Sprint

Together with Nextel

EM-SPRINT-029-120925

~ORIGINAL~

48 Spruce Street
Oakland, NJ 07436
Phone: (845) 499-4712
Jennifer Palumbo

September 19, 2012

Hand Delivered

Ms. Linda Roberts
Executive Director
Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051

RE: Sprint Spectrum L.P. notice of intent to modify an existing telecommunications facility located at 116 Pinney Street, Colebrook, CT 06021. Known to Sprint Spectrum L.P. as site CT33XC115.

Dear Ms. Roberts:

In order to accommodate technological changes, implement Code Division Multiple Access ("CDMA") and/or Long Term Evolution ("LTE") capabilities, and enhance system performance in the state of Connecticut, Sprint Spectrum L.P. plans to modify the equipment configurations at many of its existing cell sites. Please accept this letter and attachments as notification, pursuant to R.C.S.A. Section 16-50j-73, of construction which constitutes an exempt modification pursuant to R.C.S.A. Section 16-50j-72(b)(2). In compliance with R.C.S.A. Section 16-50j-73, a copy of this letter and its attachments is being sent to the chief elected official of the municipality in which affected cell site is located.

CDMA employs Spread-Spectrum technology and special coding scheme to allow multiple users to be multiplexed over the same physical channel. LTE is a new high-performance air interface for cellular mobile communications. It is designed to increase the capacity and speed of mobile telephone networks.

As part of the project the new multi-mode 800/1900 antenna will replace existing antennas. These antennas will provide more flexibility for optimization by allowing fast and easy electrical tilt adjustment from remote location and will enable the transmission of multiple technologies from a single antenna. As Sprint Nextel's network evolves to meet the demands of its customers, it is essential for Sprint Nextel to install modern equipment and antennas in order to provide reliable wireless voice and data services. The

proposed equipment will include multi-mode radios that will allow Sprint Nextel to transmit at different frequencies using different technologies, including LTE technology. Likewise, the proposed antennas are quad-pole multi-band high gain antennas that will allow Sprint to operate using its multiple frequency bands and technologies, including LTE technology. The proposed equipment and antennas will improve the reliability, coverage and capacity of Sprint Nextel's voice and data networks across Sprint Nextel's various FCC licensed frequency bands and significantly increase the data speeds of Sprint Nextel's network by utilizing the latest LTE technology. Without the proposed modifications Sprint Nextel will be unable to provide reliable wireless voice and data service using the latest technologies.

Sprint Spectrum L.P. will have an interim (testing) period during the modification/installation prior to the final configuration. This antenna configuration is shown on the attached drawings of the planned modifications. Also included is the power density calculation reflecting the change in Sprint's operations at the site and documentation of the structural sufficiency of the tower to accommodate the revised antenna configuration.

The changes to the facility do not constitute modification as defined Connecticut General Statues ("C.G.S.") Section 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 the R.C.S.A. Section 16-50j-72(b)(2).

1. The height of the overall structure will not be affected.
2. The proposed changes will not extend the site boundaries. There will be no effect on the site compound.
3. The proposed changes will not increase the noise level at the existing facility by 6 decibels or more.
4. Radio Frequency power density may increase due to the use of one or more CDMA transmissions. Moreover, LTE will utilize additional radio frequencies newly licensed by the FCC for cellular mobile communications. However, the changes will not increase the calculated "worst case" power density for the combined operations at the site to a level at or above the applicable standard for uncontrolled environments as calculated for a mixed frequency site.

For the foregoing reasons Sprint Spectrum L.P. respectfully submits that the proposed changes at the referenced site constitute exempt modifications under R.C.S.A. Section 16-50j-72(b)(2).

Please feel free to call me at (845)-499-4712 or email JPalumbo@Transcendwireless.com with questions concerning this matter.
Thank you for your consideration.

Sincerely,

Jennifer Palumbo
Real Estate Consultant

EBI Consulting
environmental | engineering | due diligence

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

Sprint Existing Facility

Site ID: CT33XC115

Horton 2 / Fredsall Property
119 Pinney Street
Colebrook, CT 06021

September 02, 2012

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

EBI Consulting
environmental | engineering | due diligence

September 02, 2012

Sprint
Attn: RF Engineering Manager
1 International Boulevard, Suite 800
Mahwah, NJ 07495

Re: Emissions Values for Site **CT33XC115 – Horton 2 / Fredsall Property**

EBI Consulting was directed to analyze the proposed upgrades to the existing Sprint facility located at 119 Pinney Street, Colebrook, CT, for the purpose of determining whether the emissions from the proposed Sprint equipment upgrades 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 μW/cm2 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 limit for the cellular band is approximately 567 $\mu W/cm^2$, and the general population exposure limit for the PCS band 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 upgrades to the existing Sprint Wireless antenna facility located at 119 Pinney Street, Colebrook, CT, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. All calculations were performed assuming the main lobe of the antenna was focused at the base of the tower to present a worst case scenario. Actual values seen from this site will be dramatically less than those shown in this report. 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 emissions were calculated using the following assumptions:

1) 2 CDMA Carriers (1900 MHz) were considered for each sector of the proposed installation.
2) 1 CDMA Carrier (850 MHz) was considered for each sector of the proposed installation
3) 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.
4) For the following calculations the sample point was the top of a six foot person standing at the base of the tower. The actual gain in this direction was used per the manufactures supplied specifications.
5) The antenna used in this modeling is the RFS APXVSPP18-C-A20. This is based on feedback from the carrier with regards to anticipated antenna selection. This antenna has a 15.9 dBd gain value at its main lobe at 1900 MHz and 13.4 dBd at its main lobe for 850 MHz. All calculations were performed assuming the main lobe of the antenna was focused at the base of the tower to present a worst case scenario.

6) The antenna mounting height centerline of the proposed antennas is **147.9 feet** above ground level (AGL)
7) 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 calculation were done with respect to uncontrolled / general public threshold limits

Site ID	CT33XC115 - Horton 2 / Fredsall Property
Site Addresss	119 Pinney Street, Colebrook, CT 06021
Site Type	Monopole

Sector 1

Antenna Number	Antenna Make	Antenna Model	Radio Type	Frequency Band	Technology	Power Out Per Channel (Watts)	Number of Channels	Composite Power	Antenna Gain in direction of sample point (dBd)	Antenna Height (ft)	analysis height	Cable Size	Cable Loss (dB)	Additional Loss	ERP	Power Density Value	Power Density Percentage
1a	RFS	APXVSPP18-C-A20	RRH	1900 MHz	CDMA / LTE	20	2	40	15.9	147.9	141.9	1/2 "	0.5	0	1386.9474	24.76288	2.47629%
1a	RFS	APXVSPP18-C-A20	RRH	850 MHz	CDMA / LTE	20	1	20	13.4	147.9	141.9	1/2 "	0.5	0	389.96892	6.962596	1.22797%
														Sector total Power Density Value:		3.704%	

Sector 2

Antenna Number	Antenna Make	Antenna Model	Radio Type	Frequency Band	Technology	Power Out Per Channel (Watts)	Number of Channels	Composite Power	Antenna Gain in direction of sample point (dBd)	Antenna Height (ft)	analysis height	Cable Size	Cable Loss (dB)	Additional Loss	ERP	Power Density Value	Power Density Percentage
2a	RFS	APXVSPP18-C-A20	RRH	1900 MHz	CDMA / LTE	20	2	40	15.9	147.9	141.9	1/2 "	0.5	0	1386.9474	24.76288	2.47629%
2a	RFS	APXVSPP18-C-A20	RRH	850 MHz	CDMA / LTE	20	1	20	13.4	147.9	141.9	1/2 "	0.5	0	389.96892	6.962596	1.22797%
														Sector total Power Density Value:		3.704%	

Sector 3

Antenna Number	Antenna Make	Antenna Model	Radio Type	Frequency Band	Technology	Power Out Per Channel (Watts)	Number of Channels	Composite Power	Antenna Gain in direction of sample point (dBd)	Antenna Height (ft)	analysis height	Cable Size	Cable Loss (dB)	Additional Loss	ERP	Power Density Value	Power Density Percentage
3a	RFS	APXVSPP18-C-A20	RRH	1900 MHz	CDMA / LTE	20	2	40	15.9	147.9	141.9	1/2 "	0.5	0	1386.9474	24.76288	2.47629%
3a	RFS	APXVSPP18-C-A20	RRH	850 MHz	CDMA / LTE	20	1	20	13.4	147.9	141.9	1/2 "	0.5	0	389.96892	6.962596	1.22797%
														Sector total Power Density Value:		3.704%	

Site Composite MPE %	
Carrier	MPE %
Sprint	11.113%
AT&T	7.140%
Verizon Wireless	21.580%
Total Site MPE %	**39.833%**

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Summary

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

The anticipated Maximum Composite contributions from the Sprint facility are **11.113% (3.704% from each sector)** of the allowable FCC established general public limit considering all three sectors simultaneously sampled at the ground level.

The anticipated composite MPE value for this site assuming all carriers present is **39.833%** 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

Scott Heffernan
RF Engineering Director

EBI Consulting
21 B Street
Burlington, MA 01803

Know what's **below.**
Call before you dig.

APPROVALS				
		APPROVED	APPROVED AS NOTED	DISAPPROVED REVISE
SPRINT REPRESENTATIVES	DATE	☐	☐	☐
SPRINT RF ENGINEER	DATE	☐	☐	☐
SITE OWNER	DATE	☐	☐	☐
	DATE	☐	☐	☐

Sprint® TM

SITE ID: CT33XC115
SITE NAME: HORTON 2 / FREDSALL PROPERTY

THE STRUCTURAL ENGINEERING CONCERNING THE STRUCTURAL STABILITY OF THE ANTENNAS, MOUNTS AND ALL ASSOCIATED ANCILLARY RADIO EQUIPMENT IS BEING COMPLETED BY OTHERS. KMB DESIGN GROUP, LLC HAS NOT BEEN REQUESTED TO PHYSICALLY CONFIRM THE EXISTING MOUNT CONFIGURATION AND PERFORM A STRUCTURAL ANALYSIS TO VERIFY THAT THE EXISTING, INTERIM AND PROPOSED ANTENNAS, MOUNTS AND ALL ASSOCIATED ANCILLARY RADIO EQUIPMENT CAN BE SAFELY SUPPORTED. SIGNED AND SEALED DRAWINGS REVISED TO STATE "ISSUED FOR CONSTRUCTION" SHALL BE PROVIDED TO THE PROFESSIONAL ENGINEERS RESPONSIBLE FOR THE STRUCTURAL ANALYSIS OF THE ANTENNAS, MOUNTS AND ALL ASSOCIATED ANCILLARY RADIO EQUIPMENT. KMB DESIGN GROUP, LLC SHALL BE NOTIFIED SHOULD THE STRUCTURAL ANALYSIS RESULT IN SOME ELEMENTS NOT BEING STRUCTURALLY CAPABLE OF SUPPORTING THE PROPOSED DESIGN DEPICTED. THE CONTRACTOR SHALL NOT COMMENCE CONSTRUCTION WITHOUT OBTAINING (A) A SIGNED AND SEALED COPY OF THE PLANS "ISSUED FOR CONSTRUCTION"; (B) STRUCTURAL ANALYSIS REPORT STATING THAT THE TOWER/POLE/FOUNDATION IS CAPABLE OF SUPPORTING THE PROPOSED LOADING REFERENCING THE SIGNED AND SEALED PLANS BY KMB DESIGN GROUP, LLC; (C) SPRINT PLATFORM ANALYSIS STATING THAT THE SPRINT PLATFORM IS CAPABLE OF SUPPORTING THE PROPOSED DESIGN AS REFERENCED WITHIN THE SIGNED AND SEALED PLANS BY KMB DESIGN GROUP, LLC.

