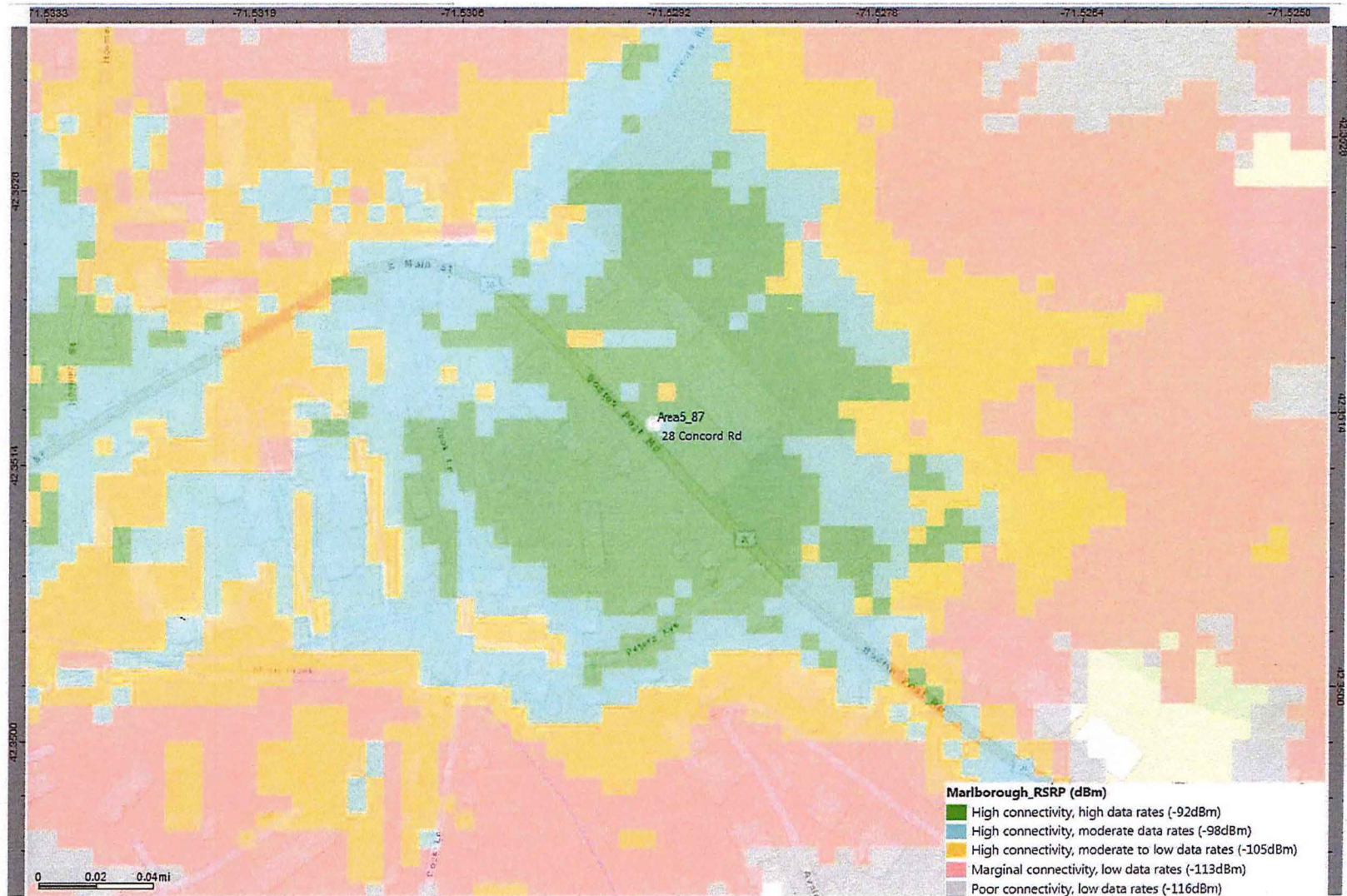
✓ Councilor Robey had several points of clarification. The information provided to the City Council does list the pole numbers on each of the three applications. Also, the City of Boston has a map showing over three hundred small cell sites by six providers so they are probably one of the bigger ones in the Commonwealth.

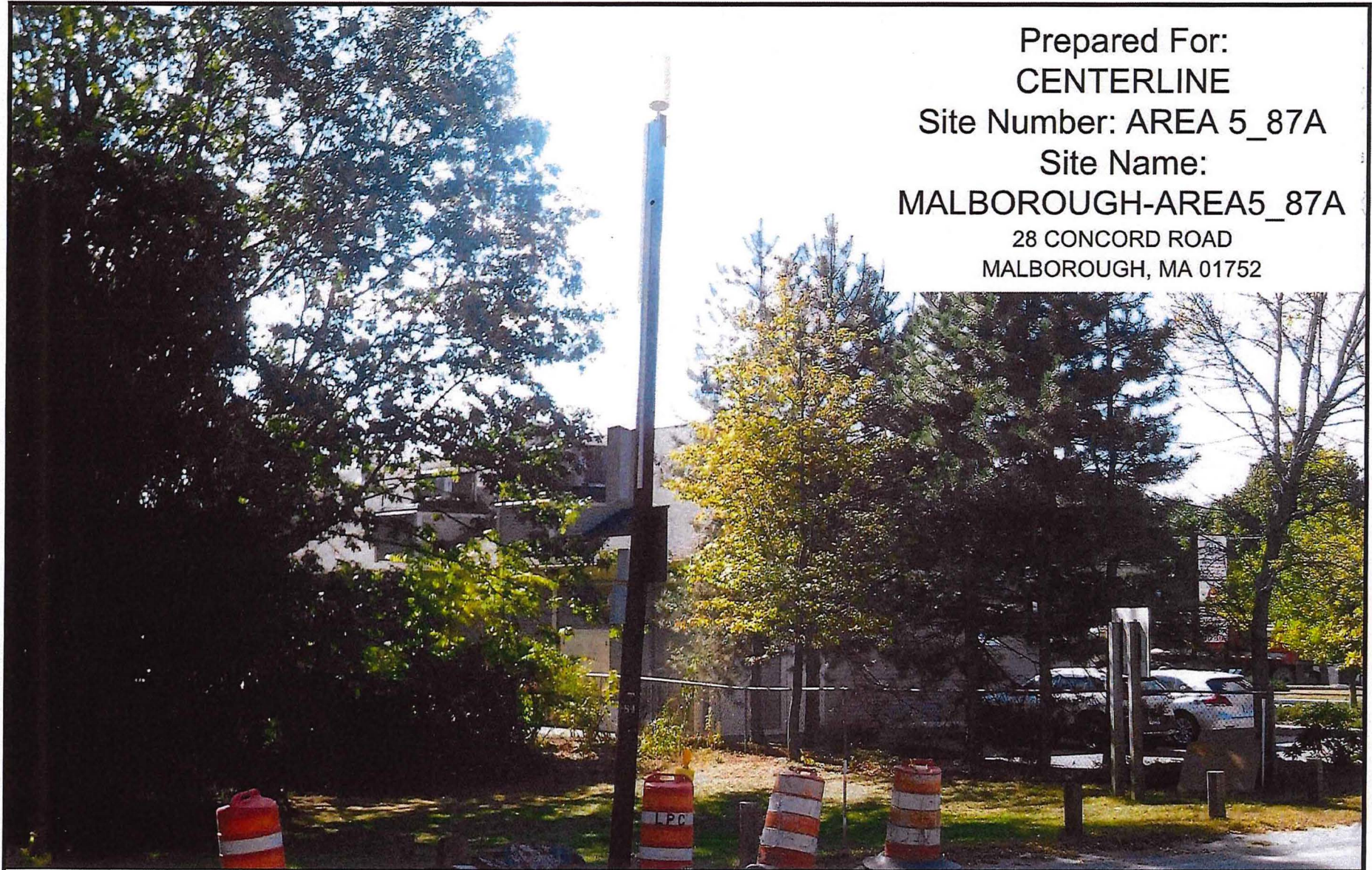
There are no further questions from members of City Council. That part of the Public Hearing is closed.

That ends the entire Public Hearing. This is currently in the Wireless Communications Committee.

ADOPTED

ORDER NO. 17-1007055A





Prepared For:
CENTERLINE
 Site Number: AREA 5_87A
 Site Name:
MALBOROUGH-AREA5_87A
 28 CONCORD ROAD
 MALBOROUGH, MA 01752

SITE NO: AREA 5_87A
SITE NAME: MALBOROUGH-AREA5_87A
ADDRESS: 28 CONCORD ROAD
 MALBOROUGH, MA 01752



SITE TYPE: UTILITYPOLE
DATE: 10/06/2017 **REV:** 0
DRAWN BY: KB
SCALE: N.T.S.

THIS STUDY DOES NOT CLAIM IN ANY WAY TO SHOW THE ONLY AREAS OF VISIBILITY. IT IS MEANT TO SHOW A BROAD REPRESENTATION OF AREAS WHERE THE PROPOSED INSTALLATION MAY BE VISIBLE BASED UPON THE BEST INFORMATION FOR TOPOGRAPHY AND VEGETATION LOCATIONS AVAILABLE TO DATE.

LOCUS MAP

TAKEN FROM GOOGLE.COM ON 10-06-17

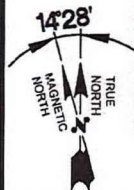
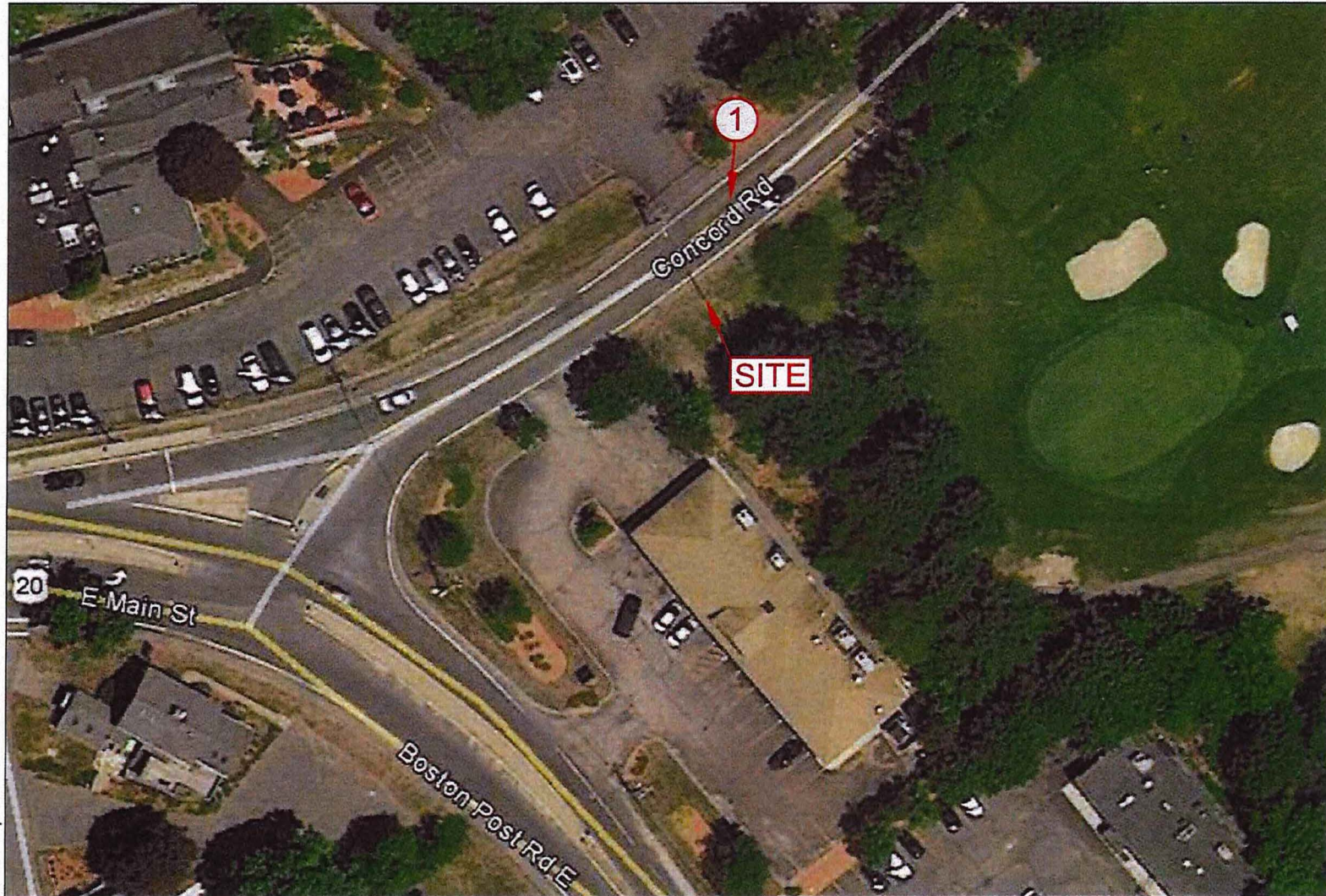


PHOTO LOCATION

SITE NO: AREA 5_87A
SITE NAME: MALBOROUGH-AREA5_87A
ADDRESS: 28 CONCORD ROAD
 MALBOROUGH, MA 01752



SITE TYPE: UTILITY POLE
DATE: 10/06/2017 **REV:** 0
DRAWN BY: KB
SCALE: N.T.S.

THIS STUDY DOES NOT CLAIM IN ANY WAY TO SHOW THE ONLY AREAS OF VISIBILITY. IT IS MEANT TO SHOW A BROAD REPRESENTATION OF AREAS WHERE THE PROPOSED INSTALLATION MAY BE VISIBLE BASED UPON THE BEST INFORMATION FOR TOPOGRAPHY AND VEGETATION LOCATIONS AVAILABLE TO DATE.

