



RECEIVED
TOWN OF NEEDHAM
SELECT BOARD

2019 MAY 24 A 11: 00

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May 23, 2019

Town of Needham
Board of Selectmen
1471 Highland Avenue, First Floor
Needham, MA 02492

Re: Grant of Location to Install a Wireless Antenna and Related Equipment on
an Existing Utility Pole in the Public Right of Way

Applicant: Cellco Partnership d/b/a Verizon Wireless ("Verizon Wireless")

Location: Utility Pole 16/16, 228 Brookline Street

Dear Chair Bulian and Select Board Members:

The purpose of this letter is to submit a Grant of Location Petition to install wireless communications equipment on utility pole number 16/16 in Needham's public right of way in accordance with Chapter 166, Section 22 of the Massachusetts General Laws.

I. APPLICATION MATERIALS

Enclosed please find a check in the amount of fifty dollars (\$50.00) made payable to the Town of Needham along with the following:

1. One (1) Petition;
2. One (1) Order;
3. One (1) Radio Frequency Report;
4. One (1) RF Emissions Report;
5. One (1) Federal Communications Commission ("FCC") License;
6. One (1) Verizon and Eversource Pole Attachment License;
7. One (1) 11" x 17" plan-set dated February 8, 2019 and
8. Excerpts from the FCC Order 18-133.

*26' to house
2' to driveway*

II. PROJECT NARRATIVE & SMALL CELL TECHNOLOGY

Verizon Wireless has identified significant coverage and capacity gaps in its wireless network in the Town of Needham. To address these gaps, Verizon Wireless seeks to install "Small Cell" wireless antennas as part of a Cloud Radio Access Network ("CRAN") it plans to deploy to provide the required capacity relief and improve network service in Needham. Installation of the CRAN will immediately improve Verizon Wireless's wireless service in Needham and pave the way for future 5G technology.

Over the last three years, Verizon Wireless has rapidly introduced CRAN technology across the Commonwealth, including in Needham (through grant of location petitions approved by the Board of Selectmen). This technology's stealth antenna equipment provides a pinpointed approach to the continued deployment of Verizon Wireless's LTE, AWS, and burgeoning 5G network in Massachusetts. In essence, CRAN systems mount small wireless antennas disguised as electric transformers to existing utility poles. This allows Verizon to increase network capacity by accessing fiberoptic infrastructure connected to offsite and centrally located processing stations. Here, the CRAN technology's combination of targeted, camouflaged antennas and centralized processing would benefit Needham, where network capacity is weighed against municipal aesthetics.

The Small Cell installation proposed in this Grant of Location Petition will primarily consist of a 38.7" tall by 12" wide canister antenna that will be mounted on the side of the existing utility pole at an antenna centerline height of 19'7"± above ground level. As noted above, the antenna itself is enclosed in a cylindrical gray fiberglass container designed to specifically resemble electric transformers used on utility poles throughout the United States. All equipment proposed herein 1) complies with applicable FCC radio frequency emissions regulations, 2) requires minimal maintenance, and 3) does not impact utility, school, traffic or other municipal resources.

Additionally, this proposal is part of Verizon Wireless's regional initiative to improve voice and data coverage in Massachusetts while developing 5G technology throughout greater New England. To this end, Verizon secured master licensing agreements with National Grid and Eversource expediting licensing and attachment of CRAN antennas to utility poles in Massachusetts, including in Needham.

III. MUNICIPAL REVIEW OF CRAN AND SMALL CELL TECHNOLOGY

Under Massachusetts law, the grant of location process enables municipalities to oversee infrastructure development in the Commonwealth's public ways. M.G.L. c. 166, § 22. This process balances the goal of maintaining useable and navigable public ways with the Commonwealth's continued need for infrastructure development, and directly intersects with

federal telecommunications laws. M.G.L. c. 166, § 21; 47 U.S.C. § 332(c)(7). Generally, federal telecommunications law seeks to expedite wireless infrastructure development by imposing certain limitations on local regulation of wireless facilities. 47 U.S.C. § 332(c)(7). As such, when considering Grant of Location Petitions for wireless telecommunications facilities, Select Boards must consider that Massachusetts and the federal government specifically seek to encourage expedited development of wireless communications infrastructure, and that the TCA prohibits municipalities from taking action that prohibits or delays such development.

More recently, the FCC issued an interpretation of the effective prohibition standard contained in the Telecommunications act of 1996 and issued an order that became effective in January of this year. The Town of Needham conditions regarding grant of location for installation of antennas and related equipment were adopted before this FCC Order. We have attached a copy of the first page and the section referenced below of the FCC for review by the Town and its legal counsel. (The entire Order contains 116 pages and is too large to submit with this grant of location petition).

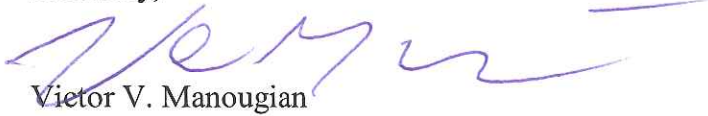
Conditions 9 and 10, regarding the 50' and 20' set back requirements (from homes and driveways, respectively) run afoul of the recent FCC Order. The small cell separation requirement, which attempts to prohibit in installations within 50 feet of a home and 20 feet from a driveway appear intended to address RF emissions. Where small cells meet the FCC's emission standards, however, Section 332 of the Act proscribes local regulation of the facilities on the basis of the effects of RF emissions. See 47 U.S.C. § 332(c)(7)(B)(iv). To the extent the concern here relates to aesthetic impact, the provision is unreasonable and discriminatory. Small cells are intended to add capacity to those areas most frequently traversed by wireless users, which are often near the very buildings listed in the conditions. The FCC made clear in the Order that anything that materially inhibits a provider's ability to improve its existing network (which includes densification) or add new technology will constitute an "effective prohibition" under Section 332. See Order at ¶67." As a result, we have eliminated those two requirements from our proposed grant of location order.

Town of Needham
Board of Selectmen
May 23, 2019
Page 4

IV. CONCLUSION

For the aforementioned reasons, Verizon respectfully requests that the Board of Selectmen execute the Grant of Location Order submitted herein. Please contact me with questions at 603-628-1310 or victor.manougian@mclane.com.

Sincerely,



Victor V. Manougian

VVM/jle

Enclosures

cc: R. Colorusso, Nexius

PETITION FOR POLE AND WIRE LOCATIONS
UNDER MGL c. 166, §§ 22 and 25A

May 23, 2019

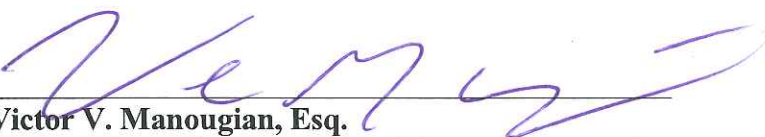
Board of Selectmen
Town of Needham, Massachusetts
1471 Highland Avenue
Needham, Massachusetts 02492

Cellco Partnership, d/b/a Verizon Wireless ("Verizon"), hereby requests permission to locate small cell wireless antennas, and all necessary sustaining and protecting fixtures, on an existing utility pole, located on a public way on **228 Brookline Street in Needham, Massachusetts**, and as more particularly shown on plans titled **Needham SC02 MA**, dated **February 9, 2019**, and attached hereto as Exhibit A.

Verizon requests after requisite notice and hearing, that it be granted location and permission to erect and maintain equipment on said utility pole, including, but not limited to:

- Antennas;
- Radio Units;
- Meters;
- Mounting brackets;
- Groundbars;
- Conduits;
- Cables;
- Disconnects; and
- All other necessary sustaining and protecting fixtures.

CELLCO PARTNERSHIP, D/B/A VERIZON WIRELESS



Victor V. Manougian, Esq.

Attorney for Cellco Partnership d/b/a Verizon Wireless

SITE NAME:
NEEDHAM_SC02_MA

LOCATION CODE:
390168

SITE ADDRESS:
UTILITY POLE NO.: 16/16
228 BROOKLINE STREET
NEEDHAM, MA 02492



① KEY PLAN
SCALE: 1" = 50'



POLE COORDINATES	LATITUDE (NAD83)	LONGITUDE (NAD83)
	42° 17' 15.34" N	71° 13' 26.59" W
GROUND ELEVATION	220' A.M.S.L. (NAVD88)	

LEASE EXHIBIT

PREPARED BY:

NEXIUS
TRANSFORM YOUR BUSINESS THROUGH WIRELESS

A&E OFFICE:
300 APOLLO DRIVE, SUITE 7
CHELMSFORD, MA 01824
1 (978) 755-1882

PROFESSIONAL STAMP:



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DRAWING SCALES ARE INTENDED FOR 11"x17" SIZE PRINTED MEDIA ONLY. ALL OTHER PRINTED SIZES ARE DEEMED "NOT TO SCALE".

SUBMITTALS

REV	DATE	DESCRIPTION	BY
0	01/24/18	FOR CONSTRUCTION	AA
1	02/08/18	REMOVED PER COMMENTS	KT
2	02/20/18	REMOVED PER COMMENTS	KT
3	02/08/18	FINAL LE	AA

SITE INFO:

SITE NAME:
NEEDHAM_SC02_MA

SITE ADDRESS:

U/P NO.: 16/16
228 BROOKLINE STREET
NEEDHAM, MA 02492

CHECKED BY:

KB

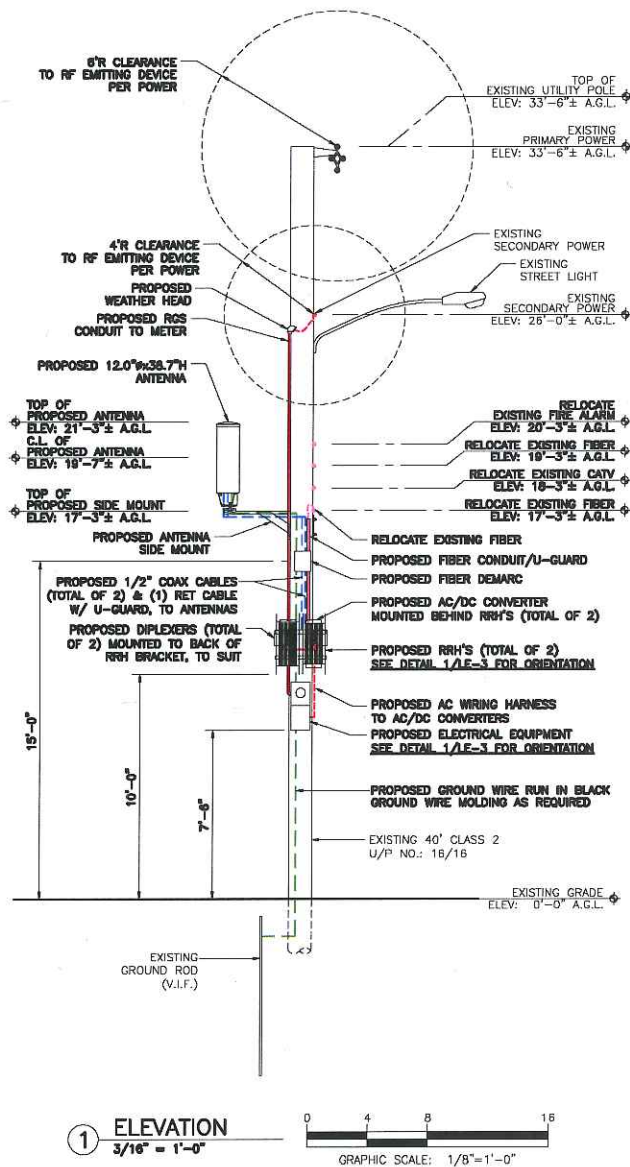
DATE:

02/08/19

PROJECT NUMBER:

SHEET NUMBER:

LE-1

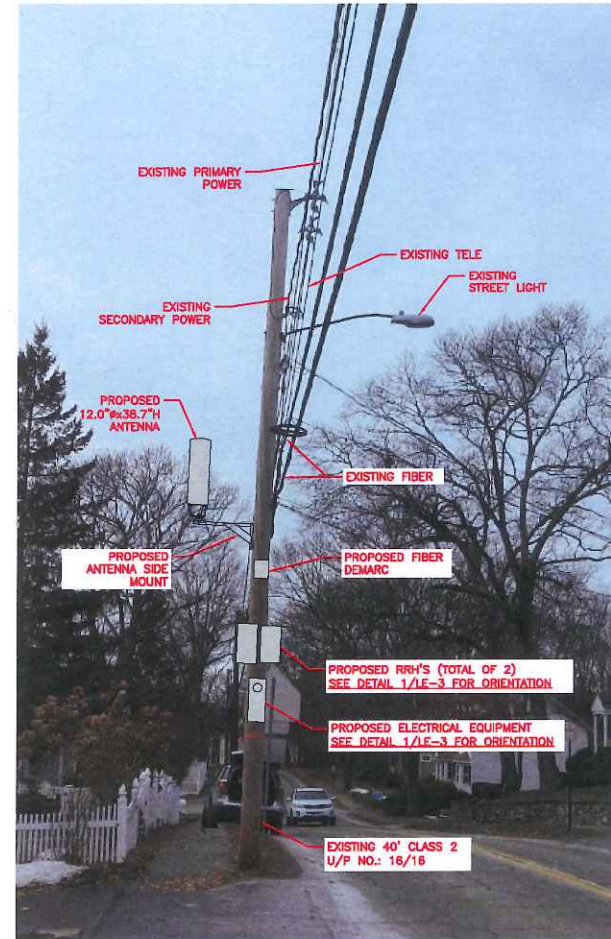


NOTES:

1. LESSEE SHALL MAKE ARRANGEMENTS WITH THE LOCAL ELECTRICAL UTILITY, TO LOWER THE POSITION OF THE EXISTING OVERHEAD PRIMARY POWER LINES AT SUBJECT UTILITY POLE TO PROVIDE THE REQUIRED CLEARANCE FOR THE INSTALLATION OF THE PROPOSED LESSEE ANTENNA. THE PROPOSED INSTALLATION OF THE ANTENNA AND ALL APPURTENANCES SHALL MEET THE REQUIREMENTS OF NATIONAL GRID AND THE 2012 NATIONAL ELECTRICAL SAFETY CODE.

LEASE EXHIBIT

THIS LEASE PLAN IS DIAGRAMMATIC IN NATURE AND IS INTENDED TO PROVIDE GENERAL INFORMATION REGARDING THE LOCATION AND SIZE OF THE PROPOSED WIRELESS COMMUNICATION FACILITY. THE SITE LAYOUT WILL BE FINALIZED UPON COMPLETION OF SITE SURVEY AND FACILITY DESIGN



LEASE EXHIBIT

PREPARED BY:

NEXIUS
TRANSFORM YOUR BUSINESS THROUGH WIRELESS

A&E OFFICE:
300 APOLLO DRIVE, SUITE 7
CHELMSFORD, MA 01824
1 (978) 755-1882

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0	01/24/18	FOR CONSTRUCTION	AA
1	02/08/18	REVISED PER COMMENTS	MT
2	02/20/18	REVISED PER COMMENTS	MT
3	02/08/18	FINAL LE	AA

SITE INFO:

SITE NAME:
NEEDHAM_SC02_MA

SITE ADDRESS:

U/P NO.: 16/16
228 BROOKLINE STREET
NEEDHAM, MA 02492

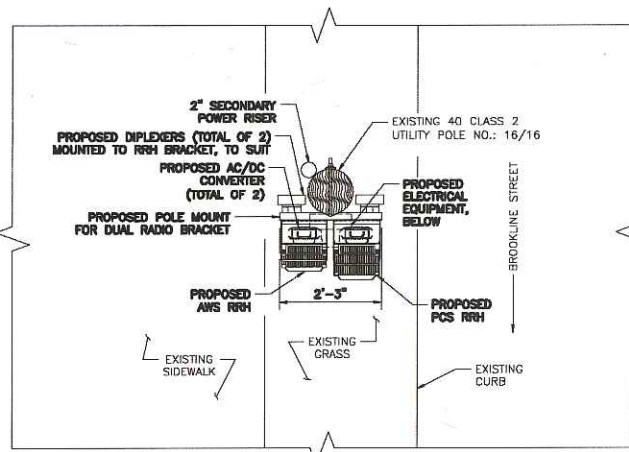
CHECKED BY:
KS

DATE:
02/08/18

PROJECT NUMBER:

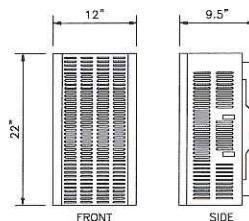
SHEET NUMBER:

LE-2

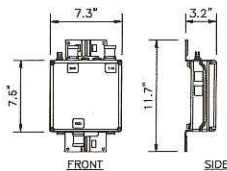


1 RRH ORIENTATION PLAN
N.T.S.

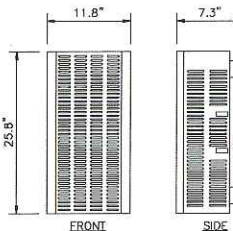
APPROX. NORTH



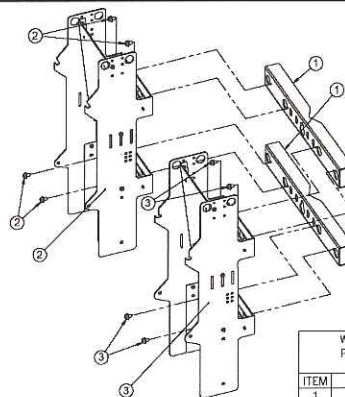
PCS RRH
WEIGHT: 55.0 LBS.



WEIGHT: 6.6 LBS.

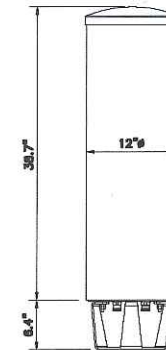


AWS RRH
WEIGHT: 58.0 LBS.



WIRELESS CONSTRUCTION, INC. POLE/WALL MOUNT FOR DUAL RADIO BRACKET		
ITEM	DESCRIPTION	QTY.
1	DOUBLE MOUNT	2
2	700MHZ RRH RACK W/ SUPPLIED HARDWARE	1
3	AWS RRH RACK W/ SUPPLIED HARDWARE	1

2 RRH MOUNTING BRACKET SPEC.
N.T.S.

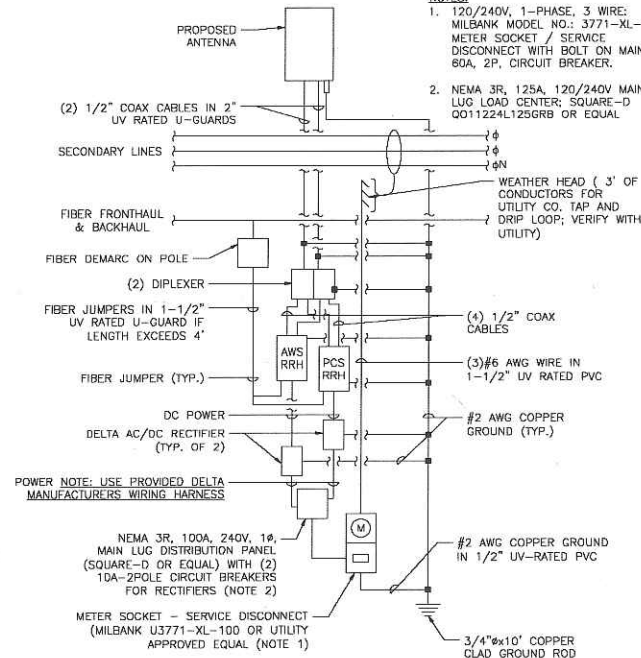


ANTENNA SPECIFICATIONS	
COMMSCOPE -	NH360QM-DG-2XR
DIMENSIONS	12"ø x 38.7"
WEIGHT	33.7 LBS

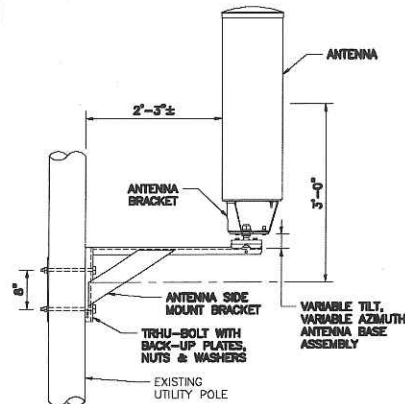
3 ANTENNA SPEC.
N.T.S.

NOTES:

- 120/240V, 1-PHASE, 3 WIRE;
MILBANK MODEL NO.: 3771-XL-100
METER SOCKET / SERVICE
DISCONNECT WITH BOLT ON MAIN
60A, 2P, CIRCUIT BREAKER.
- NEMA 3R, 125A, 120/240V MAIN
LUG LOAD CENTER; SQUARE-D
QO11224L125GRB OR EQUAL



7 GENERAL WIRING DIAGRAM
N.T.S.



6 ANTENNA MOUNTING DETAIL
N.T.S.

4 DIPLEXER SPEC.
N.T.S.

5 RRH SPEC.
N.T.S.

LEASE EXHIBIT

PREPARED BY:

NEXIUS
TRANSFORM YOUR BUSINESS THROUGH WIRELESS

A&E OFFICE:
300 APOLLO DRIVE, SUITE 7
CHELMSFORD, MA 01824
1 (972) 755-1882

PROFESSIONAL STAMP:



Jimmy Chendana

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2	08/20/18	REVISED PER COMMENTS	KT
3	08/08/18	FINAL LE	AA

SITE INFO:

SITE NAME:
NEEDHAM_SC02_MA

SITE ADDRESS:
**U/P NO.: 16/16
228 BROOKLINE STREET
NEEDHAM, MA 02492**

CHECKED BY:
KS

DATE:
02/08/19

PROJECT NUMBER:

SHEET NUMBER:

LE-3

TOWN OF NEEDHAM
BOARD OF SELECTMEN

ORDER FOR POLE AND WIRE LOCATIONS
UNDER MGL c. 166, §§ 22 AND 25 A

In the Town of Needham, Massachusetts,
Notice supplied and public hearing held, as provided by law,

IT IS HEREBY ORDERED:

That Cellco Partnership d/b/a Verizon Wireless ("Verizon") is granted location and permission to install and maintain wireless equipment and all sustaining and protecting fixtures on an existing utility pole located on a public way on **228 Brookline Street in Needham, Massachusetts**, as requested by Verizon's Petition for Pole and Wire Locations Under MGL c. 166 §§ 22 and 25A, dated **May 23, 2019**.