NETWORK VISION CONSTRUCTION DRAWINGS

AERIAL VIEW
SCALE: NTS

LOCATION MAP
SCALE: NTS

DRAWING INDEX

DWG #	DRAWING TITLES
A01	COVER SHEET
C01	GENERAL NOTES 1 OF 2
C01A	GENERAL NOTES 2 OF 2
C02	COMPOUND PLAN
C02A	ELEVATION
C03	EQUIPMENT PLANS
C03A	EQUIPMENT & ANTENNA SPECIFICATIONS
C04	EXISTING ANTENNA PLAN (ALL SECTORS)
C04A	INTERIM ANTENNA PLAN (ALL SECTORS)
C04B	FINAL ANTENNA PLAN (ALL SECTORS)
C04C	RRH MOUNT DETAILS (ALL SECTORS)
C05	SITE DETAILS
C06	RF SCHEDULE
C06A	RF DATA SHEET
C07	AAV DRAWINGS - COVER SHEET
C07A	AAV DRAWINGS - SITE PHOTOS
C07B	AAV DRAWINGS - KEY & EQUIPMENT PLAN
C07C	AAV DRAWINGS - DETAILS
E01	ELECTRICAL NOTES
E02	ELECTRICAL & GROUNDING DETAILS

CODES & STANDARDS

These documents are in compliance & all construction to be in accordance with the following codes & standards as applicable:

State Building Code: 2005 Connecticut Supplement

2003 International Building Code
2003 International Residential Code
2003 International Existing Building Code
2003 International Mechanic Code
2003 International Plumbing Code
2003 International Energy Conservation Code (re-adopted with changes)
ICC/ANSI A117.1-2003 Assessible and Usable Buildings and Facilities

2005 National Electrical Code (NFPA-70)

DRIVING DIRECTIONS

1. DEPART 1 INTERNATIONAL BLVD, MAHWAH, NJ 07495
2. TAKE 3RD EXIT FROM ROUNDABOUT INTERNATIONAL BLVD ONTO LEISURE LN.
3. TAKE RAMP ONTO STATE HIGHWAY 17 (RT-17 N).
4. CONTINUE ON I-287 N.
5. TAKE THE I-87 S/I-287/NEW YORK STATE THRUWAY SOUTH/TAPPAN ZEE BR/NEW YORK CITY EXIT ONTO NEW YORK STATE THRUWAY SOUTH (I-287 E, I-87 S) (PARTIAL TOLL ROAD).
6. KEEP RIGHT ONTO NEW YORK STATE THRUWAY SOUTH (I-87 S) TOWARD RT-119/SAW MILL PKWY NORTH/SAW MILL PKWY SOUTH/NEW YORK CITY/ELMSFORD.
7. TAKE EXIT #8A/RT-119/SAW MILL PKWY NORTH/ELMSFORD ONTO SAW MILL PKY NORTH, SAW MILL RIVER PKY N TOWARD SAW MILL RIVER PKWY NORTH/KATONAH.
8. TAKE LEFT RAMP ONTO I-684 N TOWARD BREWSTER.
9. TAKE EXIT #9E/I-84 E/DANBURY ONTO I-84 E.
10. TAKE EXIT #20/CT-8 N/TORRINGTON TO THE LEFT ONTO CT-8 N.
11. TAKE RAMP.
12. TURN RIGHT ONTO S MAIN ST (US-44) TOWARD US-44 W/CT-183 N/WINSTED.
13. 0TURN RIGHT ONTO PINNEY ST.
14. YOUR DESTINATION ON PINNEY ST IS ON THE RIGHT.

SITE INFORMATION

BLOCK: TBD
LOT: TBD
MAP: TBD
ZONING CLASSIFICATION: TBD
ZONING JURISDICTION: TBD

PROJECT INFORMATION:

SITE ADDRESS:
116 PINNEY STREET
COLEBROOK, CT 06021
LITCHFIELD COUNTY

COORDINATES:
LATITUDE: 41.966399
LONGITUDE: -73.121663
DATUM : NAD 83

STRUCTURE HEIGHT:
±150'-0" (TOP OF EXISTING MONOPOLE)

PROJECT DIRECTORY:

PROPERTY OWNER:
TBD

APPLICANT:
SPRINT-NEXTEL
6200 SPRINT PARKWAY
OVERLOOK PARK, KS 66251

ENGINEER:
KMB DESIGN GROUP, LLC
1800 ROUTE 34, SUITE 209
WALL, NJ 07719
KEITH DRENNAN - PROJECT MANAGER
(732) 280-5623

POWER COMPANY:
CONNECTICUT LIGHT & POWER
P.O. BOX 270
HARTFORD, CT 06141-0270
(800) 286-2000

TODD AMANN
(914) 715-9363

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REV.	DATE	REVISION DESCRIPTION	DRAWN BY	CHKD. BY
0	06-18-12	ISSUED FOR CONSTRUCTION	MCS	KCD

KMB DESIGN GROUP
kmbdg.com
1800 ROUTE 34, SUITE 209
WALL, NJ 07719
(732) 280-5623

Stephen A. Bray
PROFESSIONAL ENGINEER
STATE OF CONNECTICUT

CT LICENSE: 26657 6/18/12

PROJECT NUMBER:
332.1501

SITE INFORMATION:
116 PINNEY STREET
COLEBROOK, CT 06021
LITCHFIELD COUNTY

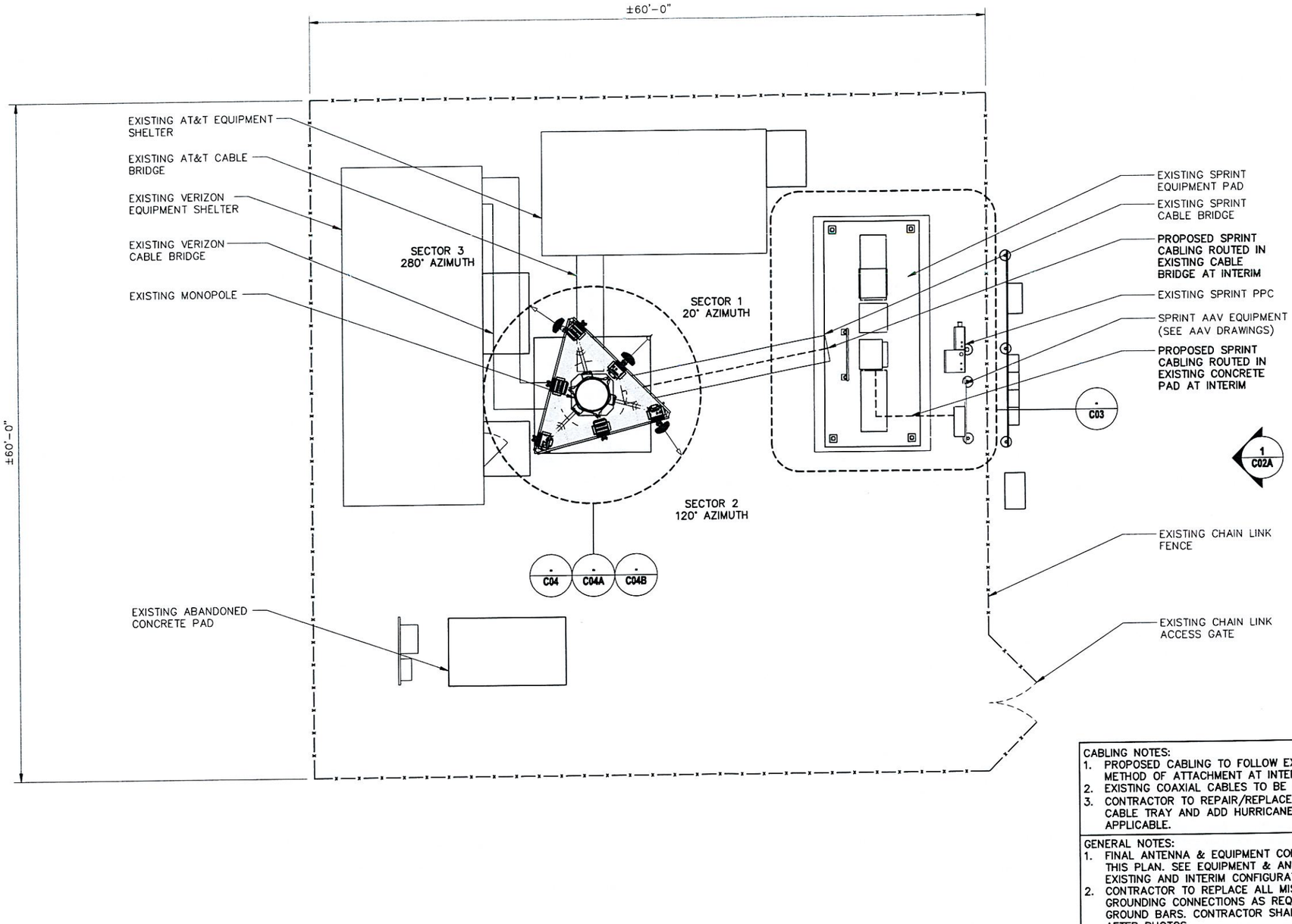
CT33XC115

PROJECT TYPE:
NETWORK VISION

DRAWN BY:	CHECKED BY:	DATE:
JLS		04-29-12

SHEET TITLE:
COVER SHEET

SHEET NUMBER:	REV:
A01	0



CABLING NOTES:
1. PROPOSED CABLING TO FOLLOW EXISTING ROUTE AND METHOD OF ATTACHMENT AT INTERIM.
2. EXISTING COAXIAL CABLES TO BE REMOVED AT FINAL.
3. CONTRACTOR TO REPAIR/REPLACE ANY MISSING/DAMAGED CABLE TRAY AND ADD HURRICANE STRAPS AS REQUIRED IF APPLICABLE.