PAGE 2 OF 4

EXISTING CONDITIONS

LOCATION # 1

DATE OF PHOTO: 10/05/2017



DETAIL OF EQUIPMENT

VIEW SOUTH FROM CONCORD ROAD

SITE NO: AREA 5_87A
SITE NAME: MALBOROUGH-AEA5_87A
ADDRESS: 28 CONCORD ROAD
 MALBOROUGH, MA 01752



SITE TYPE: UTILITYPOLE

DATE: 10/06/2017 **REV:** 0

DRAWN BY: KB

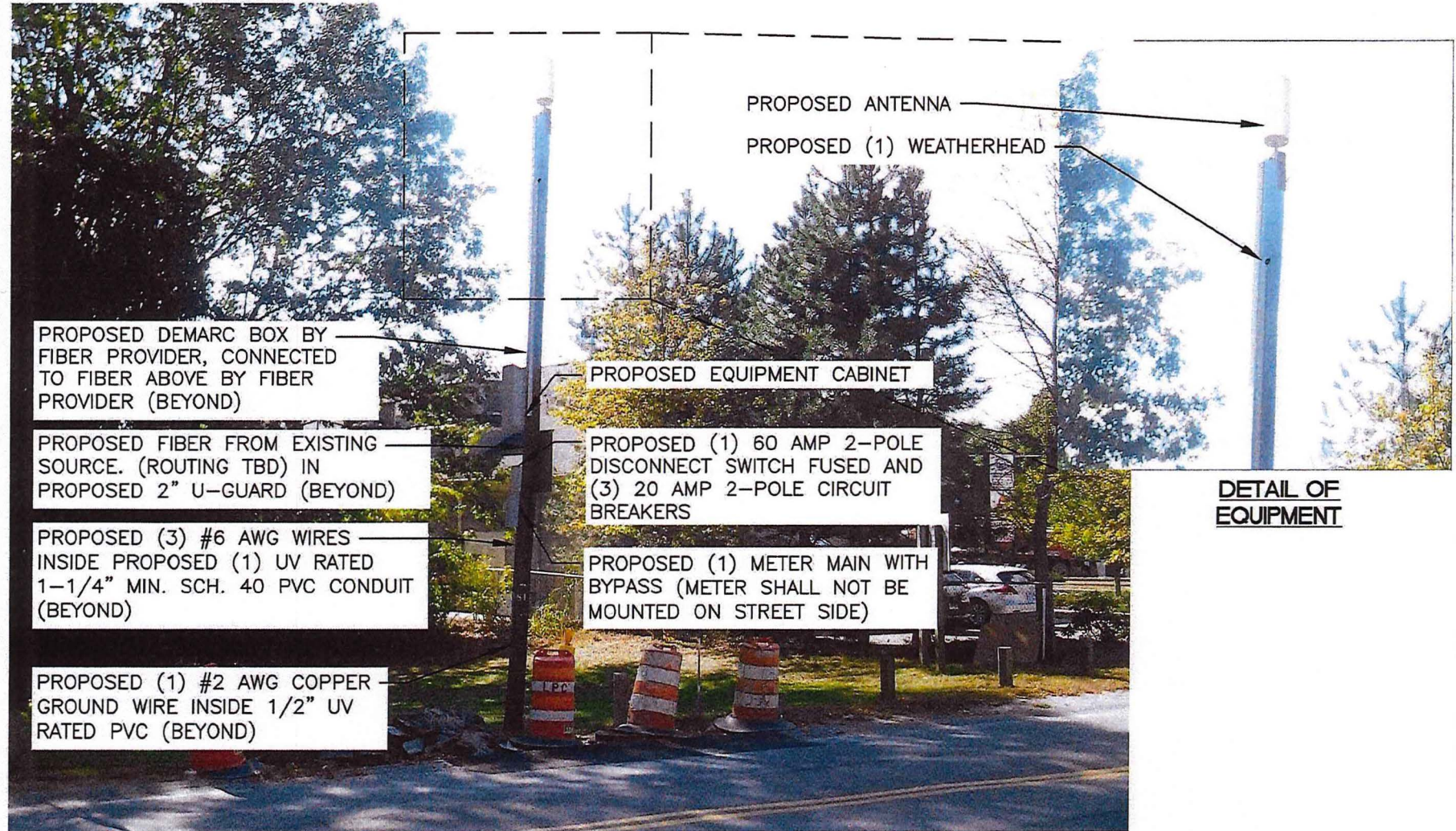
SCALE: N.T.S.

THIS STUDY DOES NOT CLAIM IN ANY WAY TO SHOW THE ONLY AREAS OF VISIBILITY. IT IS MEANT TO SHOW A BROAD REPRESENTATION OF AREAS WHERE THE PROPOSED INSTALLATION MAY BE VISIBLE BASED UPON THE BEST INFORMATION FOR TOPOGRAPHY AND VEGETATION LOCATIONS AVAILABLE TO DATE.

PROPOSED CONDITIONS

LOCATION # 1

DATE OF PHOTO: 10/05/2017



DETAIL OF EQUIPMENT

VIEW SOUTH FROM CONCORD ROAD

SITE NO: AREA 5_87A
SITE NAME: MALBOROUGH-AREA5_87A
ADDRESS: 28 CONCORD ROAD
 MALBOROUGH, MA 01752



PREPARED FOR:
CENTERLINE
 COMMUNICATIONS
 95 RYAN DRIVE
 RAYNHAM, MA 02767

Hudson
 Design Group
 45 BEECHWOOD DRIVE
 N. ANDOVER, MA 01845
 TEL: (978) 557-5553
 FAX: (978) 336-5586

SITE TYPE: UTILITYPOLE
DATE: 10/06/2017 **REV:** 0
DRAWN BY: KB
SCALE: N.T.S.

THIS STUDY DOES NOT CLAIM IN ANY WAY TO SHOW THE ONLY AREAS OF VISIBILITY. IT IS MEANT TO SHOW A BROAD REPRESENTATION OF AREAS WHERE THE PROPOSED INSTALLATION MAY BE VISIBLE BASED UPON THE BEST INFORMATION FOR TOPOGRAPHY AND VEGETATION LOCATIONS AVAILABLE TO DATE.
 PAGE 4 OF 4

DONALD L. HAES, JR., PH.D., CHP

Radiation Safety Specialist

MA Radiation Control Program Health Physics Services Provider Registration #65-0017
PO Box 198, Hampstead, NH 03841 617-680-6262 Email: donald_haes_chp@comcast.net

November 1, 2018

RE: Proposed installation of radio base station antenna and associated equipment for the New Cingular Wireless PCS, LLC (herein referred to as “AT&T”) Small Cell Personal Wireless Services facility to be located on a utility pole at 28 Concord Rd, Marlborough, MA.

PURPOSE

I have reviewed the information pertinent to the AT&T proposed installation of a small cell (SC) personal wireless services (PWS) facility on a utility pole at 28 Concord Road in Marlborough, MA. To determine regulatory compliance, theoretical calculations of maximal radio-frequency (RF) fields have been prepared. The physical conditions are that AT&T proposes to install an omni-directional PWS canister type antenna on a utility pole. The antenna arrangement will include a single canister antenna on the utility pole along with remote radio head (RRH) units. The mounting centerline height of the antenna is proposed to be 22’0” above ground level. This report provides written proof that the proposed facility would comply with the all regulatory RF exposure guidelines.

This report considers the contributions of the AT&T PWS transmitters operating at their proposed capacity. The calculated values of RF fields are presented as a percent of current Maximum Permissible Exposures (%MPE) as adopted by the Federal Communications Commission (FCC),^{i,ii} and those established by the Massachusetts Department of Public Health (MDPH).ⁱⁱⁱ

SUMMARY

Theoretical RF field calculations data indicate the summation of the proposed AT&T RF contributions would be within the established RF exposure guidelines at the proposed site; see Figure 3. This report provides written proof that the proposed facility would comply with the FCC and MDPH RF exposure guidelines, including residential areas and in the surrounding neighborhood.

Based on the theoretical RF fields I have calculated, it is my expert opinion that this facility would comply with all regulatory guidelines for RF exposure to members of the public.

Note: The analyses, conclusions and professional opinions are based upon the precise parameters and conditions of a utility pole at 28 Concord Road in Marlborough, 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.

EXPOSURE LIMITS AND GUIDELINES

RF exposure guidelines enforced by the FCC were established by the American National Standards Institute (ANSI)^{iv} and the National Council on Radiation Protection and Measurement (NCRP).^v The RF exposure guidelines are listed for RF workers and members of the public. The applicable FCC RF exposure guidelines for the public are listed in Table 1, and depicted in Figure 1. All listed values are intended to be averaged over any contiguous 30-minute period.

Table 1: Maximum Permissible Exposure (MPE) Values in Public Areas			
Frequency Bands	Maximum Permissible Exposure (MPE)		
	Electric Fields	Magnetic Fields	Equivalent Power Density
0.3 – 1.34 MHz	614 (V/m)	1.63 (A/m)	(100) mW/cm ²
1.34 - 30 MHz	824/ <i>f</i> (V/m)	2.19/ <i>f</i> (A/m)	(100) mW/cm ²
30 - 300 MHz	27.5 (V/m)	0.073 (A/m)	0.2 mW/cm ²
300 - 1500 MHz	--	--	<i>f</i> /1500 mW/cm ²
1500 - 100,000	--	--	1.0 mW/cm ²

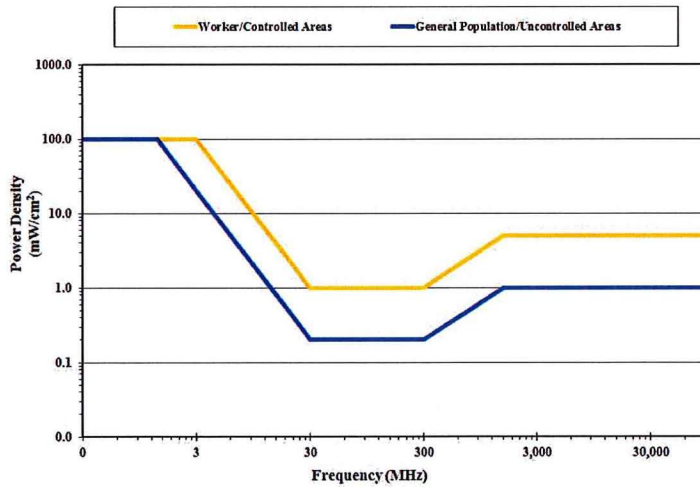


Figure 1: FCC Limits for Maximum Permissible Exposure (MPE)

NOTE: FCC 5% Rule – At multiple transmitter sites, actions necessary to bring the area into compliance with the RF exposure guidelines are the shared responsibility of all licensees whose transmitters produce RF field levels in excess of 5% of the applicable FCC MPEs.

THEORETICAL RF FIELD CALCULATIONS - GROUND LEVELS

METHODOLOGY

These calculations are based on what are called "worst-case" estimates. That is, the estimates assume 100% use of all transmitters simultaneously. Additionally, the calculations make the assumption that the surrounding area is a flat plane. The resultant values are thus conservative in that they over predict actual resultant power densities. The calculations are based on the following information for AT&T:

1. Effective Radiated Power (ERP): See Table 2 inventory.
2. Antenna height (centerline, above ground level (AGL) See Table 2 inventory.
3. Antenna vertical radiation patterns; the source of the negative gain (G) values. "Omni directional" antennas are designed to focus the RF signal, resulting in "patterns" of signal loss and gain. These patterns (see **APPENDIX A**) display the loss of signal strength relative to the direction of propagation due to elevation angle changes.

Note: G is a unitless factor usually expressed in decibels (dB); where $G = 10^{(dB/10)}$.

For example: for an antenna *gain* of 3 dB, the net factor (G) = $10^{(3/10)} = 2$.

For an antenna *loss* of -3 dB, the net factor (G) = $10^{(-3/10)} = 0.5$.

To determine the magnitude of the RF field, the power density (S) from an isotropic RF source is calculated, making use of the power density formula as outlined in FCC's OET Bulletin 65, Edition 97-01: ^{vi}

$$S = \frac{P \cdot G}{4 \cdot \pi \cdot R^2}$$

Where:

P → Power to antenna (watts)

G → Gain of antenna

R → Distance (range) from antenna source to point of intersection with the ground (feet)

$R^2 = (\text{Height})^2 + (\text{Horizontal distance})^2$

Since: $P \cdot G = \text{EIRP}$ (Effective Isotropic Radiated Power) for broadcast antennas, the equation can be presented in the following form:

$$S = \frac{\text{EIRP}}{4 \cdot \pi \cdot R^2}$$

In the situation of off-axis power density calculations, apply the negative elevation gain (G^E) value from the vertical radiation patterns with the following formula:

$$S = \frac{\text{EIRP} \cdot G^E}{4 \cdot \pi \cdot R^2}$$

Ground reflections may add in-phase with the direct wave, and essentially double the electric field intensity. Because power density is proportional to the *square* of the electric field, the power density may quadruple, that is, increase by a factor of four (4). Since ERP is routinely used, it is necessary to convert ERP into EIRP; this is done by multiplying the ERP by the factor of 1.64, which is the gain of a half-wave dipole relative to an isotropic radiator. Therefore, downrange power density estimates can be calculated by using the formula:

$$S = \frac{4 \cdot (\text{ERP} \cdot 1.64) \cdot G^E}{4 \cdot \pi \cdot R^2} = \frac{\text{ERP} \cdot 1.64 \cdot G^E}{\pi \cdot R^2} = \frac{0.522 \cdot \text{ERP} \cdot G^E}{R^2}$$

To calculate the % MPE, use the formula:

$$\% \text{ MPE} = \frac{S}{\text{MPE}} \cdot 100$$

OBSERVATIONS IN CONSIDERATION WITH FCC RULES §1.1307(B) & §1.1310

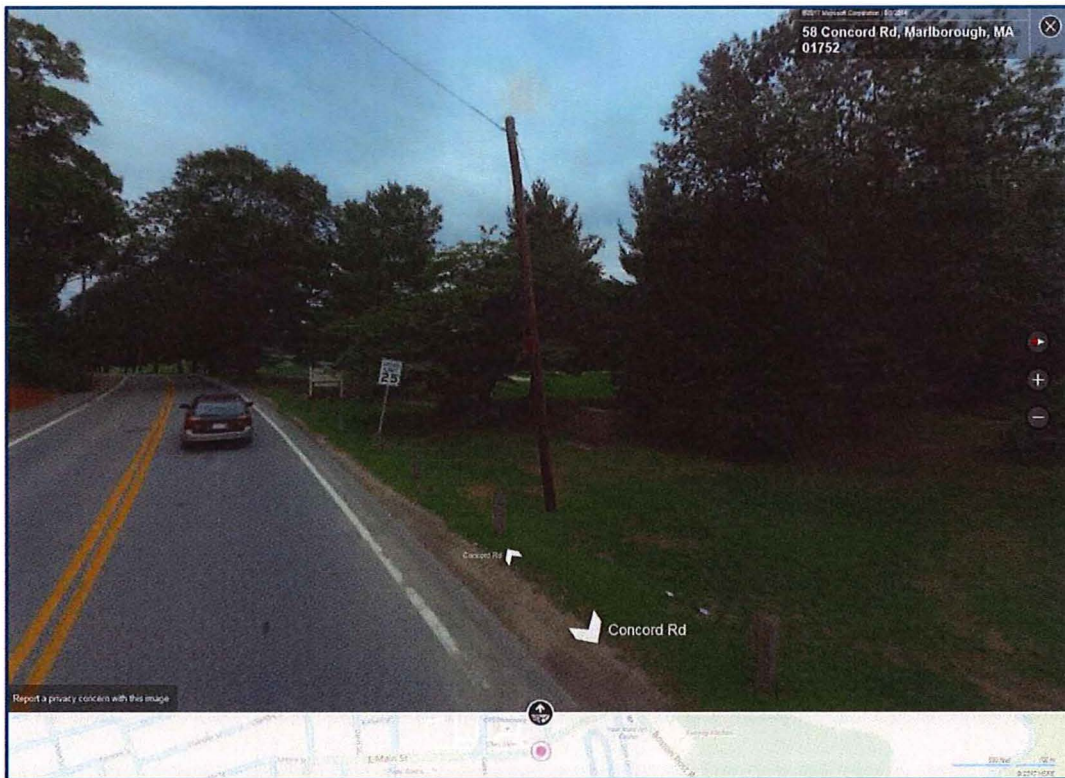
Is it physically possible to stand next to or touch any omni-directional antenna? No, access to the utility pole is restricted, and the utility companies will adhere to RF safety guidelines regarding potential access to the proposed PWS antennas mounted on the pole.

ANTENNA INVENTORY

Table 2: Proposed AT&T Antenna Inventory Utility Pole at 28 Concord Road in Marlborough, MA Parameters: 243 watts ERP* of PCS/AWS @ 1700 MHz 255 watts ERP* of GSM @ 850 MHz		
Site Information (See Figure 2)	Antenna Centerline (AGL)	Antenna Model
28 Concord Road (42.352556°N, -71.529969°W) NGRID Guyed Stub Pole	22' 0"	EXTENT™ P6480i (See Appendix A)
Information relevant to the antennas proposed by AT&T on file.		
Table Notes: AWS: Advanced Wireless Services * ERP = Power out per channel (CH) X # channels per remote radio head (RRH) X #RRHs X gain the antenna provides within that frequency band.		