All construction under this order shall be in accordance plans titled **Needham SCO2 MA**, dated **February 8, 2019**.

All equipment shown on the aforementioned plans may be attached to said utility pole, including, but not limited to:

- Antennas
- Radio Units
- Meters
- Mounting Brackets
- All other necessary sustaining and protecting fixtures.
- Groundbars
- Conduits
- Cables
- Disconnects

Such plans, including all notes shown thereon, are hereby incorporated as part of this Order. This Grant of Location is made subject to the following conditions:

1. The Small Cell Attachment shall comply with the maximum permissible radio frequency ("RF") exposures adopted by the Federal Communications Commission, taking into consideration other RF sources at the site.
2. The Petitioner shall annually provide a certificate of RF compliance to the Office of the Town Manager, Needham Town Hall, Town of Needham, Massachusetts.
3. The Petitioner shall ensure that replacement poles (if necessary) are installed at the minimum height necessary to accommodate the small cell antenna equipment.
4. The Pole shall not be a "double pole" at the time of Small Cell Attachment installation. (A "double pole" occurs where a replacement utility pole is erected alongside the pole to be replaced for the purpose of transferring the electric, telephone, cable, and other wires from one pole to the other). In the event that, after installation of the Small Cell

Attachment, the Pole must be replaced, the Petitioner shall work with the Pole owner(s) to mitigate and remove any "double pole" at the proposed location.

5. The approved small cell antenna and related equipment described in the plans identified in this Order (collectively, the "Small Cell Attachment") shall not include lights unless required under applicable federal or state law.
6. The Small Cell Attachment shall blend with the color of existing attachments on the designated utility pole (the "Pole") or with the color of the Pole itself.
7. The Small Cell Attachment shall not project over the public roadway or the sidewalk beyond the berm or curb, or otherwise interfere with the safety and convenience of ordinary travel over the public right of way or sidewalk.
8. The Petitioner shall seek to install side mount or top mount without extension equipment rather than top mount extension equipment.
9. The Petitioner shall seek to avoid locating Small Cell Antenna equipment that would negatively impact the health of public shade trees or that would require significant tree trimming as a result of the antenna location.

I hereby certify that this order was adopted at a meeting of the Board of Selectmen of the Town of Needham, Massachusetts, held on the _____ day of _____, 2019.

Town Clerk
Town of Needham, Massachusetts
1471 Highland Avenue
Needham, Massachusetts 02492

Received and entered in the records of location orders of the Town of Needham, at Book _____, Page _____.

Attest: _____
Town Clerk
Town of Needham, Massachusetts

Board of Selectmen



AFFIDAVIT OF RADIO FREQUENCY ENGINEER

The undersigned, in support of the application to install a wireless communications facility consisting of one antenna and associated radio equipment on the existing utility pole (#16/16) located at 228 Brookline Street in Needham, Massachusetts, states the following:

1. My name is Keith Vellante. I have a Bachelor of Science degree in Electrical Engineering from the University of New Hampshire and I am employed as a Radio Frequency (RF) Engineer for C Squared Systems, LLC. C Squared Systems has entered into a contract with Verizon Wireless to provide RF consulting services on behalf of Verizon Wireless. I have reviewed the proposed site with the Radio Frequency Engineer responsible for the Verizon Wireless network design in the area of Massachusetts that includes the Town of Needham, MA.
2. Verizon Wireless is a federally licensed provider of wireless communications services with a national footprint.
3. The above-mentioned location is within an area where Verizon Wireless has identified a need to install a wireless communications facility in order to provide reliable wireless service. The search area for the proposed facility was determined by the fact that wireless service needs significant improvement in eastern Needham along Brookline Street and the surrounding neighborhoods in the immediate proximity of the proposed location. Furthermore, it was determined that the areas served by the proposed facility would interact well with those of existing and planned facilities in the surrounding area.

The following table provides details of the proposed site:

Site Name:	Site Address:	Utility Pole Number:	Latitude:	Longitude:	Ground Elevation (AMSL):	Antenna Centerline Height (AGL):
Needham SC02 MA	228 Brookline Street	16/16	42.2876	-71.2241	~220'	19.6'

4. A conventional Verizon Wireless LTE macro-site consists (in part) of RRHs (Remote Radio Heads) located near the antennas on a tower, rooftop, or other support structure, which are connected via fiber optic cables to a BBU (Baseband Unit) located at the site in an equipment shelter or other weatherproof enclosure. The BBU performs network signal processing between the RRHs at the site, and Verizon's LTE core network.
5. C-RAN (Cloud Radio Access Network) nodes and small cells also utilize RRHs at each site, however a centralized BBU capable of supporting RRHs at multiple sites is implemented to gain certain efficiencies, both from a network and environmental standpoint. The proposed location is one of multiple C-RAN nodes and small cells planned to address capacity and coverage deficiencies in Needham and the surrounding area.

6. C-RAN and small cell deployments are intended to complement, not replace, the conventional LTE macro-network sites, and are typically used as a capacity solution targeting isolated areas of heavy network usage, a.k.a "hot spots." In doing so, the C-RAN nodes and small cells serve to offload the demand on the existing sites serving these "hot spots." This not only improves service to the specifically targeted area, but also improves overall system performance elsewhere in the network.
7. The purpose of the proposed facility is to provide adequate service capacity and improve coverage along Brookline Street and the surrounding neighborhoods in the vicinity of the proposed location. Verizon Wireless does not currently provide acceptable LTE service in this area of Town.
8. To find a site that would provide adequate capacity and coverage improvement, the Verizon Wireless RF Design Group utilizes computer modeling to define a search area. The search area is designed such that a site located within the area and at a given height would have a high probability of completing the capacity and coverage objectives in the target areas. The RF Design Group develops the network by working off existing sites from which to design the network.
9. Verizon Wireless' search of the area and subsequent analysis determined that installing the proposed facility on the existing utility pole referenced herein would be the most appropriate solution to meet its network capacity and coverage objectives to the areas immediately surrounding the proposed location.
10. I have reviewed the proposed installation to be placed on this utility pole as well as the other existing and proposed antenna site locations used in Verizon Wireless' system in and around the surrounding areas. I have analyzed the potential benefits this site would represent to Verizon Wireless' network and its users. I employ computer simulations, which incorporate the results of field tests of existing facilities, to determine existing radio frequency (RF) coverage for Verizon Wireless' system. These simulations model characteristics such as antenna types, antenna height, output power, terrain, land cover, and RF propagation effects of the frequency utilized.
11. The following table details information related to the surrounding Verizon Wireless macro-sites used to generate the RF maps attached hereto:

Cell Name:	Latitude:	Longitude:	Street Address:	Town/State:	Antenna Centerline Height (ft AGL):	Status
W Rox Georgetown	42.2655	-71.1520	5050 Washington Street	Boston, MA	46	On-Air
W Roxbury 2	42.2791	-71.1822	225 Rivermoor Street	Boston, MA	75	On-Air
W Roxbury Msc	42.2751	-71.1392	4620 Washington Street	Boston, MA	150	On-Air
West Roxbury North	42.3026	-71.1635	50-56 Broadlawn Park	Boston, MA	55.3	On-Air
Dedham	42.2313	-71.1830	55 Ariadne Road	Dedham, MA	88	On-Air
Dedham 2	42.2550	-71.2094	200 West Street	Dedham, MA	42	On-Air
Dedham 3	42.2559	-71.1667	5 Incinerator Road	Dedham, MA	105	On-Air
Dedham Co	42.2478	-71.17408	387 Washington Street	Dedham, MA	45	Approved
Dover Relo	42.2472	-71.2805	2 Dedham Street	Dover, MA	113	On-Air
Needham	42.3033	-71.2177	141 Cabot Street	Needham, MA	152	On-Air
Needham 2	42.2800	-71.2333	858 Great Plain Avenue	Needham, MA	68	On-Air
Needham 5	42.2760	-71.2653	1555 Central Avenue	Needham, MA	110	On-Air
Needham Heights	42.2911	-71.2364	460 Hillside Avenue	Needham, MA	49	On-Air
Brookline	42.3195	-71.1826	345 Boylston Street	Newton, MA	48	On-Air
Needham Cutler	42.2950	-71.2033	1 Wells Avenue	Newton, MA	73.3	On-Air
Newton 4	42.3184	-71.2109	56 Ramsdell Street	Newton, MA	28	On-Air
Wellesley	42.2931	-71.2985	106 Central Street	Wellesley, MA	70	On-Air
Wellesley 2	42.3175	-71.2307	20 William Street	Wellesley, MA	58	On-Air
Wellesley Hills	42.3102	-71.2761	332 Washington Street	Wellesley, MA	50	On-Air

Cell Name:	Latitude:	Longitude:	Street Address:	Town/State:	Antenna Centerline Height (ft AGL):	Status
Wellesley Hills 2	42.3090	-71.2637	125 Oakland Street	Wellesley, MA	68.7	On-Air
Westwood 3	42.2289	-71.2155	213 Fox Hill Street	Westwood, MA	76	On-Air
Westwood 6	42.2404	-71.2048	100 Lowder Brook Drive	Westwood, MA	104	On-Air

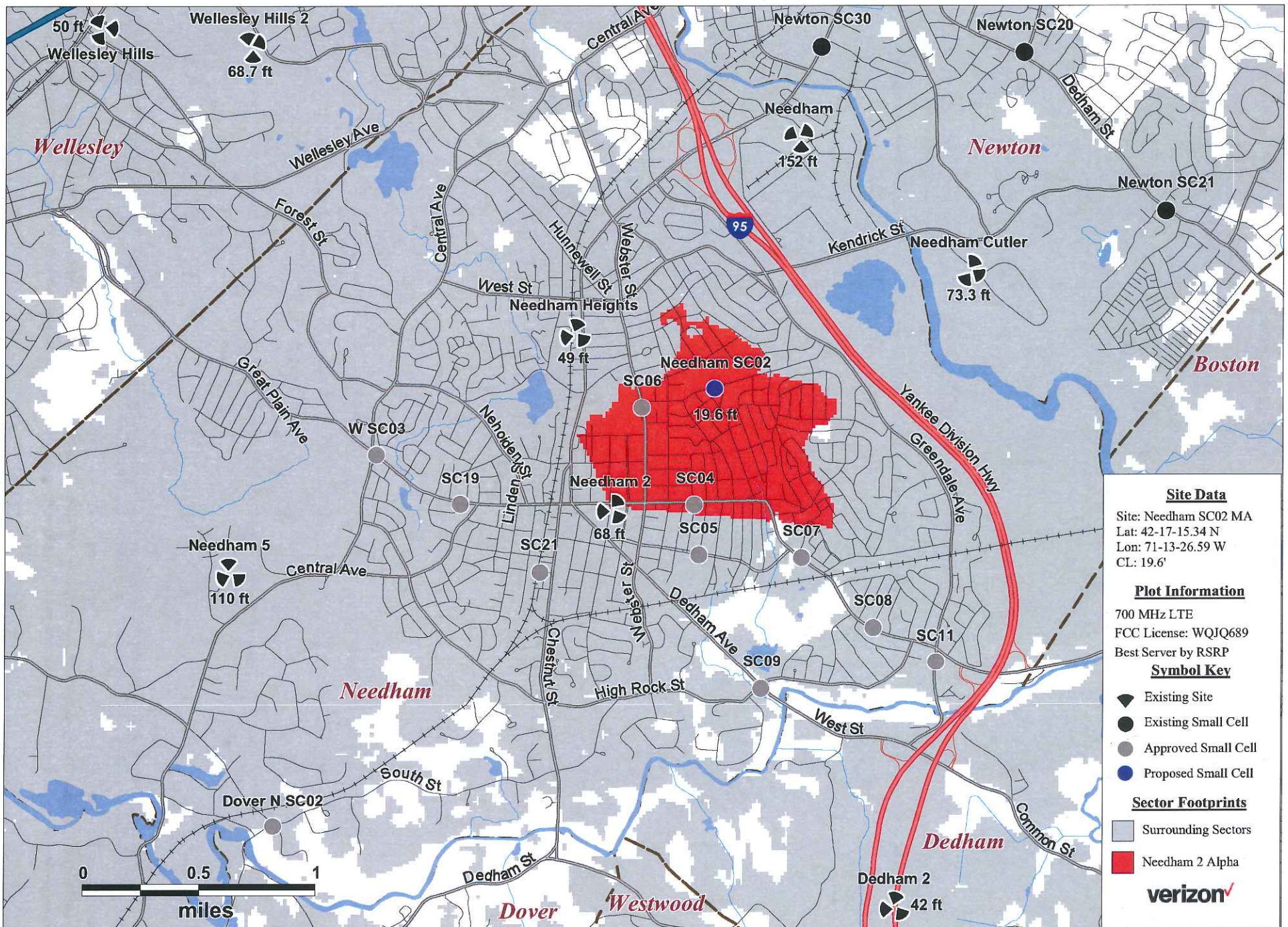
12. The signal propagation plots included as attachments were produced using deciBel Planner™, a Windows-based RF propagation computer modeling program and network planning tool. The software considers the topographical features of an area, land cover, antenna models, antenna heights, RF transmitting power and receiver thresholds to predict coverage and other related RF parameters used in site design and network expansion.
13. The RF map titled “Needham SC02 – Existing/Approved 700 MHz LTE Sector Footprints (Macro Sites)” attached hereto depicts the areas primarily served by the sectors (a.k.a. signal “footprints”) of the “On-Air” and “Approved” Verizon Wireless macro-sites in the area and shows a unique color (red) for one particular sector of interest – “Needham 2” alpha. For clarity, all other sectors of less interest with respect to the proposed facility are shown in grey. “On-Air” sites are existing Verizon Wireless facilities, and “Approved” sites are defined as those that are in the final stages of permitting or construction and are expected to be turned on-air soon. As demand for wireless voice and data services continues to grow, Verizon Wireless manages the footprint of each sector so that it can support the demand within the area it is primarily serving. In addition to improving coverage to the immediate area, the proposed site is also needed to serve existing and anticipated demand in the vicinity and thereby offload some of the burden experienced by the surrounding sites. In that way, those surrounding sites will be able to more adequately serve the demand for service in the areas nearer to them. Please note that the outer parts of each sector footprint may include areas that presently have signal strength below the targeted value required for reliable service to Verizon Wireless’ customers. The fact that low-level signal may reach these areas does not mean that these areas experience adequate coverage. These unreliable areas of low signal level can impose a significant capacity burden on the sites primarily serving the area.
14. The RF map titled “Needham SC02 – Existing/Approved 700 MHz & 2100 MHz LTE Coverage (Macro Sites)” attached hereto depicts the coverage provided from the “On-Air” and “Approved” Verizon Wireless macro-sites in the Needham area. The green and yellow shaded areas represent the minimum desired level of coverage for this area for the 700 MHz and 2100 MHz network layers, respectively. Because of the superior propagation characteristics of 700 MHz relative to 2100 MHz frequencies, the 2100 MHz coverage areas (yellow) are generally contained within the 700 MHz coverage areas (green). As such, the deficient areas of 700 MHz coverage are defined by the unshaded or white areas, whereas the deficient areas of 2100 MHz coverage consist of both the green and white areas.
15. The map titled “Needham SC02 MA – Area Terrain Map” attached hereto details the terrain features around the proposed small cell facility. These terrain features play a key role in dictating both the unique coverage achieved from a given location, and the coverage gaps within the network. The blue and green shades correspond to lower elevations, whereas the orange, red, and grey shades indicate higher elevations.
16. As shown in the aforementioned maps, the proposed facility is centrally located within the targeted area, making it suitable to provide the intended coverage improvement and capacity relief to this “hot spot” of network usage along Brookline Street and to the surrounding neighborhoods. The proposed facility will offload the sector of “Needham 2” site currently serving the area, which will in turn improve the overall system performance elsewhere within its respective service area.

17. I have concluded that the proposed facility will satisfy the present capacity and coverage needs that motivated Verizon Wireless to establish a search ring in this vicinity. Any reduction in the proposed antenna configuration and/or equipment could limit optimal performance of the facility, which could diminish the site's effectiveness.
18. Verizon Wireless certifies that the proposed facility will not cause interference to any lawfully operating emergency communication system, television, telephone, or radio in the surrounding area. The FCC has licensed Verizon Wireless to transmit and receive in the Upper C Block of the 700 MHz band, B Block of the Cellular (850 MHz) band, the C3, E and F Blocks of the PCS (1900 MHz) band, and the A and B Blocks of the AWS (2100 MHz) band of the RF spectrum. As a condition of the FCC licenses, Verizon Wireless is prohibited from interfering with other licensed devices that are being operated in a lawful manner. Furthermore, no emergency communication system, television, telephone, or radio is licensed to operate on these frequencies, and therefore interference is highly unlikely.
19. Pursuant to its Federal Communications Commission (FCC) licenses, Verizon Wireless is required to ensure that all radio equipment operating at the proposed communications facility and the resulting radio frequency exposure levels are compliant with FCC requirements as well as federal and state health and safety standards.
20. Providing reliable wireless communication services is a benefit to the residents of the Town of Needham, as well as to mobile customers traveling throughout the area. The proposed facility is well suited to meet Verizon Wireless' network requirements for the intended areas. The absence of a wireless telecommunications facility at or near this immediate location will result in the continued existence of inadequate network capacity and gaps in service in this area. Without the proposed facility, Verizon Wireless will be unable to provide reliable wireless communication services in this area of the Town; therefore, Verizon Wireless respectfully requests that the Town of Needham act favorably upon the proposed facility.

Signed and sworn under the pains and penalties of perjury May 13th, 2019.

Keith Vellante
Keith Vellante
Radio Frequency (RF) Engineer
C Squared Systems, LLC
65 Dartmouth Drive
Auburn, NH 03032

Needham SC02 MA - Existing/Approved 700 MHz LTE Sector Footprints (Macro Sites)



Site Data
 Site: Needham SC02 MA
 Lat: 42-17-15.34 N
 Lon: 71-13-26.59 W
 CL: 19.6'

Plot Information
 700 MHz & 2100 MHz RSRP
 700 MHz FCC License: WQJQ689
 2100 MHz FCC Licenses: WQGB266, WQGA900

Symbol Key
 Existing Site
 Existing Small Cell
 Approved Small Cell
 Proposed Small Cell

Coverage Key
 700 MHz > -95 dBm
 2100 MHz > -95 dBm
 Less than -95 dBm

verizon

Site: Needham SC02 MA
Lat: 42-17-15.34 N
Lon: 71-13-26.59 W
CL: 19.6'

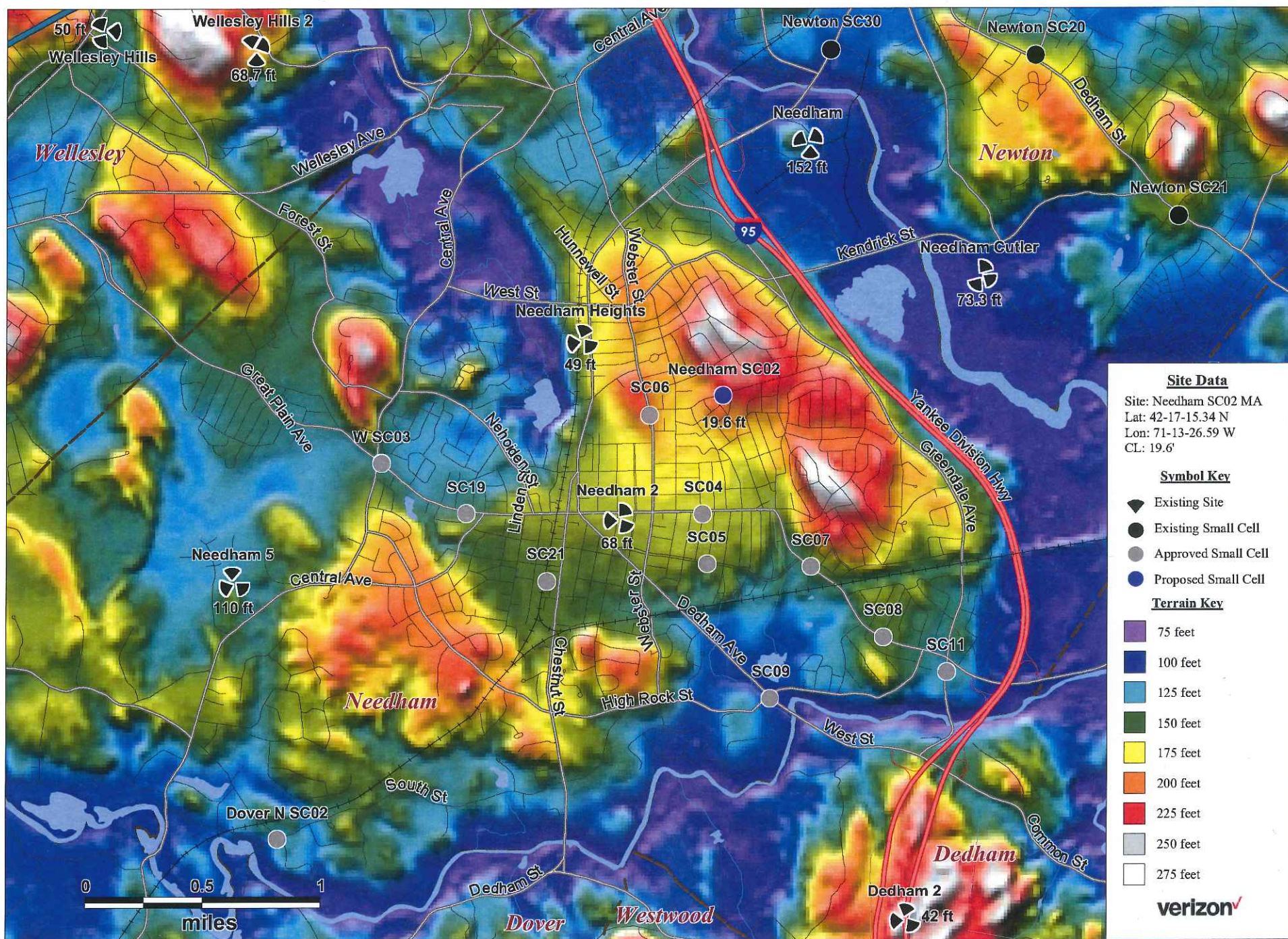
700 MHz & 2100 MHz RSRP
700 MHz FCC License:
WQJQ689
2100 MHz FCC Licenses:
WQGB266, WQGA900

- Existing Site
- Existing Small Cell
- Approved Small Cell
- Proposed Small Cell

 700 MHz > -95 dBm
 2100 MHz > -95 dBm
 Less than -95 dBm



Needham SC02 MA - Area Terrain Map



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

February 11, 2019

RE: Proposed installation of a radio base station antenna and associated equipment for the Verizon Wireless Small Cell Personal Wireless Services facility to be located on an existing utility pole located at 228 Brookline Street, Needham, MA.