GENERAL NOTES:
1. FINAL ANTENNA & EQUIPMENT CONFIGURATION SHOWN ON THIS PLAN. SEE EQUIPMENT & ANTENNA PLAN SHEETS FOR EXISTING AND INTERIM CONFIGURATION.
2. CONTRACTOR TO REPLACE ALL MISSING GROUND BARS AND GROUNDING CONNECTIONS AS REQUIRED WITH GALVANIZED GROUND BARS. CONTRACTOR SHALL PROVIDE BEFORE & AFTER PHOTOS.
3. CONTRACTOR TO RESTORE ANY RUST AREA TO ORIGINAL CONDITION AND PROTECTIVE COATING TO BE APPLIED.
4. STRUCTURAL ANALYSIS PROVIDED UNDER SEPARATE COVER.
5. PROPOSED SPRINT GPS UNIT TO REPLACE EXISTING GPS AT FINAL.

2.5 0 2.5 5 10
(IN FEET)

1 COMPOUND PLAN

11x17 SCALE: 1" = 10' | 24x36 SCALE: 1" = 5'

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REV.	DATE	REVISION DESCRIPTION	DRAWN BY	CHKD. BY
0	06-18-12	ISSUED FOR CONSTRUCTION	MCS	KCD

KMB DESIGN GROUP
kmbdg.com
1600 ROUTE 34, SUITE 205
WALL, NJ 07719
(732) 280-5623

Stephen A. Bray
PROFESSIONAL ENGINEER

CT LICENSE: 26657 6/18/12

PROJECT NUMBER: **332.1501**

SITE INFORMATION:
116 PINNEY STREET
COLEBROOK, CT 06021
LITCHFIELD COUNTY

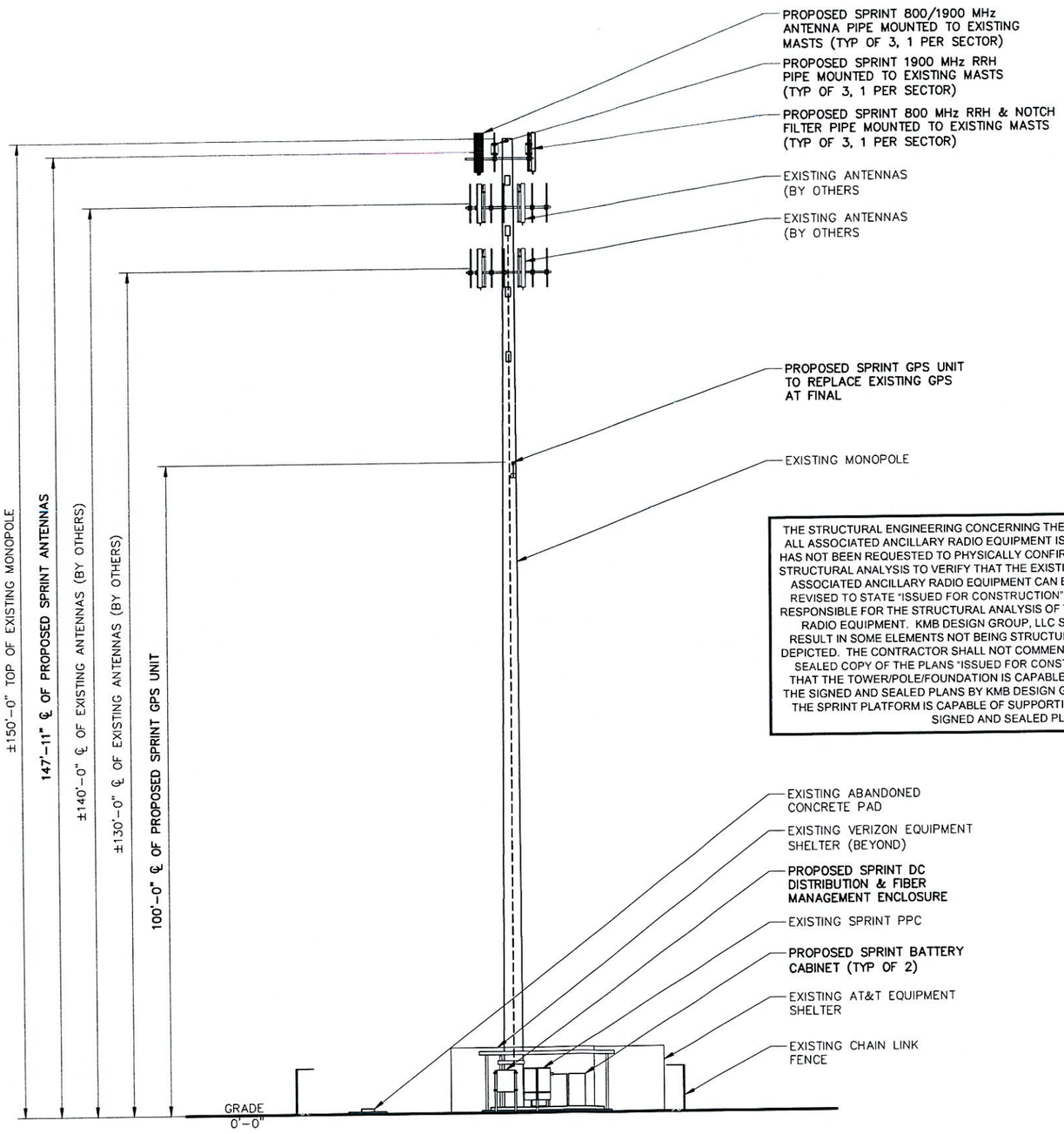
CT33XC115

PROJECT TYPE: NETWORK VISION

DRAWN BY:	CHECKED BY:	DATE:
JLS		04-29-12

SHEET TITLE: ROOF PLAN

SHEET NUMBER: C02 | REV: 0



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NOTES:
1. FINAL ANTENNA & EQUIPMENT CONFIGURATION SHOWN ON THIS PLAN. SEE EQUIPMENT & ANTENNA PLAN SHEETS FOR EXISTING AND INTERIM CONFIGURATION.

5 0 5 10 20
(IN FEET)

1 NORTHEAST ELEVATION

11x17 SCALE: 1" = 20' | 24x36 SCALE: 1" = 10'

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REV.	DATE	REVISION DESCRIPTION	DRAWN BY	CHKD. BY
0	06-18-12	ISSUED FOR CONSTRUCTION	MCS	KCD

KMB DESIGN GROUP
kmbdg.com
1800 ROUTE 34, SUITE 209
WALL, NJ 07719
(732) 280-5623

Stephen A. Bray
PROFESSIONAL ENGINEER

CT LICENSE: 26657 6/18/12

PROJECT NUMBER: 332.1501

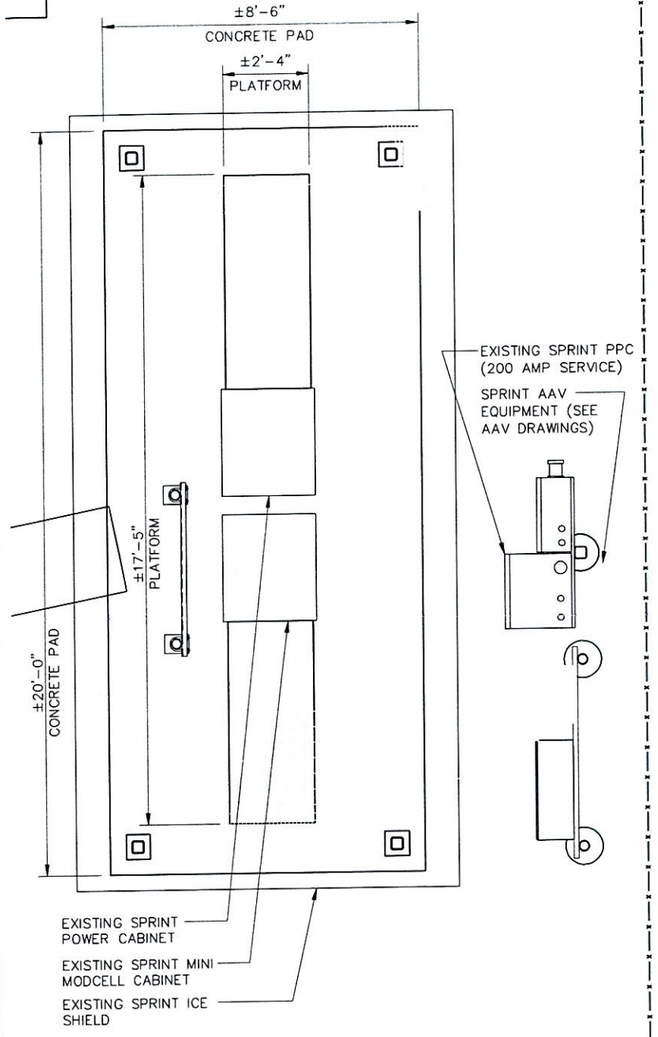
SITE INFORMATION:
116 PINNEY STREET
COLEBROOK, CT 06021
LITCHFIELD COUNTY
CT33XC115

PROJECT TYPE: NETWORK VISION

DRAWN BY:	CHECKED BY:	DATE:
JLS		04-29-12

SHEET TITLE: ELEVATION

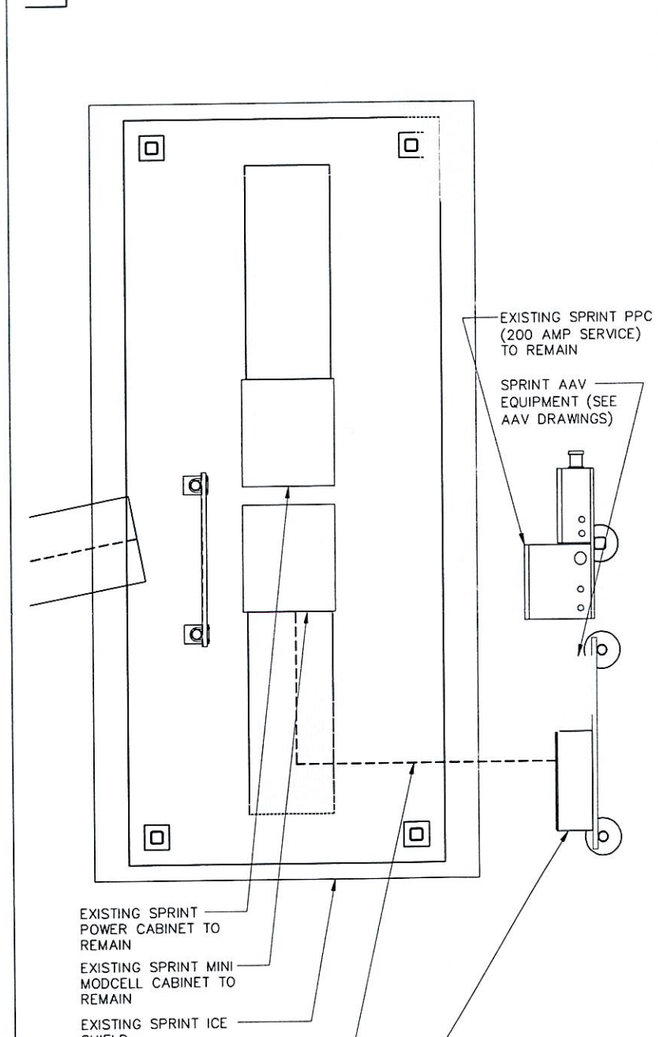
SHEET NUMBER: C02A | REV.: 0



1 0 0.5 1 2 4
(IN FEET)