RESULTS

The results of the percent Maximum Permissible Exposure (%MPE) calculations for the summation of the proposed AT&T contributions are depicted Figure 3 as plotted against linear distance from the base of the utility pole. The values have been calculated for a height of six feet above ground level in accordance with regulatory rationale. In addition to the six-foot height, and depicted on the graphs for reference only, values have been plotted for a height of 16 feet above ground level for comparison with a typical two-story structure. A logarithmic scale was used to plot the calculated theoretical %MPE values in order to compare with the MPE of 100%, which is so much larger that it would be off the page in a linear plot. The curves in the figure resemble a straight-line on the log-linear plots at distances beyond about five hundred feet. Within that distance, the curves are variable due to the application of the vertical radiation patterns.



**Figure 2: Proposed AT&T Small Cell Antenna
Site 28 Concord Road (42.352556°N, -71.529969°W)
“NGRID Guyed Stub Pole”**

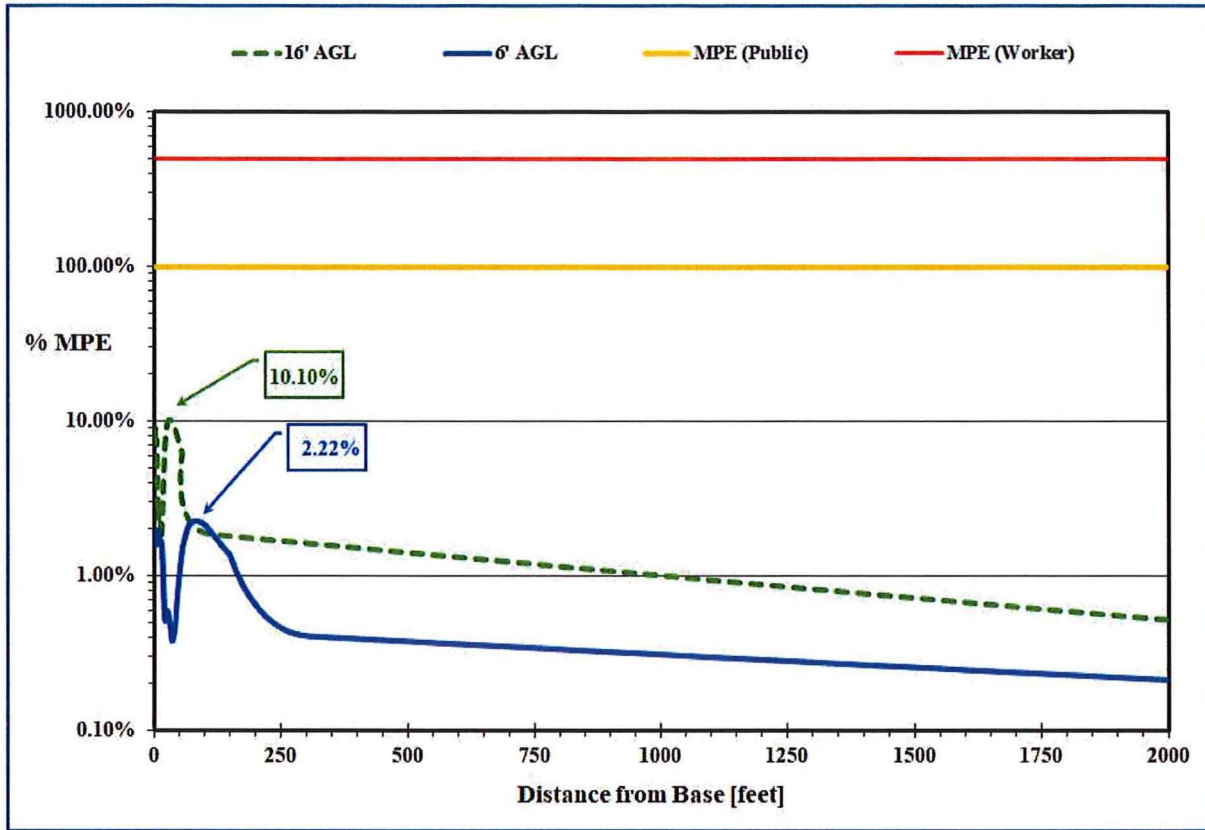


Figure 3: Theoretical RF field calculations for the summation of the proposed AT&T Small Cell Antenna Site 28 Concord Road (42.352556°N, -71.529969°W) “NGRID Guyed Stub Pole”

CONCLUSION


Theoretical RF field calculations data indicate the summation of the proposed AT&T RF contributions would be within the established RF exposure guidelines at the proposed site; see Figure 3. This report provides written proof that the proposed facility would comply with the FCC and MDPH RF exposure guidelines, including residential areas and in the surrounding neighborhood.

The number and duration of calls passing through PWS facilities cannot be accurately predicted. Thus, in order to estimate the highest RF fields possible from operation of these installations, the maximal amount of usage was considered. Even in this so-called "worst-case", the resultant increase in RF field levels are far below established levels considered safe.

Based on the theoretical RF fields I have calculated, it is my expert opinion that this facility would comply with all regulatory guidelines for RF exposure to members of the public.

Feel free to contact me if you have any questions.

Sincerely,

A handwritten signature in black ink, appearing to read 'D. Haes, Jr.', written over a horizontal line.

Donald L. Haes, Jr., Ph.D
Certified Health Physicist

Note: The analyses, conclusions and professional opinions are based upon the precise parameters and conditions of a utility pole at 28 Concord Road in Marlborough, 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.

APPENDIX A

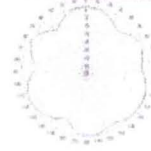


10" x 24" Outdoor Pseudo Omni Canister Antenna [1695-2400, 3550-3700 and 5150-5950 MHz]

EXTENT™ P6480i

Description:

- Pseudo Omni Canister Antenna for Outdoor DAS and Small Cells.
- 4x ports for AWS/PCS/WCS Band 1695-2400 MHz
- 4x ports for CBRS Band 3550-3700 MHz
- 2x ports for 5GHz Band 5150-5950 MHz



1695-2400, 3550-3700 and 5150-5950 MHz Pseudo Omni Canister Antenna

Electrical Specifications

Frequency Band [MHz]	1695-2180	2180-2400	3550-3700	5150-5950
Input Connector Type	4x 4.3-10 DIN(F)		4x 4.3-10 DIN(F)	2x 4.3-10 DIN(F)
Isolation (typ.)	-20 dB		-25 dB	-25 dB
Inter-band Isolation	-30 dB (typ)		-30 dB (typ)	-30 dB (typ)
VSWR/Return Loss	1.5:1(Typ.) 1.7:1(Max.) / 14.0 dB(Typ.) 11.8dB(Max.)			
Impedance	50 Ω			
Polarization	Dual slant 45° (±15°)			
Horizontal Beamwidth	Omni (360°)			
Vertical Beamwidth	15°	12°	15°	15°
Max. Gain	9 dBi	9.5 dBi	8.5 dBi	6 dBi(Max.)
Avg. Gain	7.5 dBi	8 dBi	8 dBi	3 dBi
Downtilt	0°			
Max Power / Port	150 Watts		100 Watts	10 Watts
PIM @ 2x43 dBm	<-153 dBc		N/A	N/A

Mechanical Specifications

Operating Temperature	-40° to 158°F (-40° to +70°C)
Antenna Weight	19 lbs (9 kg)
Antenna Diameter	10" (254 mm)
Antenna Height	24.7" (628 mm)
Radome Material	ASA
RoHS	Compliant
Radome Color	Gray, Brown, 3M™ Conceal Film, Custom Colors Possible
Ingress Protection	Outdoor (IP65)
Wind Survival Rating	150 mph (241 km/h)
Shipping Dimensions - L x W x D	30"x19"x19" (762x483x483 mm)
Shipping Weight (Gross Weight)	26 lbs (12 kg)

Release Date: March 02, 2017; Revision: 5.1 - RPTD6480

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WWW.GALTRONICS.COM

Composite Vertical Radiation Patterns for Proposed Small Cell Omni Antennas For AT&T Proposed PWS Frequencies

DONALD L. HAES, JR., PH.D., CHP

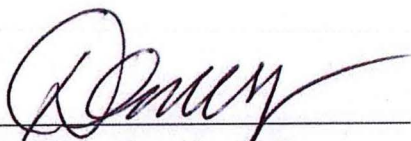
Radiation Safety Specialist

MA Radiation Control Program Health Physics Services Provider Registration #65-0017
PO Box 198, Hampstead, NH 03841 617-680-6262 Email: donald_haes_chp@comcast.net

STATEMENT OF CERTIFICATION

1. I certify to the best of my knowledge and belief, the statements of fact contained in this report are true and correct.
2. The reported analyses, opinions, and conclusions are limited only by the reported assumptions and limiting conditions, and are personal, unbiased professional analyses, opinions and conclusions.
3. I have no present or prospective interest in the property that is the subject of this report and I have no personal interest or bias with respect to the parties involved.
4. My compensation is not contingent upon the reporting of a predetermined energy level or direction in energy level that favors the cause of the client, the amount of energy level estimate, the attainment of a stipulated result, or the occurrence of a subsequent event.
5. This assignment was not based on a requested minimum environmental energy level or specific power density.
6. My compensation is not contingent on an action or event resulting from the analyses, opinions, or conclusions in, or the use of, this report.
7. The consultant has accepted this assessment assignment having the knowledge and experience necessary to complete the assignment competently.
8. My analyses, opinions, and conclusions were developed and this report has been prepared, in conformity with the *American Board of Health Physics* (ABHP) statements of standards of professional responsibility for Certified Health Physicists.

Date: November 1, 2018



Donald L. Haes, Jr., Ph.D
Certified Health Physicist

ENDNOTES

- i. Federal Register, Federal Communications Commission Rules; *Radiofrequency radiation; environmental effects evaluation guidelines* Volume 1, No. 153, 41006-41199, August 7, 1996. (47 CFR Part 1; Federal Communications Commission).
- ii. Telecommunications Act of 1996, 47 USC; Second Session of the 104th Congress of the United States of America, January 3, 1996.
- iii. 105 CMR 122.000: Massachusetts Department of Public Health, *Non-Ionizing Radiation Limits for: The General Public from Non-Occupational Exposure to Electromagnetic Fields, Employees from Occupational Exposure to Electromagnetic Fields, and Exposure from Microwave Ovens*.
- iv. ANSI/IEEE C95.1-1999: American National Standard, *Safety levels with respect to human exposure to radio frequency electromagnetic fields, from 3 KHz to 300 GHz (Updated in 2010)*.
- v. National Council on Radiation Protection and Measurements (NCRP); *Biological Effects and Exposure Criteria for Radiofrequency Electromagnetic Fields*, NCRP Report 86, 1986.
- vi. OET Bulletin 65: Federal Communications Commission Office of Engineering and Technology, *Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields*; Edition 97-01, August 1999.



City Council
140 Main Street
2nd Floor
Marlborough, MA 01752

RE: Petition of New Cingular Wireless PCS, LLC ("AT&T") for Grant of Location for Telecommunication Wires and Wireless Attachments and Appurtenances: **Project: Area5_87A: Location: 28 Concord Rd, 42.352556 N 71.529969 W, Existing Utility Pole**

Dear Honorable Members of the City Council:

Pursuant to Massachusetts General Laws Chapter 166, Sections 21, 22 and 25A, please find enclosed the petition (the "Petition") of New Cingular Wireless PCS, LLC ("AT&T") for a grant of location for telecommunication wires and wireless attachments and appurtenances to be attached to existing utility poles owned by National Grid within the City of Marlborough. Included with the Petition are detailed plans that identify the locations where AT&T's proposed attachments will be placed. This includes an area map of all locations as well as the utility pole profiles depicting the equipment attachment heights and specs.

AT&T requests that the City schedule a public hearing on this Petition, subject to the requirements of Chapter 166 of the Massachusetts General Laws. Those requirements prescribe that the City mail "written notice of the time and place of the hearing at least seven days prior to all owners of real estate abutting upon that part of the way upon, along, across or under which the line is to be constructed, as such ownership is determined by the last preceding assessment for taxation". It is my understanding that the City will be able to produce this list and I will work with the City Clerk to ensure the letters are sent per these requirements.

Project Description

AT&T proposes to deploy four (4) small cell sites in the City of Marlborough in order to deal with the rapidly increasing demand on AT&T's wireless network. All four (4) small cell sites will be mounted on existing National Grid utility poles located within the public rights of way. The small cell sites will work in conjunction with the existing macro sites installed on rooftops, towers and other structures in and around the City of Marlborough. This Petition specifically addresses the following location:

Project: Area5_144A : Location: Francis St and E. Main St, 42.350350 N 71.541444 W, Utility Pole: #11-50

AT&T's radio frequency engineers targeted the proposed location due to the high traffic and data demands on AT&T's network. AT&T's existing macro cell sites are not providing adequate data capacity in this location due to increased population, vehicular and foot traffic, multiple wireless devices used by each person and other contributing factors. This small cell site will work to offload the demand on the macro sites and allow for increased data capacity and speed within the immediate vicinity of the proposed small cell site.

The small cell site will be installed using standard commercially accepted methods in accordance with all applicable federal, state and local laws and regulations. All proposed attachments are to existing poles owned and maintained by National Grid. AT&T has entered into a Pole Attachment Agreement with National Grid.

The small cell installation on each existing utility pole will include: fiber optic cable(s); remote nodes in a small equipment cabinet H32" x W18" x D12" mounted to the pole at least 8' above ground level; an unobtrusive pole top antenna measuring 24.7" long and 10" in diameter ; conduits and cable protectors; and, an electrical meter with shutoff switch. Attached please find design sketches for each site showing the proposed location, pole height, mounting height, equipment specifications and utility plan.

The Telecommunications Act of 1996 (the "Act")

Without the installation, AT&T would be unable to provide specifically established coverage and capacity objectives. The utility pole is located within the limited geographic area whereby AT&T's radio frequency engineers determined that a wireless facility is required. The Act imposes substantial restrictions affecting the standard for granting the requested relief. The ACT provides that: no laws or actions by any local government or planning or zoning board may prohibit, or have the effect of prohibiting, the placement, construction, or modification of communications towers, antennas, or other wireless facilities in any particular geographic area, see 47 U.S.C. §332(c)(7)(B)(i); local government or planning or zoning boards may not unreasonably discriminate among providers of functionally equivalent services, see 47 U.S.C. §332(c)(7)(B)(i); health concerns may not be considered so long as the emissions comply with the applicable standards of the FCC, see 47 U.S.C. §332(c)(7)(B)(iv); and, decisions must be rendered within a reasonable period of time, see 47 U.S.C. §332(c)(7)(B)(ii) and the FCC's Declaratory Ruling commonly referred to as the "shot clock".

We have attached to this petition a generic emissions report demonstrating that the low power antenna will comply with applicable FCC standards with respect to emissions.

For the convenience of the City Council, AT&T has provided a proposed Form of Order for your consideration.

Should you have any questions, or would like any additional information prior to the public hearing please do not hesitate to contact me at (774) 261-0043 or jiacoviello@clinellc.com. AT&T will be present at the public hearing to answer any questions you may have as well.

Thank you,

Jeff Iacoviello



Jeffrey Iacoviello | Site Acquisition Consultant
750 W Center St, Floor 3 | West Bridgewater, MA 02379
Mobile: 774.261.0043 | Fax: 617.249.0819
jiacoviello@clinellc.com | www.centerlinecommunications.com

PETITION FOR LOCATIONS FOR TELECOMMUNICATIONS WIRES AND WIRELESS ATTACHMENTS AND APPURTENANCES

To THE CITY COUNCIL OF THE CITY OF MARLBOROUGH, MASSACHUSETTS

Pursuant to Massachusetts General Laws, Chapter 166, Sections 21, 22 and 25A, and the City Ordinances of the City of Marlborough, Massachusetts, NEW CINGULAR WIRELESS PCS, LLC ("AT&T") requests that it be granted locations for and permission to construct and maintain telecommunications wires and wireless attachments and appurtenances, including fiber optic cable(s), remote nodes and pole top antennas to be attached to existing National Grid utility poles, located upon and along the following public ways within the City of Marlborough, as depicted on the attached plans. In addition, AT&T seeks permission to install conduit or direct bury cable(s) as depicted on the plans submitted.

