

STATE OF CONNECTICUT
CONNECTICUT SITING COUNCIL

IN RE: :
 :
 :
 A PETITION OF CELLCO PARTNERSHIP : PETITION NO. ____
 D/B/A VERIZON WIRELESS FOR A :
 DECLARATORY RULING ON THE NEED :
 TO OBTAIN A SITING COUNCIL :
 CERTIFICATE FOR THE EXTENSION OF :
 AN EXISTING TELECOMMUNICATIONS :
 FACILITY TOWER AT 201 GRANITE :
 ROAD, GUILFORD, CONNECTICUT : AUGUST 5, 2014

PETITION FOR A DECLARATORY RULING:
INSTALLATION HAVING NO
SUBSTANTIAL ADVERSE ENVIRONMENTAL EFFECT

I. Introduction

Pursuant to Sections 16-50j-38 and 16-50j-39 of the Regulations of Connecticut State Agencies (“R.C.S.A.”), Cellco Partnership d/b/a Verizon Wireless (“Cellco”) hereby petitions the Connecticut Siting Council (the “Council”) for a declaratory ruling (“Petition”) that no Certificate of Environmental Compatibility and Public Need (“Certificate”) is required under Section 16-50k(a) of the Connecticut General Statutes (“C.G.S.”) to extend the existing 100-foot tower at 201 Granite Road in Guilford, Connecticut by ten (10) feet, to a height of 110 feet and relocate a portion of the existing site compound fence to accommodate Cellco’s shelter. All site improvements will remain within the limits of the existing 100-foot by 100-foot leased area. The facility modifications are needed so that Cellco can satisfy its wireless service objectives in southwest Guilford. For the purposes of this Petition, Cellco has identified this facility as its “Guilford West” cell site.

II. Factual Background

Crown Castle (“Crown”) currently owns and maintains the existing 100-foot monopole tower located in a wooded portion of an approximately 58 acre parcel at 201 Granite Road in Guilford (the “Property”). The Property is zoned “R-8 District” and is used for multi-family residential purposes. The tower was approved by the Council on October 14, 2003 in Docket No. 252. In the Council’s Decision and Order (“D&O”), the Granite Road tower was to be “designed and constructed capable of being extended . . . to [a height of] 140 feet above ground level, subject to Council approval of a Petition for Declaratory Ruling . . .”.

According to the Council’s Telecommunications Database, AT&T currently maintains antennas at the 97-foot level and Metro PCS maintains antennas at the 90-foot level on the tower. AT&T and Metro PCS also maintain several small equipment cabinets on concrete pads near the base of the tower. All existing improvements associated with the Crown tower are located within a 40-foot by 40-foot gravel facility compound area, surrounded by a six-foot tall security fence and gate. (See Project Plans included in Attachment 1).

A. Cellco’s Need

Cellco is licensed to provide wireless telecommunications services in the 700 MHz, 850 MHz, 1900 MHz and 2100 MHz frequency ranges in southwest Guilford and throughout the State of Connecticut. Cellco’s Guilford West facility will provide improved wireless service along portions of Interstate 95 and Route 1, as well as local roads in the area and will increase network capacity in the area by off-loading traffic from Cellco’s existing Guilford 2 cell site. Plots showing Cellco’s wireless coverage in Guilford and the surrounding towns today and following the establishment of the proposed Guilford West facility, are included in Attachment 2.

B. Proposed Modifications to the Existing Facility

Cellco proposes to extend the existing Crown tower by ten (10) feet to an overall height of 110 feet above ground level (“AGL”). Cellco’s radio frequency (RF) engineers have determined that in order to satisfy its wireless service objectives in the area, Cellco would need to install its antennas at a centerline height of 107 feet at this location. Cellco intends to install twelve (12) antennas on a low profile platform at the 107-foot level. The top of Cellco’s antennas will extend to an overall height of 110 feet. Cellco’s radio equipment and a diesel-fueled back-up generator will be located inside a 12’ x 30’ shelter, located in the southerly portion of the existing facility compound. A small expansion of the fenced compound (5 feet by 40 feet) will be required to accommodate Cellco’s shelter. As mentioned above, all improvements will remain within the limits of Crown’s 100-foot by 100-foot leased area.

III. Discussion

A. The Proposed Facility Modifications Will Not Have A Substantial Adverse Environmental Effect

The Public Utility Environmental Standards Act (the “Act”), C.G.S. § 16-50g *et seq.*, provides for the orderly and environmentally compatible development of telecommunications towers in the state to avoid “a significant impact on the environment and ecology of the State of Connecticut.” C.G.S. § 16-50g. To achieve these goals, the Act established the Council, and requires a Certificate of Environmental Compatibility and Public Need for the construction of telecommunication towers “that may, as determined by the council, have a substantial adverse environmental effect”. C.G.S. § 16-50k(a).

1. Physical Environmental Effects

Cellco respectfully submits that the proposed 10-foot tower extension and the placement of an 12’ x 30’ equipment shelter near the base of the tower will not involve a significant

alteration in the physical and environmental characteristics of the cell site, the Property or the surrounding area. Cellco's 12' x 30' shelter would be located near the base of the tower and require a small expansion (5 feet by 40 feet) of the facility compound. The area designated for compound expansion was previously cleared by the site developer. No additional trees will need to be removed. Vehicular access to the tower site will remain unchanged, extending from Granite Road along the existing site access driveway, through the Property and to the cell site. Power to Cellco's shelter would extend from the existing utility service at the cell site compound.

2. Visual Effects

When a height extension to an existing tower is contemplated, visual impacts associated with a particular tower must be re-evaluated as a part of a determination of environmental effect. As discussed in numerous other Council filings, visual impact of a tower is often the most significant and, in many cases, the only discernible environmental effect associated with such facilities. To assess these conditions, Cellco asked All-Points Technologies ("APT") to review the overall visual impact of the existing 100-foot tower and the proposed 110-foot tower, with Cellco's antennas at the top, as described in this Petition. A copy of APT's Visibility Analysis is included in Attachment 3 (the "APT Analysis").

The APT Analysis concludes that the visual impacts of the existing 100-foot tower are minimal today and the proposed 10-foot extension will not result in a substantial change to overall visibility of the structure. The character of some of the near views would change slightly, as the 10-foot tower extension would rise just above the tree line from these locations. The overall effect of this change is, however, minimal due to the still relatively low height of the Facility, combined with the dense tree cover, sparse development and the tower's separating distances from potential visual receptors.

3. FCC Compliance

Radio frequency (“RF”) emissions from the proposed installation will not exceed the standards adopted by the Federal Communications Commission (“FCC”). Included in Attachment 4 is a cumulative RF emissions calculation (General Power Density table) confirming that the existing AT&T and Metro PCS antennas, together with the proposed Cellco antennas, will operate within the RF emissions standards established by the FCC.

4. FAA Summary Report

Included in Attachment 5 of this Petition is an FAA Aeronautical Evaluation Report verifying that a 110-foot tower at the Property would not constitute an obstruction or hazard to air navigation and the structure does not require notification to the FAA.

5. Structural Analysis

Attachment 6 includes a Structural Analysis Report from B&T Group dated July 24, 2014, verifying that the Crown tower and its existing foundation can support the proposed tower extension, the existing AT&T and Metro PCS antennas and Cellco’s full array of twelve (12) antennas and associated equipment.

In sum, the effect of the modified facility on the environment would be minimal and limited, rather than significant. This stands in contrast to typical proposals for new towers that frequently must be located on properties with no other approved towers, or with no development at all. Thus, the proposed replacement would not present a substantial adverse environmental effect, and is not a modification for which the General Assembly intended to require a Certificate under C.G.S. § 16-50k(a).

B. Notice to First Selectman, Property Owner and Abutting Landowners

On August 5, 2014, a copy of this Petition was sent to Guilford’s First Selectman Joseph

S. Mazza and Branford First Selectman James Cosgrove. The existing tower site is located within 2,500 feet of the Branford-Guilford town line.

Notice of Cellco's intent to file the Petition together with a copy of the Project Plans was also sent to the owners whose land abuts the Property. Included in Attachment 7 is a copy of the letter sent to First Selectman Mazza and First Selectman Cosgrove, a sample abutter's notice letter, and the list of those abutting landowners who were sent notice of the filing of the Petition.

C. A Conclusion That the Proposed Facility Modifications Will Not Have a Substantial Adverse Environmental Effect Would Be Consistent With Siting Council Precedent

The Council has previously determined, under similar circumstances, that the extension of an existing tower would have no substantial adverse environmental effect, does not require a Certificate and, most importantly, is preferable to the construction of a new tower in a particular area. Similar tower extensions have been approved by the Council in, for example, Petition No. 956 (Cellco's 20-foot extension of an existing tower at 151 Young Street in East Hampton); Petition No. 964 (Cellco's 30-foot extension of an existing tower at 1593 Exeter Road in Lebanon); and Petition No. 1092 (Cellco's 10-foot extension of an existing tower at 134R Creamery Road in Durham).

IV. Conclusion

Based on the information provided above, Cellco respectfully requests that the Council issue a determination in the form of a declaratory ruling that the extension of the existing tower at 201 Granite Road from 100 feet to 110 feet, will not have a substantial adverse environmental effect and does not require the issuance of a Certificate of Environmental Compatibility and Public Need pursuant to § 16-50k of the General Statutes.

Respectfully submitted,

CELLCO PARTNERSHIP d/b/a VERIZON
WIRELESS

By



Kenneth C. Baldwin, Esq.

Robinson & Cole LLP

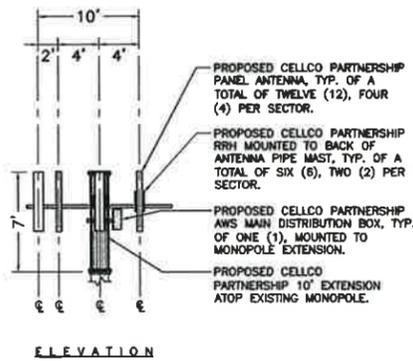
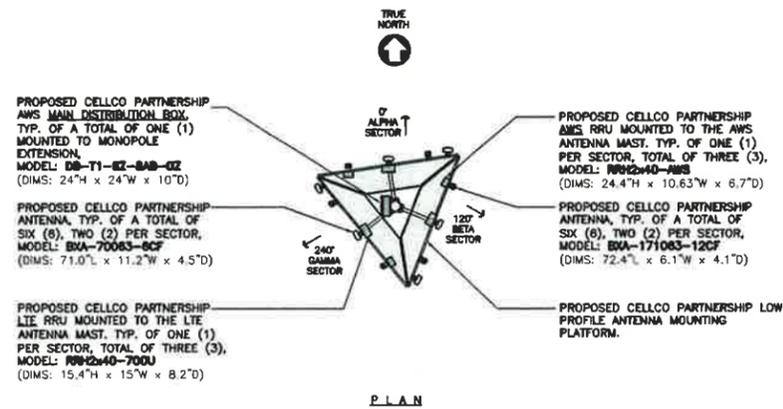
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Hartford, CT 06103-3597

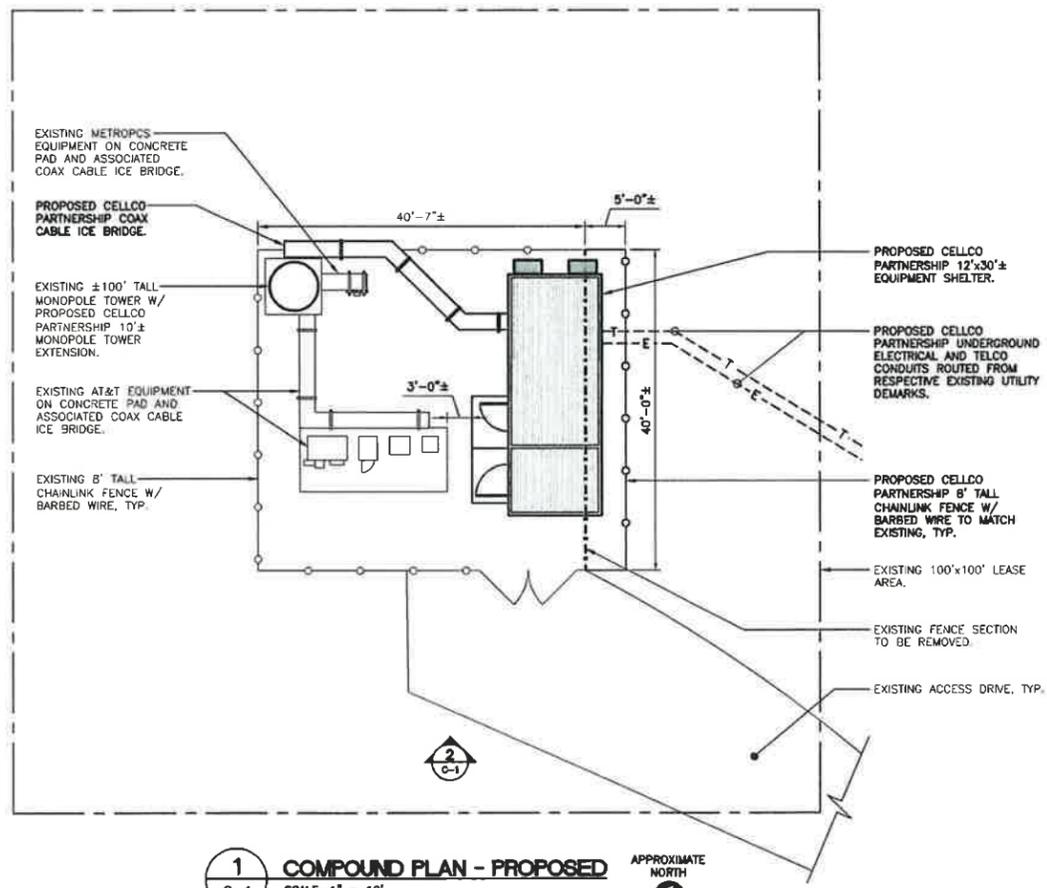
(860) 275-8200

Its Attorneys

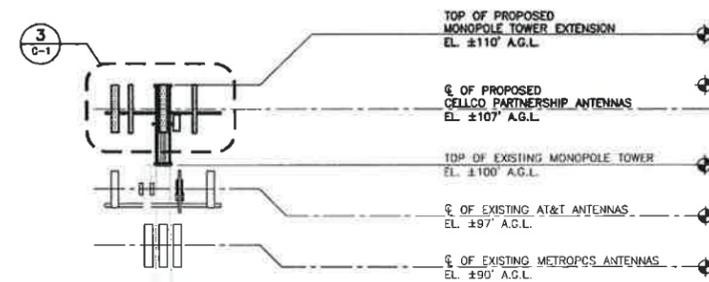
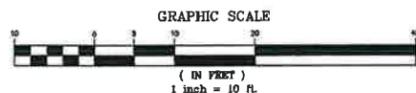
ATTACHMENT 1



3 ANTENNA MOUNTING CONFIGURATION
C-1 NOT TO SCALE

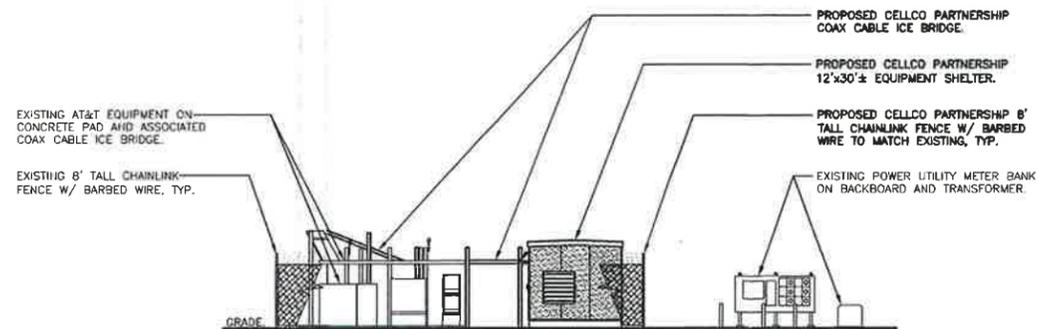


1 COMPOUND PLAN - PROPOSED
C-1 SCALE: 1" = 10' APPROXIMATE NORTH

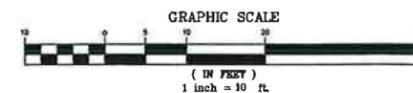


TOWER NOTES:

- EXISTING ±100' TALL MONOPOLE TOWER W/ PROPOSED 10' TOWER EXTENSION.
- REFER TO STRUCTURAL ANALYSIS REPORT AND STRUCTURAL DESIGN DRAWINGS AS PREPARED BY B+T GROUP.
PROJECT NUMBER: 93998.001.01
DATED: JULY 24, 2014



2 WEST ELEVATION - PROPOSED
C-1 SCALE: 1" = 10'



REV.	DATE	DRAWN BY	CHECK'D BY	DESCRIPTION
1	07/28/14	JMR	DMD	ISSUED FOR CSC - CLIENT REVIEW
0	07/07/14	CTP	DMD	ISSUED FOR CSC - CLIENT REVIEW

PROFESSIONAL ENGINEER SEAL

Cellco Partnership
d/b/a Verizon Wireless

CENTEX engineering
Center of solutions

(203) 486-0580
(203) 486-8587 Fax
852 North Main Road
Branford, CT 06408
www.centexeng.com

Cellco Partnership d/b/a Verizon Wireless
WIRELESS COMMUNICATIONS FACILITY
GUILFORD WEST
201 GRANITE ROAD
GUILFORD, CT 06437