1 **EXISTING EQUIPMENT PLAN**

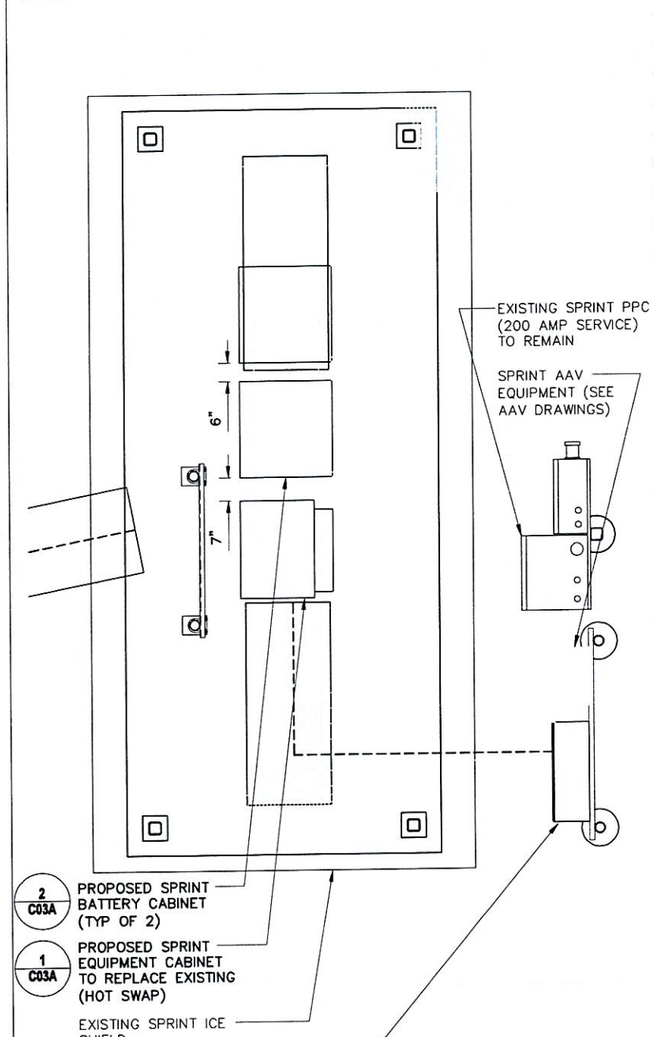
11x17 SCALE: 1/4" = 1'-0" | 24x36 SCALE: 1/2" = 1'-0"



1 0 0.5 1 2 4
(IN FEET)

2 **INTERIM EQUIPMENT PLAN**

11x17 SCALE: 1/4" = 1'-0" | 24x36 SCALE: 1/2" = 1'-0"



1 0 0.5 1 2 4
(IN FEET)

NOTE:
1. CONTRACTOR TO REPLACE ALL MISSING GROUND BARS AND GROUNDING CONNECTIONS AS REQUIRED.

3 **FINAL EQUIPMENT PLAN**

11x17 SCALE: 1/4" = 1'-0" | 24x36 SCALE: 1/2" = 1'-0"

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Alcatel·Lucent

REV.	DATE	REVISION DESCRIPTION	DRAWN BY	CHKD. BY
0	06-18-12	ISSUED FOR CONSTRUCTION	MCS	KCD

KMB DESIGN GROUP
kmbdg.com
1800 ROUTE 34, SUITE 209
WALL, NJ 07719
(732) 280-5629

Stephen A. Bray
PROFESSIONAL ENGINEER
STATE OF CONNECTICUT
STEPHEN A. BRAY
No. 26657
LICENSED
PROFESSIONAL ENGINEER

CT LICENSE: 26657 6/18/12

PROJECT NUMBER:
332.1501

SITE INFORMATION:
116 PINNEY STREET
COLEBROOK, CT 06021
LITCHFIELD COUNTY

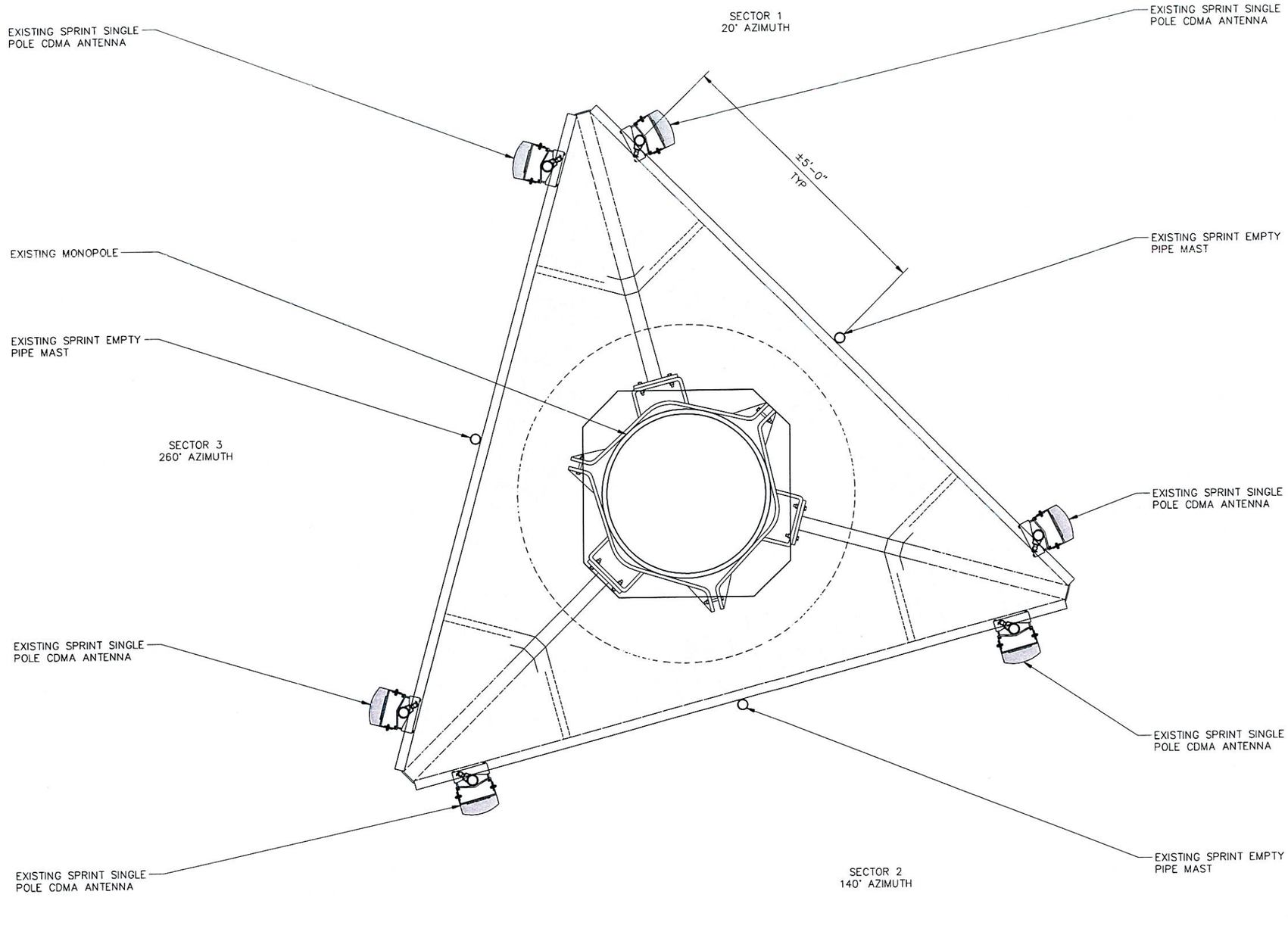
CT33XC115

PROJECT TYPE:
NETWORK VISION

DRAWN BY:	CHECKED BY:	DATE:
JLS		04-29-12

SHEET TITLE:
EQUIPMENT
PLANS

SHEET NUMBER: C03 REV.: 0



1 EXISTING ANTENNA PLAN @ ±147'-11" AGL (ALL SECTORS)

11x17 SCALE: 1/2" = 1'-0" | 24x36 SCALE: 1" = 1'-0"

Sprint®

Alcatel·Lucent

REV.	DATE	REVISION DESCRIPTION	DRAWN BY	CHKD BY
0	06-18-12	ISSUED FOR CONSTRUCTION	MCS	KCD

KMB DESIGN GROUP
kmbdg.com
1800 ROUTE 34, SUITE 209
WALL, NJ 07719
(732) 280-5622