Wherefore, AT&T requests that, after due notice and public hearing as provided by law, that it be granted locations for permission to construct the telecommunications wires and wireless attachments and appurtenances upon, along and under the public ways within the City of Marlborough as depicted on the plans filed herewith. AT&T also submitted additional information in support of this Petition.

Respectfully submitted,

NEW CINGULAR WIRELESS PCS, LLC ("AT&T")

By: Jeff Iacoviello
Site Acquisition Consultant
Centerline Communications, LLC

ORDER FOR LOCATION FOR TELECOMMUNICATIONS WIRES AND WIRELESS ATTACHMENTS AND APPURTENANCES

By the City Council

Of the City of Marlborough, Massachusetts, _____, 2018

ORDERED:

That pursuant to Massachusetts General Laws, Chapter 166, NEW CINGULAR WIRELESS PCS, LLC ("AT&T") is hereby granted locations for and permission to construct and maintain telecommunications wires and wireless attachments and appurtenances, including fiber optic cable(s), remote nodes and pole top antennas, to be attached to existing National Grid utility poles, located upon, along and under the public ways within the City of Marlborough, as substantially shown on the plans filed with said Petition. In addition, AT&T is hereby granted permission to install conduit or direct bury fiber cable(s) as depicted on the plans submitted.

The forgoing permission is subject to the following conditions:

1. The telecommunications wires and wireless attachments and appurtenances shall be installed and operated in compliance with all applicable federal and state laws and regulations.
2. AT&T shall indemnify and save the City harmless against all damages, costs and expense whatsoever to which the City may be subjected in consequence of the acts or neglect of AT&T or its agents or servants, or in any manner arising from the rights and privileges granted by the City.
3. AT&T shall comply with the requirements of existing City Ordinances, as may be applicable and such as may hereafter be adopted governing the construction and maintenance of said telecommunications wires and wireless attachments and appurtenances, so far as the same are not inconsistent with the laws of the United States or of the Commonwealth of Massachusetts.

I hereby certify that the foregoing was adopted at a meeting of the City Council of the City of Marlborough, Massachusetts, held on the _____ day of _____, 2018.

City Clerk

APPROVED

We hereby certify that on _____, 2017, at _____, o'clock at _____, a public hearing was held on the Petition of NEW CINGULAR WIRELESS PCS, LLC ("AT&T") for permission to construct and maintain telecommunications wires and wireless attachments and appurtenances, including fiber optic cable(s), remote nodes and pole top antennas, to be attached to existing utility poles, located upon, along and under the public ways within the City of Marlborough and to install conduit or direct bury fiber cable(s) as indicated in the plans described in the order herewith recorded, that we mailed at least seven days before said hearing a written notice of the time and place of said hearing to each of the owners of real estate (as determined by the last preceding assessment for taxation) along the ways or parts of ways upon which the Company is permitted to construct the telecommunications wires and appurtenances of AT&T under said order, and that thereupon said order was duly adopted.

City Council of the City of Marlborough

CERTIFICATE

I hereby certify that the forgoing is a true copy of a grant of location order and certificate of hearing with notice adopted by the City Council of the City of Marlborough, Massachusetts, on the _____ day of _____, 2018, and recorded with records of location orders of said City, Book _____, Page _____. This certified copy is made under the provisions of Chapter 166 of the Massachusetts General Laws, as amended.

Attest:

City Clerk

APPROXIMATE COORDINATES: LAT: 42.352556° N LONG: 71.529969° W



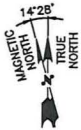
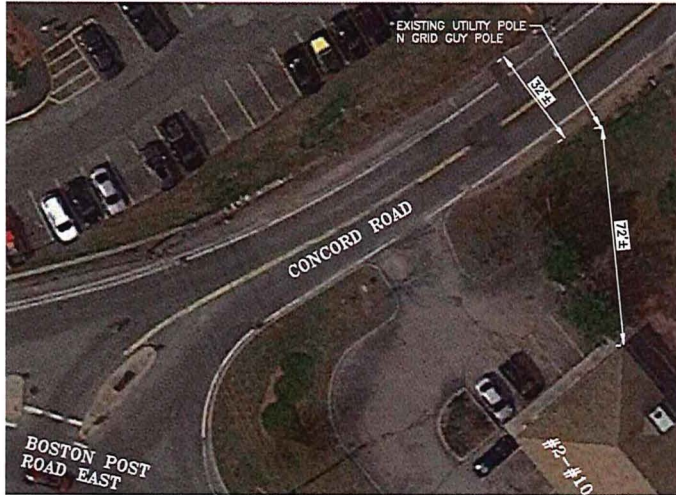
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FRAMINGHAM, MA 01701



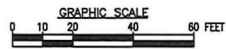
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RAYNHAM, MA 02767



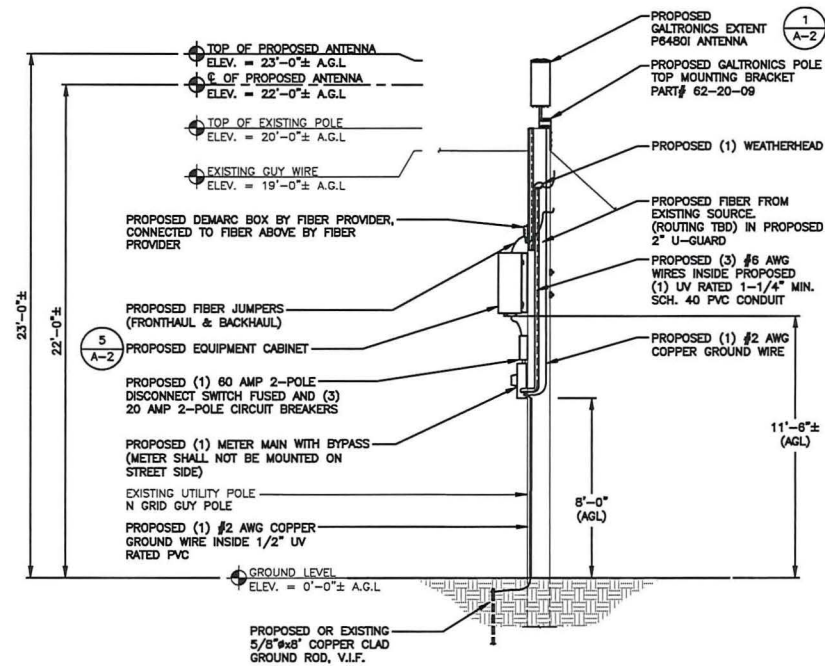
1600 OSGOOD STREET
BUILDING 20 NORTH SUITE 2090 TEL: (978) 557-5553
N. ANDOVER, MA 01845 FAX: (978) 236-0586



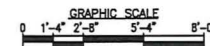
KEY PLAN
22x34 SCALE: 1"=20'
11x17 SCALE: 1"=40'



EXISTING CONDITIONS PHOTO DETAIL
SCALE: N.T.S



ELEVATION
22x34 SCALE: 3/8"=1'-0"
11x17 SCALE: 3/16"=1'-0"



CHECKED BY: AT

APPROVED BY: DJC

SUBMITTALS

REV.	DATE	DESCRIPTION	BY
1	10/01/17	REVISED PER COMMENTS	DB
0	06/02/17	ISSUED FOR REVIEW	DB

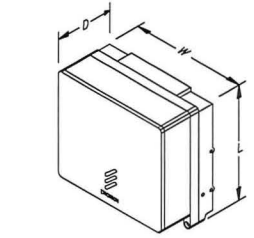
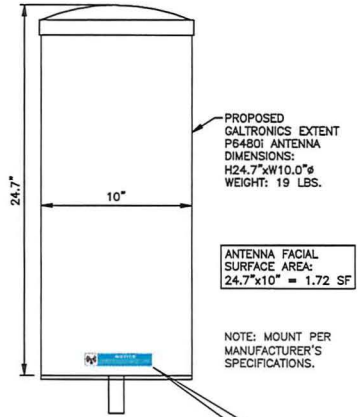
CLUSTER AND NODE NUMBER:
AREA 5_B7A

SITE ID:
AREA 5_B7A
SITE ADDRESS:
28 CONCORD ROAD
MARLBOROUGH, MA 01752
MIDDLESEX COUNTY

SHEET TITLE
KEY PLAN AND ELEVATION

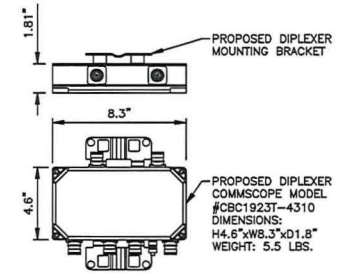
SHEET NUMBER

A-1



MODEL	QTY	L	W	D	WGT.
2203	3	8.0"	8.0"	4.0"	11 LB
2205	2	8.0"	8.0"	4.0"	11 LB

RRH (2203/2205) DETAIL
SCALE: N.T.S.

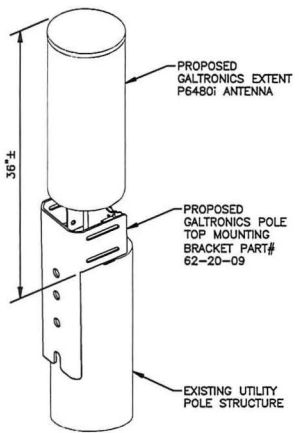


DIPLEXER DETAIL
SCALE: N.T.S.

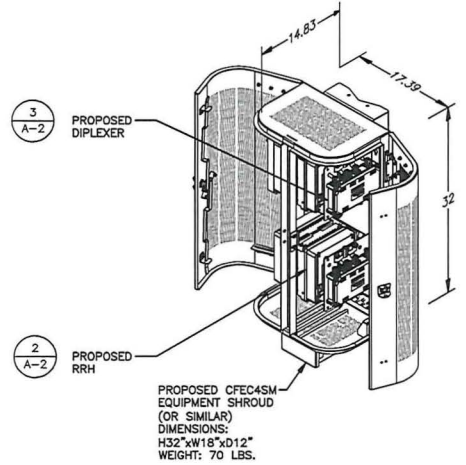
NOTICE
RF energy emitted by this device may exceed the FCC's general public exposure limits. Stay at least 3 feet away from the device. Call 603-876-2322 for info if you need advice without a need.

NO1-CD-16 1"x6" NOTICE DECAL
PLACE THREE NOTICE STICKERS EQUALLY SPACED
AROUND THE BOTTOM OF ANTENNA RADOME

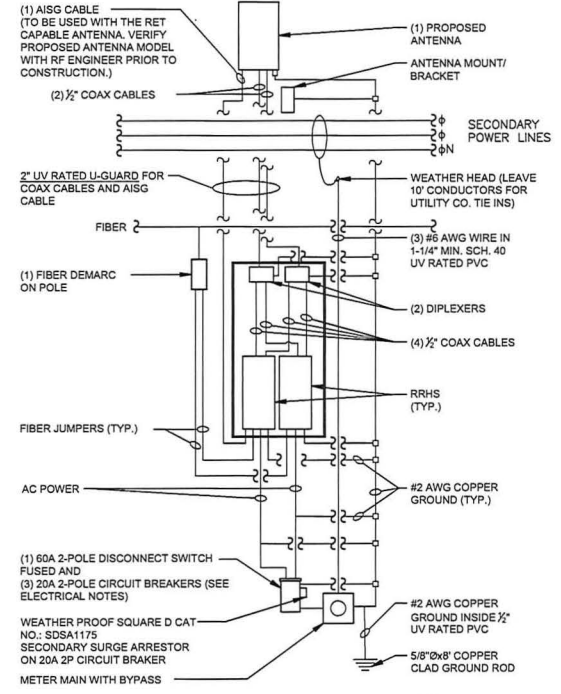
ANTENNA DETAIL
SCALE: N.T.S.



ANTENNA MOUNT DETAIL
SCALE: N.T.S.



EQUIPMENT CABINET DETAIL
SCALE: N.T.S.



GENERAL WIRING DIAGRAM - DUAL RRHS
SCALE: N.T.S.



CHECKED BY: AT
APPROVED BY: DJC

SUBMITTALS

REV.	DATE	DESCRIPTION	BY
1	10/01/17	REVISED PER COMMENTS	SB
0	08/02/17	ISSUED FOR REVIEW	SB

CLUSTER AND NODE NUMBER:
AREA 5_87A

SITE ID:
AREA 5_87A

SITE ADDRESS:
**28 CONCORD ROAD
MARLBOROUGH, MA 01752
MIDDLESEX COUNTY**

SHEET TITLE
EQUIPMENT DETAILS

SHEET NUMBER
A-2

DONALD L. HAES, JR., PH.D., CHP

Radiation Safety Specialist

Registered Health Physics Services Provider in NH and MA

PO Box 198, Hampstead, NH 03841

603-303-9959

Email: donald_haes_chp@comcast.net

January 17, 2018

I have reviewed the information pertinent to the hypothetical installation of an AT&T Personal Wireless Services (PWS) omni-directional panel antenna installation on a utility pole. I have analyzed the scenario where there would be one antenna mounted with a centerline height of 30' above ground level (AGL). This analysis considers the contributions of the AT&T PWS transmitters operating at the following supplied parameters:

PWS Service	Frequency (MHz)	Transmit Power (ERP: Watts)	Antenna Manufacturer / Model Number	Antenna Gain (dBd)
PCS LTE	1930-1950	40	EXTENT™ P6480i (See Appendix A)	7.33
5G: U-NII-1	5150-5250	1		7.53
5G: U-NII-3	5725-5850			

The calculated values of RF fields are presented as a percent of current Maximum Permissible Exposures (%MPE) as adopted by the Federal Communications Commission (FCC). Theoretical RF field calculations for the near proximity of RF source terms (in this case the AT&T transmit antennas), however, are not straight forward. For these theoretical calculations, a cylindrical model was used, where “spatially averaged plane-wave equivalent power densities parallel to the antenna may be estimated by dividing the net antenna input power by the surface area of an imaginary cylinder surrounding the length of the radiating antenna”. Calculations using “far-field” formula would considerably overestimate the resultant power densities. The calculations performed for this analysis still accurately represent the “worst case” and assume 100% usage of all the antennas.

The power density estimates can be calculated by using the formula:

$$S = \frac{P_{net}}{2 \cdot \pi \cdot R \cdot h}$$

Where: P_{net} = Net power to antenna (watts)
 R = Distance (range) from antenna
 h = aperture height of the antenna

The results of the RF field calculations for a single antenna are depicted in Figure 1 showing a side view representation demonstrating the directionality of the RF energy propagating from the antenna.

Note: The analyses, conclusions and professional opinions are based upon the precise parameters and conditions of this typical AT&T “small cell” installation on a utility pole with a mounting centerline height of 30' AGL. 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.