DATE: 08/30/14
SCALE: AS NOTED
JOB NO. 13282.000

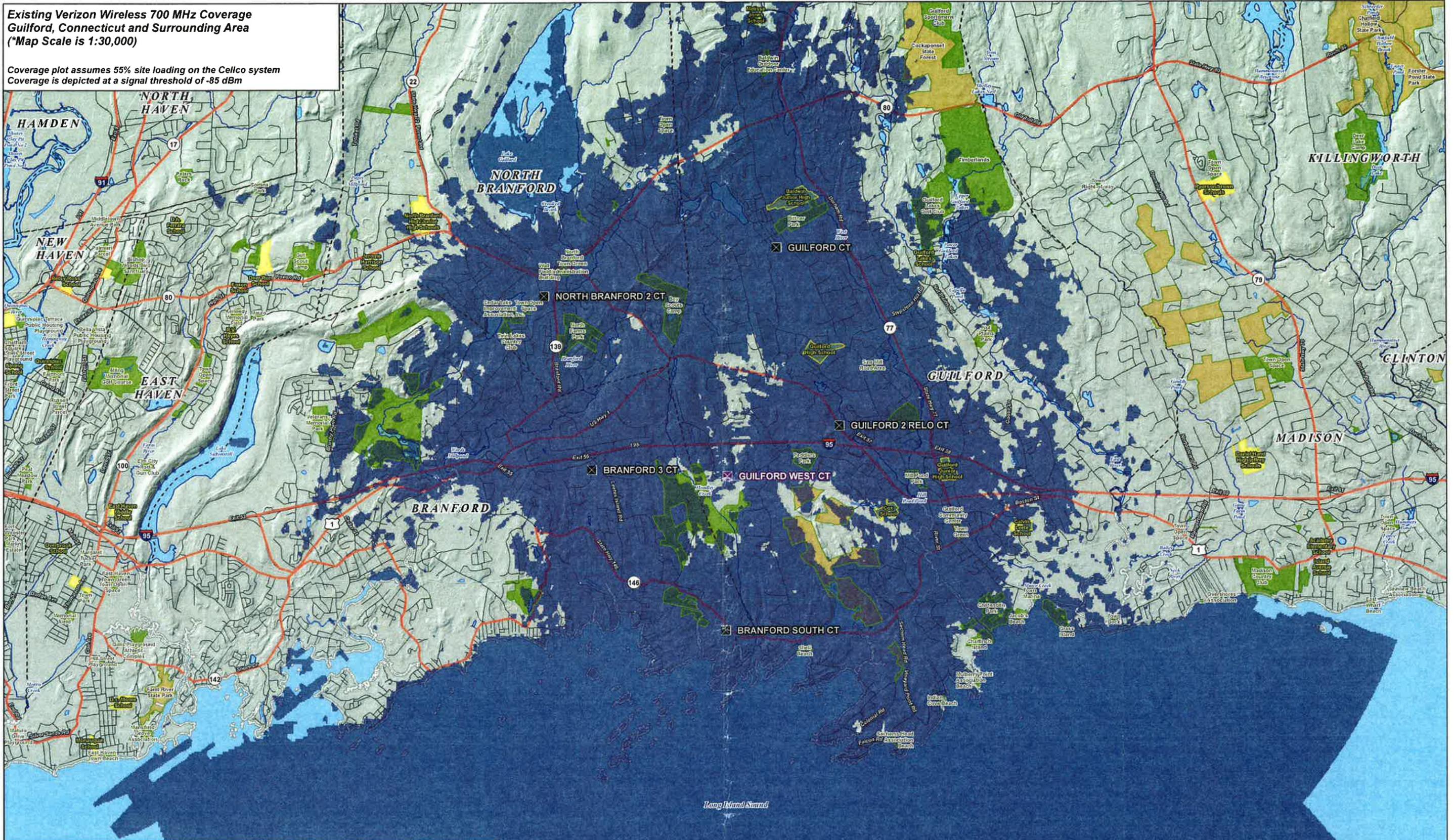
COMPOUND PLAN AND ELEVATION

C-1
Sheet No. 2 of 2

ATTACHMENT 2

**Existing Verizon Wireless 700 MHz Coverage
Guilford, Connecticut and Surrounding Area
(*Map Scale is 1:30,000)**

Coverage plot assumes 55% site loading on the Celco system
Coverage is depicted at a signal threshold of -85 dBm



Legend

- Existing 100' Monopole at 201 Granite Road, Guilford, CT
- Existing Verizon Wireless Facilities
- Existing Surrounding Wireless 700 MHz Coverage
- Major Route
- Municipal and Private Open Space
- School
- State Forest/Park
- Open Water
- Town Line

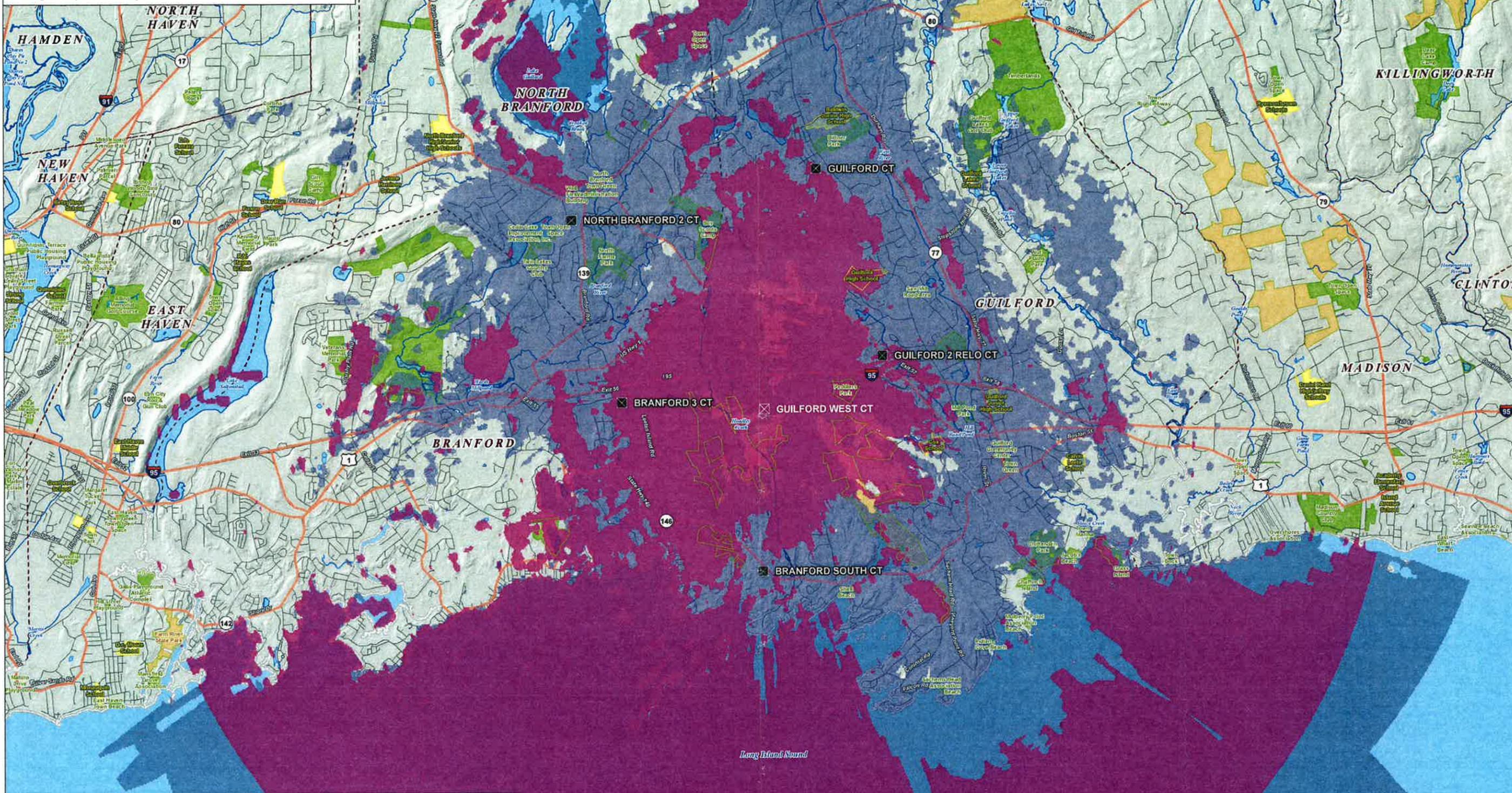
Map Notes:
This map was prepared at a map scale of 1:30,000 at 24" x 36" layout. Report copies have been reduced to 11" x 17" Refer to graphic scale.
Open Space, Schools and State Forests/Parks are depicted using available State GIS data, which may be outdated in some areas.
Base map: CT/ED Hillshade (2000)

Scale: 0 0.75 1.5 Miles

Logos: ALL POINTS TECHNOLOGY CORPORATION, verizon

**Proposed Verizon Wireless 700 MHz Coverage at 107' Antenna Centerline
Guilford, Connecticut and Surrounding Area
(*Map Scale is 1:30,000)**

Coverage plot assumes 55% site loading on the Cellco system
Coverage is depicted at a signal threshold of -85 dBm



Legend

Existing 100' Monopoles at 201 Granite Road, Guilford, CT	Municipal and Private Open Space
Existing Verizon Wireless Facilities	School
Existing Surrounding Wireless 700 MHz Coverage	State Forest/Park
Proposed Verizon Wireless 700 MHz Coverage at 107' Antenna Centerline	Open Water
Major Route	Town Line

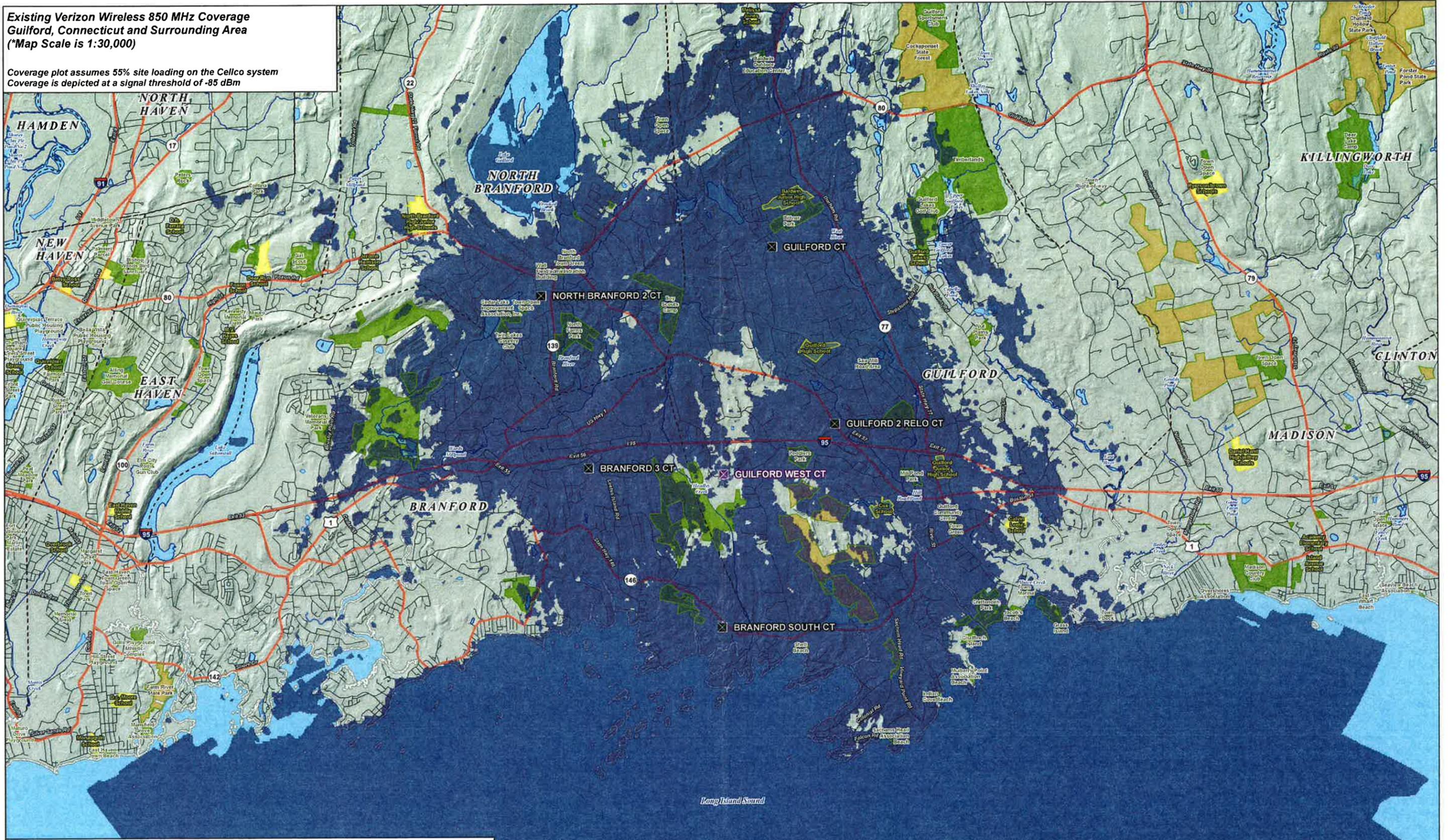
Map Notes
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Base map: © ESRI, Inc. (2010)

ALL-POINTS TECHNOLOGY CONSULTANTS

0 0.75 1.5 Miles

**Existing Verizon Wireless 850 MHz Coverage
Guilford, Connecticut and Surrounding Area
(*Map Scale is 1:30,000)**

Coverage plot assumes 55% site loading on the Celco system
Coverage is depicted at a signal threshold of -85 dBm



Legend

- X Existing 100' Monopole at 201 Granite Road, Guilford, CT
- X Existing Verizon Wireless Facilities
- Existing Surrounding Wireless 850 MHz Coverage
- Major Route
- Municipal and Private Open Space
- School
- State Forest/Park
- Open Water
- Town Line

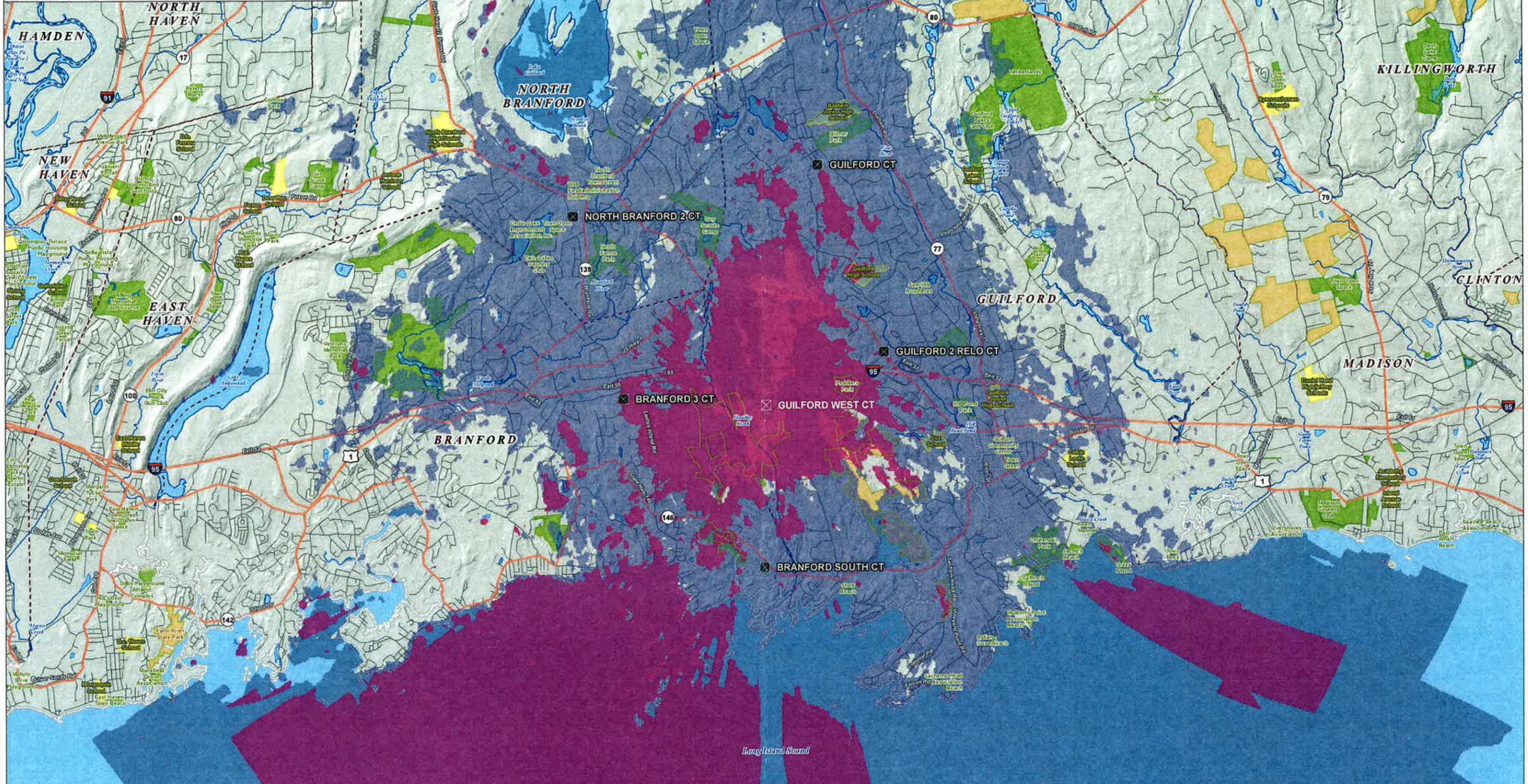
Map Notes:
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Open Space, Schools, and State Forests/Parks are depicted using available State GIS data, which may be outdated in some areas.
Base map: CTECO Hillsbide (2006)

Scale: 0 0.75 1.5 Miles

Logos: ALL-POINTS TECHNOLOGY CORPORATION, verizon

**Proposed Verizon Wireless 850 MHz Coverage at 107' Antenna Centerline
Guilford, Connecticut and Surrounding Area
(*Map Scale is 1:30,000)**

Coverage plot assumes 55% site loading on the Celco system
Coverage is depicted at a signal threshold of -85 dBm



Legend

Existing 100' Monopole at 201 Granite Road, Guilford, CT	Municipal and Private Open Space
Existing Verizon Wireless Facilities	School
Existing Surrounding Wireless 850 MHz Coverage	State Forest/Park
Proposed Verizon Wireless 850 MHz Coverage at 107' Antenna Centerline	Open Water
Major Route	Town Line