PURPOSE

I have reviewed the information pertinent to the Verizon Wireless proposed installation of a small cell (SC) personal wireless services (PWS) facility within Needham, MA. To determine regulatory compliance, theoretical calculations of maximal radio-frequency (RF) fields have been prepared. The physical conditions are that Verizon Wireless proposes to install an omnidirectional canister type PWS antenna on an existing utility pole at **228 Brookline Street, Needham, MA**. The antenna arrangement will include a single canister antenna and two remote radio head (RRH) units. The mounting centerline height of the antenna is proposed to be 19'7" above ground level (AGL). This report provides written proof that the proposed facility would comply with the Federal Communications Commission (FCC) RF exposure guidelines,^{i,ii} including residential areas and in the surrounding neighborhood.

This report considers the contributions of the Verizon Wireless PWS transmitters operating at their proposed capacity. The calculated values of RF fields are presented as a percent of current Maximum Permissible Exposure (%MPE) values as adopted by the FCC, and those established by the Massachusetts Department of Public Health (MDPH).ⁱⁱⁱ

SUMMARY

Theoretical RF field calculations data indicate the summation of the proposed Verizon Wireless RF contributions would be within the established RF exposure guidelines at the proposed site; see Figure 3. These results indicate there could be even more similar installations at this location, and still be within Federal and State guidelines for RF exposure. This report provides written proof that the proposed facility would comply with the FCC RF exposure guidelines, including residential areas and in the surrounding neighborhoods.

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 these particular sites; **utility pole at 228 Brookline Street, Needham, 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.

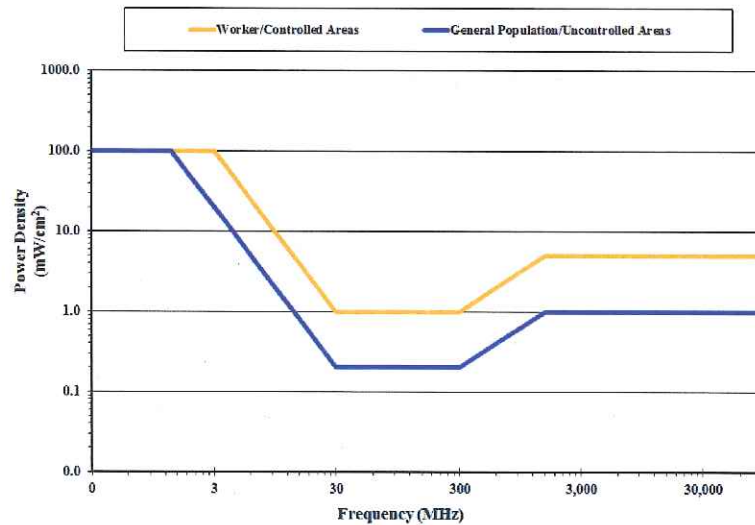


Figure 1: FCC Limits for Maximum Permissible Exposure (MPE)

EXPOSURE LIMITS AND GUIDELINES

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

Table 1: Maximum Permissible Exposure Values for Uncontrolled/Public Areas	
Frequency Band:	Maximum Permissible Exposure:
300 - 1500 MHz	$f / 1.5$ in $\mu\text{W}/\text{cm}^2$
1500 - 100,000 MHz	1000 $\mu\text{W}/\text{cm}^2$ *
Note: 1 μW = 0.000001 Watt	
* For equivalent plane-wave power density, where f is the frequency in MHz (10^6 Hz).	

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 VERIZON WIRELESS:

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 readily 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:

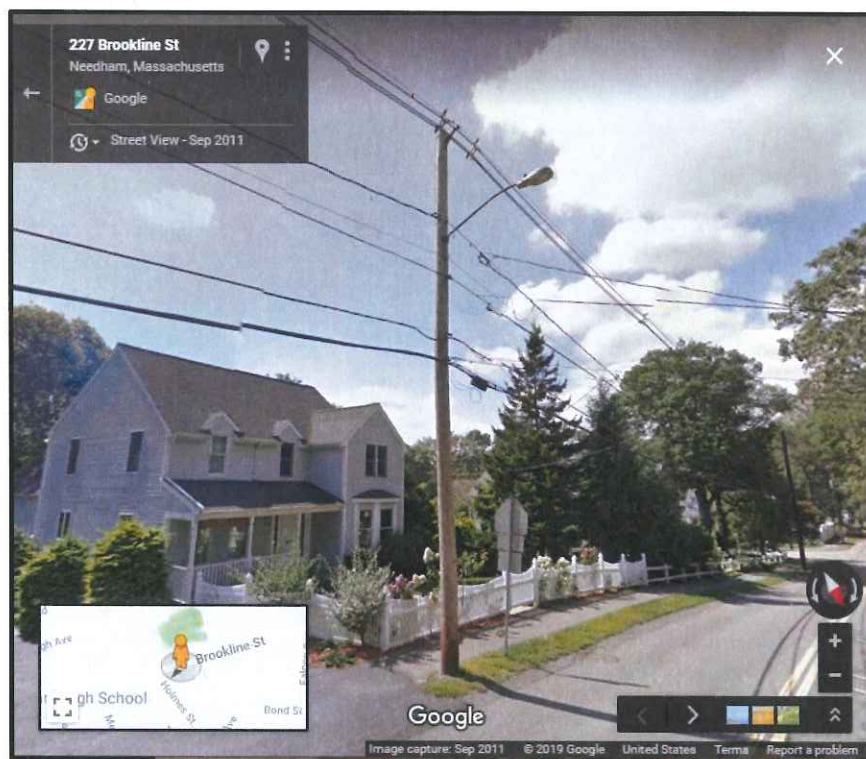
$$S = \frac{4 \cdot (\text{ERP} \cdot 1.64) \cdot G^E}{4 \cdot \pi \cdot R^2} = \frac{\text{ERP} \cdot 1.64 \cdot G^E}{\pi \cdot R^2} = \frac{0.522 \cdot \text{ERP} \cdot G^E}{R^2}$$

To calculate the % MPE, use the formula:

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

ANTENNA INSTALLATION LOCATION

The existing utility pole which would be replaced with another pole which would host a Verizon Wireless SC antenna is shown below in Figure 2.



**Figure 2: Existing Utility Pole at 228 Brookline Street, Needham, MA
Which Would Host a Verizon Wireless SC Antenna**

The results of the percent Maximum Permissible Exposure (%MPE) calculations for the summation of the proposed Verizon Wireless contributions are depicted in 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 graph 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 one thousand feet. Within that distance, the curves are variable due to the application of the vertical radiation patterns.

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 Verizon Wireless Antenna Inventory Utility Pole at 228 Brookline Street, Needham, MA Parameters: 536 watts ERP* of AWS @ 2150 MHz 512 watts ERP* of LTE @ 750 MHz		
Site Name	Antenna Centerline (AGL)	Antenna Model
Needham SC02 MA	19'7"	NH360QM-DG
Information relevant to the antenna proposed by Verizon Wireless Appendix A.		
Table Notes: AWS: Advanced Wireless Services PCS: Personal Communication 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.		

The results of the RF field calculations for the summation of the proposed Verizon Wireless AWS and LTE technologies are depicted in Figure 3.

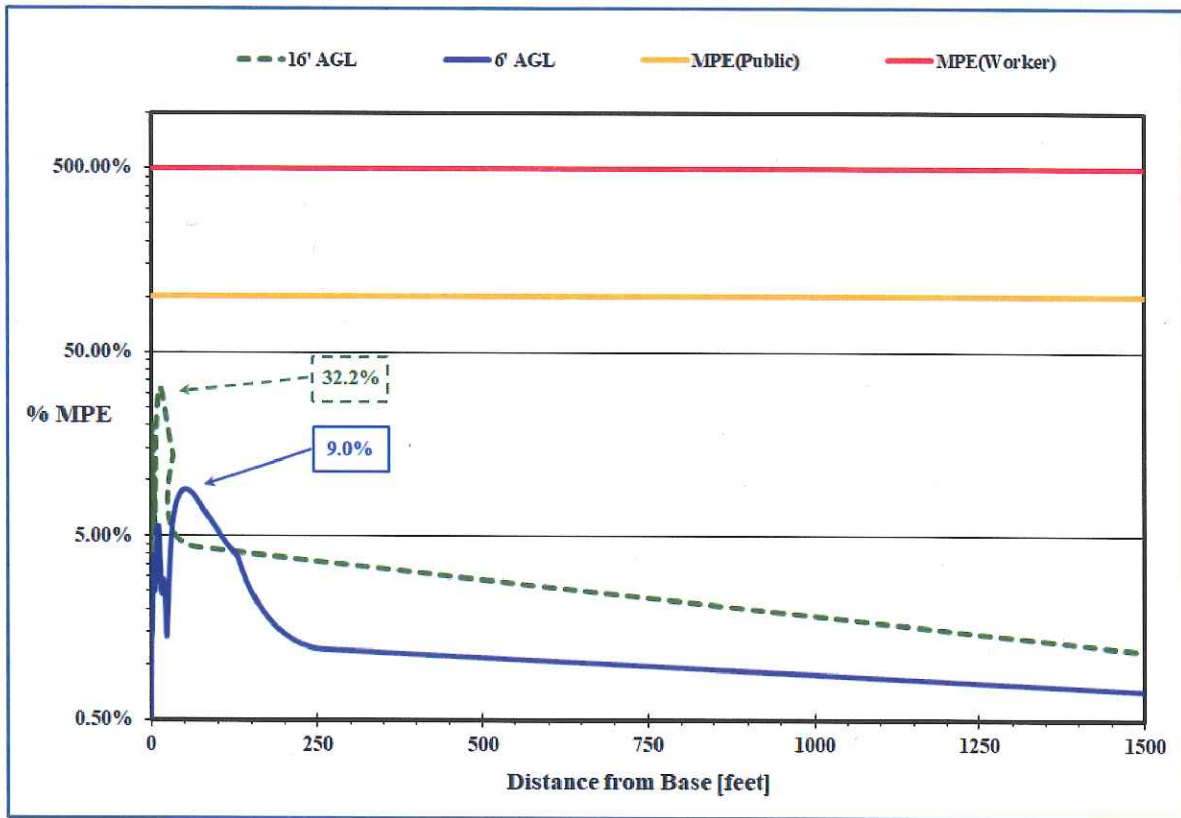


Figure 3: Theoretical RF Field Calculations for the Summation of the Proposed Verizon Wireless Small Cell Antenna Site "Needham SC02 MA" 228 Brookline Street, Needham, MA

CONCLUSION

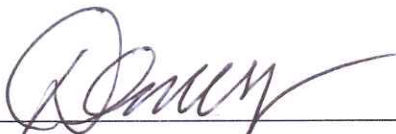
Theoretical RF field calculations data indicate the summation of the proposed Verizon Wireless RF contributions would be within the established RF exposure guidelines at the proposed site; see Figure 3. These results indicate there could be even more similar installations at this location, and still be within Federal and State guidelines for RF exposure. This report provides written proof that the proposed facility would comply with the FCC RF exposure guidelines, including residential areas and in the surrounding neighborhoods.

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,

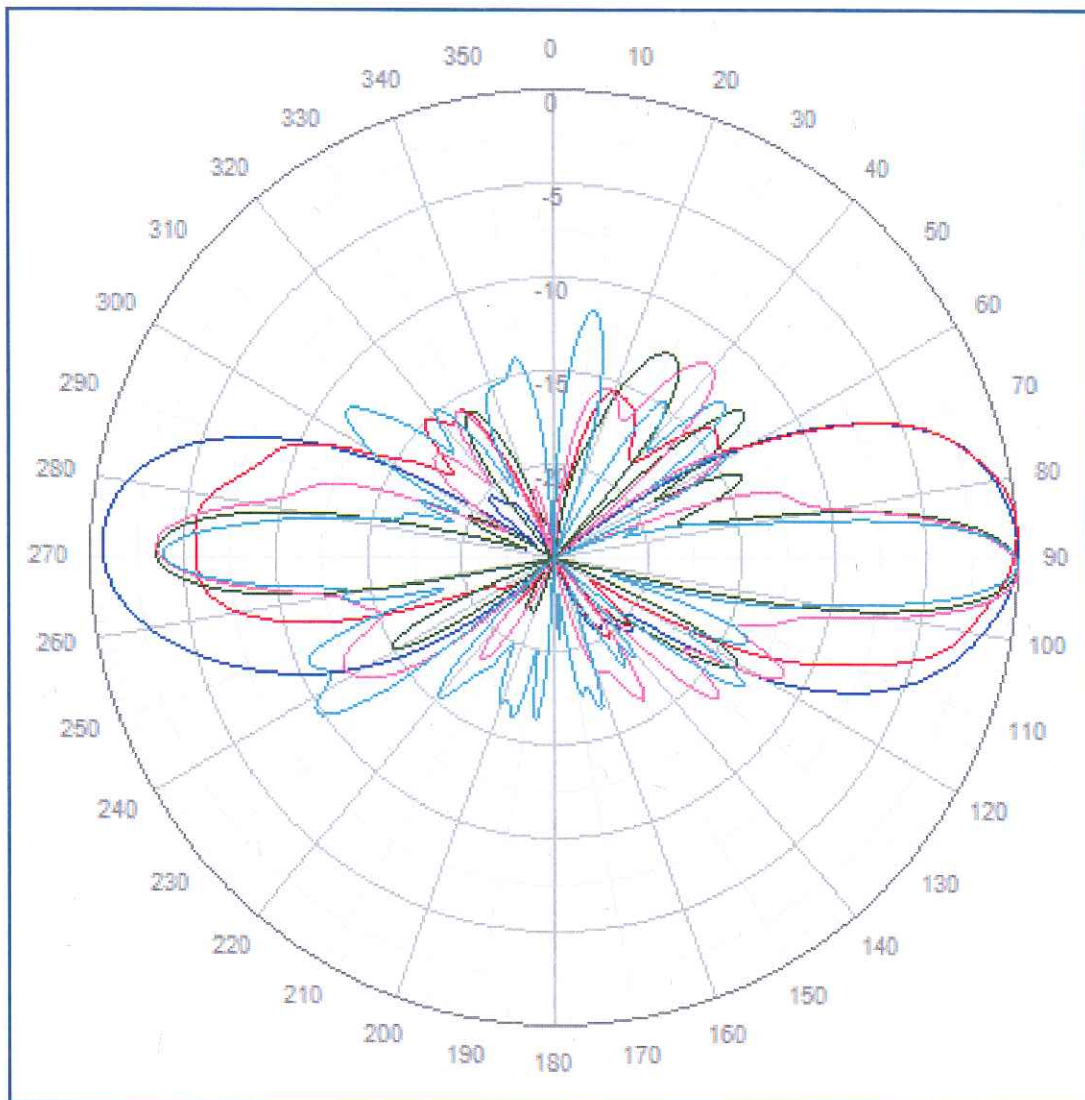
A handwritten signature in dark ink, appearing to read 'D. Haes', is written over a horizontal line.

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 these particular sites; **utility pole at 228 Brookline Street, Needham, 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



**Composite Vertical Radiation Patterns for Proposed Small Cell Omni Antenna
For Specific Verizon Wireless Proposed AWS & LTE Frequencies**

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

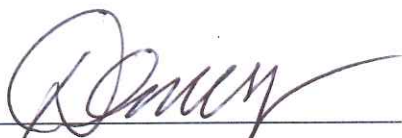
Radiation Safety Specialist

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: February 11, 2019



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 to ANSI/IEEE C95.1-2019: American National Standard, Safety levels with respect to human exposure to radio frequency electromagnetic fields, from 0 Hz to 300 GHz in 2019**).
- 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.

REFERENCE COPY

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**Federal Communications Commission
Wireless Telecommunications Bureau**

RADIO STATION AUTHORIZATION

LICENSEE: BELL ATLANTIC MOBILE SYSTEMS OF
ALLENTOWN, INC.

ATTN: REGULATORY
BELL ATLANTIC MOBILE SYSTEMS OF ALLENTOWN, INC.
5055 NORTH POINT PK WY, NP2NE NETWORK ENGINEERING
ALPHARETTA, GA 30022

Call Sign KNKN812	File Number
Radio Service CL - Cellular	
Market Numer CMA549	Channel Block B
Sub-Market Designator 0	

FCC Registration Number (FRN): 0003301512

Market Name New Hampshire 2 - Carroll				
Grant Date 08-30-2011	Effective Date 11-01-2016	Expiration Date 10-01-2021	Five Yr Build-Out Date	Print Date

Site Information:

Location	Latitude	Longitude	Ground Elevation (meters)	Structure Hgt to Tip (meters)	Antenna Structure Registration No.
3	43-13-09.3 N	071-26-23.7 W	301.1	57.9	1049982

Address: (Concord Site) 885 PLAUSAWA HILL ROAD

City: PEMBROKE County: MERRIMACK State: NH Construction Deadline:

Antenna: 4 Azimuth (from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	190.200	205.300	202.300	208.800	232.400	211.600	224.900	214.200
Transmitting ERP (watts)	378.050	107.030	3.780	0.990	0.990	0.990	4.340	117.250
Antenna: 5 Azimuth (from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	190.200	205.300	202.300	208.800	232.400	211.600	224.900	214.200
Transmitting ERP (watts)	0.890	29.780	250.080	387.670	129.610	6.090	0.890	0.890
Antenna: 6 Azimuth (from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	190.200	205.300	202.300	208.800	232.400	211.600	224.900	214.200
Transmitting ERP (watts)	0.990	0.990	0.990	7.110	147.540	370.030	81.150	2.440

Conditions:

Pursuant to §309(h) of the Communications Act of 1934, as amended, 47 U.S.C. §309(h), this license is subject to the following conditions: This license shall not vest in the licensee any right to operate the station nor any right in the use of the frequencies designated in the license beyond the term thereof nor in any other manner than authorized herein. Neither the license nor the right granted thereunder shall be assigned or otherwise transferred in violation of the Communications Act of 1934, as amended. See 47 U.S.C. § 310(d). This license is subject in terms to the right of use or control conferred by §706 of the Communications Act of 1934, as amended. See 47 U.S.C. §606.

