Crown Castle
3 Corporate Park Drive, Suite 101
Clifton Park, NY 12065

July 29, 2016

Melanie A. Bachman
Acting Executive Director
Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051

RE: **Notice of Exempt Modification for AT&T/ LTE 3C Crown Site BU: 806382**
AT&T Site ID: CT5836
74 Goodrich Lane, Portland, CT 06480
Latitude: 41° 36' 29.9" / Longitude: -72° 35' 29.56"

Dear Ms. Bachman:

AT&T currently maintains nine (9) antennas at the 116-foot level of the existing 160-foot monopole at 74 Goodrich Lane in Portland, CT. The tower and property is owned by Crown Castle. AT&T now intends to add six (6) RRU-11s and three (3) Bias-Tees.

This facility was approved by the by the Connecticut Siting Council in Docket No. 58 on July 11, 1986. This approval included the conditions that:

1. The proposed Bloomfield and Middlefield sites are rejected without prejudice.
2. The antennas on the Glastonbury tower shall be mounted no higher than 180' level of this existing tower.
3. The Portland and Rocky Hill towers shall be monopoles.
4. The towers shall be no taller than necessary to provide the proposed service, and in no event shall exceed total heights, including antennas, of
    a. 190' at the Haddam site;
    b. 173' at the Portland site;

This modification complies with the aforementioned condition(s).

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies § 16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.S.C.A. § 16-50j-73, a copy of this letter is being sent to Ms. Susan S. Branfield, First Selectman, Town of Portland, and Crown Castle is the tower and property owner.

1. The proposed modifications will not result in an increase in the height of the existing tower.

2. The proposed modifications will not require the extension of the site boundary.

3. The proposed modification will not increase noise levels at the facility by six decibels or more, or to levels that exceed state and local criteria.

4. The operation of the replacement antennas will not increase radio frequency emissions at the facility to a level at or above the Federal Communication Commission safety standard.

5. The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site.

6. The existing structure and its foundation can support the proposed loading.

For the foregoing reasons, AT&T respectfully submits that the proposed modifications to the above-reference telecommunications facility constitutes an exempt modification under R.C.S.A. § 16-50j-72(b)(2). Please send approval/rejection letter to Attn: Jeffrey Barbadora.

Sincerely,

Jeffrey Barbadora
Real Estate Specialist
12 Gill Street, Suite 5800, Woburn, MA 01801
781-729-0053
Jeff.Barbadora@crowncastle.com

Attachments:

Tab 1: Exhibit-1: Compound plan and elevation depicting the planned changes
Tab 2: Exhibit-2: Structural Modification Report
Tab 3: Exhibit-3: General Power Density Table Report (RF Emissions Analysis Report)

cc: Ms. Susan S. Branfield, First Selectman
Town of Portland
33 E Main St
Portland, CT 06480

BE

STATE OF CONNECTICUT

CONNECTICUT SITING COUNCIL

Ten Franklin Square
New Britain, Connecticut 06051
Phone: (860) 827-2935
Fax: (860) 827-2950

August 24, 1998

Donald Mitchell
Zoning Enforcement Officer
Town of Portland
265 Main Street
P.O. Box 71
Portland, CT 06480

RE: **DOCKET NO. 58** - Bell Atlantic Mobile Certificate of Environmental Compatibility and Public Need for telecommunications facilities in the Towns of Glastonbury, Haddam, Hartford, Portland, Rocky Hill, Somers, Willington, Vernon, and Windsor Connecticut.

Dear Mr. Mitchell:

As requested by Town Planner Ray Carpentino, I am providing you with information and clarification regarding the Connecticut Siting Council's (Council) jurisdiction for this proposed site refinement.

Town Planner Ray Carpentino has informed me that a proposed retaining wall has been approved and permitted by the Town of Portland for this proposed modification of an existing telecommunications tower site. Assuming that the retaining wall has been properly considered and approved by the Town, the reorientation of Omnipoint's equipment pad is generally consistent with the Council's approval of this site modification issued on November 12, 1997. However, future modification of this site including the placement of any new antennas and shelters necessary for other carriers, such as Nextel, will require advance notice and approval from the Council before any construction is pursued.

I have enclosed a copy of Omnipoint's revised site plan and a copy of the Council's approval for this site modification dated November 17, 1997, for your information.

Please contact me if you have any questions or concerns.

Very truly yours,

Joel M. Rinebold
Executive Director

JMR/sg

Enclosures (2)

c: Honorable Edward L. Kalinowski, First Selectman, Town of Portland
Ray Carpentino, Town Planner, Town of Portland
Jennifer Young Gaudet, Bell Atlantic Mobile
Brian Weinstein, Omnipoint Communications

BF

STATE OF CONNECTICUT

CONNECTICUT SITING COUNCIL

10 Franklin Square
New Britain, Connecticut 06051
Phone: (860) 827-2935
Fax: (860) 827-2950

November 17, 1997

Jennifer Young Gaudet
Regulatory Manager
Bell Atlantic NYNEX Mobile
20 Alexander Drive, P.O. Box 5029
Wallingford, CT 06492

Re: DOCKET NO. 58 - Bell Atlantic NYNEX Mobile Certificate of Environmental Compatibility and Public Need for telecommunications facilities in the Towns of Glastonbury, Haddam, Hartford, Portland, Rocky Hill, Somers, Willington, Vernon, and Windsor Connecticut. Notice of Intent to Modify Portland Facility.

Dear Ms. Gaudet:

At a public meeting held on November 12, 1997, the Connecticut Siting Council (Council) acknowledged your notice to modify this existing telecommunications facility in Portland, Connecticut, pursuant to Section 16-50j-73 of the Regulations of Connecticut State Agencies.

The proposed modifications, that include replacement of the tower structure, are to be implemented as specified here and in your notice dated October 30, 1997. The modifications are in compliance with the exception criteria in Section 16-50j-72 of the Regulations of Connecticut State Agencies as changes to an existing facility site that would not increase tower height, extend the boundaries of the tower site, increase noise levels at the tower site boundary by six decibels, and increase the total radio frequency electromagnetic radiation power density measured at the tower site boundary to or above the standard adopted by the State Department of Environmental Protection pursuant to General Statutes § 22a-162. This facility has been carefully modeled to ensure that radio frequency emissions are conservatively below State and federal standards applicable to the frequency now used on this tower. Any additional change to this facility will require explicit notice to this agency pursuant to Regulations of Connecticut State Agencies Section 16-50j-73. Such notice shall include all relevant information regarding the proposed change with cumulative worst-case modeling of radio frequency exposure at the closest point of uncontrolled access to the tower base, consistent with Federal Communications Commission, Office of Engineering and Technology, Bulletin No. 65. Any deviation from this format may result in the Council implementing enforcement proceedings pursuant to General Statutes § 16-50u including, without limitation, imposition of expenses resulting from such failure and of civil penalties in an amount not less than one thousand dollars per day for each day of construction or operation in material violation.

Thank you for your attention and cooperation.

Very truly yours,

Mortimer A. Gelston
Chairman

MAG/RKE/sg

c: Honorable Edward L. Kalinowski, First Selectman, Town of Portland

Bell Atlantic NYNEX Mobile
20 Alexander Drive
P.O. Box 5029
Wallingford, CT 06492
Telephone: 203-269-8858

Jennifer Young Gaudet
Manager - Regulatory

October 30, 1997

HAND DELIVERED

Mr. Joel M. Rinebold, Executive Director
Connecticut Siting Council
10 Franklin Square
New Britain, Connecticut 06051

Re: Bell Atlantic Mobile - Portland Cell Site

Dear Mr. Rinebold:

Bell Atlantic Mobile ("BAM" or the "Company") plans to allow Omnipoint Communications, Inc. ("Omnipoint") to install antennas and related equipment at the existing BAM facility in Portland, Connecticut. Please accept this letter as notification, pursuant to R.C.S.A. § 16-50j-73, of construction which constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b). In compliance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to the First Selectman of Portland.

The existing facility consists of a 160' monopole and an equipment shelter located off of Goodrich Lane in Portland. This facility was approved by the Connecticut Siting Council in its July 11, 1986 Decision and Order in Docket No. 58. On February 7, 1997, BAM notified the Council of its intention to allow Sprint Spectrum L.P. ("Sprint") to install antennas and related equipment at the Portland site. Sprint's installation has not been made.

Omnipoint plans to attach to the tower six panel antennas, Celwave Model APN199015, approximately 5' in height, and one small related Global Positioning Satellite System ("GPS") receive-only antenna; and to install an equipment cabinet on a pad adjacent to the tower. In order to accommodate both Sprint and Omnipoint, the existing tower will be replaced.

The changes to the tower site do not constitute a modification as defined in C.G.S. § 16-50i(d) because the general physical characteristics of the facility will not be significantly changed or altered. Rather, the planned changes to the facility fall squarely within those activities explicitly provided for in R.C.S.A. § 16-50j-72(b), subsections (2) and (3).

First, the height of the tower will be unaffected. The existing 160' monopole will be replaced with a 160' monopole. The replacement tower will be designed to accommodate multiple users, in order to further the intent of Conn. Gen. Stat. Section 16-50aa. BAM's

antennas will be placed on a platform at the top of the tower; as previously noticed, Sprint's antennas will be placed on a platform with the center of radiation at approximately the 140' level of the tower; Omnipoint's antennas will be placed on a platform with the center of radiation at approximately the 130' level of the tower, and its GPS antenna will be mounted at the 40' level of the tower. Neither the replacement tower itself nor the additional antennas will extend the current height of the tower.

Second, the proposed changes will not extend the site boundaries. The location of the replacement tower will be within the current fenced area; an additional area within the 60' by 60' leased parcel will be fenced to accommodate Omnipoint's equipment space requirements. All proposed changes are reflected on the attached site plan.

Third, the proposed additions will not increase the noise levels at the existing facility by six decibels or more. Except for noise resulting from construction, the only additional noise will be from cooling mechanisms for Omnipoint's equipment cabinet.

Fourth, operation of the additional antennas will not increase the total radio frequency electromagnetic radiation power density, measured at the tower base, to a level at or above the FCC standard. A "worst-case" calculation for a point at the base of the tower indicates that BAM's cellular operations result in 0.027 mW/cm^2, or 4.58% of the FCC standard for uncontrolled environments at cellular frequencies of approximately 0.583 mW/cm^2. Sprint's operations would add 0.0246 mW/cm^2, or 2.46% of the FCC standard of 1.000 mW/cm^2. Omnipoint's operations would add 0.0208 mW/cm^2, or 2.08% of the FCC standard of 1.000 mW/cm^2. Thus, the calculated "worst-case" power density for the combined operations at the site is 9.12% of the applicable standard for uncontrolled environments as calculated for a mixed frequency site.

For the foregoing reasons, BANM respectfully submits that the changes to accommodate tower sharing at the Portland facility constitute an exempt modification under R.C.S.A. § 16-50j-72(b).

Respectfully yours,

Jennifer Young Gaudet
Manager - Regulatory

Enclosure
cc: Honorable Edward L. Kalinowski, First Selectman

Bell Atlantic NYNEX Mobile
20 Alexander Drive
P.O. Box 5029
Wallingford, CT 06492
Telephone: 203-269-8858

Jennifer Young Gaudet
Manager - Regulatory

October 30, 1997

Honorable Edward L. Kalinowski
First Selectman
Town Hall
265 Main Street
Portland, Connecticut 06480

Dear First Selectman Kalinowski:

Consistent with the State policy of encouraging tower sharing, Bell Atlantic Mobile (the "Company") plans to allow Sprint Spectrum L.P. and Omnipoint Communications to share its telecommunications site in Portland. In order to meet structural requirements, the existing tower must be replaced. The replacement tower will be a monopole tower of the same height as the existing monopole. As required by Section 16-50j-73 of the Regulations of Connecticut State Agencies ("R.C.S.A."), please accept this letter and the attached letter to the Connecticut Siting Council as notice of intent to construct an "exempt modification" pursuant to R.C.S.A. Section 16-50j-72(b).

The attached letter fully sets forth the Company's proposal. However, if you have any questions or require any further information on the plans for the site or the Siting Council's procedures, please contact the undersigned at (203) 949-2805 or Mr. Joel M. Rinebold, Executive Director of the Connecticut Siting Council, at (860) 827-2935.

Sincerely,

Jennifer Young Gaudet

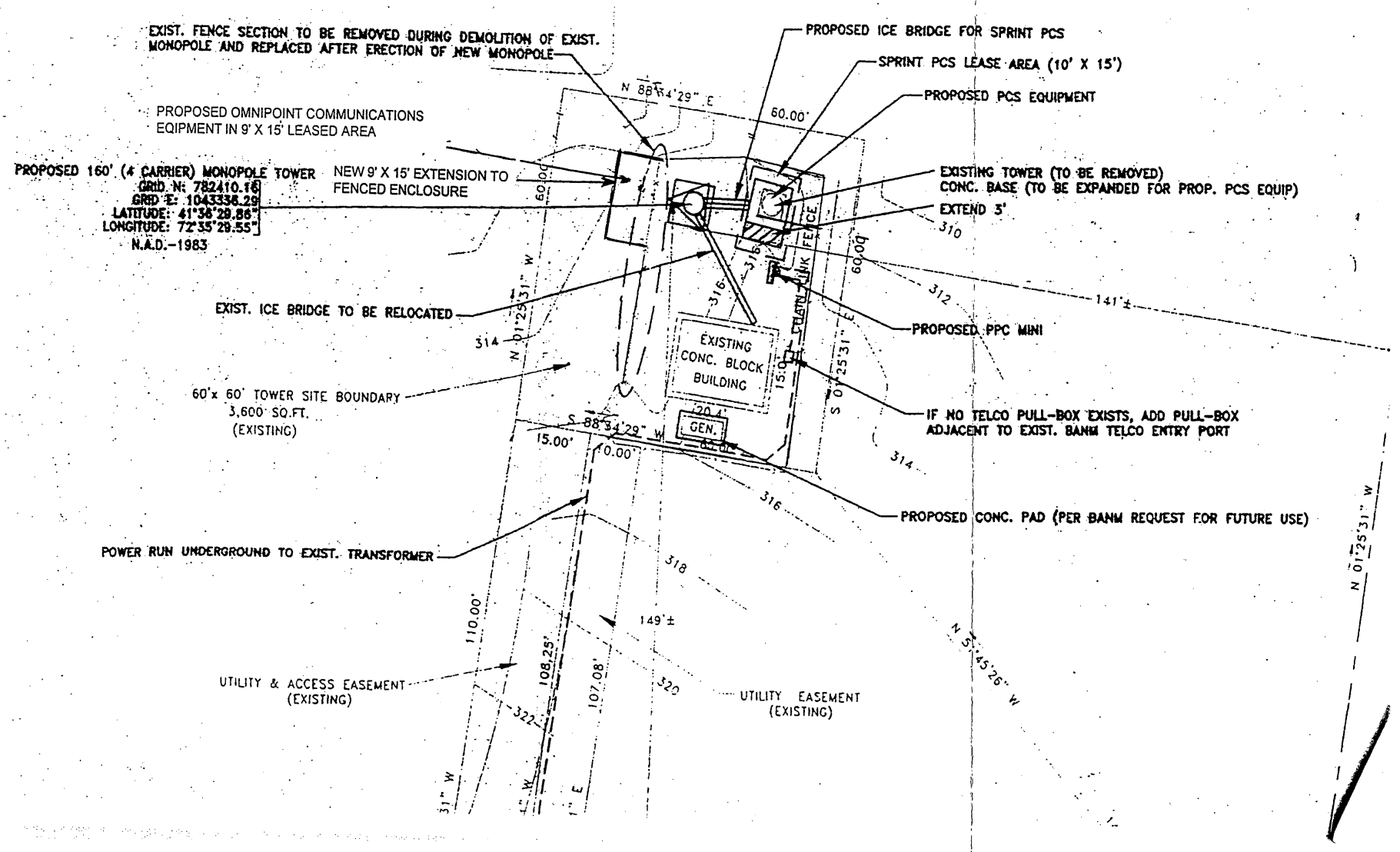
Jennifer Young Gaudet
Manager - Regulatory

Enclosure

Bell Atlantic Mobile

Portland Cell Site

Goodrich Lane, Portland, CT



BI

STATE OF CONNECTICUT

CONNECTICUT SITING COUNCIL
10 Franklin Square
New Britain, Connecticut 06051
Phone: (860) 827-2935
Fax: (860) 827-2950

February 20, 1997

Jennifer Young Gaudet
Regulatory Manager
Bell Atlantic NYNEX Mobile
20 Alexander Drive, P.O. Box 5029
Wallingford, CT 06492

Re: **DOCKET NO. 58** - Bell Atlantic NYNEX Mobile Certificate of Environmental Compatibility and Public Need for telecommunications facilities in the Towns of Glastonbury, Haddam, Hartford, Portland, Rocky Hill, Somers, Willington, and Windsor, Connecticut. Notice of Intent to Modify Portland Facility.

Dear Ms. Gaudet:

At a public meeting held on February 19, 1997, the Connecticut Siting Council (Council) acknowledged your notice to modify an existing telecommunications facility in Portland, Connecticut, pursuant to Section 16-50j-73 of the Regulations of Connecticut State Agencies.

The proposed modification is to be implemented as specified in your notice dated February 7, 1997. The modification is in compliance with the exception criteria in Section 16-50j-72 (b) of the Regulations of Connecticut State Agencies as changes to an existing facility site that would not increase tower height, extend the boundaries of the tower site, increase noise levels at the tower site boundary by six decibels, and increase the total radio frequency electromagnetic radiation power density measured at the tower site boundary to or above the standard adopted by the State Department of Environmental Protection pursuant to General Statutes § 22a-162. This change has been carefully modeled to ensure that radio frequency emissions are conservatively below State and federal standards applicable to the frequency now used and proposed for use on this tower. Any additional change to this facility will require explicit notice to this agency pursuant to Regulations of Connecticut State Agencies Section 16-50j-73. Such notice shall include all relevant information regarding the proposed change with cumulative worst-case modeling of radio frequency exposure at the closest point of uncontrolled access to the tower base, consistent with Federal Communications Commission, Office of Science and Technology, Bulletin No. 65. Any deviation from this format may result in the Council implementing enforcement proceedings pursuant to General Statutes § 16-50u including, without limitation, imposition of expenses resulting from such failure and of civil penalties in an amount not less than one thousand dollars per day for each day of construction or operation in material violation.

Thank you for your attention and cooperation.

Very truly yours,

Mortimer A. Gelston
Chairman

MAG/RKE/ss

c: Honorable Edward L. Kalinowski, First Selectman, Town of Portland

STATE OF CONNECTICUT

CONNECTICUT SITING COUNCIL

10 Franklin Square
New Britain, Connecticut 06051
Phone: (860) 827-2935
Fax: (860) 827-2950

February 20, 1997

Jennifer Young Gaudet
Regulatory Manager
Bell Atlantic NYNEX Mobile
20 Alexander Drive, P.O. Box 5029
Wallingford, CT 06492

Re: **DOCKET NO. 58** - Bell Atlantic NYNEX Mobile Certificate of Environmental Compatibility and Public Need for telecommunications facilities in the Towns of Glastonbury, Haddam, Hartford, Portland, Rocky Hill, Somers, Willington, and Windsor, Connecticut. Notice of Intent to Modify Portland Facility.

Dear Ms. Gaudet:

At a public meeting held on February 19, 1997, the Connecticut Siting Council (Council) acknowledged your notice to modify an existing telecommunications facility in Portland, Connecticut, pursuant to Section 16-50j-73 of the Regulations of Connecticut State Agencies.

The proposed modification is to be implemented as specified in your notice dated February 7, 1997. The modification is in compliance with the exception criteria in Section 16-50j-72 (b) of the Regulations of Connecticut State Agencies as changes to an existing facility site that would not increase tower height, extend the boundaries of the tower site, increase noise levels at the tower site boundary by six decibels, and increase the total radio frequency electromagnetic radiation power density measured at the tower site boundary to or above the standard adopted by the State Department of Environmental Protection pursuant to General Statutes § 22a-162. This change has been carefully modeled to ensure that radio frequency emissions are conservatively below State and federal standards applicable to the frequency now used and proposed for use on this tower. Any additional change to this facility will require explicit notice to this agency pursuant to Regulations of Connecticut State Agencies Section 16-50j-73. Such notice shall include all relevant information regarding the proposed change with cumulative worst-case modeling of radio frequency exposure at the closest point of uncontrolled access to the tower base, consistent with Federal Communications Commission, Office of Science and Technology, Bulletin No. 65. Any deviation from this format may result in the Council implementing enforcement proceedings pursuant to General Statutes § 16-50u including, without limitation, imposition of expenses resulting from such failure and of civil penalties in an amount not less than one thousand dollars per day for each day of construction or operation in material violation.

Thank you for your attention and cooperation.

Very truly yours,

Mortimer A. Gelston
Chairman

MAG/RKE/ss

c: Honorable Edward L. Kalinowski, First Selectman, Town of Portland

Bell Atlantic NYNEX Mobile

Bell Atlantic NYNEX Mobile
20 Alexander Drive
P.O. Box 5029
Wallingford, CT 06492
Telephone: 203-269-8858

Jennifer Young Gaudet
Manager - Regulatory

February 7, 1997

HAND DELIVERED

Mr. Joel M. Rinebold, Executive Director
Connecticut Siting Council
10 Franklin Square
New Britain, Connecticut 06051

Re: Bell Atlantic NYNEX Mobile - Portland Cell Site

Dear Mr. Rinebold:

Bell Atlantic NYNEX Mobile ("BANM" or the "Company") plans to allow Sprint Spectrum L.P. ("Sprint") to install antennas and related equipment at the existing BANM facility in Portland, Connecticut. Please accept this letter as notification, pursuant to R.C.S.A. § 16-50j-73, of construction which constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b). In compliance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to the Mayor of Portland.

The existing facility consists of a 160' monopole and an equipment shelter located off of Goodrich Lane in Portland. This facility was approved by the Connecticut Siting Council in its July 11, 1986 Decision and Order in Docket No. 58.

Sprint plans to attach to the tower nine panel antennas, Decibel Model DB980H90, approximately 5' in height, and one small related Global Positioning Satellite System ("GPS") receive-only antenna; and to install up to six equipment cabinets on a frame adjacent to the tower. At approximately the same time, BANM will mount a small GPS receive-only antenna on its platform for its own use. In addition, BANM will construct a concrete pad for the subsequent installation of a diesel generator for BANM's use; the generator will be installed following receipt of the required DEP permit.

The addition of Sprint's antennas and equipment and BANM's GPS antenna and generator to the tower site does not constitute a modification as defined in C.G.S. § 16-50i(d) because the general physical characteristics of the facility will not be significantly changed or altered. Rather, the planned changes to the facility fall squarely within those activities explicitly provided for in R.C.S.A. § 16-50j-72(b).

First, the height of the tower will be unaffected. Sprint's antennas will be placed on the tower with the center of radiation at the 140' level of the tower; Sprint's GPS antenna will also be placed at that level. Each panel antenna will extend up and down approximately 2 1/2 feet from its center of radiation. BANM's GPS antenna will extend no higher than the antennas mounted on the platform. Thus, the additional antennas will not extend the height of the 160' tower.

Second, the proposed additions, as reflected on the attached site plan, will not extend the site boundaries. The proposed equipment cabinets will be located on a frame, approximately 9' x 15', to be constructed adjacent to the tower. In order to accommodate the frame, the existing chain link fence will be moved to the site boundary. The proposed generator pad will be located within the fenced area. The proposed changes will have no effect on the site boundary.

Third, the proposed additions will not increase the noise levels at the existing facility by six decibels or more. The only additional noise from the generator will be during power outages and routine exercising of the generator for maintenance purposes; the only additional noise from Sprint's equipment will be from cooling mechanisms for the equipment cabinets.

Fourth, operation of the additional antennas will not increase the total radio frequency electromagnetic radiation power density, measured at the tower base, to a level at or above the ANSI standard. A "worst-case" calculation for a point at the base of the tower indicates that BANM's cellular operations result in 0.027 mW/cm^2, or 4.58% of the standard (0.583 for BANM's cellular frequencies). A "worst-case" calculation for a point at the base of the tower indicates that Sprint's antennas would add 0.020 mW/cm^2, or 1.60% of the standard (1.253 mW/cm^2 for Sprint's frequencies). Thus, the calculated "worst-case" power density for the combined operations at the site is 6.18% of the ANSI standard for uncontrolled environments as calculated for a mixed frequency site.

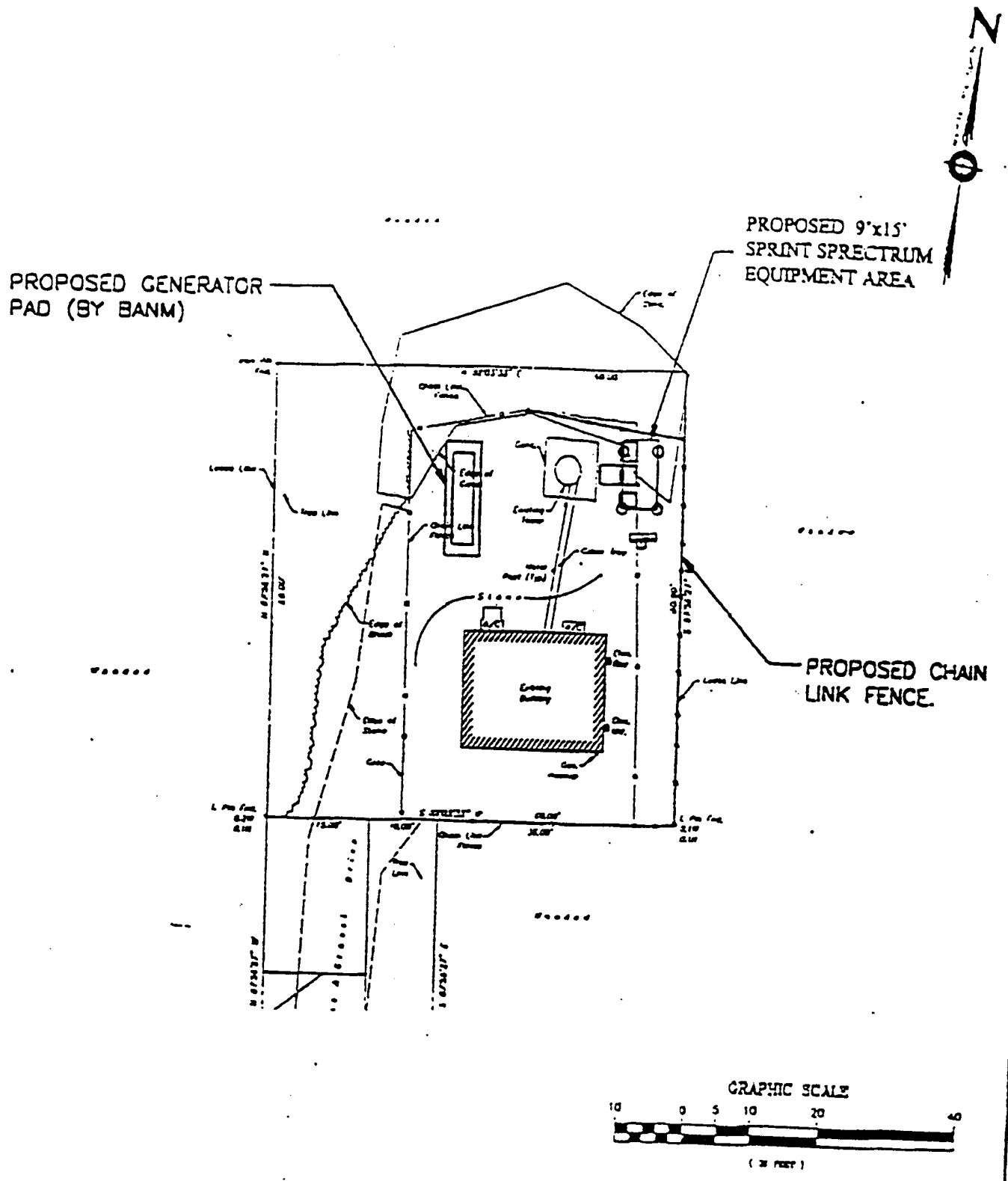
For the foregoing reasons, BANM respectfully submits that the proposed additions of antennas and associated equipment at the Portland facility constitute an exempt modification under R.C.S.A. § 16-50j-72(b).

Respectfully yours,

Jennifer Young Gaudet
Manager - Regulatory

Enclosure
cc: Honorable Edward L. Kalinowski, First Selectman

(Property Description)



SITE PLAN

AS BUILT SURVEY: 8/96

URS Greiner
300 ENTERPRISE DRIVE
ROCKY HILL, CONNECTICUT

LEASE EXHIBIT PLAN

GOODRICH LANE
PORTLAND, CONNECTICUT

LUCENT TECHNOLOGIES AND ADCOTEL ALLIANCE

SPRINT SPECTRUM

PCS INSTALLATION PROJECT

C-1

Bell Atlantic NYNEX Mobile
20 Alexander Drive
P.O. Box 5029
Wallingford, CT 06492
Telephone: 203-269-8858

Jennifer Young Gaudet
Manager - Regulatory

February 7, 1997

Honorable Edward L. Kalinowski, First Selectman
Town Hall
265 Main Street, P.O. Box 71
Portland, CT 06480

Dear First Selectman Kalinowski:

Consistent with the State policy of encouraging tower sharing, Bell Atlantic NYNEX Mobile (the "Company") plans to allow Sprint Spectrum L.P. to share its telecommunications site in Portland. At the same time, Bell Atlantic NYNEX Mobile intends to make minor changes to its site to improve its service. As required by Section 16-50j-73 of the Regulations of Connecticut State Agencies ("R.C.S.A."), please accept this letter and the attached letter to the Connecticut Siting Council dated February 7, 1997, as notice of intent to construct an "exempt modification" pursuant to R.C.S.A. Section 16-50j-72(b).

The attached letter fully sets forth the Company's proposal. However, if you have any questions or require any further information on our plans or the Siting Council's procedures, please contact the undersigned at (203) 949-2805 or Mr. Joel M. Rinebold, Executive Director of the Connecticut Siting Council at (860) 827-2935.

Sincerely,

Jennifer Young Gaudet

Jennifer Young Gaudet
Manager - Regulatory

Enclosure

B1

STATE OF CONNECTICUT

CONNECTICUT SITING COUNCIL
136 Main Street, Suite 401
New Britain, Connecticut 06051-4225
Phone: 827-7682

December 7, 1995

Jennifer Young Gaudet
Bell Atlantic NYNEX Mobile
20 Alexander Drive, P.O. Box 5029
Wallingford, CT 06492

RE: Bell Atlantic NYNEX Mobile notice of intent to modify existing telecommunications facilities in Bloomfield, Bolton, Branford, Bridgeport, Bristol, Clinton, Danbury, Darien, Durham, East Granby, East Lyme, Enfield, Fairfield, Farmington, Glastonbury, Greenwich, Groton, Guilford, Haddam, Hamden, Hartford, Killingworth, Meriden, Middletown, Milford, Naugatuck, New Britain, New Haven, New London, Newtown, North Branford, North Haven, Norwalk, Old Saybrook, Portland, Redding, Ridgefield, Rocky Hill, Somers, Southbury, Stamford, Trumbull, Vernon, West Hartford, West Haven, Wethersfield, Willington, Wilton, Windham, Windsor, Wolcott, and Woodstock, Connecticut.

Dear Ms. Gaudet:

At a meeting held December 6, 1995, the Connecticut Siting Council (Council) ruled that for these facilities over which it has jurisdiction, the modifications are in compliance with the exception criteria in Section 16-50j-72 (b) of the Regulations of Connecticut State Agencies as changes to existing facility sites that would not increase tower height, extend the boundaries of the tower site, increase noise levels at the tower site boundary by six decibels, and increase the total radio frequency electromagnetic radiation power density measured at the tower site boundary to or above the standard adopted by the State Department of Environmental Protection pursuant to General Statutes § 22a-162. These proposed modifications are to be implemented as specified in your notices dated November 22, 1995, and November 30, 1995.

In the case of non-tower structures over which the Council does not have jurisdiction, Bell Atlantic NYNEX Mobile may have regulatory responsibilities with the towns in which the non-tower structures are located.

Please notify the Council when all work is complete.

Very truly yours,

Mortimer A. Gelston
Chairman

MAG/RKE/ss

c: Municipal Offices

siting exmod townsdcl 20695.doc

BI

STATE OF CONNECTICUT

CONNECTICUT SITING COUNCIL

136 Main Street, Suite 401
New Britain, Connecticut 06051
Phone: 827-7682

August 25, 1987

Ms. Jennifer Young Gaudet
Attorney-at-Law
Byrne, Slater, Sandler, Shulman, and Rouse, P.C.
PO Box 3216
330 Main Street
Hartford, CT 06103

Re: Dockets 56, 58, 69, and 73 - Metro Mobile CTS of New Haven, Inc., Hartford, Inc., and Fairfield County, Inc., Certificates of Environmental Compatibility and Public Need for cellular telephone antenna towers and associated equipment.

Dear Ms. Gaudet:

At a meeting of the Siting Council on August 25, 1987, the Council approved the Development and Management Plan modifications described in your letters dated August 7, 1987, and the staff report on the modifications at Metro Mobile's Willington and Greenwich sites.

Enclosed for your reference is a copy of the staff report, dated August 25, 1987. Contact Robert K. Erling of the Council staff, if you have any questions on this matter.

Very truly yours,

Gloria Dibble Pond
Chairperson

RKE/ct
0197E

Enclosure

STATE OF CONNECTICUT

CONNECTICUT SITING COUNCIL
136 Main Street, Suite 401
New Britain, Connecticut 06051
Phone: 827-7682

Cellular Tower Site Modifications
Dockets 56, 58, 69, and 73
Metro Mobile CTS Companies
Staff Report
August 25, 1987

On August 7, 1987, Metro Mobile CTS, Inc., submitted to the Council notices of revised tower site plans for sites in the towns of Milford, Guilford, and North Branford (Metro Mobile CTS of New Haven, Inc., Docket 56); Somers, Rocky Hill, Portland, Haddam, and Willington (Metro Mobile CTS of Hartford, Inc., Docket 58); Killingworth (Metro Mobile CTS of Hartford, Inc., Docket 69); and Greenwich (Metro Mobile CTS of Fairfield County, Inc., Docket 73). With the exception of the Willington and Greenwich sites, the changes are to approved development and management (D&M) plans. Such changes require Council approval.

At most of the sites, Metro Mobile is proposing expansion of the area enclosed by fencing. Its stated purpose is to achieve increased security and flexibility in the use of its tower site parcels.

In Milford, Metro Mobile requests Council approval to fence a 60-foot by 80-foot by 68-foot by 50-foot area within its leased parcel, rather than its previously approved 60-foot by 40-foot area. The site is within a wooded area, 900 feet from Oronoque Road. In Guilford, Metro Mobile seeks to fence its entire 70-foot by 70-foot leased parcel, rather than the previously approved 70-foot by 40-foot area. This site is within an orchard and is adjacent to property containing a water tower. At its North Branford site, Metro Mobile would fence its entire 70-foot by 70-foot parcel, rather than the previously approved 30-foot by 70-foot area. This site is within a wooded area.

In Somers, Metro Mobile wishes to fence a 90-foot by 90-foot area of its 100-foot by 100-foot leased parcel. This site is on a farm. In Rocky Hill, Metro Mobile would fence a 45-foot by 90-foot area within its 50-foot by 100-foot parcel. This site is within property owned by the School of Swimming and is 900 feet from France Street. In Portland, Metro Mobile requests approval to fence a 58-foot by 58-foot area within its 60-foot by 60-foot leased parcel. This site is 170 feet from Goodrich Lane within a wooded area. At its Haddam site, Metro Mobile would fence a 90-foot by 90-foot area of its 100-foot by 100-foot leased parcel. The site is within an automobile junkyard, and is 450 feet from Plains Road.

In Killingworth, Metro Mobile would fence a 90-foot by 90-foot area of its leased 100-foot by 100-foot parcel. This site is within an industrially-zoned area and behind a trucking company.

The Willington site is on a 70-acre parcel of land within a wooded area. Metro Mobile would fence a 90-foot by 90-foot area of its leased 100-foot by 100-foot site. The Council did not require a D&M plan for the Willington site, so the change does not involve a D&M plan modification. The Certificate issued in Docket 58 does not specify the size of the fenced area, so the change would be consistent with the Certificate.

Similarly, no D&M plan was required for Metro Mobile's Greenwich Hospital site. Metro Mobile has notified the Council of two changes. First, it wishes to place only one transmit antenna on this rooftop instead of two. Second, it wishes to mount the 6-foot diameter microwave dish atop the penthouse instead of on the penthouse wall. The penthouse wall was found to be structurally inadequate to support the microwave dish. The Council's Docket 73 Decision and Order did not specify the exact location of the dish on the penthouse, so the change would be consistent with the terms of the Certificate the Council issued. Additionally, since the dish would be farther from the exterior face of the hospital, it is likely that the dish would be less visible.