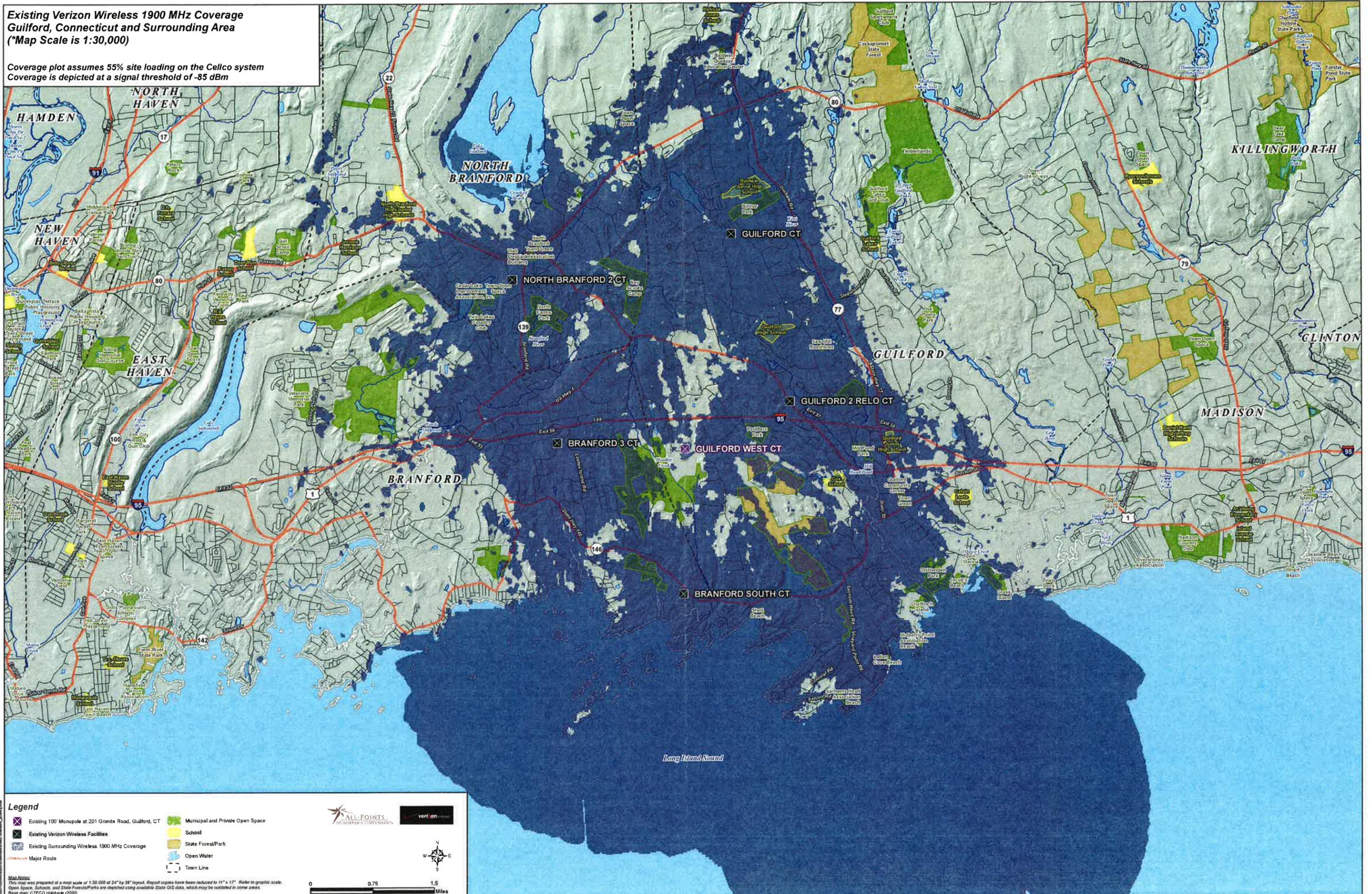
Map 2008
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Open Space, Schools, and State Forests/Parks are depicted using available State GIS data, which may be outdated in some areas.
Base map: CTECO HIRshade (2008)

ALL-POINTS
TRADING CORPORATION

verizon

**Existing Verizon Wireless 1900 MHz Coverage
Guilford, Connecticut and Surrounding Area
(*Map Scale is 1:30,000)**

Coverage plot assumes 55% site loading on the Celco system
Coverage is depicted at a signal threshold of -85 dBm



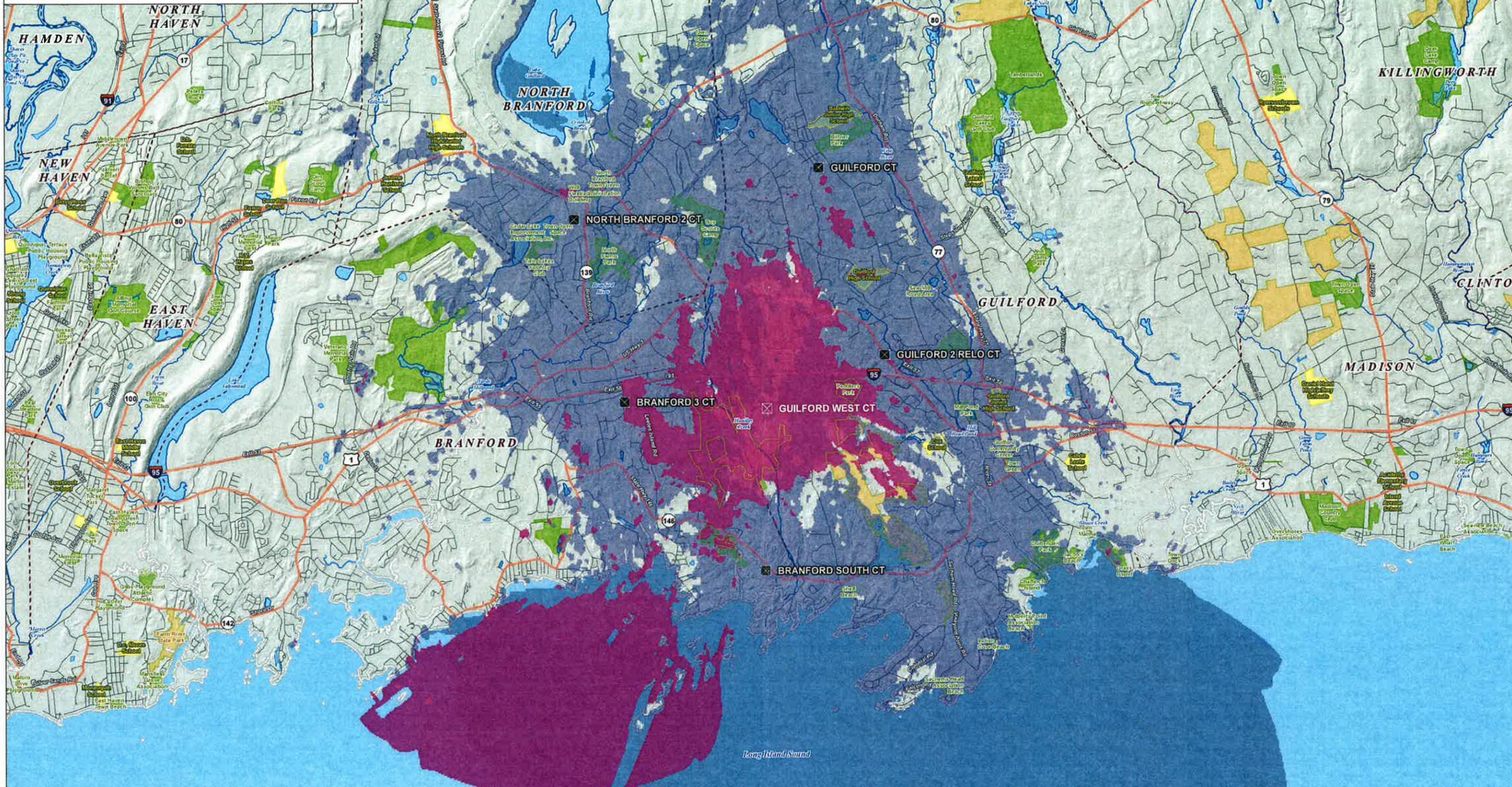
Legend

- Existing 100' Monopole at 201 Granite Road, Guilford, CT
- Existing Verizon Wireless Facilities
- Existing Surrounding Wireless 1900 MHz Coverage
- Major Route
- Municipal and Private Open Space
- School
- State Forest/Park
- Open Water
- Town Line

Map Notes:
This map was prepared at a map scale of 1:30,000 at 24" by 36" layout. Report copies have been reduced to 11" x 17". Refer to graphic scale.
Open Space, Schools, and State Forests/Parks are depicted using available State GIS data, which may be outdated in some areas.
Base map: ©TECO HighGrade (2008)

**Proposed Verizon Wireless 1900 MHz Coverage
at 107' Antenna Centerline
Guilford, Connecticut and Surrounding Area
(*Map Scale is 1:30,000)**

Coverage plot assumes 55% site loading on the Celco system
Coverage is depicted at a signal threshold of -85 dBm



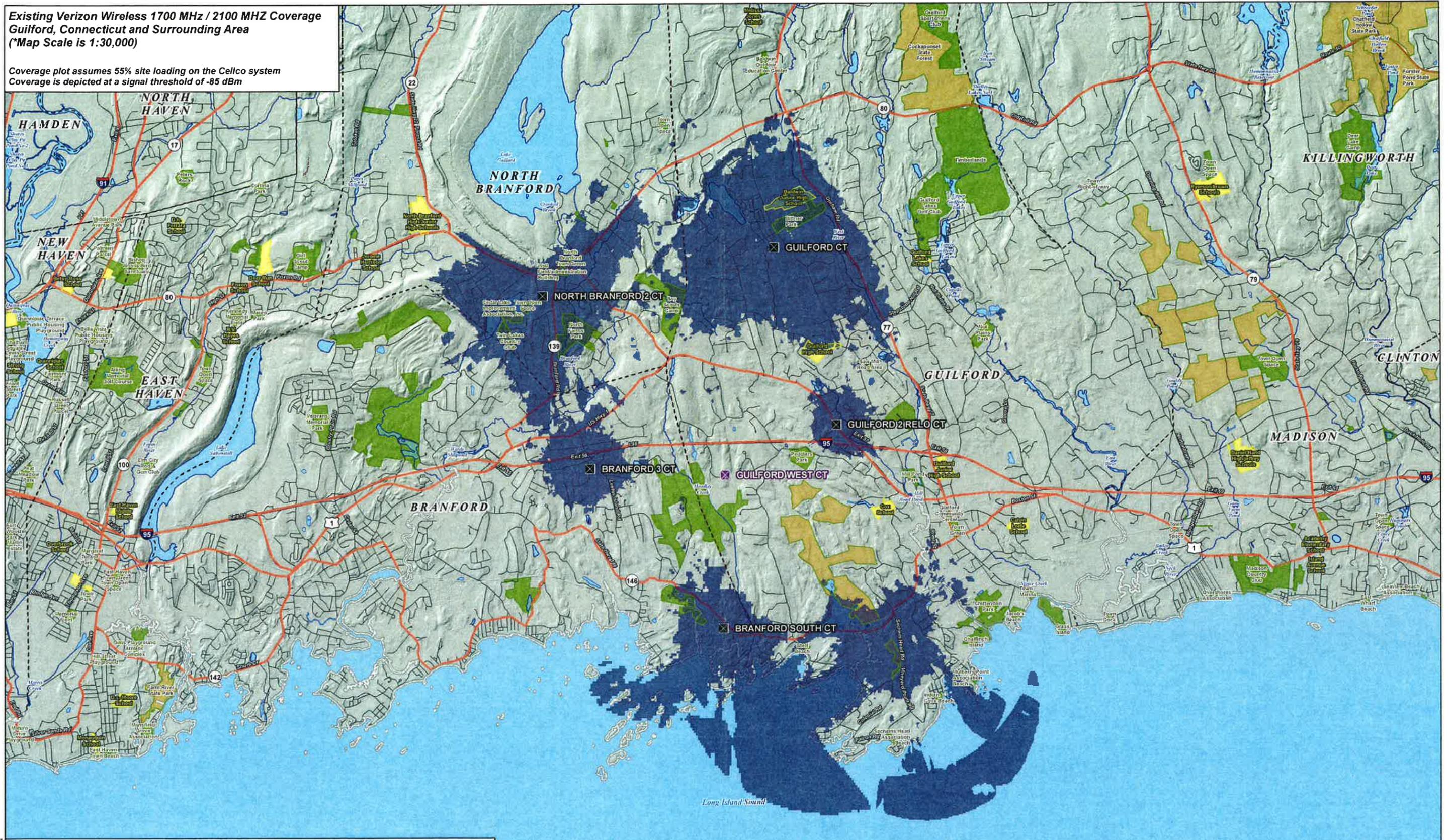
Legend

- Existing 100' Monopole at 201 Granite Road, Guilford, CT
- Municipal and Private Open Space
- Existing Verizon Wireless Facilities
- School
- Existing Surrounding Wireless 1900 MHz Coverage
- State Forest/Park
- Proposed Verizon Wireless 1900 MHz Coverage at 107' Antenna Centerline
- Open Water
- Major Route
- Town Line

Notes:
This map was prepared at a map scale of 1:30,000 at 24" by 36" layout. Report copies have been reduced to 11" x 17". Refer to graphic scale.
Open Space, Schools, and State Forest/Parks are depicted using available State GIS data, which may be outdated in some areas.
Base map: © TELCO Hillshade (2009)

**Existing Verizon Wireless 1700 MHz / 2100 MHz Coverage
Guilford, Connecticut and Surrounding Area
(*Map Scale is 1:30,000)**

Coverage plot assumes 55% site loading on the Cellco system
Coverage is depicted at a signal threshold of -85 dBm



Legend

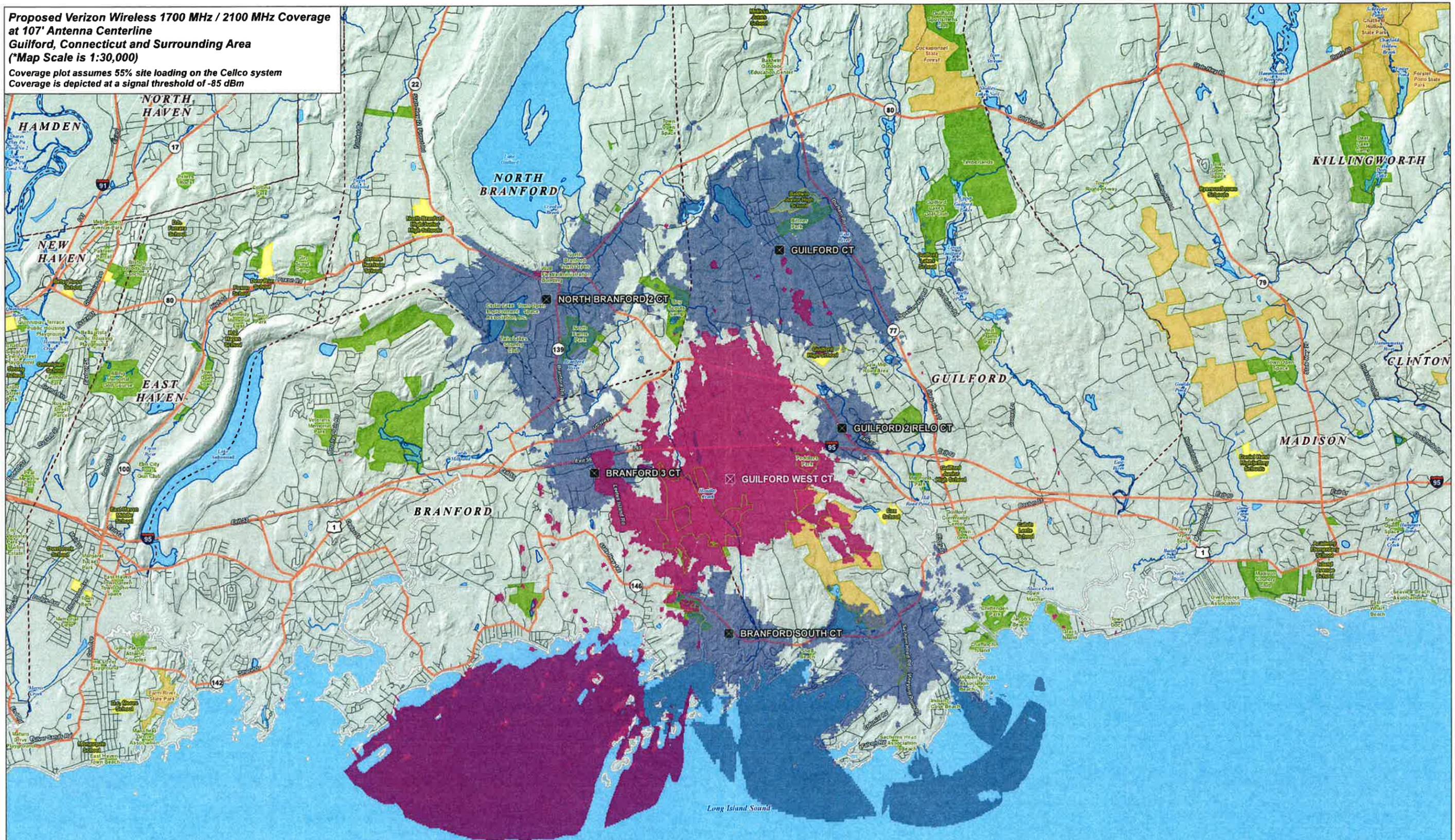
- Existing 100' Monopole at 201 Granite Road, Guilford, CT
- Existing Verizon Wireless Facilities
- Existing Surrounding Wireless 1700 MHz / 2100 MHz Coverage
- Major Route
- Municipal and Private Open Space
- School
- State Forest/Park
- Open Water
- Town Line

Map Notes:
This map was prepared at a map scale of 1:30,000 at 24" by 36" layout. Report copies have been reduced to 11" x 17". Refer to graphic scale.
Open Space, Schools, and State Forests/Parks are depicted using available State GIS data, which may be outdated in some areas.
Base map: CTECO Hillshade (2000)

Scale: 0 0.75 1.5 Miles

Logos: ALL POINTS TECHNOLOGY CORPORATION, verizon

Proposed Verizon Wireless 1700 MHz / 2100 MHz Coverage at 107' Antenna Centerline
Guilford, Connecticut and Surrounding Area
 (*Map Scale is 1:30,000)
 Coverage plot assumes 55% site loading on the Cellco system
 Coverage is depicted at a signal threshold of -85 dBm



Legend

- Existing 100' Monopole at 201 Granite Road, Guilford, CT
- Existing Verizon Wireless Facilities
- Existing Surrounding Wireless 1700 MHz / 2100 MHz Coverage
- Proposed Verizon Wireless 1700 MHz / 2100 MHz Coverage at 107' Antenna Centerline
- Major Route
- Municipal and Private Open Space
- School
- State Forest/Park
- Open Water
- Town Line

Scale: 0 0.75 1.5 Miles

This map was prepared at a map scale of 1:30,000 at 24" by 36" layout. Report copies have been reduced to 11" x 17". Refer to graphic scale. Open Space, Schools, and State Forest/Parks are depicted using available State GIS data, which may be outdated in some areas. Base map: CTEC/Airbase (2010)

ATTACHMENT 3



VISIBILITY ANALYSIS

**GUILFORD WEST
201 GRANITE ROAD
GUILFORD, CT 06437**



Prepared for:

**Verizon Wireless
99 East River Drive
East Hartford CT 06108**

Prepared by:

**All-Points Technology Corporation, P.C.
3 Saddlebrook Drive
Killingworth, CT 06419**

JULY 2014



Visibility Analysis

Date: July 30, 2014

To: Alexandria Carter
Verizon Wireless
99 East River Drive
East Hartford, CT 06108

From: Michael Libertine

Re: Guilford West
201 Granite Road
Guilford, Connecticut

At the request of Cellco Partnership (d/b/a "Verizon Wireless"), All-Points Technology Corporation, P.C. ("APT") prepared this Visibility Evaluation of a proposed 10-foot extension to an existing wireless telecommunications facility ("Facility") at the referenced property (the "Host Property"). The proposed Facility would consist of extending an existing 100-foot tall monopole an additional 10 feet in height to allow Verizon Wireless to install antennas at a center line height of 107 feet. The resultant modified structure would rise to a new height of 110 feet above ground level ("AGL").