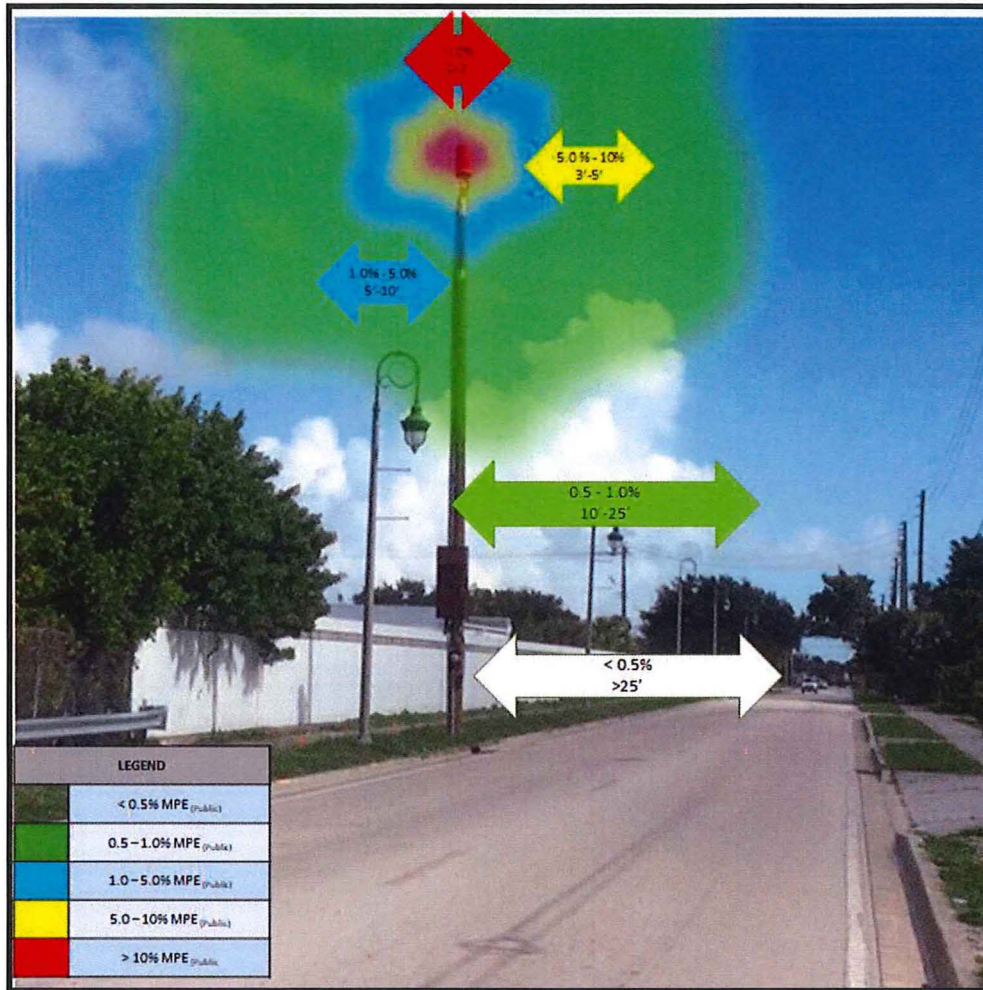


Figure 1: Results of RF field calculations for a typical AT&T antenna installation on a utility pole at 30' (AGL) showing profile view

CONCLUSION

Theoretical RF field calculations data indicate the summation of the AT&T RF contributions on a typical utility pole would be well within the established RF exposure guidelines; see Figure 1. Although the calculations assume a typically low mounting height of 30' AGL, some applications may require the antenna to be mounted higher. In these circumstances, the increased separation between the ground and antenna would result in an even lower general public exposure levels. These results indicate there could be more similar installations at these locations, and still be within Federal and State guidelines for RF exposure. This report provides written proof that the proposed facilities would comply with the FCC RF exposure guidelines. These small cell antenna installations proposed by AT&T would not produce significant changes to the ambient RF environment.

DONALD L. HAES, JR., PH.D., CHP

Radiation Safety Specialist

Registered Health Physics Services Provider in NH and MA

PO Box 198, Hampstead, NH 03841

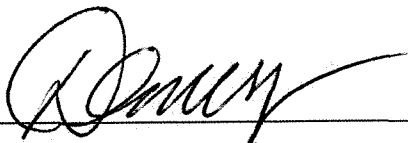
603-303-9959

Email: donald_haes_chp@comcast.net

STATEMENT OF CERTIFICATION

1. I certify to the best of my knowledge and belief, the statements of fact contained in this report are true and correct.
2. The reported analyses, opinions, and conclusions are limited only by the reported assumptions and limiting conditions, and are personal, unbiased professional analyses, opinions and conclusions.
3. I have no present or prospective interest in the property that is the subject of this report and I have no personal interest or bias with respect to the parties involved.
4. My compensation is not contingent upon the reporting of a predetermined energy level or direction in energy level that favors the cause of the client, the amount of energy level estimate, the attainment of a stipulated result, or the occurrence of a subsequent event.
5. This assignment was not based on a requested minimum environmental energy level or specific power density.
6. My compensation is not contingent on an action or event resulting from the analyses, opinions, or conclusions in, or the use of, this report.
7. The consultant has accepted this assessment assignment having the knowledge and experience necessary to complete the assignment competently.
8. My analyses, opinions, and conclusions were developed and this report has been prepared, in conformity with the *American Board of Health Physics* (ABHP) statements of standards of professional responsibility for Certified Health Physicists.

Date: January 17, 2018



Donald L. Haes, Jr., Ph.D

Certified Health Physicist

APPENDIX A

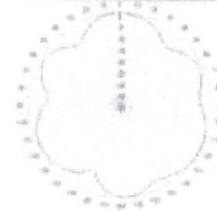


10" x 24" Outdoor Pseudo Omni Canister Antenna [1695-2400, 3550-3700 and 5150-5950 MHz]

EXTENT™ P6480i

Description:

- Pseudo Omni Canister Antenna for Outdoor DAS and Small Cells.
- 4x ports for AWS/PCS/WCS Band 1695-2400 MHz
- 4x ports for CBRS Band 3550-3700 MHz
- 2x ports for 5GHz Band 5150-5950 MHz



1695-2400, 3550-3700 and 5150-5950 MHz Pseudo Omni Canister Antenna

Electrical Specifications

Frequency Band [MHz]	1695-2180	2180-2400	3550-3700	5150-5950
Input Connector Type	4x 4.3-10 DIN(F)		4x 4.3-10 DIN(F)	2x 4.3-10 DIN(F)
Isolation (typ.)	-20 dB		-25 dB	-25 dB
Inter-band Isolation	-30 dB (typ)		-30 dB (typ)	-30 dB (typ)
VSWR/Return Loss	1.5:1(Typ.) 1.7:1(Max.) / 14.0 dB(Typ.) 11.8dB(Max.)			
Impedance	50 Ω			
Polarization	Dual slant 45° (±45°)			
Horizontal Beamwidth	Omni (360°)			
Vertical Beamwidth	15°	12°	15°	19°
Max. Gain	9 dBi	9.5 dBi	8.5 dBi	6 dBi(Max.)
Avg. Gain	7.5 dBi	8 dBi	8 dBi	3 dBi
Downtilt	0°			
Max Power / Port	150 Watts		100 Watts	10 Watts
PIM @ 2x43 dBm	<-153 dBc		N/A	N/A

Mechanical Specifications

Operating Temperature	-40° to 158°F (-40° to +70°C)
Antenna Weight	19 lbs (9 kg)
Antenna Diameter	10" (254 mm)
Antenna Height	24.7" (628 mm)
Radome Material	ASA
RoHS	Compliant
Radome Color	Gray, Brown, 3M™ Conceal Film, Custom Colors Possible
Ingress Protection	Outdoor (IP65)
Wind Survival Rating	150 mph (241 km/h)
Shipping Dimensions - L x W x D	30"x19"x19" (762x483x483 mm)
Shipping Weight (Gross Weight)	26 lbs (12 kg)

Release Date: March 02, 2017; Revision: 5-1 : RFD#6480

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WWW.GALTRONICS.COM



IN CITY COUNCIL

Marlborough, Mass., ~~SEPTEMBER 25, 2017~~

ORDERED:

That there being no objection thereto set **MONDAY NOVEMBER 13, 2017** as **DATE FOR PUBLIC HEARING** On the Petition of AT & T to deploy one small cell site which will be mounted on existing utility poles at 319 East Main Street, be and is herewith refer to **WIRELESS COMMUNICATION COMMITTEE**.

ADOPTED

ORDER NO. 17-1007034



IN CITY COUNCIL

Marlborough, Mass., NOVEMBER 13, 2017

PAGE 1

ORDERED:

That the Public Hearing on the Petition of AT & T to deploy one small cell site which will be mounted on existing utility pole at 319 East Main Street, Order No. 17-1007034, hearing recessed at 8:25 p.m.

Councilors Present: Doucette, Tunnera, Irish, Clancy, Landers, Juair, Oram, Ossing & Robey.

Absent: Delano & Elder

PUBLIC SPEAKING IN FAVOR

Michael Dolan from the law firm of Brown Rudnick appeared on behalf of the petitioner, AT&T. AT&T proposed a small cell facility at this location. President Clancy requested they explain where the location is or he could do it for them. President Clancy stated it is directly across from Hosmer Street by Mitrakas Realty.

There is no one else speaking in favor. That part of the Public Hearing is closed.

QUESTIONS FROM THE PUBLIC

Andre Coullard asked a question regarding if the boxes are located on the street side of the utility pole, how can they be mounted on the street side if the pole is in the middle of the intersection. Mr. Dolan stated all the utility poles are on the side of the road with the boxes being mounted opposite the street side so it is not an issue.

Thomas Byrnes asked if this were part of a larger plan, the first three of a larger initiative to alleviate the dead spots within Marlborough or a very targeted action. Mr. Dolan indicated it is currently a targeted initiative, but it will aid carriers in filling in those gaps. He suspected these will be done in more cities and towns on a targeted basis.

Mr. Byrnes stated there are several dead spots throughout Marlborough and asked if anyone collects that information to study it. Mr. Dolan confirmed there are people who review that information and AT&T customers should call their customer service representative to point out problem areas so that data can be collected by them. They go by complaints and where the small cell sites are needed the most.

There are no further questions from the public. That part of the Public Hearing is closed.

PUBLIC SPEAKING IN OPPOSITION

There is no one speaking in opposition. That part of the Public Hearing is closed.



IN CITY COUNCIL

Marlborough, Mass., NOVEMBER 13, 2017
PAGE 2

ORDERED:

QUESTIONS FROM THE CITY COUNCIL

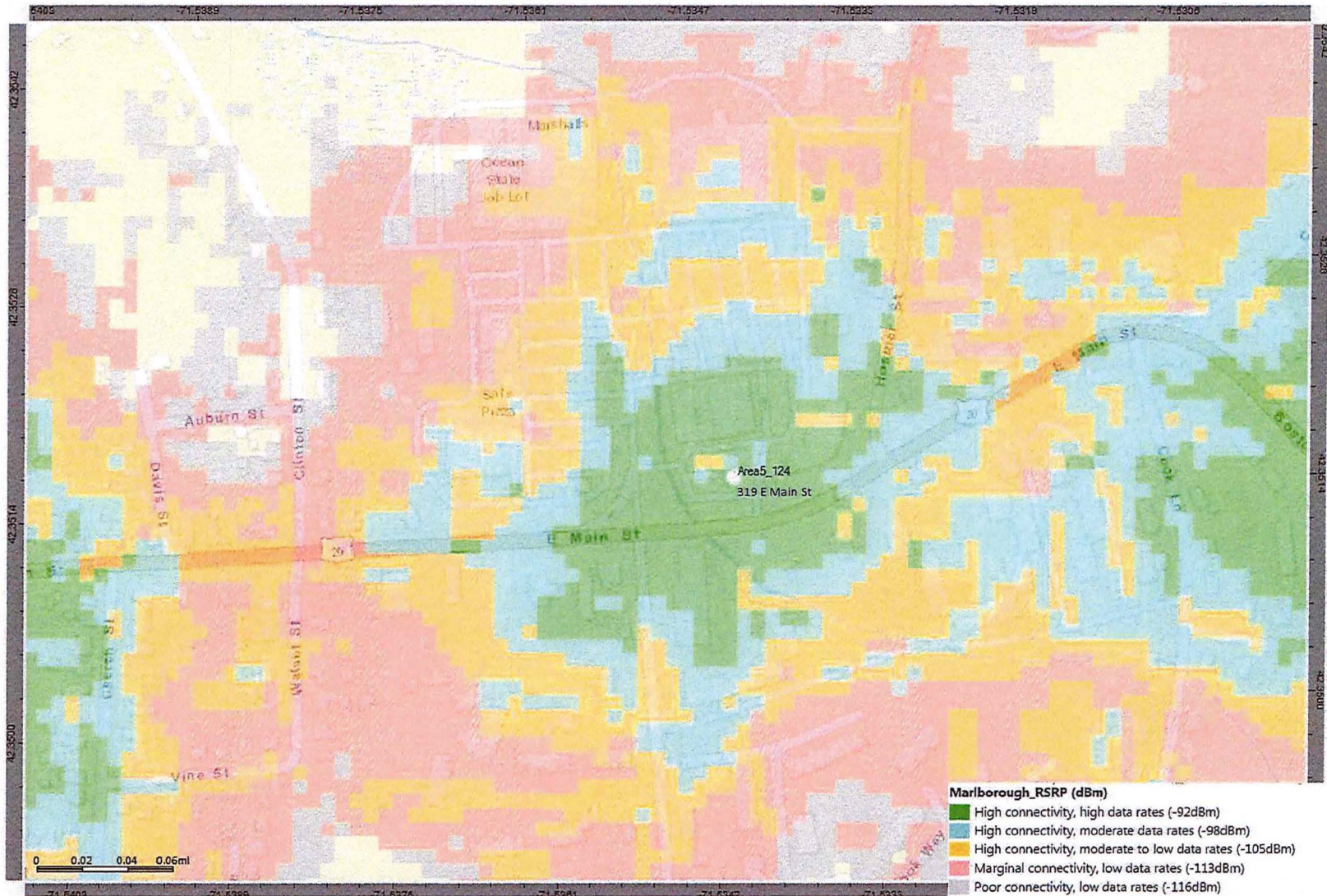
✓ Councilor Oram stated the petition is in the Wireless Communications Committee for review.

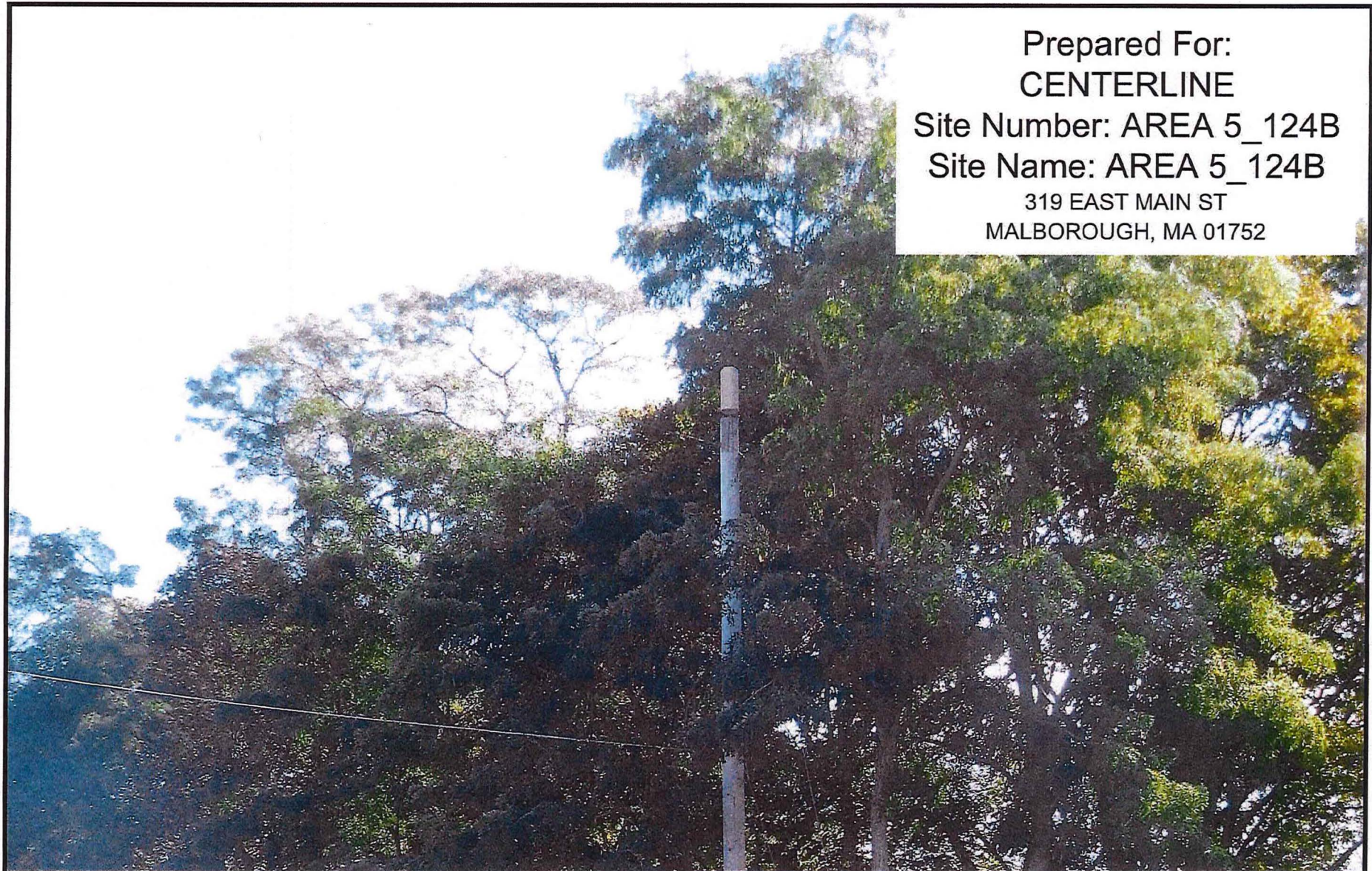
There are no further questions from members of City Council. That part of the Public Hearing is closed.