Robert K. Erling
Siting Analyst

0174E

DOCKET NO. 58

AN APPLICATION OF HARTFORD CELLULAR COMPANY FOR A CERTIFICATE OF ENVIRONMENTAL COMPATIBILITY AND PUBLIC NEED FOR THE CONSTRUCTION, MAINTENANCE, AND OPERATION OF FACILITIES TO PROVIDE CELLULAR SERVICE IN HARTFORD, TOLLAND, AND MIDDLESEX COUNTIES.	:	CONNECTICUT SITING COUNCIL
	:	July 11, 1986

FINDINGS OF FACT

1. Hartford Cellular Company (Hartford), in accordance with provisions of sections 16-50g to 16-50z of the Connecticut General Statutes (CGS), applied to the Connecticut Siting Council (Council) on January 15, 1986, for a certificate of environmental compatibility and public need (certificate) for the construction, maintenance, and operation of telecommunication towers and associated equipment buildings to provide Domestic Public Cellular Radio Telecommunication Service (cellular service) in the Hartford New England County Metropolitan Area (Hartford NECMA). (Record)
2. Cellular tower sites were proposed for the towns of Bloomfield (two), Glastonbury, Haddam, Hartford, Middlefield, Portland, Rocky Hill, Somers, and Willington, Connecticut. (Hartford 1, p. 2)
3. On April 14, 1986, the applicant amended its application to include a proposed tower site in the Town of Vernon. On May 12, 1986, the applicant withdrew one of its proposed Bloomfield sites and proposed a substitute tower site in the Town of Windsor. (Hartford 1, Exhibit 7, p. 4; Hartford 17, p. 2)
4. The application was accompanied by proof of service as required by section 16-501 of the CGS. (Record)
5. The fee as prescribed by section 16-50v-1 of the Regulations of State Agencies (RSA) accompanied the application. (Record)

6. Affidavits of newspaper notice as required by section 16-501 of the CGS were supplied by the applicant. Newspaper notices of this application were published twice by the applicant in the Hartford Courant, Manchester Journal-Inquirer, the Middletown Press, and the Willimantic Chronicle. Notice of the amendment for a proposed Vernon tower site was published twice by the applicant in the Hartford Courant and the Manchester Journal Inquirer. Notice of the amendment for a proposed Windsor site was published twice in the Hartford Courant. (Hartford 1, p. 5; Hartford 7, p. 2; Hartford 17, p. 3)

7. The Council and its staff inspected the proposed tower sites in the towns of Bloomfield and Hartford on March 18, 1986; in Willington and Somers on April 15, 1986; in Portland, Glastonbury, Haddam, Rocky Hill and Middlefield on April 17, 1986; and in Vernon on May 21, 1986. (Record)

8. Pursuant to section 16-50m of the CGS, the Council, after giving due notice thereof, held public hearings on this application on March 18, 1986, at 7:00 P.M. in the Bloomfield Town Hall in Bloomfield; on April 15, 1986, at 7:00 P.M. in the Center School in Willington; on April 17, 1986, at 7:00 P.M. in the Portland Public Library in Portland; and on May 21, 1986, at 7:00 P.M. in the Vernon Center Middle School in Vernon. (Record)

9. The following state agency filed written comments with the Council pursuant to section 16-50j of the CGS: the Department of Environmental Protection (DEP). (Record)

10. The parties to the proceeding are the applicant and those persons and organizations whose names are listed in the Decision and Order which accompanies these findings. (Record)

11. The Council took administrative notice of its complete record in Docket 56; in Docket 40, of Sections I-IV of the application and the Council's Findings of Fact, Opinion, and Decision and Order; in Docket 51, of the Council's Findings of Fact, Opinion, and Decision and Order; in Docket 11, of the Council's Findings of Fact, Opinion, and Decision and Order, and Volume #1 of the Application; in Docket 24, of the Council's Findings of Fact, Opinion, and Decision and Order; and of the Public Utility Environmental Standards Act, CGS 16-50g-z. (Record)

12. Exhibits in this application are as follows:

1) Application dated January 15, 1986; 2) Responses to Pre-Hearing Questions Set #1, dated March 14, 1986; 3) Responses to Pre-hearing Questions Set #2, dated March 18, 1986; 4) Responses to Questions dated April 4, 1986; 5) Responses to Questions dated April 11, 1986; 6) Zoning regulations of specified communities; 7) Amendement to application with Vernon site, dated April 14, 1986; 8) Site-line graphics from Talcott Mountain Science Center Observatory; 9) Dimension of spire atop Heublein Tower; 10) Responses to questions in Peter Cubeta letter dated April 9, 1986; 11) Two sets of 15½"x20" coverage maps; 12) Report on three Portland site alternates; 13) Response dated May 21, 1986, on Rosenfeld property; 14) Response dated April 15, 1986; 15) Response dated April 17, 1986; 16) Response dated May 9, 1986; 17) Amendment to application with Windsor site, dated May 12, 1986; 18) Response dated May 21, 1986; 19) Visibility from

Tilney property; 20) Calculations of power densities at Windsor and Vernon sites; 21) Cell coverage map for Talcott Mountain site with 100' tower; 22) Summary of all cost changes since original application; 23) FAA response to painting and lighting of Vernon and Windsor towers. (Record)

13. Cellular service consists of small overlapping broadcast regions, two to ten miles in diameter, known as cells. Each cell is served by a transmitter limited by the Federal Communications Commission (FCC) to no more than 100 watts effective radiated power per channel. Each cell has a central switching point containing electronic apparatus uniting the cells into a system. Mobile units are limited by the FCC to a maximum of seven watts of transmitted power. (Docket 56, Finding 11)

14. For the purposes of cellular service construction permit applications, the FCC has defined a NECMA consisting of Hartford, Tolland, and Middlesex Counties. (Hartford 1, p. 1, p. 8)

15. The FCC requires that a licensee serve at least 75% of its licensed service area within three years of obtaining an operating license or risk losing the license. The proposed Hartford Cellular system would cover at least 75% of the Hartford NECMA. (Hartford 1, p. 9; Docket 56, Finding 14)

16. Cellular service is an improved mobile telephone service. To date, mobile telephone service has been regulated by the Connecticut Department of Public Utility Control (DPUC). In DPUC Docket No. 85-07-16, the DPUC is considering regulations developed pursuant to Section 7 of Public Act No. 85-552 to determine the extent of state

regulation of cellular service providers licensed by the FCC. Eventually, cellular service could replace the existing simplex mobile service. Cellular service has been classified by the FCC as a form of basic local exchange service, which would also be subject to DPUC regulation. (Hartford 1, p. 31; Docket 56, Finding 14)

17. The FCC has determined that a national public need exists to improve the present mobile telephone service, due to the current system's limited capacity, long waiting lists nationally, and poor quality service, which have created congested channels and long waiting times. (Hartford 1, p. 6; Docket 56, Finding 15)

18. The FCC has established the technical standards for cellular service to insure the efficient use of the allotted frequency spectrum and to insure nationwide compatibility. (Hartford 1, p. 7; Docket 56, Finding 16)

19. The FCC has pre-empted the state's regulation of cellular service in three major areas: technical standards, market structure, and state certification prior to federal application for a construction permit. (Hartford 1, p. 7; Docket 56, Finding 17)

20. Applicants for FCC cellular system authorizations are not required to demonstrate a public need for cellular service, because the FCC has exercised its primary jurisdiction to determine that there is a need for cellular service generally and to encourage the development of cellular service nationwide. (Hartford 1, p. 7; Docket 56, Finding 18)

21. The FCC has reserved to the states jurisdiction with respect to charges, classifications, practices, services, facilities, and regulation of service by licensed carriers. (Docket 56, Finding 19)

22. According to FCC rules, there must be two licenses awarded in each NECMA to provide competition. One is awarded to a wireline company, the other to a non-wireline applicant. (Hartford 1, p. 7; Docket 56, Finding 20)

23. The FCC defines a Reliable Service Contour as an area having a signal quality greater than or equal to 39 dbu. The FCC requires 75% coverage of the cellular geographic service area. (Hartford 1, p. 9; Docket 56, Finding 21)

24. Cell-splitting accommodates the future growth of demand for cellular mobile service. Adding a cell between existing cells increases the number of calls which can be handled in an area. Cell-splitting adds cell sites containing lower power omnidirectional antennas, converts to directional antennas, or does both. (Hartford 1, p. 21; Docket 56, Finding 22)

25. Each new cell achieved by cell-splitting requires additional towers and/or associated equipment. (Docket 56, Finding 23)

26. An omnidirectional antenna radiates in 360 degrees, but may be blocked by part of the tower itself, an effect called shadowing. Terrain and buildings can also cause shadowing. (Docket 56, Finding 24)

27. Shadowing in urban areas can be reduced by overlapping coverage from two cell sites. Such overlapping fills in holes from shadowing and increases the possible number of simultaneous conversations. (Docket 56, Finding 25)

28. The potential for intermodulation interference and shadowing may be significant when antennas broadcasting independent radio signals are located on the same tower. (Hartford 3, Q. 13; Docket 56, Finding 26)

29. Hartford Cellular is a partnership 91% owned by Metro Mobile CTS of Hartford, Inc., which in turn is a wholly-owned subsidiary of Metro Mobile CTS, Inc., a corporation organized in the State of Delaware, with principal business offices at 110 East 59th Street, New York, New York. (Hartford 1, p. 2; Docket 56, Finding 27)

30. Hartford Cellular is authorized by the FCC to construct cell sites in the Hartford NECMA. (Hartford 1, p. 8)

31. Contingent upon Council approval and construction of the proposed cellular system, the applicant will seek a renewable operating license from the FCC. (Hartford 1, p. 9)

32. The FCC has authorized Hartford Cellular and other Metro Mobile affiliates to construct cellular systems in the New Haven, Hartford, and Bridgeport NECMAs in Connecticut as well as the Springfield NECMA in Massachusetts. (Hartford 1, p. 8; Docket 56, Finding 32)

33. The proposed Hartford NECMA and similar NECMAs in Bridgeport and New Haven, Connecticut, and Springfield, Massachusetts, all of which would operate as one system. (Hartford 1, p. 19)

34. A mobile telephone switching office (MTSO) would be located in Windsor to serve as one of the two MTSO's needed for the operation of the system and for interconnection with Southern New England Telephone Company's (SNET's) public switched landline network. A second MTSO would be located in Norwalk. (Hartford 1, p. 19; Hartford 17, p. 4)

35. To begin its search for potential cellular tower sites, Hartford Cellular developed a hexagonal grid for the area to be served, with the center of each hexagon representing a primary cell site location.

For uneven terrain, secondary cell sites were considered. (Hartford 1, p. 26)

36. Primary cell site search areas have a radius of 1.2 miles, and secondary search areas have a 0.6 mile radius. (Hartford 1, p. 26)

37. Using computer modeling, Hartford Cellular based site selections on the location of existing towers; elevation; impacts on residential, historic, scenic, or environmentally sensitive areas; possible interference from airports, transmission lines, or broadcast facilities; ease of access; and utility service. Computer modeling was used in the process of site selection. (Hartford 1, pp. 25-27)

38. The system as originally designed included a 10-20% overlap of cells to assure coverage. (Hartford 1, p. 27)

39. Typically, each cell site would contain a tower and an associated equipment building. Six of the cell sites would feature Rohn SSV Heavy series self-supporting lattice-type towers. Two of the cell sites would contain Rohn SSMW self-supporting lattice-type towers. There is some visual difference between Rohn SSV and SSMW towers, which contain more braces in their lower sections. One proposed site would contain a Valmont Radio Mast monopole, one proposed site would include shared space on an existing tower, and one would use a building roof top instead of a tower. (Hartford 1, pp. 10-11; Hartford 17, Exhibit 6, p. 10; Hartford 1, Exhibit G, pp. 1-4)

40. The Rohn SSV Heavy Series towers proposed for the towns of Haddam, Somers, and Willington would measure 22'x22'x22' at the base. The Rohn SSV Heavy Series towers proposed for the towns of Portland,

Windsor, and Vernon would measure 20'x20'x20' at the base. The Rohn SSMW tower proposed for Bloomfield would measure 22'x22'x22' at its base. The Rohn SSMW tower proposed for Middlefield would measure 27'x27'x27' at its base. (Tr. 3/18/86, pp. 24-25)

41. The proposed Rohn lattice towers would provide the strength and stability needed to support two transmit and three receive antennas, plus 100 square feet of loading capacity to allow for expansion. (Hartford 2, Q. 1)

42. The towers would be constructed of galvanized steel, which weathers to a gray finish. (Tr. 4/17/86, p. 157)

43. As a condition of leasing, the heavier towers proposed for the towns of Bloomfield and Middlefield accommodate shared use with the prospective lessors for paging services and conventional two-way land mobile technologies. No height increment would be necessary for such sharing. (Hartford 2, Q. 9; Hartford 4, Q. 33)

44. Hartford Cellular unsuccessfully attempted to gain shared use of existing SNET towers in the towns of Middlefield and Portland. (Hartford 1, p. 28)

45. All of the towers proposed in this application are designed for Zone A windloading with ½" radial icing under Electronic Industries Association (EIA) Standard RS-222-C. All of the State of Connecticut is within Zone A, requiring towers to withstand 30 psf wind pressure and average extreme velocities of 87 mph. (Hartford 1, p. 12, p. 32)

46. Attached to the top of the proposed towers would be two 11' whip type antennas with 2' mountings on 3' sidearms, adding 13' to the

total height of the tower structures. Three dual 8' reflectorized antennas with 2' mountings on 6' sidearms would be mounted below the top of the tower. The whip antennas would be omnidirectional transmit antennas, while the reflectorized antennas would be receive-only antennas. (Hartford 1, pp. 11-12; Docket 56, Finding 44)

47. A single-story electronics building would be located at the base of a typical tower. These buildings, constructed of concrete or fiberglass, would house receiving, transmitting, switching, processing, and monitoring equipment, as well as a standby power source. Buildings would be approximately 10' in height and contain 350 square feet (ft^2). (Hartford 1, p. 12)

48. The proposed equipment buildings would be unmanned. Typical tower site buildings would have a 12' wide crushed stone driveway and be surrounded by an 8' chain link fence with 12" security wire on top. (Hartford 1, pp. 12-13)

49. As required by the FCC, cellular frequency coordination to avoid interference with the SNET system would be achieved with correct frequency selection, antenna placement, shielding, and filtering. (Hartford 4, Q. 28; Docket 56, Finding 50)

50. Interference between cellular transmission and television reception is very unlikely. (Hartford Late File 10)

51. Motorola has informed Hartford Cellular that, as a general rule, cell tower sites should not be located less than two miles from a full power 50 kilowatt AM broadcast facility due to significant radio frequency interference problems. (Hartford 3, Q. 13; Hartford 15, Q. 47)

52. For the proposed frequency range of 870-890 Mhz, the power density allowable is 2.9 mW/cm^2, according to the American National Standards Institute (ANSI) standard. The electromagnetic radio frequency power densities at all proposed sites would be several orders of magnitude below these standards. Even if the ANSI standards were lowered to one-tenth their present level, all of the proposed tower sites would still be within the standards. (Hartford 1, Exhibit Q; Tr. 5/21/86, p. 136; Docket 56, Finding 53)

53. The proposed Bloomfield tower site is a 45'x85' leased parcel on the ridge of Talcott Mountain, off of Montevideo Road. The title of this land is in dispute. (Hartford 1, Exhibit 9, p. 4, p. 24; Hartford 5, Q. 44; Tr. 4/15/86, p. 22)

54. Located within 400' of the Talcott Mountain Science Center property, within 1200' of the Talcott Mountain Science Center Complex, and within 500' of Talcott Mountain State Park, the proposed Bloomfield site is zoned residential. (Hartford 5, Q. 12, Q. 50; Late File 13)

55. On April 11, 1986, Hartford Cellular submitted a revised site plan for the proposed Bloomfield site, located 200' south of the originally proposed site, 475' from a house now under construction, owned by James Tilney, and within an easement area of the Tilney property. The tower would be 175' from the Wiepert property line. (Hartford 13, Attachment A.; Hartford 5, Q. 48; Tr. 3/18/86, p. 44; Tr. 4/15/86, p. 21; Hartford Late File 19, Exhibit A)

56. Within a 2000' radius of the proposed Bloomfield site, vegetation is variable and consists primarily of 30'-50' deciduous trees. (Hartford 5, Exhibit 4, p. 1)

57. The applicant originally proposed a 180' lattice tower for the Bloomfield site. On May 21, 1986, Hartford Cellular revised its proposed tower height to 100', 113' including antennas. (Hartford 1, Exhibit 9, p. 9; Tr. 5/21/86, pp. 14-15; Hartford Late File 19, Exhibit A)

58. Because of the mountainous terrain, some grading and backfilling would be required at the proposed Bloomfield site. Parking spaces for two vehicles would be required because of the proposed shared use of the facility with the Message Center Beeper Company. (Hartford 1, Exhibit 9, p. 4, p. 15)

59. The lessor of the Bloomfield Talcott Mountain site, Henry Zachs, would initially require three antennas at this site. The company would receive a rental fee for any additional antennas. Mr. Zachs's company, Message Center Beeper Company, does not presently use microwave technology in Connecticut. (Hartford 5, Q. 52, Q. 58)

60. The elevation of the proposed Bloomfield site is 850' above mean sea level (AMSL). The proposed tower would be visible from the towns of Bloomfield and West Hartford, which are located to the east of Talcott Mountain, a regionally prominent ridge line, and from the towns of Avon and Simsbury, which are located to the west of Talcott Mountain. The proposed tower would also be visible from the Talcott Mountain Science Center, located to the north. (Hartford 1, Exhibit 9, p. 5, p. 12; Hartford 5, Exhibit 4; DEP letter of 3/6/86)

61. There is a small private tower on the Wiepert property, estimated as 100' in height, which is adjacent to the proposed Bloomfield site. (Tr. 3/18/86 pp. 73-74; pp. 120-121)

62. Construction of the proposed Bloomfield tower is opposed by the Talcott Mountain Science Center, the Bloomfield Planning and Zoning Commission, and the DEP. The Science Center expressed concern about possible obstruction of its astronomical observations, by a 180' tower. The Bloomfield Planning and Zoning Commission prefers to leave the Talcott Mountain ridge line in its natural state, and the DEP believes the proposed tower would create aesthetic and land use conflicts. (Talcott Mountain Science Center letter of 3/18/86; DEP letter of 3/6/86; Tr. 3/18/86, pp. 118-119)

63. A 20'x20' equipment building would be constructed at the base of the proposed Bloomfield tower. (Hartford 1, Exhibit 9, p. 13)

64. Based on conservative assumptions, operating at 100 watts, the power density for the proposed Bloomfield site would be 0.0060718 mW/cm^2 at the base of the proposed tower. (Hartford 1, Exhibit Q.)

65. Regarding possible alternate sites, Hartford Cellular investigated the nearby radio tower WTHT and Heublein tower but was informed they are not available for shared use. The radio station WCCC tower was investigated, but preliminary analysis indicated inadequate structural strength and the applicant was unable to reach an economically feasible arrangement with the tower owner. The applicant also investigated possible sharing of the DEP tower to be constructed in the area, but determined that such a shared use would require an increase in the intended 60' height of this tower. (Docket 24, Finding 12; Hartford 3, Q. 13; Hartford 5, Q. 45, Q. 46; Tr. 5/21/86, p. 152)

66. There are 13 existing towers, within 3 miles of the proposed Bloomfield site. Those towers located in Avon are a 291' WHCT tower, a 465' WTIC (FM) tower, a 500' WFSB tower, a 100' WWUH (FM) tower, a 465' WEDH TV tower, a 60' DEP tower, a 60' WKNB tower, and a 435' WTIC (AM) tower. Towers located in Bloomfield include a 347' WCCC tower, an 80' RAFS tower, a 100' Department of Motor Vehicles tower, and an 80' Federal Bureau of Investigation tower. The 165' Heublein tower is in Simsbury. (Hartford 5, Q. 45)

67. A potential site proposed by the Town of Bloomfield Assessor on St. Andrews Road was investigated by the applicant, but this site did not meet the company's coverage objectives. This site would shield coverage on the Avon side of Talcott Mountain, and therefore another tower would be required to cover the Avon-Farmington area. (Tr. 4/15/86, pp. 31-32, pp. 54-55)

68. The proposed Glastonbury site is an existing 220' guyed lattice communications tower on a parcel of land off of Birch Mountain Road. The tower is owned by Michael Gassner Electrical Contractors Inc., of West Hartford. (Hartford 1, Exhibit 5, p. 1, p. 4)

69. The proposed transmit antennas would be base mounted at the 178' level of this tower, while the receive antennas would be base mounted at the 167' level. (Hartford 1, Exhibit 5, p. 7)

70. The proposed Glastonbury site is 870' AMSL, and utilities are present as is an access roadway. A 15'x22' equipment building would be constructed at the base of the existing tower. (Hartford 1, Exhibit 5, p. 4, p. 9A, p. 11; Hartford 5, Q. 32)

71. Based on conservative assumptions, the power densities for the proposed Glastonbury site would be 0.0034696 mW/cm^2 at 100 watts, at the

180' level of the tower. (Hartford 1, Exhibit Q)

72. Other towers on land adjacent to the proposed Glastonbury tower are a 146' AT&T Long Lines tower, a 120' SNET tower, a 70' DEP tower, a 120' DEP tower, and a 120' Department of Transportation tower. (Hartford 1, Exhibit 5, p. 6)

73. The proposed Haddam site is a 100'x100' parcel of land owned by Jack and Jacqueline Michael on Turkey Hill Road Zoned residential, but is within an automobile salvage yard. (Hartford 1, Exhibit 1, p. 1, p. 5)

74. The proposed Haddam site is 500' AMSL and is surrounded by deciduous trees. Utilities would be brought in above ground 450' from Plains Road. (Hartford 1, Exhibit 1, p. 6, p. 15, p. 23)

75. The proposed Haddam tower would be a lattice tower 180' in height, 193' including antennas. A 15'x21' equipment building would be constructed at the base. (Hartford 1, Exhibit 1, p. 10, p. 14)

76. The proposed Haddam site is within a right-of-way presently under dispute. The proposed tower would be located approximately 150' from the nearest property line, and therefore might be moved south another 20' by the applicant. (Tr. 4/17/86, p. 144; Tr. 5/21/86, p. 31).

77. The proposed Haddam tower would be visible from the intersection of Ranger Road and Beaver Meadow Road. Approximately the top 40' of the proposed tower might be visible 2½ miles away from the Goodspeed Opera House and from the East Haddam National Register Historic District. (Hartford 5, Exhibit 4; Tr. 5/21/86, p. 93; Hartford Late File 24)

78. The applicant is exploring potential tower sites north of the proposed Haddam site to compensate for an expected coverage gap along Route 9. Hartford Cellular anticipates the need for a tower in the

Middletown area. (Hartford 18, Q. 3)

79. Hartford Cellular cannot reduce the height of the proposed Haddam tower from 180' without losing coverage along Route 9. The proposed Haddam site is one of a group which would provide coverage along Routes 9 and 95 and would interface with an expected Old Saybrook site. (Tr. 5/21/86, pp. 94-98)

80. The applicant has assumed responsibility for constructing and financing a new access road, should it be required at the proposed Haddam site. (Tr. 5/21/86, p. 154)

81. Based on conservative assumptions, power densities at the proposed Haddam site would be 0.0034696 mW/cm^2 at the base of the proposed tower, operating on 100 watts of power. (Hartford 1, Exhibit Q)

82. The proposed Hartford site would be located on the rooftop of an existing building at One State Street owned by Gerald D. Hines Interests and the Hartford Steam Boiler Inspection and Insurance Company. The proposed antennas would be attached to the penthouse on the roof, 300' above ground level (AGL). (Hartford 1, Exhibit 8, pp. 1-2; Hartford 2, Q. 17)

83. The proposed receive antennas would be mounted below the top of the high point of the building. The two proposed whip type transmit antennas would be located 13' above the penthouse facade. The penthouse facade is set back 10' from the overall building facade. Only the two transmit antennas might be visible from nearby streets. (Hartford 1, Exhibit 8, pp. 1-2; Hartford 2, Q. 6)

84. There is one antenna presently at the proposed Hartford site, operated by T-Com Company for paging services. (Hartford 2, Q. 6)

85. The applicant's associated cellular equipment would be in the existing penthouse at the proposed Hartford site. Utilities are present. (Hartford 1, Exhibit 8, p. 2; Hartford 5, Q. 32)

86. Based on conservative assumptions, power densities at the proposed Hartford site would be 0.00184809 mW/cm^2, (Tr. 3/18/86, p. 23; Hartford 4, Q. 30)

87. The proposed Middlefield site is a 75'x75' leased parcel off of Palisades Road on top of Beseck Mountain. The proposed site is owned by Howard McAuliffe of Middletown, Connecticut. (Hartford 1, Exhibit 3, p. 1, p. 4)

88. The proposed Middlefield site is zoned HO-Residential. The proposed tower would be shared with the lessor, a provider of commercial radio service. The lessor would construct a separate communications equipment building, adjacent to the proposed tower, to contain his communications equipment. The applicant has no knowledge of the prospective lessor's actual plans regarding this building, but anticipates this building of undetermined size would be built at the base of the proposed tower. (Hartford 1, Exhibit 3, p. 4; p. 15; Hartford 5, Q. 19)

89. Hartford Cellular would construct a 15'x21' equipment building near the base of the proposed Middlefield tower. (Hartford 1, Exhibit 3, p. 13)

90. Hartford Cellular had originally proposed a 180' lattice tower for the proposed Middlefield site, but on April 17, 1986, reduced the proposed tower height to 130'. (Hartford 1, Exhibit 3, p. 9; Tr. 4/17/86, p. 64)

91. The proposed Beseck Mountain site is 750' AMSL. Beseck Mountain is part of a regionally prominent ridgeline, and the proposed site is the highest point in Middlefield. Hikers on the Mattabassett Trail use Beseck Mountain to obtain scenic views over the area. (Hartford 1, Exhibit 3, p. 14; Tr. 4/17/86, p. 50; Middlefield 2, p. 14; DEP letter of 3/6/86)

92. The proposed tower would violate Middlefield zoning regulations regarding the construction of towers on ridgelines. These regulations, adopted in 1974, require towers to conform to tree lines along ridge tops. (Middlefield 1, p. 28; Tr. 5/21/86, pp. 59-60)

93. Hartford Cellular did not research any literature regarding ridgelines when investigating the proposed Middlefield site. (Tr. 4/17/86, pp. 111-113)

94. The proposed Middlefield site is the only proposed site outside of the company's search area. (Hartford 5, Exhibit 1, Q. 7, pp. 1-10)

95. There are approximately 50 residences located within 2000' of the proposed Middlefield tower site. The proposed tower would be 250' north of the 75' SNET tower. The SNET tower site is 778' AMSL, 28' higher than the proposed Hartford Cellular site. Four other towers located on this ridge are a 30' tower owned by Connecticut Public Broadcasting, a 20' utility pole owned by Message Center Beepers, a 30' utility pole owned by Valley Oil Company, and a 25' mast owned by Valley Oil Company. (Hartford 5, Exhibit 4; Hartford 5, Q. 19; Docket 40, Finding 127)

96. The towns of Meriden and Middlefield both oppose the location of the Middlefield tower as proposed. The Town of Meriden objects to

the proposed site on aesthetic grounds, and the Town of Middlefield opposes the location, size, and design of the proposed tower. (Meriden Planning Commission letter of 2/28/86; Town of Middlefield letter of 3/17/86; Middlefield 4)

97. The proposed Middlefield tower would be visible from the town of Middlefield to the east and Meriden to the west. It would also be visible from the intersection of Beseck Lake Road and West Road, from Spice Apple Lane, and from the intersection of High Hill Road and Wildwood Road. (Hartford 1, Exhibit 3, p. 5; DEP letter of 3/6/86; Hartford 5, Exhibit 4)

98. Another Middlefield site, a 610' elevation south of a transmission line off of Route 66, was analyzed for coverage but was not investigated for availability by the applicant. A 180' tower at this location would result in a significant loss of coverage along roads to the north and southwest. If this site were used instead of the proposed Beseck Mountain site, an additional cell site would be needed in the Wallingford area. (Hartford 18, Q. 60)

99. Hartford Cellular is negotiating with the Connecticut State Police regarding the potential sharing of a proposed tower in Middlefield. (Tr. 4/17/86, p. 64)

100. The applicant would be agreeable to negotiating with the Town of Middlefield for an alternate site. (Tr. 4/17/86, pp. 55-56)

101. Based on conservative assumptions, power densities at the proposed Middlefield site would be 0.0039033 mW/cm^2 at 100 watts at the tower base. (Hartford 1, Exhibit Q)

102. The proposed Portland site is a 60'x60' leased parcel on Goodrich Lane property owned by Terence Newbury of Portland. (Hartford 1, Exhibit 4, pp. 1-3)

103. The proposed site in Portland is 320' AMSL and is set back 170' from Goodrich Lane. The proposed site is surrounded by trees and zoned Rural Residential. (Hartford 1, Exhibit 4, pp. 3-4, pp. 13-14)

104. The proposed Portland tower would be a 160' lattice tower, with 13' additional for antennas, totaling 173'. A 15'x21' equipment building would be located at the base of the proposed tower. (Hartford 1, Exhibit 4, p. 8, p. 12)

105. In compliance with the lessor's wishes, utilities would be brought into the proposed Portland site underground. (Hartford 1, Exhibit 4, p. 3)

106. The proposed Portland tower would be visible from Old Marlborough Turnpike. It would not be visible from Wilcox Road Extension or Coxs Road. The proposed site is 2000' from Meshomasic State Forest. (Hartford 5, Exhibit 4; Hartford 5, Q. 20)

107. Hartford Cellular was refused a request to share an existing SNET tower in Portland. (Hartford 1, Exhibit 4, p. 19)

108. Based on conservative assumptions, power densities at the proposed Portland site would be 0.0049386 mW/cm^2 at 100 watts at the tower base. (Hartford 1, Exhibit Q; Tr. 4/17/86, p. 62)

109. The proposed Rocky Hill site is a 50'x100' leased parcel of land owned by Charles W. Bevier of Portland located 900' north of France Street within property used by the School of Swimming. (Hartford 1, Exhibit 2, pp. 3-4)

110. The proposed Rocky Hill site is zoned R-40 Residential and is within 350' of an existing transmission line. The elevation of the proposed site is 200' AMSL. (Hartford 1, Exhibit 2, pp. 3-4, pp. 13-14)

111. Hartford Cellular would construct a monopole at the proposed Rocky Hill site. The monopole would be 140' in height, a reduction from the original 175'. (Hartford 1, Exhibit 2, p. 8, p. 11; Hartford 2, Q. 2; Tr. 4/17/86, p. 63)

112. A 15'x21' equipment building would be constructed at the base of the proposed Rocky Hill tower. The only structure presently within the drop zone of the proposed tower is a tool shed. (Hartford 1, Exhibit 2, p. 3, p. 12)

113. The applicant investigated a site on Vexation Hill and a SNET tower in Berlin. The Vexation Hill site was rejected due to high residential development in the area. The SNET tower is too short. (Hartford 1, Exhibit 2, p. 22)

114. The proposed Rocky Hill tower would be visible from certain areas along France Street. The proposed monopole would resemble the existing monopole structures of the electric transmission line between the proposed site and France Street. The proposed tower would also be visible from the intersection of Route 160 and New Road and from the intersection of Ten Rod Highway and France Road. (Hartford 1, Exhibit 2, pp. 3-4; Hartford 5, Exhibit 4)

115. The applicant was not willing to propose monopoles at any of the proposed sites other than Rocky Hill, citing expense, twist and sway problems, and the single purpose use of monopoles. (Hartford 15, Q. 52)

116. Based on conservative assumptions, the power densities at the proposed Rocky Hill site would be 0.004337 mW/cm^2 at 100 watts at the base of the tower. (Hartford 1, Exhibit Q)

117. The proposed Somers site is a 100'x100' leased parcel of land located off of Pioneer Heights Road, owned by Clarence D. Farnham of Somers. The proposed site is zoned Residential A-1 and is in agricultural use. (Hartford 1, Exhibit 10, pp. 1-3)

118. The elevation of the proposed Somers site is 400' AMSL. The lattice tower was originally proposed to be 180' in height, but has since been revised by the applicant to 160'. (Hartford 1, Exhibit 10, p. 8, p. 14; Tr. 4/17/86, p. 63)

119. A 15' x 21' equipment building would be constructed near the base of the proposed Somers tower. (Hartford 1, Exhibit 10, p. 12)

120. The applicant investigated and rejected several alternate sites in the Somers area. A hilltop area one mile northwest of the Ellington airport was rejected due to a high degree of residential development and proximity to Ellington airport. The Friedman property on Green Road was rejected due to inaccessibility of the site, low elevation, and long utility runs. The Fox property on Pioneer Heights Road was rejected for lack of adequate space. (Hartford 1, Exhibit 10, p. 21)

121. The proposed Somers tower would be partially visible from Pioneer Heights Road and from Pinney Road. (Hartford 5, Exhibit 4; Tr. 4/15/86, p. 63)

122. Based on conservative assumptions, the power density at the proposed Somers site would be 0.0030359 mW/cm^2 at 100 watts at the base of the tower. (Hartford 1, Exhibit Q)

123. The proposed Vernon site is a 60'x60' leased parcel of land 350' south of South Street owned by the Connecticut Water Company. (Hartford 7, Exhibit 6, pp. 1-3)

124. The proposed Vernon tower would be approximately 250' from the base of an existing 80' Connecticut Water Company water tank. No future water tanks are planned for the proposed site. The proposed tower would be approximately 300' from the nearest occupied dwelling. (Tr. 5/21/86, pp. 130-133)

125. The proposed Vernon site has an elevation of 620' AMSL and is zoned R-22, single family residential. (Hartford 7, Exhibit 6, p. 6, p. 14)

126. With antennas, the proposed Vernon 160' lattice tower would reach 173'. A 15'x21' equipment building would be constructed near the base of the proposed tower. (Hartford 7, Exhibit 6, p. 8, p. 12)

127. The proposed Vernon tower would be visible from the intersection of South Street and Janet Lane, from the intersection of Vernon Avenue and High Street, from the intersection of South Street and Henry Parkway, and from Middle Terrace. Very limited visibility would be obtained from Knollwood Drive. (Hartford 16, Q. 24; Tr. 5/21/86, pp. 131-133)

128. The applicant investigated two alternate sites off of South Street on properties adjacent to the proposed Vernon tower site, but the owners of these properties were not interested in leasing. (Hartford 7, Exhibit 6, p. 21; Hartford 18, Q. 66, Exhibit 1)

129. Based on conservative assumptions, the power density at the proposed Vernon site would be 0.0038411 mW/cm^2 at 100 watts at the base of the tower. (Tr. 4/17/86, p. 62)

130. The proposed Willington tower site is a 100'x100' leased parcel of land on Whifford Hill owned by Martin Drobney of Cosgrove Road. (Hartford 1, Exhibit 11, p. 1, p. 5)

131. The nearest residence to proposed Willington site is owned by the lessor, and is 600' southeast of the proposed site. The nearest off-site residence is 300' away. (Hartford 1, Exhibit 11, p. 5)

132. The proposed Willington site is within a wooded area located 950' AMSL. The proposed site is zoned R-80 Residential. (Hartford 1, Exhibit 11, p. 6, pp. 15-16)

133. The proposed Willington tower was originally proposed to be 180' in height. On April 17, 1986, Hartford Cellular reduced the proposed lattice tower's height to 140'. A 15'x21' equipment building would be constructed near the base of the proposed tower. (Hartford 1, Exhibit 11, p. 10, p. 14; Tr. 4/17/86, p. 65)

134. The proposed Willington tower would be visible from portions of Cosgrove Road, but not from Ruby Road. (Hartford 5, Exhibit 4; Tr. 4/15/86, p. 63)

135. Hartford Cellular investigated property owned by Mrs. Jenkins on Whifford Hill, but the owner was not interested in leasing. (Hartford 1, Exhibit 11, p. 23)

136. Based on conservative assumptions, power densities at the proposed Willington site, would be 0.0030359 mW/cm^2 at the base of the proposed tower, based on conservative assumptions. (Hartford 1, Exhibit Q)

137. The proposed Windsor tower site is a 418'x310'x175'x365' leased parcel of land north of Pigeon Hill Road, owned by Roger Ball of Windsor. (Hartford 17, Exhibit 7A, p. 1, p. 3)

138. The proposed Windsor site is Zoned I-1, Industrial, and is presently a vacant grassy lot 170' AMSL. (Hartford 17, Exhibit 7A, p. 3, p. 13)

139. The proposed Windsor lattice tower would be 160' in height, 173' including antennas. The applicant is negotiating with the Town of Windsor to share the proposed tower for municipal use, such as public safety radio communications. The municipal use is expected to involve five antennas at the 130'-140' level of the proposed tower. (Hartford 17, Exhibit 7A, p. 13; Hartford 17, pp. 3-4)

140. The proposed Windsor site would include a 4000 ft^2 MTSO building. The building would require sanitation facilities and a parking lot for ten vehicles. This MTSO is needed for system operation and for interconnection with SNET's public-switched landline telephone network. (Hartford 1, pp. 12-13, p. 19; Hartford 17, pp. 3-4)

141. A seven kW generator to supply back-up power for the proposed Windsor MTSO would be located near the proposed tower. The generator would be fueled by diesel or propane. (Tr. 5/21/86, p. 134)

142. The proposed Windsor tower would be visible from selected points along Pigeon Hill Road and Addison Road. (Hartford 17, Exhibit A,. p. 4)

143. Based on conservative assumptions, operating at 100 watts, the power density at the proposed Windsor site, would be 0.007312 mW/cm^2 at the tower base. (Hartford Late File 20)

144. Hartford Cellular has not yet received a response from the Federal Aviation Administration (FAA) regarding obstruction marking and lighting for the proposed Vernon and Windsor towers. The FAA has

notified the applicant that obstruction marking and lighting would not be required at any of the other proposed tower sites. (Hartford 2, Q. 5; Tr. 5/21/86, p. 156; Hartford Late File 23)

145. Even if the ANSI power density standards were lowered to one-tenth their present levels, all of the proposed towers would still meet these standards. (Hartford 1, Exhibit Q; Tr. 5/21/86, p. 136)

146. Changes in the originally proposed tower sites and tower heights would still allow Hartford Cellular to cover between 85-90% of the NECMA. (Tr. 4/17/86, p. 95)

147. No known rare, endangered, or threatened species or critical habitats would be affected by the construction of the proposed tower sites. (Hartford 1, Exhibit K; Hartford Late File 24, Exhibit D)

148. The construction of the proposed tower sites would have no substantial effect on the architectural, historical, or archaeological resources listed on or eligible for the National Register of Historic Places, except for the visibility of the proposed Haddam tower from 2½ miles away in East Haddam. (Hartford Late File 24, Exhibit E, Exhibit H)

149. The applicant provided coverage maps of the Hartford NECMA proposed sites to illustrate the characteristics of a cellular system. One indicates the extent of geographic coverage in square miles, and the other indicates the quality of coverage in areas of noisy or non-existent transmissions within a cell's individual coverage area. These maps indicated coverage areas for towers of 140', 160', and 180'. (Hartford 5, Q. 23, Exhibit 2)

150. The company designed its proposed system to provide high quality coverage. The coverage maps depict the farthest reaches of the expected reliable coverage by each cell, and do not depict coverages within the outer boundaries. Changes in tower height would produce changes in coverage that are not indicated. (Hartford 5, Q. 23, Exhibit 2)

151. Since the application does not include any point-to-point facilities, the applicant did not conduct any point-to-point studies concerning intertower, line of sight connections between the proposed tower sites at antenna heights. Propagation studies conducted by the applicant indicated line-of-sight technology is not technically significant for cellular systems. (Hartford 4, Q. 34)

152. The numbers of channels to be provided by each proposed cell site are

Bloomfield,	14;
Glastonbury,	8;
Haddam,	8;
Hartford,	11;
Middlefield,	9;
Portland,	9;
Rocky Hill,	10;
Somers,	7;
Vernon,	7;
Willington,	7;
Windsor,	unknown.