Licensee Name: BELL ATLANTIC MOBILE SYSTEMS OF

Call Sign: KNKN812

File Number:

Print Date:

Location	Latitude	Longitude	Ground Elevation (meters)	Structure Hgt to Tip (meters)	Antenna Structure Registration No.
4	43-23-52.0 N	071-33-01.0 W	446.8	60.3	1033930

Address: Highland Ski Area - Bean Hill Road

City: Northfield County: MERRIMACK State: NH Construction Deadline:

Antenna: 4 Azimuth (from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	290.500	276.200	241.300	307.500	331.700	354.800	306.000	350.300
Transmitting ERP (watts)	89.130	93.330	40.740	5.620	0.270	0.200	3.240	31.620
Antenna: 5 Azimuth (from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	290.500	276.200	241.300	307.500	331.700	354.800	306.000	350.300
Transmitting ERP (watts)	0.330	7.580	45.500	62.790	57.310	23.110	1.890	0.200
Antenna: 6 Azimuth (from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	290.500	276.200	241.300	307.500	331.700	354.800	306.000	350.300
Transmitting ERP (watts)	11.480	0.590	0.200	1.260	16.600	74.130	100.000	61.660

Location	Latitude	Longitude	Ground Elevation (meters)	Structure Hgt to Tip (meters)	Antenna Structure Registration No.
6	43-57-32.2 N	071-33-21.3 W	1178.4	36.6	

Address: 15.6 miles SW Plymouth

City: Waterville Valley County: GRAFTON State: NH Construction Deadline:

Antenna: 2 Azimuth (from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	474.500	490.300	433.500	643.100	693.000	850.100	730.600	713.000
Transmitting ERP (watts)	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000

Location	Latitude	Longitude	Ground Elevation (meters)	Structure Hgt to Tip (meters)	Antenna Structure Registration No.
7	44-04-13.3 N	071-13-10.3 W	682.7	12.2	

Address: ROUTE 302

City: BARTLETT County: CARROLL State: NH Construction Deadline:

Antenna: 3 Azimuth (from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	268.100	355.900	422.600	519.700	281.400	146.600	266.000	32.900
Transmitting ERP (watts)	22.320	25.660	8.580	0.480	0.100	0.100	0.220	5.190
Antenna: 4 Azimuth (from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	268.100	355.900	422.600	519.700	281.400	146.600	266.000	32.900
Transmitting ERP (watts)	3.870	0.200	0.200	0.200	5.120	41.480	69.260	36.940

Licensee Name: BELL ATLANTIC MOBILE SYSTEMS OF

Call Sign: KNKN812

File Number:

Print Date:

Location	Latitude	Longitude	Ground Elevation (meters)	Structure Hgt to Tip (meters)	Antenna Structure Registration No.
8	43-36-46.8 N	071-03-12.4 W	330.7	65.7	1044047

Address: (Long Mountain) JUNIPER RIDGE ROAD

City: WAKEFIELD County: CARROLL State: NH Construction Deadline:

Antenna: 4 Azimuth (from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	194.500	155.900	205.500	170.700	184.500	156.600	196.700	114.800
Transmitting ERP (watts)	212.710	25.910	0.680	0.680	0.680	0.680	35.280	218.500
Antenna: 5 Azimuth (from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	194.500	155.900	205.500	170.700	184.500	156.600	196.700	114.800
Transmitting ERP (watts)	1.010	71.790	162.280	104.610	3.870	0.680	0.680	0.680
Antenna: 6 Azimuth (from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	194.500	155.900	205.500	170.700	184.500	156.600	196.700	114.800
Transmitting ERP (watts)	0.680	0.680	0.680	2.440	87.060	164.500	90.930	1.550

Location	Latitude	Longitude	Ground Elevation (meters)	Structure Hgt to Tip (meters)	Antenna Structure Registration No.
9	43-22-18.4 N	071-59-23.7 W	558.4	30.5	

Address: (Kling Ridge site) Off Summit Road

City: Sutton County: MERRIMACK State: NH Construction Deadline:

Antenna: 3 Azimuth (from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	135.100	280.000	193.500	323.700	303.800	80.100	264.500	210.000
Transmitting ERP (watts)	2.620	99.620	10.190	1.000	1.000	1.000	1.000	1.000
Antenna: 4 Azimuth (from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	135.100	280.000	193.500	323.700	303.800	80.100	264.500	210.000
Transmitting ERP (watts)	1.000	1.000	26.810	99.620	10.190	1.000	1.000	1.000
Antenna: 5 Azimuth (from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	135.100	280.000	193.500	323.700	303.800	80.100	264.500	210.000
Transmitting ERP (watts)	3.670	1.000	1.000	1.000	1.000	1.000	1.340	4.880

Licensee Name: BELL ATLANTIC MOBILE SYSTEMS OF

Call Sign: KNKN812

File Number:

Print Date:

Location	Latitude	Longitude	Ground Elevation (meters)	Structure Hgt to Tip (meters)	Antenna Structure Registration No.
10	44-03-33.7 N	071-05-28.0 W	493.8	40.8	1233142

Address: ATOP MT. CRANMORE, OFF SKI MOBILE ROAD

City: Conway County: CARROLL State: NH Construction Deadline:

Antenna: 4 Azimuth (from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	-10.100	356.400	379.700	381.700	347.200	304.100	179.100	279.700
Transmitting ERP (watts)	25.890	64.600	54.870	11.830	0.270	0.200	0.200	1.560
Antenna: 5 Azimuth (from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	-10.100	356.400	379.700	381.700	347.200	304.100	179.100	279.700
Transmitting ERP (watts)	0.200	0.200	5.250	42.420	67.610	39.590	4.790	0.200
Antenna: 6 Azimuth (from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	-10.100	356.400	379.700	381.700	347.200	304.100	179.100	279.700
Transmitting ERP (watts)	24.220	1.490	0.200	0.200	0.270	13.280	56.150	64.520

Location	Latitude	Longitude	Ground Elevation (meters)	Structure Hgt to Tip (meters)	Antenna Structure Registration No.
11	43-01-19.0 N	071-24-16.6 W	122.5	54.9	

Address: 85 Londonderry Turnpike

City: Hooksett County: MERRIMACK State: NH Construction Deadline: 10-15-2005

Antenna: 4 Azimuth (from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	13.400	10.400	44.200	48.500	68.300	73.000	55.000	31.600
Transmitting ERP (watts)	31.370	50.830	27.910	3.260	0.110	0.110	0.110	4.320
Antenna: 5 Azimuth (from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	13.400	10.400	44.200	48.500	68.300	73.000	55.000	31.600
Transmitting ERP (watts)	0.110	0.480	9.360	28.860	30.490	14.590	0.990	0.110
Antenna: 6 Azimuth (from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	13.400	10.400	44.200	48.500	68.300	73.000	55.000	31.600
Transmitting ERP (watts)	7.680	0.270	0.110	0.110	1.660	19.400	50.940	37.330

Control Points:

Control Pt. No. 1

Address: 500 West Dove Rd.

City: Southlake County: TARRANT State: TX Telephone Number: (800)264-6620

Licensee Name: BELL ATLANTIC MOBILE SYSTEMS OF

Call Sign: KNKN812

File Number:

Print Date:

Waivers/Conditions:

THIS AUTHORIZATION IS SUBJECT TO THE CONDITION THAT, IN THE EVENT THAT CELLULAR SYSTEMS USING THE SAME FREQUENCY BLOCK AS GRANTED HEREIN ARE AUTHORIZED IN ADJACENT TERRITORY IN CANADA, COORDINATION OF ANY OF THE LICENSEE'S TRANSMITTER INSTALLATIONS WHICH ARE WITHIN 45 MILES OF THE U.S. CANADA BORDER SHALL BE REQUIRED TO ELIMINATE ANY HARMFUL INTERFERENCE THAT MIGHT OTHERWISE EXIST AND TO INSURE CONTINUANCE OF EQUAL ACCESS TO THE FREQUENCY BLOCK BY BOTH COUNTRIES.

License renewal granted on a conditional basis, subject to the outcome of FCC proceeding WT Docket No. 10-112 (see FCC 10-86, paras. 113 and 126).

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**Federal Communications Commission****Wireless Telecommunications Bureau****RADIO STATION AUTHORIZATION**

LICENSEE: RURAL CELLULAR CORPORATION

ATTN: REGULATORY
RURAL CELLULAR CORPORATION
5055 NORTH POINT PKWY, NP2NE NETWORK ENGINEERING
ALPHARETTA, GA 30022

Call Sign KNLF937	File Number 0007638851
Radio Service CW - PCS Broadband	

FCC Registration Number (FRN): 0003715919

Grant Date 03-31-2017	Effective Date 03-31-2017	Expiration Date 04-28-2027	Print Date 04-01-2017
Market Number BTA274	Channel Block F	Sub-Market Designator 0	
Market Name Manchester-Nashua-Concord, NH			
1st Build-out Date 04-28-2002	2nd Build-out Date	3rd Build-out Date	4th Build-out Date

Waivers/Conditions:

This authorization is subject to the condition that, in the event that systems using the same frequencies as granted herein are authorized in an adjacent foreign territory (Canada/United States), future coordination of any base station transmitters within 72 km (45 miles) of the United States/Canada border shall be required to eliminate any harmful interference to operations in the adjacent foreign territory and to ensure continuance of equal access to the frequencies by both countries.

This authorization is conditioned upon the full and timely payment of all monies due pursuant to Sections 1.2110 and 24.716 of the Commission's Rules and the terms of the Commission's installment plan as set forth in the Note and Security Agreement executed by the licensee. Failure to comply with this condition will result in the automatic cancellation of this authorization.

Conditions:

Pursuant to §309(h) of the Communications Act of 1934, as amended, 47 U.S.C. §309(h), this license is subject to the following conditions: This license shall not vest in the licensee any right to operate the station nor any right in the use of the frequencies designated in the license beyond the term thereof nor in any other manner than authorized herein. Neither the license nor the right granted thereunder shall be assigned or otherwise transferred in violation of the Communications Act of 1934, as amended. See 47 U.S.C. § 310(d). This license is subject in terms to the right of use or control conferred by §706 of the Communications Act of 1934, as amended. See 47 U.S.C. §606.

This license may not authorize operation throughout the entire geographic area or spectrum identified on the hardcopy version. To view the specific geographic area and spectrum authorized by this license, refer to the Spectrum and Market Area information under the Market Tab of the license record in the Universal Licensing System (ULS). To view the license record, go to the ULS homepage at <http://wireless.fcc.gov/uls/index.htm?job=home> and select "License Search". Follow the instructions on how to search for license information.

Licensee Name: RURAL CELLULAR CORPORATION

Call Sign: KNLF937

File Number: 0007638851

Print Date: 04-01-2017

License renewal granted on a conditional basis, subject to the outcome of FCC proceeding WT Docket No. 10-112 (see FCC 10-86, paras. 113 and 126).

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Federal Communications Commission
Wireless Telecommunications Bureau

RADIO STATION AUTHORIZATION

LICENSEE: CELLCO PARTNERSHIP

ATTN: REGULATORY
CELLCO PARTNERSHIP
5055 NORTH POINT PKWY, NP2NE NETWORK ENGINEERING
ALPHARETTA, GA 30022

Call Sign KNLG267	File Number 0007640016
Radio Service CW - PCS Broadband	

FCC Registration Number (FRN): 0003290673

Grant Date 04-04-2017	Effective Date 04-04-2017	Expiration Date 04-28-2027	Print Date 04-05-2017
Market Number BTA274	Channel Block E	Sub-Market Designator 0	
Market Name Manchester-Nashua-Concord, NH			
1st Build-out Date 04-28-2002	2nd Build-out Date	3rd Build-out Date	4th Build-out Date

Waivers/Conditions:

This authorization is subject to the condition that, in the event that systems using the same frequencies as granted herein are authorized in an adjacent foreign territory (Canada/United States), future coordination of any base station transmitters within 72 km (45 miles) of the United States/Canada border shall be required to eliminate any harmful interference to operations in the adjacent foreign territory and to ensure continuance of equal access to the frequencies by both countries.

License renewal granted on a conditional basis, subject to the outcome of FCC proceeding WT Docket No. 10-112 (see FCC 10-86, paras. 113 and 126).

Conditions:

Pursuant to §309(h) of the Communications Act of 1934, as amended, 47 U.S.C. §309(h), this license is subject to the following conditions: This license shall not vest in the licensee any right to operate the station nor any right in the use of the frequencies designated in the license beyond the term thereof nor in any other manner than authorized herein. Neither the license nor the right granted thereunder shall be assigned or otherwise transferred in violation of the Communications Act of 1934, as amended. See 47 U.S.C. § 310(d). This license is subject in terms to the right of use or control conferred by §706 of the Communications Act of 1934, as amended. See 47 U.S.C. §606.

This license may not authorize operation throughout the entire geographic area or spectrum identified on the hardcopy version. To view the specific geographic area and spectrum authorized by this license, refer to the Spectrum and Market Area information under the Market Tab of the license record in the Universal Licensing System (ULS). To view the license record, go to the ULS homepage at <http://wireless.fcc.gov/uls/index.htm?job=home> and select "License Search". Follow the instructions on how to search for license information.

Licensee Name: CELLCO PARTNERSHIP

Call Sign: KNLG267

File Number: 0007640016

Print Date: 04-05-2017

This authorization is subject to the condition that the remaining balance of the winning bid amount will be paid in accordance with Part 1 of the Commission's rules, 47 C.F.R. Part 1.

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**Federal Communications Commission
Wireless Telecommunications Bureau****RADIO STATION AUTHORIZATION****LICENSEE: CELLCO PARTNERSHIP**

ATTN: REGULATORY
CELLCO PARTNERSHIP
5055 NORTH POINT PKWY, NP2NE NETWORK ENGINEERING
ALPHARETTA, GA 30022

Call Sign KNLG733	File Number 0007639986
Radio Service CW - PCS Broadband	

FCC Registration Number (FRN): 0003290673

Grant Date 04-04-2017	Effective Date 04-04-2017	Expiration Date 04-28-2027	Print Date 04-05-2017
Market Number BTA249	Channel Block F		Sub-Market Designator 1
Market Name Lebanon-Claremont, NH			
1st Build-out Date 04-28-2002	2nd Build-out Date	3rd Build-out Date	4th Build-out Date

Waivers/Conditions:

This authorization is subject to the condition that, in the event that systems using the same frequencies as granted herein are authorized in an adjacent foreign territory (Canada/United States), future coordination of any base station transmitters within 72 km (45 miles) of the United States/Canada border shall be required to eliminate any harmful interference to operations in the adjacent foreign territory and to ensure continuance of equal access to the frequencies by both countries.

This authorization is conditioned upon the full and timely payment of all monies due pursuant to Sections 1.2110 and 24.716 of the Commission's Rules and the terms of the Commission's installment plan as set forth in the Note and Security Agreement executed by the licensee. Failure to comply with this condition will result in the automatic cancellation of this authorization.

Conditions:

Pursuant to §309(h) of the Communications Act of 1934, as amended, 47 U.S.C. §309(h), this license is subject to the following conditions: This license shall not vest in the licensee any right to operate the station nor any right in the use of the frequencies designated in the license beyond the term thereof nor in any other manner than authorized herein. Neither the license nor the right granted thereunder shall be assigned or otherwise transferred in violation of the Communications Act of 1934, as amended. See 47 U.S.C. § 310(d). This license is subject in terms to the right of use or control conferred by §706 of the Communications Act of 1934, as amended. See 47 U.S.C. §606.

This license may not authorize operation throughout the entire geographic area or spectrum identified on the hardcopy version. To view the specific geographic area and spectrum authorized by this license, refer to the Spectrum and Market Area information under the Market Tab of the license record in the Universal Licensing System (ULS). To view the license record, go to the ULS homepage at <http://wireless.fcc.gov/uls/index.htm?job=home> and select "License Search". Follow the instructions on how to search for license information.

Licensee Name: CELLCO PARTNERSHIP

Call Sign: KNLG733

File Number: 0007639986

Print Date: 04-05-2017

License renewal granted on a conditional basis, subject to the outcome of FCC proceeding WT Docket No. 10-112 (see FCC 10-86, paras. 113 and 126).

Reference Copy



**Federal Communications Commission
Wireless Telecommunications Bureau**

Spectrum Leasing Arrangement

ATTN: REGULATORY
BELL ATLANTIC MOBILE SYSTEMS OF ALLENTOWN, INC.
1120 SANCTUARY PKWY #150 - GASA5REG
ALPHARETTA, GA 30009

Date: 02/14/2018
Reference Number:

This approval allows the Lessee to lease spectrum from the Licensee pursuant to the provisions and requirements of Subpart X of Part 1 of the Commission's Rules, 47 C.F.R. Part 1, and as described in the associated spectrum leasing application or notification.

Type of Lease Arrangement	Lease Term	Lease Identifier
Spectrum Manager Lease	Long Term	L000019080

Lease Grant/Accepted Date	Lease Commencement Date	Lease Expiration Date
04/25/2016	02/09/2016	06/13/2019

Call Sign	Radio Service
WQJQ689	WU - 700 MHz Upper Band (Block C)

Lessee Information

0003301512
BELL ATLANTIC MOBILE SYSTEMS OF ALLENTOWN, INC.
Attn: REGULATORY
1120 SANCTUARY PKWY #150 - GASA5REG
ALPHARETTA, GA 30009

Licensee Information

0003290673
CELLCO PARTNERSHIP
Attn: REGULATORY
5055 NORTH POINT PKWY, NP2NE NETWORK ENGINEERING
ALPHARETTA, GA 30022

Geographically-Licensed Services		
Market Number	Market Name	Channel Block
REA001	Northeast	C

Condition:

This lease may not authorize operation throughout the entire geographic area or spectrum identified on the hardcopy version. To view the specific geographic area and spectrum associated with this leasing agreement, refer to the Spectrum and Market Area information under the Market Tab of the license record in the Universal Licensing System (ULS). To view the license record, go to the ULS homepage at <http://wireless.fcc.gov/uls/index.htm?job=home> and select "License Search". Follow the instructions on how to search for license information.

Conditions:

Pursuant to §309(h) of the Communications Act of 1934, as amended, 47 U.S.C. §309(h), this license is subject to the following conditions: This license shall not vest in the licensee any right to operate the station nor any right in the use of the frequencies designated in the license beyond the term thereof nor in any other manner than authorized herein. Neither the license nor the right granted thereunder shall be assigned or otherwise transferred in violation of the Communications Act of 1934, as amended. See 47 U.S.C. § 310(d). This license is subject in terms to the right of use or control conferred by §706 of the Communications Act of 1934, as amended. See 47 U.S.C. §606.



Federal Communications Commission
Wireless Telecommunications Bureau

Spectrum Leasing Arrangement

ATTN: REGULATORY
BELL ATLANTIC MOBILE SYSTEMS OF ALLENTOWN, INC.
1120 SANCTUARY PKWY #150 - GASASREG
ALPHARETTA, GA 30009

Date: 02/14/2018
Reference Number:

This approval allows the Lessee to lease spectrum from the Licensee pursuant to the provisions and requirements of Subpart X of Part 1 of the Commission's Rules, 47 C.F.R. Part 1, and as described in the associated spectrum leasing application or notification.

Type of Lease Arrangement	Lease Term	Lease Identifier
Spectrum Manager Lease	Long Term	L000019065

Lease Grant/Accepted Date	Lease Commencement Date	Lease Expiration Date
04/22/2016	02/09/2016	12/31/2019

Call Sign	Radio Service
KNLF937	CW - PCS Broadband

Lessee Information

0003301512
BELL ATLANTIC MOBILE SYSTEMS OF ALLENTOWN, INC.
Attn: REGULATORY
1120 SANCTUARY PKWY #150 - GASASREG
ALPHARETTA, GA 30009

Licensee Information

0003715919
RURAL CELLULAR CORPORATION
Attn: REGULATORY
5055 NORTH POINT PKWY, NP2NE NETWORK ENGINEERING
ALPHARETTA, GA 30022

Geographically-Licensed Services		
Market Number	Market Name	Channel Block
BTA274	Manchester-Nashua-Concord, NH	F

Condition:

This lease may not authorize operation throughout the entire geographic area or spectrum identified on the hardcopy version. To view the specific geographic area and spectrum associated with this leasing agreement, refer to the Spectrum and Market Area information under the Market Tab of the license record in the Universal Licensing System (ULS). To view the license record, go to the ULS homepage at <http://wireless.fcc.gov/uls/index.htm?job=home> and select "License Search". Follow the instructions on how to search for license information.

Conditions:

Pursuant to §309(h) of the Communications Act of 1934, as amended, 47 U.S.C. §309(h), this license is subject to the following conditions: This license shall not vest in the licensee any right to operate the station nor any right in the use of the frequencies designated in the license beyond the term thereof nor in any other manner than authorized herein. Neither the license nor the right granted thereunder shall be assigned or otherwise transferred in violation of the Communications Act of 1934, as amended. See 47 U.S.C. § 310(d). This license is subject in terms to the right of use or control conferred by §706 of the Communications Act of 1934, as amended. See 47 U.S.C. §606.

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Federal Communications Commission
Wireless Telecommunications Bureau

RADIO STATION AUTHORIZATION

LICENSEE: CELLCO PARTNERSHIP

ATTN: REGULATORY
CELLCO PARTNERSHIP
1120 SANCTUARY PKWY, #150 GASA5REG
ALPHARETTA, GA 30009-7630

Call Sign WQGB266	File Number 0006150458
Radio Service	
AW - AWS (1710-1755 MHz and 2110-2155 MHz)	

FCC Registration Number (FRN): 0003290673

Grant Date 11-29-2006	Effective Date 01-04-2014	Expiration Date 11-29-2021	Print Date 02-14-2014
Market Number CMA006	Channel Block A	Sub-Market Designator 0	
Market Name Boston-Lowell-Brockton-Lawrence			
1st Build-out Date	2nd Build-out Date	3rd Build-out Date	4th Build-out Date

Waivers/Conditions:

This authorization is conditioned upon the licensee, prior to initiating operations from any base or fixed station, making reasonable efforts to coordinate frequency usage with known co-channel and adjacent channel incumbent federal users operating in the 1710-1755 MHz band whose facilities could be affected by the proposed operations. See, e.g., FCC and NTIA Coordination Procedures in the 1710-1755 MHz Band, Public Notice, FCC 06-50, WTB Docket No. 02-353, rel. April 20, 2006.

Conditions:

Pursuant to §309(h) of the Communications Act of 1934, as amended, 47 U.S.C. §309(h), this license is subject to the following conditions: This license shall not vest in the licensee any right to operate the station nor any right in the use of the frequencies designated in the license beyond the term thereof nor in any other manner than authorized herein. Neither the license nor the right granted thereunder shall be assigned or otherwise transferred in violation of the Communications Act of 1934, as amended. See 47 U.S.C. § 310(d). This license is subject in terms to the right of use or control conferred by §706 of the Communications Act of 1934, as amended. See 47 U.S.C. §606.

This license may not authorize operation throughout the entire geographic area or spectrum identified on the hardcopy version. To view the specific geographic area and spectrum authorized by this license, refer to the Spectrum and Market Area information under the Market Tab of the license record in the Universal Licensing System (ULS). To view the license record, go to the ULS homepage at <http://wireless.fcc.gov/uls/index.htm?job=home> and select "License Search". Follow the instructions on how to search for license information.

Licensee Name: CELLCO PARTNERSHIP

Call Sign: WQGB266

File Number: 0006150458

Print Date: 02-14-2014

The license is subject to compliance with the provisions of the January 12, 2001 Agreement between Deutsche Telekom AG, VoiceStream Wireless Corporation, VoiceStream Wireless Holding Corporation and the Department of Justice (DOJ) and the Federal Bureau of Investigation (FBI), which addresses national security, law enforcement, and public safety issues of the FBI and the DOJ regarding the authority granted by this license. Nothing in the Agreement is intended to limit any obligation imposed by Federal law or regulation including, but not limited to, 47 U.S.C. Section 222(a) and (c)(1) and the FCC's implementing regulations. The Agreement is published at VoiceStream-DT Order, IB Docket No. 00-187, FCC 01-142, 16 FCC Rcd 9779, 9853 (2001).