That ends the entire Public Hearing. This is currently in the Wireless Communications Committee.

ADOPTED

ORDER NO. 17-1007034A





Prepared For:
CENTERLINE
 Site Number: AREA 5_124B
 Site Name: AREA 5_124B
 319 EAST MAIN ST
 MALBOROUGH, MA 01752

SITE NO: AREA 5_124B
SITE NAME: AREA 5_124B
ADDRESS: 319 EAST MAIN ST
 MALBOROUGH, MA 01752



550 COCHITUATE ROAD
 FRAMINGHAM, MA 01701

PREPARED FOR:



95 RYAN DRIVE
 RAYNHAM, MA 02767



45 BEECHWOOD DRIVE
 N. ANDOVER, MA 01845
 TEL: (978) 557-5553
 FAX: (978) 334-5586

SITE TYPE: UTILITY POLE
DATE: 10/06/2017 **REV:** 0
DRAWN BY: KB
SCALE: N.T.S.

THIS STUDY DOES NOT CLAIM IN ANY WAY TO SHOW THE ONLY AREAS OF VISIBILITY. IT IS MEANT TO SHOW A BROAD REPRESENTATION OF AREAS WHERE THE PROPOSED INSTALLATION MAY BE VISIBLE BASED UPON THE BEST INFORMATION FOR TOPOGRAPHY AND VEGETATION LOCATIONS AVAILABLE TO DATE.

PAGE 1 OF 4

LOCUS MAP

TAKEN FROM GOOGLE.COM ON 10-05-17

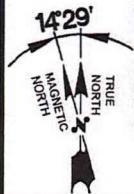
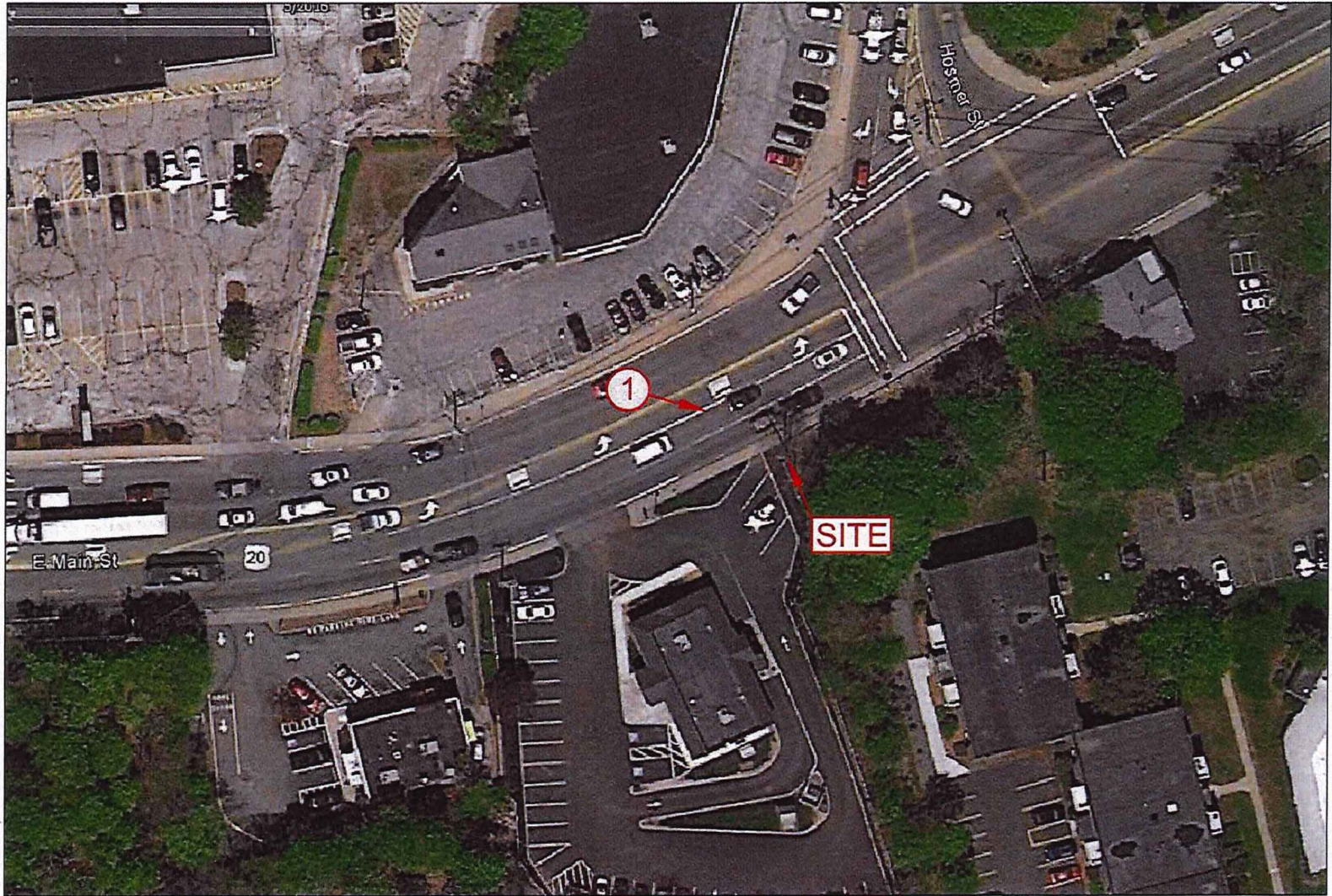


PHOTO LOCATION

SITE NO: AREA 5_124B
SITE NAME: AREA 5_124B
ADDRESS: 319 EAST MAIN ST
 MALBOROUGH, MA 01752



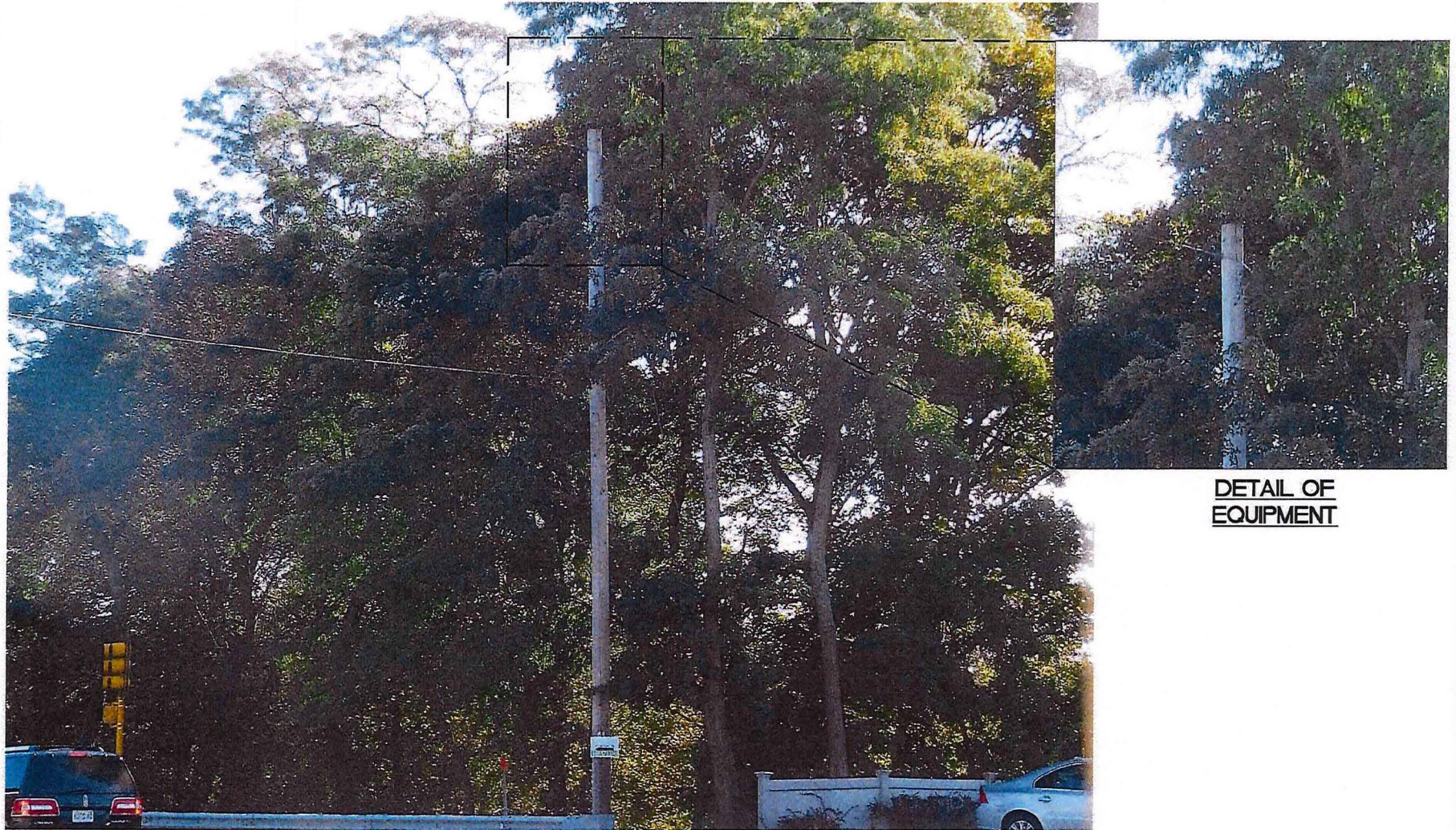
SITE TYPE: UTILITY POLE
DATE: 10/06/2017 **REV:** 0
DRAWN BY: KB
SCALE: N.T.S.

THIS STUDY DOES NOT CLAIM IN ANY WAY TO SHOW THE ONLY AREAS OF VISIBILITY. IT IS MEANT TO SHOW A BROAD REPRESENTATION OF AREAS WHERE THE PROPOSED INSTALLATION MAY BE VISIBLE BASED UPON THE BEST INFORMATION FOR TOPOGRAPHY AND VEGETATION LOCATIONS AVAILABLE TO DATE.

EXISTING CONDITIONS

LOCATION # 1

DATE OF PHOTO: 10/05/2017



DETAIL OF EQUIPMENT

VIEW SOUTHEAST FROM EAST MAIN STREET

SITE NO: AREA 5_124B
SITE NAME: AREA 5_124B
ADDRESS: 319 EAST MAIN ST
MALBOROUGH, MA 01752



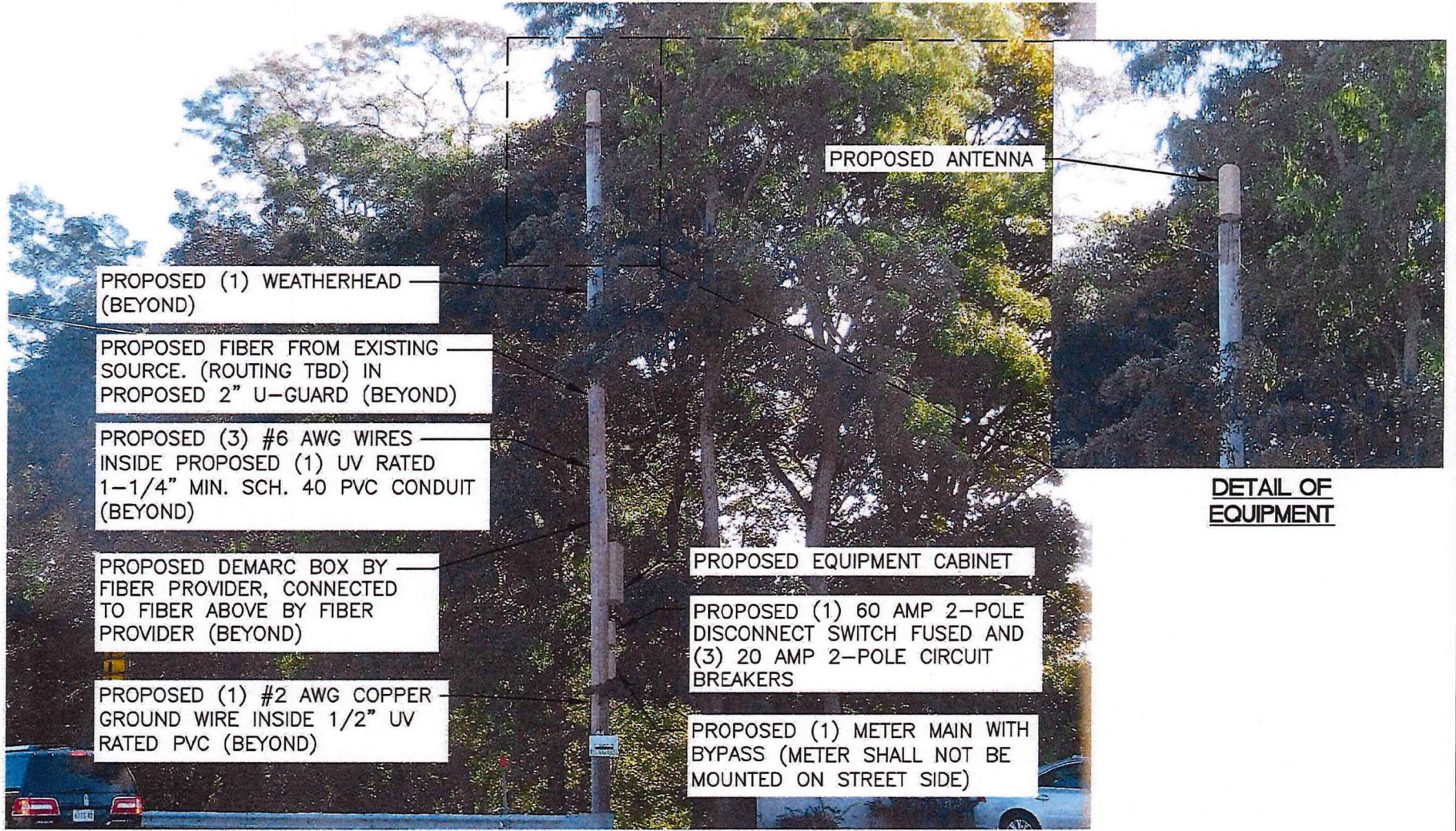
SITE TYPE: UTILITY POLE
DATE: 10/06/2017 **REV:** 0
DRAWN BY: KB
SCALE: N.T.S.