The existing Facility is located within a heavily wooded area east of Granite Road and south of Interstate 95. Land use within the vicinity of the Host Property is a mix of undeveloped woodlands, residential development and the transportation corridor.

To evaluate the potential effects of the proposed increase, APT completed balloon floats at the facility site on July 10 and 11, 2014. The balloon float activities consisted of raising a four-foot diameter, helium-filled balloon tethered to a string height of 110 feet AGL at the Facility location. Weather conditions were favorable for the in-field activities and included mostly sunny skies and generally calm winds, with occasional gusts approaching four to five miles per hour ("mph"). Once the balloon was secured, APT conducted a reconnaissance by driving along the local and State roads and other publicly accessible locations to document and inventory where the balloon could be seen above/through the tree canopy.

During the balloon floats, APT obtained photographs from representative areas where the balloon was visible. At each photo location, the geographic coordinates of the camera's position were logged using global positioning system ("GPS") technology. Photographs were taken with a Canon EOS 6D digital camera body and Canon EF 24 to 105

millimeter (“mm”) zoom lens, with lens set to 50 mm. A 50 mm focal length has a narrower field of view than the human eye but the relation of sizes between objects is represented similar to what the human eye might perceive.

“The lens that most closely approximates the view of the unaided human eye is known as the normal focal-length lens. For the 35 mm camera format, which gives a 24x36 mm image, the normal focal length is about 50 mm.”¹”

Photographic simulations were generated to portray scaled renderings of the proposed modified Facility from three locations where the existing balloon was visible. Using field data, site plan information and 3-dimension (3D) modeling software, spatially referenced models of the vicinity and Facility were generated and merged. The geographic coordinates obtained in the field for the photograph locations were incorporated into the model to produce virtual camera positions within the spatial 3D model. Photo simulations were then created using a combination of renderings generated in the 3D model and photo-rendering software programs. Photo-documentation of existing conditions and photo-simulations of the proposed modified Facility are presented at the end of this report. The photographs of existing conditions are included to provide visual reference points for the location, height and proportions of the proposed replacement Facility relative to the scene.

The three photographs and corresponding simulations presented herein were taken from the following locations:

- Granite Road, at the I-95 underpass looking southeast, from ±0.42 mile away
- Entrance to the Host Property, looking southeast, from ±0.28 mile away
- On the Host Property, looking east, ±0.09 mile away

At this time of year, when the leaves are on the trees, the existing Facility is not visible from locations beyond the Host Property. As can be seen from the three photo-simulations, the visual impacts of the proposed 10-foot extension will not result in a substantive change to the overall visibility of the structure. The character of some near views would change slightly, as the 10-foot tower extension would rise just above the tree line from these locations. The overall effect of this change is, however, minimal due to the still relatively low height of the Facility, combined with the dense tree cover, sparse development and the tower’s separating distance from potential visual receptors.

¹ Warren, Bruce. Photography, West Publishing Company, Eagan, MN, c. 1993, (page 70).

Attachments

ALL-POINTS TECHNOLOGY CORPORATION, P.C.

3 SADDLEBROOK DRIVE · KILLINGWORTH, CT 06419 · PHONE 860-663-1697 · FAX 860-663-0935



PHOTO LOG

- Legend
- Site
 - Photo Location





EXISTING

PHOTO

1

LOCATION

GRANITE ROAD

ORIENTATION

SOUTHEAST

DISTANCE TO SITE

+/- 0.42 MILE





PROPOSED

PHOTO

1

LOCATION

GRANITE ROAD

ORIENTATION

SOUTHEAST

DISTANCE TO SITE

+/- 0.42 MILE





EXISTING

PHOTO	LOCATION	ORIENTATION	DISTANCE TO SITE
2	HOST PROPERTY	SOUTHEAST	+/- 0.28 MILE



PROPOSED

PHOTO

2

LOCATION

HOST PROPERTY

ORIENTATION

SOUTHEAST

DISTANCE TO SITE

+/- 0.28 MILE

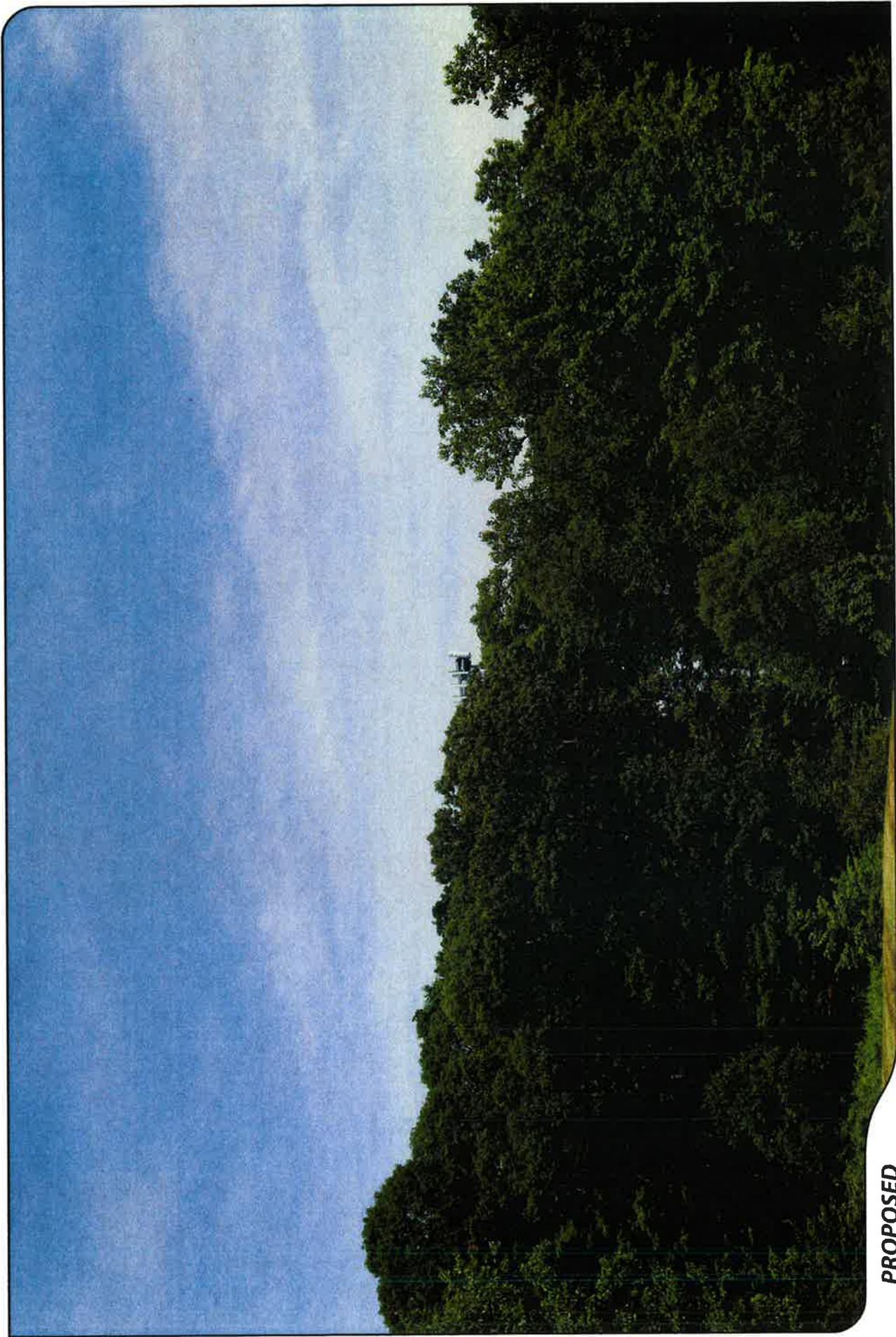




EXISTING

PHOTO	LOCATION	ORIENTATION	DISTANCE TO SITE
3	HOST PROPERTY	EAST	+/- 0.09 MILE





PROPOSED

PHOTO

3

LOCATION

HOST PROPERTY

ORIENTATION

EAST

DISTANCE TO SITE

+/- 0.09 MILE



ATTACHMENT 4

FAA Aeronautical Evaluation

842864

© 2011 Sitesafe, Inc. Arlington, VA

For more information contact:
faa@sitesafe.com
770.532.3255 phone
703.276.1169 fax

AIRPORT AND HELIPAD INFORMATION

Nearest public use or Government Use (DOD) facility is Tweed New Haven.

This structure is located 7.1 NM or 43504 FT from the airport on a bearing of 256 degrees true to the airport.

Nearest private use facility is USSC North Haven.

This structure is located 6.7 NM from the airport on a bearing of 294 degrees true to the airport.

FINDINGS

FCC Notice Requirements:

(FCC Rules, Part 17)

This structure does not require notification to the FAA or FCC based on these rules.

FAA EMI:

(The FAA protects certain air navigational aids and radio transmitters from possible electro-magnetic interference. The distance and direction are dependent on the type of facility to be evaluated. Most of these transmission and receiver facilities are listed in the National Flight Data Center (NFDC) database.)

This site would not affect any FAA air navigational aids or transmitters listed in the NFDC database.

Military Airspace:

This structure will not affect this airspace.

FAA Evaluation:

FAR Part 77 paragraph 9 (FAR 77.9). Construction or Alteration requiring notice:
(These are the imaginary surfaces that the FAA has implemented to provide general criteria for notification purposes only.)

This structure does not require notification to the FAA.

Note: This report is for planning purposes only. If notification to the FAA or FCC is submitted on a site (whether it is, or is not required), a determination of no hazard or an approval letter should be received prior to any actions taken at this site.

FAR Part 77 paragraph 17 (FAR 77.17). Standards for Determining Obstructions:
(These are the imaginary surfaces that the FAA has implemented to protect aircraft safety. If any of these surfaces are penetrated, the structure may pose a Hazard to Air Navigation.)

This structure does not exceed these surfaces.

MARKING AND LIGHTING

FAA Advisory Circular 70/7460-1

Marking and lighting is not required for this structure.

RECOMMENDATIONS OR ACTIONS

SiteSafe does not consider this site to be a Hazard to Air Navigation as specified in FAR part 77.

Note: This report is for planning purposes only. If notification to the FAA or FCC is submitted on a site (whether it is, or is not required), a determination of no hazard or an approval letter should be received prior to any actions taken at this site.



ATTACHMENT 6

July 24, 2014

Darcy Tarr
Crown Castle
3530 Toringdon Way Suite 300
Charlotte, NC 28277
(704) 405-6589



B+T Group
1717 S. Boulder, Suite 300
Tulsa, OK 74119
(918) 587-4630
btwo@btgrp.com

Subject: **Structural Analysis Report**

Carrier Designation: **Verizon Wireless Co-Locate**
Carrier Site Number: 278463
Carrier Site Name: Guilford West, CT

Crown Castle Designation: **Crown Castle BU Number:** 842864
Crown Castle Site Name: Guilford SW
Crown Castle JDE Job Number: 261924
Crown Castle Work Order Number: 807351
Crown Castle Application Number: 219854 Rev. 6

Engineering Firm Designation: **B+T Group Project Number:** 93996.001.01

Site Data: **201 Granite Road, Guilford, New Haven County, CT**
Latitude 41° 17' 31.14", Longitude -72° 43' 58.28"
99 Foot - Monopole Tower/W 10' Proposed Extension

Dear Darcy Tarr,

B+T Group are pleased to submit this "**Structural Analysis Report**" to determine the structural integrity of the above mentioned tower. This analysis has been performed in accordance with the Crown Castle Structural 'Statement of Work' and the terms of Crown Castle Purchase Order Number 672261, in accordance with application 219854, revision 6.

The purpose of the analysis is to determine acceptability of the tower stress level. Based on our analysis we have determined the tower stress level for the structure and foundation, under the following load case, to be:

LC4.7: Existing + Reserved + Proposed Equipment

Sufficient Capacity

Note: See Table 1 and Table 2 for the proposed and existing/reserved loading, respectively.

This analysis has been performed in accordance with the TIA/EIA-222-F standard and 2005 CT State Building Code with 2009 amendment based upon a wind speed of 85 mph fastest mile.

All equipment proposed in this report shall be installed in accordance with the attached drawings for the determined available structural capacity to be effective.

We at B+T Group appreciate the opportunity of providing our continuing professional services to you and Crown Castle. If you have any questions or need further assistance on this or any other projects please give us a call.

Respectfully submitted by:
B+T Engineering, Inc.

Jyoti Ojha
Project Engineer

Chad E. Tuttle, P.E.
President

tnxTower Report - version 6.1.4.1



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1) INTRODUCTION

This tower is a 99 ft Monopole tower with 10' proposed extension designed by Engineered Endeavors, Inc. in November of 2003. The tower was originally designed for a wind speed of 85 mph per TIA/EIA-222-F. A 10' proposed extension modification by B+T Group In February of 2014 is considered in this analysis

2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 85 mph with no ice, 37.6 mph with 0.75 inch ice thickness and 50 mph under service loads.

Table 1 - Proposed Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
107.0	107.0	3	Alcatel Lucent	RRH2X40-07-U	14	1 5/8	--
		3	Alcatel Lucent	RRH2X40-AWS			
		6	Amphenol	BXA-171063-12CF-EDIN-X			
		6	Amphenol	BXA-70063-6CF-EDIN-X			
		1	Rfs Celwave	DB-B1-6C-8AB-0Z			
		1	--	Platform Mount [LP 301-1]			

Table 2 - Existing and Reserved Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
98.0	98.0	6	Ericsson	RBS 6601	12	1 1/4	1
		3	Kmw Comm.	AM-X-CD-16-65-00T-RET			
		6	Powerwave Tech.	7770.00			
		6	Powerwave Tech.	LGP21401			
		1	Raycap	DC6-48-60-18-8F			
		1	--	Platform Mount [LP 303-1]			
90.0	90.0	1	--	T-Arm Mount [TA 602-3]	1	1 5/8	2
	86.0	3	Ericsson	ERICSSON AIR 21 B2A B4P			
		3	Ericsson	ERICSSON AIR 21 B4A B2P			
		--	--	--			

Notes:

- 1) Existing Equipment
- 2) Reserved Equipment

Table 3 - Design Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
110	110	3	Generic	4 sf Antennas	--	--
		1	Generic	Low Profile Platforms		
100	100	3	Generic	4 sf Antennas	--	--
		1	Generic	Low Profile Platforms		
90	90	3	Generic	4 sf Antennas	--	--
		1	Generic	Low Visibility Mount		

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
Online Application	Verizon Wireless Co-Locate Rev# 6	219854	CCI Sites
Tower Manufacturer Drawings	EEl, Project No: 12051	4492171	CCI Sites
Tower Modification Drawings	B+T Group, Project No: 88725.002.01	Date: 02/20/2014	CCI Sites
Tower Foundation Drawings	EEl, Project No: 12051 Rev 1	4492171	CCI Sites
Geotech Report	Jaworski Geotech, Inc., Project No: 03580G	4713222	CCI Sites
Antenna Configuration	Crown CAD Package	07/22/2014	CCI Sites

3.1) Analysis Method

tnxTower (version 6.1.4.1), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A.

3.2) Assumptions

- 1) Tower and structures were built in accordance with the manufacturer's specifications.
- 2) The tower and structures have been maintained in accordance with the manufacturer's specification.
- 3) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
- 4) When applicable, transmission cables are considered as structural components for calculating wind loads as allowed by TIA/EIA-222-F.
- 5) Mount areas and weights are assumed based on photographs provided.

This analysis may be affected if any assumptions are not valid or have been made in error. B+T Group should be notified to determine the effect on the structural integrity of the tower.

4) ANALYSIS RESULTS

Table 5 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail	
L1	110 - 100	Pole	TP24x24x0.375	1	-2.925	779.117	10.4	Pass	
L2	100 - 99.5	Pole	TP26.513x24x0.375	2	-2.926	779.117	10.4	Pass	
L3	99.5 - 47.93	Pole	TP37.12x26.513x0.313	3	-12.296	1843.446	45.5	Pass	
L4	47.93 - 1	Pole	TP46x35.438x0.375	4	-22.964	2823.161	55.7	Pass	
							Summary		
							Pole (L4)	55.7	Pass
							RATING =	55.7	Pass

Table 6 - Tower Component Stresses vs. Capacity – LC4.7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	Base	45.6	Pass
1	Base Plate	Base	59.0	Pass
1	Base Foundation	Base	50.2	Pass
1	Flange Connection	100	25.6	Pass
Structure Rating (max from all components) =				59.0%

Notes:

- 1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity consumed.

4.1) Recommendations

The tower and its foundation have sufficient capacity to carry the existing, reserved, and proposed loads. No modifications are required at this time.