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Federal Communications Commission
Wireless Telecommunications Bureau

RADIO STATION AUTHORIZATION

LICENSEE: CELLCO PARTNERSHIP

ATTN: REGULATORY
 CELLCO PARTNERSHIP
 1120 SANCTUARY PK WY, #150 GASA5REG
 ALPHARETTA, GA 30009

Call Sign WQGA900	File Number 0006150134
Radio Service	
AW - AWS, 1710-1755/2110-2155 MHz bands	

FCC Registration Number (FRN): 0003290673

Grant Date 11-29-2006	Effective Date 12-28-2013	Expiration Date 11-29-2021	Print Date 02-14-2014
Market Number BEA003	Channel Block B	Sub-Market Designator 1	
Market Name Boston-Worcester-Lawrence-Lowe			
1st Build-out Date	2nd Build-out Date	3rd Build-out Date	4th Build-out Date

Waivers/Conditions:

This authorization is conditioned upon the licensee, prior to initiating operations from any base or fixed station, making reasonable efforts to coordinate frequency usage with known co-channel and adjacent channel incumbent federal users operating in the 1710-1755 MHz band whose facilities could be affected by the proposed operations. See, e.g., FCC and NTIA Coordination Procedures in the 1710-1755 MHz Band, Public Notice, FCC 06-50, WTB Docket No. 02-353, rel. April 20, 2006.

AWS operations must not cause harmful interference across the Canadian or Mexican Border. The authority granted herein is subject to future international agreements with Canada or Mexico, as applicable.

Conditions:

Pursuant to §309(h) of the Communications Act of 1934, as amended, 47 U.S.C. §309(h), this license is subject to the following conditions: This license shall not vest in the licensee any right to operate the station nor any right in the use of the frequencies designated in the license beyond the term thereof nor in any other manner than authorized herein. Neither the license nor the right granted thereunder shall be assigned or otherwise transferred in violation of the Communications Act of 1934, as amended. See 47 U.S.C. § 310(d). This license is subject in terms to the right of use or control conferred by §706 of the Communications Act of 1934, as amended. See 47 U.S.C. §606.

This license may not authorize operation throughout the entire geographic area or spectrum identified on the hardcopy version. To view the specific geographic area and spectrum authorized by this license, refer to the Spectrum and Market Area information under the Market Tab of the license record in the Universal Licensing System (ULS). To view the license record, go to the ULS homepage at <http://wireless.fcc.gov/uls/index.htm?job=home> and select "License Search". Follow the instructions on how to search for license information.

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Federal Communications Commission

Wireless Telecommunications Bureau

RADIO STATION AUTHORIZATION

LICENSEE: AIRTOUCH CELLULAR

ATTN: REGULATORY
AIRTOUCH CELLULAR
5055 NORTH POINT PKWY, NP2NE NETWORK ENGINEERING
ALPHARETTA, GA 30022

Call Sign KNLF646	File Number 0007490665
Radio Service CW - PCS Broadband	

FCC Registration Number (FRN): 0006146468

Grant Date 12-02-2016	Effective Date 12-02-2016	Expiration Date 01-03-2027	Print Date 12-03-2016
Market Number BTA051	Channel Block C		Sub-Market Designator 1
Market Name Boston, MA			
1st Build-out Date 12-07-2003	2nd Build-out Date 01-03-2007	3rd Build-out Date	4th Build-out Date

Waivers/Conditions:

This authorization is subject to the condition that, in the event that systems using the same frequencies as granted herein are authorized in an adjacent foreign territory (Canada/United States), future coordination of any base station transmitters within 72 km (45 miles) of the United States/Canada border shall be required to eliminate any harmful interference to operations in the adjacent foreign territory and to ensure continuance of equal access to the frequencies by both countries.

Grant of the request to update licensee name is conditioned on it not reflecting an assignment or transfer of control (see Rule 1.948); if an assignment or transfer occurred without proper notification or FCC approval, the grant is void and the station is licensed under the prior name.

Conditions:

Pursuant to §309(h) of the Communications Act of 1934, as amended, 47 U.S.C. §309(h), this license is subject to the following conditions: This license shall not vest in the licensee any right to operate the station nor any right in the use of the frequencies designated in the license beyond the term thereof nor in any other manner than authorized herein. Neither the license nor the right granted thereunder shall be assigned or otherwise transferred in violation of the Communications Act of 1934, as amended. See 47 U.S.C. § 310(d). This license is subject in terms to the right of use or control conferred by §706 of the Communications Act of 1934, as amended. See 47 U.S.C. §606.

This license may not authorize operation throughout the entire geographic area or spectrum identified on the hardcopy version. To view the specific geographic area and spectrum authorized by this license, refer to the Spectrum and Market Area information under the Market Tab of the license record in the Universal Licensing System (ULS). To view the license record, go to the ULS homepage at <http://wireless.fcc.gov/uls/index.htm?job=home> and select "License Search". Follow the instructions on how to search for license information.

Licensee Name: AIRTOUCH CELLULAR

Call Sign: KNLF646

File Number: 0007490665

Print Date: 12-03-2016

License renewal granted on a conditional basis, subject to the outcome of FCC proceeding WT Docket No. 10-112 (see FCC 10-86, paras. 113 and 126).

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Federal Communications Commission
Wireless Telecommunications Bureau

RADIO STATION AUTHORIZATION

LICENSEE: CELLCO PARTNERSHIP

ATTN: REGULATORY
CELLCO PARTNERSHIP
5055 NORTH POINT PKWY, NP2NE NETWORK ENGINEERING
ALPHARETTA, GA 30022

Call Sign KNLH242	File Number 0007716969
Radio Service CW - PCS Broadband	

FCC Registration Number (FRN): 0003290673

Grant Date 06-02-2017	Effective Date 06-02-2017	Expiration Date 06-27-2027	Print Date 06-06-2017
Market Number BTA051	Channel Block F	Sub-Market Designator 0	
Market Name Boston, MA			
1st Build-out Date 06-27-2002	2nd Build-out Date	3rd Build-out Date	4th Build-out Date

Waivers/Conditions:

This authorization is subject to the condition that, in the event that systems using the same frequencies as granted herein are authorized in an adjacent foreign territory (Canada/United States), future coordination of any base station transmitters within 72 km (45 miles) of the United States/Canada border shall be required to eliminate any harmful interference to operations in the adjacent foreign territory and to ensure continuance of equal access to the frequencies by both countries.

This authorization is conditioned upon the full and timely payment of all monies due pursuant to Sections 1.2110 and 24.716 of the Commission's Rules and the terms of the Commission's installment plan as set forth in the Note and Security Agreement executed by the licensee. Failure to comply with this condition will result in the automatic cancellation of this authorization.

Conditions:

Pursuant to §309(h) of the Communications Act of 1934, as amended, 47 U.S.C. §309(h), this license is subject to the following conditions: This license shall not vest in the licensee any right to operate the station nor any right in the use of the frequencies designated in the license beyond the term thereof nor in any other manner than authorized herein. Neither the license nor the right granted thereunder shall be assigned or otherwise transferred in violation of the Communications Act of 1934, as amended. See 47 U.S.C. § 310(d). This license is subject in terms to the right of use or control conferred by §706 of the Communications Act of 1934, as amended. See 47 U.S.C. §606.

This license may not authorize operation throughout the entire geographic area or spectrum identified on the hardcopy version. To view the specific geographic area and spectrum authorized by this license, refer to the Spectrum and Market Area information under the Market Tab of the license record in the Universal Licensing System (ULS). To view the license record, go to the ULS homepage at <http://wireless.fcc.gov/uls/index.htm?job=home> and select "License Search". Follow the instructions on how to search for license information.

Licensee Name: CELLCO PARTNERSHIP

Call Sign: KNLH242

File Number: 0007716969

Print Date: 06-06-2017

License renewal granted on a conditional basis, subject to the outcome of FCC proceeding WT Docket No. 10-112 (see FCC 10-86, paras. 113 and 126).

Reference Copy

REFERENCE COPY

This is not an official FCC license. It is a record of public information contained in the FCC's licensing database on the date that this reference copy was generated. In cases where FCC rules require the presentation, posting, or display of an FCC license, this document may not be used in place of an official FCC license.



Federal Communications Commission

Wireless Telecommunications Bureau

RADIO STATION AUTHORIZATION

LICENSEE: CELLCO PARTNERSHIP

ATTN: REGULATORY
CELLCO PARTNERSHIP
1120 SANCTUARY PKWY., #150 GASA5REG
ALPHARETTA, GA 30009-7630

Call Sign WQJQ689	File Number
Radio Service WU - 700 MHz Upper Band (Block C)	

FCC Registration Number (FRN): 0003290673

Grant Date 11-26-2008	Effective Date 05-28-2014	Expiration Date 06-13-2019	Print Date
Market Number REA001	Channel Block C	Sub-Market Designator 0	
Market Name Northeast			
1st Build-out Date 06-13-2013	2nd Build-out Date 06-13-2019	3rd Build-out Date	4th Build-out Date

Waivers/Conditions:

If the facilities authorized herein are used to provide broadcast operations, whether exclusively or in combination with other services, the licensee must seek renewal of the license either within eight years from the commencement of the broadcast service or within the term of the license had the broadcast service not been provided, whichever period is shorter in length. See 47 CFR §27.13(b).

This authorization is conditioned upon compliance with section 27.16 of the Commission's rules

Conditions:

Pursuant to §309(h) of the Communications Act of 1934, as amended, 47 U.S.C. §309(h), this license is subject to the following conditions: This license shall not vest in the licensee any right to operate the station nor any right in the use of the frequencies designated in the license beyond the term thereof nor in any other manner than authorized herein. Neither the license nor the right granted thereunder shall be assigned or otherwise transferred in violation of the Communications Act of 1934, as amended. See 47 U.S.C. § 310(d). This license is subject in terms to the right of use or control conferred by §706 of the Communications Act of 1934, as amended. See 47 U.S.C. §606.

This license may not authorize operation throughout the entire geographic area or spectrum identified on the hardcopy version. To view the specific geographic area and spectrum authorized by this license, refer to the Spectrum and Market Area information under the Market Tab of the license record in the Universal Licensing System (ULS). To view the license record, go to the ULS homepage at <http://wireless.fcc.gov/uls/index.htm?job=home> and select "License Search". Follow the instructions on how to search for license information.

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**Federal Communications Commission
Wireless Telecommunications Bureau**

RADIO STATION AUTHORIZATION

LICENSEE: CELLCO PARTNERSHIP

ATTN: REGULATORY
CELLCO PARTNERSHIP
1120 SANCTUARY PKWY, #150 GASA5REG
ALPHARETTA, GA 30009-7630

Call Sign KNKA201	File Number 0006356224
Radio Service CL - Cellular	
Market Numer CMA006	Channel Block B
Sub-Market Designator 0	

FCC Registration Number (FRN): 0003290673

Market Name Boston-Lowell-Brockton-Lawrenc
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Grant Date 08-26-2014	Effective Date 08-26-2014	Expiration Date 10-01-2024	Five Yr Build-Out Date	Print Date 08-26-2014
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Site Information:

Location	Latitude	Longitude	Ground Elevation (meters)	Structure Hgt to Tip (meters)	Antenna Structure Registration No.
1	42-38-26.3 N	070-36-25.2 W	36.3	35.7	

Address: (Rockport) Thatcher Road
City: Rockport **County:** ESSEX **State:** MA **Construction Deadline:**

Antenna: 5 Azimuth (from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	70.400	34.100	34.100	34.100	70.400	67.800	55.200	61.300
Transmitting ERP (watts)	246.920	325.500	33.310	0.940	0.820	0.820	1.210	20.070
Antenna: 6 Azimuth (from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	70.400	34.100	34.100	34.100	70.400	67.800	55.200	61.300
Transmitting ERP (watts)	0.820	3.330	54.020	373.730	191.670	10.780	0.820	0.820
Antenna: 7 Azimuth (from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	70.400	34.100	34.100	34.100	70.400	67.800	55.200	61.300
Transmitting ERP (watts)	3.330	0.820	0.820	0.820	7.810	126.630	409.780	89.650

Conditions:

Pursuant to §309(h) of the Communications Act of 1934, as amended, 47 U.S.C. §309(h), this license is subject to the following conditions: This license shall not vest in the licensee any right to operate the station nor any right in the use of the frequencies designated in the license beyond the term thereof nor in any other manner than authorized herein. Neither the license nor the right granted thereunder shall be assigned or otherwise transferred in violation of the Communications Act of 1934, as amended. See 47 U.S.C. § 310(d). This license is subject in terms to the right of use or control conferred by §706 of the Communications Act of 1934, as amended. See 47 U.S.C. §606.

Licensee Name: CELLCO PARTNERSHIP

Call Sign: KNKA201

File Number: 0006356224

Print Date: 08-26-2014

Location	Latitude	Longitude	Ground Elevation (meters)	Structure Hgt to Tip (meters)	Antenna Structure Registration No.
4	42-08-56.4 N	071-24-55.2 W	75.6	44.2	

Address: 113 Main Street

City: Medway County: NORFOLK State: MA Construction Deadline:

Antenna: 4 Azimuth (from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	59.500	66.700	61.200	46.900	23.900	39.300	13.900	12.300
Transmitting ERP (watts)	81.280	89.130	24.550	1.120	0.200	0.200	0.420	16.600
Antenna: 5 Azimuth (from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	59.500	66.700	61.200	46.900	23.900	39.300	13.900	12.300
Transmitting ERP (watts)	0.200	2.000	33.800	95.500	67.610	10.700	0.200	0.200
Antenna: 6 Azimuth (from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	59.500	66.700	61.200	46.900	23.900	39.300	13.900	12.300
Transmitting ERP (watts)	3.890	0.200	0.200	0.200	6.760	57.540	100.000	44.670

Location	Latitude	Longitude	Ground Elevation (meters)	Structure Hgt to Tip (meters)	Antenna Structure Registration No.
9	42-11-42.4 N	070-49-10.2 W	57.9	56.1	

Address: (Scituate) OFF CLAPP RD

City: SCITUATE County: PLYMOUTH State: MA Construction Deadline:

Antenna: 7 Azimuth (from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	105.300	106.100	93.800	85.900	95.600	76.500	81.800	104.300
Transmitting ERP (watts)	172.400	167.230	26.990	1.190	0.960	0.960	1.720	28.870
Antenna: 8 Azimuth (from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	105.300	106.100	93.800	85.900	95.600	76.500	81.800	104.300
Transmitting ERP (watts)	0.980	3.910	54.020	409.780	200.700	15.220	0.980	0.980
Antenna: 9 Azimuth (from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	105.300	106.100	93.800	85.900	95.600	76.500	81.800	104.300
Transmitting ERP (watts)	4.490	0.980	0.980	1.300	10.060	123.750	449.320	96.060

Licensee Name: CELLCO PARTNERSHIP

Call Sign: KNKA201

File Number: 0006356224

Print Date: 08-26-2014

Location	Latitude	Longitude	Ground Elevation (meters)	Structure Hgt to Tip (meters)	Antenna Structure Registration No.
10	42-52-57.3 N	071-16-28.2 W	163.0	58.2	

Address: (Derry) 46 FLOYD ROAD

City: DERRY County: ROCKINGHAM State: NH Construction Deadline:

Antenna: 4 Azimuth (from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	82.200	129.400	144.500	155.100	136.800	127.900	126.200	118.100
Transmitting ERP (watts)	31.810	146.820	102.310	15.410	1.000	1.000	1.000	1.130
Antenna: 5 Azimuth (from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	82.200	129.400	144.500	155.100	136.800	127.900	126.200	118.100
Transmitting ERP (watts)	1.000	1.000	4.660	82.110	250.350	80.300	3.790	1.000
Antenna: 6 Azimuth (from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	80.200	129.400	144.500	155.100	136.800	127.900	126.200	118.100
Transmitting ERP (watts)	32.480	1.680	1.000	1.000	1.000	13.740	107.220	143.470

Location	Latitude	Longitude	Ground Elevation (meters)	Structure Hgt to Tip (meters)	Antenna Structure Registration No.
12	41-52-08.3 N	070-52-56.1 W	29.6	58.2	

Address: (Middleboro) E. GROVE ST.

City: MIDDLESBORO County: PLYMOUTH State: MA Construction Deadline:

Antenna: 7 Azimuth (from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	57.600	32.400	40.200	47.600	44.900	41.300	50.300	52.600
Transmitting ERP (watts)	277.330	364.730	40.890	2.250	0.960	0.960	2.410	20.640
Antenna: 8 Azimuth (from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	57.600	32.400	40.200	47.600	44.900	41.300	50.300	52.600
Transmitting ERP (watts)	0.960	3.730	61.620	418.280	215.780	13.090	1.700	0.960
Antenna: 9 Azimuth (from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	57.600	32.400	40.200	47.600	44.900	41.300	50.300	52.600
Transmitting ERP (watts)	5.070	1.130	0.610	1.600	5.050	89.040	278.490	66.210

Licensee Name: CELLCO PARTNERSHIP

Call Sign: KNKA201

File Number: 0006356224

Print Date: 08-26-2014

Location	Latitude	Longitude	Ground Elevation (meters)	Structure Hgt to Tip (meters)	Antenna Structure Registration No.
14	42-28-06.3 N	071-27-16.2 W	102.1	54.0	

Address: Main Street

City: South Acton County: MIDDLESEX State: MA Construction Deadline:

Antenna: 4 Azimuth (from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	69.000	79.000	105.500	96.200	72.600	76.300	47.400	58.700
Transmitting ERP (watts)	65.200	77.960	20.970	2.400	0.200	0.200	2.000	13.720
Antenna: 5 Azimuth (from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	69.000	79.900	105.500	96.200	72.600	76.300	47.400	58.700
Transmitting ERP (watts)	0.200	3.880	23.800	59.780	43.360	10.290	0.830	0.200
Antenna: 6 Azimuth (from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	76.400	65.500	105.500	96.200	72.600	76.300	47.400	58.700
Transmitting ERP (watts)	5.010	0.420	0.200	0.740	6.570	43.660	91.210	34.920

Location	Latitude	Longitude	Ground Elevation (meters)	Structure Hgt to Tip (meters)	Antenna Structure Registration No.
15	42-30-08.4 N	070-55-02.2 W	39.6	46.3	

Address: 12 First Street

City: Salem County: ESSEX State: MA Construction Deadline:

Antenna: 7 Azimuth (from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	63.400	62.100	62.800	77.900	77.500	70.500	40.900	50.900
Transmitting ERP (watts)	49.150	56.730	19.190	2.360	0.200	0.200	1.930	12.920
Antenna: 8 Azimuth (from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	63.400	62.100	62.800	77.900	77.500	70.500	40.900	50.900
Transmitting ERP (watts)	0.100	1.550	9.520	23.920	17.350	4.120	0.330	0.100
Antenna: 9 Azimuth (from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	63.400	62.100	62.800	77.900	77.500	70.500	40.900	50.900
Transmitting ERP (watts)	5.010	0.380	0.200	0.680	6.510	35.500	64.630	29.380

Licensee Name: CELLCO PARTNERSHIP

Call Sign: KNKA201

File Number: 0006356224

Print Date: 08-26-2014

Location Latitude Longitude Ground Elevation Structure Hgt to Tip Antenna Structure
(meters) (meters) Registration No.
16 42-16-51.4 N 071-02-04.2 W 5.2 53.0
Address: 100 HANCOCK STREET
City: QUINCY County: NORFOLK State: MA Construction Deadline:

Antenna: 5 Azimuth (from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	43.000	44.100	42.200	29.000	8.300	14.800	12.100	31.500
Transmitting ERP (watts)	7.170	6.480	6.790	0.320	0.100	0.100	0.160	5.630
Antenna: 6 Azimuth (from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	40.900	41.900	40.000	26.800	6.200	12.600	9.900	29.300
Transmitting ERP (watts)	0.100	0.340	3.140	2.480	2.970	1.500	0.100	0.100
Antenna: 7 Azimuth (from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	43.000	44.100	42.200	29.000	8.300	14.800	12.100	31.500
Transmitting ERP (watts)	0.100	0.100	0.100	0.120	2.640	2.770	2.720	2.360

Location Latitude Longitude Ground Elevation Structure Hgt to Tip Antenna Structure
(meters) (meters) Registration No.
21 42-30-36.4 N 070-51-21.2 W 23.2 47.2
Address: Tioga Way
City: Marblehead County: ESSEX State: MA Construction Deadline:

Antenna: 2 Azimuth (from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	44.200	46.700	37.200	60.400	60.400	54.600	28.000	43.700
Transmitting ERP (watts)	0.100	0.130	3.130	7.860	6.600	1.220	0.100	0.100
Antenna: 3 Azimuth (from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	44.200	46.700	37.200	60.400	60.400	54.600	28.000	43.700
Transmitting ERP (watts)	0.410	0.100	0.100	0.100	0.530	5.070	8.210	4.870
Antenna: 4 Azimuth (from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	44.200	46.700	37.200	60.400	60.400	54.600	28.000	43.700
Transmitting ERP (watts)	6.780	7.760	2.800	0.100	0.100	0.100	0.100	1.540

Licensee Name: CELLCO PARTNERSHIP

Call Sign: KNKA201

File Number: 0006356224

Print Date: 08-26-2014

Location	Latitude	Longitude	Ground Elevation (meters)	Structure Hgt to Tip (meters)	Antenna Structure Registration No.
22	42-51-55.4 N	070-56-13.2 W	94.5	50.9	

Address: (Amesbury) 10 DENNET WAY

City: AMESBURY County: ESSEX State: MA Construction Deadline:

Antenna: 4 Azimuth (from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	117.000	123.800	125.500	137.800	126.100	109.800	94.200	100.300
Transmitting ERP (watts)	178.880	225.190	34.880	0.860	0.860	0.860	0.860	10.780
Antenna: 5 Azimuth (from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	117.000	123.800	125.500	137.800	126.100	109.800	94.200	100.300
Transmitting ERP (watts)	0.860	1.240	35.690	258.560	148.780	12.380	0.860	0.860
Antenna: 6 Azimuth (from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	117.000	123.800	125.500	137.800	126.100	109.800	94.200	100.300
Transmitting ERP (watts)	3.110	0.830	0.860	0.860	3.110	89.650	270.740	81.760