Stephen A. Bray
PROFESSIONAL ENGINEER
STATE OF CONNECTICUT
CT LICENSE: 26657 6/18/12

PROJECT NUMBER: **332.1501**

SITE INFORMATION:
116 PINNEY STREET
COLEBROOK, CT 06021
LITCHFIELD COUNTY

CT33XC115

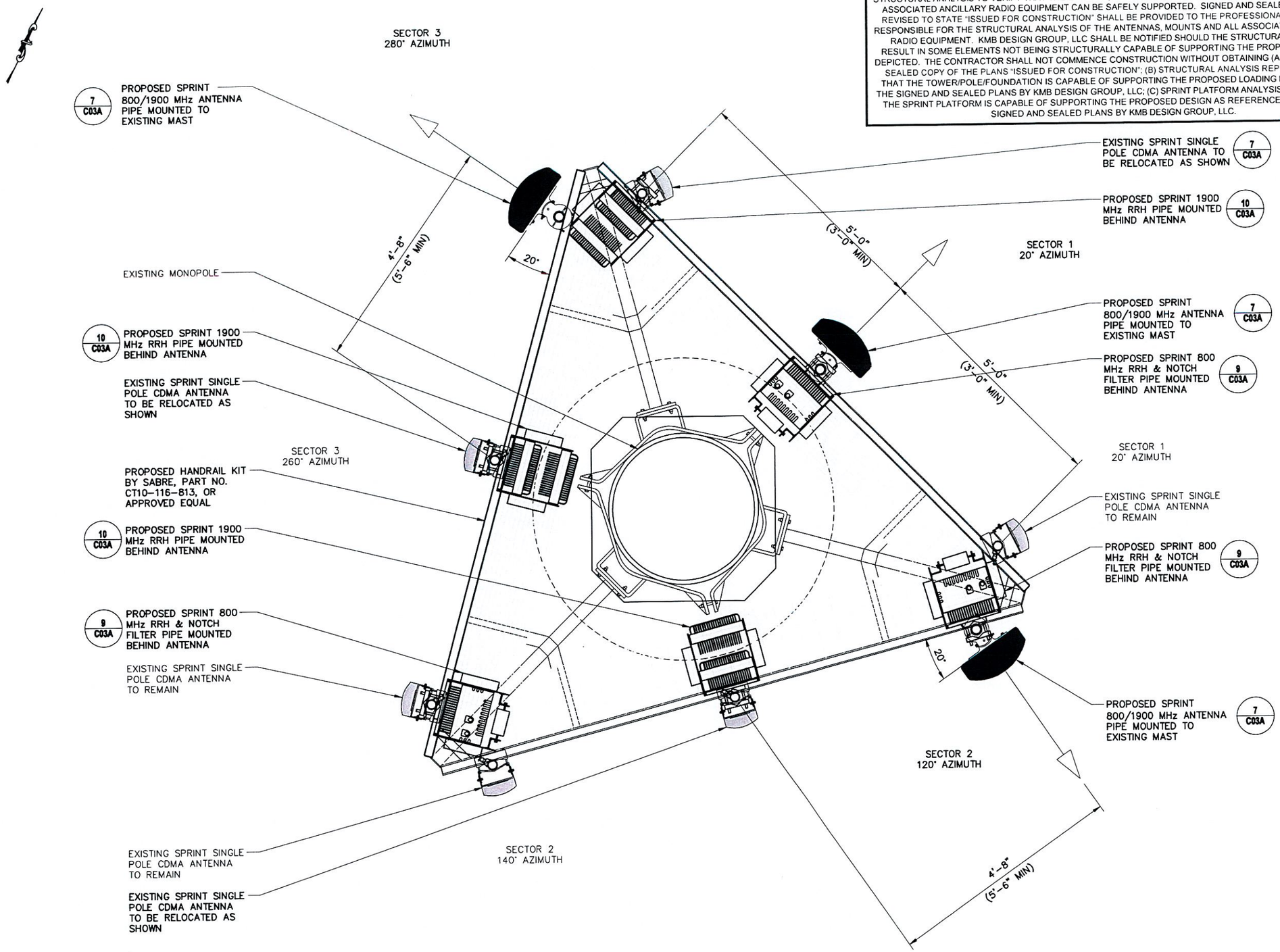
PROJECT TYPE: NETWORK VISION

DRAWN BY:	CHECKED BY:	DATE:
JLS		04-29-12

SHEET TITLE: EXISTING ANTENNA PLAN (ALL SECTORS)

SHEET NUMBER: C04 | REV: 0

THE STRUCTURAL ENGINEERING CONCERNING THE STRUCTURAL STABILITY OF THE ANTENNAS, MOUNTS AND ALL ASSOCIATED ANCILLARY RADIO EQUIPMENT IS BEING COMPLETED BY OTHERS. KMB DESIGN GROUP, LLC HAS NOT BEEN REQUESTED TO PHYSICALLY CONFIRM THE EXISTING MOUNT CONFIGURATION AND PERFORM A STRUCTURAL ANALYSIS TO VERIFY THAT THE EXISTING, INTERIM AND PROPOSED ANTENNAS, MOUNTS AND ALL ASSOCIATED ANCILLARY RADIO EQUIPMENT CAN BE SAFELY SUPPORTED. SIGNED AND SEALED DRAWINGS REVISED TO STATE "ISSUED FOR CONSTRUCTION" SHALL BE PROVIDED TO THE PROFESSIONAL ENGINEERS RESPONSIBLE FOR THE STRUCTURAL ANALYSIS OF THE ANTENNAS, MOUNTS AND ALL ASSOCIATED ANCILLARY RADIO EQUIPMENT. KMB DESIGN GROUP, LLC SHALL BE NOTIFIED SHOULD THE STRUCTURAL ANALYSIS RESULT IN SOME ELEMENTS NOT BEING STRUCTURALLY CAPABLE OF SUPPORTING THE PROPOSED DESIGN DEPICTED. THE CONTRACTOR SHALL NOT COMMENCE CONSTRUCTION WITHOUT OBTAINING (A) A SIGNED AND SEALED COPY OF THE PLANS "ISSUED FOR CONSTRUCTION"; (B) STRUCTURAL ANALYSIS REPORT STATING THAT THE TOWER/POLE/FOUNDATION IS CAPABLE OF SUPPORTING THE PROPOSED LOADING REFERENCING THE SIGNED AND SEALED PLANS BY KMB DESIGN GROUP, LLC; (C) SPRINT PLATFORM ANALYSIS STATING THAT THE SPRINT PLATFORM IS CAPABLE OF SUPPORTING THE PROPOSED DESIGN AS REFERENCED WITHIN THE SIGNED AND SEALED PLANS BY KMB DESIGN GROUP, LLC.



1 INTERIM ANTENNA PLAN @ ±147'-11" AGL (ALL SECTORS)

11x17 SCALE: 1/2" = 1'-0" | 24x36 SCALE: 1" = 1'-0"

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REV.	DATE	REVISION DESCRIPTION	DRAWN BY	CHKD. BY
0	06-18-12	ISSUED FOR CONSTRUCTION	MCS	KCD

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Stephen A. Bray
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CT LICENSE: 26657 6/18/12

PROJECT NUMBER: 332.1501

SITE INFORMATION:
116 PINNEY STREET
COLEBROOK, CT 06021
LITCHFIELD COUNTY

CT33XC115

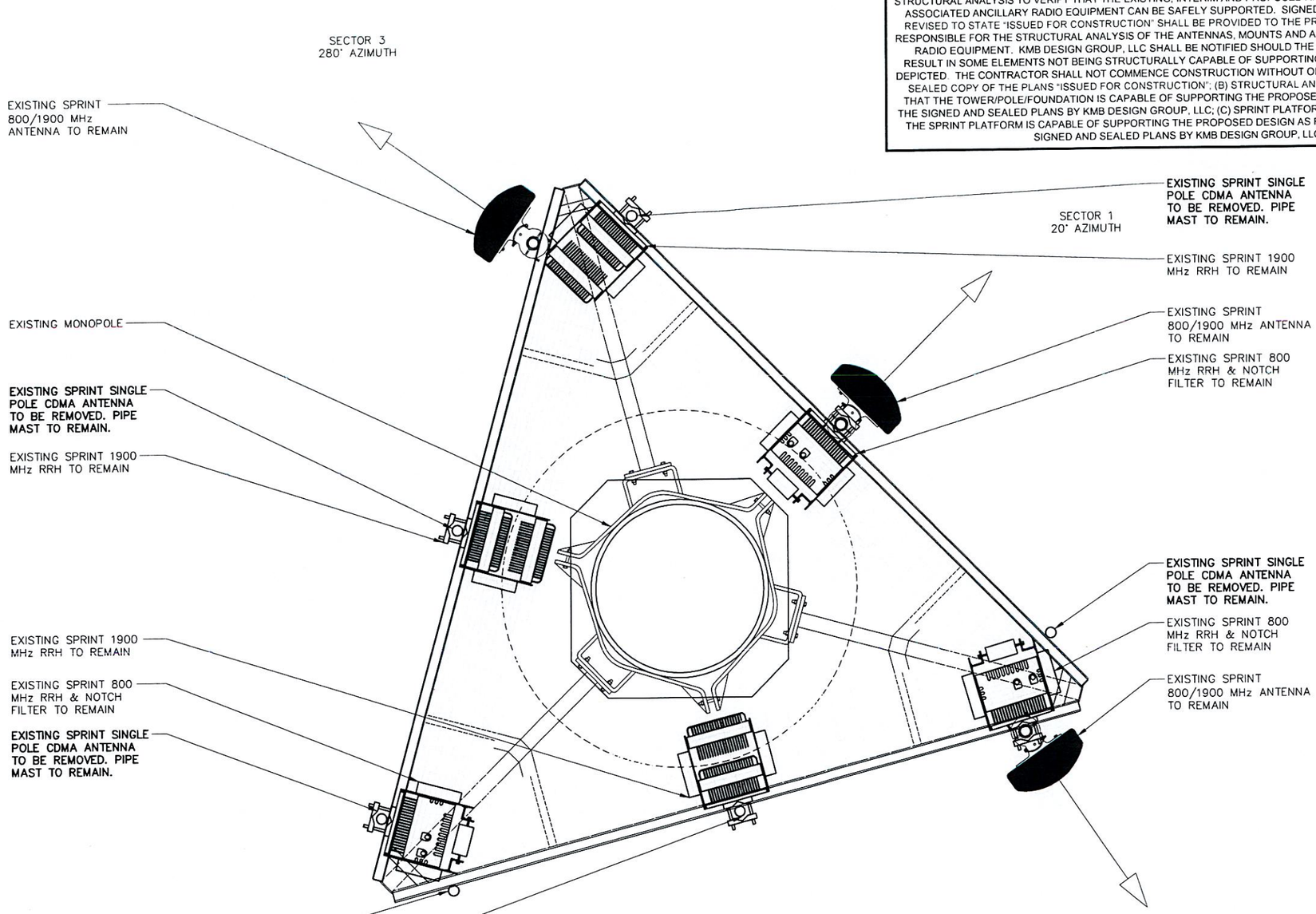
PROJECT TYPE: NETWORK VISION

DRAWN BY:	CHECKED BY:	DATE:
JLS		04-29-12

SHEET TITLE: INTERIM ANTENNA PLAN (ALL SECTORS)