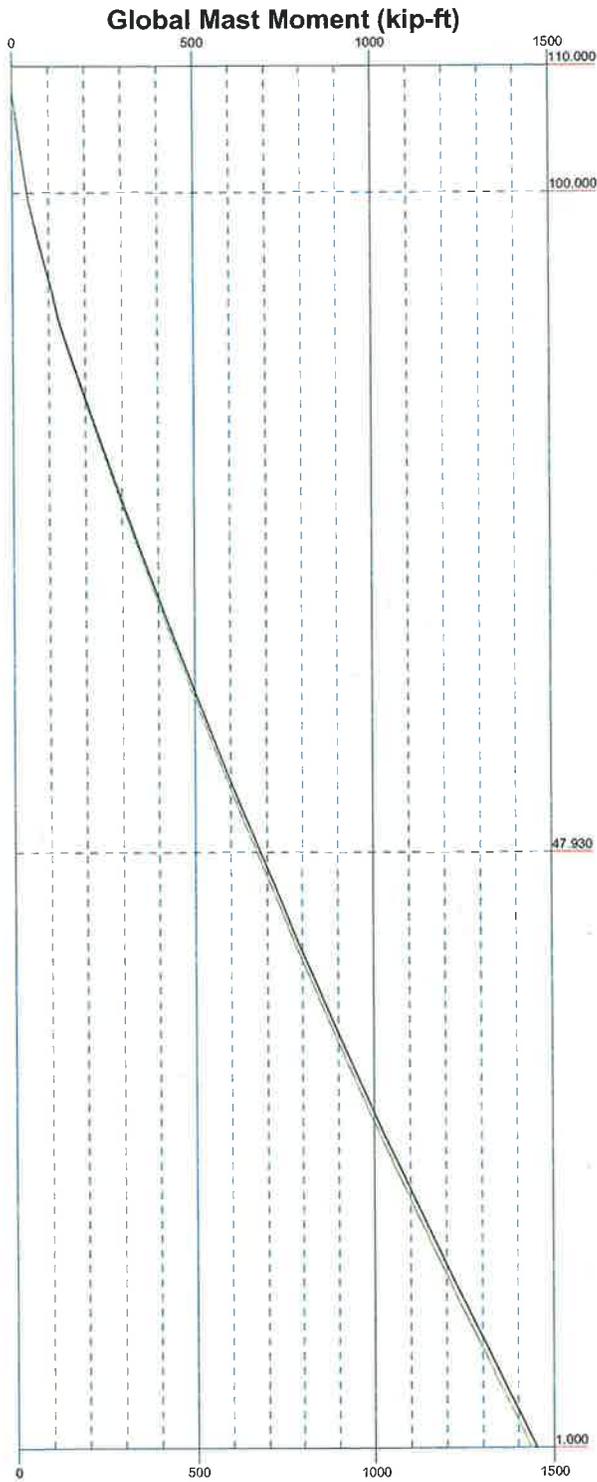
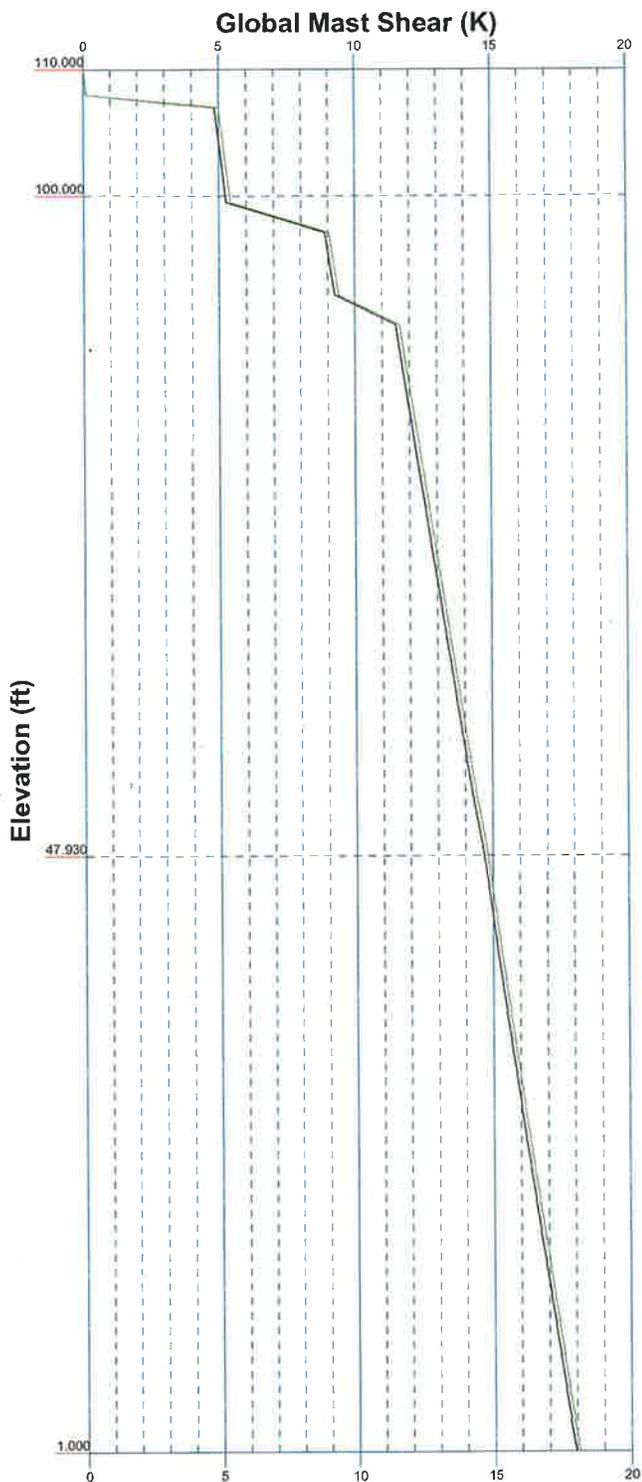
APPENDIX A
TNXTOWER OUTPUT

Vx

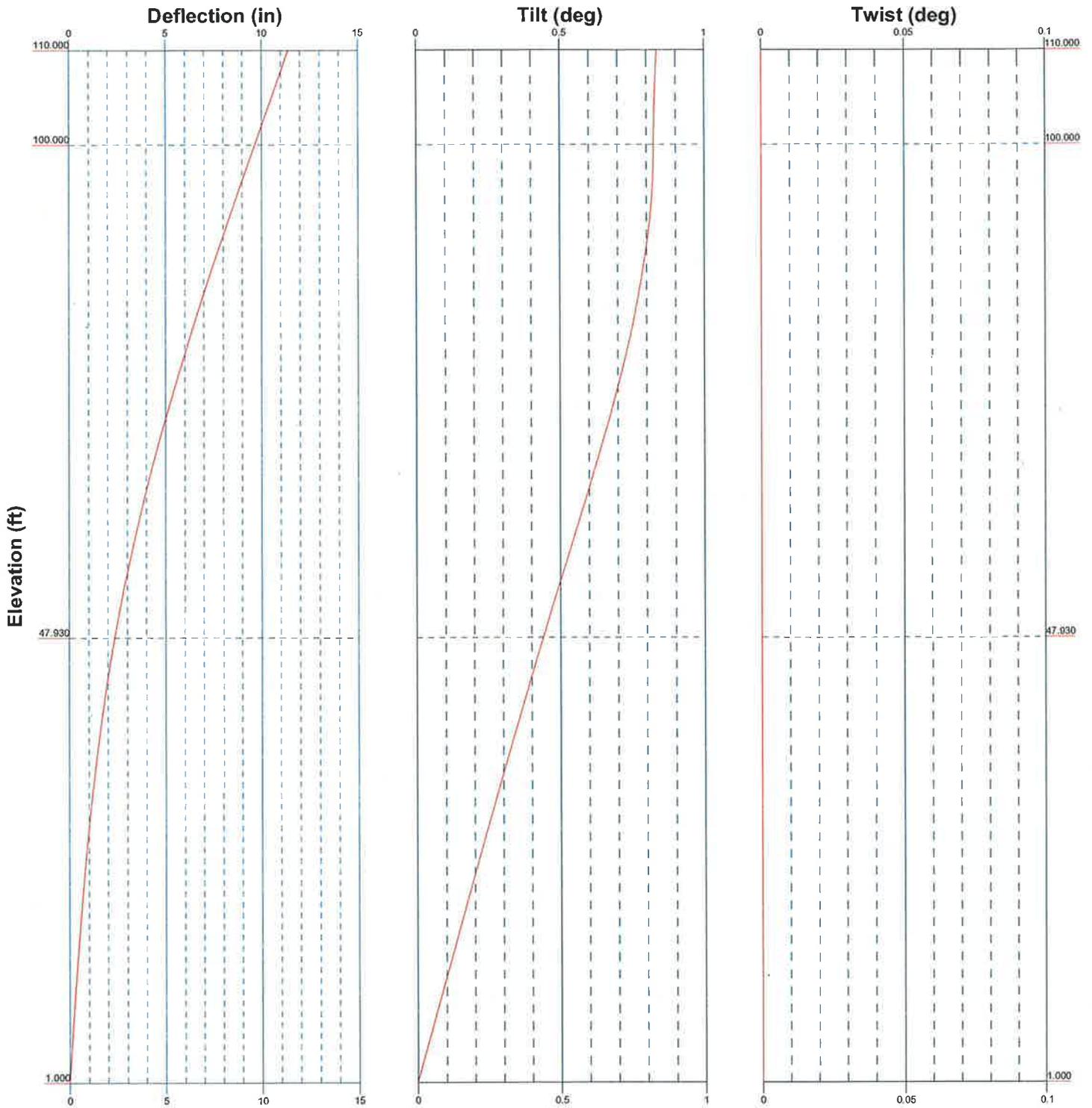
Vz

Mx

Mz



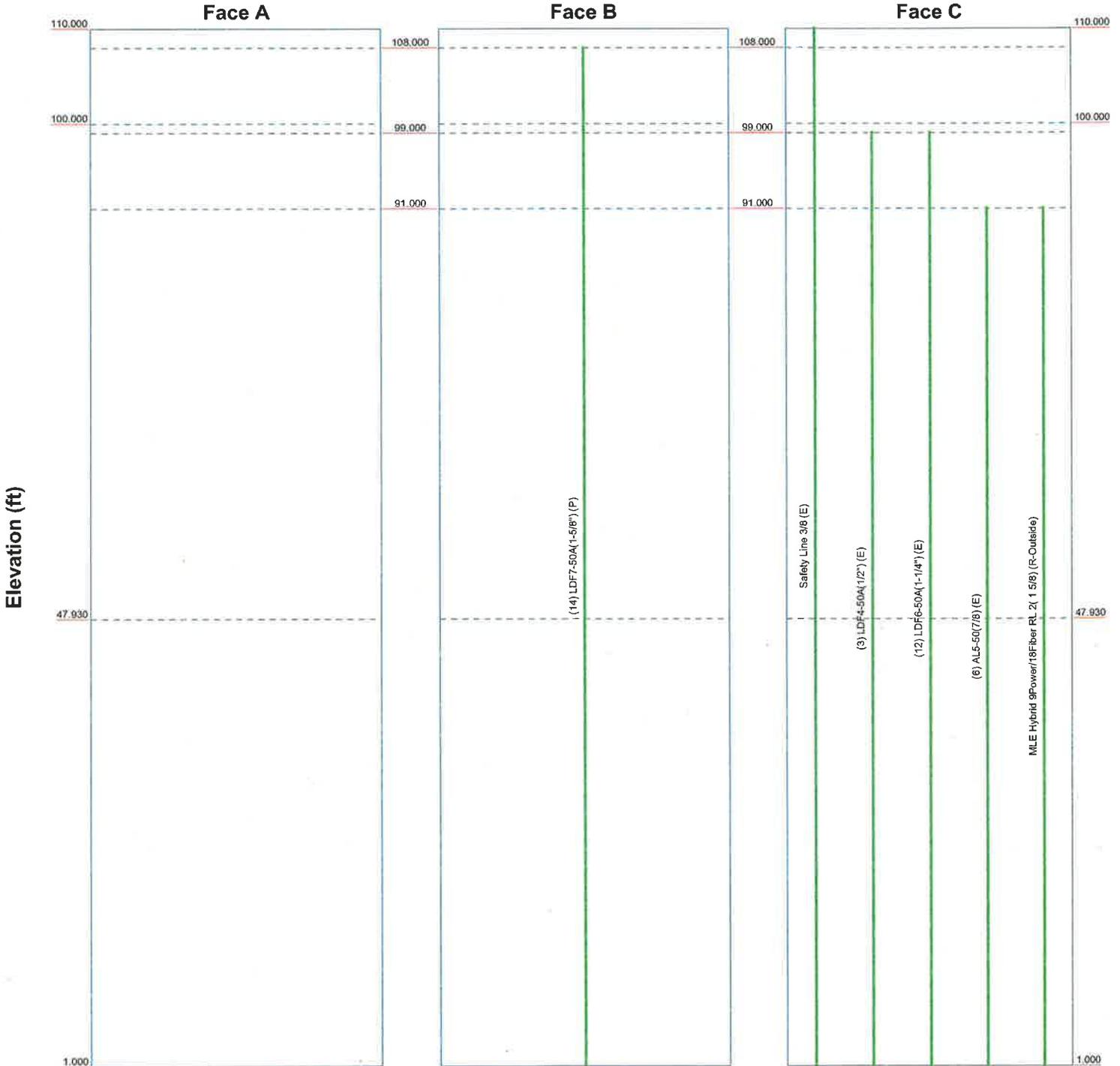
 <p>B+T Group 1717 S Boulder Ave, Suite 300 Tulsa, OK 74119 Phone: (918) 587-4630 FAX: (918) 295-0265</p>	Job: 93996.001.01- GUILFORD SW, CT (BU# 842864)		
	Project: Client: Crown Castle Code: TIA/EIA-222-F Path:	Drawn by: jojha Date: 07/24/14	App'd: Scale: NTS Dwg No. E-4



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	<p>Project:</p>	<p>Client: Crown Castle</p>
	<p>Code: TIA/EIA-222-F</p>	<p>Drawn by: jojha</p>
	<p>Path:</p>	<p>Date: 07/24/14</p>
	<p>App'd:</p>	<p>Scale: NTS</p>
		<p>Dwg No: E-5</p>

Feed Line Distribution Chart 1' - 110'

— Round
 — Flat
 — App In Face
 — App Out Face
 — Truss Leg



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	Phone: (918) 587-4630		Code: TIA/EIA-222-F	Date: 07/24/14	Scale: NTS
	FAX: (918) 295-0265		Path:		Dwg No. E-7

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	Project	Date 09:37:39 07/24/14
	Client Crown Castle	Designed by jojha

Tower Input Data

There is a pole section.

This tower is designed using the TIA/EIA-222-F standard.

The following design criteria apply:

Tower is located in New Haven County, Connecticut.

Basic wind speed of 85 mph.

Nominal ice thickness of 0.750 in.

Ice thickness is considered to increase with height.

Ice density of 56.000 pcf.

A wind speed of 38 mph is used in combination with ice.

Temperature drop of 50.000 °F.

Deflections calculated using a wind speed of 50 mph.

A non-linear (P-delta) analysis was used.

Pressures are calculated at each section.

Stress ratio used in pole design is 1.333.

Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

<ul style="list-style-type: none"> Consider Moments - Legs Consider Moments - Horizontals Consider Moments - Diagonals Use Moment Magnification √ Use Code Stress Ratios √ Use Code Safety Factors - Guys √ Escalate Ice Always Use Max Kz Use Special Wind Profile Include Bolts In Member Capacity Leg Bolts Are At Top Of Section Secondary Horizontal Braces Leg Use Diamond Inner Bracing (4 Sided) Add IBC .6D+W Combination 	<ul style="list-style-type: none"> Distribute Leg Loads As Uniform Assume Legs Pinned √ Assume Rigid Index Plate √ Use Clear Spans For Wind Area Use Clear Spans For KL/r Retention Guys To Initial Tension √ Bypass Mast Stability Checks √ Use Azimuth Dish Coefficients √ Project Wind Area of Appurt. Autocalc Torque Arm Areas SR Members Have Cut Ends Sort Capacity Reports By Component Triangulate Diamond Inner Bracing Use TIA-222-G Tension Splice Capacity Exemption 	<ul style="list-style-type: none"> Treat Feedline Bundles As Cylinder Use ASCE 10 X-Brace Ly Rules Calculate Redundant Bracing Forces Ignore Redundant Members in FEA SR Leg Bolts Resist Compression All Leg Panels Have Same Allowable Offset Girt At Foundation √ Consider Feedline Torque Include Angle Block Shear Check Poles √ Include Shear-Torsion Interaction Always Use Sub-Critical Flow Use Top Mounted Sockets
--	---	--

Tapered Pole Section Geometry

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	110.000-100.000	10.000	0.000	Round	24.000	24.000	0.375		A53-B-35 (35 ksi)
L2	100.000-99.500	0.500	0.000	Round	24.000	26.513	0.375		A53-B-35 (35 ksi)
L3	99.500-47.930	51.570	5.140	18	26.513	37.120	0.313	1.250	A572-65 (65 ksi)
L4	47.930-1.000	52.070		18	35.438	46.000	0.375	1.500	A572-65 (65 ksi)

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Tapered Pole Properties

Section	Tip Dia. in	Area in ²	I in ⁴	r in	C in	I/C in ³	J in ⁴	I/Q in ²	w in	w/r
L1	24.000	27.833	1942.299	8.354	12.000	161.858	3884.597	13.908	0.000	0
	24.000	27.833	1942.299	8.354	12.000	161.858	3884.597	13.908	0.000	0
L2	24.000	27.833	1942.299	8.354	12.000	161.858	3884.597	13.908	0.000	0
	26.513	30.793	2630.193	9.242	13.256	198.409	5260.386	15.387	0.000	0
L3	26.922	25.987	2253.789	9.301	13.469	167.338	4510.543	12.996	4.116	13.172
	37.693	36.508	6248.897	13.067	18.857	331.384	12506.016	18.258	5.983	19.146
L4	37.043	41.733	6482.083	12.447	18.002	360.068	12972.695	20.871	5.577	14.872
	46.710	54.305	14281.844	16.197	23.368	611.171	28582.480	27.158	7.436	19.829