(Hartford 5, Q. 55)

153. Based upon projections included in the original 1983 applications for FCC authorizations to construct and operate cellular telephone systems in the Hartford NECMA, the number of subscribers to wireline and non-wireline cellular service in the Hartford NECMA by 1990 would be 9,000-10,000 subscribers. For proprietary reasons, Hartford Cellular declined to predict customer numbers for 1990. (Hartford 4, Q. 31)

154. Total original costs of constructing the initial Hartford NECMA system were estimated as follows:

Radio and electronics,	$2,198,082.00;
Towers and antennas,	$ 784,800.00;
Utilities,	$ 105,800.00;
Equipment shelters,	$ 796,400.00;
Miscellaneous (including engineering, site preparation, and fencing)	$1,870,400.00;
Total construction and installation	$5,755,482.00.

(Hartford 1, p. 29; Hartford 4, Q. 36)

155. Total cost to construct the revised proposed Hartford NECMA system, including the Vernon tower not included originally, would increase by $306,811.00 to $6,062,293.00. (Hartford 22, Exhibit C; Hartford 4, Q. 36)

156. The addition of the proposed Windsor site and the withdrawal of the Bloomfield (R) site produces no change in total system construction costs. (Hartford 22, Exhibit C)

157. The estimated construction costs for the withdrawn Bloomfield (R) site would have totaled $1,803,941.00 for construction, site preparation, office and MTSO construction, and equipment. (Hartford 1, Exhibit 7, p. 10)

158. The original estimated construction cost for the proposed Bloomfield (RQ) site included:

Radio equipment,	$302,364.00;
Tower and antenna,	$105,900.00;
Utilities,	$ 13,600.00;
Equipment shelter,	$ 75,000.00;
Miscellaneous (including site preparation, and installation),	$ 67,050.00;
Total equipment and construction,	$563,914.00.

(Hartford 1, Exhibit 9, p. 10)

159. Reducing the Bloomfield (CRQ) tower height from 180' to 100' would decrease the cost of its construction by $34,440.00, to $529,474.00. (Hartford 22, Exhibit C)

160. The estimated construction costs for proposed tower-sharing at the Glastonbury site include:

Radio equipment,	$191,338.00;
Antenna and feedline,	$ 25,900.00;
Utilities,	$ 6,800.00;
Equipment shelter,	$ 75,000.00;
Miscellaneous (including site preparation and cost construction),	$ 50,000.00;
Total equipment and construction,	$349,038.00.

(Hartford 1, Exhibit 5, p. 8)

161. The original estimated construction cost for the proposed Haddam site included:

Radio and electronics equipment,	$191,338.00;
Tower and antenna,	$ 85,200.00;
Utilities,	$ 6,800.00;
Equipment shelter,	$ 75,000.00;
Miscellaneous (including site preparation and installation),	$ 67,050.00;
Total equipment and construction,	$425,388.00.

(Hartford 1, Exhibit 1, p. 11)

162. The estimated construction cost for the proposed Hartford site include:

Radio equipment,	$284,223.00;
Antenna,	$ 25,900.00;
Utilities,	$ 6,800.00;
Facility,	$ 20,000.00;
Miscellaneous (including site preparation and installation),	$ 25,000.00;
Total equipment and construction,	$361,923.00.

(Hartford 1, Exhibit 8, p. 5)

163. The original estimated construction cost for the proposed Middlefield site included:

Radio and electronics equipment,	$197,385.00;
Tower and antenna,	$ 85,200.00;
Utilities,	$ 6,800.00;
Equipment shelter,	$ 75,000.00;
Miscellaneous (including site preparation and construction),	$ 67,050.00;
Total equipment and construction,	$431,435.00.

(Hartford 1, Exhibit 3, p. 10)

164. Reducing the Middlefield tower height from 180' to 130' would decrease the cost of construction by $24,710.00 to $406,725.00.

(Hartford 22, Exhibit C)

165. The original estimated construction costs for the proposed Portland site included:

Radio and electronics equipment,	$197,385.00;
Tower and antenna,	$ 85,200.00;
Utilities,	$ 6,800.00;
Equipment shelter,	$ 75,000.00;
Miscellaneous (including site preparation and construction),	$ 67,050.00;
Total equipment and construction,	$431,435.00.

(Hartford 1, Exhibit 4, p. 9)

166. The original estimated construction cost for the proposed Rocky Hill site included:

Radio and electronics equipment,	$278,176.00;
Mast and antenna,	$115,900.00;
Utilities,	$ 13,600.00;
Equipment shelter,	$ 75,000.00;
Miscellaneous (including site preparation and installation),	$ 67,050.00;
Total equipment and construction,	$549,726.00.

(Hartford 1, Exhibit 2, p. 9)

167. Reducing the height of the mast from 175' to 140' would decrease the cost of constructing the proposed Rocky Hill facility by $20,000.00, to $529,726.00. (Hartford 22, Exhibit C)

168. The original estimated construction cost for the proposed Somers site include:

Radio equipment,	$185,291.00;
Tower and antenna,	$ 85,200.00;
Utilities,	$ 6,800.00;
Equipment shelter,	$ 75,000.00;
Miscellaneous (including site preparation and installation),	$ 67,050.00;
Total equipment and construction,	$419,341.00.

(Hartford 1, Exhibit 10, p. 9)

169. Reducing the tower height from 180' to 160' would decrease the cost of constructing the proposed Somers facility by $9,380.00, to $409,961.00. (Hartford 22, Exhibit C)

170. The estimated construction cost for the proposed added Vernon site includes:

Radio equipment,	$185,291.00;
Tower and antennas,	$ 76,200.00;
Utilities,	$ 6,800.00;
Equipment shelter,	$ 75,000.00;
Miscellaneous (including site preparation and installation),	$ 67,050.00;
Total equipment and construction,	$410,341.00.

(Hartford 7, Exhibit 6, p. 9)

171. Adding the Vernon proposed facility would increase the total costs of constructing the Hartford NECMA system by $410,341.00. (Hartford 22, Exhibit C)

172. The original estimated construction cost for the proposed Willington site included:

Radio equipment,	$185,291.00;
Tower and antenna,	$ 85,200.00;
Utilities,	$ 6,800.00;
Equipment shelter,	$ 75,000.00;
Miscellaneous (including site preparation and installation),	$ 67,050.00
Total equipment and construction,	$419,341.00.

(Hartford 1, Exhibit 11, p. 11)

173. The estimated construction cost for the proposed added Windsor site includes:

Radio equipment,	$ 185,291.00;
Tower and antenna,	$ 85,200.00;
Standby power,	$ 31,000.00;
Building,	$ 176,400.00;
Miscellaneous (including site preparation, office and MTSO construction and installation),	$1,326,050.00;
Total equipment and construction,	$1,803,941.00.

(Hartford 17, Exhibit 7A, p. 16)

174. The greater estimated radio equipment costs for the proposed Bloomfield, Hartford, and Rocky Hill cell sites are for additional radio channels and related electronics equipment to handle the greater traffic-handling capacity needed in the metropolitan Hartford area. (Hartford 2, Q. 11)

175. The following table indicates the estimated distances from the nearest utility pole to the proposed equipment building and the estimated costs for underground utility lines:

Site	Distance	Cost
Bloomfield (RQ)	100'	$1,250
Glastonbury	Existing Utilities	
Haddam	450'	$3,150
Hartford	Existing Utilities	
Middlefield	100'	$1,000
Portland	250'	$3,750
Rocky Hill	350'	$1,425
Somers	450'	$1,465
Vernon	250'	$2,065
Willington	350'	$1,425
Windsor	170'	unknown*

* Included in miscellaneous costs Exhibit 7A, p. 16

(Hartford 5, Q. 32; Hartford 17, Exhibit 7A, pp. 16, 21; Hartford Exhibit 22, p. 4)

176. The costs of 140', 160', and 180' Valmont monopole masts identical to the one intended for the proposed Rocky Hill facility are as follows:

140 feet,	$42,000.00;
160 feet,	$55,000.00;
180 feet,	$71,000.00.

(Hartford 4, Q. 39)

DOCKET NO. 58

AN APPLICATION OF HARTFORD CELLULAR COMPANY FOR A CERTIFICATE OF ENVIRONMENTAL COMPATIBILITY AND PUBLIC NEED FOR THE CONSTRUCTION, MAINTENANCE, AND OPERATION OF FACILITIES TO PROVIDE CELLULAR SERVICE IN HARTFORD, TOLLAND AND MIDDLESEX COUNTIES.

CONNECTICUT SITING COUNCIL

July 11, 1986

O P I N I O N

Hartford Cellular Company applied to the Connecticut Siting Council (Council) for a certificate of environmental compatibility and public need for the construction, maintenance, and operation of telecommunication towers and associated equipment in the towns of: Bloomfield; Glastonbury; Haddam; Hartford; Middlefield; Portland; Rocky Hill; Somers; and Willington. The application was subsequently amended to include proposed sites in the towns of Vernon and Windsor.

This application, which includes that portion of the state designated by the Federal Communications Commission (FCC) as the Hartford NECMA, is the second NECMA in the non-wireline competitor's plan to provide cellular telephone coverage to Connecticut. The Hartford NECMA coverages are planned to overlap with coverages from those sites already certificated by the Council in the New Haven NECMA to provide continuous mobile telephone coverage along the major highways of Connecticut.

The geologic characteristics of Connecticut include a Central Lowlands, a Coastal Plain and Western and Eastern Highlands. Most of the major thoroughfares of Connecticut follow paths of least resistance through the Central Valley and

along the coastal plain. Running north and south parallel to the Central Valley are Connecticut's ridgelines, which are both impediments to cellular telephone service and leading candidates for tower sites providing extensive coverage.

Just as the development of Connecticut has been closely tied to its geological formations, so apparently are its cellular telephone sites and coverages. Conflicts between those who wish to see natural ridgelines and broadcasters seeking broad coverage therefore become inevitable. The FCC having declared a need for cellular service, the Council is faced with the difficult choice between sacrificing ridgelines to a few conspicuous towers or placing more towers in less visible areas of lower elevation, where most of the state's population resides. Exposure to electromagnetic radiation at the levels described in this application is not now considered a threat to human health by most United States scientists at the present time.

Since the radiation standards are currently under federal review the Council will order that the certificate holder shall comply with any new EPA RF standard, even if existing facilities are not subject to any such standard when and if it is promulgated.

Tower visibility is the other environmental issue of major concern here. The placement of towers on exposed ridgelines renders such towers more visible to the valleys below the

ridgelines. The Council is concerned about the incremental effects of placing more and more towers on ridgelines, which as a group represent one of the last undeveloped portions of Connecticut and which serve as important migration corridors and habitat for a variety of wildlife. Historically, the Council has encouraged the siting of towers which it found to be of public need within already developed areas, such as commercial and industrial zones where people work, rather than recreational or residential areas where people tend to spend their leisure time.

Sharing existing towers is an option highly encouraged by the Council. Another favorable solution is the siting of towers on the rooftops of tall urban buildings. Such sites tend to provide high elevation, low visibility, and distance from residences.

Given the prominence of ridgelines and the clear intent of both local and state government to protect Connecticut ridgelines, the Council assessed very carefully the need for the proposed Bloomfield and Middlefield tower sites to determine if such need outweighs the environmental effects of the towers. The proposed Bloomfield site is near a state park, an educational facility, and residences. As originally proposed, a 180' lattice tower would be clearly visible over a wide area from all points of the compass. A 100' tower, as the revised application proposes, would still be visible from the

surrounding area. It would be added to thirteen towers and an earth station facility within three miles of the proposed site. This, however, is not sufficient evidence in favor of this proposed site. The Council would prefer the further exploration of the option of siting towers on either side of Talcott Mountain ridge and of the potential for sharing one or more existing towers or tower sites on Talcott and Rattlesnake Mountains. The proposed Bloomfield site is therefore rejected without prejudice.

The proposed Middlefield site on Beseck Mountain offers a somewhat different set of circumstances to those found in Bloomfield. Although it is on a prominent ridgeline, this proposed site is not near a state park or an educational facility. However, it would be clearly visible from a wide area encompassing several towns, major highways, and several homes nearby.

The proposed site is near a Southern New England Telephone (SNET) monopole. Although the applicant reported that SNET refused permission to share their tower at this site it does believe some sharing as with the State Police, will be possible at this site to eliminate the need for some additional towers. The Council urges the applicant to continue negotiating with the State Police regarding a shared tower in the Middlefield area and to reopen negotiation with SNET to seek a means of consolidating facilities at this location, as

is apparently contemplated for a cell site in Southbury.

The Council at this time has no information from the State Police regarding their requirements as to tower height, type, alignment, or antennas. To certificate the applicant's proposed tower at this time could lead to the construction of two new substantial towers atop Beseck Mountain, instead of the consolidation of one shared facility. The Council will therefore reject the proposed Middlefield tower without prejudice, pending further development of a tower sharing and consolidation plan.

The proposed Glastonbury site is on an existing tower, a consolidation strategy the Council strongly encourages. The proposed Haddam tower site raised some visibility questions, but it is not on a prominent ridgeline, nor is it near many residences or any recreational areas. The site will also provide needed coverage along Route 9.

The proposed Hartford site is on the rooftop of an existing building; only two antennas might be visible from the streets below.

The proposed Portland site is not in the immediate vicinity of any homes, but would be visible from Old Marlborough Turnpike. The visibility of a tower at this site would be lessened if a monopole structure were used and the Council will approve the site for a monopole structure only.

In Rocky Hill, the applicant proposed a monopole, which will resemble the pole structures on a nearby electric transmission line. There are no residences in the vicinity of the Rocky Hill site which is within a relatively isolated area. The proposed Somers site is in a level agricultural area and well removed from most homes and roads.

The proposed Vernon tower would be constructed near an existing well-screened water tank which will aid in shielding the lower portion of this tower. Although there are many residences in the area, few would have a direct view of the tower due to the topography of the area. The proposed Willington tower is well removed from any nearby homes and roads, and the substantial number of trees in the area would add further screening.

The proposed Windsor tower would be placed within an industrial area of that town, which has few homes in the immediate vicinity. The tower might also be shared with the Town of Windsor, a relationship the Council encourages.

One salient point noted by the Council in these proceedings was that those tower sites which were proposed for developed areas such as an existing tower, a rooftop, and an industrial zone, received virtually no opposition. Those which were proposed in exposed areas such as residential neighborhoods and ridgelines provoked a substantial negative response from nearby residents and town officials. The Council assumes that the applicant has also noted such responses.

DOCKET NO. 58

AN APPLICATION OF HARTFORD CELLULAR COPANY FOR A CERTIFICATE OF ENVIRONMENTAL COMPATIBILITY AND PUBLIC NEED FOR THE CONSTRUCTION, MAINTENANCE, AND OPERATION OF FACILITIES TO PROVIDE CELLULAR SERVICE IN HARTFORD, TOLLAND AND MIDDLESEX COUNTIES.

CONNECTICUT SITING COUNCIL

July 11, 1986.

D E C I S I O N A N D O R D E R

Pursuant to the foregoing opinion, the Connecticut Siting Council (Council) hereby directs that a Certificate of Environmental Compatibility and Public Need as provided by Section 16-50k of the General Statutes of Connecticut (CGS) be issued to the Hartford Cellular Company for the construction, maintenance, and operation of cellular mobile phone telecommunication towers and associated equipment in the towns of Glastonbury, Haddam, Hartford, Portland, Rocky Hill, Somers, Vernon, Windsor, and Willington subject to the conditions below.

1) The proposed Bloomfield (Talcott 9A) and Middlefield (Beseck 7) sites are rejected without prejudice.

2) The antennas on the Glastonbury tower shall be mounted no higher than the 180' level of this existing tower.

3) The Portland and Rocky Hill towers shall be monopoles.

4) The towers shall be no taller than necessary to provide the proposed service, and in no event shall exceed total heights, including antennas, of

a) 193' at the Haddam site;

b) 173' at the Portland site;

c) 153' at the Rocky Hill site;

d) 173' at the Somers site;

e) 173' at the Vernon site;

f) 153' at the Willington site;

g) 173' at the Windsor site.

5) The Hartford site receive antennas shall be mounted below the top of the high point of the building to preclude visibility.

6) Any future actions requiring the removal of the existing Glastonbury tower to be shared by the certificate holder shall also apply to the equipment mounted on that tower by the certificate holder, regardless of that equipment's status under Chapter 277a of the CGS.

7) The certificate holder shall submit a development and management (D&M) plan for the Haddam, Portland, Rocky Hill, Somers, Vernon and Windsor sites pursuant to Sections 16-50j-75 through 16-50j-77 of the Regulations of State Agencies (RSA), except that irrelevant items in Section 16-50j-76 need only be identified as such. In addition to the requirements of Section 16-50j-76, the D&M plan shall provide plans for evergreen screening around the fenced perimeter at the Haddam, Somers, Vernon, and Windsor sites. The D&M plan shall include a proposal for painting the approved monopole structures to blend with the sky. The D&M plan must be approved prior to facility construction. Any changes to specifications in the D&M plan must be approved by the Council prior to facility operation.

8) All certified facilities shall be constructed, operated, and maintained as specified in the Council's record and in the

site plan required by order number 7.

9) The certificate holder shall comply with any future radiofrequency (RF) standards promulgated by state or federal regulatory agencies. Upon the establishment of any new governmental RF standards, the facilities granted in this decison shall continue to be in compliance with such standards.

10) The certificate holder shall permit public or private entities to share space on the towers approved herein, for due consideration received, or shall provide any requesting entity with specific legal, technical, environmental, or economic reasons precluding such tower sharing. In addition to complying with Section 16-50j-73 of the RSA, the certificate holder shall notify the Council of the addition of any equipment to any approved tower.

11) A fence not lower than 8' shall surround each tower and associated equipment.

12) Unless necessary to comply with order 13, no lights shall be installed on any of these towers.

13) The facilities' construction and any future tower sharing shall be in accordance with all applicable federal, state, and municipal laws and regulations. Shared uses by entities not subject to jurisdiction pursuant to Section 16-50k of the CGS shall be subject to all applicable federal, state, and municipal laws and regulations.

14) Construction activities shall take place during daylight working hours.

15) This decision and order shall be void and the towers and associate equipment shall be dismantled and removed, or reapplication for any new use shall be made to the Council before any such new use is made, if the towers do not provide or permanently cease to provide cellular service following completion of construction.

16) This decision and order shall be void if all construction authorized herein is not completed within three years of the issuance of this decision, or within three years of the completion of any appeal if appeal of this decision is taken, unless otherwise approved by the Council.

Pursuant to CGS Section 16-50p, we hereby direct that a copy of the decision and order shall be served on each person listed below. A notice of the issuance shall be published in the Hartford Courant, Middletown Press, Manchester Journal Inquirer, and the Willimantic Chronicle.

The parties to the proceeding are:

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The Southern New England Telephone Company
227 Church Street
New Haven, Connecticut 06506
ATTN: Peter J. Tyrrell, Esq.

Mr. James W. Tilney

represented by:
Patricia A. Ayars
Samuel Baily, Jr.
Robinson & Cole
One Commercial Plaza
Hartford, CT. 06103-3597

Mr. Samuel DuBosar, Chairman
Bessie Bennett, Esq.
Town Plan & Zoning Commission
P.O. Box 337
Bloomfield, Connecticut 06002

Town of Somers

represented by:

Mr. Robert F. Peters
Town Counsel
Tatoian, Devline, Peters
& Davis
11 South Road
P.O. Box 415
Somers, CT. 06071

Town of Haddam
represented by:

Lucy R. Petrella
Chairperson
Town Office Building
Route 9A
P.O. Box 87
Haddam, CT. 06438

Midstate Regional Planning Agency

represented by:

Thomas M.Gilligan
Regional Planner
P.O. Box 139
Middletown, CT. 06457

Dr. Donald P. LaSalle
Director
Talcott Mountain Science Center
Montevideo Road
Avon, Connecticut 06001

Barnard Tilson (service waived)
Secretary
Avon Planning and Zoning
60 West Main Street
Avon, Connecticut 06001

Alden Giddings
33 Privelege Road
Bloomfield, Connecticut 06002

Town of Bloomfield

represented by:

Joseph M.Suggs, Jr.
Deputy Mayor
Town Hall
880 Bloomfield Avenue
P.O. Box 337
Bloomfield, CT. 06002
(service waived)

Town of Middlefield represented by:

David Silverstone, Esq.
Silverstone & Koontz
37 Lewis Street
Hartford, CT. 06103

with a copy to:

Geoffrey Colegrove
Midstate Regional Planning Agency
100 DeKoven Drive
Middletown, CT. 06457

Zoning Commission represented by:
Town of Somers

Joseph A. Paradis
Chairman
Town Hall
600 Main Street
P.O. Box 803
Somers, CT. 06071

Barbara Sirwilo, Secretary (service waived)
Planning & Zoning Commission
Town of Rocky Hill
600 Old Main Street
P.O. Box 657
Rocky Hill, Connecticut 06067

H. Robert Goodrich (service waived)
Goodrich Lane
Portland, Connecticut 06480

The Honorable Richard P. Antonetti
State Representative (service waived)
5 Sachem Circle
Meriden, Connecticut 06450

John Hevrin
R.D. #1 - Plains Road
Haddam, Connecticut 06438

Norman and Darlene Manning (represented by)

Elizabeth Allen, Esq.
P.O. Box 467
Higganum, CT. 06441
(service waived)

CERTIFICATION

The undersigned members of the Connecticut Siting Council hereby certify that they have heard this case or read the record thereof, and that we voted as follows:

Dated at New Britain, Connecticut, this 11th day of July, 1986.

Council Members	Vote Cast
Gloria Dibble Pond Chairperson	Absent
Commissioner John Downey Designee: Patricia Shea	Yes
Commissioner Stanley Pac Designee: Christopher Cooper	Yes
Owen L. Clark	Yes
Mortimer A. Gelston	Yes
James G. Horsfall	Yes
Pamela B. Katz	Absent
William H. Smith	Yes
Colin C. Tait	Yes

STATE OF CONNECTICUT)
: ss. New Britain, July 11, 1986
COUNTY OF HARTFORD)

I hereby certify that the foregoing is a true and correct copy of the decision and order issued by the Connecticut Siting Council, State of Connecticut.

ATTEST:

Christopher S. Wood, Executive Director
Connecticut Siting Council

Portland, CT : Commercial Property Record Card

[Back to Search Results] [Start a New Search][Help with Printing]

Search For Properties

Parcel ID

Street Name

GOODRICH LANE

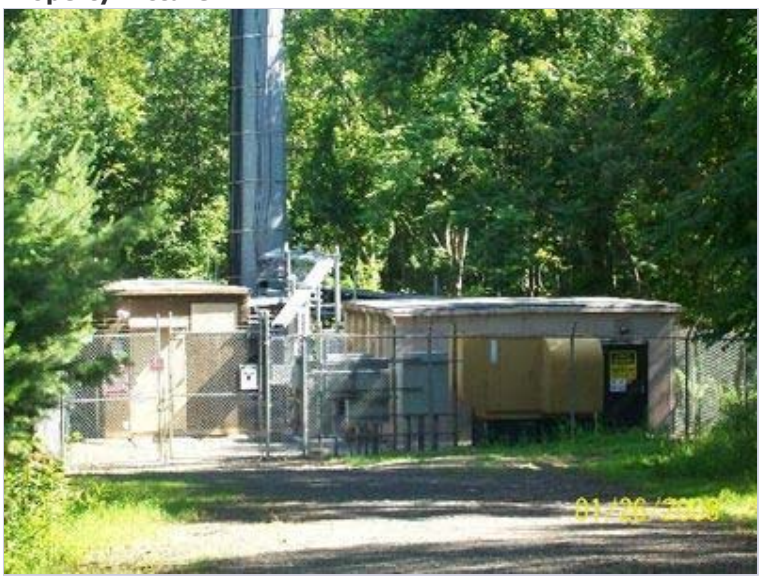
Search Reset Search

Parcel ID	Card	Map-Block-Lot	Location	Zoning	State Class	Acres
00354100	1	084/0009	74 GOODRICH LANE	R25	431 - n/a	0.083

Owner Information

Hale Joan J Crown Atlantic Llc
Pmb 353
4017 Washington Rd
Mcmurray PA 15317

Property Picture



Deed Information

Book/Page: 284/47
Deed Date: 1992/12/23

Building Information

Building No: 0
Year Built: 0
No of Units: 0
Structure Type:
Grade:
Living Units: 0
Identical Units: 0
Net Leasable Area: 0

Valuation

Land: $68,300
Building: $161,950
Total: $230,250
Net Assessment: $161,180

Sales History

Book/Page	Date	Price	Type	Validity

Permit History

Date	Purpose	Price
2015/11/12	REPLC ANTN	$15,000
2014/11/19	ADD REPLA 3 ANT	$15,000

Out Building Information

Structure Code	Width	Lgth/SqFt	Year	RCNLD
Fence Chain	8	260	1996	$4,050
Cell Tower	1	160	1978	$140,400
Shed Frame	1	200	1978	$6,930
Shed Frame	1	96	2000	$1,300
Paving Conc Slab	1	2640	1996	$9,270

Exterior/Interior Information

Levels	Size	Use Type	Ext. Walls	Const. Type	Partitions	Heating	A/C	Plumbing	Condition	Func.	Utility	Unadj. RCNLD

Building Sketch

	Descriptor/Area

Notice

The information delivered through this on-line database is provided in the spirit of open access to government information and is intended as an enhanced service and convenience for citizens of Portland, CT.

The providers of this database: Tyler/CLT, Big Room Studios, and Portland, CT assume no liability for any error or omission in the information provided herein.

Revaluation October 1, 2011. Data is updated in February, April, July and October.

Comments regarding this service should be directed to: assessor@portlandct.org

BUILT BY bigRoom STUDIOS


806382
876364
Meadow Rd
Golf Club Rd
TPC at River Highlands
Geer St
Woodside Rd
Field Rd
Vincy Dr
Shadow Ln
Cromwell
Main St
Nooks Hill Rd
Chelsea Dr
Hillside Rd
Dead Mans Swamp
Connecticut River
West St
Timber Hill Rd
Diane Dr
South St
River Rd
Round Meadow
Main St-CT-17A
Meadow Rd
Gospel Ln
Summer St
Bartlett St
William St
Fairway Dr
Portland Golf Club
Portland Course West
Quarry Ridge Golf Course
Rose Hill Rd
Carr Brook
Cox Rd
Wilcox Hill Rd
Glastonbury Tpke
Paley Farms Rd
Isinglass Hill Rd
Hales Brook
Appletree Ln
Wangunk Meadows
Thompson Hill Rd
E Cotton Hill Rd
N Mulford Rd
Buck Brook
Reservoir Rd
Portland Reservoir
Midwood Farm Rd
Reservoir Brook
Old Marlborough Tpke
South Rd
Mulford Rd
Cox Rd
Stocking Brook
Wood Choppers Rd
Stephen Tom Rd
Great Hill Rd
Rattlesnake Brook
Penfield
Green River
2 km
1 mi
Crown Castle | Earthstar Geographics | Esri, HERE, DeLorme, NGA, USGS, NPS
CCIsites™

WIRELESS COMMUNICATIONS FACILITY
CT5836 - LTE 2C
PORTLAND
CROWN CASTLE SITE NO.: 806382
74 GOODRICH LANE
PORTLAND, CT 06480

GENERAL NOTES

1. ALL WORK SHALL BE IN ACCORDANCE WITH THE 2003 INTERNATIONAL BUILDING CODE AS MODIFIED BY THE 2005 CONNECTICUT SUPPLEMENT AND 2009 AMENDMENTS, INCLUDING THE TIA/EIA-222 REVISION "F" "STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWERS AND SUPPORTING STRUCTURES." 2005 CONNECTICUT FIRE SAFETY CODE AND 2009 AMENDMENTS, NATIONAL ELECTRICAL CODE AND LOCAL CODES.
2. THE COMPOUND, TOWER, PRIMARY GROUND RING, ELECTRICAL SERVICE TO THE METER BANK AND TELEPHONE SERVICE TO THE DEMARCATION POINT ARE PROVIDED BY SITE OWNER. AS BUILT FIELD CONDITIONS REGARDING THESE ITEMS SHALL BE CONFIRMED BY THE CONTRACTOR. SHOULD ANY FIELD CONDITIONS PRECLUDE COMPLIANCE WITH THE DRAWINGS, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER AND SHALL NOT PROCEED WITH ANY AFFECTED WORK.
3. CONTRACTOR SHALL REVIEW ALL DRAWINGS AND SPECIFICATIONS IN THE CONTRACT DOCUMENT SET. CONTRACTOR SHALL COORDINATE ALL WORK SHOWN IN THE SET OF DRAWINGS. THE CONTRACTOR SHALL PROVIDE A COMPLETE SET OF DRAWINGS TO ALL SUBCONTRACTORS AND ALL RELATED PARTIES. THE SUBCONTRACTORS SHALL EXAMINE ALL THE DRAWINGS AND SPECIFICATIONS FOR THE INFORMATION THAT AFFECTS THEIR WORK.
4. CONTRACTOR SHALL PROVIDE A COMPLETE BUILD-OUT WITH ALL FINISHES, STRUCTURAL, MECHANICAL, AND ELECTRICAL COMPONENTS AND PROVIDE ALL ITEMS AS SHOWN OR INDICATED ON THE DRAWINGS OR IN THE WRITTEN SPECIFICATIONS.
5. CONTRACTOR SHALL FURNISH ALL MATERIAL, LABOR AND EQUIPMENT TO COMPLETE THE WORK AND FURNISH A COMPLETED JOB ALL IN ACCORDANCE WITH LOCAL AND STATE GOVERNING AUTHORITIES AND OTHER AUTHORITIES HAVING LAWFUL JURISDICTION OVER THE WORK.
6. CONTRACTOR SHALL SECURE AND PAY FOR ALL PERMITS AND ALL INSPECTIONS REQUIRED AND SHALL ALSO PAY FEES REQUIRED FOR THE GENERAL CONSTRUCTION, PLUMBING, ELECTRICAL AND HVAC. PERMITS SHALL BE PAID FOR BY THE RESPECTIVE SUBCONTRACTORS.
7. CONTRACTOR SHALL MAINTAIN A CURRENT SET OF DRAWINGS AND SPECIFICATIONS ON SITE AT ALL TIMES AND INSURE DISTRIBUTION OF NEW DRAWINGS TO SUBCONTRACTORS AND OTHER RELEVANT PARTIES AS SOON AS THEY ARE MADE AVAILABLE. ALL OLD DRAWINGS SHALL BE MARKED VOID AND REMOVED FROM THE CONTRACT AREA. THE CONTRACTOR SHALL FURNISH AN 'AS-BUILT' SET OF DRAWINGS TO OWNER UPON COMPLETION OF PROJECT.
8. LOCATION OF EQUIPMENT, AND WORK SUPPLIED BY OTHERS THAT IS DIAGRAMMATICALLY INDICATED ON THE DRAWINGS SHALL BE DETERMINED BY THE CONTRACTOR. THE CONTRACTOR SHALL DETERMINE LOCATIONS AND DIMENSIONS SUBJECT TO STRUCTURAL CONDITIONS AND WORK OF THE SUBCONTRACTORS.
9. THE CONTRACTOR IS SOLELY RESPONSIBLE TO DETERMINE CONSTRUCTION PROCEDURE AND SEQUENCE, AND TO ENSURE THE SAFETY OF THE EXISTING STRUCTURES AND ITS COMPONENT PARTS DURING CONSTRUCTION. THIS INCLUDES THE ADDITION OF WHATEVER SHORING, BRACING, UNDERPINNING, ETC. THAT MAY BE NECESSARY. MAINTAIN EXISTING BUILDING'S/PROPERTY'S OPERATIONS, COORDINATE WORK WITH BUILDING/PROPERTY OWNER.
10. DRAWINGS INDICATE THE MINIMUM STANDARDS, BUT IF ANY WORK SHOULD BE INDICATED TO BE SUBSTANDARD TO ANY ORDINANCES, LAWS, CODES, RULES, OR REGULATIONS BEARING ON THE WORK, THE CONTRACTOR SHALL INCLUDE IN HIS WORK AND SHALL EXECUTE THE WORK CORRECTLY IN ACCORDANCE WITH SUCH ORDINANCES, LAWS, CODES, RULES OR REGULATIONS WITH NO INCREASE IN COSTS.
11. ALL UTILITY WORK SHALL BE IN ACCORDANCE WITH LOCAL UTILITY COMPANY REQUIREMENTS AND SPECIFICATIONS.
12. ALL EQUIPMENT AND PRODUCTS PURCHASED ARE TO BE REVIEWED BY CONTRACTOR AND ALL APPLICABLE SUBCONTRACTORS FOR ANY CONDITION PER MFR.'S RECOMMENDATIONS. CONTRACTOR TO SUPPLY THESE ITEMS AT NO COST TO OWNER OR CONSTRUCTION MANAGER.
13. ANY AND ALL ERRORS, DISCREPANCIES, AND 'MISSED" ITEMS ARE TO BE BROUGHT TO THE ATTENTION OF THE AT&T CONSTRUCTION MANAGER DURING THE BIDDING PROCESS BY THE CONTRACTOR. ALL THESE ITEMS ARE TO BE INCLUDED IN THE BID. NO 'EXTRA' WILL BE ALLOWED FOR MISSED ITEMS.
14. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL ON-SITE SAFETY FROM THE TIME THE JOB IS AWARDED UNTIL ALL WORK IS COMPLETE AND ACCEPTED BY THE OWNER.
15. CONTRACTOR TO REVIEW ALL SHOP DRAWINGS AND SUBMIT COPY TO ENGINEER FOR APPROVAL. DRAWINGS MUST BEAR THE CHECKER'S INITIALS BEFORE SUBMITTING TO THE CONSTRUCTION MANAGER FOR REVIEW.
16. THE CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS, ELEVATIONS, ANGLES, AND EXISTING CONDITIONS AT THE SITE, PRIOR TO FABRICATION AND/OR INSTALLATION OF ANY WORK IN THE CONTRACT AREA.
17. COORDINATION, LAYOUT, FURNISHING AND INSTALLATION OF CONDUIT AND ALL APPURTENANCES REQUIRED FOR PROPER INSTALLATION OF ELECTRICAL AND TELECOMMUNICATION SERVICE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
18. ALL EQUIPMENT AND PRODUCTS PURCHASED ARE TO BE REVIEWED BY CONTRACTOR AND ALL APPLICABLE SUB-CONTRACTORS FOR ANY CONDITION PER THE MANUFACTURER'S RECOMMENDATIONS. CONTRACTOR TO SUPPLY THESE ITEMS AT NO COST TO OWNER OR CONSTRUCTION MANAGER.
19. ALL DAMAGE CAUSED TO ANY EXISTING STRUCTURE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR WILL BE HELD LIABLE FOR ALL REPAIRS REQUIRED FOR EXISTING STRUCTURES IF DAMAGED DURING CONSTRUCTION ACTIVITIES.
20. THE CONTRACTOR SHALL CONTACT "CALL BEFORE YOU DIG" AT LEAST 48 HOURS PRIOR TO ANY EXCAVATIONS AT 1-800-922-4455. ALL UTILITIES SHALL BE IDENTIFIED AND CLEARLY MARKED PRIOR TO ANY EXCAVATION WORK. CONTRACTOR SHALL MAINTAIN AND PROTECT MARKED UTILITIES THROUGHOUT PROJECT COMPLETION.
21. CONTRACTOR SHALL COMPLY WITH OWNERS ENVIRONMENTAL ENGINEER ON ALL METHODS AND PROVISIONS FOR ALL EXCAVATION ACTIVITIES INCLUDING SOIL DISPOSAL. ALL BACKFILL MATERIALS TO BE PROVIDED BY THE CONTRACTOR.