SHEET NUMBER: C04A | REV.: 0

THE STRUCTURAL ENGINEERING CONCERNING THE STRUCTURAL STABILITY OF THE ANTENNAS, MOUNTS AND ALL ASSOCIATED ANCILLARY RADIO EQUIPMENT IS BEING COMPLETED BY OTHERS. KMB DESIGN GROUP, LLC HAS NOT BEEN REQUESTED TO PHYSICALLY CONFIRM THE EXISTING MOUNT CONFIGURATION AND PERFORM A STRUCTURAL ANALYSIS TO VERIFY THAT THE EXISTING, INTERIM AND PROPOSED ANTENNAS, MOUNTS AND ALL ASSOCIATED ANCILLARY RADIO EQUIPMENT CAN BE SAFELY SUPPORTED. SIGNED AND SEALED DRAWINGS REVISED TO STATE "ISSUED FOR CONSTRUCTION" SHALL BE PROVIDED TO THE PROFESSIONAL ENGINEERS RESPONSIBLE FOR THE STRUCTURAL ANALYSIS OF THE ANTENNAS, MOUNTS AND ALL ASSOCIATED ANCILLARY RADIO EQUIPMENT. KMB DESIGN GROUP, LLC SHALL BE NOTIFIED SHOULD THE STRUCTURAL ANALYSIS RESULT IN SOME ELEMENTS NOT BEING STRUCTURALLY CAPABLE OF SUPPORTING THE PROPOSED DESIGN DEPICTED. THE CONTRACTOR SHALL NOT COMMENCE CONSTRUCTION WITHOUT OBTAINING (A) A SIGNED AND SEALED COPY OF THE PLANS "ISSUED FOR CONSTRUCTION"; (B) STRUCTURAL ANALYSIS REPORT STATING THAT THE TOWER/POLE/FOUNDATION IS CAPABLE OF SUPPORTING THE PROPOSED LOADING REFERENCING THE SIGNED AND SEALED PLANS BY KMB DESIGN GROUP, LLC; (C) SPRINT PLATFORM ANALYSIS STATING THAT THE SPRINT PLATFORM IS CAPABLE OF SUPPORTING THE PROPOSED DESIGN AS REFERENCED WITHIN THE SIGNED AND SEALED PLANS BY KMB DESIGN GROUP, LLC.



1 FINAL ANTENNA PLAN @ ±147'-11" AGL (ALL SECTORS)

11x17 SCALE: 1/2" = 1'-0" | 24x36 SCALE: 1" = 1'-0"

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REV.	DATE	REVISION DESCRIPTION	DRAWN BY	CHKD. BY
0	06-18-12	ISSUED FOR CONSTRUCTION	MCS	KCD

KMB DESIGN GROUP
kmbdg.com
1800 ROUTE 34, SUITE 209
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Stephen A. Bray
PROFESSIONAL ENGINEER

STATE OF CONNECTICUT · STEPHEN A. BRAY · No. 26657 · LICENSED PROFESSIONAL ENGINEER

CT LICENSE: 26657 6/18/12

PROJECT NUMBER:
332.1501

SITE INFORMATION:
116 PINNEY STREET
COLEBROOK, CT 06021
LITCHFIELD COUNTY

CT33XC115

PROJECT TYPE:
NETWORK VISION

DRAWN BY:	CHECKED BY:	DATE:
JLS		04-29-12

SHEET TITLE:
FINAL ANTENNA PLAN
(ALL SECTORS)

SHEET NUMBER:	REV.:
C04B	0

PAUL J. FORD AND COMPANY
STRUCTURAL ENGINEERS
250 East Broad Street • Suite 1500 • Columbus, Ohio 43215-3708

Date: June 05, 2012

James Williams
Crown Castle USA Inc.
3530 Toringdon Way, Suite 300
Charlotte, NC 28277

Paul J Ford and Company
250 E. Broad Street Suite 1500
Columbus, OH 43215
614.221.6679
lgimeno@pjfweb.com

Subject: **Structural Analysis Report**

Carrier Designation:	*Sprint PCS* Co-Locate – Interim loading	
	Carrier Site Number:	CT33XC115
	Carrier Site Name:	N/A
Crown Castle Designation:	**Crown Castle BU Number:**	876377
	Crown Castle Site Name:	HORTON 2 / FREDSALL PROPERTY
	Crown Castle JDE Job Number:	189142
	Crown Castle Work Order Number:	498936
	Crown Castle Application Number:	151587 Rev. 0
Engineering Firm Designation:	**Paul J Ford and Company Project Number:**	37512-1619 A
Site Data:	**161 Pinney Street, COLEBROOK, Litchfield County, CT** **Latitude *41° 57' 58.57"*, Longitude *-73° 7' 19.65"*** **148 Foot - Monopole Tower**	

Dear James Williams,

Paul J Ford and Company 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 468185, in accordance with application 151587, revision 0.

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 I and Table II for the proposed and existing/reserved loading, respectively.

The structural analysis was performed for this tower in accordance with the requirements of TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures and 2005 CT State Building Code using a fastest mile wind speed of 80 mph with no ice, 28.1 mph with 1 inch ice thickness and 50 mph under service loads.

We at *Paul J Ford and Company* appreciate the opportunity of providing our continuing professional services to you and Crown Castle USA Inc.. If you have any questions or need further assistance on this or any other projects please give us a call.

Respectfully submitted by:

Lohengrin Gimeno
Project Engineer

tnxTower Report - version 6.0.3.0

STATE OF CONNECTICUT
KEVIN P. BAUMAN
NO. 17891
LICENSED
PROFESSIONAL ENGINEER

6-14-2012

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 148 ft Monopole tower designed by PJF in September of 2000 and manufactured by SUMMIT. The tower was originally designed for a wind speed of 85 mph per TIA/EIA-222-F.

2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures and 2005 CT State Building Code using a fastest mile wind speed of 80 mph with no ice, 28.1 mph with 1 inch ice thickness and 50 mph under service loads.

Table 1 - Proposed Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
150.0	148.0	1	tower mounts	Miscellaneous (NA507-1)	3	1-1/4	-
		3	alcatel lucent	1900MHz RRH (25MHz)			
		3	alcatel lucent	800 EXTERNAL NOTCH FILTER			
		3	alcatel lucent	800MHZ RRH			
		9	rfs celwave	ACU-A20-N			
		3	rfs celwave	APXVSPP18-C-A20 w/ Mount Pipe			

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
150.0	148.0	6	decibel	DB980H90E-M w/ Mount Pipe	6	1-5/8	1
		1	tower mounts	Platform Mount [LP 401-1]			
140.0	140.0	6	powerwave technologies	7770.00 w/ Mount Pipe	12	1-5/8	1
		6	powerwave technologies	LGP 17201			
		6	powerwave technologies	LGP21901			
		1	tower mounts	T-Arm Mount [TA 602-3]			
130.0	130.0	3	antel	BXA-171085-12BF-EDIN-2 w/ Mount Pipe	-	-	2
		1	antel	BXA-70080-6CF-EDIN-6 w/ Mount Pipe			
		2	antel	BXA-70080/6CF w/ Mount Pipe			
		2	antel	LPA-80080-6CF-EDIN-6 w/ Mount Pipe			
		6	rfs celwave	FD9R6004/2C-3L			
		6	antel	LPA-185080/12CFx2 w/ Mount Pipe	-	-	3
		4	antel	LPA-80080/6CF w/ Mount Pipe	12	1-5/8	1
		1	tower mounts	Platform Mount [LP 305-1]			
100.0	102.0	1	lucent	KS24019-L112A	1	1/2	1
	100.0	1	tower mounts	Side Arm Mount [SO 701-1]			

Notes:
1) Existing Equipment
2) Reserved Equipment
3) Equipment to be Removed

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	SEA Cpmsultants, 99674.03-A, 09/05/2000	1532992	CCISITES
4-POST-MODIFICATION INSPECTION	PJF, 41708-0177_Record, 02/11/2009	2385953	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	PJF/Summit, 29200-1364/11163, 09/11/2000	1629428	CCISITES
4-TOWER MANUFACTURER DRAWINGS	PJF/Summit, 29200-1364/11163, 09/11/2000	1883532	CCISITES
4-TOWER STRUCTURAL ANALYSIS REPORTS	PJF, 41708-0177_Record, 02/11/2009	2385952	CCISITES

3.1) Analysis Method

tnxTower (version 6.0.3.0), 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) Monopole was reinforced in conformance with the referenced modification drawings.

This analysis may be affected if any assumptions are not valid or have been made in error. Paul J Ford and Company should be notified to determine the effect on the structural integrity of the tower.

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	148 - 117.25	Pole	TP27.227x22x0.1875	1	-6.69	755.23	54.8	Pass
L2	117.25 - 97.25	Pole	TP30.2515x26.2571x0.25	2	-9.47	1142.41	75.8	Pass
L3	97.25 - 80.75	Pole	TP33.056x30.2515x0.443	3	-11.67	2049.74	53.2	Pass
L4	80.75 - 40	Pole	TP39.483x31.4476x0.4385	4	-20.29	2447.21	71.7	Pass
L5	40 - 13.25	Pole	TP43.4677x37.7133x0.4502	5	-28.63	2845.69	78.8	Pass
L6	13.25 - 12.75	Pole	TP43.5527x43.4677x0.4516	6	-28.76	2827.21	79.5	Pass
L7	12.75 - 5.3333	Pole	TP44.8134x43.5527x0.4254	7	-30.56	2838.90	82.6	Pass
L8	5.3333 - 4.75	Pole	TP44.9126x44.8134x0.4467	8	-30.71	2888.05	81.6	Pass
L9	4.75 - 0	Pole	TP45.72x44.9126x0.4425	9	-31.92	2947.77	82.0	Pass
							Summary	
						Pole (L7)	82.6	Pass
						Rating =	82.6	Pass

Table 5 - Tower Component Stresses vs. Capacity – LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	86.1	Pass
1	Base Plate	0	74.9	Pass
1	Base Foundation Steel	0	87.2	Pass
1,2	Base Foundation Soil Interaction	0	88.1	Pass

Structure Rating (max from all components) =	88.1%

Notes:

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

2) According to the procedures prescribed and agreed to by the Crown Castle Engineering Foundation Committee, held in January 2010, the existing caisson foundation was analyzed using the methodology in the software 'PLS-Caisson' (Version 8.10, or newer, by Power Line Systems, Inc.). Per the methods in PLS-Caisson, the soil reactions of cohesive soils are calculated using 8CD independent of the depth of the soil layer. The depth of soil to be ignored at the top of the caisson is the greater of the geotechnical report's recommendation, the frost depth of the site or half of the caisson diameter.

APPENDIX A

TNXTOWER OUTPUT

Tower Input Data

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

Tower is located in Litchfield County, Connecticut.
Basic wind speed of 80 mph.
Nominal ice thickness of 1.0000 in.
Ice thickness is considered to increase with height.
Ice density of 56 pcf.
A wind speed of 28 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 50 mph.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.333.
Local bending stresses due to climbing loads, feedline supports, and appurtenance mounts are not considered.