Tower Elevation	Gusset Area (per face)	Gusset Thickness	Gusset Grade	Adjust. Factor A _r	Adjust. Factor A _r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals	Double Angle Stitch Bolt Spacing Horizontals
ft	ft ²	in					in	in
L1 110.000-100.000				1	1	1		
L2 100.000-99.500				1	1	1		
L3 99.500-47.930				1	1	1		
L4 47.930-1.000				1	1	1		

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Component Type	Placement	Total Number	Number Per Row	Clear Spacing	Width or Diameter	Perimeter	Weight
				ft			in	in	in	klf

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement	Total Number		C _A A _A	Weight
				ft			ft ² /ft	klf
Safety Line 3/8 (E)	C	No	CaAa (Out Of Face)	110.000 - 1.000	1	No Ice	0.037	0.000
						1/2" Ice	0.137	0.001
						1" Ice	0.238	0.001
						2" Ice	0.437	0.002
						4" Ice	0.838	0.004

LDF7-50A(1-5/8") (P)	B	No	Inside Pole	108.000 - 1.000	14	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
						2" Ice	0.000	0.001
						4" Ice	0.000	0.001

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Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_{AA1} ft ² /ft	Weight klf
LDF4-50A(1/2") (E)	C	No	Inside Pole	99.000 - 1.000	3	No Ice	0.000	0.000
						1/2" Ice	0.000	0.000
						1" Ice	0.000	0.000
						2" Ice	0.000	0.000
						4" Ice	0.000	0.000
LDF6-50A(1-1/4") (E)	C	No	Inside Pole	99.000 - 1.000	12	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
						2" Ice	0.000	0.001
						4" Ice	0.000	0.001
*** AL5-50(7/8) (E)	C	No	Inside Pole	91.000 - 1.000	6	No Ice	0.000	0.000
						1/2" Ice	0.000	0.000
						1" Ice	0.000	0.000
						2" Ice	0.000	0.000
						4" Ice	0.000	0.000
MLE Hybrid 9Power/18Fiber RL 2(1 5/8) (R-Outside)	C	No	CaAa (Out Of Face)	91.000 - 1.000	1	No Ice	0.163	0.001
						1/2" Ice	0.263	0.002
						1" Ice	0.362	0.004
						2" Ice	0.562	0.010
						4" Ice	0.962	0.029

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft ²	A_F ft ²	C_{AA} In Face ft ²	C_{AA} Out Face ft ²	Weight K
L1	110.000-100.000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.092
		C	0.000	0.000	0.000	0.375	0.002
L2	100.000-99.500	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.006
		C	0.000	0.000	0.000	0.019	0.000
L3	99.500-47.930	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.592
		C	0.000	0.000	0.000	8.933	0.552
L4	47.930-1.000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.539
		C	0.000	0.000	0.000	9.386	0.527

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft ²	A_F ft ²	C_{AA} In Face ft ²	C_{AA} Out Face ft ²	Weight K
L1	110.000-100.000	A	0.862	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.092
		C		0.000	0.000	0.000	2.099	0.011
L2	100.000-99.500	A	0.856	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.006
		C		0.000	0.000	0.000	0.104	0.001
L3	99.500-47.930	A	0.825	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.592
		C		0.000	0.000	0.000	24.546	0.706

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Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A _R ft ²	A _F ft ²	C _A A _A In Face ft ²	C _A A _A Out Face ft ²	Weight K
L4	47.930-1.000	A	0.750	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.539
		C		0.000	0.000	0.000	24.870	0.687

Feed Line Center of Pressure

Section	Elevation ft	CP _X in	CP _Z in	CP _X Ice in	CP _Z Ice in
L1	110.000-100.000	-0.048	0.028	-0.232	0.134
L2	100.000-99.500	-0.048	0.028	-0.232	0.134
L3	99.500-47.930	-0.216	0.125	-0.510	0.294
L4	47.930-1.000	-0.246	0.142	-0.576	0.333

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft	C _A A _A Front ft ²	C _A A _A Side ft ²	Weight K	
(2) BXA-70063-6CF-EDIN-X (P)	A	From Leg	4.000	0.000	108.000	No Ice	7.731	4.158	0.017
			0.000			1/2" Ice	8.268	4.595	0.059
			0.000			1" Ice	8.814	5.040	0.108
						2" Ice	9.931	5.951	0.223
						4" Ice	12.270	7.863	0.532
(2) BXA-70063-6CF-EDIN-X (P)	B	From Leg	4.000	0.000	108.000	No Ice	7.731	4.158	0.017
			0.000			1/2" Ice	8.268	4.595	0.059
			0.000			1" Ice	8.814	5.040	0.108
						2" Ice	9.931	5.951	0.223
						4" Ice	12.270	7.863	0.532
(2) BXA-70063-6CF-EDIN-X (P)	C	From Leg	4.000	0.000	108.000	No Ice	7.731	4.158	0.017
			0.000			1/2" Ice	8.268	4.595	0.059
			0.000			1" Ice	8.814	5.040	0.108
						2" Ice	9.931	5.951	0.223
						4" Ice	12.270	7.863	0.532
(2) BXA-171063-12CF-EDIN-X (P)	A	From Leg	4.000	0.000	108.000	No Ice	4.791	3.618	0.015
			0.000			1/2" Ice	5.242	4.058	0.042
			0.000			1" Ice	5.699	4.504	0.075
						2" Ice	6.636	5.420	0.159
						4" Ice	8.641	7.340	0.401
(2) BXA-171063-12CF-EDIN-X (P)	B	From Leg	4.000	0.000	108.000	No Ice	4.791	3.618	0.015
			0.000			1/2" Ice	5.242	4.058	0.042
			0.000			1" Ice	5.699	4.504	0.075
						2" Ice	6.636	5.420	0.159
						4" Ice	8.641	7.340	0.401
(2) BXA-171063-12CF-EDIN-X (P)	C	From Leg	4.000	0.000	108.000	No Ice	4.791	3.618	0.015
			0.000			1/2" Ice	5.242	4.058	0.042
			0.000			1" Ice	5.699	4.504	0.075
						2" Ice	6.636	5.420	0.159
						4" Ice	8.641	7.340	0.401

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Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _A A ₁		Weight	
			Horz	Lateral			Front	Side		
			ft	ft	°	ft	ft ²	ft ²	K	
RRH2X40-AWS (P)	A	From Leg	4.000	0.000	0.000	108.000	4" Ice	8.641	7.340	0.401
			0.000	0.000			No Ice	2.522	1.589	0.044
			0.000	0.000			1/2" Ice	2.753	1.795	0.061
							1" Ice	2.993	2.010	0.082
							2" Ice	3.499	2.465	0.132
RRH2X40-AWS (P)	B	From Leg	4.000	0.000	0.000	108.000	4" Ice	4.615	3.479	0.275
			0.000	0.000			No Ice	2.522	1.589	0.044
			0.000	0.000			1/2" Ice	2.753	1.795	0.061
							1" Ice	2.993	2.010	0.082
							2" Ice	3.499	2.465	0.132
RRH2X40-AWS (P)	C	From Leg	4.000	0.000	0.000	108.000	4" Ice	4.615	3.479	0.275
			0.000	0.000			No Ice	2.522	1.589	0.044
			0.000	0.000			1/2" Ice	2.753	1.795	0.061
							1" Ice	2.993	2.010	0.082
							2" Ice	3.499	2.465	0.132
RRH2X40-07-U (P)	A	From Leg	4.000	0.000	0.000	108.000	4" Ice	4.615	3.479	0.275
			0.000	0.000			No Ice	2.246	1.228	0.050
			0.000	0.000			1/2" Ice	2.447	1.385	0.067
							1" Ice	2.657	1.551	0.086
							2" Ice	3.103	1.909	0.134
RRH2X40-07-U (P)	B	From Leg	4.000	0.000	0.000	108.000	4" Ice	4.099	2.728	0.271
			0.000	0.000			No Ice	2.246	1.228	0.050
			0.000	0.000			1/2" Ice	2.447	1.385	0.067
							1" Ice	2.657	1.551	0.086
							2" Ice	3.103	1.909	0.134
RRH2X40-07-U (P)	C	From Leg	4.000	0.000	0.000	108.000	4" Ice	4.099	2.728	0.271
			0.000	0.000			No Ice	2.246	1.228	0.050
			0.000	0.000			1/2" Ice	2.447	1.385	0.067
							1" Ice	2.657	1.551	0.086
							2" Ice	3.103	1.909	0.134
DB-B1-6C-8AB-0Z (P)	A	From Leg	4.000	0.000	0.000	108.000	4" Ice	4.099	2.728	0.271
			0.000	0.000			No Ice	5.600	2.333	0.044
			0.000	0.000			1/2" Ice	5.915	2.558	0.080
							1" Ice	6.240	2.791	0.120
							2" Ice	6.914	3.284	0.213
Platform Mount [LP 301-1] (P-4M.P/Sector)	C	None			0.000	108.000	4" Ice	8.365	4.373	0.455
							No Ice	30.100	30.100	1.589
							1/2" Ice	40.800	40.800	2.029
							1" Ice	51.500	51.500	2.470
							2" Ice	72.900	72.900	3.351
***##** (2) 7770.00 w/ Mount Pipe (E)	A	From Leg	4.000	0.000	0.000	99.000	4" Ice	115.700	115.700	5.114
			0.000	0.000			No Ice	6.119	4.254	0.055
			0.000	0.000			1/2" Ice	6.626	5.014	0.103
							1" Ice	7.128	5.711	0.157
							2" Ice	8.164	7.155	0.287
(2) 7770.00 w/ Mount Pipe (E)	B	From Leg	4.000	0.000	0.000	99.000	4" Ice	10.360	10.412	0.665
			0.000	0.000			No Ice	6.119	4.254	0.055
			0.000	0.000			1/2" Ice	6.626	5.014	0.103
							1" Ice	7.128	5.711	0.157
							2" Ice	8.164	7.155	0.287
(2) 7770.00 w/ Mount Pipe (E)	C	From Leg	4.000	0.000	0.000	99.000	4" Ice	10.360	10.412	0.665
			0.000	0.000			No Ice	6.119	4.254	0.055
			0.000	0.000			1/2" Ice	6.626	5.014	0.103
							1" Ice	7.128	5.711	0.157
							2" Ice	8.164	7.155	0.287
		4" Ice	10.360	10.412	0.665					

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Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _A A ₄		Weight	
			Horz	Lateral			Front	Side		
			ft	ft	°	ft	ft ²	ft ²	K	
AM-X-CD-16-65-00T-RET w/ Mount Pipe (E)	A	From Leg	4.000	0.000	0.000	99.000	No Ice	8.498	6.304	0.074
			0.000				1/2" Ice	9.149	7.479	0.139
			0.000				1" Ice	9.767	8.368	0.212
							2" Ice	11.031	10.179	0.385
							4" Ice	13.679	14.024	0.874
AM-X-CD-16-65-00T-RET w/ Mount Pipe (E)	B	From Leg	4.000	0.000	0.000	99.000	No Ice	8.498	6.304	0.074
			0.000				1/2" Ice	9.149	7.479	0.139
			0.000				1" Ice	9.767	8.368	0.212
							2" Ice	11.031	10.179	0.385
							4" Ice	13.679	14.024	0.874
AM-X-CD-16-65-00T-RET w/ Mount Pipe (E)	C	From Leg	4.000	0.000	0.000	99.000	No Ice	8.498	6.304	0.074
			0.000				1/2" Ice	9.149	7.479	0.139
			0.000				1" Ice	9.767	8.368	0.212
							2" Ice	11.031	10.179	0.385
							4" Ice	13.679	14.024	0.874
(2) LGP21401 (E)	A	From Leg	4.000	0.000	0.000	99.000	No Ice	1.288	0.233	0.014
			0.000				1/2" Ice	1.445	0.313	0.021
			0.000				1" Ice	1.611	0.403	0.030
							2" Ice	1.969	0.608	0.055
							4" Ice	2.788	1.121	0.135
(2) LGP21401 (E)	B	From Leg	4.000	0.000	0.000	99.000	No Ice	1.288	0.233	0.014
			0.000				1/2" Ice	1.445	0.313	0.021
			0.000				1" Ice	1.611	0.403	0.030
							2" Ice	1.969	0.608	0.055
							4" Ice	2.788	1.121	0.135
(2) LGP21401 (E)	C	From Leg	4.000	0.000	0.000	99.000	No Ice	1.288	0.233	0.014
			0.000				1/2" Ice	1.445	0.313	0.021
			0.000				1" Ice	1.611	0.403	0.030
							2" Ice	1.969	0.608	0.055
							4" Ice	2.788	1.121	0.135
(2) RBS 6601 (E)	A	From Leg	4.000	0.000	0.000	99.000	No Ice	0.480	0.348	0.022
			0.000				1/2" Ice	0.625	0.459	0.034
			0.000				1" Ice	0.778	0.578	0.049
							2" Ice	1.110	0.842	0.087
							4" Ice	1.878	1.474	0.202
(2) RBS 6601 (E)	B	From Leg	4.000	0.000	0.000	99.000	No Ice	0.480	0.348	0.022
			0.000				1/2" Ice	0.625	0.459	0.034
			0.000				1" Ice	0.778	0.578	0.049
							2" Ice	1.110	0.842	0.087
							4" Ice	1.878	1.474	0.202
(2) RBS 6601 (E)	C	From Leg	4.000	0.000	0.000	99.000	No Ice	0.480	0.348	0.022
			0.000				1/2" Ice	0.625	0.459	0.034
			0.000				1" Ice	0.778	0.578	0.049
							2" Ice	1.110	0.842	0.087
							4" Ice	1.878	1.474	0.202
DC6-48-60-18-8F (E)	C	From Leg	4.000	0.000	0.000	99.000	No Ice	1.266	1.266	0.020
			0.000				1/2" Ice	1.456	1.456	0.035
			0.000				1" Ice	1.658	1.658	0.053
							2" Ice	2.093	2.093	0.095
							4" Ice	3.098	3.098	0.215
4' x 2" Pipe Mount (E-TME)	A	From Leg	4.000	0.000	0.000	99.000	No Ice	0.785	0.785	0.029
			0.000				1/2" Ice	1.028	1.028	0.035
			0.000				1" Ice	1.281	1.281	0.044
							2" Ice	1.814	1.814	0.072
							4" Ice	3.111	3.111	0.167
4' x 2" Pipe Mount (E-TME)	B	From Leg	4.000	0.000	0.000	99.000	No Ice	0.785	0.785	0.029
			0.000				1/2" Ice	1.028	1.028	0.035

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Load Combinations

Comb. No.	Description
1	Dead Only
2	Dead+Wind 0 deg - No Ice
3	Dead+Wind 30 deg - No Ice
4	Dead+Wind 60 deg - No Ice
5	Dead+Wind 90 deg - No Ice
6	Dead+Wind 120 deg - No Ice
7	Dead+Wind 150 deg - No Ice
8	Dead+Wind 180 deg - No Ice
9	Dead+Wind 210 deg - No Ice
10	Dead+Wind 240 deg - No Ice
11	Dead+Wind 270 deg - No Ice
12	Dead+Wind 300 deg - No Ice
13	Dead+Wind 330 deg - No Ice
14	Dead+Ice+Temp
15	Dead+Wind 0 deg+Ice+Temp
16	Dead+Wind 30 deg+Ice+Temp
17	Dead+Wind 60 deg+Ice+Temp
18	Dead+Wind 90 deg+Ice+Temp
19	Dead+Wind 120 deg+Ice+Temp
20	Dead+Wind 150 deg+Ice+Temp
21	Dead+Wind 180 deg+Ice+Temp
22	Dead+Wind 210 deg+Ice+Temp
23	Dead+Wind 240 deg+Ice+Temp
24	Dead+Wind 270 deg+Ice+Temp
25	Dead+Wind 300 deg+Ice+Temp
26	Dead+Wind 330 deg+Ice+Temp
27	Dead+Wind 0 deg - Service
28	Dead+Wind 30 deg - Service
29	Dead+Wind 60 deg - Service
30	Dead+Wind 90 deg - Service
31	Dead+Wind 120 deg - Service
32	Dead+Wind 150 deg - Service
33	Dead+Wind 180 deg - Service
34	Dead+Wind 210 deg - Service
35	Dead+Wind 240 deg - Service
36	Dead+Wind 270 deg - Service
37	Dead+Wind 300 deg - Service
38	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	110 - 100	Pole	Max Tension	15	0.000	-0.000	-0.000
			Max. Compression	14	-5.211	0.010	0.541
			Max. Mx	11	-2.934	40.270	0.200
			Max. My	2	-2.925	0.003	41.644
			Max. Vy	11	-5.247	40.270	0.200
			Max. Vx	2	-5.392	0.003	41.644
			Max. Torque	11			-0.520
			Max Tension	1	0.000	0.000	0.000
L2	100 - 99.5	Pole	Max. Compression	14	-5.281	0.010	0.541
			Max. Mx	11	-2.989	42.901	0.200
			Max. My	2	-2.980	0.004	44.347
			Max. Vy	11	-5.277	42.901	0.200

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Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L3	99.5 - 47.93	Pole	Max. Vx	2	-5.422	0.004	44.347
			Max. Torque	11			-0.519
			Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-18.942	0.444	0.291
			Max. Mx	11	-12.304	598.290	0.133
			Max. My	2	-12.296	0.154	606.323
			Max. Vy	11	-14.257	598.290	0.133
L4	47.93 - 1	Pole	Max. Vx	2	-14.404	0.154	606.323
			Max. Torque	11			-0.519
			Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-31.629	0.797	0.087
			Max. Mx	11	-22.965	1437.653	0.080
			Max. My	2	-22.964	0.253	1453.118
			Max. Vy	11	-17.980	1437.653	0.080
		Max. Vx	2	-18.124	0.253	1453.118	
		Max. Torque	9			-0.482	

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	15	31.629	0.000	4.401
	Max. H _x	11	22.976	17.966	0.000
	Max. H _z	2	22.976	0.000	18.109
	Max. M _x	2	1453.118	0.000	18.109
	Max. M _z	5	1437.146	-17.966	0.000
	Max. Torsion	3	0.481	-8.983	15.683
	Min. Vert	1	22.976	0.000	0.000
	Min. H _x	5	22.976	-17.966	0.000
	Min. H _z	8	22.976	0.000	-18.109
	Min. M _x	8	-1452.956	0.000	-18.109
	Min. M _z	11	-1437.653	17.966	0.000
	Min. Torsion	9	-0.482	8.983	-15.683