SITE DIRECTIONS

FROM: 500 ENTERPRISE DRIVE
ROCKY HILL, CONNECTICUT

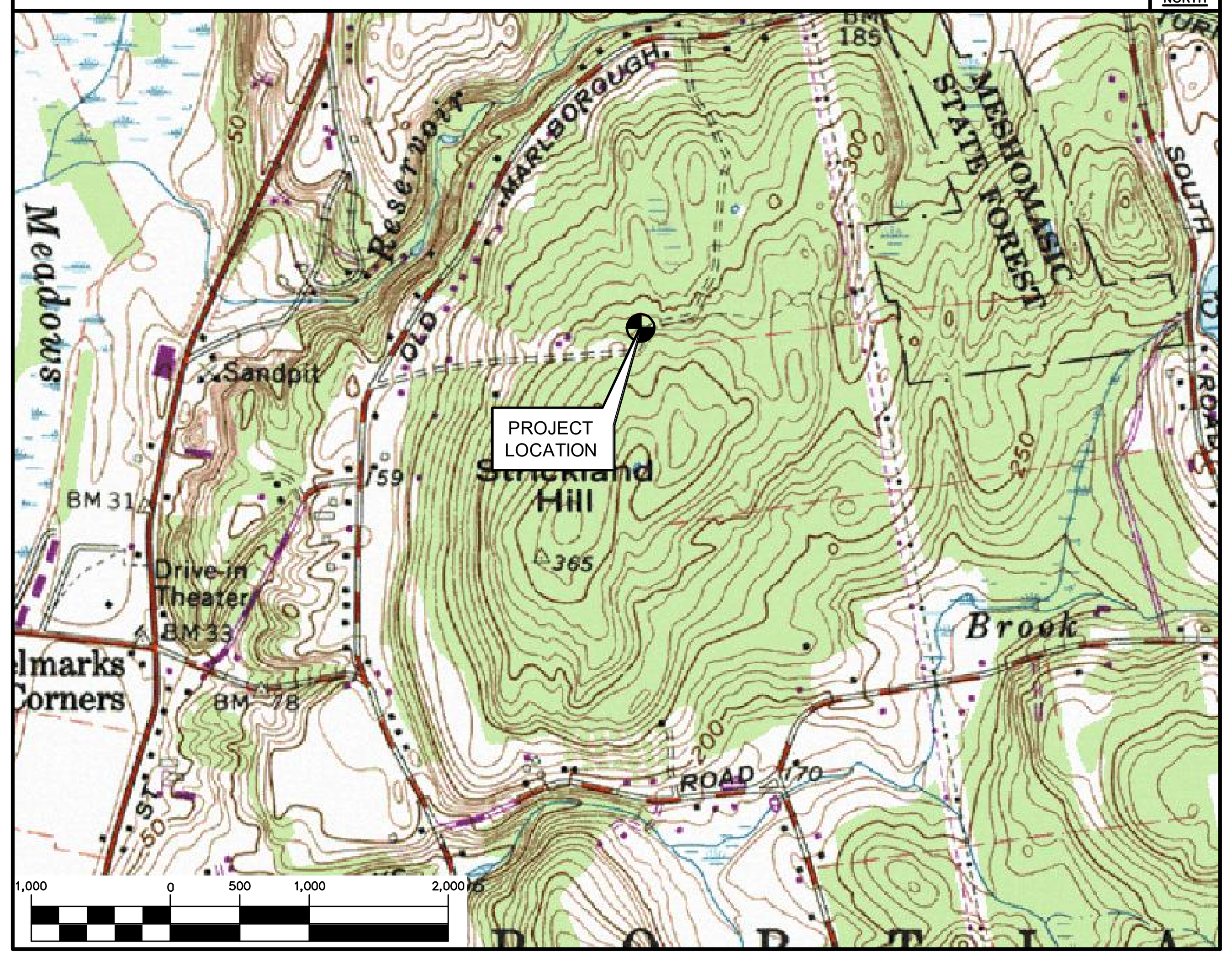
TO: 74 GOODRICH LANE
PORTLAND, CONNECTICUT

1.	HEAD NORTHEAST ON ENTERPRISE DR TOWARD CAPITAL BLVD	0.30 MI
2.	TURN LEFT ONTO CAPITAL BLVD	0.30 MI
3.	TURN LEFT ONTO WEST ST	0.30 MI
4.	TURN LEFT TO MERGE ONTO I-91 S TOWARD NEW HAVEN	1.40 MI
5.	MERGE ONTO CT-9 S via EXIT 22S TOWARD MIDDLETOWN/OLD SAYBROOK	5.60 MI
6.	TURN RIGHT ONTO CT-17/SAINT JOHNS SQ.	0.20 MI
7.	TURN RIGHT ONTO CT-66/CT-17/MAIN ST. CONTINUE TO FOLLOW MAIN ST.	4.00 MI
8.	MAIN ST. BECOMES SAGE HOLLOW RD.	0.10 MI
9.	TURN SLIGHT LEFT ONTO CORNWALL ST.	0.40 MI
10.	TURN LEFT ONTO OLD MARLBOROUGH TURNPIKE	0.10 MI
11.	TAKE THE 1ST RIGHT ONTO GOODRICH LANE.	0.30 MI
12.	ARRIVE AT 74 GOODRICH LANE ON LEFT	

VICINITY MAP

SCALE: 1" = 1000'

NORTH



PROJECT SUMMARY

1. THE PROPOSED SCOPE OF WORK CONSISTS OF A MODIFICATION TO THE EXISTING UNMANNED TELECOMMUNICATIONS FACILITY INCLUDING THE FOLLOWING:

   A. INSTALL (3) NEW RRUS-11 BEHIND POSITION 3 ANTENNA

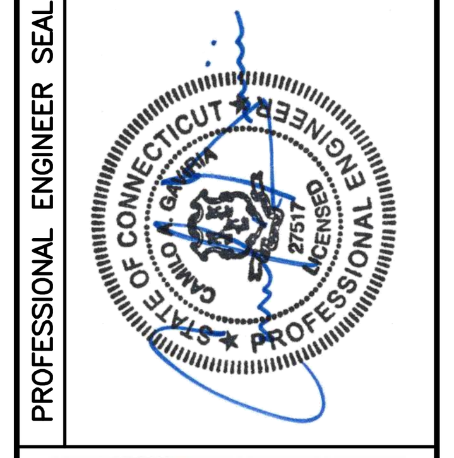
PROJECT INFORMATION

AT&T SITE NUMBER:	CT5836
AT&T SITE NAME:	PORTLAND
SITE ADDRESS:	CROWN CASTLE SITE NO.: 806382 74 GOODRICH LANE PORTLAND, CT 06480
LESSEE/APPLICANT:	NEW CINGULAR WIRELESS PCS, LLC 500 ENTERPRISE DRIVE, SUITE 3A ROCKY HILL, CT 06067
ENGINEER:	CENTEK ENGINEERING, INC. 63-2 NORTH BRANFORD RD. BRANFORD, CT. 06405
PROJECT COORDINATES:	LATITUDE: 41°-36'-29.490"N LONGITUDE: 72°-35'-29.396"W GROUND ELEVATION: ±338.5' AMSL GROUND ELEVATION REFERENCED FROM GOOGLE EARTH. COORDINATES REFERENCED FROM RFDS DOCUMENTS.

SHEET INDEX

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	06/20/16	WWW	JTD	CONSTRUCTION DOCUMENTS - ISSUED FOR CONSTRUCTION

PROFESSIONAL ENGINEER SEAL



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AT&T MOBILITY
WIRELESS COMMUNICATIONS FACILITY
PORTLAND
CT5836 - LTE 2C
74 GOODRICH LANE
PORTLAND, CT 06480

DATE: 06/15/16
SCALE: AS NOTED
JOB NO. 16071.02

TITLE SHEET

T-1

NOTES AND SPECIFICATIONS

DESIGN BASIS:

GOVERNING CODE: 2003 INTERNATIONAL BUILDING (IBC) AS MODIFIED BY THE 2005 CT STATE BUILDING CODE AND 2009 AMENDMENTS.

1. DESIGN CRITERIA:

- WIND LOAD: PER EIA/TIA 222 F–96 (ANTENNA MOUNTS): 85 MPH (FASTEST MILE), EQUIVALENT TO 105 MPH (3 SECOND GUST)
- BUILDING CLASSIFICATION: II (BASED ON IBC TABLE 1604.5)
- BASIC WIND SPEED (OTHER STRUCTURE): 105 MPH (3 SECOND GUST) (EXPOSURE B/IMPORTANCE FACTOR 1.0 BASED ON ASCE 7–02) PER 2003 INTERNATIONAL BUILDING CODE (IBC) AS MODIFIED BY THE 2005 CONNECTICUT SUPPLEMENT AND 2009 AMMENDMENT.
- SEISMIC LOAD (DOES NOT CONTROL): PER ASCE 7–02 MINIMUM DESIGN LOADS FOR BUILDING AND OTHER STRUCTURES.

GENERAL NOTES:

1. ALL CONSTRUCTION SHALL BE IN COMPLIANCE WITH THE GOVERNING BUILDING CODE.
2. DRAWINGS INDICATE THE MINIMUM STANDARDS, BUT IF ANY WORK SHOULD BE INDICATED TO BE SUBSTANDARD TO ANY ORDINANCES, LAWS, CODES, RULES, OR REGULATIONS BEARING ON THE WORK, THE CONTRACTOR SHALL INCLUDE IN HIS WORK AND SHALL EXECUTE THE WORK CORRECTLY IN ACCORDANCE WITH SUCH ORDINANCES, LAWS, CODES, RULES OR REGULATIONS WITH NO INCREASE IN COSTS.
3. BEFORE BEGINNING THE WORK, THE CONTRACTOR IS RESPONSIBLE FOR MAKING SUCH INVESTIGATIONS CONCERNING PHYSICAL CONDITIONS (SURFACE AND SUBSURFACE) AT OR CONTIGUOUS TO THE SITE WHICH MAY AFFECT PERFORMANCE AND COST OF THE WORK.
4. DIMENSIONS AND DETAILS SHALL BE CHECKED AGAINST EXISTING FIELD CONDITIONS.
5. THE CONTRACTOR SHALL VERIFY AND COORDINATE THE SIZE AND LOCATION OF ALL OPENINGS, SLEEVES AND ANCHOR BOLTS AS REQUIRED BY ALL TRADES.
6. ALL DIMENSIONS, ELEVATIONS, AND OTHER REFERENCES TO EXISTING STRUCTURES, SURFACE, AND SUBSURFACE CONDITIONS ARE APPROXIMATE. NO GUARANTEE IS MADE FOR THE ACCURACY OR COMPLETENESS OF THE INFORMATION SHOWN. THE CONTRACTOR SHALL VERIFY AND COORDINATE ALL DIMENSIONS, ELEVATIONS, ANGLES WITH EXISTING CONDITIONS AND WITH ARCHITECTURAL AND SITE DRAWINGS BEFORE PROCEEDING WITH ANY WORK.
7. AS THE WORK PROGRESSES, THE CONTRACTOR SHALL NOTIFY THE OWNER OF ANY CONDITIONS WHICH ARE IN CONFLICT OR OTHERWISE NOT CONSISTENT WITH THE CONSTRUCTION DOCUMENTS AND SHALL NOT PROCEED WITH SUCH WORK UNTIL THE CONFLICT IS SATISFACTORILY RESOLVED.
8. THE CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE SAFETY CODES AND REGULATIONS DURING ALL PHASES OF CONSTRUCTION. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR PROVIDING AND MAINTAINING ADEQUATE SHORING, BRACING, AND BARRICADES AS MAY BE REQUIRED FOR THE PROTECTION OF EXISTING PROPERTY, CONSTRUCTION WORKERS, AND FOR PUBLIC SAFETY.
9. THE CONTRACTOR IS SOLELY RESPONSIBLE TO DETERMINE CONSTRUCTION PROCEDURE AND SEQUENCE, AND TO ENSURE THE SAFETY OF THE EXISTING STRUCTURES AND ITS COMPONENT PARTS DURING CONSTRUCTION. THIS INCLUDES THE ADDITION OF WHATEVER SHORING, BRACING, UNDERPINNING, ETC. THAT MAY BE NECESSARY. MAINTAIN EXISTING SITE OPERATIONS, COORDINATE WORK WITH NORTHEAST UTILITIES
10. THE STRUCTURE IS DESIGNED TO BE SELF–SUPPORTING AND STABLE AFTER FOUNDATION REMEDIATION WORK IS COMPLETE. IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY TO DETERMINE ERECTION PROCEDURE AND SEQUENCE AND TO ENSURE THE SAFETY OF THE STRUCTURE AND ITS COMPONENT PARTS DURING ERECTION. THIS INCLUDES THE ADDITION OF WHATEVER SHORING, TEMPORARY BRACING, GUYS OR TIEDOWNS, WHICH MIGHT BE NECESSARY.
11. ALL DAMAGE CAUSED TO ANY EXISTING STRUCTURE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR WILL BE HELD LIABLE FOR ALL REPAIRS REQUIRED FOR EXISTING STRUCTURES IF DAMAGED DURING CONSTRUCTION ACTIVITIES.
12. SHOP DRAWINGS, CONCRETE MIX DESIGNS, TEST REPORTS, AND OTHER SUBMITTALS PERTAINING TO STRUCTURAL WORK SHALL BE FORWARDED TO THE OWNER FOR REVIEW BEFORE FABRICATION AND/OR INSTALLATION IS MADE. SHOP DRAWINGS SHALL INCLUDE ERECTION DRAWINGS AND COMPLETE DETAILS OF CONNECTIONS AS WELL AS MANUFACTURER'S SPECIFICATION DATA WHERE APPROPRIATE. SHOP DRAWINGS SHALL BE CHECKED BY THE CONTRACTOR AND BEAR THE CHECKER'S INITIALS BEFORE BEING SUBMITTED FOR REVIEW.
13. NO DRILLING WELDING OR TAPING ON CL&P OWNED EQUIPMENT.
14. REFER TO DRAWING T1 FOR ADDITIONAL NOTES AND REQUIREMENTS.

STRUCTURAL STEEL

1. ALL STRUCTURAL STEEL IS DESIGNED BY ALLOWABLE STRESS DESIGN (ASD)

   A. STRUCTURAL STEEL (W SHAPES)–––ASTM A992 (FY = 50 KSI)
   B. STRUCTURAL STEEL (OTHER SHAPES)–––ASTM A36 (FY = 36 KSI)
   C. STRUCTURAL HSS (RECTANGULAR SHAPES)–––ASTM A500 GRADE B, (FY = 46 KSI)
   D. STRUCTURAL HSS (ROUND SHAPES)–––ASTM A500 GRADE B, (FY = 42 KSI)
   E. PIPE–––ASTM A53 (FY = 35 KSI)
   F. CONNECTION BOLTS–––ASTM A325–N
   G. U–BOLTS–––ASTM A36
   H. ANCHOR RODS–––ASTM F 1554
   I. WELDING ELECTRODE–––ASTM E 70XX

2. CONTRACTOR TO REVIEW ALL SHOP DRAWINGS AND SUBMIT COPY TO ENGINEER FOR APPROVAL. DRAWINGS MUST BEAR THE CHECKER'S INITIALS BEFORE SUBMITTING TO THE ENGINEER FOR REVIEW. SHOP DRAWINGS SHALL INCLUDE THE FOLLOWING: SECTION PROFILES, SIZES, CONNECTION ATTACHMENTS, REINFORCING, ANCHORAGE, SIZE AND TYPE OF FASTENERS AND ACCESSORIES. INCLUDE ERECTION DRAWINGS, ELEVATIONS AND DETAILS.
3. STRUCTURAL STEEL SHALL BE DETAILED, FABRICATED AND ERECTED IN ACCORDANCE WITH THE LATEST PROVISIONS OF AISC MANUAL OF STEEL CONSTRUCTION.
4. PROVIDE ALL PLATES, CLIP ANGLES, CLOSURE PIECES, STRAP ANCHORS, MISCELLANEOUS PIECES AND HOLES REQUIRED TO COMPLETE THE STRUCTURE.
5. FIT AND SHOP ASSEMBLE FABRICATIONS IN THE LARGEST PRACTICAL SECTIONS FOR DELIVERY TO SITE.
6. INSTALL FABRICATIONS PLUMB AND LEVEL, ACCURATELY FITTED, AND FREE FROM DISTORTIONS OR DEFECTS.
7. AFTER ERECTION OF STRUCTURES, TOUCHUP ALL WELDS, ABRASIONS AND NON–GALVANIZED SURFACES WITH A 95% ORGANIC ZINC RICH PAINT IN ACCORDANCE WITH ASTM 780.
8. ALL STEEL MATERIAL (EXPOSED TO WEATHER) SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123 "ZINC (HOT DIPPED GALVANIZED) COATINGS" ON IRONS AND STEEL PRODUCTS.
9. ALL BOLTS, ANCHORS AND MISCELLANEOUS HARDWARE SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A153 "ZINC COATING (HOT–DIP) ON IRON AND STEEL HARDWARE".
10. THE ENGINEER SHALL BE NOTIFIED OF ANY INCORRECTLY FABRICATED, DAMAGED OR OTHERWISE MISFITTING OR NON CONFORMING MATERIALS OR CONDITIONS TO REMEDIAL OR CORRECTIVE ACTION. ANY SUCH ACTION SHALL REQUIRE ENGINEER REVIEW.
11. CONNECTION ANGLES SHALL HAVE A MINIMUM THICKNESS OF 1/4 INCHES.
12. STRUCTURAL CONNECTION BOLTS SHALL CONFORM TO ASTM A325. ALL BOLTS SHALL BE 3/4" DIAMETER MINIMUM AND SHALL HAVE A MINIMUM OF TWO BOLTS, UNLESS OTHERWISE ON THE DRAWINGS.
13. LOCK WASHER ARE NOT PERMITTED FOR A325 STEEL ASSEMBLIES.
14. SHOP CONNECTIONS SHALL BE WELDED OR HIGH STRENGTH BOLTED.
15. MILL BEARING ENDS OF COLUMNS, STIFFENERS, AND OTHER BEARING SURFACES TO TRANSFER LOAD OVER ENTIRE CROSS SECTION.
16. FABRICATE BEAMS WITH MILL CAMBER UP.
17. LEVEL AND PLUMB INDIVIDUAL MEMBERS OF THE STRUCTURE TO AN ACCURACY OF 1:500, BUT NOT TO EXCEED 1/4" IN THE FULL HEIGHT OF THE COLUMN.
18. COMMENCEMENT OF STRUCTURAL STEEL WORK WITHOUT NOTIFYING THE ENGINEER OF ANY DISCREPANCIES WILL BE CONSIDERED ACCEPTANCE OF PRECEDING WORK.
19. INSPECTION AND TESTING OF ALL WELDING AND HIGH STRENGTH BOLTING SHALL BE PERFORMED BY AN INDEPENDENT TESTING LABORATORY.
20. FOUR COPIES OF ALL INSPECTION TEST REPORTS SHALL BE SUBMITTED TO THE ENGINEER WITHIN TEN (10) WORKING DAYS OF THE DATE OF INSPECTION.

PAINT NOTES

PAINTING SCHEDULE:

1. ANTENNA PANELS:

   A. SHERWIN WILLIAMS POLANE–B
   B. COLOR TO BE MATCHED WITH EXISTING TOWER STRUCTURE.

2. COAXIAL CABLES:

   A. ONE COAT OF DTM BONDING PRIMER (2–5 MILS. DRY FINISH)
   B. TWO COATS OF DTM ACRYLIC PRIMER/FINISH (2.5–5 MILS. DRY FINISH)
   C. COLOR TO BE FIELD MATCHED WITH EXISTING STRUCTURE.

EXAMINATION AND PREPARATION:

1. DO NOT APPLY PAINT IN SNOW, RAIN, FOG OR MIST OR WHEN RELATIVE HUMIDITY EXCEEDS 85%. DO NOT APPLY PAINT TO DAMP OR WET SURFACES.
2. VERIFY THAT SUBSTRATE CONDITIONS ARE READY TO RECEIVE WORK. EXAMINE SURFACE SCHEDULED TO BE FINISHED PRIOR TO COMMENCEMENT OF WORK. REPORT ANY CONDITION THAT MAY POTENTIALLY AFFECT PROPER APPLICATION.
3. TEST SHOP APPLIED PRIMER FOR COMPATIBILITY WITH SUBSEQUENT COVER MATERIALS.
4. PERFORM PREPARATION AND CLEANING PROCEDURE IN STRICT ACCORDANCE WITH COATING MANUFACTURER'S INSTRUCTIONS FOR EACH SUBSTRATE CONDITION.
5. CORRECT DEFECTS AND CLEAN SURFACES WHICH AFFECT WORK OF THIS SECTION. REMOVE EXISTING COATINGS THAT EXHIBIT LOOSE SURFACE DEFECTS.
6. IMPERVIOUS SURFACE: REMOVE MILDEW BY SCRUBBING WITH SOLUTION OF TRI–SODIUM PHOSPHATE AND BLEACH. RINSE WITH CLEAN WATER AND ALLOW SURFACE TO DRY.
7. ALUMINUM SURFACE SCHEDULED FOR PAINT FINISH: REMOVE SURFACE CONTAMINATION BY STEAM OR HIGH–PRESSURE WATER. REMOVE OXIDATION WITH ACID ETCH AND SOLVENT WASHING. APPLY ETCHING PRIMER IMMEDIATELY FOLLOWING CLEANING.
8. FERROUS METALS: CLEAN UNGALVANIZED FERROUS METAL SURFACES THAT HAVE NOT BEEN SHOP COATED; REMOVE OIL, GREASE, DIRT, LOOSE MILL SCALE, AND OTHER FOREIGN SUBSTANCES. USE SOLVENT OR MECHANICAL CLEANING METHODS THAT COMPLY WITH THE STEEL STRUCTURES PAINTING COUNCIL'S (SSPC) RECOMMENDATIONS. TOUCH UP BARE AREAS AND SHOP APPLIED PRIME COATS THAT HAVE BEEN DAMAGED. WIRE BRUSH, CLEAN WITH SOLVENTS RECOMMENDED BY PAINT MANUFACTURER, AND TOUCH UP WITH THE SAME PRIMER AS THE SHOP COAT.
9. GALVANIZED SURFACES: CLEAN GALVANIZED SURFACES WITH NON–PETROLEUM–BASED SOLVENTS SO SURFACE IS FREE OF OIL AND SURFACE CONTAMINANTS. REMOVE PRETREATMENT FROM GALVANIZED SHEET METAL FABRICATED FROM COIL STOCK BY MECHANICAL METHODS.
10. ANTENNA PANELS: REMOVE ALL OIL, DUST, GREASE, DIRT, AND OTHER FOREIGN MATERIAL TO ENSURE ADEQUATE ADHESION. PANELS MUST BE WIPED WITH METHYL ETHYL KETONE (MEK).
11. COAXIAL CABLES: REMOVE ALL OIL, DUST, GREASE. DIRT, AND OTHER FOREIGN MATERIAL TO ENSURE ADEQUATE ADHESION.

CLEANING:

1. COLLECT WASTE MATERIAL, WHICH MAY CONSTITUTE A FIRE HAZARD, PLACE IN CLOSED METAL CONTAINERS AND REMOVE DAILY FROM SITE.

APPLICATION:

1. APPLY PRODUCTS IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.
2. DO NOT APPLY FINISHES TO SURFACES THAT ARE NOT DRY.
3. APPLY EACH COAT TO UNIFORM FINISH.
4. APPLY EACH COAT OF PAINT SLIGHTLY DARKER THAN PRECEDING COAT UNLESS OTHERWISE APPROVED.
5. SAND METAL LIGHTLY BETWEEN COATS TO ACHIEVE REQUIRED FINISH.
6. VACUUM CLEAN SURFACES FREE OF LOOSE PARTICLES. USE TACK CLOTH JUST PRIOR TO APPLYING NEXT COAT.
7. ALLOW APPLIED COAT TO DRY BEFORE NEXT COAT IS APPLIED.

COMPLETED WORK:

1. SAMPLES: PREPARE 24" X 24" SAMPLE AREA FOR REVIEW.
2. MATCH APPROVED SAMPLES FOR COLOR, TEXTURE AND COVERAGE. REMOVE REFINISH OR REPAINT WORK NOT IN COMPLIANCE WITH SPECIFIED REQUIREMENTS.

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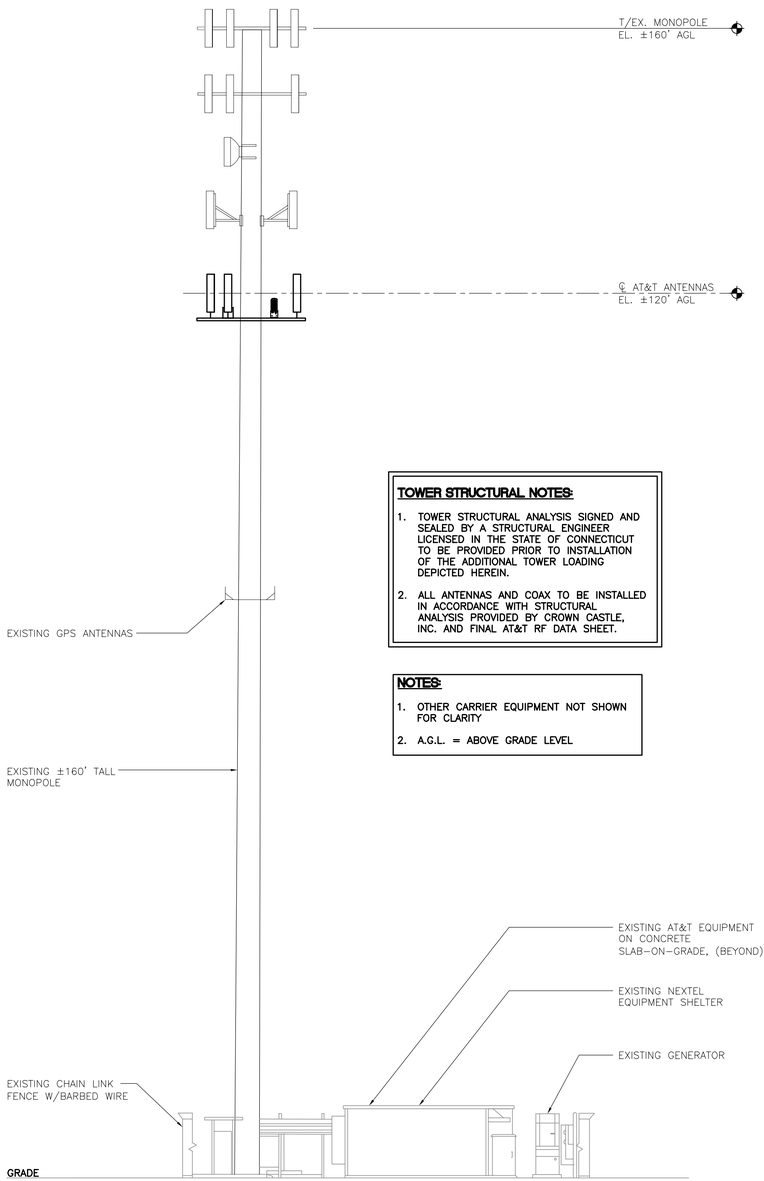
NOTES AND SPECIFICATIONS

N-1



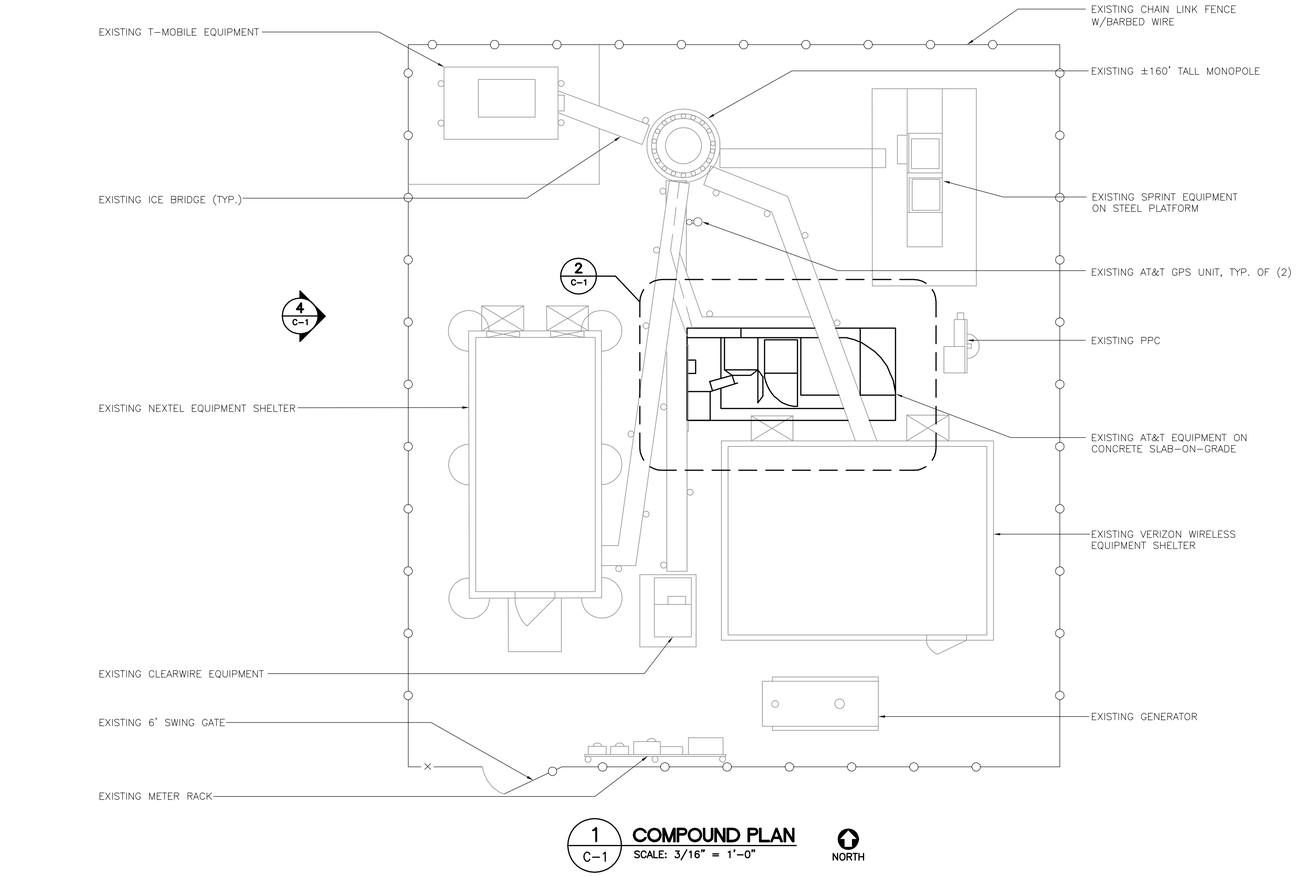
TOWER STRUCTURAL NOTES:

1. TOWER STRUCTURAL ANALYSIS SIGNED AND SEALED BY A STRUCTURAL ENGINEER LICENSED IN THE STATE OF CONNECTICUT TO BE PROVIDED PRIOR TO INSTALLATION OF THE ADDITIONAL TOWER LOADING DEPICTED HEREIN.
2. ALL ANTENNAS AND COAX TO BE INSTALLED IN ACCORDANCE WITH STRUCTURAL ANALYSIS PROVIDED BY CROWN CASTLE, INC. AND FINAL AT&T RF DATA SHEET.

NOTES:

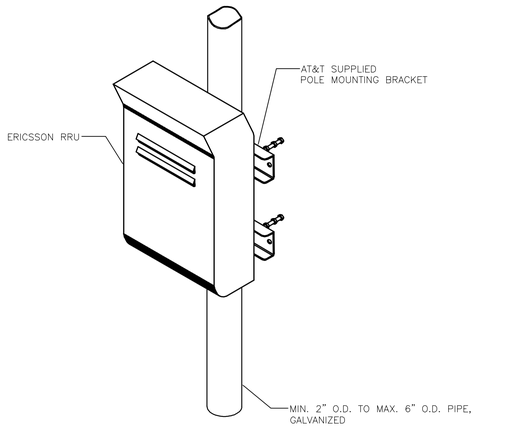
1. OTHER CARRIER EQUIPMENT NOT SHOWN FOR CLARITY
2. A.G.L. = ABOVE GRADE LEVEL

4 C-1 WEST ELEVATION
SCALE: 1" = 10'



1 C-1 COMPOUND PLAN
SCALE: 3/16" = 1'-0"

NORTH

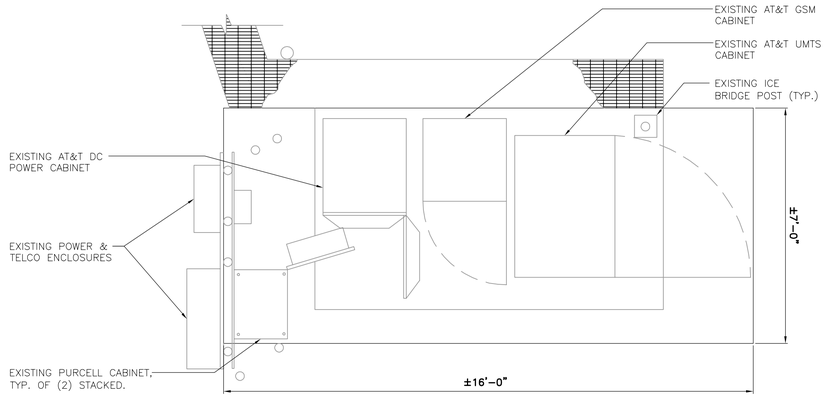


ISOMETRIC VIEW

NOTES:

1. AT&T SHALL SUPPLY RRU, AND RRU POLE-MOUNTING BRACKET. CONTRACTOR SHALL SUPPLY POLE/PIPE AND INSTALL ALL MOUNTING HARDWARE INCLUDING ERICSSON RRU POLE-MOUNTING BRACKET. CONTRACTOR SHALL INSTALLS RRU AND MAKES CABLE TERMINATIONS.
3. NO PAINTING OF THE RRU OR SOLAR SHIELD IS ALLOWED.