Location	Latitude	Longitude	Ground Elevation (meters)	Structure Hgt to Tip (meters)	Antenna Structure Registration No.
24	42-03-31.4 N	071-17-29.2 W	105.5	59.1	

Address: (Wrentham) 415 Washington St. - Route 1

City: WRENTHAM County: NORFOLK State: MA Construction Deadline:

Antenna: 4 Azimuth (from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	99.900	78.700	94.600	120.300	114.800	77.800	71.700	95.700
Transmitting ERP (watts)	2.580	85.500	401.990	363.280	54.920	1.060	0.850	0.850
Antenna: 5 Azimuth (from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	99.900	78.700	94.600	120.300	114.800	77.800	71.700	95.700
Transmitting ERP (watts)	0.850	0.850	0.850	8.930	146.240	311.250	197.740	18.980
Antenna: 6 Azimuth (from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	99.900	78.700	94.600	120.300	114.800	77.800	71.700	95.700
Transmitting ERP (watts)	352.500	136.390	5.560	0.980	0.980	0.980	39.210	263.760

Licensee Name: CELLCO PARTNERSHIP

Call Sign: KNKA201

File Number: 0006356224

Print Date: 08-26-2014

Location	Latitude	Longitude	Ground Elevation (meters)	Structure Hgt to Tip (meters)	Antenna Structure Registration No.
25	43-10-34.3 N	071-12-24.2 W	335.3	31.4	

Address: (Northwood) SADDLEBACK MOUNTAIN

City: NORTHWOOD County: ROCKINGHAM State: NH Construction Deadline:

Antenna: 4 Azimuth (from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	152.900	213.700	260.100	268.500	234.000	215.400	150.700	173.600
Transmitting ERP (watts)	45.240	219.790	199.540	31.860	1.550	1.000	1.000	2.360
Antenna: 5 Azimuth (from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	152.900	213.700	260.100	268.500	234.000	215.400	150.700	173.600
Transmitting ERP (watts)	1.000	1.000	6.160	105.350	236.610	142.220	7.190	1.780
Antenna: 6 Azimuth (from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	152.900	213.700	260.100	268.500	234.000	215.400	150.700	173.600
Transmitting ERP (watts)	55.630	1.980	1.000	1.000	2.260	8.170	110.540	141.320

Location	Latitude	Longitude	Ground Elevation (meters)	Structure Hgt to Tip (meters)	Antenna Structure Registration No.
27	41-41-13.4 N	070-48-25.1 W	22.9	59.4	

Address: (Mattapoisett) Industrial Drive

City: Mattapoisett County: PLYMOUTH State: MA Construction Deadline:

Antenna: 4 Azimuth (from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	61.700	76.400	79.200	79.900	80.600	75.400	56.100	60.600
Transmitting ERP (watts)	217.540	281.390	29.930	2.050	0.980	0.980	2.340	21.270
Antenna: 5 Azimuth (from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	61.700	76.400	79.300	79.900	80.600	75.400	56.100	60.600
Transmitting ERP (watts)	0.980	10.610	118.800	349.190	74.510	4.550	0.980	0.980
Antenna: 6 Azimuth (from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	61.700	76.400	79.200	79.900	80.600	75.400	56.100	60.600
Transmitting ERP (watts)	2.220	0.980	0.980	2.540	27.640	252.570	253.110	22.510

Licensee Name: CELLCO PARTNERSHIP

Call Sign: KNKA201

File Number: 0006356224

Print Date: 08-26-2014

Location	Latitude	Longitude	Ground Elevation (meters)	Structure Hgt to Tip (meters)	Antenna Structure Registration No.
29	41-55-21.0 N	070-39-05.0 W	39.6	77.4	1021869

Address: (Plymouth) CALEB ST

City: Plymouth County: PLYMOUTH State: MA Construction Deadline:

Antenna: 4 Azimuth (from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	94.600	84.200	79.500	67.900	61.400	63.600	52.500	63.200
Transmitting ERP (watts)	252.450	246.240	37.800	1.470	0.940	0.940	2.080	39.370
Antenna: 5 Azimuth (from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	94.600	84.200	79.500	67.900	61.400	63.600	52.500	63.200
Transmitting ERP (watts)	1.000	3.000	53.330	346.500	184.150	15.870	1.000	1.000
Antenna: 6 Azimuth (from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	94.600	84.200	79.500	67.900	61.400	63.600	52.500	63.200
Transmitting ERP (watts)	4.660	1.000	1.000	1.000	5.610	128.480	425.450	99.740

Location	Latitude	Longitude	Ground Elevation (meters)	Structure Hgt to Tip (meters)	Antenna Structure Registration No.
31	42-14-40.0 N	071-30-38.0 W	142.6	102.0	1009024

Address: 1.25 MI NNE

City: HOPKINTON County: MIDDLESEX State: MA Construction Deadline:

Antenna: 4 Azimuth (from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	107.800	138.000	130.800	126.800	101.200	85.900	73.000	97.500
Transmitting ERP (watts)	23.200	21.890	16.370	2.550	0.130	0.100	1.640	13.250
Antenna: 5 Azimuth (from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	107.800	138.000	130.800	126.800	101.200	85.900	73.000	97.500
Transmitting ERP (watts)	0.940	9.100	53.990	96.320	78.580	26.320	3.730	0.460
Antenna: 6 Azimuth (from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	107.800	138.000	130.800	126.800	101.200	85.900	73.000	97.500
Transmitting ERP (watts)	13.400	1.700	0.620	2.340	18.300	72.460	95.170	63.740

Licensee Name: CELLCO PARTNERSHIP

Call Sign: KNKA201

File Number: 0006356224

Print Date: 08-26-2014

Location	Latitude	Longitude	Ground Elevation (meters)	Structure Hgt to Tip (meters)	Antenna Structure Registration No.
34	42-23-29.5 N	071-07-22.9 W	7.9	26.8	

Address: 2067 MASSACHUSETTS AVENUE

City: CAMBRIDGE County: SUFFOLK State: MA Construction Deadline:

Antenna: 4 Azimuth (from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	-3.400	5.800	21.700	28.600	13.000	-2.600	-14.400	-21.300
Transmitting ERP (watts)	6.780	7.760	2.800	0.100	0.100	0.100	0.100	1.540
Antenna: 5 Azimuth (from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	-3.400	5.800	21.700	28.600	13.000	-2.600	-14.400	-21.300
Transmitting ERP (watts)	0.100	0.130	3.130	7.860	6.600	1.220	0.100	0.100
Antenna: 6 Azimuth (from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	-3.400	5.800	21.700	28.300	13.000	-2.600	-14.400	-21.300
Transmitting ERP (watts)	0.410	0.100	0.100	0.100	0.530	5.070	8.210	4.870

Location	Latitude	Longitude	Ground Elevation (meters)	Structure Hgt to Tip (meters)	Antenna Structure Registration No.
35	42-39-16.7 N	071-44-12.3 W	192.6	51.2	

Address: 84 Bayberry Hill Road

City: Townsend County: MIDDLESEX State: MA Construction Deadline:

Antenna: 2 Azimuth (from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	57.900	139.500	149.200	136.100	102.200	42.700	-79.000	-25.700
Transmitting ERP (watts)	0.580	7.080	42.660	95.500	77.620	22.390	2.820	0.460
Antenna: 4 Azimuth (from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	51.300	146.600	148.900	136.600	101.300	25.000	-79.700	-22.300
Transmitting ERP (watts)	35.060	35.620	17.670	2.660	0.200	0.150	1.860	13.500
Antenna: 5 Azimuth (from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	51.300	146.600	148.900	136.600	101.300	25.000	-79.700	-22.300
Transmitting ERP (watts)	5.360	0.690	0.250	0.930	7.320	28.980	38.070	25.500

Licensee Name: CELLCO PARTNERSHIP

Call Sign: KNKA201

File Number: 0006356224

Print Date: 08-26-2014

Location	Latitude	Longitude	Ground Elevation (meters)	Structure Hgt to Tip (meters)	Antenna Structure Registration No.
38	42-38-45.8 N	071-05-37.7 W	117.3	52.4	

Address: 5 Boston Hill Road

City: North Andover County: ESSEX State: MA Construction Deadline:

Antenna: 4 Azimuth (from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	96.900	98.200	110.000	111.300	110.000	101.700	90.300	106.200
Transmitting ERP (watts)	83.180	87.100	23.990	2.290	0.200	0.200	1.820	20.420
Antenna: 5 Azimuth (from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	96.900	98.100	110.000	111.300	110.000	101.700	90.200	106.200
Transmitting ERP (watts)	0.240	4.170	38.020	97.720	66.070	11.750	1.050	0.200
Antenna: 6 Azimuth (from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	96.900	98.200	110.000	111.300	110.000	101.700	90.200	106.200
Transmitting ERP (watts)	5.250	0.340	0.200	0.830	9.770	60.262	100.000	42.660

Location	Latitude	Longitude	Ground Elevation (meters)	Structure Hgt to Tip (meters)	Antenna Structure Registration No.
39	42-18-13.0 N	071-13-05.0 W	44.8	96.0	1018331

Address: 140 CABOT ST

City: NEEDHAM County: NORFOLK State: MA Construction Deadline:

Antenna: 1 Azimuth (from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	44.200	68.400	58.900	48.800	36.300	40.300	44.100	41.600
Transmitting ERP (watts)	30.340	35.650	9.380	0.920	0.100	0.100	0.610	6.050
Antenna: 2 Azimuth (from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	44.200	68.400	58.900	48.800	36.300	40.300	44.100	41.600
Transmitting ERP (watts)	0.100	1.230	10.440	23.990	19.000	4.420	0.370	0.100
Antenna: 3 Azimuth (from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	44.200	68.400	58.900	48.800	36.300	40.300	44.100	41.600
Transmitting ERP (watts)	2.200	0.190	0.100	0.300	2.700	19.270	35.660	16.260

Licensee Name: CELLCO PARTNERSHIP

Call Sign: KNKA201

File Number: 0006356224

Print Date: 08-26-2014

Location Latitude Longitude Ground Elevation (meters) Structure Hgt to Tip (meters) Antenna Structure Registration No.
41 42-22-16.6 N 071-05-49.6 W 6.3 18.6
Address: (Cambridge Donnelly Field site) 284 Norfolk Street
City: Cambridge County: MIDDLESEX State: MA Construction Deadline: 07-03-2014

Antenna: 1 Azimuth (from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	-11.600	16.500	20.700	21.000	2.200	-20.400	2.300	-16.900
Transmitting ERP (watts)	48.150	197.980	63.920	1.080	0.680	0.680	0.680	0.850
Antenna: 2 Azimuth (from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	-11.600	16.500	20.700	21.000	2.200	-20.400	2.300	-16.900
Transmitting ERP (watts)	0.670	0.670	18.990	128.120	74.750	3.300	0.670	0.670
Antenna: 3 Azimuth (from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	-10.600	17.600	21.700	22.000	3.200	-19.400	3.400	-15.900
Transmitting ERP (watts)	28.690	0.650	0.650	0.650	0.650	5.700	114.450	208.740

Control Points:

Control Pt. No. 3

Address: 500 W. Dove Rd.

City: Southlake County: TARRANT State: TX Telephone Number: (800)264-6620

Waivers/Conditions:

License renewal granted on a conditional basis, subject to the outcome of FCC proceeding WT Docket No. 10-112 (see FCC 10-86, paras. 113 and 126).

THE FOLLOWING CELLULAR GEOGRAPHIC SERVICE AREAS HAVE BEEN COMBINED (LISTED BY CALL SIGN, MARKET NUMBER AND BLOCK, AND MARKET NAME): KNKA201 6B BOSTON, MASSACHUSETTS KNKA251 76B

APPENDIX IV

WJ.# 2264052

Form 1

APPLICATION AND POLE ATTACHMENT LICENSE

Licensee Cellco Partnership d/b/a Verizon Wireless
Street Address One Verizon Way, Mail Stop 4A W100
City, State and Zip Basking Ridge, NJ 07920
Date 01/29/2018

In accordance with the terms and conditions of the Pole Attachment Agreement, application is hereby made for a license to make one (1) antenna attachments to poles and one (1) Power Supply(ies) and other attachments located in the municipality of Needham in the State of Massachusetts.

This request will be designated **Pole Attachment License Application Number NEEDHAMSC02MA-390168**. Attached are my power supply specifications if applicable. The cable's strand size is .05 and weight per foot of cable is .02.

X Communication Space

☐ **Power / Supply Space**

Licensee's Name (Print) Austin George

Signature *Austin George*

EVERSOURCE

Power Company

Title Sr. Project Manager

Tel. No. 203-704-1298

Fax No. N/A

E-mail tom.fields@nexius.com

*****For licensor use, do not write below this line*****
Pole Attachment License Application Number NEEDHAMSC02MA-390168 is hereby granted to make the attachments described in this application to 1 attachments to JO¹ poles, _____ attachments to FO² poles, _____ attachments to JU³ poles, _____ Power Supplies and _____ other attachments located in the municipality of NEEDHAM, in the State of MASSACHUSETTS as indicated on the attached Form 3.

Licensor's Name (Print) *Steve Owens*

Signature *[Signature]*

(AGREEMENT ID #)

Title *Supervisor*

Date *6-7-18*

Tel. No. _____

The Licensee shall submit an original copy of this application to Verizon New England Inc. and NSTAR Electric Company d/b/a EVERSOURCE ENERGY.

Revised 03/06/2015

Eversource Energy

AUTHORIZATION FOR FIELD SURVEY WORKLicensee: Cellco Partnership d/b/a Verizon Wireless

In accordance with Article III & Appendix I of the Pole Attachment Agreement, following is a summary of the charges which will apply to complete a field survey covering Pole Attachment License Application Number **NEEDHAMSC02MA-390168** in the municipality of Needham in the State of Massachusetts.

FIELD SURVEY CHARGES

<u>Field Survey</u>	<u>#Poles</u>	<u>Unit Rate</u>	<u>Total</u>
Field Survey Application Fee (includes 1st pole)	1 pole	\$139.00	 \$ <u>139.00</u>
Field Survey 2 -200 Poles	_____	\$ <u>13.45</u> per Pole	\$ _____
Additional Travel Time*	_____	\$ <u>200.00</u> per Day	\$ _____
TOTAL Charges			\$ <u>139.00</u>

* Based on average of 75 poles surveyed per day, add \$200.00 travel time for each additional day required to complete survey.

Please note, if you calculated the cost incorrectly, your check will be returned and a new check for the correct amount must be received by this office in order to schedule the survey. If you need assistance, please call the **HOTLINE** on 800-340-9822. The required field survey covering Pole Attachment License Application # _____ is authorized. I am enclosing an advance payment in the amount of \$ 139.00.

Licensee's Name (Print) Austin GeorgeSignature Austin GeorgeTitle Sr. Project ManagerAddress 7 Lyberty Way, Westford, MA 01886Tel. No. 203-704-1298Date 1/29/2018

RCE to Complete:	Total Poles Surveyed	<u> 1 </u>	Total Poles Requiring NSTAR Make-Ready
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Appendix IV Form 3

FIELD SURVEY / MAKE READY WORK FORM																	
SURVEYORS:						DATE OF SURVEY:						CWO #:					
Verizon						MUNIC: Needham			STATE: MA			Exch Code:			Munic Code:		
Licensee			John McGillicuddy			LISCENSEE NAME: Verizon Wireless			LISCENSEE APPLICATION #: NEEDHAMSC02MA-390168								
EVERSOURCE						ELCO NAME: EVERSOURCE			INSTAR APPLICATION #								
LOCATION TEL RTE / STREET NAME <i>List one pole per line</i>			POLE # Tel El		ATT F/C P.S. Riser		OWNERSHIP				CHARGE		WORK DESCRIPTION TASK #S / REMARKS		* Height of Att.		
							J.O. Tel	J.U. El	F.O. Tel	NO	YES	NO					
U Pole# 16 @ 228 Brookline Street			16	16													
TOTALS:																	

* Height of Attachment = Height of Licensee Attachment shall be 40' below ELCO MGN unless otherwise noted here by Verizon and EVERSOURCE surveyor.
 Licensee to complete bold italicized areas only. (Provide ownership information if known)

EVERSOURCE - Work Order Application

FOR KEN KENDRICK:

Customer Request In-Service Date: 01/29/2018 WO Received Date: _____

Service Address: Street: U Pole # 16 @ 228 Brookline Road Suite: _____ Town: Needham
Zip: 02494

Customer Of Record:

Customer Responsible for Payment of Monthly Electric Bills

Name to appear on Monthly Bill: Cellco Partnership (a Delaware Corporation)

DBA - C/O Name: Verizon Wireless

Billing Address: P.O. Box 2375, Spokane, WA 99210-2375

Telephone: 866-322-4547 Tax ID Number: 22-3372889 Existing Account or Meter

Number (if applicable): _____

Property Owner Name (if different from above): Verizon Telephone & Eversource

Owner Address: One Nstar Way - Westwood, MA 02090

Owner Phone Number: 781-441-3611

Party Responsible for Construction costs associated with work order (if different from above)

Name: Verizon Wireless

Address: 7118 Flanders Road, Westborough, MA 01581

Phone Number: 1-508-320-2017

Please Note that Articles of Incorporation are required for new commercial EVERSOURCE Customers

Type of Service Requested: (Circle Appropriate)

New Service Service Upgrade Service Relocation Temporary Service
Pole Relocation Disconnect/Reconnect Service Removal ☒
OH Service from Pole, Pole#: _____ UG Service from: Riser-Pole #: _____ Padmount #: _____

Customer Loading

Type of Load	New Connected Load in KVA	
	Single Phase	Three Phase
Lighting		
Electric heat		
Air Conditioning		
Refrigeration		
Cooking		
Electric Dryer		
Water Heater		
Computer		
Process Equip.	14.4	
Motors/Elevators		
Miscellaneous	X	
Totals		

Brief Description of Work

Attach antenna (NH36OQM-DG-2RX) to Existing U Pole # 16 at indicated height on LE. In addition attach 2 Remote Radio Heads, Rectifier, Router and Disconnect as shown on Lease Exhibit . Attach Coax and Wires as necessary Will require 60 Amp Single Phase Service.

Number of Meters Required:

Residential: _____ Commercial: _____ Public: _____

Main Switch Voltage: _____ Amperage: _____ Phase: _____

Service Voltage: _____ Amperage: _____ Phase: _____

Facility Type (ie: school, hospital): _____ New Building Square Feet: _____

ALL 480V SERVICES REQUIRE COLD SEQUENCE METERING (DISCONNECT SWITCH ON THE LINE SIDE OF THE METER)

If more than 1 meter is required, how will meters be labeled? (ie: Unit 1, 2, etc, Unit A, B, etc.)

Additional Equipment:

Generator: KW: N/A Phase: _____ Purpose: _____

Motor(S): Total #: N/A Largest HP: _____ Phase: _____ Locked Rotor AMP: _____

Type of Starting Compensation (choose one): Hard Soft Capacitor VFD

*See Article 802 of EVERSOURCE Information and Requirements Book for Maximum LR current and Three Phase Protection *

Contact Name (circle appropriate):

Customer/Contractor/Consultant: Timberline Construction

Street Address: 300 Pine Street

City, State, Zip: Canton, MA 02021

Telephone: 339-502-5000

Best Time to Call: 8:00 AM to 5:00 PM

Pager: _____

Fax: _____

Cell: _____

Electrician: Keith Howes

License Number: # 11325

Business Name: Multi State Electric

Street Address: 221 Meadow Street

City, State, Zip: Carver, MA 02330

Telephone: 508-866-9052

Best Time to Call: 7:00 AM to 4:00 PM

Pager: _____

Fax: _____

Cell: _____

Please note that by Interconnecting with the EVERSOURCE Distribution System the Customer of Record acknowledges that they have reviewed and are in compliance with the EVERSOURCE Information & Requirements for Electric Service (Blue Book).

For New Commercial Services, New Residential Developments, New 13.8 kv Two Line Station Electric Service, please provide (2) copies of City/Town approved site plans that illustrates the new facility location and the proposed location of the new utilities (electric, gas, water, sewer, telecommunications) and a One-Line Diagram.

For Service Increases at existing facilities, please submit a One-Line Diagram if available.

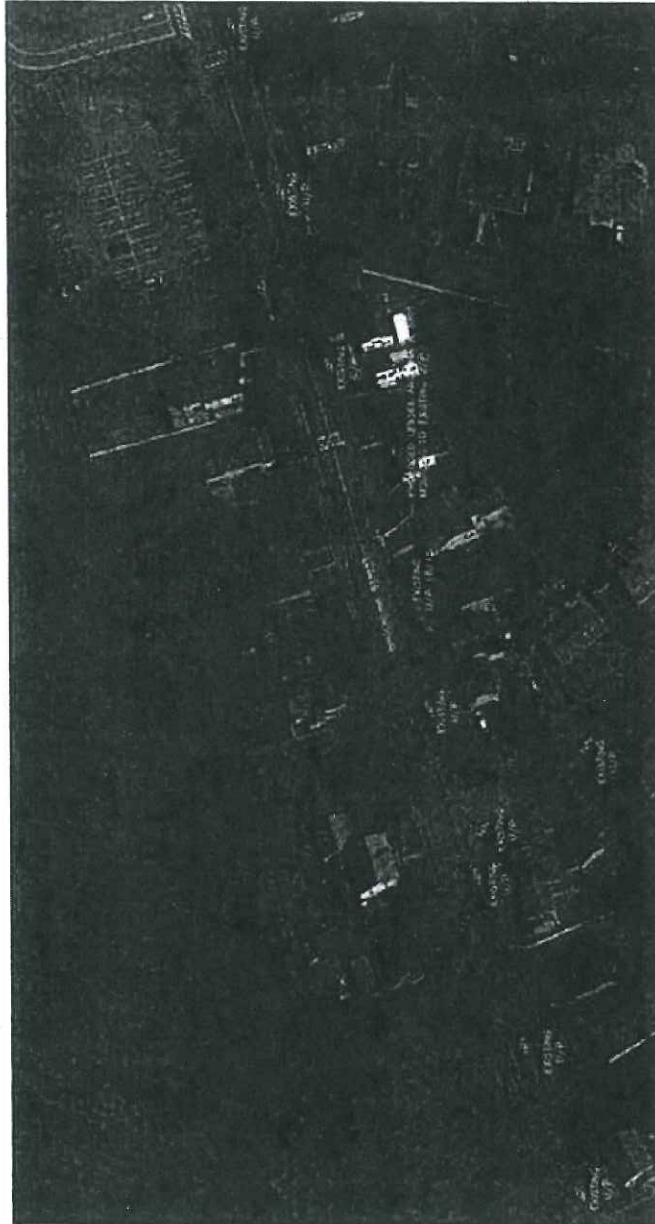
For New Residential Services where a pole must be set, please provide (2) copies of a site plan that illustrates the proposed location of the new facilities.