Tower Mast Reaction Summary

Load Combination	Vertical K	Shear _x K	Shear _z K	Overturning Moment, M _x kip-ft	Overturning Moment, M _z kip-ft	Torque kip-ft
Dead Only	22.976	0.000	0.000	-0.077	0.248	0.000
Dead+Wind 0 deg - No Ice	22.976	0.000	-18.109	-1453.118	0.253	-0.384
Dead+Wind 30 deg - No Ice	22.976	8.983	-15.683	-1258.450	-718.443	-0.481
Dead+Wind 60 deg - No Ice	22.976	15.559	-9.055	-726.603	-1244.569	-0.450
Dead+Wind 90 deg - No Ice	22.976	17.966	0.000	-0.080	-1437.146	-0.298
Dead+Wind 120 deg - No Ice	22.976	15.559	9.055	726.442	-1244.569	-0.067
Dead+Wind 150 deg - No Ice	22.976	8.983	15.683	1258.289	-718.442	0.183
Dead+Wind 180 deg - No Ice	22.976	0.000	18.109	1452.956	0.253	0.384
Dead+Wind 210 deg - No Ice	22.976	-8.983	15.683	1258.289	718.949	0.482
Dead+Wind 240 deg - No Ice	22.976	-15.559	9.055	726.443	1245.076	0.450
Dead+Wind 270 deg - No Ice	22.976	-17.966	0.000	-0.080	1437.653	0.298
Dead+Wind 300 deg - No Ice	22.976	-15.559	-9.055	-726.604	1245.076	0.066
Dead+Wind 330 deg - No Ice	22.976	-8.983	-15.683	-1258.450	718.949	-0.184

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Load Combination	Vertical	Shear _x	Shear _y	Overtuning Moment, M _x	Overtuning Moment, M _y	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
Dead+Ice+Temp	31.629	0.000	0.000	-0.087	0.797	0.000
Dead+Wind 0 deg+Ice+Temp	31.629	-0.000	-4.401	-361.728	0.825	-0.140
Dead+Wind 30 deg+Ice+Temp	31.629	2.186	-3.811	-313.279	-178.366	-0.142
Dead+Wind 60 deg+Ice+Temp	31.629	3.786	-2.200	-180.914	-309.543	-0.106
Dead+Wind 90 deg+Ice+Temp	31.629	4.371	-0.000	-0.100	-357.556	-0.042
Dead+Wind 120 deg+Ice+Temp	31.629	3.786	2.200	180.715	-309.543	0.034
Dead+Wind 150 deg+Ice+Temp	31.629	2.186	3.811	313.080	-178.366	0.100
Dead+Wind 180 deg+Ice+Temp	31.629	-0.000	4.401	361.528	0.825	0.140
Dead+Wind 210 deg+Ice+Temp	31.629	-2.186	3.811	313.080	180.016	0.142
Dead+Wind 240 deg+Ice+Temp	31.629	-3.786	2.200	180.715	311.193	0.106
Dead+Wind 270 deg+Ice+Temp	31.629	-4.371	-0.000	-0.100	359.207	0.042
Dead+Wind 300 deg+Ice+Temp	31.629	-3.786	-2.200	-180.914	311.193	-0.034
Dead+Wind 330 deg+Ice+Temp	31.629	-2.186	-3.811	-313.279	180.016	-0.100
Dead+Wind 0 deg - Service	22.976	0.000	-6.266	-503.005	0.254	-0.133
Dead+Wind 30 deg - Service	22.976	3.108	-5.427	-435.626	-248.500	-0.167
Dead+Wind 60 deg - Service	22.976	5.384	-3.133	-251.543	-430.600	-0.156
Dead+Wind 90 deg - Service	22.976	6.217	0.000	-0.081	-497.254	-0.103
Dead+Wind 120 deg - Service	22.976	5.384	3.133	251.381	-430.600	-0.023
Dead+Wind 150 deg - Service	22.976	3.108	5.427	435.464	-248.500	0.063
Dead+Wind 180 deg - Service	22.976	0.000	6.266	502.843	0.254	0.133
Dead+Wind 210 deg - Service	22.976	-3.108	5.427	435.464	249.007	0.167
Dead+Wind 240 deg - Service	22.976	-5.384	3.133	251.381	431.108	0.156
Dead+Wind 270 deg - Service	22.976	-6.217	0.000	-0.081	497.761	0.103
Dead+Wind 300 deg - Service	22.976	-5.384	-3.133	-251.543	431.108	0.023
Dead+Wind 330 deg - Service	22.976	-3.108	-5.427	-435.626	249.007	-0.064

Solution Summary

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
1	0.000	-22.976	0.000	0.000	22.976	0.000	0.000%
2	0.000	-22.976	-18.109	0.000	22.976	18.109	0.000%
3	8.983	-22.976	-15.683	-8.983	22.976	15.683	0.000%
4	15.559	-22.976	-9.055	-15.559	22.976	9.055	0.000%
5	17.966	-22.976	0.000	-17.966	22.976	0.000	0.000%
6	15.559	-22.976	9.055	-15.559	22.976	-9.055	0.000%
7	8.983	-22.976	15.683	-8.983	22.976	-15.683	0.000%
8	0.000	-22.976	18.109	0.000	22.976	-18.109	0.000%
9	-8.983	-22.976	15.683	8.983	22.976	-15.683	0.000%
10	-15.559	-22.976	9.055	15.559	22.976	-9.055	0.000%
11	-17.966	-22.976	0.000	17.966	22.976	0.000	0.000%
12	-15.559	-22.976	-9.055	15.559	22.976	9.055	0.000%
13	-8.983	-22.976	-15.683	8.983	22.976	15.683	0.000%
14	0.000	-31.629	0.000	0.000	31.629	0.000	0.000%
15	0.000	-31.629	-4.401	0.000	31.629	4.401	0.000%
16	2.186	-31.629	-3.811	-2.186	31.629	3.811	0.000%
17	3.786	-31.629	-2.200	-3.786	31.629	2.200	0.000%
18	4.371	-31.629	0.000	-4.371	31.629	0.000	0.000%
19	3.786	-31.629	2.200	-3.786	31.629	-2.200	0.000%
20	2.186	-31.629	3.811	-2.186	31.629	-3.811	0.000%
21	0.000	-31.629	4.401	0.000	31.629	-4.401	0.000%
22	-2.186	-31.629	3.811	2.186	31.629	-3.811	0.000%
23	-3.786	-31.629	2.200	3.786	31.629	-2.200	0.000%
24	-4.371	-31.629	0.000	4.371	31.629	0.000	0.000%
25	-3.786	-31.629	-2.200	3.786	31.629	2.200	0.000%
26	-2.186	-31.629	-3.811	2.186	31.629	3.811	0.000%
27	0.000	-22.976	-6.266	0.000	22.976	6.266	0.000%

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	Client	Crown Castle	Designed by	jojha

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
28	3.108	-22.976	-5.427	-3.108	22.976	5.427	0.000%
29	5.384	-22.976	-3.133	-5.384	22.976	3.133	0.000%
30	6.217	-22.976	0.000	-6.217	22.976	0.000	0.000%
31	5.384	-22.976	3.133	-5.384	22.976	-3.133	0.000%
32	3.108	-22.976	5.427	-3.108	22.976	-5.427	0.000%
33	0.000	-22.976	6.266	0.000	22.976	-6.266	0.000%
34	-3.108	-22.976	5.427	3.108	22.976	-5.427	0.000%
35	-5.384	-22.976	3.133	5.384	22.976	-3.133	0.000%
36	-6.217	-22.976	0.000	6.217	22.976	0.000	0.000%
37	-5.384	-22.976	-3.133	5.384	22.976	3.133	0.000%
38	-3.108	-22.976	-5.427	3.108	22.976	5.427	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	4	0.00000001	0.00016597
3	Yes	5	0.00000001	0.00007484
4	Yes	5	0.00000001	0.00008054
5	Yes	4	0.00000001	0.00021802
6	Yes	5	0.00000001	0.00007603
7	Yes	5	0.00000001	0.00007716
8	Yes	4	0.00000001	0.00016591
9	Yes	5	0.00000001	0.00008077
10	Yes	5	0.00000001	0.00007442
11	Yes	4	0.00000001	0.00021812
12	Yes	5	0.00000001	0.00007861
13	Yes	5	0.00000001	0.00007814
14	Yes	4	0.00000001	0.00000001
15	Yes	4	0.00000001	0.00098543
16	Yes	5	0.00000001	0.00003946
17	Yes	5	0.00000001	0.00003945
18	Yes	4	0.00000001	0.00097101
19	Yes	5	0.00000001	0.00003921
20	Yes	5	0.00000001	0.00003937
21	Yes	4	0.00000001	0.00098228
22	Yes	5	0.00000001	0.00003969
23	Yes	5	0.00000001	0.00003938
24	Yes	4	0.00000001	0.00097668
25	Yes	5	0.00000001	0.00003959
26	Yes	5	0.00000001	0.00003975
27	Yes	4	0.00000001	0.00002867
28	Yes	4	0.00000001	0.00019834
29	Yes	4	0.00000001	0.00023853
30	Yes	4	0.00000001	0.00003684
31	Yes	4	0.00000001	0.00020582
32	Yes	4	0.00000001	0.00021224
33	Yes	4	0.00000001	0.00002864
34	Yes	4	0.00000001	0.00023893
35	Yes	4	0.00000001	0.00019698
36	Yes	4	0.00000001	0.00003689
37	Yes	4	0.00000001	0.00022382
38	Yes	4	0.00000001	0.00021926

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Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	110 - 100	11.398	27	0.835	0.001
L2	100 - 99.5	9.653	27	0.827	0.001
L3	99.5 - 47.93	9.566	27	0.826	0.001
L4	53.07 - 1	2.833	27	0.493	0.000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
108.000	(2) BXA-70063-6CF-EDIN-X	27	11.047	0.834	0.001	62052
99.000	(2) 7770.00 w/ Mount Pipe	27	9.480	0.825	0.001	24863
91.000	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	27	8.118	0.799	0.001	13666

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	110 - 100	32.907	2	2.411	0.004
L2	100 - 99.5	27.872	2	2.387	0.003
L3	99.5 - 47.93	27.622	2	2.385	0.003
L4	53.07 - 1	8.182	2	1.424	0.001

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
108.000	(2) BXA-70063-6CF-EDIN-X	2	31.896	2.408	0.004	21905
99.000	(2) 7770.00 w/ Mount Pipe	2	27.373	2.382	0.003	8708
91.000	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	2	23.442	2.308	0.003	4759

Compression Checks

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	Project	Date 09:37:39 07/24/14
	Client Crown Castle	Designed by jojha

Pole Design Data

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	F _u ksi	A in ²	Actual P K	Allow. P _a K	Ratio P P _a
L1	110 - 100 (1)	TP24x24x0.375	10.000	0.000	0.0	21.000	27.833	-2.925	584.484	0.005
L2	100 - 99.5 (2)	TP26.513x24x0.375	0.500	0.000	0.0	21.000	27.833	-2.926	584.484	0.005
L3	99.5 - 47.93 (3)	TP37.12x26.513x0.313	51.570	0.000	0.0	39.000	35.460	-12.296	1382.930	0.009
L4	47.93 - 1 (4)	TP46x35.438x0.375	52.070	0.000	0.0	39.000	54.305	-22.964	2117.900	0.011

Pole Bending Design Data

Section No.	Elevation ft	Size	Actual M _x kip-ft	Actual f _{bx} ksi	Allow. F _{bx} ksi	Ratio f _{bx} F _{bx}	Actual M _y kip-ft	Actual f _{by} ksi	Allow. F _{by} ksi	Ratio f _{by} F _{by}
L1	110 - 100 (1)	TP24x24x0.375	41.644	3.087	23.100	0.134	0.000	0.000	23.100	0.000
L2	100 - 99.5 (2)	TP26.513x24x0.375	41.644	3.087	23.100	0.134	0.000	0.000	23.100	0.000
L3	99.5 - 47.93 (3)	TP37.12x26.513x0.313	606.323	23.280	39.000	0.597	0.000	0.000	39.000	0.000
L4	47.93 - 1 (4)	TP46x35.438x0.375	1453.11	28.531	39.000	0.732	0.000	0.000	39.000	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V K	Actual f _v ksi	Allow. F _v ksi	Ratio f _v F _v	Actual T kip-ft	Actual f _{vt} ksi	Allow. F _{vt} ksi	Ratio f _{vt} F _{vt}
L1	110 - 100 (1)	TP24x24x0.375	5.392	0.194	14.000	0.028	0.002	0.000	14.000	0.000
L2	100 - 99.5 (2)	TP26.513x24x0.375	5.422	0.195	14.000	0.025	0.002	0.000	14.000	0.000
L3	99.5 - 47.93 (3)	TP37.12x26.513x0.313	14.404	0.406	26.000	0.031	0.303	0.006	26.000	0.000
L4	47.93 - 1 (4)	TP46x35.438x0.375	18.124	0.334	26.000	0.026	0.384	0.004	26.000	0.000

Pole Interaction Design Data

Section No.	Elevation ft	Ratio P P _a	Ratio f _{bx} F _{bx}	Ratio f _{by} F _{by}	Ratio f _v F _v	Ratio f _{vt} F _{vt}	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	110 - 100 (1)	0.005	0.134	0.000	0.028	0.000	0.139	1.333	H1-3+VT ✓
L2	100 - 99.5 (2)	0.005	0.134	0.000	0.025	0.000	0.139	1.333	H1-3+VT ✓
L3	99.5 - 47.93 (3)	0.009	0.597	0.000	0.031	0.000	0.606	1.333	H1-3+VT ✓
L4	47.93 - 1 (4)	0.011	0.732	0.000	0.026	0.000	0.743	1.333	H1-3+VT ✓

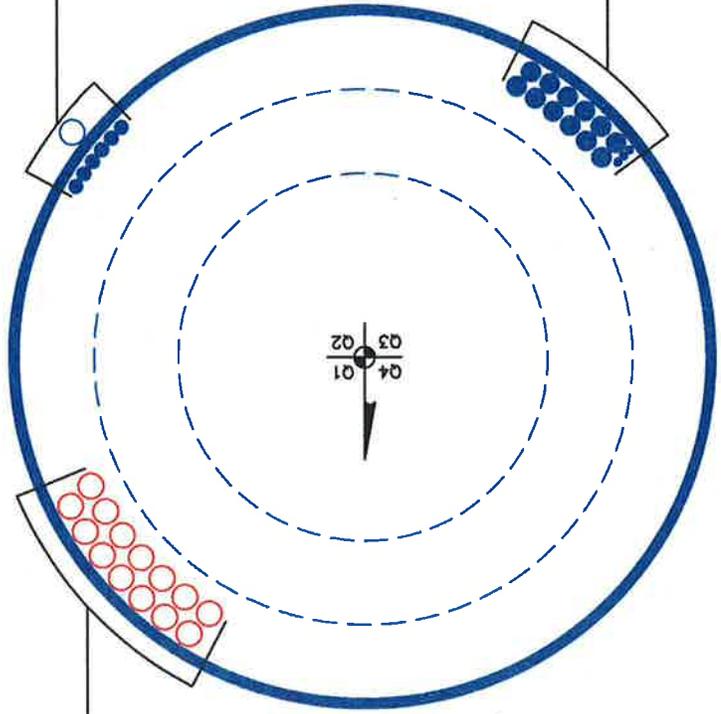
tnxTower B+T Group 1717 S Boulder Ave, Suite 300 Tulsa, OK 74119 Phone: (918) 587-4630 FAX: (918) 295-0265	Job 93996.001.01- GUILFORD SW, CT (BU# 842864)	Page 14 of 14
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Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	SF*P _{allow} K	% Capacity	Pass Fail	
L1	110 - 100	Pole	TP24x24x0.375	1	-2.925	779.117	10.4	Pass	
L2	100 - 99.5	Pole	TP26.513x24x0.375	2	-2.926	779.117	10.4	Pass	
L3	99.5 - 47.93	Pole	TP37.12x26.513x0.313	3	-12.296	1843.446	45.5	Pass	
L4	47.93 - 1	Pole	TP46x35.438x0.375	4	-22.964	2823.161	55.7	Pass	
							Summary		
							Pole (L4)	55.7	Pass
							RATING =	55.7	Pass

APPENDIX B
BASE LEVEL DRAWING

(RESERVED)
(1) 1 5/8" TO 90 FT LEVEL
(INSTALLED)
(6) 7/8" TO 90 FT LEVEL



(PROPOSED)
(14) 1-5/8" TO 107 FT LEVEL

(INSTALLED)
(3) 1/2" TO 98 FT LEVEL
(12) 1-1/4" TO 98 FT LEVEL

APPENDIX C
ADDITIONAL CALCULATIONS

Stiffened or Unstiffened, Ungrouted, Circular Base Plate - Any Rod Material

TIA Rev F

Site Data	
BU#	
Site Name:	Guilford SW, CT
Applicatio No:	
Pole Manufacturer:	Other

Anchor Rod Data	
Qty:	14
Diam:	2.25 in
Rod Material:	A615-J
Strength (Fu):	100 ksi
Yield (Fy):	75 ksi
Bolt Circle:	55 in

Plate Data	
Diam:	61 in
Thick:	2 in
Grade:	60 ksi
Single-Rod B-eff:	10.43 in

Stiffener Data (Welding at both sides)	
Config:	0 *
Weld Type:	Fillet
Groove Depth:	<-- Disregard
Groove Angle:	<-- Disregard
Fillet H. Weld:	in
Fillet V. Weld:	in
Width:	in
Height:	in
Thick:	in
Notch:	in
Grade:	ksi
Weld str.:	ksi

Pole Data	
Diam:	46 in
Thick:	0.375 in
Grade:	65 ksi
# of Sides:	18 "0" IF Round
Fu	80 ksi
Reinf. Fillet Weld	0 "0" if None

Stress Increase Factor	
ASIF:	1.333

Reactions		
Moment:	1453	ft-kips
Axial:	23	kips
Shear:	18	kips

If No stiffeners, Criteria: **AISC ASD** <-Only Applicable to Unstiffened Cases

Anchor Rod Results
 Maximum Rod Tension: 88.9 Kips
 Allowable Tension: 195.0 Kips
 Anchor Rod Stress Ratio: 45.6% Pass

Rigid
Service, ASD
Fty*ASIF

Base Plate Results
 Base Plate Stress: 35.4 ksi
 Allowable Plate Stress: 60.0 ksi
 Base Plate Stress Ratio: 59.0% Pass