3 C-1 EQUIPMENT ELEVATION
SCALE: 3/4" = 1'-0"



2 C-1 EQUIPMENT LAYOUT PLAN
SCALE: 1/8" = 1'-0"

NORTH

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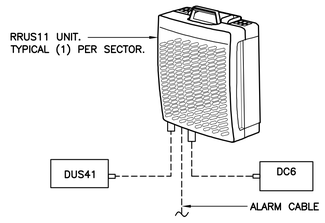
PLANS, ELEVATION AND DETAILS

C-1

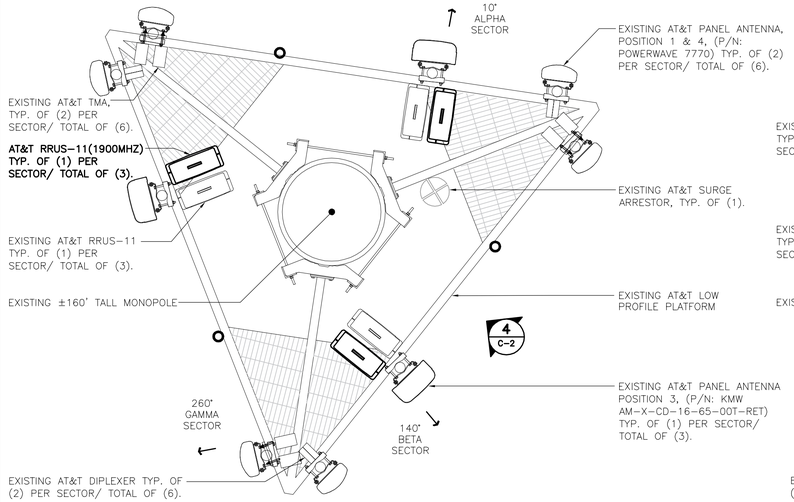
Sheet No. 3 of 7



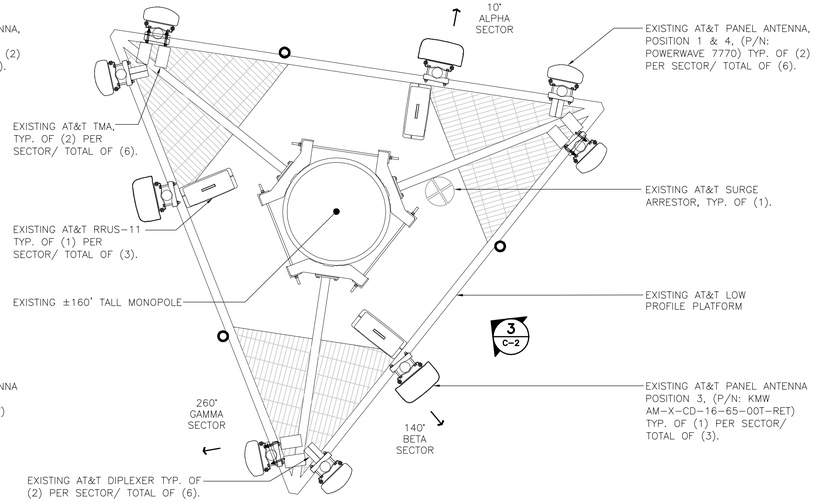
RRU (REMOTE RADIO UNIT)			
EQUIPMENT	DIMENSIONS	WEIGHT	CLEARANCES
MAKE: ERICSSON MODEL: RRUS-11	17.8"L x 17.3"W x 7.2"D	50 LBS.	ABOVE: 16" MIN. BELOW: 12" MIN. FRONT: 36" MIN.

NOTES:
1. CONTRACTOR TO COORDINATE FINAL EQUIPMENT MODEL SELECTION WITH AT&T CONSTRUCTION MANAGER PRIOR TO ORDERING.

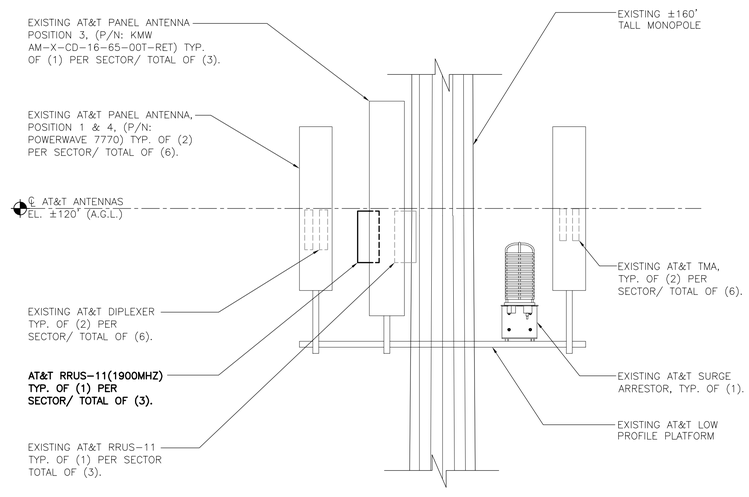
5 / C-2 **ERICSSON RRUS 11 DETAIL**
SCALE: 1" = 1'-0"



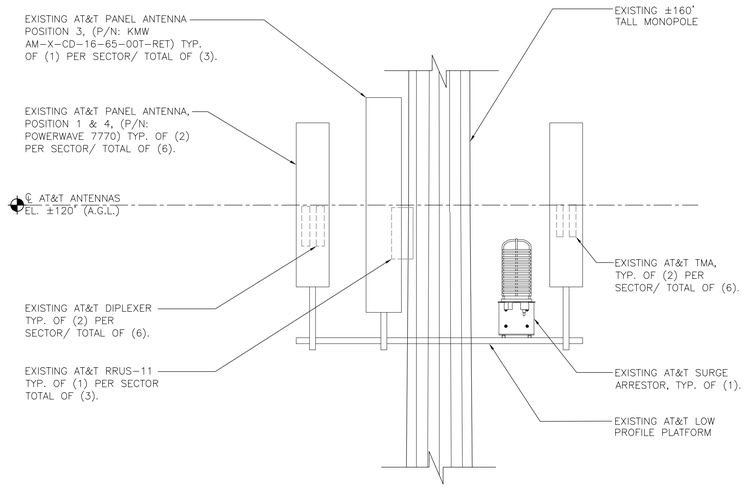
2 / C-2 **PROPOSED ANTENNA PLAN**
SCALE: 1/2" = 1'-0"
NORTH



1 / C-2 **EXISTING ANTENNA PLAN**
SCALE: 1/2" = 1'-0"
NORTH



4 / C-2 **PROPOSED ANTENNA PLAN**
SCALE: 1/2" = 1'-0"



3 / C-2 **EXISTING ANTENNA PLAN**
SCALE: 1/2" = 1'-0"

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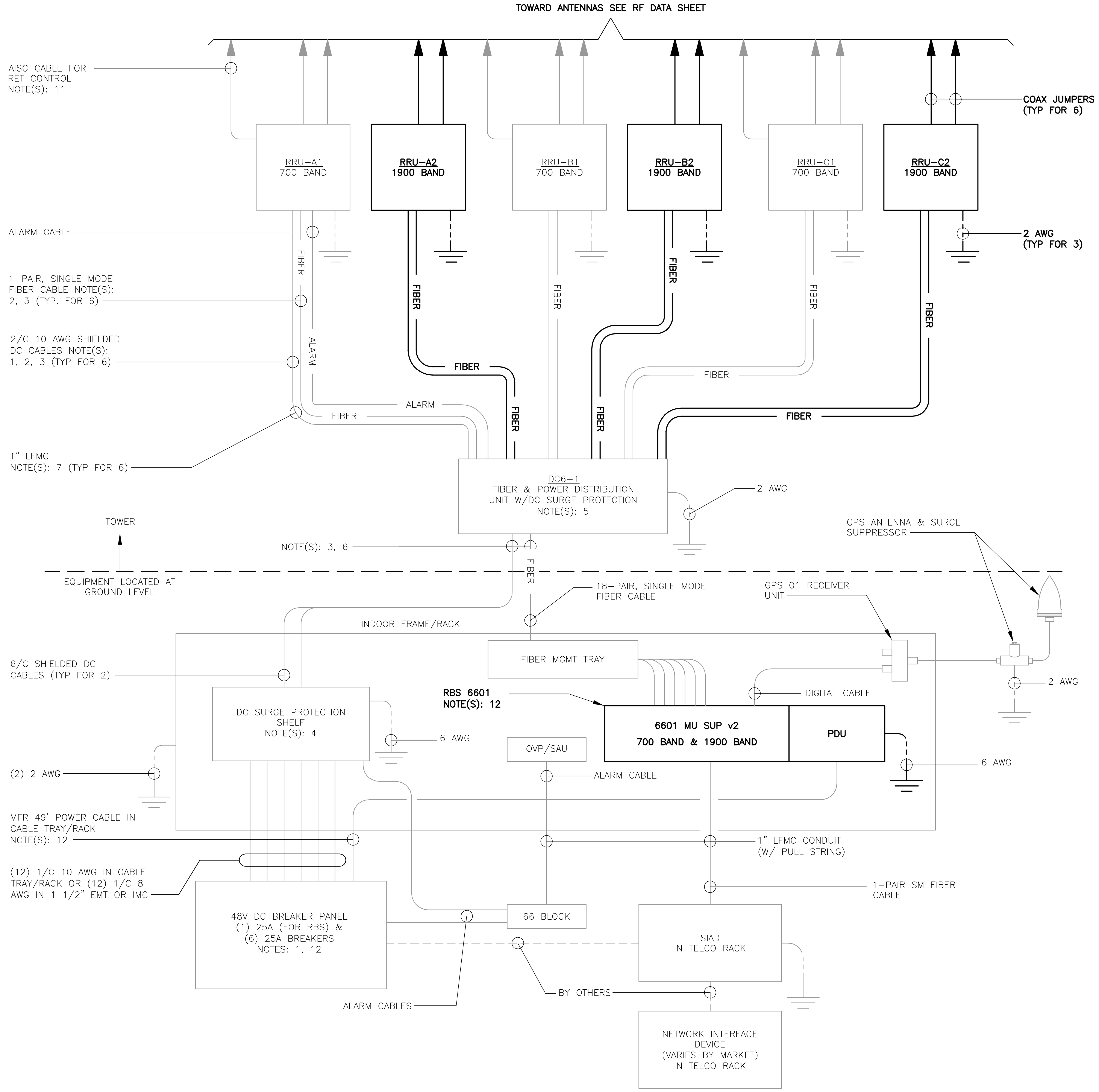
LTE 2C EQUIPMENT DETAILS

C-2

Sheet No. 4 of 7



1 / E-1

LTE SCHEMATIC DIAGRAM

NOT TO SCALE

LTE SCHEMATIC DIAGRAM NOTES:

1. BREAKERS TO BE TAGGED AND LOCKED OUT. A 20A (MIN.) OR 30A (MAX.) BREAKER FOR RRUs MAY BE SUBSTITUTED FOR THE RECOMMENDED 25A BREAKER. SIZE 12 CONDUCTORS MAY BE USED ONLY WITH 20A BREAKERS.
2. LEAVE COILED AND PROTECTED UNTIL TERMINATED.
3. DC AND FIBER CABLE SHALL BE ROUTED WITH THE EXISTING COAX CABLE.
4. DC SURGE PROTECTION SHELF SHALL BE RAYCAP DCx–48–60–RM.
5. FIBER & DC DISTRIBUTION BOX W/DC SURGE PROTECTION SHALL BE RAYCAP DC6–48–60–18–8F.
6. SUPPORT FIBER & DC POWER CABLES WITH SNAP–IN HANGERS SPACED NO GREATER THAN 3 FEET APART ON TOWER. SUPPORT FIBER AND DC POWER CABLES INSIDE MONOPOLE WITH CABLE HOISTING GRIPS AT 250 FT MAXIMUM INTERVALS. DRESS CABLES TO PREVENT CONTACT WITH ENTRANCE AND EXIT OPENINGS.
7. CONDUIT TO BE USED ON A TOWER IF THE RRU IS MORE THAN 10' FROM THE DISTRIBUTION UNITS. MAX CABLE LENGTH IS 16 FEET.
8. SINGLE–CONDUCTOR DC POWER CABLES SHALL BE TELCOFLEX® OR KS24194™, COPPER, UL LISTED RHH NON–HALOGEN, LOW SMOKE WITH BRAIDED COVER, TYPE TC (1/0 AND LARGER). UNLESS OTHERWISE NOTED, STRANDING SHALL BE CLASS B (TYPE III) FOR CABLES SIZES 14, 12 & 10 AWG AND CLASS I (TYPE IV) FOR SIZES 8 AWG AND LARGER. CABLES SHALL BE COLOR CODED RED FOR +24V, BLUE FOR –48V AND GRAY FOR 24V AND 48V RETURN CONDUCTORS. MULTI–CONDUCTOR DC POWER CABLES SHALL BE COPPER, CLASS B STRANDING WITH FLAME RETARDANT PVC JACKET, TYPE TC, UL LISTED FOR 90°C DRY/ 75°C WET INSTALLATION.
9. GROUNDING WIRES SHALL BE COPPER, GREEN THHN/THWN UL LISTED FOR 90°C DRY/75°C WET INSTALLATION. MINIMUM SIZE IS 6 AWG UNLESS NOTED OTHERWISE.
10. FIBER OPTIC CABLES SHALL BE INSTALLED IN FLEXIBLE CONDUIT AS SCOPED BY MARKET.
11. RET CONTROL FROM THE RRU IS AN OPTIONAL METHOD OF CONNECTION. REFER TO RF DATA SHEET FOR APPLICABILITY.
12. RBS 6601 VARIANT 2 REQUIRES A 25A BREAKER AND 10 AWG (MIN.) CONDUCTORS. REPLACE EXISTING 15A OR 20A BREAKERS AND 12 AWG CONDUCTORS WHEN UPGRADING AN EXISTING RBS 6601 VARIANT 1.

ELECTRICAL NOTES

1. PRIOR TO START OF CONSTRUCTION CONTRACTOR SHALL COORDINATE WITH OWNER FOR ALL CONSTRUCTION STANDARDS AND SPECIFICATIONS, AND ALL MANUFACTURER DOCUMENTATION FOR ALL EQUIPMENT TO BE INSTALLED.
2. INSTALL ALL EQUIPMENT IN ACCORDANCE WITH LOCAL BUILDING CODE, NATIONAL ELECTRIC CODE, OWNER AND MANUFACTURER'S SPECIFICATIONS.
3. CONNECT ALL NEW EQUIPMENT TO EXISTING TELCO AS REQUIRED BY MANUFACTURER.
4. MAINTAIN ALL CLEARANCES REQUIRED BY NEC AND EQUIPMENT MANUFACTURER.
5. PRIOR TO INSTALLATION CONTRACTOR SHALL MEASURE EXISTING ELECTRICAL LOAD AND VERIFY EXISTING AVAILABLE CAPACITY FOR PROPOSED INSTALLATION. IF INADEQUATE CAPACITY IS AVAILABLE, CONTRACTOR SHALL COORDINATE WITH LOCAL ELECTRIC UTILITY COMPANY TO UPGRADE EXISTING ELECTRIC SERVICE.
6. CONTRACTOR SHALL INSPECT EXISTING GROUNDING AND LIGHTNING PROTECTION SYSTEM AND ENSURE THAT IT IS IN COMPLIANCE WITH NEC, AND SITE OWNER'S SPECIFICATIONS. THE RESULTS OF THIS INSPECTION SHALL BE PRESENTED TO OWNERS REPRESENTATIVE, AND ANY DEFICIENCIES SHALL BE CORRECTED.
7. ALL TRANSMISSION TOWER SITES CONTAIN AN EXTENSIVE BURIED GROUNDING SYSTEM. ALL GROUNDING WORK MUST BE COORDINATED WITH, AND APPROVED BY, THE TOWER OWNER'S SITE REPRESENTATIVE. ALL OF THE TOWER OWNER'S SPECIFICATIONS MUST BE STRICTLY FOLLOWED.
8. PROVIDE AND INSTALL GROUND KITS FOR ALL NEW COAXIAL CABLES AND BOND TO EXISTING OWNERS GROUNDING SYSTEM PER OWNERS SPECIFICATIONS AND NEC.
9. ALL CONDUCTORS SHALL BE TYPE THWN (INT. APPLICATION) AND XHHW (EXT. APPLICATION), 75 DEGREE C, 600 VOLT INSULATION, SOFT ANNEALED STRANDED COPPER. #10 AWG AND SMALLER SHALL BE SPLICED USING ACCEPTABLE SOLDERLESS PRESSURE CONNECTORS. #8 AWG AND LARGER SHALL BE SPLICED USING COMPRESSION SPLIT–BOLT TYPE CONNECTORS, #12 AWG SHALL BE THE MINIMUM SIZE CONDUCTOR FOR LINE VOLTAGE BRANCH CIRCUITS. REFER TO PANEL SCHEDULE FOR BRANCH CIRCUIT CONDUCTOR SIZE(S). CONDUCTORS SHALL BE COLOR CODED FOR CONSISTENT PHASE IDENTIFICATION:
10. MINIMUM BENDING RADIUS FOR CONDUCTORS SHALL BE 12 TIMES THE LARGEST DIAMETER OF BRANCH CIRCUIT CONDUCTOR.
11. THE ENTIRE ELECTRICAL INSTALLATION SHALL BE MADE IN STRICT ACCORDANCE WITH ALL LOCAL, STATE AND NATIONAL CODES AND REGULATIONS WHICH MAY APPLY AND NOTHING IN THE DRAWINGS OR SPECIFICATIONS SHALL BE INTERPRETED AS AN INFRINGEMENT OF SUCH CODES OR REGULATIONS.
12. THE ELECTRICAL CONTRACTOR IS TO BE RESPONSIBLE FOR THE COMPLETE INSTALLATION AND COORDINATION OF THE ENTIRE ELECTRICAL SERVICE. ALL ACTIVITIES TO BE COORDINATED THROUGH OWNER'S REPRESENTATIVE, DESIGN ENGINEER AND OTHER AUTHORITIES HAVING JURISDICTION OF TRADES.
13. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL PERMITS AND PAY ALL FEES AS MAY BE REQUIRED FOR THE ELECTRICAL WORK AND FOR SCHEDULING OF ALL INSPECTIONS AS MAY BE REQUIRED BY THE LOCAL AUTHORITY.
14. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATION WITH THE SITE AND/OR BUILDING OWNER FOR NEW AND/OR DEMOLITION WORK INVOLVED.
15. THE CONTRACTOR SHALL GUARANTEE ALL NEW WORK FOR A PERIOD OF ONE YEAR FROM THE ACCEPTANCE DATE BY THE OWNER. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING WARRANTIES FROM ALL EQUIPMENT MANUFACTURERS FOR SUBMISSION TO THE OWNER.
16. DRAWINGS INDICATE GENERAL ARRANGEMENT OF WORK INCLUDED IN CONTRACT. CONTRACTOR SHALL WITHOUT EXTRA CHARGE, MAKE MODIFICATIONS TO THE LAYOUT OF THE WORK TO PREVENT CONFLICT WITH WORK OF OTHER TRADES AND FOR THE PROPER INSTALLATION OF WORK. CHECK ALL DRAWINGS AND VISIT JOB SITE TO VERIFY SPACE AND TYPE OF EXISTING CONDITIONS IN WHICH WORK WILL BE DONE, PRIOR TO SUBMITTAL OF BID.
17. ALL NON–CURRENT CARRYING PARTS OF THE ELECTRICAL AND TELEPHONE CONDUIT SYSTEMS SHALL BE MECHANICALLY AND ELECTRICALLY CONNECTED TO PROVIDE AN INDEPENDENT RETURN PATH TO THE EQUIPMENT GROUNDING SOURCES.
18. GROUNDING SYSTEM WILL BE IN ACCORDANCE WITH THE LATEST ACCEPTABLE EDITION OF THE NATIONAL ELECTRICAL CODE AND REQUIREMENTS PER LOCAL INSPECTOR HAVING JURISDICTION.
19. EACH EQUIPMENT GROUND CONDUCTOR SHALL BE SIZED IN ACCORDANCE WITH THE N.E.C. ARTICLE 250–122. (MIN. #12 AWG).
20. CONTRACTOR SHALL PROVIDE A CELLULAR GROUNDING SYSTEM WITH THE MAXIMUM AC RESISTANCE TO GROUND OF 5 OHM BETWEEN ANY POINT ON THE GROUNDING SYSTEM AS MEASURED BY 3–POINT GROUNDING TEST. (REFER TO SECTION 16960).

TESTS BY INDEPENDENT ELECTRICAL TESTING FIRM

A. CONTRACTOR SHALL RETAIN THE SERVICES OF A LOCAL INDEPENDENT ELECTRICAL TESTING FIRM (WITH MINIMUM 5 YEARS COMMERCIAL EXPERIENCE IN THE ELECTRICAL TESTING INDUSTRY) AS SPECIFIED BY OWNER TO PERFORM:

TEST 1: RESISTANCE TO GROUND TEST ON THE CELLULAR GROUNDING SYSTEM.

THE TESTING FIRM SHALL INCLUDE THE FOLLOWING INFORMATION WITH THE REPORT:

1. TESTING PROCEDURE INCLUDING THE MAKE AND MODEL OF TEST EQUIPMENT.
2. CERTIFICATION OF TESTING EQUIPMENT CALIBRATION WITHIN SIX (6) MONTHS OF DATE OF TESTING. INCLUDE CERTIFICATION LAB ADDRESS AND TELEPHONE NUMBER.
3. GRAPHICAL DESCRIPTION OF TESTING METHOD ACTUALLY IMPLEMENTED.

B. TESTING SHALL BE PERFORMED IN THE PRESENCE AND TO THE SATISFACTION OF OWNERS CONSTRUCTION REPRESENTATIVE. TESTING DATA SHALL BE INITIALED AND DATED BY THE CONSTRUCTION AND INCLUDED WITH THE WRITTEN REPORT/ANALYSIS.

C. THE CONTRACTOR SHALL FORWARD SIX (6) COPIES OF THE INDEPENDENT ELECTRICAL TESTING FIRM REPORT/ANALYSIS TO ENGINEER A MINIMUM OF TEN (10) WORKING DAYS PRIOR TO THE JOB TURNOVER.

D. CONTRACTOR TO PROVIDE A MINIMUM OF ONE (1) WEEK NOTICE TO OWNER AND ENGINEER FOR ALL TESTS REQUIRING WITNESSING.

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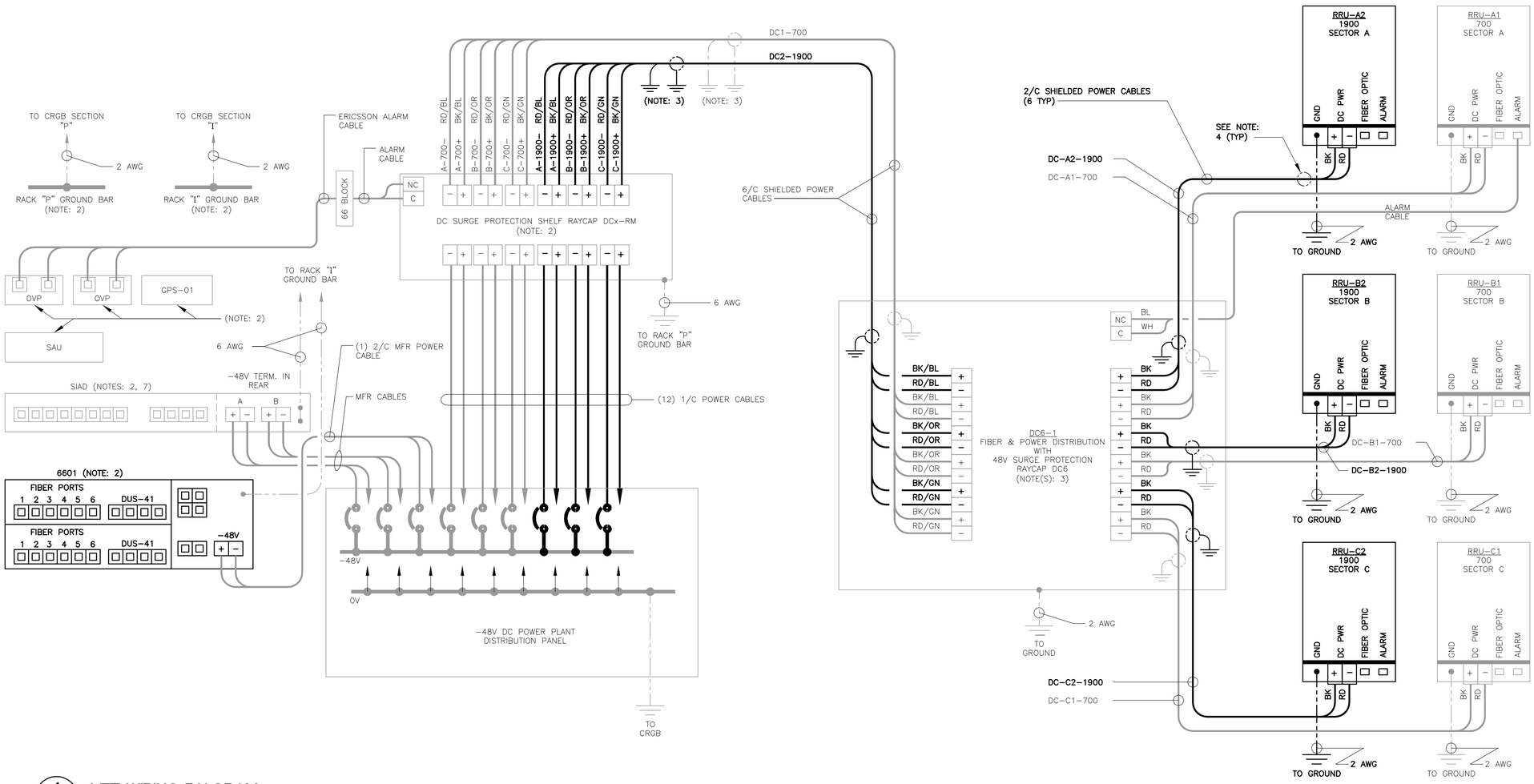
LTE SCHEMATIC DIAGRAM AND NOTES

E-1

Sheet No. 5 of 7



1 / E–2 LTE WIRING DIAGRAM

NOT TO SCALE

LTE WIRING DIAGRAM NOTES:

1. LABEL THE DC POWER CABLES AT BOTH ENDS OF EVERY WIRE AND IN ANY PULL BOX IF USED. LABEL SHALL BE DURABLE, SELF ADHESIVE, WRAPPED LONGITUDINALLY ALONG THE CABLE AND STATE THE SECTOR, FREQUENCY BAND AND POLARITY; I.E. "A–1900+". CABLE AND WIRE LABELS SHOWN ARE REPRESENTATIVE AND MAY BE MODIFIED AS DIRECTED BY AT&T.
2. INSTALL ON BASEBAND EQUIPMENT RACK.
3. THE BARE GROUND WIRE OF EACH MULTI–CONDUCTOR CABLE SHALL BE CONNECTED TO THE "P" GROUND BAR ON THE RACK. WHEN A SHIELDED CABLE IS USED, THE DRAIN WIRE ALSO SHALL BE CONNECTED TO THE "P" GROUND BAR.
4. CABLE GROUND WIRE AND SHIELD DRAIN WIRE TO BE LEFT UN–TERMINATED AT RRU AND DC POWER PLANT.
5. SEE LTE SCHEMATIC DIAGRAM DETAIL 1/E–1 FOR BREAKER RATING.

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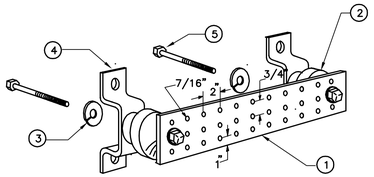
LTE WIRING DIAGRAM

E–2

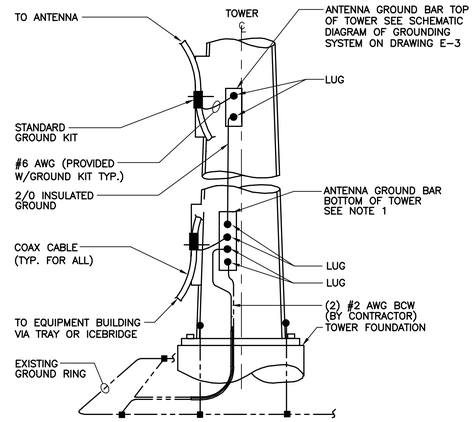
Sheet No. 6 of 7



LEGEND

1. TINNED COPPER GROUND BAR, 1/4"x 4"x 20", NEWTON INSTRUMENT CO. HOLE CENTERS TO MATCH NEMA DOUBLE LUG .
2. INSULATORS, NEWTON INSTRUMENT CAT. NO. 2. 3061-4.
3. 3. 5/8" LOCK WASHERS, NEWTON INSTRUMENT CO. CAT. NO. 3015-8.
4. WALL MOUNTING BRACKET, NEWTON INSTRUMENT CO. 4. CAT NO. A-6056.
5. STAINLESS STEEL SECURITY SCREWS.

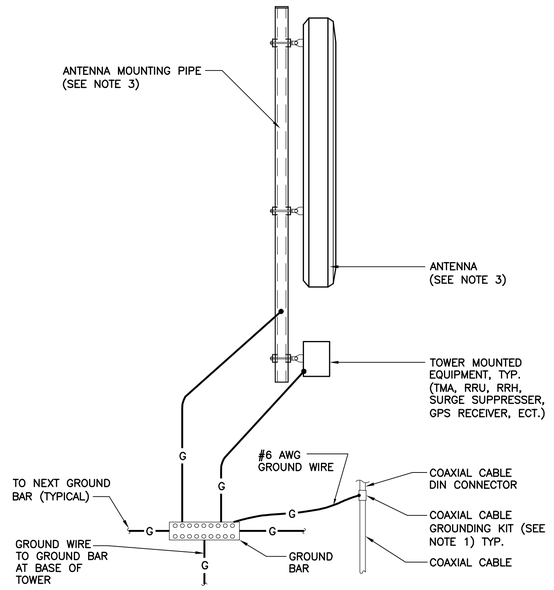
3 GROUND BAR DETAIL
E-3 NOT TO SCALE



NOTES:

1. NUMBER OF GROUND BARS MAY VARY DEPENDING ON THE TYPE OF TOWER, LOCATION AND CONNECTION ORIENTATION. PROVIDE AS REQUIRED.
2. A SEPARATE GROUND BAR TO BE USED FOR GPS ANTENNA IF REQUIRED.

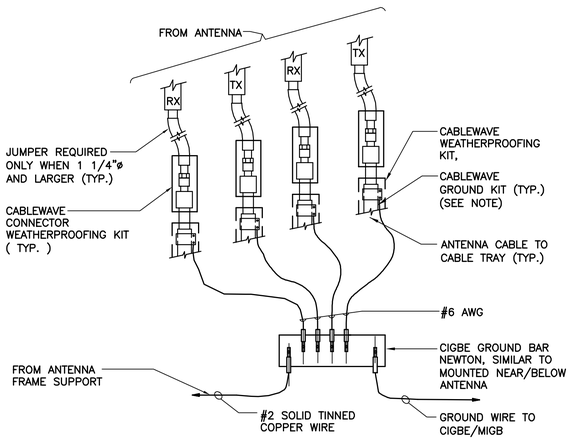
2 ANTENNA CABLE GROUNDING - TOWER
E-3 NOT TO SCALE



NOTES:

1. BOND COAXIAL CABLE GROUND KITS TO EACH OWNER'S GROUND BAR ALONG ENTIRE COAX RUN FROM ANTENNA TO SHELTER.
2. BOND ALL EQUIPMENT TO GROUND PER NEC AND MANUFACTURERS SPECIFICATIONS.
3. DETAIL IS TYPICAL FOR ALL ANTENNA SECTORS, INCLUDING GPS ANTENNA.

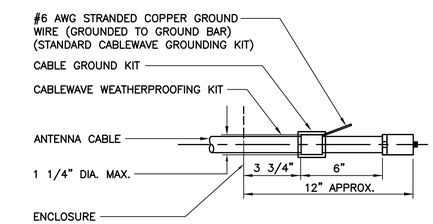
1 TYPICAL ANTENNA GROUNDING DETAIL
E-3 NOT TO SCALE



NOTE:

1. DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO CIGBE

5 CONNECTION OF GROUND WIRES TO GROUND BAR
E-3 NOT TO SCALE



NOTE:

1. DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO GROUND BAR.

4 ANTENNA CABLE GROUNDING DETAIL
E-3 NOT TO SCALE

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	06/20/16	WMW	JTD	CONSTRUCTION DOCUMENTS - ISSUED FOR CONSTRUCTION

PROFESSIONAL ENGINEER SEAL

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Branford, CT 06405
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AT&T MOBILITY

WIRELESS COMMUNICATIONS FACILITY

PORTLAND

CT5836 - LTE 2C

74 GOODRICH LANE
PORTLAND, CT 06480

DATE: 06/15/16
SCALE: AS NOTED
JOB NO. 16071.02

TYPICAL ELECTRICAL DETAILS

E-3

Sheet No. 7 of 7

May 20, 2016

Sean Dempsey
Crown Castle
3530 Toringdon Way Suite 300
Charlotte, NC 28277
(704) 405-6565

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

Subject:	**Structural Analysis Report**	
Carrier Designation:	***AT&T Mobility* Co-Locate**	
	Carrier Site Number:	CTL05836
	Carrier Site Name:	Portland Central
Crown Castle Designation:	**Crown Castle BU Number:**	806382
	Crown Castle Site Name:	HRT 082 943274
	Crown Castle JDE Job Number:	377804
	Crown Castle Work Order Number:	1238300
	Crown Castle Application Number:	343912 Rev. 2
Engineering Firm Designation:	**B+T Group Project Number:**	81363.014.01
Site Data:	**Old Marlborough Turnpike, Portland, Middlesex County, CT** **Latitude *41° 36' 29.9"*, Longitude *-72° 35' 29.56"*** **160 Foot - Monopole Tower**	

Dear Sean Dempsey,

B+T Group is 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 904496, in accordance with application 343912, revision 2.

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:

LC7: Existing + Reserved + Proposed Equipment **Sufficient Capacity**
Note: See Table 1 and Table 2 for the proposed and existing/reserved loading, respectively.

The analysis has been performed in accordance with the TIA-222-G, as allowed by Sections 104.10 and 104.11 of the 2005 CT State Building Code with 2009 Amendments, based upon a wind speed of 105 mph 3-second gust, exposure category B with topographic category 1 and crest height of 0 feet.

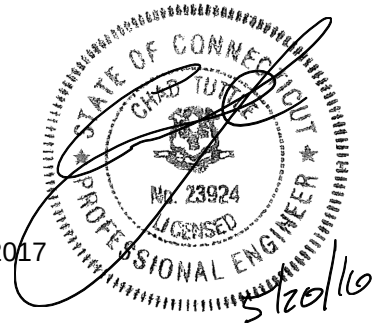
All equipment proposed in this report shall be installed in accordance with the attached drawings for the determined available structural capacity to be effective.

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.

Jennifer Tillson, E.I.
Project Engineer

Chad E. Tuttle, P.E.
Engineer of Record
COA: PEC.0001564 Expires: 02/10/2017



5/20/16

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 160 ft. Monopole tower designed by Valmont in January of 1998. The tower was originally designed for a wind speed of 85 mph per TIA/EIA-222-F. This tower has been modified by B+T Group in May of 2013 and those modifications were incorporated in this analysis.

2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of TIA-222-G Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a 3-second gust wind speed of 105 mph with no ice, 50 mph with 0.75 inch ice thickness and 60 mph under service loads, exposure category B with topographic category 1 and crest height of 0 feet.