For Temporary Service Requests, please provide (2) copies of a site plan illustrating service location.

You may Fax this Form or mail any additional correspondence to:

EVERSOURCE ENERGY Electric and Gas
One NSTAR Way
Westwood, MA, 02090
Tel: (781) 441 - 3851
Fax: (781) 441-3194
Cell: 339-987-7059
H. Kendrick SW340

SITE NAME:
NEEDHAM_SC02_MA
 LOCATION CODE:
390168
 SITE ADDRESS:
UTILITY POLE NO.: 16/16
228 BROOKLINE STREET
NEEDHAM, MA 02494



① KEY PLAN
 SCALE 1" = 50'



APPROX. NORTH



POLE COORDINATES	LATITUDE (NAD83)	LONGITUDE (NAD83)
GROUND ELEVATION	42° 17' 15.14" N	71° 13' 28.97" W
	220' A.M.S.L. (NAVD83)	

PREPARED BY:

NEXIUS

ASK OFFICE:
 7A VIBERT WAY
 WESTFORD, MA 01886
 1 (978) 755-1002

PROFESSIONAL SEAL

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 11/1/17 SITE PRINTED MEDIA ONLY
 ALL OTHER PRINTED SITES ARE
 DEEMED NOT TO SCALE

REV	DATE	DESCRIPTION	BY
1	11/1/17	CONSTRUCTION	MA

SITE INFO:

SITE NAME:
NEEDHAM_SC02_MA

SITE ADDRESS

U/P NO.: 16/16
 228 BROOKLINE STREET
 NEEDHAM, MA 02494

CONTRACT REF	DATE
10	01/24/18
PROJECT NUMBER	

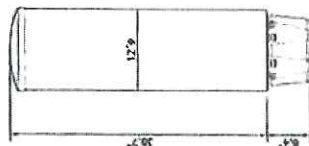
SHEET NUMBER

LE-1

NEXIUS

ALL OFFICE
7A CENEX MA
NEEDHAM, MA 02494
TEL: 781-455-1833

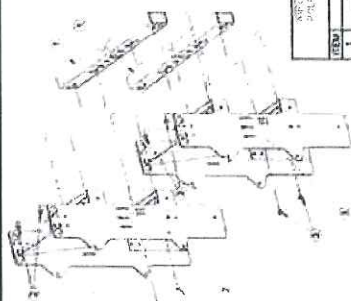
1. BASE EXHIBIT



ANTENNA SPECIFICATIONS		
CONSTRUCTION	ALUMINUM-6061-T6	
FINISH	ANODIZED	
WEIGHT	15.7 LBS	

3. ANTENNA SPEC.

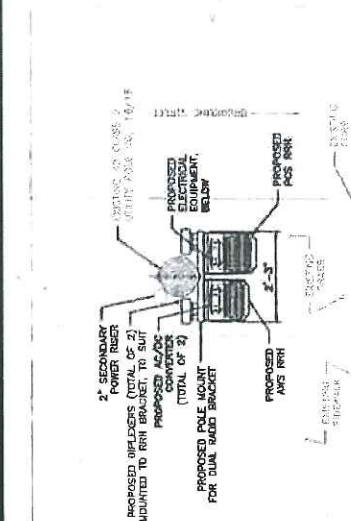
NOTE: THE ANTENNA IS TO BE USED FOR THE FOLLOWING PURPOSES: TO RECEIVE AND TRANSMIT SIGNALS FROM THE MOBILE COMMUNICATIONS SYSTEM. THE ANTENNA IS TO BE USED FOR THE FOLLOWING PURPOSES: TO RECEIVE AND TRANSMIT SIGNALS FROM THE MOBILE COMMUNICATIONS SYSTEM. THE ANTENNA IS TO BE USED FOR THE FOLLOWING PURPOSES: TO RECEIVE AND TRANSMIT SIGNALS FROM THE MOBILE COMMUNICATIONS SYSTEM.



ANTENNA MOUNTING BRACKET SPEC.		
ITEM	DESCRIPTION	QTY
1	ANTENNA MOUNTING BRACKET	1
2	ANTENNA MOUNTING BRACKET	1
3	ANTENNA MOUNTING BRACKET	1

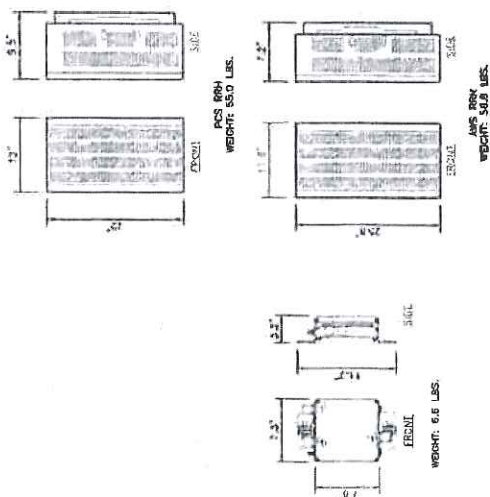
2. RRH MOUNTING BRACKET SPEC.

NOTE: THE RRH MOUNTING BRACKET IS TO BE USED FOR THE FOLLOWING PURPOSES: TO RECEIVE AND TRANSMIT SIGNALS FROM THE MOBILE COMMUNICATIONS SYSTEM. THE RRH MOUNTING BRACKET IS TO BE USED FOR THE FOLLOWING PURPOSES: TO RECEIVE AND TRANSMIT SIGNALS FROM THE MOBILE COMMUNICATIONS SYSTEM.



1. RRH ORIENTATION PLAN

NOTE: THE RRH ORIENTATION PLAN IS TO BE USED FOR THE FOLLOWING PURPOSES: TO RECEIVE AND TRANSMIT SIGNALS FROM THE MOBILE COMMUNICATIONS SYSTEM. THE RRH ORIENTATION PLAN IS TO BE USED FOR THE FOLLOWING PURPOSES: TO RECEIVE AND TRANSMIT SIGNALS FROM THE MOBILE COMMUNICATIONS SYSTEM.



5. RRH SPEC.

NOTE: THE RRH SPEC. IS TO BE USED FOR THE FOLLOWING PURPOSES: TO RECEIVE AND TRANSMIT SIGNALS FROM THE MOBILE COMMUNICATIONS SYSTEM. THE RRH SPEC. IS TO BE USED FOR THE FOLLOWING PURPOSES: TO RECEIVE AND TRANSMIT SIGNALS FROM THE MOBILE COMMUNICATIONS SYSTEM.

4. DIPLEXER SPEC.

NOTE: THE DIPLEXER SPEC. IS TO BE USED FOR THE FOLLOWING PURPOSES: TO RECEIVE AND TRANSMIT SIGNALS FROM THE MOBILE COMMUNICATIONS SYSTEM. THE DIPLEXER SPEC. IS TO BE USED FOR THE FOLLOWING PURPOSES: TO RECEIVE AND TRANSMIT SIGNALS FROM THE MOBILE COMMUNICATIONS SYSTEM.

6. ANTENNA MOUNTING DETAIL

NOTE: THE ANTENNA MOUNTING DETAIL IS TO BE USED FOR THE FOLLOWING PURPOSES: TO RECEIVE AND TRANSMIT SIGNALS FROM THE MOBILE COMMUNICATIONS SYSTEM. THE ANTENNA MOUNTING DETAIL IS TO BE USED FOR THE FOLLOWING PURPOSES: TO RECEIVE AND TRANSMIT SIGNALS FROM THE MOBILE COMMUNICATIONS SYSTEM.

7. GENERAL WIRING DIAGRAM

NOTE: THE GENERAL WIRING DIAGRAM IS TO BE USED FOR THE FOLLOWING PURPOSES: TO RECEIVE AND TRANSMIT SIGNALS FROM THE MOBILE COMMUNICATIONS SYSTEM. THE GENERAL WIRING DIAGRAM IS TO BE USED FOR THE FOLLOWING PURPOSES: TO RECEIVE AND TRANSMIT SIGNALS FROM THE MOBILE COMMUNICATIONS SYSTEM.

NEEDHAM, SC02_MA

U/P NO: 16/16
228 BROOKLINE STREET
NEEDHAM, MA 02494

LE-3

[illegible][illegible]

21 'S 01 17 S: 10 N

[illegible][illegible]

51 'S 01 17 S: 114 N

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2015年12月15日

APPLICATION AND POLE ATTACHMENT LICENSE - FORM 1

Licensee	VERIZON WIRELESS
Agreement No.	AMA140012
Pole Attachment License Number	AMA1400121719
Customer License Number	NEEDHAMSC02MA-390168
State of	MA
Municipality	NEEDHAM

Type of Attachment	Number of Attachments	Billing Description
Anchor	0	
Antenna	1	MA CAE-ANTENNA-JO
Cable/ADSS	0	
Cable/Strand	0	
Decorative	1	MA CAE-POWER METER-JO
Drop	0	
ERUV	0	
Misc	1	MA - JOINT OWNED URBAN TELECOM
Overlash	0	
Power supply	1	MA - PS URBAN TELECOM
Riser	0	

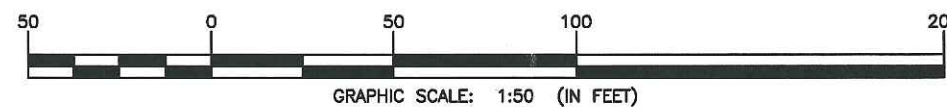
Total Attachments	4
Total Attachments Billable	4
Total Attachments - No Bill	0

Licensor's Name (Print)	DEBORAH TOBIN
Signature	Approved by DEBORAH TOBIN on 02/03/2019
Date	02/03/2019
Title	SUPERVISOR
Phone	857-415-5150

SITE NAME:
NEEDHAM_SC02_MA
LOCATION CODE:
390168
SITE ADDRESS:
UTILITY POLE NO.: 16/16
228 BROOKLINE STREET
NEEDHAM, MA 02492



1 KEY PLAN
SCALE: 1" = 50'



POLE COORDINATES	LATITUDE (NAD83)	LONGITUDE (NAD83)
	42° 17' 15.34" N	71° 13' 26.59" W
GROUND ELEVATION	220' A.M.S.L. (NAVD88)	

LEASE EXHIBIT

PREPARED BY:

NEXIUS
TRANSFORM YOUR BUSINESS...THROUGH WIRELESS

A&E OFFICE:
300 APOLLO DRIVE, SUITE 7
CHELMSFORD, MA 01824
1 (972) 755-1882

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SUBMITTALS

REV	DATE	DESCRIPTION	BY
0	01/24/18	FOR CONSTRUCTION	AA
1	03/28/18	REVISED PER COMMENTS	KT
2	03/30/18	REVISED PER COMMENTS	KT
3	02/08/19	FINAL LE	AA

SITE INFO:

SITE NAME:
NEEDHAM_SC02_MA

SITE ADDRESS:

U/P NO.: 16/16
228 BROOKLINE STREET
NEEDHAM, MA 02492

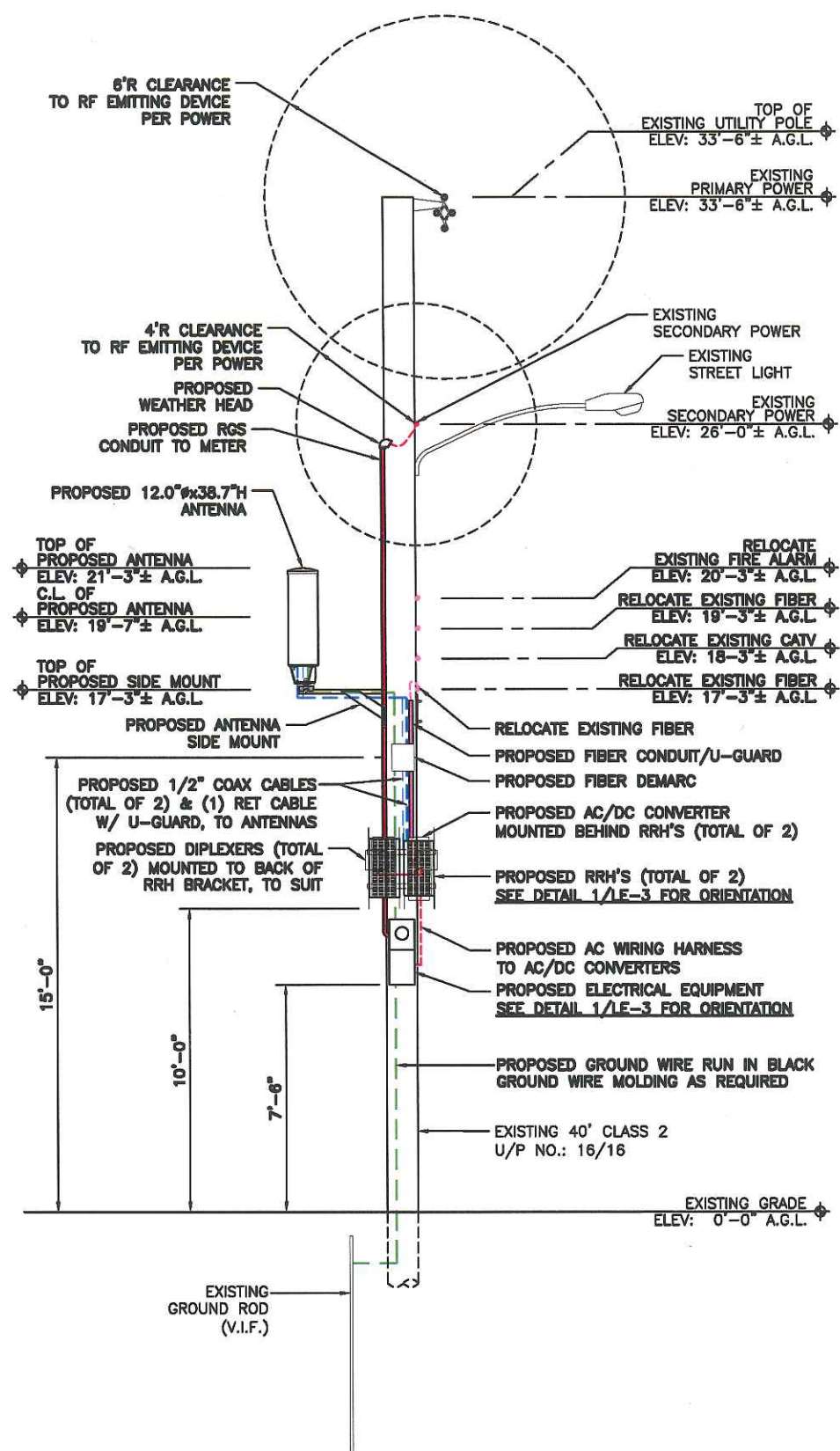
CHECKED BY:
KB

DATE:
02/08/19

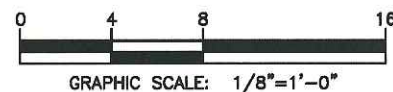
PROJECT NUMBER:

SHEET NUMBER:

LE-1



① **ELEVATION**
3/16" = 1'-0"

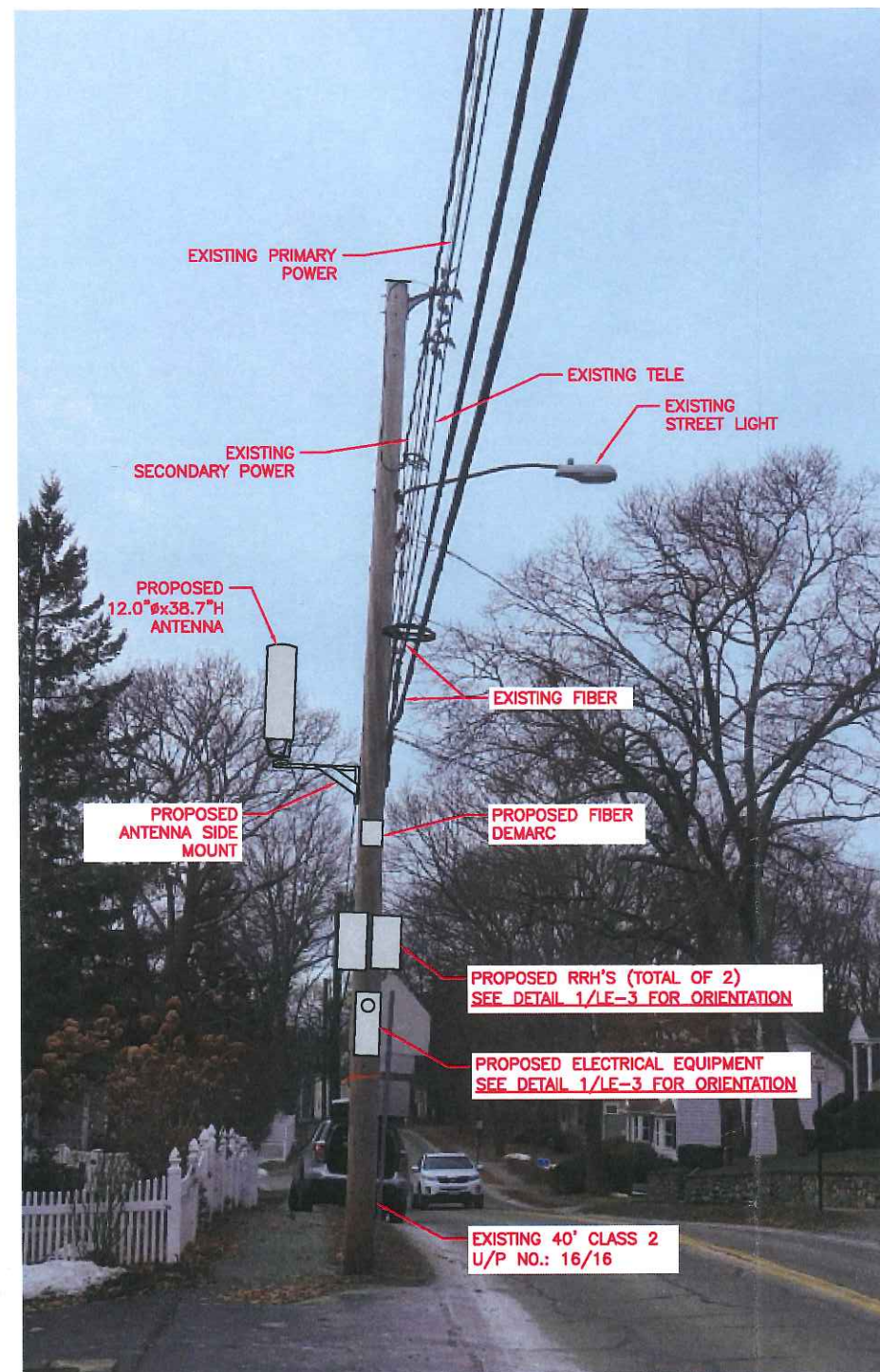


NOTES:

1. LESSEE SHALL MAKE ARRANGEMENTS WITH THE LOCAL ELECTRICAL UTILITY, TO LOWER THE POSITION OF THE EXISTING OVERHEAD PRIMARY POWER LINES AT SUBJECT UTILITY POLE TO PROVIDE THE REQUIRED CLEARANCE FOR THE INSTALLATION OF THE PROPOSED LESSEE ANTENNA. THE PROPOSED INSTALLATION OF THE ANTENNA AND ALL APPURTENANCES SHALL MEET THE REQUIREMENTS OF NATIONAL GRID AND THE 2012 NATIONAL ELECTRICAL SAFETY CODE.

LEASE EXHIBIT

THIS LEASE PLAN IS DIAGRAMMATIC IN NATURE AND IS INTENDED TO PROVIDE GENERAL INFORMATION REGARDING THE LOCATION AND SIZE OF THE PROPOSED WIRELESS COMMUNICATION FACILITY. THE SITE LAYOUT WILL BE FINALIZED UPON COMPLETION OF SITE SURVEY AND FACILITY DESIGN



② **PHOTO DETAIL**
N.T.S.