Flexural Check

Rigid
Service ASD
0.75*Fy*ASIF
Y.L. Length: 30.15

n/a

Stiffener Results
 Horizontal Weld : n/a
 Vertical Weld: n/a
 Plate Flex+Shear, fb/Fb+(fv/Fv)^2: n/a
 Plate Tension+Shear, ft/Ft+(fv/Fv)^2: n/a
 Plate Comp. (AISC Bracket): n/a

Pole Results
 Pole Punching Shear Check: n/a



* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt

** Note: for complete joint penetration groove welds the groove depth must be exactly 1/2 the stiffener thickness for calculation purposes

Stiffened or Unstiffened, Exterior Flange Plate - Any Bolt Material TIA Rev F

Site Data

BU#: 842864
 Site Name: Guilford SW, CT
 Application No: 219854 Rev # 6

Reactions		
Moment:	41.644	ft-kips
Axial:	2.925	kips
Shear:	5.392	kips
Elevation:	100	feet

Pole Manufacturer: Other

If No stiffeners, Criteria: **AISC ASD** <-Only Applicable to Unstiffened Cases

Bolt Data

Qty:	24		
Diameter (in.):	1	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:	75	<-- Disregard	Bolt Fty:
N/A:	55	<-- Disregard	44.00
Circle (in.):	30		

Flange Bolt Results

Bolt Tension Capacity, B: 46.07 kips
 Max Bolt directly applied T: 2.65 Kips
 Min. PL "tc" for B cap. w/o Pry: 1.283 in
 Min PL "tred" for actual T w/ Pry: 0.237 in
 Min PL "t1" for actual T w/o Pry: 0.308 in
 T allowable w/o Prying: 46.07 kips
 Prying Force, Q: 0.00 kips
 Total Bolt Tension=T+Q: 2.65 kips
 Non-Prying Bolt Stress Ratio, T/B: 5.8% **Pass**

Rigid
Service, ASD
Fty*ASIF

Plate Data

Diam:	33	in
Thick, t:	1.5	in
Grade (Fy):	60	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	3.47	in

Exterior Flange Plate Results

Flexural Check
 Compression Side Plate Stress: 2.4 ksi
 Allowable Plate Stress: 60.0 ksi
 Compression Plate Stress Ratio: 4.0% **Pass**
No Prying
 Tension Side Stress Ratio, (treq/t)^2: 2.5% **Pass**

Rigid
Service ASD
0.75*Fy*ASIF
Comp. Y.L. Length:
14.02

Stiffener Data (Welding at Both Sides)

Config:	0	*
Weld Type:	Fillet	
Groove Depth:		<-- Disregard
Groove Angle:		<-- Disregard
Fillet H. Weld:		in
Fillet V. Weld:		in
Width:		in
Height:		in
Thick:		in
Notch:		in
Grade:		ksi
Weld str.:		ksi

n/a

Stiffener Results

Horizontal Weld : n/a
 Vertical Weld: n/a
 Plate Flex+Shear, fb/Fb+(fv/Fv)^2: n/a
 Plate Tension+Shear, ft/Ft+(fv/Fv)^2: n/a
 Plate Comp. (AISC Bracket): n/a

Pole Results

Pole Punching Shear Check: n/a

Pole Data

Diam:	26.52	in
Thick:	0.25	in
Grade:	35	ksi
# of Sides:	0	"0" IF Round
Fu	63	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor

ASIF: 1.333



* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt

** Note: for complete joint penetration groove welds the groove depth must be exactly 1/2 the stiffener thickness for calculation purposes

Stiffened or Unstiffened, Exterior Flange Plate - Any Bolt Material TIA Rev F

Site Data

Bu#: 842864
 Site Name: Guilford SW, CT
 Application No: 219854 Rev # 6

Pole Manufacturer: Other

Bolt Data

Qty:	24	Bolt Fu:	120
Diameter (in.):	1	Bolt Fy:	92
Bolt Material:	A325	Bolt Fty:	44.00
N/A:	75	<-- Disregard	
N/A:	55	<-- Disregard	
Circle (in.):	30		

Plate Data

Diam:	33	in
Thick, t:	1	in
Grade (Fy):	36	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	3.14	in

Stiffener Data (Welding at Both Sides)

Config:	0	*
Weld Type:	Fillet	
Groove Depth:		<-- Disregard
Groove Angle:		<-- Disregard
Fillet H. Weld:		in
Fillet V. Weld:		in
Width:		in
Height:		in
Thick:		in
Notch:		in
Grade:		ksi
Weld str.:		ksi

Pole Data

Diam:	24	in
Thick:	0.25	in
Grade:	35	ksi
# of Sides:	0	"0" IF Round
Fu:	63	ksi
Reinf. Fillet Weld:	0	"0" if None

Stress Increase Factor

ASIF: 1.333

Reactions

Moment:	41.644	ft-kips
Axial:	2.925	kips
Shear:	5.392	kips
Elevation:	100	feet

If No stiffeners, Criteria: AISC ASD <--Only Applicable to Unstiffened Cases

Flange Bolt Results

Bolt Tension Capacity, B:	46.07 kips
Max Bolt <u>directly</u> applied T:	2.65 Kips
Min. PL "tc" for B cap. w/o Pry:	2.472 in
Min PL "treq" for actual T w/ Pry:	0.460 in
Min PL "t1" for actual T w/o Pry:	0.593 in
T allowable with Prying:	12.53 kips
Prying Force, Q:	0.00 kips
Total Bolt Tension=T+Q:	2.65 kips
Prying Bolt Stress Ratio=(T+Q)/(B):	5.8% Pass

Non-Rigid

Service, ASD
 Fty*ASIF

$\alpha > 1$ case

Exterior Flange Plate Results

Flexural Check	Non-Rigid
Compression Side Plate Stress:	9.2 ksi
Allowable Plate Stress:	36.0 ksi
Compression Plate Stress Ratio:	25.6% Pass
No Prying	
Tension Side Stress Ratio, (treq/t)^2:	21.2% Pass

Non-Rigid

Service ASD
 0.75*Fy*ASIF
 Comp. Y.L. Length:
 18.00

n/a

Stiffener Results

Horizontal Weld :	n/a
Vertical Weld:	n/a
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	n/a
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	n/a
Plate Comp. (AISC Bracket):	n/a

Pole Results

Pole Punching Shear Check: n/a



* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt

** Note: for complete joint penetration groove welds the groove depth must be exactly 1/2 the stiffener thickness for calculation purposes

PROJECT	842864 - Guilford SW, CT		
SUBJECT	Foundation Analysis		
DATE	07/24/14	PAGE	1 OF 1



B+T GRP
 1717 S. Boulder, Suite 300
 Tulsa, OK 74159
 (918) 587-4630

Monopole Pad & Pier Foundation Analysis

Rev. Type: **F**

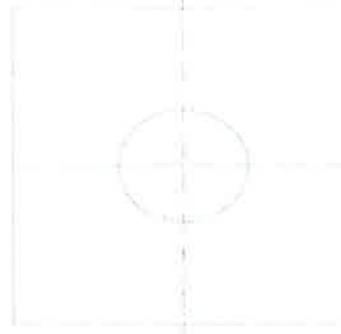
Design Loads:

	Input unfactored loads	
Shear:	<u>18.0</u>	kips
Moment:	<u>1,453.0</u>	ft-kips
Tower Height:	<u>109.0</u>	ft
Tower Weight:	<u>23.0</u>	kips

Pad & Pier Dimensions / Properties:

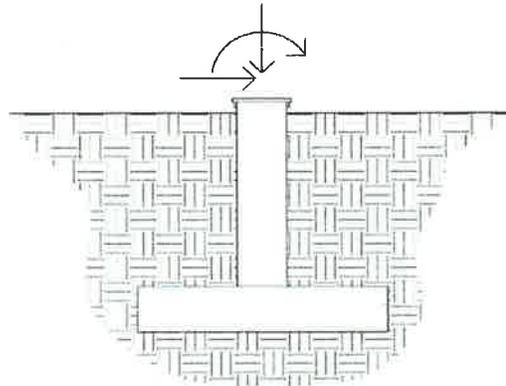
Pole Diameter at Base:	<u>46.00</u>	in
Bearing Depth:	<u>7.0</u>	ft
Pad Width:	<u>21.5</u>	ft
Neglected Depth:	<u>3.5</u>	ft
Thickness:	<u>3.0</u>	ft
Pier Diameter:	<u>7.0</u>	ft
Pier Height Above Grade:	<u>1.0</u>	ft
BP Dist. Above Pier:	<u>3.0</u>	in
Clear Cover:	<u>3.0</u>	in
Pier Rebar Size:	<u>8</u>	
Pier Rebar Quantity:	<u>30</u>	
Pad Rebar Size:	<u>8</u>	
Pad Rebar Quantity:	<u>22</u>	
Pier Tie Size:	<u>4</u>	
Tie Quantity:	<u>10</u>	
Rebar Yield Strength:	<u>60000</u>	psi
Concrete Strength:	<u>4000</u>	psi
Concrete Unit Weight:	<u>0.15</u>	kcf

21.5 FT



21.5 FT

Elevation Overview



Soil Data:

	Allowable Values	
Soil Unit Weight:	<u>0.120</u>	kcf
Ult. Bearing Capacity:	<u>60.000</u>	ksf
Angle of Friction:	<u>40.000</u>	deg
Cohesion:	<u>0.000</u>	ksf
Passive Pressure:	<u>0.000</u>	ksf
Base Friction:	<u>0.500</u>	

** Notes:

Summary of Results

Req'd Pier Diam.	OK
Overturning	39.5%
Shear Capacity	13.3%
Bearing	4.8%
Pad Shear - 1-way	30.8%
Pad Shear - 2-way	4.0%
Pad Moment Capacity	23.5%
Pier Moment Capacity	50.2%

ATTACHMENT 7

August 5, 2014

Via Certified Mail, Return Receipt Requested

Joseph Mazza, Jr.
First Selectman
Town of Guilford
31 Park Street
Guilford, CT 06437-2629

Re: **Proposed Modifications to the Existing Telecommunications Facility at 201 Granite Road, Guilford, Connecticut**

Dear Mr. Mazza:

This firm represents Cellco Partnership d/b/a Verizon Wireless ("Cellco"). Today, Cellco filed a Petition for Declaratory Ruling ("Petition") with the Connecticut Siting Council ("Council") seeking approval to make certain modifications to the existing Crown Castle ("Crown") telecommunications facility at 201 Granite Road in Guilford (the "Property").

Cellco intends to extend the existing 100-foot tower to an overall height of 110 feet and relocate a portion of the existing compound fence to accommodate its shelter. All improvements will remain within the limits of Crown's existing 100-foot by 100-foot leased area. The tower is currently shared by AT&T and Metro PCS. The extension of this tower was contemplated by the Council when the facility was originally approved in 2003 (Council Docket No. 252).

A copy of Cellco's Petition is attached for your review. Landowners whose property abuts the Property were also sent notice of this filing along with a copy of the Petition's project plans.

Robinson+Cole

Joseph Mazza, Jr.

August 5, 2014

Page 2

Please contact me if you have any questions regarding this proposal.

Sincerely,



Kenneth C. Baldwin

KCB/kmd

Attachment

Copy to:

Sandy M. Carter

August 5, 2014

Via Certified Mail, Return Receipt Requested

James B. Cosgrove
First Selectman
Town of Branford
1019 Main Street
Branford, CT 06405

Re: **Proposed Modifications to the Existing Telecommunications Facility at 201 Granite Road, Guilford, Connecticut**

Dear Mr. Cosgrove:

This firm represents Cellco Partnership d/b/a Verizon Wireless (“Cellco”). Today, Cellco filed a Petition for Declaratory Ruling (“Petition”) with the Connecticut Siting Council (“Council”) seeking approval to make certain modifications to the existing Crown Castle (“Crown”) telecommunications facility at 201 Granite Road in Guilford (the “Property”).

Cellco intends to extend the existing 100-foot tower to an overall height of 110 feet and relocate a portion of the existing compound fence to accommodate its shelter. All improvements will remain within the limits of Crown’s existing 100-foot by 100-foot leased area. The tower is currently shared by AT&T and Metro PCS. The extension of this tower was contemplated by the Council when the facility was originally approved in 2003 (Council Docket No. 252).

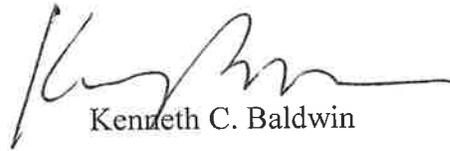
A copy of Cellco’s Petition is attached for your review. Landowners whose property abuts the Property were also sent notice of this filing along with a copy of the Petition’s project plans.

Robinson+Cole

Joseph Mazza, Jr.
August 5, 2014
Page 2

Please contact me if you have any questions regarding this proposal.

Sincerely,



Kenneth C. Baldwin

KCB/kmd
Attachment
Copy to:
Sandy M. Carter

KENNETH C. BALDWIN

280 Trumbull Street
Hartford, CT 06103-3597
Main (860) 275-8200
Fax (860) 275-8299
kbaldwin@rc.com
Direct (860) 275-8345

Also admitted in Massachusetts

August 5, 2014

Via Certified Mail, Return Receipt Requested

«Name_and_Address»

Re: Notice Of Intent To File A Petition for Declaratory Ruling With The Connecticut Siting Council For Modifications To The Existing Telecommunications Facility At 201 Granite Road, Guilford, Connecticut

Dear «Salutation»:

This firm represents Cellco Partnership d/b/a Verizon Wireless (“Cellco”). Today, Cellco filed a Petition for Declaratory Ruling (“Petition”) with the Connecticut Siting Council (“Council”) seeking approval to modify the existing Crown Castle (“Crown”) telecommunications facility at 201 Granite Road in Guilford (the “Property”). Cellco plans to extend the existing 100-foot tower to 110 feet and relocate a portion of the compound fence to accommodate its equipment shelter. A set of Project Plans showing Cellco’s proposed improvements are attached for your review.

This notice is being sent to you because you are listed as an owner of land that abuts the Property. If you have any questions regarding the Petition, the Council’s process for reviewing the proposed modifications or the details of the filing itself, please feel free to contact me at the number listed above. You may also contact the Council directly at 860-827-2935.

August 5, 2014
Page 2

Sincerely,

A handwritten signature in black ink, appearing to read "Kenneth C. Baldwin". The signature is fluid and cursive, with a long horizontal stroke at the end.

Kenneth C. Baldwin

Attachment
Copy to:
Sandy M. Carter

REV.	DATE	BY	CHK'D BY	DESCRIPTION
1	07/21/14	MM	MM	ISSUED FOR PERMITS
2	07/21/14	MM	MM	ISSUED FOR PERMITS - CLEAN REVIEW



ZONING NOTES:
 1. EXISTING 4" DIA. MONOPOLE TOWER W/ 4" DIA. WIND ANEMOMETER & METEOROLOGICAL ANTENNAS TO BE REMOVED & REPLACED BY 4" DIA. MONOPOLE TOWER AS SHOWN ON THIS PLAN.
 2. ALL WORK SHALL BE COMPLETED BY DATE: JULY 24, 2014



2 WEST ELEVATION - PROPOSED
 SCALE: 1" = 10'
 GRAPHIC SCALE
 1 inch = 10 ft.



3 ANTENNA MOUNTING CONFIGURATION
 1/8" TO SCALE



1 COMPOUND PLAN - PROPOSED
 SCALE: 1" = 10'
 GRAPHIC SCALE
 1 inch = 10 ft.



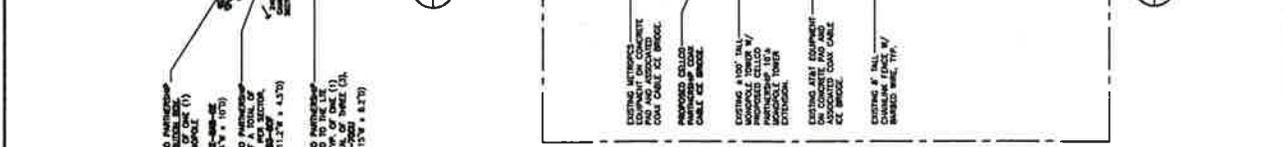
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 SCALE: 1" = 10'
 GRAPHIC SCALE
 1 inch = 10 ft.

CELLCO PARTNERSHIP D/B/A VERIZON WIRELESS

ABUTTING PROPERTY OWNERS

**201 GRANITE ROAD
GUILFORD, CONNECTICUT**

	<u>Parcel ID</u>	<u>Owner and Mailing Address</u>	<u>Property Address</u>
1.	077046A	Walden Three Condominium c/o Nancy Parker 108 Granite Road Guilford, CT 06437	Granite Road
2.	077048A1	Bradley D. Svalberg 420 Granite Road Guilford, CT 06437	420 Granite Road
3.	071007	Valley Family Associates 300 Granite Road Guilford, CT 06437	300 Granite Road
4.	071007A	David Valley 308 Granite Road Guilford, CT 06437	308 Granite Road
5.	071005	Harvest Guilford RET RES c/o Thompson Prop Tax Serv LLC 2235 Faraday Avenue, Suite Q Carlsbad, CA 92008	Granite Road
6.	071002	Guilford Land Trust P.O. Box 200 Guilford, CT 06437	Granite Road
7.	071011A12	Kathleen Conlon and Ryan VanWilgen 19 Balaurel Drive Guilford, CT 06437	19 Balaurel Drive
8.	071011A11	Michael E. and Annette Amento 17 Balaurel Drive Guilford, CT 06437	17 Balaurel Drive
9.	071011A10	Bernard Lauzier 15 Balaurel Drive Guilford, CT 06437	15 Balaurel Drive

	<u>Parcel ID</u>	<u>Owner and Mailing Address</u>	<u>Property Address</u>
10.	071011A09	Jennifer S. and Thomas Ginz II 13 Balaurel Drive Guilford, CT 06437	13 Balaurel Drive
11.	071011A08	Elizabeth J. and Joseph Omara III 11 Balaurel Drive Guilford, CT 06437	11 Balaurel Drive
12.	071011A07	Michael J. and Dorothy Vaspasiano 16 Pheasant Run Guilford, CT 06437	16 Pheasant Run
13.	071011A06	Harsha and Roopashree Panyadahundi 12 Pheasant Run Guilford, CT 06437	12 Pheasant Run