Options

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

Tapered Pole Section Geometry

Section	Elevation	Section Length	Splice Length	Number of Sides	Top Diameter	Bottom Diameter	Wall Thickness	Bend Radius	Pole Grade
	ft	ft	ft		in	in	in	in	
L1	148.0000-117.2500	30.7500	3.50	18	22.0000	27.2270	0.1875	0.7500	A572-60 (60 ksi)
L2	117.2500-97.2500	23.5000	0.00	18	26.2571	30.2514	0.2500	1.0000	A572-60 (60 ksi)
L3	97.2500-80.7500	16.5000	4.25	18	30.2514	33.0560	0.4430	1.7721	Reinf 57.15 ksi (57 ksi)
L4	80.7500-40.0000	45.0000	5.00	18	31.4476	39.4830	0.4385	1.7538	Reinf 57.63 ksi (58 ksi)
L5	40.0000-13.2500	31.7500	0.00	18	37.7133	43.4677	0.4502	1.8009	Reinf 57.88 ksi (58 ksi)
L6	13.2500-12.7500	0.5000	0.00	18	43.4677	43.5527	0.4516	1.8063	Reinf 57.22 ksi (57 ksi)
L7	12.7500-5.3333	7.4167	0.00	18	43.5527	44.8134	0.4254	1.7017	Reinf 59.22 ksi (59 ksi)

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
L8	5.3333-4.7500	0.5833	0.00	18	44.8134	44.9126	0.4467	1.7867	Reinf 57.28 ksi (57 ksi)
L9	4.7500-0.0000	4.7500		18	44.9126	45.7200	0.4425	1.7699	Reinf 57.96 ksi (58 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/ft
L1	22.3394	12.9812	780.3007	7.7434	11.1760	69.8193	1561.6281	6.4918	3.5420	18.891
	27.6470	16.0919	1486.4203	9.5990	13.8313	107.4677	2974.7964	8.0475	4.4620	23.797
L2	27.2662	20.6366	1763.4297	9.2325	13.3386	132.2051	3529.1798	10.3203	4.1812	16.725
	30.7181	23.8062	2707.1425	10.6505	15.3677	176.1575	5417.8471	11.9053	4.8843	19.537
L3	30.7181	41.9159	4705.3765	10.5820	15.3677	306.1854	9416.9444	20.9619	4.5445	10.258
	33.5659	45.8596	6162.3812	11.5776	16.7924	366.9734	12332.871 1	22.9342	5.0381	11.372
L4	32.7033	43.1535	5242.4214	11.0082	15.9754	328.1568	10491.741 0	21.5809	4.7631	10.863
	40.0921	54.3360	10465.156 1	13.8608	20.0574	521.7613	20944.082 6	27.1731	6.1773	14.089
L5	39.2153	53.2488	9341.2437	13.2284	19.1583	487.5809	18694.778 9	26.6295	5.8452	12.983
	44.1382	61.4719	14371.544 6	15.2712	22.0816	650.8386	28761.999 6	30.7418	6.8579	15.232
L6	44.1382	61.6556	14413.590 2	15.2707	22.0816	652.7427	28846.146 2	30.8337	6.8555	15.181
	44.2245	61.7774	14499.193 0	15.3009	22.1248	655.3380	29017.464 5	30.8946	6.8705	15.214
L7	44.2245	58.2354	13684.454 2	15.3102	22.1248	618.5132	27386.914 8	29.1232	6.9165	16.258
	45.5047	59.9377	14919.993 3	15.7577	22.7652	655.3856	29859.618 8	29.9746	7.1384	16.779
L8	45.5047	62.9001	15642.411 7	15.7502	22.7652	687.1191	31305.406 2	31.4560	7.1010	15.898
	45.6054	63.0407	15747.518 4	15.7854	22.8156	690.2090	31515.757 8	31.5263	7.1185	15.937
L9	45.6054	62.4552	15604.208 7	15.7869	22.8156	683.9278	31228.949 8	31.2335	7.1258	16.104
	46.4253	63.5892	16469.708 5	16.0735	23.2258	709.1139	32961.088 2	31.8006	7.2680	16.425

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
L1 148.0000-117.2500				1	1	1		
L2 117.2500-97.2500				1	1	1		
L3 97.2500-80.7500				1	1	1		
L4 80.7500-40.0000				1	1	1		
L5 40.0000-13.2500				1	1	1		

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
L6 13.2500-12.7500				1	1	1		
L7 12.7500-5.3333				1	1	1		
L8 5.3333-4.7500				1	1	1		
L9 4.7500-0.0000				1	1	1		

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 plf
LDF7-50A(1-5/8")	C	No	Inside Pole	148.0000 - 0.0000	6	No Ice	0.0000	0.82
						1/2" Ice	0.0000	0.82
						1" Ice	0.0000	0.82
						2" Ice	0.0000	0.82
						4" Ice	0.0000	0.82
HB114-1-0813U4-M5J(1 1/4")	C	No	Inside Pole	148.0000 - 0.0000	3	No Ice	0.0000	1.20
						1/2" Ice	0.0000	1.20
						1" Ice	0.0000	1.20
						2" Ice	0.0000	1.20
						4" Ice	0.0000	1.20
***								
LCF158-50A(1-5/8")	C	No	Inside Pole	140.0000 - 0.0000	12	No Ice	0.0000	0.80
						1/2" Ice	0.0000	0.80
						1" Ice	0.0000	0.80
						2" Ice	0.0000	0.80
						4" Ice	0.0000	0.80
***								
LDF7-50A(1-5/8")	C	No	Inside Pole	130.0000 - 0.0000	12	No Ice	0.0000	0.82
						1/2" Ice	0.0000	0.82
						1" Ice	0.0000	0.82
						2" Ice	0.0000	0.82
						4" Ice	0.0000	0.82
***								
LDF4-50A(1/2")	C	No	Inside Pole	100.0000 - 0.0000	1	No Ice	0.0000	0.15
						1/2" Ice	0.0000	0.15
						1" Ice	0.0000	0.15
						2" Ice	0.0000	0.15
						4" Ice	0.0000	0.15
***								
LDF4-50A(1/2")	C	No	Inside Pole	8.2500 - 0.0000	1	No Ice	0.0000	0.15
						1/2" Ice	0.0000	0.15
						1" Ice	0.0000	0.15
						2" Ice	0.0000	0.15
						4" Ice	0.0000	0.15
**********								
Aero MP3-05	C	No	CaAa (Out Of Face)	99.5000 - 0.0000	1	No Ice	0.3478	0.00
						1/2" Ice	0.4001	0.00
						1" Ice	0.6566	0.00
						2" Ice	0.8788	0.00
						4" Ice	1.3232	0.00

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	148.0000-117.2500	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.61
L2	117.2500-97.2500	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.783	0.56
L3	97.2500-80.7500	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	5.739	0.46
L4	80.7500-40.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	14.173	1.15
L5	40.0000-13.2500	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	9.304	0.75
L6	13.2500-12.7500	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.174	0.01
L7	12.7500-5.3333	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	2.579	0.21
L8	5.3333-4.7500	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.203	0.02
L9	4.7500-0.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	1.652	0.13

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	148.0000-117.2500	A	1.181	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.61
L2	117.2500-97.2500	A	1.152	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	1.568	0.56
L3	97.2500-80.7500	A	1.126	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	11.296	0.46
L4	80.7500-40.0000	A	1.075	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	27.898	1.15
L5	40.0000-13.2500	A	1.000	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	18.007	0.75
L6	13.2500-12.7500	A	1.000	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.328	0.01
L7	12.7500-5.3333	A	1.000	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	4.869	0.21

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
L8	5.3333-4.7500	A	1.000	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.383	0.02
L9	4.7500-0.0000	A	1.000	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	3.119	0.13

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	148.0000-117.2500	0.0000	0.0000	0.0000	0.0000
L2	117.2500-97.2500	-0.0526	0.0304	-0.0961	0.0555
L3	97.2500-80.7500	-0.3992	0.2305	-0.6683	0.3859
L4	80.7500-40.0000	-0.4047	0.2336	-0.6883	0.3974
L5	40.0000-13.2500	-0.4101	0.2368	-0.7000	0.4042
L6	13.2500-12.7500	-0.4123	0.2380	-0.6951	0.4013
L7	12.7500-5.3333	-0.4128	0.2383	-0.6970	0.4024
L8	5.3333-4.7500	-0.4133	0.2386	-0.6990	0.4036
L9	4.7500-0.0000	-0.4137	0.2388	-0.7002	0.4043

Discrete Tower Loads

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
(2) DB980H90E-M w/ Mount Pipe	A	From Face	4.0000 0.00 0.00	0.0000	148.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.0361 4.4987 4.9468 5.8700 8.0460	3.6194 4.4808 5.2186 6.7442 9.9954	0.03 0.06 0.11 0.22 0.55
(2) DB980H90E-M w/ Mount Pipe	B	From Face	4.0000 0.00 0.00	0.0000	148.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.0361 4.4987 4.9468 5.8700 8.0460	3.6194 4.4808 5.2186 6.7442 9.9954	0.03 0.06 0.11 0.22 0.55
(2) DB980H90E-M w/ Mount Pipe	C	From Face	4.0000 0.00 0.00	0.0000	148.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.0361 4.4987 4.9468 5.8700 8.0460	3.6194 4.4808 5.2186 6.7442 9.9954	0.03 0.06 0.11 0.22 0.55
Platform Mount [LP 401-1]	C	None		0.0000	148.0000	No Ice 1/2" Ice Ice	24.3300 30.2200 36.1100	24.3300 30.2200 36.1100	1.65 2.03 2.41