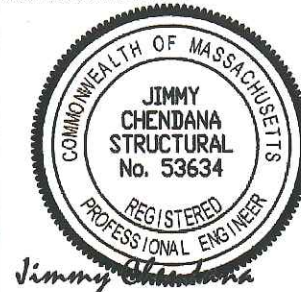
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PREPARED BY:

NEXIUS
TRANSFORM YOUR BUSINESS...THROUGH WIRELESS

A&E OFFICE:
300 APOLLO DRIVE, SUITE 7
CHELMSFORD, MA 01824
1 (972) 755-1882

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2	03/30/18	REVISED PER COMMENTS	KT
3	02/08/19	FINAL LE	AA

SITE INFO:

SITE NAME:
NEEDHAM_SC02_MA

SITE ADDRESS:

U/P NO.: 16/16
228 BROOKLINE STREET
NEEDHAM, MA 02492

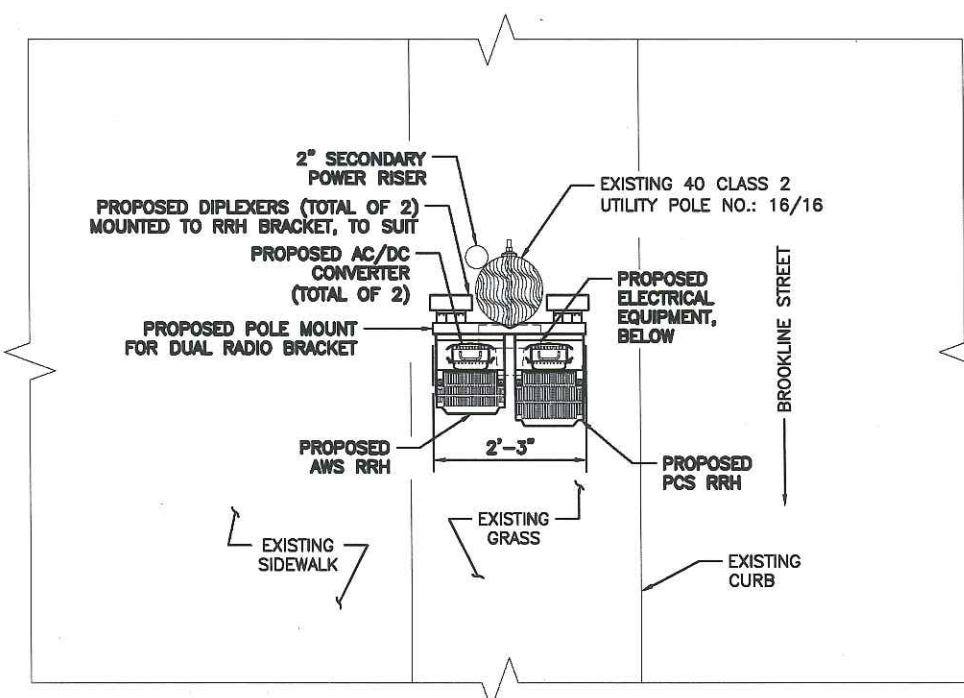
CHECKED BY:
KB

DATE:
02/08/19

PROJECT NUMBER:

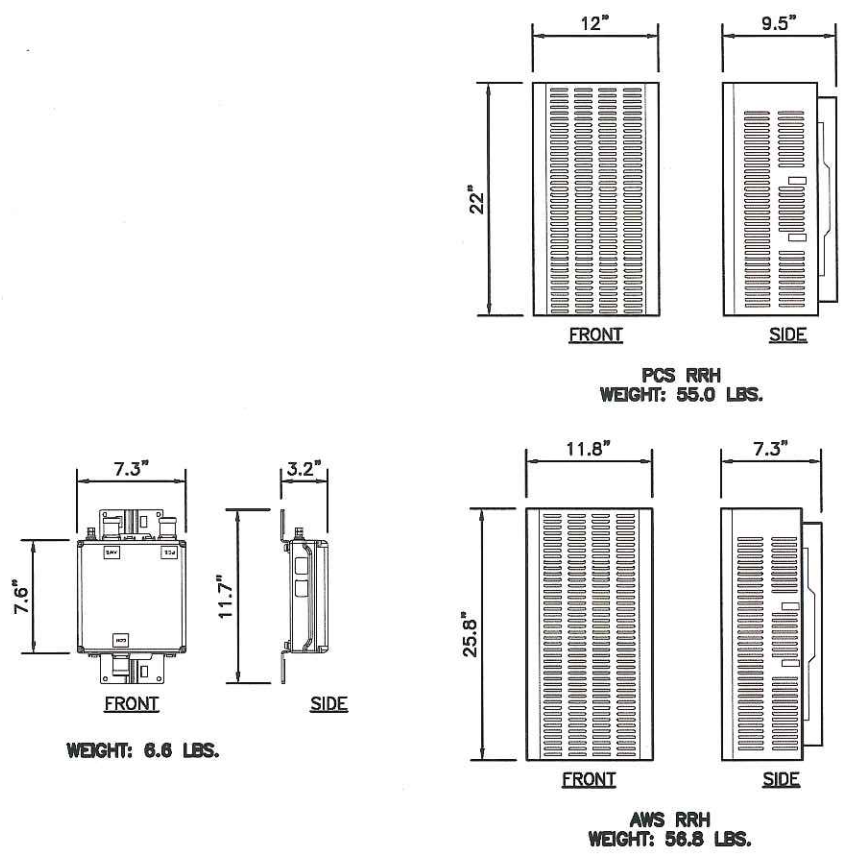
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LE-2



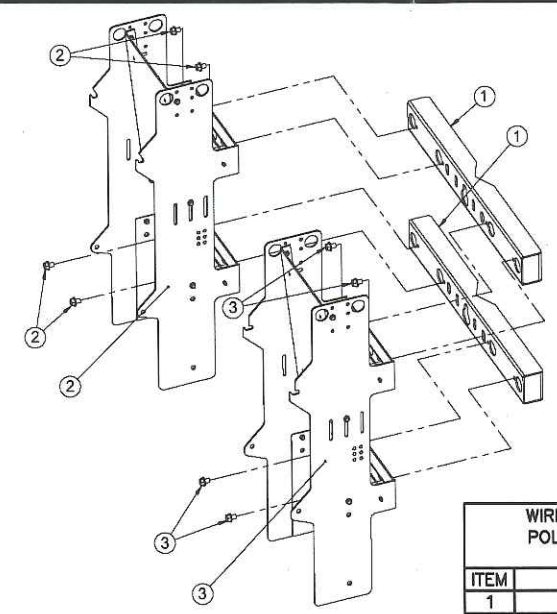
1 RRH ORIENTATION PLAN
N.T.S.

APPROX. NORTH



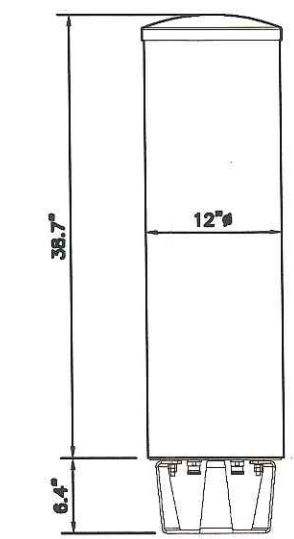
4 DIPLEXER SPEC.
N.T.S.

5 RRH SPEC.
N.T.S.



WIRELESS CONSTRUCTION, INC. POLE/WALL MOUNT FOR DUAL RADIO BRACKET		
ITEM	DESCRIPTION	QTY.
1	DOUBLE MOUNT	2
2	700MHZ RRH RACK W/ SUPPLIED HARDWARE	1
3	AWS RRH RACK W/ SUPPLIED HARDWARE	1

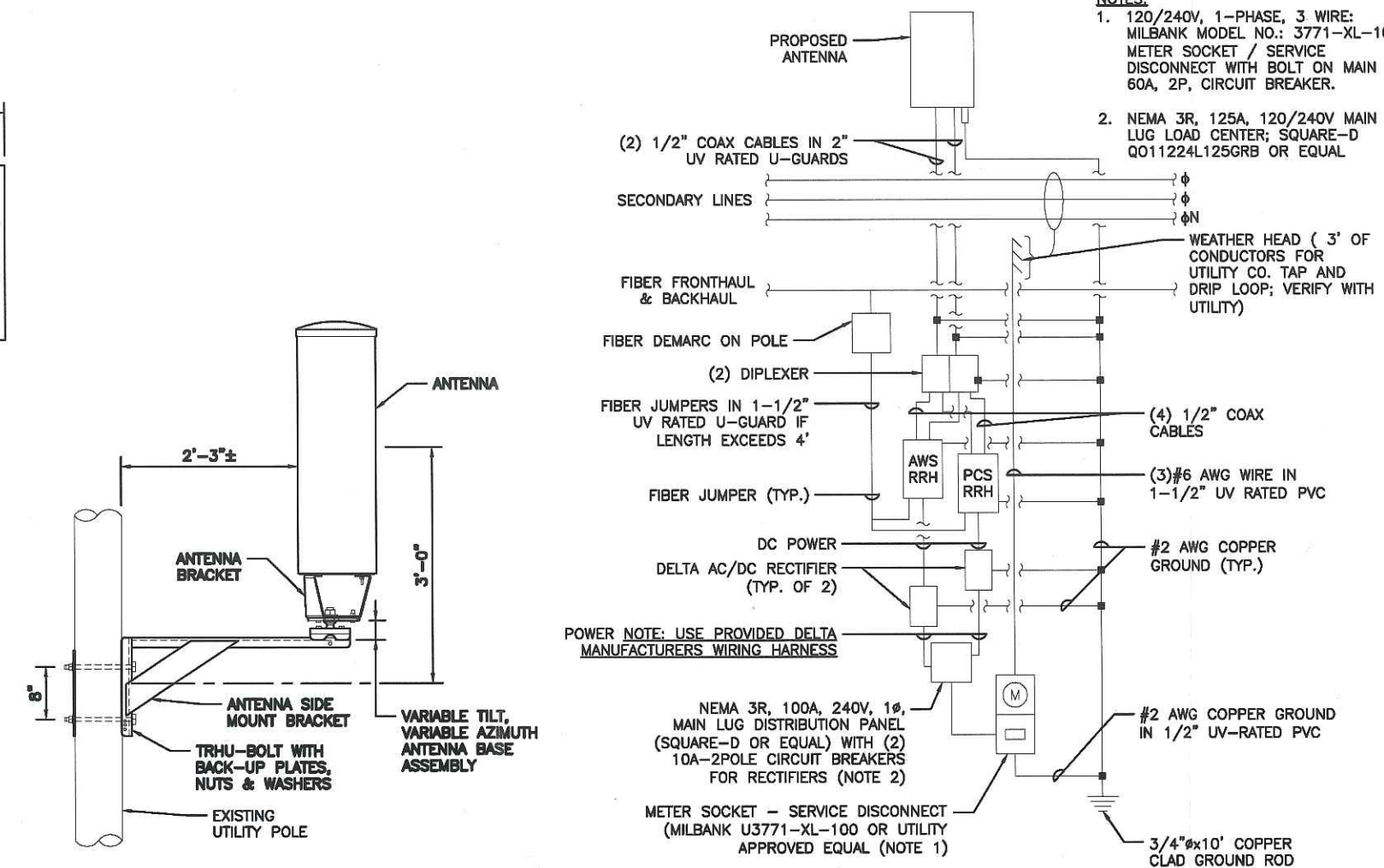
2 RRH MOUNTING BRACKET SPEC.
N.T.S.



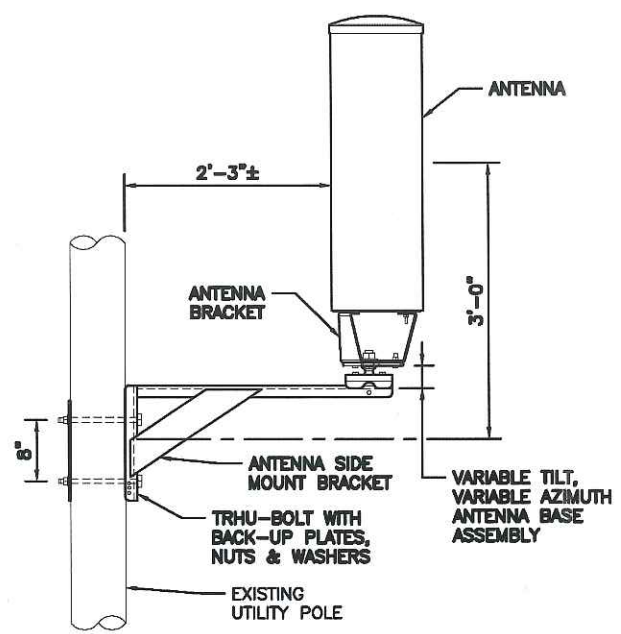
ANTENNA SPECIFICATIONS	
COMMSCOPE -	NH360QM-DG-2XR
DIMENSIONS	12" x 38.7"
WEIGHT	33.7 LBS

3 ANTENNA SPEC.
N.T.S.

- NOTES:
- 120/240V, 1-PHASE, 3 WIRE:
MILBANK MODEL NO.: 3771-XL-100
METER SOCKET / SERVICE
DISCONNECT WITH BOLT ON MAIN
60A, 2P, CIRCUIT BREAKER.
 - NEMA 3R, 125A, 120/240V MAIN
LUG LOAD CENTER; SQUARE-D
Q011224L125GRB OR EQUAL



7 GENERAL WIRING DIAGRAM
N.T.S.



6 ANTENNA MOUNTING DETAIL
N.T.S.

LEASE EXHIBIT

PREPARED BY:

NEXIUS
TRANSFORM YOUR BUSINESS...THROUGH WIRELESS

A&E OFFICE:
300 APOLLO DRIVE, SUITE 7
CHELMSFORD, MA 01824
1 (972) 755-1882

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Jimmy Chendana

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3	02/08/19	FINAL LE	AA

SITE INFO:

SITE NAME:
NEEDHAM_SC02_MA

SITE ADDRESS:
**U/P NO.: 16/16
228 BROOKLINE STREET
NEEDHAM, MA 02492**

CHECKED BY: KB	DATE: 02/08/19
--------------------------	--------------------------

PROJECT NUMBER:

SHEET NUMBER:

LE-3

Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of	)	
	)	
Accelerating Wireless Broadband Deployment by	)	WT Docket No. 17-79
Removing Barriers to Infrastructure Investment	)	
	)	
Accelerating Wireline Broadband Deployment by	)	WC Docket No. 17-84
Removing Barriers to Infrastructure Investment	)	

DECLARATORY RULING AND THIRD REPORT AND ORDER

Adopted: September 26, 2018

Released: September 27, 2018

By the Commission: Chairman Pai and Commissioners O’Rielly and Carr issuing separate statements;
Commissioner Rosenworcel approving in part, dissenting in part and issuing a statement.

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jurisdiction.²⁰⁰ In other cases, where it is essential for a provider to deploy in a given area, the fees charged in that geographic area can deprive providers of capital needed to deploy elsewhere, and lead to reduced or forgone near-term deployment of Small Wireless Facilities in other geographic areas.²⁰¹ In both of those scenarios the bottom-line outcome on the national development of 5G networks is the same—diminished deployment of Small Wireless Facilities critical for wireless service and building out 5G networks.²⁰²

66. Some have argued that our decision today regarding Sections 253 and 332 should not be applied to preempt agreements (or provisions within agreements) entered into prior to this Declaratory Ruling.²⁰³ We note that courts have upheld the Commission’s preemption of the enforcement of provisions in private agreements that conflict with our decisions.²⁰⁴ We therefore do not exempt existing agreements (or particular provisions contained therein) from the statutory requirements that we interpret here. That said, however, this Declaratory Ruling’s effect on any particular existing agreement will depend upon all the facts and circumstances of that specific case.²⁰⁵ Without examining the particular features of an agreement, including any exchanges of value that might not be reflected by looking at fee provisions alone, we cannot state that today’s decision does or does not impact any particular agreement entered into before this decision.

67. *Relationship to Section 332.* While the above analysis focuses on the text and structure of the Act, legislative history, Commission orders, and case law interpreting Section 253(a), we reiterate that in the fee context, as elsewhere, the statutory phrase “prohibit or have the effect of prohibiting” in Section 332(c)(7)(B)(i)(II) has the same meaning as the phrase “prohibits or has the effect of prohibiting” in Section 253(a). As noted in the prior section, there is no evidence to suggest that Congress intended for virtually identical language to have different meanings in the two provisions.²⁰⁶ Instead, we find it

²⁰⁰ See, e.g., AT&T June 8, 2018 *Ex Parte* Letter at 1-2; Crown Castle June 7, 2018 *Ex Parte* Letter at 2.

²⁰¹ AT&T June 8, 2018 *Ex Parte* Letter at 1-2; Crown Castle June 7, 2018 *Ex Parte* Letter at 2; Verizon June 21, 2018 *Ex Parte* Letter at 2; CCA July 16, 2018 *Ex Parte* Letter at 2-3.

²⁰² See, e.g., Letter from Thomas J. Navin, Counsel to Corning, Inc. to Marlene Dortch, Secretary, FCC, WT Docket No. 17-79 (filed Jan 25, 2018), Attach. at 6-7 (comparing different effects on deployment between a base case and a high fee case, and estimating that pole attachment fees nationwide assuming high fees would result in 28.2M fewer premises passed, or 31 percent of the 5G Base case results, and an associated \$37.9B in forgone network deployment).

²⁰³ City of San Jose Sept. 18, 2018 *Ex Parte* Letter at 1-2.

²⁰⁴ See, e.g., *Building Owners and Managers Ass’n Int’l v. FCC*, 254 F.3d 89 (D.C. Cir. 2001) (OTARD rules barring exclusivity provisions in lease agreements). As the D.C. Circuit has recognized, “[w]here the Commission has been instructed by Congress to prohibit restrictions on the provision of a regulated means of communication, it may assert jurisdiction over a party that directly furnishes those restrictions, and, in so doing, the Commission may alter property rights created under State law.” *Id.* at 96; see also *Lansdowne on the Potomac Homeowners Ass’n v. OpenBand at Lansdowne, LLC*, 713 F.3d 187 (4th Cir. 2013).

²⁰⁵ For example, the City of Los Angeles asserts that fee provisions in its agreements with providers are not prohibitory and must be examined in light of a broader exchange of value contemplated by the agreements in their entirety. Letter from Eric Garcetti, Mayor, City of Los Angeles to the Hon. Ajit Pai, Chairman, FCC, WT Docket No. 17-79 (filed Sept 18, 2018). We agree that agreements entered into before this decision will need to be examined in light of their potentially unique circumstances before a decision can be reached about whether those agreements or any particular provisions in those agreements are or are not impacted by today’s FCC decision.

²⁰⁶ We reject the claims of some commenters that Section 332(c)(7)(B)(i)(II) is limited exclusively to decisions on individual requests and therefore must be interpreted differently than Section 253(a). See, e.g., San Francisco Comments at 24-26. Section 332(c)(7)(B)(i) explicitly applies to “regulation of the placement, construction, and modification,” and it would be irrational to interpret “regulation” in that paragraph to mean something different from the term “regulation” as used in 253(a) or to find that it does not encompass generally applicable “regulations” as well as decisions on individual applications. Moreover, even assuming *arguendo* that San Francisco’s position reflects the appropriate interpretation of the scope of Section 332(c)(7)(B)(i)(II), the record does not reveal why a

more reasonable to conclude that the language in both sections generally should be interpreted to have the same meaning and to reflect the same standard, including with respect to preemption of fees that could “prohibit” or have “the effect of prohibiting” the provision of covered service. Both sections were enacted to address concerns about state and local government practices that undermined providers’ ability to provide covered services, and both bar state or local conduct that prohibits or has the effect of prohibiting service.

68. To be sure, Sections 253 and 332(c)(7) may relate to different categories of state and local fees. Ultimately, we need not resolve here the precise interplay between Sections 253 and 332(c)(7). It is enough for us to conclude that, collectively, Congress intended for the two provisions to cover the universe of fees charged by state and local governments in connection with the deployment of telecommunications infrastructure. Given the analogous purposes of both sections and the consistent language used by Congress, we find the phrase “prohibit or have the effect of prohibiting” in Section 332(c)(7)(B)(i)(II) should be construed as having the same meaning and governed by the same preemption standard as the identical language in Section 253(a).²⁰⁷

69. *Application of the Interpretations and Principles Established Here.* Consistent with the interpretations above, the requirement that compensation be limited to a reasonable approximation of objectively reasonable costs and be non-discriminatory applies to all state and local government fees paid in connection with a provider’s use of the ROW to deploy Small Wireless Facilities including, but not limited to, fees for access to the ROW itself, and fees for the attachment to or use of property within the ROW owned or controlled by the government (e.g., street lights, traffic lights, utility poles, and other infrastructure within the ROW suitable for the placement of Small Wireless Facilities). This interpretation applies with equal force to any fees reasonably related to the placement, construction, maintenance, repair, movement, modification, upgrade, replacement, or removal of Small Wireless Facilities within the ROW, including, but not limited to, application or permit fees such as siting applications, zoning variance applications, building permits, electrical permits, parking permits, or excavation permits.

70. Applying the principles established in this Declaratory Ruling, a variety of fees not reasonably tethered to costs appear to violate Sections 253(a) or 332(c)(7) in the context of Small Wireless Facility deployments.²⁰⁸ For example, we agree with courts that have recognized that gross

(Continued from previous page) —————

distinction between broadly-applicable requirements and decisions on individual requests would call for a materially different analytical approach, even if it arguably could be relevant when evaluating the application of that analytical approach to a particular preemption claim. In addition, although some commenters assert that such an interpretation “would make it virtually impossible for local governments to enforce their zoning laws with regard to wireless facility siting,” they provide no meaningful explanation why that would be the case. *See, e.g.,* San Francisco Reply at 16. While some local commenters note that the savings clauses in Section 253(b) and (c) do not have express counterparts in the text of Section 332(c)(7)(B)(i), *see, e.g.,* San Francisco Comments at 26, we are not persuaded that this compels a different interpretation of the virtually identical language restricting actual or effective prohibitions of service in Section 253(a) and Section 332(c)(7)(B)(i)(II), particularly given our reliance on considerations in addition to the savings clauses themselves when interpreting the “effective prohibition” language. *See supra* paras. 57-65. We offer these interpretations both to respond to comments and in the event that some court decision could be viewed as supporting a different result.

²⁰⁷ Section 253(a) expressly addresses state or local activities that prohibit or have the effect of prohibiting “any entity” from providing a telecommunications service. 47 U.S.C. § 253(a). In the 2009 Declaratory Ruling, the Commission likewise interpreted Section 332(c)(7)(B)(i)(II) as implicated where the state or local conduct prohibits or has the effect of prohibiting the provision of personal wireless service by one entity even if another entity already is providing such service. *See 2009 Declaratory Ruling*, 24 FCC Rcd at 14016-19, paras. 56-65.

²⁰⁸ We acknowledge that a fee not calculated by reference to costs might nonetheless happen to land at a level that is a reasonable approximation of objectively reasonable costs, and otherwise constitute fair and reasonable compensation as we describe herein. If all these criteria are met, the fee would not be preempted.