THIS STUDY DOES NOT CLAIM IN ANY WAY TO SHOW THE ONLY AREAS OF VISIBILITY. IT IS MEANT TO SHOW A BROAD REPRESENTATION OF AREAS WHERE THE PROPOSED INSTALLATION MAY BE VISIBLE BASED UPON THE BEST INFORMATION FOR TOPOGRAPHY AND VEGETATION LOCATIONS AVAILABLE TO DATE.

PROPOSED CONDITIONS

LOCATION # 1

DATE OF PHOTO: 10/05/2017



PROPOSED (1) WEATHERHEAD — (BEYOND)

PROPOSED FIBER FROM EXISTING SOURCE. (ROUTING TBD) IN PROPOSED 2" U-GUARD (BEYOND)

PROPOSED (3) #6 AWG WIRES — INSIDE PROPOSED (1) UV RATED 1-1/4" MIN. SCH. 40 PVC CONDUIT (BEYOND)

PROPOSED DEMARC BOX BY FIBER PROVIDER, CONNECTED TO FIBER ABOVE BY FIBER PROVIDER (BEYOND)

PROPOSED (1) #2 AWG COPPER GROUND WIRE INSIDE 1/2" UV RATED PVC (BEYOND)

PROPOSED ANTENNA

DETAIL OF EQUIPMENT

PROPOSED EQUIPMENT CABINET

PROPOSED (1) 60 AMP 2-POLE DISCONNECT SWITCH FUSED AND (3) 20 AMP 2-POLE CIRCUIT BREAKERS

PROPOSED (1) METER MAIN WITH BYPASS (METER SHALL NOT BE MOUNTED ON STREET SIDE)

VIEW SOUTHEAST FROM EAST MAIN STREET

SITE NO: AREA 5_124B
SITE NAME: AREA 5_124B
ADDRESS: 319 EAST MAIN ST
 MALBOROUGH, MA 01752



SITE TYPE: UTILITY POLE
DATE: 10/06/2017 **REV:** 0
DRAWN BY: KB
SCALE: N.T.S.

THIS STUDY DOES NOT CLAIM IN ANY WAY TO SHOW THE ONLY AREAS OF VISIBILITY. IT IS MEANT TO SHOW A BROAD REPRESENTATION OF AREAS WHERE THE PROPOSED INSTALLATION MAY BE VISIBLE BASED UPON THE BEST INFORMATION FOR TOPOGRAPHY AND VEGETATION LOCATIONS AVAILABLE TO DATE.

PAGE 4 OF 4

RECEIVED
CITY CLERK'S OFFICE
CITY OF MARLBOROUGH



2017 SEP 21 A 11:30

City Council
City of Marlborough
City Hall
140 Main Street
Marlborough, MA 01752

August 9, 2017

RE: Petition of New Cingular Wireless PCS, LLC ("AT&T") for Grant of Location for Telecommunication Wires and Appurtenances: Area5_124: 319 East Main Street
(42.351319, -71.533467) – NGRID Pole #35-84

Dear Members of the City Council:

Pursuant to Massachusetts General Laws Chapter 166 section 22, please find enclosed the petition of New Cingular Wireless PCS, LLC ("AT&T") for a grant of location for telecommunication wires and appurtenances to be attached to existing utility poles owned by National Grid within the City of Marlborough. Included with the petition are detailed plans that identify the locations where AT&T's proposed pole attachments will be placed. This includes an area map of all locations as well as the Utility pole profiles depicting the equipment attachment heights and specs.

AT&T requests that the City schedule a public hearing on this petition, subject to the requirements of Massachusetts General Laws, Section 22. Those requirements prescribe that the city provide written notice to all owners of real estate, abutting that part of each street upon or across which, wires appurtenances are proposed to be located. It is my understanding that the City will be able to produce this list, and I will work with the City Clerk to ensure the letters are sent per the requirements of the City.

For the convenience of the City Council, AT&T has provided a proposed form of order.

Should you have any questions, or would like any additional information prior to the public hearing please do not hesitate to contact me at (508) 821-6509 or dford@clinellc.com. I will be present at the public hearing to answer any questions you may have as well.

Thank you,



David Ford | Site Acquisition Lead - Manager
Mobile: 508.821.6509 | Fax: 508.819.3017
dford@clinellc.com | www.centerlinecommunications.com

PETITION FOR LOCATIONS FOR TELECOMMUNICATIONS WIRES AND APPURTENANCES

To the CITY COUNCIL OF THE CITY OF MARLBOROUGH, MASSACHUSETTS

Pursuant to Massachusetts General Laws, Chapter 166 and the City Ordinance of the City of Marlborough, Massachusetts, NEW CINGULAR WIRELESS PCS, LLC ("AT&T"), requests that it be granted locations for and permission to construct and maintain telecommunications wires and appurtenances, including fiber optic cable, remote nodes and pole top antennas; to be attached to existing National Grid utility poles, located upon and along the following public ways within the City of Marlborough, as indicated on the attached plans. In addition, the petitioner seeks permission to install conduit or direct bury cable as indicated in the attached plans.

Wherefore, Petitioner requests that, after due notice and hearing as provided by law, that it be granted locations for and permission to construct the telecommunications wires and appurtenances upon and along the public ways within the City of Marlborough, shown on the plan, filed herewith. AT&T also submitted additional information in support of this petition.

Respectfully submitted,

NEW CINGULAR WIRELESS PCS, LLC ("AT&T")

**By: David Ford
Project Manager – Small Cell
Centerline Communications, LLC**

ORDER FOR LOCATION FOR TELECOMMUNICATIONS WIRES AND APPURTENANCES

By the City Council

Of the City of Marlborough, Massachusetts, _____, 2017

ORDERED:

That NEW CINGULAR WIRELESS PCS, LLC ("AT&T") is hereby granted locations for and permission to construct and maintain telecommunications wires and appurtenances, including fiber optic cable, remote nodes and pole top antennas, to be attached to existing National Grid utility poles, located upon and along the public ways within the City of Marlborough, as substantially shown on the plan filed with said petition. In addition, the petitioner is hereby granted permission to install conduit or direct bury fiber cable as indicated in the plans.

The forgoing permission is subject to the following conditions:

1. The telecommunications wires and appurtenances shall be of such material and construction and all work done in such manner as to be satisfactory to the City Council or to such municipal officers as may be appointed to the supervision of the work.
2. Said company shall indemnify and save the City harmless against all damages, costs and expense whatsoever to which the City may be subjected in consequence of the acts or neglect of said Company, its agents or servants, or in any manner arising from the rights and privileges granted it by the City.
3. Said Company shall comply with the requirements of existing City ordinances, as may be applicable and such as may hereafter be adopted governing the construction and maintenance of said telecommunications wires and appurtenances, so far as the same are not inconsistent with the laws of the Commonwealth of Massachusetts.

I hereby certify that the foregoing was adopted at a meeting of the City Council of the City of Marlborough, Massachusetts, held on the _____ day of _____, 2017.

City Clerk

APPROVED

We hereby certify that on _____, 2017, at _____, o'clock at _____, a public hearing was held on the Petition of NEW CINGULAR WIRELESS PCS, LLC ("AT&T") for permission to construct and maintain telecommunications wires and appurtenances, including fiber optic cable, remote nodes and pole top antennas, to be attached to existing utility poles, located upon and along the public ways within the City of Marlborough; and to install conduit or direct bury fiber cable as indicated in the plans described in the order herewith recorded, that we mailed at least seven days before said hearing a written notice of the time and place of said hearing to each of the owners of real estate (as determined by the last preceding assessment for taxation) along the ways or parts of ways upon which the Company is permitted to construct the telecommunications wires and appurtenances of said Company under said order, and that thereupon said order was duly adopted.

City Council of the City of Marlborough

CERTIFICATE

I hereby certify that the forgoing is a true copy of a grant of location order and certificate of hearing with notice adopted by the City Council of the City of Marlborough, Massachusetts, on the _____ day of _____, 2017, and recorded with records of location orders of said City, Book _____, Page _____. This certified copy is made under the provisions of Chapter 166 of the Massachusetts General Laws, as amended.

Attest:

City Clerk

Applicable State Law

Municipal Approval of the Construction and Placement of AT&T's Wires and Related Pole Attachments is governed by Massachusetts General Laws Chapter 166, Sections 21-22. As a FCC regulated provider of intrastate telecommunications services, AT&T is authorized under Chapter 166, Section 21 to construct lines and other facilities upon, along, under and across the public ways. Such construction must not incommode the public use of public ways.

In order to obtain municipal permission to construct its telecommunications facilities in public ways, AT&T must file a written petition with the selectmen of a town or the board of alderman or like body of a city, such as the AT&T City Council, pursuant to Chapter 166, Section 22. This same process has been employed routinely by the City of Marlborough in the case of Verizon and Massachusetts Electric Company, in the case of poles, wires, conduits and related appurtenances. In carrying out the permit-granting authority conferred by the General Court, municipalities act as public officers under a delegation of power from the General Court and not as agents of the municipality. Municipalities may adopt reasonable regulations for the erection of facilities by telecommunications carriers having authority to place their facilities in or under public ways. AT&T stands ready, willing and able to comply with the reasonable requirements of the City under General Laws Chapter 166, Sections 21-22 and related requirements imposed by the City applicable to grants of location by the City Council.

Project Description

AT&T proposes to deploy (4) small cell sites in the City of Marlborough in order to deal with ongoing demand on the wireless network. All (4) will be mounted on existing National Grid utility poles located within the public right of way. The small cell sites will work in conjunction with the existing macro sites installed on city rooftops, towers and other structures. This petition specifically addresses the following location:

Area5_124: 319 East Main Street – (42.351319, -71.533467) – NGRID Pole #35-84

AT&T's radio frequency engineers targeted the proposed location due to the high traffic nature and data demand on the network. The existing macro cell sites are having difficulty providing adequate data capacity in the location due to a number of reasons relating to increased population, vehicle and foot traffic, multiple devices per person and other contributing factors. The small cell site will work to offload the demand on the macro sites and allow for increased LTE data capacity and speed within the immediate vicinity of the proposed site.

The network will be installed using typical and commercially accepted methods. Currently no new poles are proposed to be installed. All other poles in this development are existing poles, and are owned and maintained by National Grid through a Pole Attachment Agreement.

Installed telecommunication facilities will include fiber optic cable and small remote nodes for transmitting RF signal, with an unobtrusive pole top antenna on utility poles. Specifically, a small antenna on top of each pole measuring 24.7" x 10" along with an equipment cabinet mounted further down the pole. Attached please find design sketches at each site showing the proposed location, pole height, mounting height, equipment specifications and utility plan.

Node: Area5_124
Address: 319 East Main St, Marlborough, MA
Target Site: NGRID POLE # 35/84
Coordinates: 42.351291, -71.533434



KATHREIN

840 10510 840 10511

Dual Band Omni Antenna with GPS

	Antenna 1	Antenna 2
Dual Band (MHz)	698-894	1710-2180
Dual Polarization	X	X
HPBW	360°	360°

General specifications:

Frequency range	698-894 MHz 1710-2180 MHz
VSWR	<1.5:1
Impedance	50 ohms
Intermodulation (2x20w)	IM3: <-150 dBc
Polarization	+45° upper and lower band -45° upper and lower band
Connector	4 x 7-16 DIN female
Isolation Intrasystem	>30 dB
Intersystem	>40 dB (698-894 // 1710-2180 MHz)
Radome color	Brown or grey
Weight	45 lb (20.4 kg)
Height	24 inches (609 mm)
Radome diameter	16 inches (407 mm)
Wind load Side	at 93 mph (150kph) 32 lbf (138 N)
Wind survival rating*	150 mph (241.4 kph)
Shipping dimensions	32 x 20 x 19 inches (813 x 508 x 483 mm)
Shipping weight	52 lb (23.6 kg)
Mounting	Designed to be mounted on top of a utility pole using a custom mounting bracket supplied by the customer.

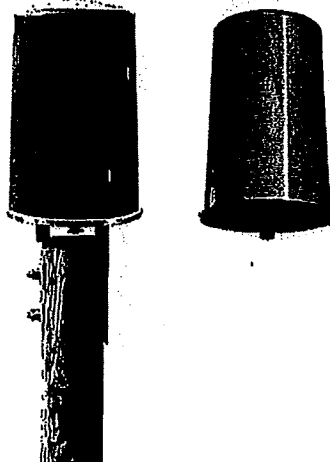
See reverse for order information.

* Mechanical design is based on environmental conditions as stipulated in TIA-222-G-2 (December 2009) and/or ETS 300 019-1-4 which include the static mechanical load imposed on an antenna by wind at maximum velocity. See the Engineering Section of the catalog for further details.

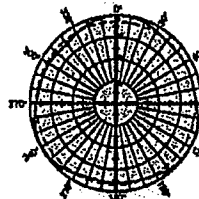
GPS specifications:

Frequency range	1575.42 ± 3 MHz
LNA gain	27 dB Typical
Pre-amp filtering	-30 dB at ± 100 MHz
Polarization	Righthand circular
H-plane beamwidth	Omni
E-plane beamwidth	105 degrees (half-power)
Connector	N female
DC power	+3-5.5 Vdc, 22 mA ± 3 Through N output connector
Temperature range	-35° C to +70° C

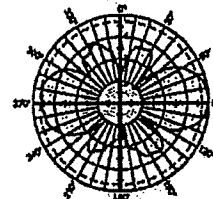
Specifications:	698-894 MHz	895-894 MHz	1710-1880 MHz	1850-1990 MHz	1920-2180 MHz
Gain (typical)	4.5 dBi (with 1-4 dB nulls, typical)	6.5 dBi	9 dBi	9 dBi (with 8-10 dB nulls, typical)	8.5 dBi
Maximum input power	250 watts (at 50°C)	250 watts (at 50°C)	200 watts (at 50°C)	200 watts (at 50°C)	200 watts (at 50°C)
+45° and -45° polarization vertical beamwidth	37° (half-power)	30° (half-power)	19° (half-power)	17° (half-power)	17.5° (half-power)