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
116.0	120.0	6	Ericsson	RRUS 11	--	--	--
		3	Kathrein	782 10253			

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
160.0	160.0	3	Alcatel Lucent	RRH2X60-AWS	--	--	2
		3	Alcatel Lucent	RRH2X60-PCS			
		3	Alcatel Lucent	RRH2x60-700			
		6	Andrew	SBNHH-1D65B			
		1	RFS Celwave	DB-B1-6C-8AB-0Z			
		3	Andrew	HBXX-6517DS-A2M	11 2 1	1-5/8 1-1/4 1/2	1
		2	Decibel	DB846F65ZAXY			
		4	Decibel	DB846H80E-SX			
		1	RFS Celwave	DB-T1-6Z-8AB-0Z			
		2	RFS Celwave	FD9R6004/2C-3L			
		1	--	Platform Mount [LP 602-1]			
150.0	152.0	6	Decibel	DB980H90E-M	6 1	1-5/8 1/2	1
	150.0	1	--	Platform Mount [LP 602-1]			
142.0	144.0	2	Radiowaves	HP3-11	2	1/2	1
	142.0	1	--	Side Arm Mount [SO 101-3]			
134.0	137.0	3	Commscope	SBNH-1D65C-SR	1	1-5/8	2
		3	Ericsson	ERICSSON AIR 21 B4A B2P			
		3	Ericsson	RRUS 11 B12			
		3	Ericsson	RRUS 11 B2			
	134.0	3	Site Pro1	RMV12-396			
116.0	120.0	**6**	**Ericsson**	**RRUS-11**	**--**	**--**	**4**
		3	KMW Comm.	AM-X-CD-16-65-00T-RET	12 2 1	1-1/4 3/4 3/8	1
		6	Powerwave Tech.	7770.00			
		1	Raycap	DC6-48-60-18-8F			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
	116.0	6	Powerwave Tech.	LGP21401			
		6	Powerwave Tech.	LGP21901			
		1	--	Platform Mount [LP 303-1]			
61.0	61.0	2	--	Side Arm Mount [SO 701-1]	2	1/2	1
		2	Unknown	GPS			
50.0	50.0	2	--	Side Arm Mount [SO 701-1]	--	--	3

Notes:
1) Existing Equipment
2) Reserved Equipment
3) Empty Mount; Considered in This Analysis
4) Equipment To Be Removed; Not Considered in This Analysis

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)
157	157	12	Swedcom	ALP 9212-N	--	--
		1	Valmont	Cellular Platform		
148	148	12	Swedcom	ALP 9212-N	--	--
		1	Valmont	Cellular Platform		
138	138	12	Swedcom	ALP 9212-N	--	--
		1	Valmont	Cellular Platform		
128	128	12	Swedcom	ALP 9212-N	--	--
		1	Valmont	Cellular Platform		
60	60	2	Generic	GPS	--	--
		2	Generic	Short Straight Arm		
50	50	2	Generic	GPS	--	--
		2	Generic	Short Straight Arm		

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
Online Application	AT&T Mobility Co-locate, Rev# 2	343912	CCI Sites
Tower Manufacturer Drawing	Valmont, Order No: 16750-98	255193	CCI Sites
Tower Modification Drawing	B+T Group, Date: 05/29/2013	3865159	CCI Sites
Post Modification Inspection	TEP, Date: 09/17/2013	3996803	CCI Sites
Foundation Drawing	Valmont, Order No: 16750-98	301226	CCI Sites
Geotech Report	TGG, Project No. 067058	1041653	CCI Sites
Antenna Configuration	Crown CAD Package	Date: 05/16/2016	CCI Sites

3.1) Analysis Method

tnxTower (version 7.0.5.1), 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) 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	160 - 123.667	Pole	TP29.05x18.87x0.188	1	-8.695	965.169	85.8	Pass
L2	123.667 - 76.25	Pole	TP41.95x27.461x0.313	2	-20.467	2534.090	82.6	Pass
L3	76.25 - 51	Pole	TP48.398x39.715x0.344	3	-29.875	3182.680	88.0	Pass
L4	51 - 37	Pole	TP52.32x48.398x0.433	4	-32.461	3098.030	95.6	Pass
L5	37 - 0	Pole	TP62x49.672x0.406	5	-50.608	4570.550	83.2	Pass
							Summary	
						Pole (L4)	95.6	Pass
						Rating =	95.6	Pass

Table 6 - Tower Component Stresses vs. Capacity – LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	Base	80.4	Pass
1	Base Plate	Base	43.5	Pass
1	Base Foundation (Structural)	Base	71.1	Pass
1	Base Foundation (Soil Interaction)	Base	52.2	Pass

Structure Rating (max from all components) =	**95.6%**

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

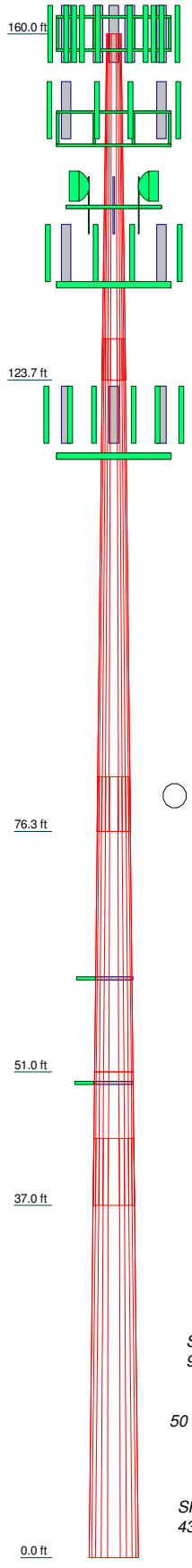
4.1) Recommendations

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

Section	Length (ft)	Number of Sides	Thickness (in)	Socket Length (ft)	Top Dia (in)	Bot Dia (in)	Grade	Weight (K)
1	36.333	12	0.188	4.333	18.870	29.050	A572-65	1.8
2	51.750	12	0.313	5.750	27.461	41.950	A572-65	6.1
3	31.000	12	0.344		39.715	48.398	A572-65	5.1
4	14.000	12	0.433	7.000	48.398	52.320	A572-65	3.3
5	44.000	12	0.406		49.672	62.000	A572-65	10.9
							40.041618ksi	



ALL REACTIONS ARE FACTORED

AXIAL 89 K
SHEAR 9 K
MOMENT 1044 kip-ft
TORQUE 0 kip-ft
50 mph WIND - 0.750 in ICE

AXIAL 51 K
SHEAR 43 K
MOMENT 4727 kip-ft
TORQUE 2 kip-ft
REACTIONS - 105 mph WIND

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
(2) DB846H80E-SX w/ Mount Pipe (E)	160	RRUS 11 B2 (R)	134
(2) DB846H80E-SX w/ Mount Pipe (E)	160	RRUS 11 B2 (R)	134
(2) DB846F65ZAXY w/ Mount Pipe (E)	160	RRUS 11 B12 (R)	134
HBXX-6517DS-A2M w/ Mount Pipe (E)	160	RRUS 11 B12 (R)	134
HBXX-6517DS-A2M w/ Mount Pipe (E)	160	RRUS 11 B12 (R)	134
HBXX-6517DS-A2M w/ Mount Pipe (E)	160	T-Arm Mount [TA 602-3] (R-RMV12-396)	134
(2) FD9R6004/2C-3L (E)	160	ERICSSON AIR 21 B4A B2P w/ Mount Pipe (R)	134
DB-T1-6Z-8AB-0Z (E)	160	ERICSSON AIR 21 B4A B2P w/ Mount Pipe (R)	134
(2) SBNHH-1D65B w/ Mount Pipe (R)	160	AM-X-CD-16-65-00T-RET w/ Mount Pipe (E)	116
(2) SBNHH-1D65B w/ Mount Pipe (R)	160	(2) 7770.00 w/ Mount Pipe (E)	116
(2) SBNHH-1D65B w/ Mount Pipe (R)	160	(2) 7770.00 w/ Mount Pipe (E)	116
DB-B1-6C-8AB-0Z (R)	160	(2) 7770.00 w/ Mount Pipe (E)	116
RRH2x60-700 (R)	160	(2) LGP21401 (E)	116
RRH2x60-700 (R)	160	(2) LGP21401 (E)	116
RRH2x60-700 (R)	160	(2) LGP21401 (E)	116
RRH2X60-PCS (R)	160	(2) LGP21901 (E)	116
RRH2X60-PCS (R)	160	(2) LGP21901 (E)	116
RRH2X60-PCS (R)	160	(2) LGP21901 (E)	116
RRH2X60-AWS (R)	160	DC6-48-60-18-8F (E)	116
RRH2X60-AWS (R)	160	(2) RRUS 11 (P)	116
RRH2X60-AWS (R)	160	(2) RRUS 11 (P)	116
Platform Mount [LP 602-1] (E)	160	(2) RRUS 11 (P)	116
(2) DB980H90E-M w/ Mount Pipe (E)	150	782 10253 (P)	116
(2) DB980H90E-M w/ Mount Pipe (E)	150	782 10253 (P)	116
(2) DB980H90E-M w/ Mount Pipe (E)	150	782 10253 (P)	116
(2) 6' x 2" Mount Pipe (E-Empty)	150	3' x 2" Pipe Mount (E-For TMA)	116
(2) 6' x 2" Mount Pipe (E-Empty)	150	3' x 2" Pipe Mount (E-For TMA)	116
(2) 6' x 2" Mount Pipe (E-Empty)	150	(2) 3' x 2" Pipe Mount (E-For TMA)	116
Platform Mount [LP 602-1] (E)	150	Platform Mount [LP 303-1] (E)	116
4' x 2" Horizontal Face Mount Pipe (E-Dish Tie Back)	145	AM-X-CD-16-65-00T-RET w/ Mount Pipe (E)	116
4' x 2" Horizontal Face Mount Pipe (E-Dish Tie Back)	145	AM-X-CD-16-65-00T-RET w/ Mount Pipe (E)	116
J-Box - 1' x 1' x 4" (E-Per Photo)	145	2' x 2" Pipe Mount (E)	61
(2) 6' x 3" Mount Pipe (E)	142	2' x 2" Pipe Mount (E)	61
(2) 6' x 3" Mount Pipe (E)	142	Side Arm Mount [SO 701-1] (E)	61
(2) 6' x 3" Mount Pipe (E)	142	Side Arm Mount [SO 701-1] (E)	61
Side Arm Mount [SO 101-3] (E)	142	GPS (E)	61
Radiowaves HP3-11 (E)	142	GPS (E)	61
Radiowaves HP3-11 (E)	142	Side Arm Mount [SO 701-1] (E-Empty)	50
ERICSSON AIR 21 B4A B2P w/ Mount Pipe (R)	134	Side Arm Mount [SO 701-1] (E-Empty)	50
SBNH-1D65C-SR w/ Mount Pipe (R)	134	2' x 2" Pipe Mount (E-Empty)	50
SBNH-1D65C-SR w/ Mount Pipe (R)	134	2' x 2" Pipe Mount (E-Empty)	50
SBNH-1D65C-SR w/ Mount Pipe (R)	134		
RRUS 11 B2 (R)	134		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-65	65 ksi	80 ksi	40.041618ksi	40 ksi	55 ksi

TOWER DESIGN NOTES

1. Tower is located in Middlesex County, Connecticut.
2. Tower designed for Exposure B to the TIA-222-G Standard.
3. Tower designed for a 105 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 50 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Structure Class II.
7. Topographic Category 1 with Crest Height of 0.000 ft
8. TOWER RATING: 95.6%

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Tulsa, OK 74119
Phone: (918) 587-4630
FAX: (918) 295-0265

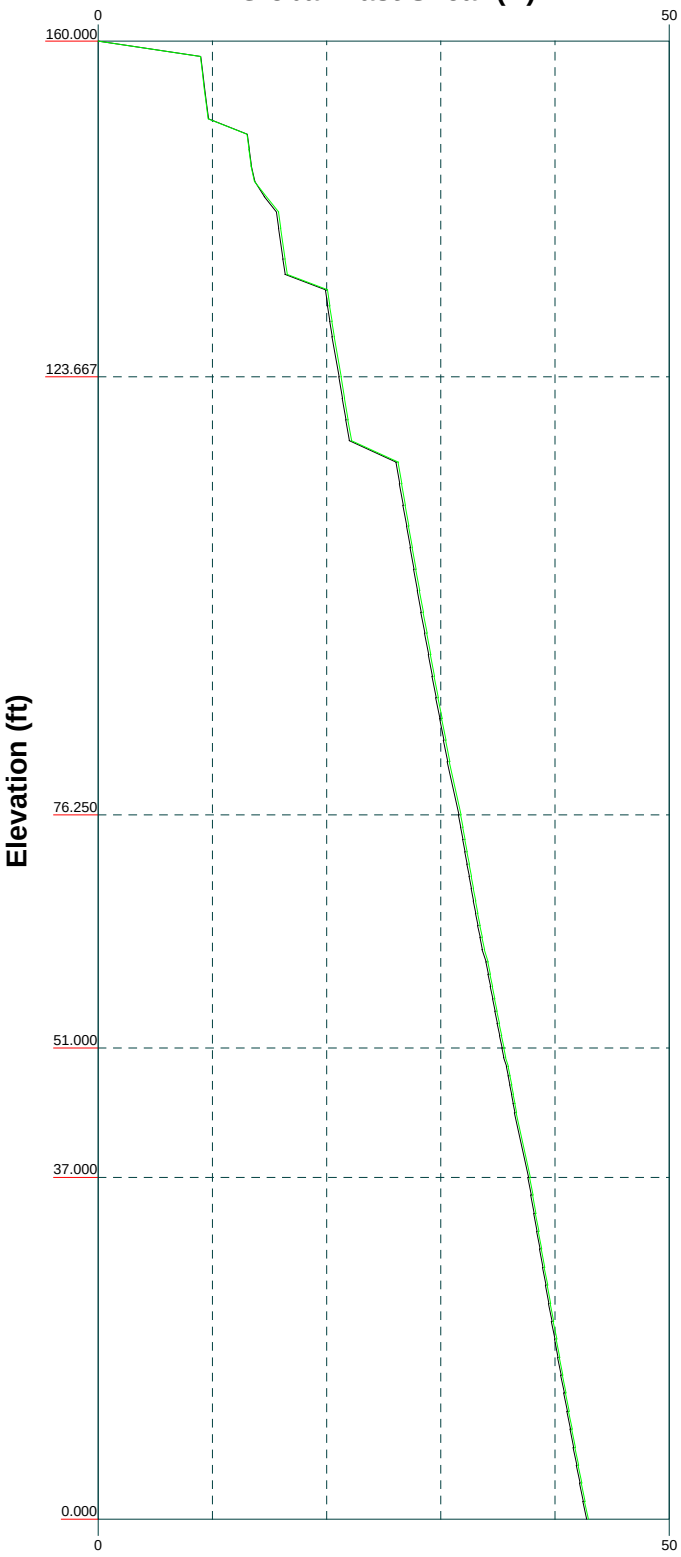
Job: 81363.014.01 - HRT 082 943274, CT (BU# 806382)			
Project:			
Client: Crown Castle	Drawn by: Sunil Kamath	App'd:	
Code: TIA-222-G	Date: 05/19/16	Scale: NTS	
Path:		Dwg No. E-1	

TIA-222-G - 105 mph/50 mph 0.750 in Ice Exposure B

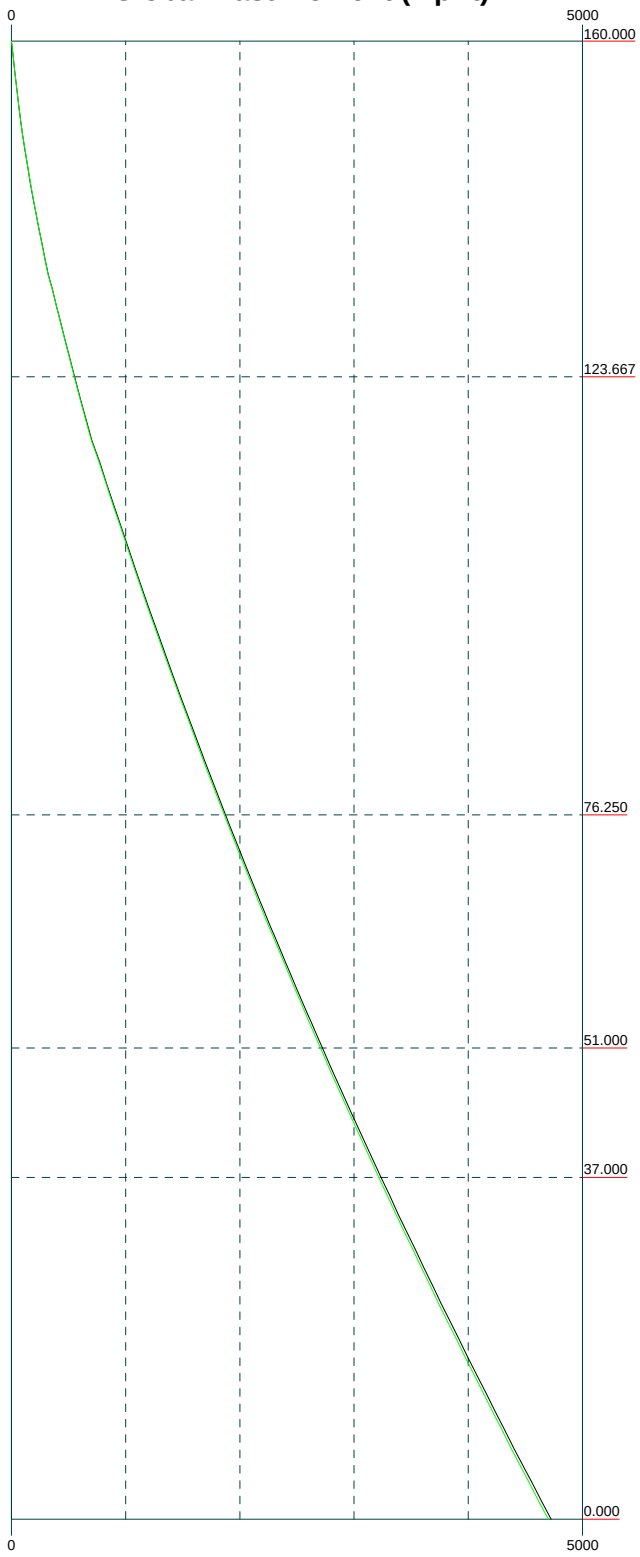
Maximum Values

Vx Vz Mx Mz

Global Mast Shear (K)



Global Mast Moment (kip-ft)



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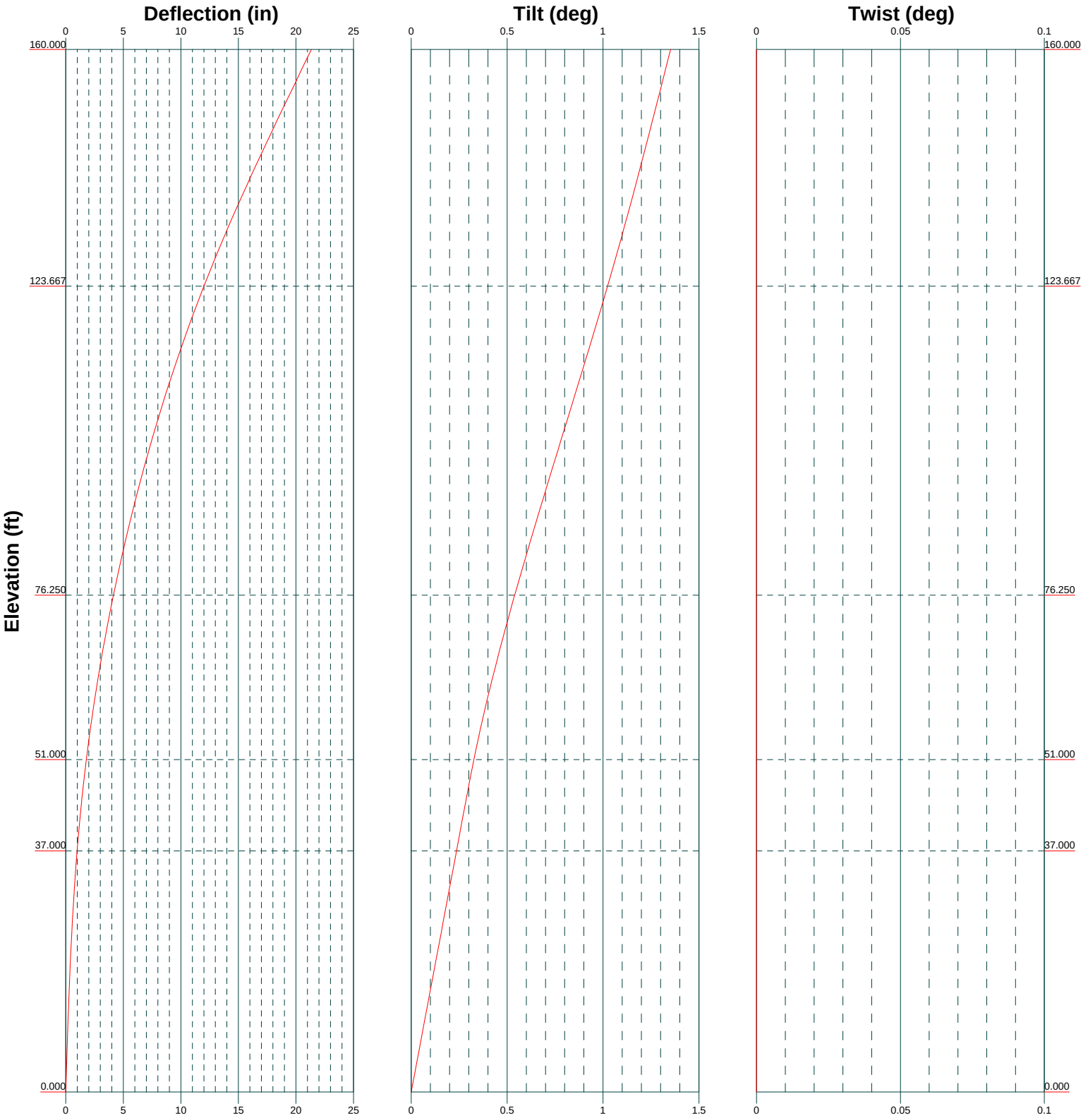
Job: 81363.014.01 - HRT 082 943274, CT (BU# 806382		
Project:		
Client: Crown Castle	Drawn by: Sunil Kamath	App'd:
Code: TIA-222-G	Date: 05/19/16	Scale: NTS
Path:		Dwg No. E-4

TIA-222-G - Service - 60 mph

Maximum Values



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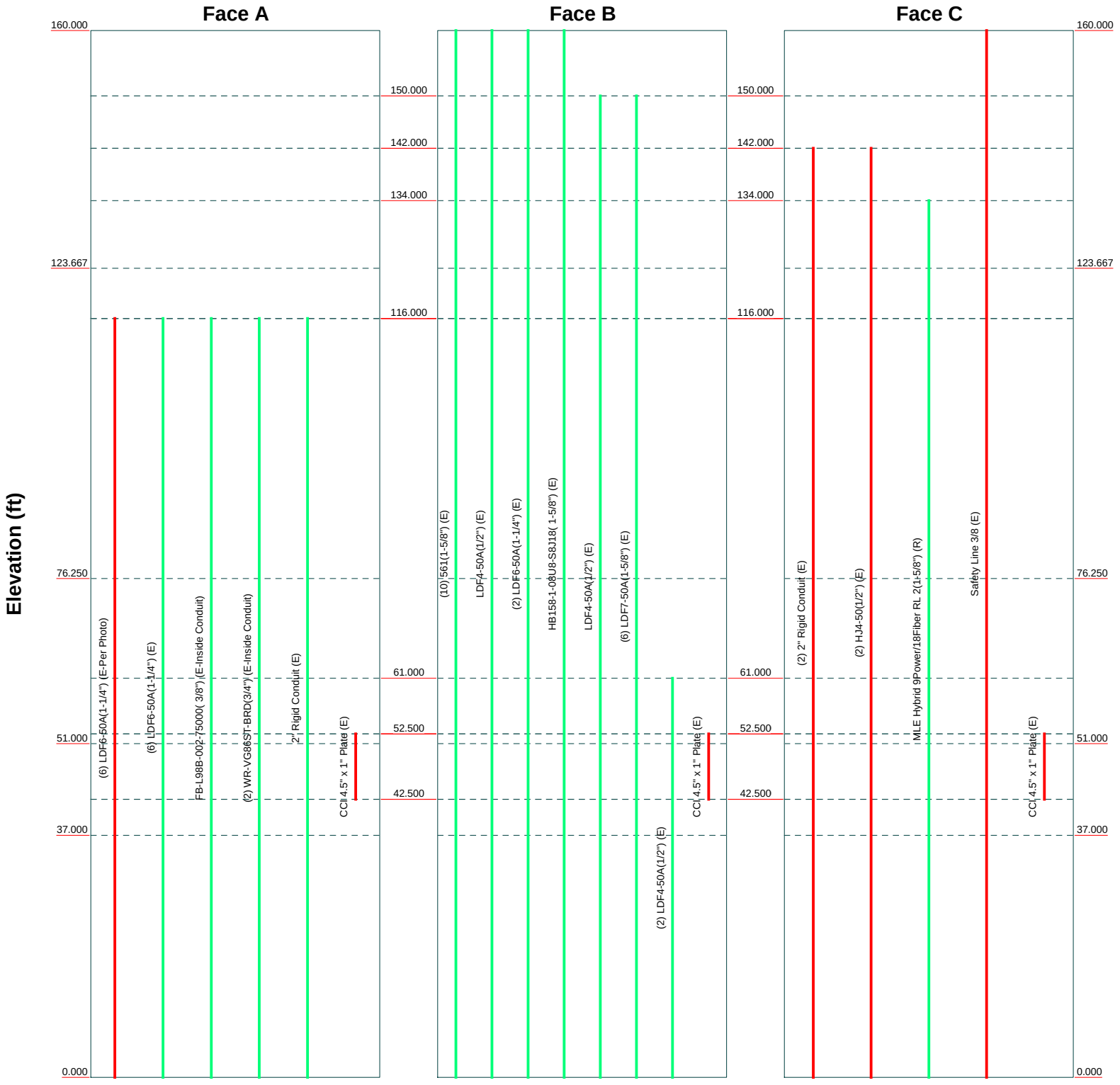
Job: 81363.014.01 - HRT 082 943274, CT (BU# 806382			
Project:			
Client: Crown Castle	Drawn by: Sunil Kamath	App'd:	
Code: TIA-222-G	Date: 05/19/16	Scale: NTS	
Path:		Dwg No. E-5	

Feed Line Distribution Chart
0' - 160'

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



B+T GRP

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Phone: (918) 587-4630
FAX: (918) 295-0265

Job:	***81363.014.01 - HRT 082 943274, CT (BU# 806382***		
Project:			
Client: Crown Castle	Drawn by: Sunil Kamath	App'd:	
Code: TIA-222-G	Date: 05/19/16	Scale: NTS	
Path:		Dwg No. E-7	

Tower Input Data

There is a pole section.
This tower is designed using the TIA-222-G standard.
The following design criteria apply:

Tower is located in Middlesex County, Connecticut.
Basic wind speed of 105 mph.
Structure Class II.
Exposure Category B.
Topographic Category 1.
Crest Height 0.000 ft.
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 50 mph is used in combination with ice.
Temperature drop of 50.000 °F.
Deflections calculated using a wind speed of 60 mph.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.
Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

Consider Moments - Legs	Distribute Leg Loads As Uniform	Use ASCE 10 X-Brace Ly Rules
Consider Moments - Horizontals	Assume Legs Pinned	Calculate Redundant Bracing Forces
Consider Moments - Diagonals	√ Assume Rigid Index Plate	Ignore Redundant Members in FEA
Use Moment Magnification	√ Use Clear Spans For Wind Area	SR Leg Bolts Resist Compression
√ Use Code Stress Ratios	Use Clear Spans For KL/r	All Leg Panels Have Same Allowable
√ Use Code Safety Factors - Guys	Retension Guys To Initial Tension	Offset Girt At Foundation
Escalate Ice	√ Bypass Mast Stability Checks	√ Consider Feed Line Torque
Always Use Max Kz	√ Use Azimuth Dish Coefficients	Include Angle Block Shear Check
Use Special Wind Profile	√ Project Wind Area of Appurt.	Use TIA-222-G Bracing Resist. Exemption
Include Bolts In Member Capacity	Autocalc Torque Arm Areas	Use TIA-222-G Tension Splice Exemption
Leg Bolts Are At Top Of Section	Add IBC .6D+W Combination	Poles
Secondary Horizontal Braces Leg	Sort Capacity Reports By Component	√ Include Shear-Torsion Interaction
Use Diamond Inner Bracing (4 Sided)	Triangulate Diamond Inner Bracing	Always Use Sub-Critical Flow
SR Members Have Cut Ends	Treat Feed Line Bundles As Cylinder	Use Top Mounted Sockets
SR Members Are Concentric		

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	160.000-123.667	36.333	4.333	12	18.870	29.050	0.188	0.750	A572-65 (65 ksi)
L2	123.667-76.250	51.750	5.750	12	27.461	41.950	0.313	1.250	A572-65 (65 ksi)
L3	76.250-51.000	31.000	0.000	12	39.715	48.398	0.344	1.375	A572-65

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
L4	51.000-37.000	14.000	7.000	12	48.398	52.320	0.433	1.731	(65 ksi) 40.041618ksi
L5	37.000-0.000	44.000		12	49.672	62.000	0.406	1.625	(40 ksi) A572-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	19.536	11.280	502.514	6.688	9.775	51.410	1018.229	5.551	4.555	24.292
	30.075	17.426	1852.870	10.333	15.048	123.131	3754.417	8.576	7.283	38.842
L2	29.686	27.318	2569.965	9.719	14.225	180.668	5207.445	13.445	6.522	20.871
	43.430	41.898	9271.410	14.906	21.730	426.662	18786.390	20.621	10.405	33.296
L3	42.784	43.579	8622.350	14.095	20.572	419.122	17471.219	21.448	9.722	28.283
	50.106	53.191	15678.080	17.204	25.070	625.362	31768.040	26.179	12.050	35.053
L4	50.106	66.843	19629.140	17.172	25.070	782.960	39773.960	32.898	11.811	27.291
	54.166	72.308	24847.930	18.576	27.102	916.838	50348.643	35.588	12.862	29.719
L5	53.454	64.445	19964.737	17.637	25.730	775.933	40453.969	31.718	12.223	30.088
	64.187	80.572	39016.215	22.051	32.116	1214.853	79057.429	39.655	15.527	38.221

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
L1 160.000-123.667				1	1	1			
L2 123.667-76.250				1	1	1			
L3 76.250-51.000				1	1	1			
L4 51.000-37.000				1	1	0.987468			
L5 37.000-0.000				1	1	1			

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Sector	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight klf
s									
2" Rigid Conduit (E)	C	Surface Ar (CaAa)	142.000 - 0.000	2	2	0.300 0.400	2.000		0.003
HJ4-50(1/2") (E)	C	Surface Ar (CaAa)	142.000 - 0.000	2	2	0.410 0.450	0.580		0.000
s									
LDF6-50A(1-1/4") (E-Per Photo)	A	Surface Ar (CaAa)	116.000 - 0.000	6	6	-0.490 -0.350	1.550		0.001

Description	Sector	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight klf
s									
Safety Line 3/8 (E) *s*	C	Surface Ar (CaAa)	160.000 - 0.000	1	1	-0.490 -0.480	0.375		0.000
CCI 4.5" x 1" Plate (E)	A	Surface Af (CaAa)	52.500 - 42.500	1	1	0.450 0.500	4.500	11.000	0.000
CCI 4.5" x 1" Plate (E)	B	Surface Af (CaAa)	52.500 - 42.500	1	1	0.450 0.500	4.500	11.000	0.000
CCI 4.5" x 1" Plate (E) *s*	C	Surface Af (CaAa)	52.500 - 42.500	1	1	0.450 0.500	4.500	11.000	0.000

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight klf
561(1-5/8") (E)	B	No	Inside Pole	160.000 - 0.000	10	No Ice 1/2" Ice 1" Ice	0.000 0.000 0.000	0.001 0.001 0.001
LDF4-50A(1/2") (E)	B	No	Inside Pole	160.000 - 0.000	1	No Ice 1/2" Ice 1" Ice	0.000 0.000 0.000	0.000 0.000 0.000
LDF6-50A(1-1/4") (E)	B	No	Inside Pole	160.000 - 0.000	2	No Ice 1/2" Ice 1" Ice	0.000 0.000 0.000	0.001 0.001 0.001
HB158-1-08U8-S8J18(1-5/8") (E) *s*	B	No	Inside Pole	160.000 - 0.000	1	No Ice 1/2" Ice 1" Ice	0.000 0.000 0.000	0.001 0.001 0.001
LDF4-50A(1/2") (E)	B	No	Inside Pole	150.000 - 0.000	1	No Ice 1/2" Ice 1" Ice	0.000 0.000 0.000	0.000 0.000 0.000
LDF7-50A(1-5/8") (E) *s*	B	No	Inside Pole	150.000 - 0.000	6	No Ice 1/2" Ice 1" Ice	0.000 0.000 0.000	0.001 0.001 0.001
MLE Hybrid 9Power/18Fiber RL 2(1-5/8") (R)	C	No	Inside Pole	134.000 - 0.000	1	No Ice 1/2" Ice 1" Ice	0.000 0.000 0.000	0.001 0.001 0.001
LDF6-50A(1-1/4") (E)	A	No	Inside Pole	116.000 - 0.000	6	No Ice 1/2" Ice 1" Ice	0.000 0.000 0.000	0.001 0.001 0.001
FB-L98B-002-75000(3/8") (E-Inside Conduit)	A	No	Inside Pole	116.000 - 0.000	1	No Ice 1/2" Ice 1" Ice	0.000 0.000 0.000	0.000 0.000 0.000
WR-VG86ST-BRD(3/4") (E-Inside Conduit)	A	No	Inside Pole	116.000 - 0.000	2	No Ice 1/2" Ice 1" Ice	0.000 0.000 0.000	0.001 0.001 0.001
2" Rigid Conduit (E) *s*	A	No	Inside Pole	116.000 - 0.000	1	No Ice 1/2" Ice 1" Ice	0.000 0.000 0.000	0.003 0.003 0.003
LDF4-50A(1/2") (E) *s*	B	No	Inside Pole	61.000 - 0.000	2	No Ice 1/2" Ice 1" Ice	0.000 0.000 0.000	0.000 0.000 0.000

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	160.000-123.667	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.725
		C	0.000	0.000	10.822	0.000	0.131
L2	123.667-76.250	A	0.000	0.000	36.968	0.000	0.475
		B	0.000	0.000	0.000	0.000	1.012
		C	0.000	0.000	26.245	0.000	0.350
L3	76.250-51.000	A	0.000	0.000	24.608	0.000	0.302
		B	0.000	0.000	1.125	0.000	0.542
		C	0.000	0.000	15.101	0.000	0.187
L4	51.000-37.000	A	0.000	0.000	19.395	0.000	0.167
		B	0.000	0.000	6.375	0.000	0.303
		C	0.000	0.000	14.124	0.000	0.103
L5	37.000-0.000	A	0.000	0.000	34.410	0.000	0.442
		B	0.000	0.000	0.000	0.000	0.801
		C	0.000	0.000	20.480	0.000	0.273

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_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	160.000-123.667	A	1.734	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.725
		C		0.000	0.000	41.684	0.000	0.599
L2	123.667-76.250	A	1.674	0.000	0.000	63.442	0.000	1.207
		B		0.000	0.000	0.000	0.000	1.012
		C		0.000	0.000	89.920	0.000	1.352
L3	76.250-51.000	A	1.601	0.000	0.000	41.340	0.000	0.765
		B		0.000	0.000	1.420	0.000	0.559
		C		0.000	0.000	48.240	0.000	0.709
L4	51.000-37.000	A	1.543	0.000	0.000	29.571	0.000	0.479
		B		0.000	0.000	7.894	0.000	0.389
		C		0.000	0.000	32.575	0.000	0.438
L5	37.000-0.000	A	1.411	0.000	0.000	57.290	0.000	1.039
		B		0.000	0.000	0.000	0.000	0.801
		C		0.000	0.000	65.228	0.000	0.931

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	160.000-123.667	-0.228	0.303	-0.220	0.603
L2	123.667-76.250	-1.137	0.705	-1.139	0.961
L3	76.250-51.000	-1.269	0.755	-1.356	1.081
L4	51.000-37.000	-1.082	0.644	-1.248	0.981
L5	37.000-0.000	-1.371	0.816	-1.560	1.227

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L1	9	2" Rigid Conduit	123.67 - 142.00	1.0000	1.0000
L1	10	HJ4-50(1/2")	123.67 - 142.00	1.0000	1.0000
L1	23	Safety Line 3/8	123.67 - 160.00	1.0000	1.0000
L1	15	LDF6-50A(1-1/4")	123.67 - 116.00	1.0000	1.0000
L2	9	2" Rigid Conduit	76.25 - 123.67	1.0000	1.0000
L2	10	HJ4-50(1/2")	76.25 - 123.67	1.0000	1.0000
L2	15	LDF6-50A(1-1/4")	76.25 - 116.00	1.0000	1.0000
L2	23	Safety Line 3/8	76.25 - 123.67	1.0000	1.0000
L2	25	CCI 4.5" x 1" Plate	76.25 - 52.50	1.0000	1.0000
L2	26	CCI 4.5" x 1" Plate	76.25 - 52.50	1.0000	1.0000
L2	27	CCI 4.5" x 1" Plate	76.25 - 52.50	1.0000	1.0000
L4	9	2" Rigid Conduit	37.00 - 51.00	1.0000	1.0000
L4	10	HJ4-50(1/2")	37.00 - 51.00	1.0000	1.0000
L4	15	LDF6-50A(1-1/4")	37.00 - 51.00	1.0000	1.0000
L4	23	Safety Line 3/8	37.00 - 51.00	1.0000	1.0000
L4	25	CCI 4.5" x 1" Plate	42.50 - 51.00	1.0000	1.0000
L4	26	CCI 4.5" x 1" Plate	42.50 - 51.00	1.0000	1.0000
L4	27	CCI 4.5" x 1" Plate	42.50 - 51.00	1.0000	1.0000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
(2) DB846H80E-SX w/ Mount Pipe (E)	A	From Leg	4.000 0.000 0.000	0.000	160.000	No Ice 1/2" Ice 1" Ice	5.331 5.888 6.412	7.735 8.930 9.843	0.041 0.099 0.165
(2) DB846H80E-SX w/ Mount Pipe (E)	B	From Leg	4.000 0.000 0.000	0.000	160.000	No Ice 1/2" Ice 1" Ice	5.331 5.888 6.412	7.735 8.930 9.843	0.041 0.099 0.165
(2) DB846F65ZAXY w/ Mount Pipe (E)	C	From Leg	4.000 0.000 0.000	0.000	160.000	No Ice 1/2" Ice 1" Ice	7.271 7.832 8.348	7.821 9.010 9.912	0.047 0.114 0.189
HBXX-6517DS-A2M w/ Mount Pipe (E)	A	From Leg	4.000 0.000 0.000	0.000	160.000	No Ice 1/2" Ice 1" Ice	8.765 9.342 9.889	6.963 8.182 9.144	0.067 0.137 0.215
HBXX-6517DS-A2M w/ Mount Pipe (E)	B	From Leg	4.000 0.000 0.000	0.000	160.000	No Ice 1/2" Ice 1" Ice	8.765 9.342 9.889	6.963 8.182 9.144	0.067 0.137 0.215
HBXX-6517DS-A2M w/ Mount Pipe (E)	C	From Leg	4.000 0.000 0.000	0.000	160.000	No Ice 1/2" Ice 1" Ice	8.765 9.342 9.889	6.963 8.182 9.144	0.067 0.137 0.215
(2) FD9R6004/2C-3L (E)	B	From Leg	4.000 0.000 0.000	0.000	160.000	No Ice 1/2" Ice 1" Ice	0.314 0.386 0.466	0.076 0.119 0.169	0.003 0.005 0.009

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Offsets: Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
DB-T1-6Z-8AB-0Z	B	From Leg	4.000	0.000	0.000	160.000	No Ice	4.800	2.000	0.044
(E)			0.000				1/2" Ice	5.070	2.193	0.080
			0.000				1" Ice	5.348	2.393	0.120
(2) SBNHH-1D65B w/ Mount Pipe	A	From Leg	4.000	0.000	0.000	160.000	No Ice	8.397	7.071	0.066
(R)			0.000				1/2" Ice	8.960	8.260	0.135
			0.000				1" Ice	9.490	9.170	0.212
(2) SBNHH-1D65B w/ Mount Pipe	B	From Leg	4.000	0.000	0.000	160.000	No Ice	8.397	7.071	0.066
(R)			0.000				1/2" Ice	8.960	8.260	0.135
			0.000				1" Ice	9.490	9.170	0.212
(2) SBNHH-1D65B w/ Mount Pipe	C	From Leg	4.000	0.000	0.000	160.000	No Ice	8.397	7.071	0.066
(R)			0.000				1/2" Ice	8.960	8.260	0.135
			0.000				1" Ice	9.490	9.170	0.212
DB-B1-6C-8AB-0Z	A	From Leg	4.000	0.000	0.000	160.000	No Ice	4.800	2.000	0.044
(R)			0.000				1/2" Ice	5.070	2.193	0.080
			0.000				1" Ice	5.348	2.393	0.120
RRH2x60-700	A	From Leg	4.000	0.000	0.000	160.000	No Ice	3.500	1.816	0.060
(R)			0.000				1/2" Ice	3.761	2.052	0.083
			0.000				1" Ice	4.029	2.289	0.109
RRH2x60-700	B	From Leg	4.000	0.000	0.000	160.000	No Ice	3.500	1.816	0.060
(R)			0.000				1/2" Ice	3.761	2.052	0.083
			0.000				1" Ice	4.029	2.289	0.109
RRH2x60-700	C	From Leg	4.000	0.000	0.000	160.000	No Ice	3.500	1.816	0.060
(R)			0.000				1/2" Ice	3.761	2.052	0.083
			0.000				1" Ice	4.029	2.289	0.109
RRH2X60-PCS	A	From Leg	4.000	0.000	0.000	160.000	No Ice	2.200	1.723	0.055
(R)			0.000				1/2" Ice	2.393	1.901	0.075
			0.000				1" Ice	2.593	2.087	0.099
RRH2X60-PCS	B	From Leg	4.000	0.000	0.000	160.000	No Ice	2.200	1.723	0.055
(R)			0.000				1/2" Ice	2.393	1.901	0.075
			0.000				1" Ice	2.593	2.087	0.099
RRH2X60-PCS	C	From Leg	4.000	0.000	0.000	160.000	No Ice	2.200	1.723	0.055
(R)			0.000				1/2" Ice	2.393	1.901	0.075
			0.000				1" Ice	2.593	2.087	0.099
RRH2X60-AWS	A	From Leg	4.000	0.000	0.000	160.000	No Ice	3.500	1.816	0.060
(R)			0.000				1/2" Ice	3.761	2.052	0.083
			0.000				1" Ice	4.029	2.289	0.109
RRH2X60-AWS	B	From Leg	4.000	0.000	0.000	160.000	No Ice	3.500	1.816	0.060
(R)			0.000				1/2" Ice	3.761	2.052	0.083
			0.000				1" Ice	4.029	2.289	0.109
RRH2X60-AWS	C	From Leg	4.000	0.000	0.000	160.000	No Ice	3.500	1.816	0.060
(R)			0.000				1/2" Ice	3.761	2.052	0.083
			0.000				1" Ice	4.029	2.289	0.109
Platform Mount [LP 602-1]	C	None			0.000	160.000	No Ice	32.030	32.030	1.343
(E)							1/2" Ice	38.710	38.710	1.800
							1" Ice	45.390	45.390	2.257
s										
(2) DB980H90E-M w/ Mount Pipe	A	From Leg	4.000	0.000	0.000	150.000	No Ice	4.036	3.619	0.030
(E)			0.000				1/2" Ice	4.499	4.481	0.066
			2.000				1" Ice	4.947	5.219	0.109
(2) DB980H90E-M w/ Mount Pipe	B	From Leg	4.000	0.000	0.000	150.000	No Ice	4.036	3.619	0.030
(E)			0.000				1/2" Ice	4.499	4.481	0.066
			2.000				1" Ice	4.947	5.219	0.109
(2) DB980H90E-M w/ Mount Pipe	C	From Leg	4.000	0.000	0.000	150.000	No Ice	4.036	3.619	0.030
(E)			0.000				1/2" Ice	4.499	4.481	0.066
			2.000				1" Ice	4.947	5.219	0.109
(2) 6' x 2" Mount Pipe	A	From Leg	4.000	0.000	0.000	150.000	No Ice	1.425	1.425	0.022
(E-Empty)			0.000				1/2" Ice	1.925	1.925	0.033

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.000			1" Ice	2.294	2.294	0.048
(2) 6' x 2" Mount Pipe	B	From Leg	4.000	0.000	150.000	No Ice	1.425	1.425	0.022
(E-Empty)			0.000			1/2" Ice	1.925	1.925	0.033
			0.000			1" Ice	2.294	2.294	0.048
(2) 6' x 2" Mount Pipe	C	From Leg	4.000	0.000	150.000	No Ice	1.425	1.425	0.022
(E-Empty)			0.000			1/2" Ice	1.925	1.925	0.033
			0.000			1" Ice	2.294	2.294	0.048
Platform Mount [LP 602-1]	C	None		0.000	150.000	No Ice	32.030	32.030	1.343
(E)						1/2" Ice	38.710	38.710	1.800
						1" Ice	45.390	45.390	2.257
S									
(2) 6' x 3" Mount Pipe	A	From Leg	2.000	0.000	142.000	No Ice	1.767	1.767	0.030
(E)			0.000			1/2" Ice	2.129	2.129	0.044
			0.000			1" Ice	2.501	2.501	0.061
(2) 6' x 3" Mount Pipe	B	From Leg	2.000	0.000	142.000	No Ice	1.767	1.767	0.030
(E)			0.000			1/2" Ice	2.129	2.129	0.044
			0.000			1" Ice	2.501	2.501	0.061
(2) 6' x 3" Mount Pipe	C	From Leg	2.000	0.000	142.000	No Ice	1.767	1.767	0.030
(E)			0.000			1/2" Ice	2.129	2.129	0.044
			0.000			1" Ice	2.501	2.501	0.061
4' x 2" Horizontal Face Mount	B	From Face	0.500	0.000	145.000	No Ice	0.866	0.043	0.010
Pipe			0.000			1/2" Ice	1.111	0.087	0.017
(E-Dish Tie Back)			0.000			1" Ice	1.365	0.131	0.027
4' x 2" Horizontal Face Mount	C	From Face	0.500	0.000	145.000	No Ice	0.866	0.043	0.010
Pipe			0.000			1/2" Ice	1.111	0.087	0.017
(E-Dish Tie Back)			0.000			1" Ice	1.365	0.131	0.027
J-Box - 1' x 1' x 4"	C	From Leg	0.500	0.000	145.000	No Ice	2.133	1.200	0.020
(E-Per Photo)			0.000			1/2" Ice	2.315	1.343	0.039
			0.000			1" Ice	2.504	1.493	0.061
Side Arm Mount [SO 101-3]	C	None		0.000	142.000	No Ice	7.500	7.500	0.252
(E)						1/2" Ice	8.900	8.900	0.333
						1" Ice	10.300	10.300	0.414
S									
ERICSSON AIR 21 B4A	A	From Leg	4.000	0.000	134.000	No Ice	6.329	5.642	0.112
B2P w/ Mount Pipe			0.000			1/2" Ice	6.775	6.426	0.169
(R)			3.000			1" Ice	7.214	7.131	0.233
ERICSSON AIR 21 B4A	B	From Leg	4.000	0.000	134.000	No Ice	6.329	5.642	0.112
B2P w/ Mount Pipe			0.000			1/2" Ice	6.775	6.426	0.169
(R)			3.000			1" Ice	7.214	7.131	0.233
ERICSSON AIR 21 B4A	C	From Leg	4.000	0.000	134.000	No Ice	6.329	5.642	0.112
B2P w/ Mount Pipe			0.000			1/2" Ice	6.775	6.426	0.169
(R)			3.000			1" Ice	7.214	7.131	0.233
SBNH-1D65C-SR w/ Mount	A	From Leg	4.000	0.000	134.000	No Ice	11.683	9.842	0.083
Pipe			0.000			1/2" Ice	12.404	11.366	0.172
(R)			3.000			1" Ice	13.135	12.914	0.272
SBNH-1D65C-SR w/ Mount	B	From Leg	4.000	0.000	134.000	No Ice	11.683	9.842	0.083
Pipe			0.000			1/2" Ice	12.404	11.366	0.172
(R)			3.000			1" Ice	13.135	12.914	0.272
SBNH-1D65C-SR w/ Mount	C	From Leg	4.000	0.000	134.000	No Ice	11.683	9.842	0.083
Pipe			0.000			1/2" Ice	12.404	11.366	0.172
(R)			3.000			1" Ice	13.135	12.914	0.272
RRUS 11 B2	A	From Leg	4.000	0.000	134.000	No Ice	2.833	1.182	0.051
(R)			0.000			1/2" Ice	3.043	1.330	0.072
			3.000			1" Ice	3.259	1.485	0.095
RRUS 11 B2	B	From Leg	4.000	0.000	134.000	No Ice	2.833	1.182	0.051
(R)			0.000			1/2" Ice	3.043	1.330	0.072
			3.000			1" Ice	3.259	1.485	0.095

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
RRUS 11 B2	C	From Leg	4.000	0.000	134.000	No Ice	2.833	1.182	0.051
(R)			0.000			1/2" Ice	3.043	1.330	0.072
			3.000			1" Ice	3.259	1.485	0.095
RRUS 11 B12	A	From Leg	4.000	0.000	134.000	No Ice	2.833	1.182	0.051
(R)			0.000			1/2" Ice	3.043	1.330	0.072
			3.000			1" Ice	3.259	1.485	0.095
RRUS 11 B12	B	From Leg	4.000	0.000	134.000	No Ice	2.833	1.182	0.051
(R)			0.000			1/2" Ice	3.043	1.330	0.072
			3.000			1" Ice	3.259	1.485	0.095
RRUS 11 B12	C	From Leg	4.000	0.000	134.000	No Ice	2.833	1.182	0.051
(R)			0.000			1/2" Ice	3.043	1.330	0.072
			3.000			1" Ice	3.259	1.485	0.095
T-Arm Mount [TA 602-3]	C	None		0.000	134.000	No Ice	11.590	11.590	0.774
(R-RMV12-396)						1/2" Ice	15.440	15.440	0.990
						1" Ice	19.290	19.290	1.206
S									
AM-X-CD-16-65-00T-RET	A	From Leg	4.000	0.000	116.000	No Ice	8.262	6.304	0.074
w/ Mount Pipe			0.000			1/2" Ice	8.822	7.479	0.139
(E)			4.000			1" Ice	9.346	8.368	0.212
AM-X-CD-16-65-00T-RET	B	From Leg	4.000	0.000	116.000	No Ice	8.262	6.304	0.074
w/ Mount Pipe			0.000			1/2" Ice	8.822	7.479	0.139
(E)			4.000			1" Ice	9.346	8.368	0.212
AM-X-CD-16-65-00T-RET	C	From Leg	4.000	0.000	116.000	No Ice	8.262	6.304	0.074
w/ Mount Pipe			0.000			1/2" Ice	8.822	7.479	0.139
(E)			4.000			1" Ice	9.346	8.368	0.212
(2) 7770.00 w/ Mount Pipe	A	From Leg	4.000	0.000	116.000	No Ice	5.746	4.254	0.055
(E)			0.000			1/2" Ice	6.179	5.014	0.103
			4.000			1" Ice	6.607	5.711	0.157
(2) 7770.00 w/ Mount Pipe	B	From Leg	4.000	0.000	116.000	No Ice	5.746	4.254	0.055
(E)			0.000			1/2" Ice	6.179	5.014	0.103
			4.000			1" Ice	6.607	5.711	0.157
(2) 7770.00 w/ Mount Pipe	C	From Leg	4.000	0.000	116.000	No Ice	5.746	4.254	0.055
(E)			0.000			1/2" Ice	6.179	5.014	0.103
			4.000			1" Ice	6.607	5.711	0.157
(2) LGP21401	A	From Leg	4.000	0.000	116.000	No Ice	1.104	0.207	0.014
(E)			0.000			1/2" Ice	1.239	0.274	0.021
			0.000			1" Ice	1.381	0.348	0.030
(2) LGP21401	B	From Leg	4.000	0.000	116.000	No Ice	1.104	0.207	0.014
(E)			0.000			1/2" Ice	1.239	0.274	0.021
			0.000			1" Ice	1.381	0.348	0.030
(2) LGP21401	C	From Leg	4.000	0.000	116.000	No Ice	1.104	0.207	0.014
(E)			0.000			1/2" Ice	1.239	0.274	0.021
			0.000			1" Ice	1.381	0.348	0.030
(2) LGP21901	A	From Leg	4.000	0.000	116.000	No Ice	0.231	0.158	0.006
(E)			0.000			1/2" Ice	0.294	0.213	0.008
			0.000			1" Ice	0.365	0.276	0.011
(2) LGP21901	B	From Leg	4.000	0.000	116.000	No Ice	0.231	0.158	0.006
(E)			0.000			1/2" Ice	0.294	0.213	0.008
			0.000			1" Ice	0.365	0.276	0.011
(2) LGP21901	C	From Leg	4.000	0.000	116.000	No Ice	0.231	0.158	0.006
(E)			0.000			1/2" Ice	0.294	0.213	0.008
			0.000			1" Ice	0.365	0.276	0.011
DC6-48-60-18-8F	C	From Leg	4.000	0.000	116.000	No Ice	0.917	0.917	0.019
(E)			0.000			1/2" Ice	1.458	1.458	0.037
			4.000			1" Ice	1.643	1.643	0.057
(2) RRUS 11	A	From Leg	4.000	0.000	116.000	No Ice	2.784	1.187	0.048
(P)			0.000			1/2" Ice	2.992	1.334	0.068

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			4.000			1" Ice	3.207	1.490	0.092
(2) RRUS 11	B	From Leg	4.000	0.000	116.000	No Ice	2.784	1.187	0.048
(P)			0.000			1/2" Ice	2.992	1.334	0.068
			4.000			1" Ice	3.207	1.490	0.092
(2) RRUS 11	C	From Leg	4.000	0.000	116.000	No Ice	2.784	1.187	0.048
(P)			0.000			1/2" Ice	2.992	1.334	0.068
			4.000			1" Ice	3.207	1.490	0.092
782 10253	A	From Leg	4.000	0.000	116.000	No Ice	0.108	0.061	0.003
(P)			0.000			1/2" Ice	0.152	0.098	0.004
			4.000			1" Ice	0.203	0.142	0.006
782 10253	B	From Leg	4.000	0.000	116.000	No Ice	0.108	0.061	0.003
(P)			0.000			1/2" Ice	0.152	0.098	0.004
			4.000			1" Ice	0.203	0.142	0.006
782 10253	C	From Leg	4.000	0.000	116.000	No Ice	0.108	0.061	0.003
(P)			0.000			1/2" Ice	0.152	0.098	0.004
			4.000			1" Ice	0.203	0.142	0.006
3' x 2" Pipe Mount	A	From Leg	4.000	0.000	116.000	No Ice	0.583	0.583	0.011
(E-For TMA)			0.000			1/2" Ice	0.770	0.770	0.017
			4.000			1" Ice	0.967	0.967	0.024
3' x 2" Pipe Mount	B	From Leg	4.000	0.000	116.000	No Ice	0.583	0.583	0.011
(E-For TMA)			0.000			1/2" Ice	0.770	0.770	0.017
			4.000			1" Ice	0.967	0.967	0.024
(2) 3' x 2" Pipe Mount	C	From Leg	4.000	0.000	116.000	No Ice	0.583	0.583	0.011
(E-For TMA)			0.000			1/2" Ice	0.770	0.770	0.017
			4.000			1" Ice	0.967	0.967	0.024
Platform Mount [LP 303-1]	C	None		0.000	116.000	No Ice	14.660	14.660	1.250
(E)						1/2" Ice	18.870	18.870	1.481
						1" Ice	23.080	23.080	1.713
S									
GPS	A	From Leg	3.000	0.000	61.000	No Ice	0.150	0.150	0.000
(E)			0.000			1/2" Ice	0.204	0.204	0.002
			0.000			1" Ice	0.265	0.265	0.005
GPS	C	From Leg	3.000	0.000	61.000	No Ice	0.150	0.150	0.000
(E)			0.000			1/2" Ice	0.204	0.204	0.002
			0.000			1" Ice	0.265	0.265	0.005
2' x 2" Pipe Mount	A	From Leg	3.000	0.000	61.000	No Ice	0.023	0.023	0.007
(E)			0.000			1/2" Ice	0.049	0.049	0.008
			0.000			1" Ice	0.085	0.085	0.009
2' x 2" Pipe Mount	C	From Leg	3.000	0.000	61.000	No Ice	0.023	0.023	0.007
(E)			0.000			1/2" Ice	0.049	0.049	0.008
			0.000			1" Ice	0.085	0.085	0.009
Side Arm Mount [SO 701-1]	A	From Leg	1.500	0.000	61.000	No Ice	0.850	1.670	0.065
(E)			0.000			1/2" Ice	1.140	2.340	0.079
			0.000			1" Ice	1.430	3.010	0.093
Side Arm Mount [SO 701-1]	C	From Leg	1.500	0.000	61.000	No Ice	0.850	1.670	0.065
(E)			0.000			1/2" Ice	1.140	2.340	0.079
			0.000			1" Ice	1.430	3.010	0.093
S									
2' x 2" Pipe Mount	A	From Leg	3.000	0.000	50.000	No Ice	0.023	0.023	0.007
(E-Empty)			0.000			1/2" Ice	0.049	0.049	0.008
			0.000			1" Ice	0.085	0.085	0.009
2' x 2" Pipe Mount	C	From Leg	3.000	0.000	50.000	No Ice	0.023	0.023	0.007
(E-Empty)			0.000			1/2" Ice	0.049	0.049	0.008
			0.000			1" Ice	0.085	0.085	0.009
Side Arm Mount [SO 701-1]	A	From Leg	1.500	0.000	50.000	No Ice	0.850	1.670	0.065
(E-Empty)			0.000			1/2" Ice	1.140	2.340	0.079
			0.000			1" Ice	1.430	3.010	0.093

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Side Arm Mount [SO 701-1] (E-Empty) *s*	C	From Leg	1.500 0.000 0.000	0.000	50.000	No Ice 1/2" Ice 1" Ice	0.850 1.140 1.430	1.670 2.340 3.010	0.065 0.079 0.093

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
Radiowaves HP3-11 (E)	B	Paraboloid w/Shroud (HP)	From Leg	2.000 0.000 2.000	70.000		142.000	3.167	No Ice 1/2" Ice 1" Ice	7.876 8.296 8.716	0.050 0.093 0.135
Radiowaves HP3-11 (E) *s*	C	Paraboloid w/Shroud (HP)	From Leg	2.000 0.000 2.000	78.000		142.000	3.167	No Ice 1/2" Ice 1" Ice	7.876 8.296 8.716	0.050 0.093 0.135

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.6 Wind 0 deg - No Ice
3	0.9 Dead+1.6 Wind 0 deg - No Ice
4	1.2 Dead+1.6 Wind 30 deg - No Ice
5	0.9 Dead+1.6 Wind 30 deg - No Ice
6	1.2 Dead+1.6 Wind 60 deg - No Ice
7	0.9 Dead+1.6 Wind 60 deg - No Ice
8	1.2 Dead+1.6 Wind 90 deg - No Ice
9	0.9 Dead+1.6 Wind 90 deg - No Ice
10	1.2 Dead+1.6 Wind 120 deg - No Ice
11	0.9 Dead+1.6 Wind 120 deg - No Ice
12	1.2 Dead+1.6 Wind 150 deg - No Ice
13	0.9 Dead+1.6 Wind 150 deg - No Ice
14	1.2 Dead+1.6 Wind 180 deg - No Ice
15	0.9 Dead+1.6 Wind 180 deg - No Ice
16	1.2 Dead+1.6 Wind 210 deg - No Ice
17	0.9 Dead+1.6 Wind 210 deg - No Ice
18	1.2 Dead+1.6 Wind 240 deg - No Ice
19	0.9 Dead+1.6 Wind 240 deg - No Ice
20	1.2 Dead+1.6 Wind 270 deg - No Ice
21	0.9 Dead+1.6 Wind 270 deg - No Ice
22	1.2 Dead+1.6 Wind 300 deg - No Ice
23	0.9 Dead+1.6 Wind 300 deg - No Ice
24	1.2 Dead+1.6 Wind 330 deg - No Ice

Comb. No.	Description
25	0.9 Dead+1.6 Wind 330 deg - No Ice
26	1.2 Dead+1.0 Ice+1.0 Temp
27	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
28	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
29	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
30	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
31	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
32	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
33	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
34	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
39	Dead+Wind 0 deg - Service
40	Dead+Wind 30 deg - Service
41	Dead+Wind 60 deg - Service
42	Dead+Wind 90 deg - Service
43	Dead+Wind 120 deg - Service
44	Dead+Wind 150 deg - Service
45	Dead+Wind 180 deg - Service
46	Dead+Wind 210 deg - Service
47	Dead+Wind 240 deg - Service
48	Dead+Wind 270 deg - Service
49	Dead+Wind 300 deg - Service
50	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	160 - 123.667	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-26.892	-0.310	-1.072
			Max. Mx	8	-8.724	-460.933	-2.347
			Max. My	14	-8.696	-2.459	-463.061
			Max. Vy	8	20.493	-460.933	-2.347
			Max. Vx	2	-20.677	1.218	463.043
			Max. Torque	9			-1.734
L2	123.667 - 76.25	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-47.449	2.608	-3.446
			Max. Mx	8	-20.488	-1684.466	-9.836
			Max. My	2	-20.467	6.042	1695.313
			Max. Vy	8	30.608	-1684.466	-9.836
			Max. Vx	2	-30.794	6.042	1695.313
			Max. Torque	9			-1.885
L3	76.25 - 51	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-60.880	5.097	-4.817
			Max. Mx	8	-29.887	-2705.814	-14.867
			Max. My	2	-29.875	9.742	2722.798
			Max. Vy	8	35.370	-2705.814	-14.867
			Max. Vx	2	-35.538	9.742	2722.798
			Max. Torque	9			-1.877
L4	51 - 37	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-64.487	6.000	-4.943
			Max. Mx	8	-32.471	-2957.072	-16.035
			Max. My	2	-32.461	10.952	2975.605
			Max. Vy	8	36.492	-2957.072	-16.035

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vx	2	-36.644	10.952	2975.605
			Max. Torque	9			-1.744
L5	37 - 0	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-88.531	9.293	-7.531
			Max. Mx	8	-50.608	-4700.654	-24.409
			Max. My	2	-50.608	16.989	4726.019
			Max. Vy	8	42.768	-4700.654	-24.409
			Max. Vx	2	-42.916	16.989	4726.019
			Max. Torque	9			-1.625

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	32	88.531	-4.407	-7.655
	Max. H_x	20	50.633	42.689	0.076
	Max. H_z	2	50.633	0.113	42.886
	Max. M_x	2	4726.019	0.113	42.886
	Max. M_z	8	4700.654	-42.739	-0.170
	Max. Torsion	21	1.341	42.689	0.076
	Min. Vert	7	37.975	-36.927	21.485
	Min. H_x	8	50.633	-42.739	-0.170
	Min. H_z	14	50.633	-0.181	-42.858
	Min. M_x	14	-4725.441	-0.181	-42.858
	Min. M_z	20	-4699.014	42.689	0.076
	Min. Torsion	9	-1.624	-42.739	-0.170

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	42.194	0.000	0.000	1.466	2.350	0.000
1.2 Dead+1.6 Wind 0 deg - No Ice	50.633	-0.113	-42.886	-4726.019	16.989	-0.169
0.9 Dead+1.6 Wind 0 deg - No Ice	37.975	-0.113	-42.886	-4686.695	16.128	-0.175
1.2 Dead+1.6 Wind 30 deg - No Ice	50.633	21.246	-37.192	-4101.763	-2332.872	0.118
0.9 Dead+1.6 Wind 30 deg - No Ice	37.975	21.246	-37.192	-4067.672	-2313.969	0.115
1.2 Dead+1.6 Wind 60 deg - No Ice	50.633	36.927	-21.485	-2370.798	-4059.068	1.087
0.9 Dead+1.6 Wind 60 deg - No Ice	37.975	36.927	-21.485	-2351.271	-4025.642	1.090
1.2 Dead+1.6 Wind 90 deg - No Ice	50.633	42.739	0.170	24.409	-4700.654	1.617
0.9 Dead+1.6 Wind 90 deg - No Ice	37.975	42.739	0.170	23.747	-4661.831	1.624
1.2 Dead+1.6 Wind 120 deg - No Ice	50.633	37.014	21.592	2385.605	-4069.258	1.172
0.9 Dead+1.6 Wind 120 deg -	37.975	37.014	21.592	2365.065	-4035.748	1.181

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
No Ice						
1.2 Dead+1.6 Wind 150 deg - No Ice	50.633	21.372	37.194	4102.802	-2346.845	0.767
0.9 Dead+1.6 Wind 150 deg - No Ice	37.975	21.372	37.194	4067.816	-2327.830	0.776
1.2 Dead+1.6 Wind 180 deg - No Ice	50.633	0.181	42.858	4725.441	-21.324	0.636
0.9 Dead+1.6 Wind 180 deg - No Ice	37.975	0.181	42.858	4685.226	-21.848	0.643
1.2 Dead+1.6 Wind 210 deg - No Ice	50.633	-21.176	37.098	4091.355	2328.231	0.075
0.9 Dead+1.6 Wind 210 deg - No Ice	37.975	-21.176	37.098	4056.464	2307.947	0.077
1.2 Dead+1.6 Wind 240 deg - No Ice	50.633	-36.930	21.391	2360.510	4065.363	-0.963
0.9 Dead+1.6 Wind 240 deg - No Ice	37.975	-36.930	21.391	2340.187	4030.454	-0.965
1.2 Dead+1.6 Wind 270 deg - No Ice	50.633	-42.689	-0.076	-6.762	4699.014	-1.335
0.9 Dead+1.6 Wind 270 deg - No Ice	37.975	-42.689	-0.076	-7.156	4658.784	-1.341
1.2 Dead+1.6 Wind 300 deg - No Ice	50.633	-36.901	-21.564	-2377.853	4058.249	-0.460
0.9 Dead+1.6 Wind 300 deg - No Ice	37.975	-36.901	-21.564	-2358.283	4023.418	-0.468
1.2 Dead+1.6 Wind 330 deg - No Ice	50.633	-21.305	-37.204	-4100.720	2342.682	-0.133
0.9 Dead+1.6 Wind 330 deg - No Ice	37.975	-21.305	-37.204	-4066.653	2322.281	-0.142
1.2 Dead+1.0 Ice+1.0 Temp	88.531	-0.000	0.000	7.531	9.293	-0.000
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	88.531	-0.024	-8.510	-1000.914	12.265	-0.097
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	88.531	4.219	-7.376	-867.239	-489.511	-0.053
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	88.531	7.334	-4.257	-497.870	-857.970	0.126
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	88.531	8.488	0.034	11.977	-994.680	0.246
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	88.531	7.353	4.284	515.731	-860.104	0.208
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	88.531	4.407	7.655	911.076	-509.091	0.174
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	88.531	0.036	8.505	1015.479	4.841	0.177
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	88.531	-4.207	7.360	880.061	506.557	0.087
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	88.531	-7.334	4.242	510.723	876.948	-0.104
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	88.531	-8.479	-0.018	5.813	1012.257	-0.198
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	88.531	-7.334	-4.280	-499.685	876.023	-0.087
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	88.531	-4.396	-7.657	-896.036	526.227	-0.067
Dead+Wind 0 deg - Service	42.194	-0.021	-7.831	-858.449	4.968	-0.031
Dead+Wind 30 deg - Service	42.194	3.880	-6.791	-744.895	-422.454	0.024
Dead+Wind 60 deg - Service	42.194	6.743	-3.923	-430.038	-736.424	0.204
Dead+Wind 90 deg - Service	42.194	7.804	0.031	5.622	-853.121	0.301
Dead+Wind 120 deg - Service	42.194	6.759	3.943	435.101	-738.284	0.218
Dead+Wind 150 deg - Service	42.194	3.903	6.792	747.449	-424.996	0.142
Dead+Wind 180 deg - Service	42.194	0.033	7.826	860.704	-1.999	0.118

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
Dead+Wind 210 deg - Service	42.194	-3.867	6.774	745.356	425.362	0.013
Dead+Wind 240 deg - Service	42.194	-6.743	3.906	430.532	741.323	-0.180
Dead+Wind 270 deg - Service	42.194	-7.795	-0.014	-0.047	856.577	-0.249
Dead+Wind 300 deg - Service	42.194	-6.738	-3.938	-431.323	740.032	-0.087
Dead+Wind 330 deg - Service	42.194	-3.890	-6.793	-744.707	427.995	-0.025

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
1	0.000	-42.194	0.000	0.000	42.194	0.000	0.000%
2	-0.113	-50.633	-42.886	0.113	50.633	42.886	0.000%
3	-0.113	-37.975	-42.886	0.113	37.975	42.886	0.000%
4	21.246	-50.633	-37.192	-21.246	50.633	37.192	0.000%
5	21.246	-37.975	-37.192	-21.246	37.975	37.192	0.000%
6	36.927	-50.633	-21.485	-36.927	50.633	21.485	0.000%
7	36.927	-37.975	-21.485	-36.927	37.975	21.485	0.000%
8	42.739	-50.633	0.170	-42.739	50.633	-0.170	0.000%
9	42.739	-37.975	0.170	-42.739	37.975	-0.170	0.000%
10	37.014	-50.633	21.592	-37.014	50.633	-21.592	0.000%
11	37.014	-37.975	21.592	-37.014	37.975	-21.592	0.000%
12	21.372	-50.633	37.194	-21.372	50.633	-37.194	0.000%
13	21.372	-37.975	37.194	-21.372	37.975	-37.194	0.000%
14	0.181	-50.633	42.858	-0.181	50.633	-42.858	0.000%
15	0.181	-37.975	42.858	-0.181	37.975	-42.858	0.000%
16	-21.176	-50.633	37.098	21.176	50.633	-37.098	0.000%
17	-21.176	-37.975	37.098	21.176	37.975	-37.098	0.000%
18	-36.930	-50.633	21.391	36.930	50.633	-21.391	0.000%
19	-36.930	-37.975	21.391	36.930	37.975	-21.391	0.000%
20	-42.689	-50.633	-0.076	42.689	50.633	0.076	0.000%
21	-42.689	-37.975	-0.076	42.689	37.975	0.076	0.000%
22	-36.901	-50.633	-21.564	36.901	50.633	21.564	0.000%
23	-36.901	-37.975	-21.564	36.901	37.975	21.564	0.000%
24	-21.305	-50.633	-37.204	21.305	50.633	37.204	0.000%
25	-21.305	-37.975	-37.204	21.305	37.975	37.204	0.000%
26	0.000	-88.531	0.000	0.000	88.531	-0.000	0.000%
27	-0.024	-88.531	-8.509	0.024	88.531	8.510	0.000%
28	4.219	-88.531	-7.376	-4.219	88.531	7.376	0.000%
29	7.334	-88.531	-4.257	-7.334	88.531	4.257	0.000%
30	8.488	-88.531	0.034	-8.488	88.531	-0.034	0.000%
31	7.353	-88.531	4.284	-7.353	88.531	-4.284	0.000%
32	4.407	-88.531	7.655	-4.407	88.531	-7.655	0.000%
33	0.036	-88.531	8.505	-0.036	88.531	-8.505	0.000%
34	-4.207	-88.531	7.360	4.207	88.531	-7.360	0.000%
35	-7.334	-88.531	4.242	7.334	88.531	-4.242	0.000%
36	-8.479	-88.531	-0.018	8.479	88.531	0.018	0.000%
37	-7.334	-88.531	-4.280	7.334	88.531	4.280	0.000%
38	-4.396	-88.531	-7.656	4.396	88.531	7.657	0.000%
39	-0.021	-42.194	-7.831	0.021	42.194	7.831	0.000%
40	3.880	-42.194	-6.791	-3.880	42.194	6.791	0.000%
41	6.743	-42.194	-3.923	-6.743	42.194	3.923	0.000%
42	7.804	-42.194	0.031	-7.804	42.194	-0.031	0.000%
43	6.759	-42.194	3.943	-6.759	42.194	-3.943	0.000%
44	3.903	-42.194	6.792	-3.903	42.194	-6.792	0.000%
45	0.033	-42.194	7.826	-0.033	42.194	-7.826	0.000%
46	-3.867	-42.194	6.774	3.867	42.194	-6.774	0.000%
47	-6.743	-42.194	3.906	6.743	42.194	-3.906	0.000%

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
48	-7.795	-42.194	-0.014	7.795	42.194	0.014	0.000%
49	-6.738	-42.194	-3.938	6.738	42.194	3.938	0.000%
50	-3.890	-42.194	-6.793	3.890	42.194	6.793	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	0.00034019
3	Yes	4	0.00000001	0.00015486
4	Yes	5	0.00000001	0.00062737
5	Yes	5	0.00000001	0.00024746
6	Yes	5	0.00000001	0.00061314
7	Yes	5	0.00000001	0.00024079
8	Yes	4	0.00000001	0.00097576
9	Yes	4	0.00000001	0.00056439
10	Yes	5	0.00000001	0.00063865
11	Yes	5	0.00000001	0.00025178
12	Yes	5	0.00000001	0.00062058
13	Yes	5	0.00000001	0.00024388
14	Yes	4	0.00000001	0.00034256
15	Yes	4	0.00000001	0.00015676
16	Yes	5	0.00000001	0.00061808
17	Yes	5	0.00000001	0.00024364
18	Yes	5	0.00000001	0.00063509
19	Yes	5	0.00000001	0.00025101
20	Yes	4	0.00000001	0.00061021
21	Yes	4	0.00000001	0.00034046
22	Yes	5	0.00000001	0.00062218
23	Yes	5	0.00000001	0.00024480
24	Yes	5	0.00000001	0.00062310
25	Yes	5	0.00000001	0.00024535
26	Yes	4	0.00000001	0.00006035
27	Yes	5	0.00000001	0.00064242
28	Yes	5	0.00000001	0.00069398
29	Yes	5	0.00000001	0.00069188
30	Yes	5	0.00000001	0.00064038
31	Yes	5	0.00000001	0.00070400
32	Yes	5	0.00000001	0.00072330
33	Yes	5	0.00000001	0.00065288
34	Yes	5	0.00000001	0.00070935
35	Yes	5	0.00000001	0.00070954
36	Yes	5	0.00000001	0.00064817
37	Yes	5	0.00000001	0.00070102
38	Yes	5	0.00000001	0.00071916
39	Yes	4	0.00000001	0.00006545
40	Yes	4	0.00000001	0.00020299
41	Yes	4	0.00000001	0.00019110
42	Yes	4	0.00000001	0.00007416
43	Yes	4	0.00000001	0.00021181
44	Yes	4	0.00000001	0.00019743
45	Yes	4	0.00000001	0.00006576
46	Yes	4	0.00000001	0.00019809
47	Yes	4	0.00000001	0.00021175
48	Yes	4	0.00000001	0.00007084

49	Yes	4	0.00000001	0.00019813
50	Yes	4	0.00000001	0.00020015

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	160 - 123.667	21.344	45	1.350	0.003
L2	128 - 76.25	12.986	45	1.068	0.002
L3	82 - 51	4.847	45	0.597	0.000
L4	51 - 37	1.788	45	0.328	0.000
L5	44 - 0	1.344	45	0.279	0.000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
160.000	(2) DB846H80E-SX w/ Mount Pipe	45	21.344	1.350	0.003	28591
150.000	(2) DB980H90E-M w/ Mount Pipe	45	18.603	1.265	0.002	14295
145.000	4' x 2" Horizontal Face Mount Pipe	45	17.259	1.222	0.002	9530
144.000	Radiowaves HP3-11	45	16.993	1.214	0.002	8934
142.000	(2) 6' x 3" Mount Pipe	45	16.467	1.196	0.002	7941
134.000	ERICSSON AIR 21 B4A B2P w/ Mount Pipe	45	14.427	1.124	0.002	5497
116.000	AM-X-CD-16-65-00T-RET w/ Mount Pipe	45	10.385	0.949	0.001	4850
61.000	GPS	45	2.580	0.406	0.000	6467
50.000	2' x 2" Pipe Mount	45	1.719	0.321	0.000	6522