698-894 MHz

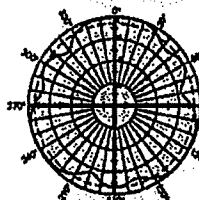


Horizontal pattern
±45°-polarization

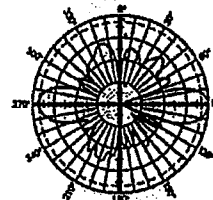


Vertical pattern
±45°-polarization

1710-2180 MHz



Horizontal pattern
±45°-polarization



Vertical pattern
±45°-polarization



11202-L

RoHS



Lead-Free

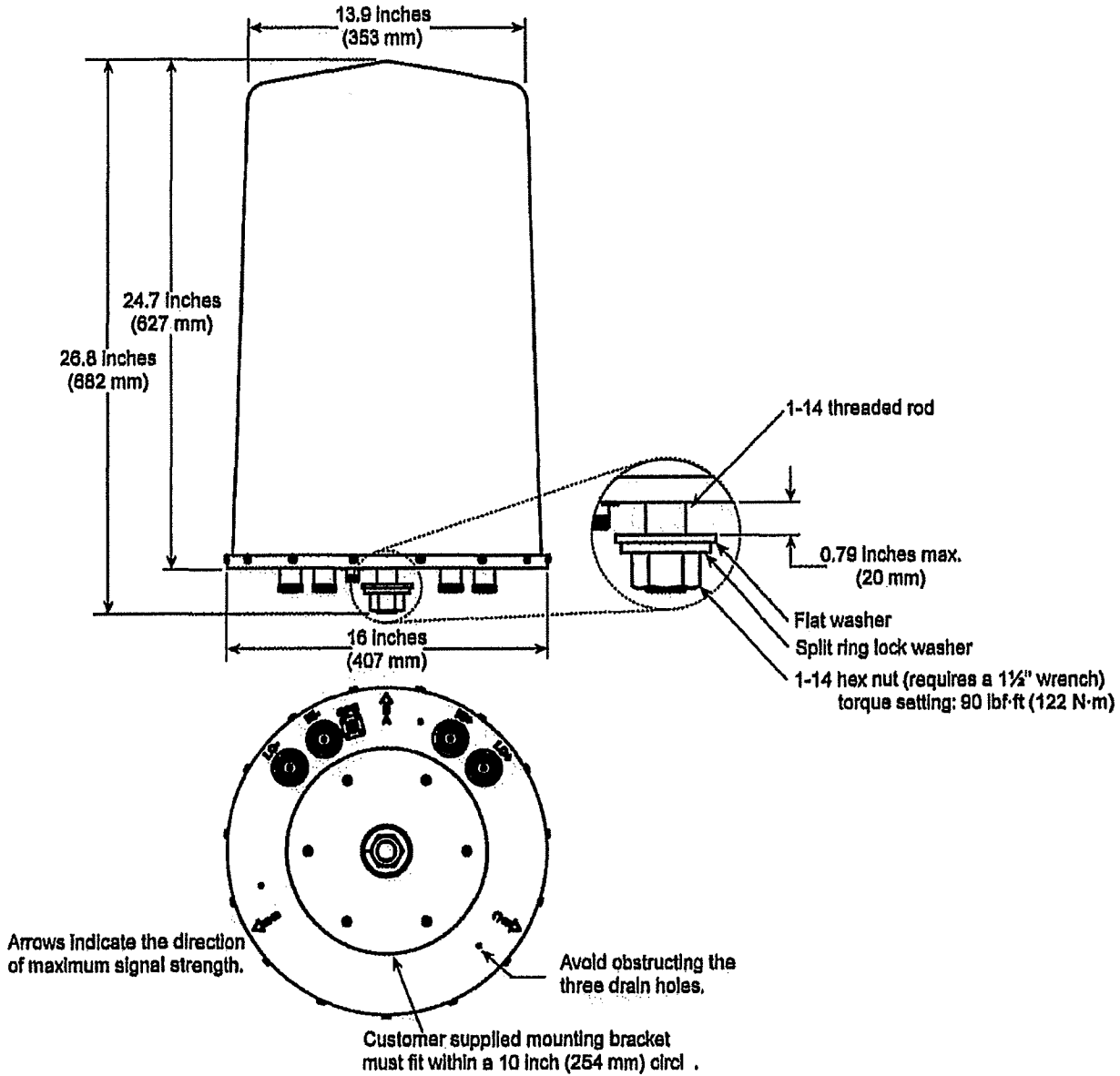
All specifications are subject to change without notice.
The latest specifications are available at www.kathreinusa.com

Kathrein USA Greenway Plaza II, 2400 Lakeside Blvd., Suite 650, Richardson TX 75082
Phone: 214.238.8800 Fax: 214.238.8801 Email: info@kathrein.com

KATHREIN

840 10510 840 10511

Dual Band Omni Antenna with GPS



Order Information:

Model	Description
840 10510	Brown Dualband X-pol Omni Antenna
840 10511	Grey Dualband X-pol Omni Antenna

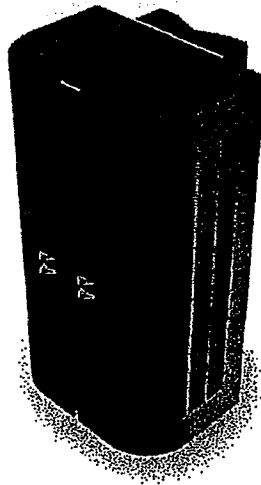
All specifications are subject to change without notice.
 The latest specifications are available at www.kathreinusa.com

Kathrein USA Greenway Plaza II, 2400 Lakeside Blvd., Suite 650, Richardson TX 75082
 Phone: 214.238.8800 Fax: 214.238.8801 Email: info@kathrein.com



Curved Shroud

Technical Product Description



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Disclaimer

The contents of this document are subject to revision without notice due to continued progress in methodology, design, and manufacturing. Ericsson shall have no liability for any error or damage of any kind resulting from the use of this document.



DESCRIPTION

The Curved Shroud is a pole mounted radio concealment. Its compact rounded shape design and variable powder coat finishes blends with surrounding infrastructure.

TECHNICAL SPECIFICATION

COMPLIANCE

Telcordia GR-487-CORE:

Exposure to High-Temperature
 Environmental Induced Vibration
 Seismic Test
 Transportation Vibration (for configuration with up to 4x 2203 radios)

MECHANICAL

Width x Depth x Height:

18" x 12" x 32"

Weight:

70 lbs. (enclosure only)

Internal Volume:

3.8 cu. ft.

MOUNTING

Pole Mounting:

Wood/Steel (6" offset available) metal banding or thru bolt

FINISH

Variable Powder Coat Finishes

GROUNDING

Isolated ground bar with ¼-in stud, 5/8 ctr-ctr, copper ground bar

CABLE ENTRY

6 cable egress/Ingress knock-out

OPTIONAL EQUIPMENT CONFIGURATIONS

Up to 4x Ericsson 2203

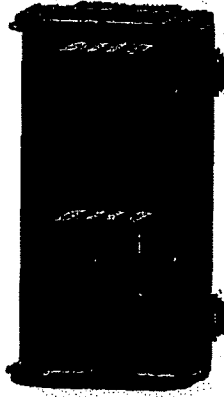
Up to 2x 2203 and 1x mRRUS12

Integrated bracket for up to 2x twin-diplexer

Integrated bracket for outdoor rated fiber termination box

ENCLOSURE CONFIGURATIONS

- 4x 2203, 2x twin-diplexer, 1x Fiber termination box

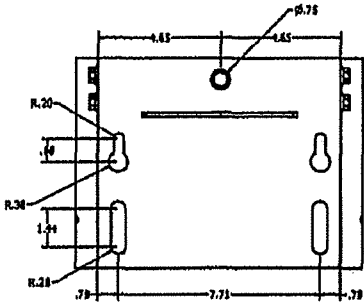


- 2x 2203, 1x mRRUS12, Fiber termination box, twin-diplexer

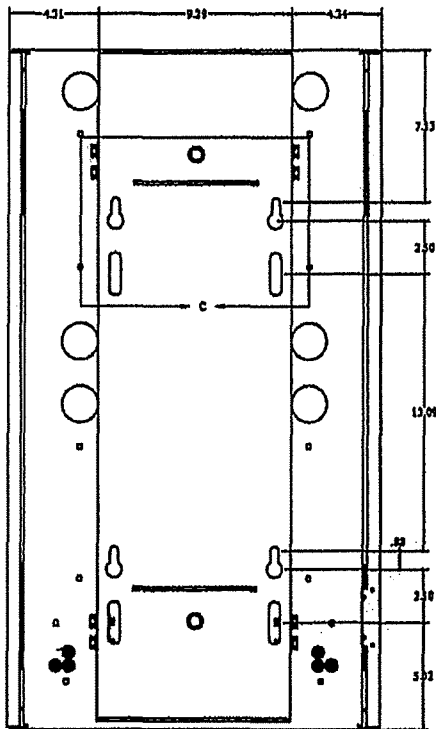


- Additional feature: mounting provision for AC distribution box

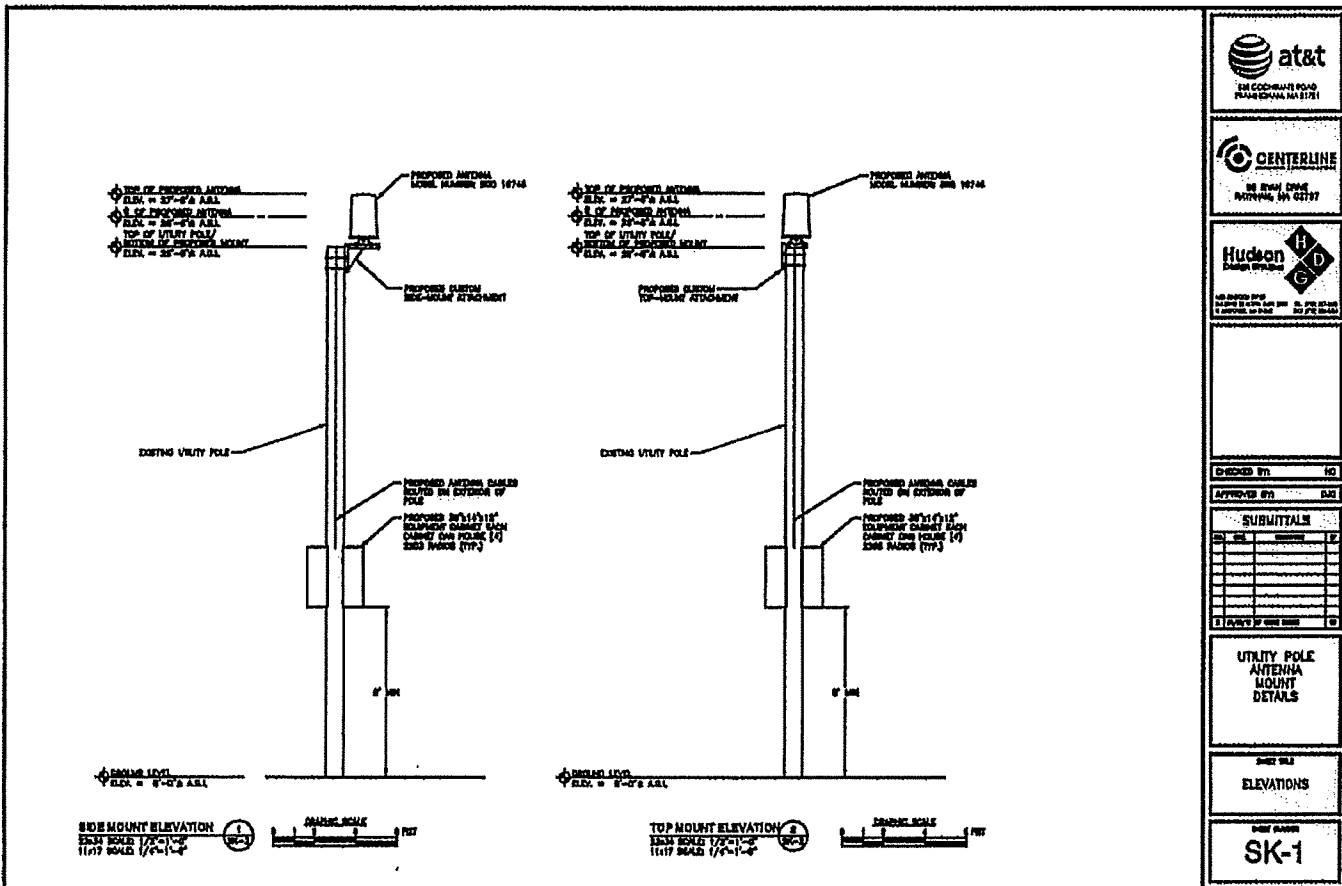




DETAIL C
SCALE: AS2



DOUBLE DOOR, VARIABLE PANEL INSTALLATION AS2			
REVISED BY	DATE	DESCRIPTION	APP'D
A		REV. HANDLE	DA
B		INSTALL NEEDED	DA
SHOWING ARE IN INCHES 1/8" = 1'-0" 1/4" = 3'-0" 1/2" = 6'-0" 3/4" = 9'-0" 1" = 12'-0"			
Consultant			
Contractor			
Steel Shop			
Sheet Scale	Sheet No.	Rev.	
1/8"	2	OF 2	
Drawing / Part Number			



at&t
 THE COLUMBIAN ROAD
 HARRISBURG, PA 17111

CENTERLINE
 48 BERRY ROAD
 HARRISBURG, PA 17111

Hudson
 CONSULTING ENGINEERS
 1000 MARKET STREET
 HARRISBURG, PA 17101

Checked By: [Signature]
 Approved By: [Signature]

SUBMITTALS		
NO.	DATE	DESCRIPTION

UTILITY POLE ANTENNA MOUNT DETAILS

SK-1

APPROXIMATE COORDINATE DATA FOR CENTERLINE OF ROAD (SEE SHEET 22-17) FOR USE OF INFORMATION PURPOSES ONLY. ROAD NOT TO BE CONSTRUCTED.

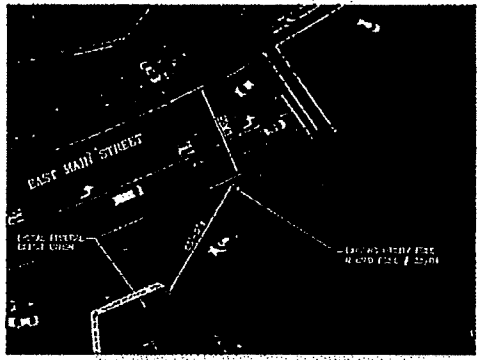


CHECKED BY: [Signature] DATE: 07/01/01
APPROVED BY: [Signature] DATE: 07/01/01

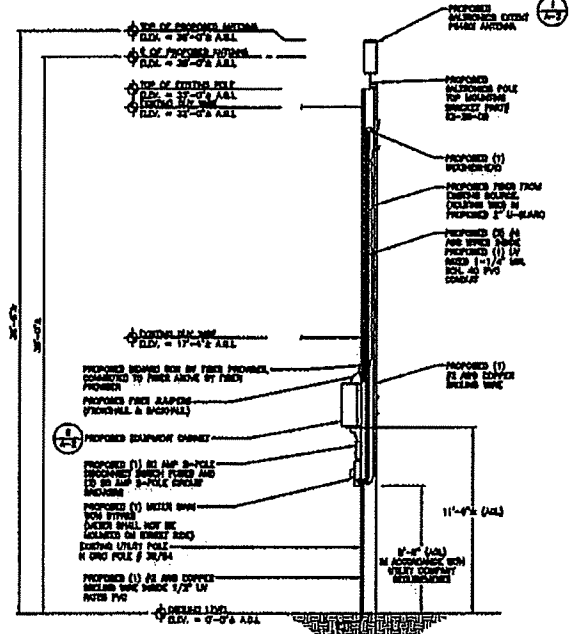
SUBMITTALS	
NO.	DESCRIPTION
1	KEY PLAN AND ELEVATION
2	UTILITY PLAN
3	CONCRETE FOUNDATION
4	FOUNDATION
5	FOUNDATION
6	FOUNDATION
7	FOUNDATION
8	FOUNDATION
9	FOUNDATION
10	FOUNDATION

PROJECT NO. 01-1248
AREA 5.1248
318 EAST OAK ST
LAUREL, MD 21112
MIDDLESEX COUNTY

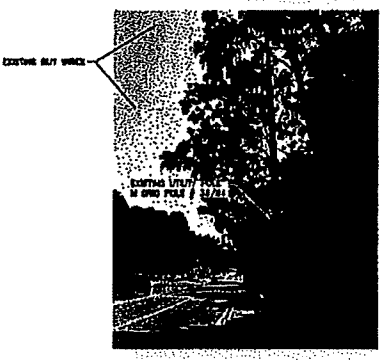
DATE: 07/01/01
KEY PLAN AND ELEVATION
SHEET NUMBER
A-1



KEY PLAN
SCALE: 1/8" = 1'-0"
DATE: 07/01/01



ELEVATION
SCALE: 1/8" = 1'-0"
DATE: 07/01/01



EXISTING CONDITIONS PHOTO DETAIL
SCALE: 1/8" = 1'-0"
DATE: 07/01/01