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	160 - 123.667	117.065	2	7.410	0.016
L2	128 - 76.25	71.290	2	5.866	0.009
L3	82 - 51	26.627	2	3.283	0.003
L4	51 - 37	9.823	2	1.802	0.001
L5	44 - 0	7.381	2	1.530	0.001

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
160.000	(2) DB846H80E-SX w/ Mount Pipe	2	117.065	7.410	0.016	5368
150.000	(2) DB980H90E-M w/ Mount Pipe	2	102.056	6.947	0.014	2683
145.000	4' x 2" Horizontal Face Mount Pipe	2	94.694	6.712	0.012	1787
144.000	Radiowaves HP3-11	2	93.240	6.664	0.012	1675
142.000	(2) 6' x 3" Mount Pipe	2	90.356	6.568	0.012	1488
134.000	ERICSSON AIR 21 B4A B2P w/ Mount Pipe	2	79.183	6.175	0.010	1028
116.000	AM-X-CD-16-65-00T-RET w/ Mount Pipe	2	57.025	5.211	0.007	900
61.000	GPS	2	14.172	2.232	0.001	1180
50.000	2' x 2" Pipe Mount	2	9.444	1.762	0.001	1189

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
L1	160 - 123.667 (1)	TP29.05x18.87x0.188	36.333	0.000	0.0	16.693	-8.695	965.169	0.009
L2	123.667 - 76.25 (2)	TP41.95x27.461x0.313	51.750	0.000	0.0	40.278	-20.467	2534.090	0.008
L3	76.25 - 51 (3)	TP48.398x39.715x0.344	31.000	0.000	0.0	53.191	-29.875	3182.680	0.009
L4	51 - 37 (4)	TP52.32x48.398x0.433	14.000	0.000	0.0	69.575	-32.461	3098.030	0.010
L5	37 - 0 (5)	TP62x49.672x0.406	44.000	0.000	0.0	80.572	-50.608	4570.550	0.011

Pole Bending Design Data

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L1	160 - 123.667 (1)	TP29.05x18.87x0.188	463.168	544.269	0.851	0.000	544.269	0.000
L2	123.667 - 76.25 (2)	TP41.95x27.461x0.313	1695.325	2066.708	0.820	0.000	2066.708	0.000
L3	76.25 - 51 (3)	TP48.398x39.715x0.344	2722.817	3118.233	0.873	0.000	3118.233	0.000
L4	51 - 37 (4)	TP52.32x48.398x0.433	2975.625	3148.783	0.945	0.000	3148.783	0.000
L5	37 - 0 (5)	TP62x49.672x0.406	4726.592	5742.817	0.823	0.000	5742.817	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	160 - 123.667	TP29.05x18.87x0.188	20.657	482.585	0.043	0.217	1103.608	0.000

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L2	(1) 123.667 - 76.25 (2)	TP41.95x27.461x0.313	30.794	1267.040	0.024	0.262	4190.633	0.000
L3	76.25 - 51 (3)	TP48.398x39.715x0.344	35.538	1591.340	0.022	0.038	6322.808	0.000
L4	51 - 37 (4)	TP52.32x48.398x0.433	36.645	1549.010	0.024	0.169	6384.741	0.000
L5	37 - 0 (5)	TP62x49.672x0.406	42.926	2285.280	0.019	0.767	11644.667	0.000

Pole Interaction Design Data

Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	160 - 123.667 (1)	0.009	0.851	0.000	0.043	0.000	0.862 ✔	1.000	4.8.2 ✔
L2	123.667 - 76.25 (2)	0.008	0.820	0.000	0.024	0.000	0.829 ✔	1.000	4.8.2 ✔
L3	76.25 - 51 (3)	0.009	0.873	0.000	0.022	0.000	0.883 ✔	1.000	4.8.2 ✔
L4	51 - 37 (4)	0.010	0.945	0.000	0.024	0.000	0.956 ✔	1.000	4.8.2 ✔
L5	37 - 0 (5)	0.011	0.823	0.000	0.019	0.000	0.834 ✔	1.000	4.8.2 ✔

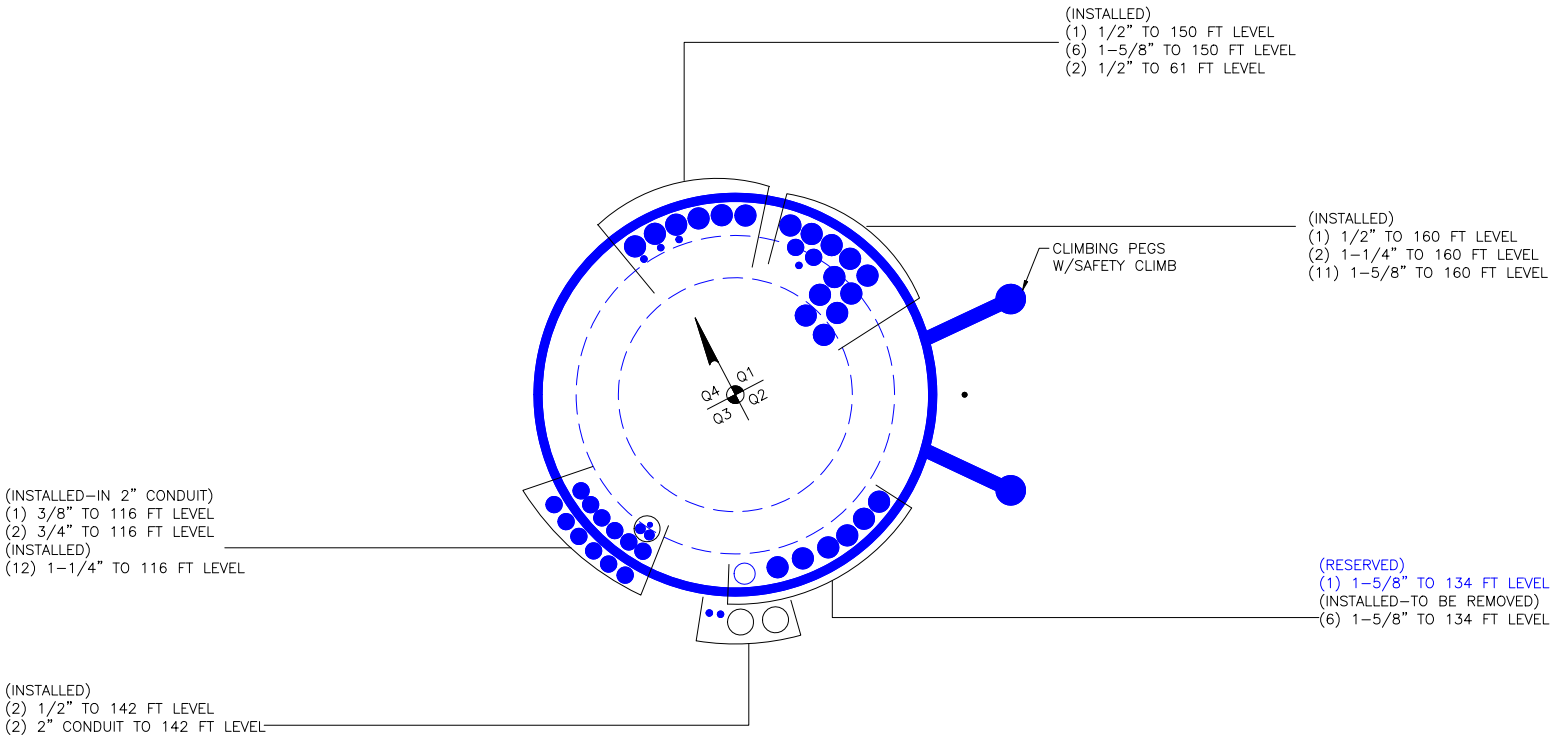
Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L1	160 - 123.667	Pole	TP29.05x18.87x0.188	1	-8.695	965.169	**	**
L2	123.667 - 76.25	Pole	TP41.95x27.461x0.313	2	-20.467	2534.090	**	**
L3	76.25 - 51	Pole	TP48.398x39.715x0.344	3	-29.875	3182.680	**	**
L4	51 - 37	Pole	TP52.32x48.398x0.433	4	-32.461	3098.030	**	**
L5	37 - 0	Pole	TP62x49.672x0.406	5	-50.608	4570.550	**	**
						Summary		
						Pole (L4)	**	**
						RATING =	**	**

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

APPENDIX B

BASE LEVEL DRAWING



BUSINESS UNIT: 806382

APPENDIX C

ADDITIONAL CALCULATIONS

Reinforcement 1

Bottom	Top	QTY	Type	Position	Gap	Ten/Comp
42.5	51	3	CI-XFP-0451(	F	0	T&C
				F	0	T&C
				F	0	T&C
				F	0	T&C
				F	0	T&C
				F	0	T&C
				F	0	T&C
				F	0	T&C
				F	0	T&C

Reinforcement 2

Bottom	Top	QTY	Type	Position	Gap	Ten/Comp
				F	0	T&C
				F	0	T&C
				F	0	T&C
				F	0	T&C
				F	0	T&C
				F	0	T&C
				F	0	T&C
				F	0	T&C
				F	0	T&C

Reinforcement 3

Bottom	Top	QTY	Type	Position	Gap	Ten/Comp
0				F	0	T&C
				F	0	T&C
				F	0	T&C
				F	0	T&C
				F	0	T&C
				F	0	T&C
				F	0	T&C
				F	0	T&C
				F	0	T&C

Bottom Elevation	Top Elevation	Original Thickness	Original Yield Stress	Original Ultimate Stress	Reinforced Shaft Capacity	Reinf. 1 QTY	Reinf. 1 Type	Rein. 1 Capacity	Reinf. 2 QTY	Reinf. 2 Type	Rein. 2 Capacity	Reinf. 3 QTY	Reinf. 3 Type	Rein. 3 Capacity	Control Stress Ratio	Top Height	Section Length	Lap Splice	# of Sides	Top Diameter	Bottom Diameter	Equivalent Shaft Thickness	Equivalent Shaft Fy	Equivalent Weight Mult.		Bottom Elevation Failure	Top Elevation Failure	Section Failure %
123.6670	160.0000	0.1875	65	80	85.8%										**85.8%**	160.0000	36.3330	4.3330	12	18.8700	29.0500	0.1875	65.0	1.00	1			
76.2500	128.0000	0.3125	65	80	82.6%										**82.6%**	128.0000	51.7500	5.7500	12	27.4610	41.9500	0.3125	65.0	1.00	2			
51.0000	82.0000	0.3438	65	80	88.0%										**88.0%**	82.0000	31.0000	0.0000	12	39.7151	48.3985	0.3438	65.0	1.00	3			
37.0000	51.0000	0.3438	65	80	78.5%	3	CI-XFP-0451(	95.6%							**95.6%**	51.0000	14.0000	7.0000	12	48.3985	52.3200	0.4328	40.0	0.99	4			
0.0000	44.0000	0.4063	65	80	83.2%										**83.2%**	44.0000	44.0000	0.0000	12	49.6717	62.0000	0.4063	65.0	1.00	5			
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Reinforced Pole Stress
and Effective Thickness Check

AeroSolutions LLC
Optimizing Your Tower Infrastructure
5500 Flatirons Parkway, Suite 100
Boulder, CO 80301
720-304-6882

Section		Loads				Pole								Unreinforced Pole - Rev. G																Reinforced Pole					Rev. G					Reinforcement 1							Composite							
Section	Elevation (ft)	Moment (ft-kip)	Compression (kip)	Shear (kip)	Torsion (kip-ft)	Number of Sides	OD (in)	Thickness (in)	Yield Strength (ksi)	Flat Width (in)	Area (in²)	Moment of Inertia (in⁴)	Percent of Composite Moment of Inertia	Angle Offset to Pole Flat	Distance to Extreme Fiber (in)	Section Modulus (in³)	Torsion Constant (in⁴)	Effective Yield Stress (ksi)	Nominal Bending Moment Strength (ft-kip)	Strength Resistance Factor	Design Bending Moment Strength (ft-kip)	Nominal Compressive Strength (kip)	Strength Resistance Factor	Design Compressive Strength (kip)	Nominal Shear Strength (kip)	Strength Resistance Factor	Design Shear Strength (kip)	Nominal Torsion Shear Strength (kip-ft)	Strength Resistance Factor	Design Torsion Shear Strength (kip-ft)	Stress Ratio	Moment in Pole when Reinforced	Bending Stress (ksi)	Axial Stress (ksi)	Shear Stress (ksi)	Torsion Shear Stress (ksi)	Allowable Bending Stress (ksi)	Allowable Compressive Stress (ksi)	Allowable Shear Stress (ksi)	Allowable Torsion Shear Stress (ksi)	Reinforced Pole Stress Ratio	Qty	Model	Position (F-Flat, C-Corner)	Gap Between Pole and Back of Rein. (in)	Tension only or Tension & Comp.	Total Moment of Inertia (in⁴)	Axial Force (kip)	Stress Ratio	Centroid Offset (in)	Area (in²)	Moment of Inertia (in⁴)	Controlling Stress Ratio	Thickness (in)	Weight Multiplier	Derated Yield Stress (ksi)	% Error in Derated Yield Stress
Section	*Elevation*	*Moment*	*Compression*	*Shear*	*Torsion*	*PoleSides*	*PoleOD*	*PoleT*	*PoleFy*	*PoleW*	*PoleA*	*PoleI*	*PolePer*	*PoleCPoint*	*PoleC*	*PoleS*	*PoleJ*	*PoleFye*	*PoleMn*	*PolePhiF*	*PolePhiMn*	*PolePn*	*PolePhiC*	*PolePhiPn*	*PoleVn*	*PolePhiV*	*PolePhiVn*	*PoleVtn*	*PolePhiVt*	*VdesPhiVtn*	*PolesSRG*	*PoleMoment*	*PoleFbAct*	*PoleFaAct*	*PoleFvAct*	*PoleFvtAct*	*PoleFbG*	*PoleFpG*	*PoleFvG*	*PoleFvtG*	*RPolesSRG*	*Rein1Qty*	*Rein1Model*	*Rein1Pos*	*Rein1Gap*	*Rein1TC*	*Rein1Total*	*Rein1P*	*Rein1SR*	*CompYBar*	*CompA*	*CompI*	*CompSR*	*EPoleT*	*EPoleWM*	*EDPoleFy*	*%DPoleSRCheck*
1	160	0.7	10.2	1.7	0.0	12	18.8700	0.1875	65	4.55	11.2	502	100%	TRUE	9.73	52	985	78.2	336.2	0.9	302.6	879.3	0.9	791.3	439.6	0.9	395.7	7911.3	0.9	7120.1	**0.015**	0.7	0.2	0.91	0.00	0.00	70.4	70.4	70.4	70.4	**0.015**									0.000	11.2	502	**0.015**	**0.1875**	**1.00**	**65.0**	**0.1%**
2	128	463.2	8.7	20.7	0.2	12	27.8360	0.1875	65	6.96	16.6	1628	100%	TRUE	14.38	113	3189	64.3	606.5	0.9	545.9	1069.5	0.9	962.6	534.8	0.9	481.3	14255.2	0.9	12829.7	**0.859**	463.2	49.1	0.52	0.00	0.00	57.8	57.8	57.8	57.8	**0.858**									0.000	16.6	1628	**0.858**	**0.1875**	**1.00**	**65.0**	**0.5%**
3	123.667	554.0	9.7	21.2	0.2	12	29.0500	0.5000	65	6.44	45.7	4769	100%	TRUE	14.95	319	9376	81.9	2177.4	0.9	1959.6	3745.5	0.9	3371.0	1872.8	0.9	1685.5	51369.7	0.9	46232.7	**0.286**	554.0	20.8	0.21	0.00	0.00	73.7	73.7	73.7	75.7	**0.286**									0.000	45.7	4769	**0.286**	**0.5000**	**1.00**	**65.0**	**0.4%**
4	82	1695.3	20.5	30.8	0.3	12	40.3401	0.3125	65	9.37	40.2	8234	100%	TRUE	20.83	395	16133	69.9	2303.3	0.9	2073.0	2807.4	0.9	2526.6	1403.7	0.9	1263.3	54155.7	0.9	48740.1	**0.827**	1695.3	51.5	0.51	0.00	0.00	62.9	62.9	62.9	62.9	**0.826**									0.000	40.2	8234	**0.826**	**0.3125**	**1.00**	**65.0**	**0.4%**
5	76.25	1875.0	22.8	31.7	0.3	12	41.9500	0.6563	65	9.48	86.8	18948	100%	TRUE	21.60	877	37232	81.9	5987.1	0.9	5388.4	7112.8	0.9	6401.6	3556.4	0.9	3200.8	141176.7	0.9	127059.0	**0.352**	1875.0	25.6	0.26	0.00	0.00	73.7	73.7	73.7	73.7	**0.352**									0.000	86.8	18948	**0.352**	**0.6563**	**1.00**	**65.0**	**0.4%**
6	51	2722.8	29.9	35.5	0.0	12	48.3985	0.3438	65	12.05	53.0	15674	100%	TRUE	24.99	627	30703	66.5	3475.0	0.9	3127.5	3526.4	0.9	3173.8	1763.2	0.9	1586.9	81685.0	0.9	73516.5	**0.881**	2722.8	52.1	0.56	0.00	0.00	59.8	59.8	59.8	59.8	**0.880**									0.000	53.0	15674	**0.880**	**0.3438**	**1.00**	**65.0**	**0.3%**
7	44	2975.6	32.5	36.6	0.2	12	50.3592	0.3438	65	12.57	55.2	17673	80%	0	25.18	702	34616	58.3	3412.6	0.9	3071.4	3220.9	0.9	2898.8	1610.4	0.9	1449.4	80210.4	0.9	72189.4	**0.981**	2375.7	40.6	0.59	0.00	0.00	52.5	52.5	52.5	52.5	**0.785**	3	CCI-XFP-045100	F	0	T&C	4463	186.4	**0.956**	0.000	68.7	22136	**0.956**	**0.4328**	**0.99**	**40.0**	**0.1%**
8	42.5	3030.8	33.2	36.9	0.2	12	50.7794	0.7500	65	11.60	120.3	38518	89%	TRUE	26.15	1473	75665	65.0	7977.6	0.9	7179.8	7817.8	0.9	7036.1	3908.9	0.9	3518.0	188055.3	0.9	169249.8	**0.427**	2711.4	22.1	0.28	0.00	0.00	58.5	58.5	58.5	58.5	**0.382**	3	CCI-XFP-045100	F	0	T&C	4536	98.4	**0.505**	0.000	133.8	43054	**0.505**	**0.8411**	**0.99**	**38.6**	**1.7%**
9	37	3236.0	36.8	37.8	0.2	12	52.3200	0.7500	65	12.01	124.0	42192	100%	TRUE	26.95	1566	82869	81.9	10684.6	0.9	9616.2	10154.8	0.9	9139.3	5077.4	0.9	4569.6	251830.2	0.9	226647.2	**0.341**	3236.0	24.8	0.30	0.00	0.00	73.7	73.7	73.7	73.7	**0.341**									0.000	124.0	42192	**0.341**	**0.7500**	**1.00**	**65.0**	**0.4%**
10	0	4726.6	50.6	42.9	0.8	12	62.0000	0.4063	65	15.52	80.3	39011	100%	TRUE	32.02	1218	76401	63.0	6399.5	0.9	5759.6	5064.8	0.9	4558.4	2532.4	0.9	2279.2	150399.5	0.9	135359.6	**0.832**	4726.6	46.6	0.63	0.00	0.00	56.7	56.7	56.7	56.7	**0.832**									0.000	80.3	39011	**0.832**	**0.4063**	**1.00**	**65.0**	**0.3%**
																														0.981									**0.880**							**0.956**				**0.956**				

Rein1

Bottom	Top	Qty	Model	Position	T or T&C
42.5		51	3 FP-045100		F T&C
					F T&C
					F T&C
					F T&C
					F T&C
					F T&C
					F T&C
					F T&C
					F T&C

Flats (Used for relative orientation only. Actual flat numbers may vary.)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
		1				1				1							

Rein2

Bottom	Top	Qty	Model	Position	T or T&C
					F T&C
					F T&C
					F T&C
					F T&C
					F T&C
					F T&C
					F T&C
					F T&C
					F T&C

Rein3

Bottom	Top	Qty	Model	Position	T or T&C
	0				F T&C
					F T&C
					F T&C
					F T&C
					F T&C
					F T&C
					F T&C
					F T&C
					F T&C

Reinforcement Capacity

AeroSolutions LLC
Optimizing Your Tower Infrastructure
5500 Flatirons Parkway, Suite 100
Boulder, CO 80301
720-304-6882

Dimensions and Properties														Compression				Axial				
																		ASD-9			LRFD	
Model	Weight (lb/ft)	Area (in^2)	Moment of Inertia (in^4)	Moment of Inertia (in^4)	Centroid from Mating Edge (in)	Centroid from Bolt Hole Center (in)	Web Thickness (in)	Width (in)	Flange Width (in)	Flange Thickness (in)	Hole Diameter (in)	Yield Stress (ksi)	Ultimate Stress (ksi)	Slender. Ratio Coefficient	Unbraced Length (in)	Slender. Ratio Coefficient	Unbraced Length (in)	Allowable Axial (kip)	Allowable Axial w/ increase (kip)	Governing Axial	Design Axial Strength (kip)	Governing Axial
CCI-XFP-045100	15.3	4.50	0.38	7.59	0.5	0	1	4.5	0	0	1.1875	65	80	0.80	20	1.00	20	129.7	172.9	Compress.	195.0	Rupture

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

TIA Rev G Assumption: Clear space between bottom of leveling nut and top of concrete **not** exceeding (1)*(F

Site Data

BU#:	*806382*
Site Name:	*HRT 082 943274*
App #:	*343912 Rev# 2*
Pole Manufacturer:	*Other*

Reactions		
Mu:	4726.5912	ft-kips
Axial, Pu:	50.6079	kips
Shear, Vu:	42.926573	kips
Eta Factor, η	0.5	TIA G (Fig. 4-4)

If No stiffeners, Criteria:	AISC LRFD	<-Only Applcable to Unstiffene

Anchor Rod Data		
Qty:	16	
Diam:	2.25	in
Rod Material:	A615-J	
Strength (Fu):	100	ksi
Yield (Fy):	75	ksi
Bolt Circle:	70.69	in

Anchor Rod Results

Max Rod (Cu+ Vu/ή):	209.1	Kips
Allowable Axial, Φ*Fu*Anet:	260.0	Kips
Anchor Rod Stress Ratio:	80.4%	**Pass**

Plate Data		
Diam:	76.69	in
Thick:	2.75	in
Grade:	60	ksi
Single-Rod B-eff:	12.46	in

Base Plate Results Flexural Check

Base Plate Stress:	23.5	ksi
Allowable Plate Stress:	54.0	ksi
Base Plate Stress Ratio:	43.5%	**Pass**

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

n/a

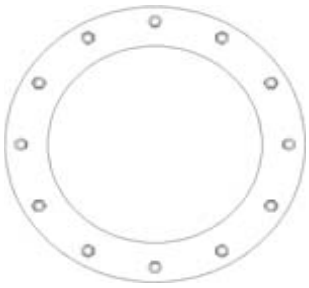
Stiffener Results

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:	62	in
Thick:	0.40625	in
Grade:	65	ksi
# of Sides:	12	"0" IF Round
Fu	80	ksi
Reinf. Fillet Weld	0	"0" if None



* 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

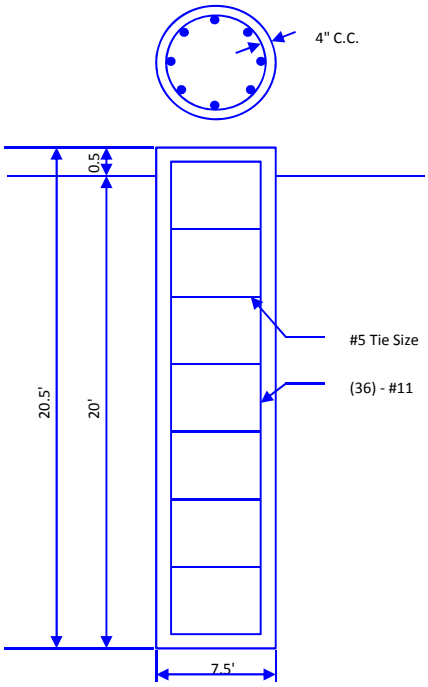
CCI Foundation Tool Suite - Monopole Pier

CCIFTS 1.2.108.14286 - Phase 1-2 Date: 19-05-2016

BU:	806382
Site Name:	HRT 082 943274, CT
App Number:	343912 Rev# 2
Work Order:	1238300

Monopole Drilled Pier

Input



Criteria

TIA Revision:	G
ACI 318 Revision:	2008
Seismic Category:	B

Forces

Compression	51	kips
Shear	43	kips
Moment	4727	k-ft
Swelling Force	0	kips

Foundation Dimensions

Pier Diameter:	7.5	ft
Ext. above grade:	0.5	ft
Depth below grade:	20	ft

Material Properties

Number of Rebar:	36	
Rebar Size:	11	
Tie Size	5	
Rebar tensile strength:	60	ksi
Concrete Strength:	4000	psi
Ultimate Concrete Strain	0.003	in/in
Clear Cover to Ties:	4	in

Soil Profile: Soil

Layer	Thickness (ft)	From (ft)	To (ft)	Unit Weight (pcf)	Cohesion (psf)	Friction Angle (deg)	Ultimate Uplift Skin Friction (ksf)	Ultimate Comp. Skin Friction (ksf)	Ultimate Bearing Capacity (ksf)	SPT 'N' Counts
1	1	0	1	100	0	0	0	0	0	
2	5	1	6	110		34			0	
3	3.5	6	9.5	115		38			0	
4	10.5	9.5	20	145		45			30	

Analysis Results

Soil Lateral Capacity

Depth to Zero Shear:	4.47	ft
Max Moment, Mu:	4870.28	k-ft
Soil Safety Factor:	1.87	
Safety Factor Req'd:	1.33	
RATING:	71.1%	

Soil Axial Capacity

Skin Friction (k):	280.02	kips
End Bearing (k):	994.02	kips
Comp. Capacity (k), ϕCn:	1274.04	kips
Comp. (k), Cu:	51.00	kips
RATING:	4.0%	

Concrete/Steel Check

Mu (from soil analysis)	4870.28	k-ft
ϕMn	9335.02	k-ft
RATING:	52.2%	

rho provided	0.88	
rho required	0.33	OK

Rebar Spacing	5.51	
Spacing required	22.56	OK

Dev. Length required	15.19	
Dev. Length provided	53.51	OK

Overall Foundation Rating: 71.1%

EBI Consulting
environmental | engineering | due diligence

RADIO FREQUENCY EMISSIONS ANALYSIS REPORT
EVALUATION OF HUMAN EXPOSURE POTENTIAL TO NON-IONIZING EMISSIONS

AT&T Existing Facility

Site ID: CT5836

Portland
74 Goodrich Lane
Portland, CT 06480

July 11, 2016

EBI Project Number: 6216003143

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general public allowable limit:	7.22 %

21 B Street · Burlington, MA 01803 · Tel: (781) 273.2500 · Fax: (781) 273.3311

July 11, 2016

AT&T Mobility – New England
Attn: Cameron Syme, RF Manager
550 Cochituate Road
Suite 550 – 13&14
Framingham, MA 06040

Emissions Analysis for Site: **CT5836 – Portland**

EBI Consulting was directed to analyze the proposed AT&T facility located at **74 Goodrich Lane, Portland, CT**, for the purpose of determining whether the emissions from the Proposed AT&T Antenna Installation located on this property are within specified federal limits.

All information used in this report was analyzed as a percentage of current Maximum Permissible Exposure (% MPE) as listed in the FCC OET Bulletin 65 Edition 97-01and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter (μW/cm2). The number of $\mu W/cm^2$ calculated at each sample point is called the power density. The exposure limit for power density varies depending upon the frequencies being utilized. Wireless Carriers and Paging Services use different frequency bands each with different exposure limits, therefore it is necessary to report results and limits in terms of percent MPE rather than power density.

All results were compared to the FCC (Federal Communications Commission) radio frequency exposure rules, 47 CFR 1.1307(b)(1) – (b)(3), to determine compliance with the Maximum Permissible Exposure (MPE) limits for General Population/Uncontrolled environments as defined below.

General population/uncontrolled exposure limits apply to situations in which the general public may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Therefore, members of the general public would always be considered under this category when exposure is not employment related, for example, in the case of a telecommunications tower that exposes persons in a nearby residential area.

Public exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ($\mu W/cm^2$). The general population exposure limits for the 700 and 850 MHz Bands are approximately 467 $\mu W/cm^2$ and 567 $\mu W/cm^2$ respectively. The general population exposure limit for the 1900 MHz (PCS), 2100 MHz (AWS) and 2300 MHz (WCS) bands is 1000 $\mu W/cm^2$. Because each carrier will be using different frequency bands, and each frequency band has different exposure limits, it is necessary to report percent of MPE rather than power density.

Occupational/controlled exposure limits apply to situations in which persons are exposed as a consequence of their employment and in which those persons who are exposed have been made fully aware of the potential for exposure and can exercise control over their exposure. Occupational/controlled exposure limits also apply where exposure is of a transient nature as a result of incidental passage through a location where exposure levels may be above general population/uncontrolled limits (see below), as long as the exposed person has been made fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means.

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were done for the proposed AT&T Wireless antenna facility located at **74 Goodrich Lane, Portland, CT**, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since AT&T is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was focused at the base of the tower. For this report the sample point is the top of a 6-foot person standing at the base of the tower.

For all calculations, all equipment was calculated using the following assumptions:

1) 2 UMTS channels (850 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

2) 2 UMTS channels (1900 MHz (PCS)) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

3) 2 LTE channels (700 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.

4) 2 LTE channels (1900 MHz (PCS)) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.

5) 2 GSM channels (850 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

6) 2 GSM channels (1900 MHz (PCS)) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

7) All radios at the proposed installation were considered to be running at full power and were uncombined in their RF transmissions paths per carrier prescribed configuration. Per FCC OET Bulletin No. 65 - Edition 97-01 recommendations to achieve the maximum anticipated value at each sample point, all power levels emitting from the proposed antenna installation are increased by a factor of 2.56 to account for possible in-phase reflections from the surrounding environment. This is rarely the case, and if so, is never continuous.

8) For the following calculations the sample point was the top of a 6-foot person standing at the base of the tower. The maximum gain of the antenna per the antenna manufactures supplied specifications minus 10 dB was used in this direction. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

9) The antennas used in this modeling are the **Powerwave 7770 and the KMW AM-X-CD-16-65-00T-RET** for transmission in the 700 MHz, 850 MHz and 1900 MHz (PCS) frequency bands. This is based on feedback from the carrier with regards to anticipated antenna selection. Maximum gain values for all antennas are listed in the Inventory and Power Data table below. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

10) The antenna mounting height centerlines of the proposed antennas are **120 feet** above ground level (AGL) for **Sector A**, **120 feet** above ground level (AGL) for **Sector B** and **120 feet** above ground level (AGL) for Sector C.

11) Emissions values for additional carriers were taken from the Connecticut Siting Council active database. Values in this database are provided by the individual carriers themselves.

All calculations were done with respect to uncontrolled / general public threshold limits.

AT&T Site Inventory and Power Data by Antenna

Sector:	A	Sector:	B	Sector:	C
Antenna #:	**1**	Antenna #:	**1**	Antenna #:	**1**
Make / Model:	Powerwave 7770	Make / Model:	Powerwave 7770	Make / Model:	Powerwave 7770
Gain:	11.4 / 13.4 dBd	Gain:	11.4 / 13.4 dBd	Gain:	11.4 / 13.4 dBd
Height (AGL):	**120 feet**	Height (AGL):	**120 feet**	Height (AGL):	**120 feet**
Frequency Bands	850 MHz / 1900 MHz (PCS)	Frequency Bands	850 MHz / 1900 MHz (PCS)	Frequency Bands	850 MHz / 1900 MHz (PCS)
Channel Count	4	Channel Count	4	Channel Count	4
Total TX Power(W):	120 Watts	Total TX Power(W):	120 Watts	Total TX Power(W):	120 Watts
ERP (W):	2,140.89	ERP (W):	2,140.89	ERP (W):	2,140.89
Antenna A1 MPE%	**0.77 %**	Antenna B1 MPE%	**0.77 %**	Antenna C1 MPE%	**0.77 %**
Antenna #:	**2**	Antenna #:	**2**	Antenna #:	**2**
Make / Model:	KMW AM-X-CD-16-65-00T-RET	Make / Model:	KMW AM-X-CD-16-65-00T-RET	Make / Model:	KMW AM-X-CD-16-65-00T-RET
Gain:	13.35 / 15.25 dBd	Gain:	13.35 / 15.25 dBd	Gain:	13.35 / 15.25 dBd
Height (AGL):	**120 feet**	Height (AGL):	**120 feet**	Height (AGL):	**120 feet**
Frequency Bands	700 MHz / 1900 MHz (PCS)	Frequency Bands	700 MHz / 1900 MHz (PCS)	Frequency Bands	700 MHz / 1900 MHz (PCS)
Channel Count	4	Channel Count	4	Channel Count	4
Total TX Power(W):	240 Watts	Total TX Power(W):	240 Watts	Total TX Power(W):	240 Watts
ERP (W):	6,614.85	ERP (W):	6,614.85	ERP (W):	6,614.85
Antenna A2 MPE%	**2.65 %**	Antenna B2 MPE%	**2.65 %**	Antenna C2 MPE%	**2.65 %**
Antenna #:	**3**	Antenna #:	**3**	Antenna #:	**3**
Make / Model:	Powerwave 7770	Make / Model:	Powerwave 7770	Make / Model:	Powerwave 7770
Gain:	11.4 / 13.4 dBd	Gain:	11.4 / 13.4 dBd	Gain:	11.4 / 13.4 dBd
Height (AGL):	**120 feet**	Height (AGL):	**120 feet**	Height (AGL):	**120 feet**
Frequency Bands	850 MHz / 1900 MHz (PCS)	Frequency Bands	850 MHz / 1900 MHz (PCS)	Frequency Bands	850 MHz / 1900 MHz (PCS)
Channel Count	4	Channel Count	4	Channel Count	4
Total TX Power(W):	120 Watts	Total TX Power(W):	120 Watts	Total TX Power(W):	120 Watts
ERP (W):	2,140.89	ERP (W):	2,140.89	ERP (W):	2,140.89
Antenna A3 MPE%	**0.77 %**	Antenna B3 MPE%	**0.77 %**	Antenna C3 MPE%	**0.77 %**

Site Composite MPE%	
Carrier	**MPE%**
AT&T – Max per sector	**4.18 %**
Verizon Wireless	1.94 %
Clearwire	0.10 %
Sprint	0.22 %
Nextel	0.36 %
T-Mobile / Voicestream	0.42 %
Site Total MPE %:	**7.22 %**

AT&T Sector A Total:	4.18 %
AT&T Sector B Total:	4.18 %
AT&T Sector C Total:	4.18 %
Site Total:	7.22 %

AT&T _ Max Values Per Sector	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ($\mu W/cm^2$)	Frequency (MHz)	Allowable MPE ($\mu W/cm^2$)	Calculated % MPE
AT&T 850 MHz UMTS	2	414.12	120	2.29	850 MHz	567	0.40 %
AT&T 1900 MHz (PCS) UMTS	2	656.33	120	3.63	1900 MHz (PCS)	1000	0.36 %
AT&T 700 MHz LTE	2	1,297.63	120	7.18	700 MHz	467	1.54 %
AT&T 1900 MHz (PCS) LTE	2	2,009.79	120	11.12	1900 MHz (PCS)	1000	1.11 %
AT&T 850 MHz GSM	2	414.12	120	2.29	850 MHz	567	0.40 %
AT&T 1900 MHz (PCS) GSM	2	656.33	120	3.63	1900 MHz (PCS)	1000	0.36 %
						Total: *	**4.18 %**

NOTE: Totals may vary by .01% due to summing of remainders

Summary

All calculations performed for this analysis yielded results that were **within** the allowable limits for general public exposure to RF Emissions.

The anticipated maximum composite contributions from the AT&T facility as well as the site composite emissions value with regards to compliance with FCC's allowable limits for general public exposure to RF Emissions are shown here:

AT&T Sector	Power Density Value (%)
Sector A:	4.18 %
Sector B:	4.18 %
Sector C:	4.18 %
AT&T Maximum Total (per sector):	4.18 %
Site Total:	7.22 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **7.22 %** of the allowable FCC established general public limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions.

FCC guidelines state that if a site is found to be out of compliance (over allowable thresholds), that carriers over a 5% contribution to the composite value will require measures to bring the site into compliance. For this facility, the composite values calculated were well within the allowable 100% threshold standard per the federal government.