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
							1" Ice	47.8900	47.8900	3.18
							2" Ice	71.4500	71.4500	4.72
							4" Ice			
***										
APXVSPP18-C-A20 w/ Mount Pipe	A	From Face	4.0000	0.00	0.0000	150.0000	No Ice	8.4975	6.9458	0.08
				-2.00			1/2" Ice	9.1490	8.1266	0.15
							1" Ice	9.7672	9.0212	0.22
							2" Ice	11.0311	10.8440	0.41
							4" Ice	13.6786	14.8507	0.91
APXVSPP18-C-A20 w/ Mount Pipe	B	From Face	4.0000	0.00	0.0000	150.0000	No Ice	8.4975	6.9458	0.08
				-2.00			1/2" Ice	9.1490	8.1266	0.15
							1" Ice	9.7672	9.0212	0.22
							2" Ice	11.0311	10.8440	0.41
							4" Ice	13.6786	14.8507	0.91
APXVSPP18-C-A20 w/ Mount Pipe	C	From Face	4.0000	0.00	0.0000	150.0000	No Ice	8.4975	6.9458	0.08
				-2.00			1/2" Ice	9.1490	8.1266	0.15
							1" Ice	9.7672	9.0212	0.22
							2" Ice	11.0311	10.8440	0.41
							4" Ice	13.6786	14.8507	0.91
1900MHz RRH (25MHz)	A	From Face	4.0000	0.00	0.0000	150.0000	No Ice	2.9069	3.8014	0.09
				-2.00			1/2" Ice	3.1446	4.0650	0.12
							1" Ice	3.3909	4.3372	0.15
							2" Ice	3.9094	4.9076	0.24
							4" Ice	5.0502	6.1520	0.45
1900MHz RRH (25MHz)	B	From Face	4.0000	0.00	0.0000	150.0000	No Ice	2.9069	3.8014	0.09
				-2.00			1/2" Ice	3.1446	4.0650	0.12
							1" Ice	3.3909	4.3372	0.15
							2" Ice	3.9094	4.9076	0.24
							4" Ice	5.0502	6.1520	0.45
1900MHz RRH (25MHz)	C	From Face	4.0000	0.00	0.0000	150.0000	No Ice	2.9069	3.8014	0.09
				-2.00			1/2" Ice	3.1446	4.0650	0.12
							1" Ice	3.3909	4.3372	0.15
							2" Ice	3.9094	4.9076	0.24
							4" Ice	5.0502	6.1520	0.45
(3) ACU-A20-N	A	From Face	4.0000	0.00	0.0000	150.0000	No Ice	0.0778	0.1361	0.00
				-2.00			1/2" Ice	0.1210	0.1890	0.00
							1" Ice	0.1728	0.2506	0.00
							2" Ice	0.3025	0.3997	0.01
							4" Ice	0.6654	0.8015	0.04
(3) ACU-A20-N	B	From Face	4.0000	0.00	0.0000	150.0000	No Ice	0.0778	0.1361	0.00
				-2.00			1/2" Ice	0.1210	0.1890	0.00
							1" Ice	0.1728	0.2506	0.00
							2" Ice	0.3025	0.3997	0.01
							4" Ice	0.6654	0.8015	0.04
(3) ACU-A20-N	C	From Face	4.0000	0.00	0.0000	150.0000	No Ice	0.0778	0.1361	0.00
				-2.00			1/2" Ice	0.1210	0.1890	0.00
							1" Ice	0.1728	0.2506	0.00
							2" Ice	0.3025	0.3997	0.01

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" Ice	0.6654	0.8015	0.04
						4" Ice			
800MHZ RRH	A	From Face	4.0000 0.00 -2.00	0.0000	150.0000	No Ice	2.4899	2.0685	0.05
						1/2" Ice	2.7061	2.2705	0.07
							2.9310	2.4812	0.10
						1" Ice	3.4068	2.9284	0.16
						2" Ice	4.4620	3.9265	0.32
						4" Ice			
800MHZ RRH	B	From Face	4.0000 0.00 -2.00	0.0000	150.0000	No Ice	2.4899	2.0685	0.05
						1/2" Ice	2.7061	2.2705	0.07
							2.9310	2.4812	0.10
						1" Ice	3.4068	2.9284	0.16
						2" Ice	4.4620	3.9265	0.32
						4" Ice			
800MHZ RRH	C	From Face	4.0000 0.00 -2.00	0.0000	150.0000	No Ice	2.4899	2.0685	0.05
						1/2" Ice	2.7061	2.2705	0.07
							2.9310	2.4812	0.10
						1" Ice	3.4068	2.9284	0.16
						2" Ice	4.4620	3.9265	0.32
						4" Ice			
800 EXTERNAL NOTCH FILTER	A	From Face	4.0000 0.00 -2.00	0.0000	150.0000	No Ice	0.7701	0.3747	0.01
						1/2" Ice	0.8898	0.4647	0.02
							1.0181	0.5634	0.02
						1" Ice	1.3007	0.7868	0.04
						2" Ice	1.9696	1.3372	0.11
						4" Ice			
800 EXTERNAL NOTCH FILTER	B	From Face	4.0000 0.00 -2.00	0.0000	150.0000	No Ice	0.7701	0.3747	0.01
						1/2" Ice	0.8898	0.4647	0.02
							1.0181	0.5634	0.02
						1" Ice	1.3007	0.7868	0.04
						2" Ice	1.9696	1.3372	0.11
						4" Ice			
800 EXTERNAL NOTCH FILTER	C	From Face	4.0000 0.00 -2.00	0.0000	150.0000	No Ice	0.7701	0.3747	0.01
						1/2" Ice	0.8898	0.4647	0.02
							1.0181	0.5634	0.02
						1" Ice	1.3007	0.7868	0.04
						2" Ice	1.9696	1.3372	0.11
						4" Ice			
Miscellaneous (NA507-1)	C	From Face	4.0000 0.00 -2.00	0.0000	150.0000	No Ice	4.8000	4.8000	0.25
						1/2" Ice	6.7000	6.7000	0.29
							8.6000	8.6000	0.34
						1" Ice	12.4000	12.4000	0.44
						2" Ice	20.0000	20.0000	0.64
						4" Ice			
** ** ***									
(2) 7770.00 w/ Mount Pipe	A	From Face	4.0000 0.00 0.00	0.0000	140.0000	No Ice	6.1194	4.2543	0.06
						1/2" Ice	6.6258	5.0137	0.10
							7.1283	5.7109	0.16
						1" Ice	8.1643	7.1553	0.29
						2" Ice	10.3599	10.4117	0.66
						4" Ice			
(2) 7770.00 w/ Mount Pipe	B	From Face	4.0000 0.00 0.00	0.0000	140.0000	No Ice	6.1194	4.2543	0.06
						1/2" Ice	6.6258	5.0137	0.10
							7.1283	5.7109	0.16

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
						1" Ice	8.1643	7.1553	0.29
						2" Ice	10.3599	10.4117	0.66
						4" Ice			
(2) 7770.00 w/ Mount Pipe	C	From Face	4.0000 0.00 0.00	0.0000	140.0000	No Ice	6.1194	4.2543	0.06
						1/2" Ice	6.6258	5.0137	0.10
						1" Ice	7.1283	5.7109	0.16
						2" Ice	8.1643	7.1553	0.29
						4" Ice	10.3599	10.4117	0.66
(2) LGP 17201	A	From Face	4.0000 0.00 0.00	0.0000	140.0000	No Ice	1.9460	0.5180	0.03
						1/2" Ice	2.1337	0.6396	0.04
						1" Ice	2.3301	0.7699	0.06
						2" Ice	2.7488	1.0564	0.09
						4" Ice	3.6900	1.7331	0.19
(2) LGP 17201	B	From Face	4.0000 0.00 0.00	0.0000	140.0000	No Ice	1.9460	0.5180	0.03
						1/2" Ice	2.1337	0.6396	0.04
						1" Ice	2.3301	0.7699	0.06
						2" Ice	2.7488	1.0564	0.09
						4" Ice	3.6900	1.7331	0.19
(2) LGP 17201	C	From Face	4.0000 0.00 0.00	0.0000	140.0000	No Ice	1.9460	0.5180	0.03
						1/2" Ice	2.1337	0.6396	0.04
						1" Ice	2.3301	0.7699	0.06
						2" Ice	2.7488	1.0564	0.09
						4" Ice	3.6900	1.7331	0.19
(2) LGP21901	A	From Face	4.0000 0.00 0.00	0.0000	140.0000	No Ice	0.2695	0.1838	0.01
						1/2" Ice	0.3432	0.2483	0.01
						1" Ice	0.4255	0.3216	0.01
						2" Ice	0.6160	0.4940	0.02
						4" Ice	1.1009	0.9425	0.07
(2) LGP21901	B	From Face	4.0000 0.00 0.00	0.0000	140.0000	No Ice	0.2695	0.1838	0.01
						1/2" Ice	0.3432	0.2483	0.01
						1" Ice	0.4255	0.3216	0.01
						2" Ice	0.6160	0.4940	0.02
						4" Ice	1.1009	0.9425	0.07
(2) LGP21901	C	From Face	4.0000 0.00 0.00	0.0000	140.0000	No Ice	0.2695	0.1838	0.01
						1/2" Ice	0.3432	0.2483	0.01
						1" Ice	0.4255	0.3216	0.01
						2" Ice	0.6160	0.4940	0.02
						4" Ice	1.1009	0.9425	0.07
T-Arm Mount [TA 602-3]	C	None		0.0000	140.0000	No Ice	11.5900	11.5900	0.77
						1/2" Ice	15.4400	15.4400	0.99
						1" Ice	19.2900	19.2900	1.21
						2" Ice	26.9900	26.9900	1.64
						4" Ice	42.3900	42.3900	2.50
***									
(2) LPA-80080/6CF w/ Mount Pipe	A	From Face	4.0000 0.00 0.00	0.0000	130.0000	No Ice	4.5639	10.7282	0.05
						1/2" Ice	5.1051	11.9896	0.11
						1" Ice	5.6116	12.9683	0.19
						1" Ice	6.6508	14.9795	0.36

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" Ice	8.8342	19.2168	0.86
						4" Ice			
(2) LPA-80080/6CF w/ Mount Pipe	B	From Face	4.0000 0.00 0.00	0.0000	130.0000	No Ice	4.5639	10.7282	0.05
						1/2" Ice	5.1051	11.9896	0.11
						1" Ice	5.6116	12.9683	0.19
						2" Ice	6.6508	14.9795	0.36
						4" Ice	8.8342	19.2168	0.86
BXA-171085-12BF-EDIN-2 w/ Mount Pipe	A	From Face	4.0000 0.00 0.00	0.0000	130.0000	No Ice	4.9710	5.2283	0.04
						1/2" Ice	5.5211	6.3892	0.08
						1" Ice	6.0361	7.2610	0.14
						2" Ice	7.0911	9.0462	0.27
						4" Ice	9.3593	12.8165	0.67
BXA-171085-12BF-EDIN-2 w/ Mount Pipe	B	From Face	4.0000 0.00 0.00	0.0000	130.0000	No Ice	4.9710	5.2283	0.04
						1/2" Ice	5.5211	6.3892	0.08
						1" Ice	6.0361	7.2610	0.14
						2" Ice	7.0911	9.0462	0.27
						4" Ice	9.3593	12.8165	0.67
BXA-171085-12BF-EDIN-2 w/ Mount Pipe	C	From Face	4.0000 0.00 0.00	0.0000	130.0000	No Ice	4.9710	5.2283	0.04
						1/2" Ice	5.5211	6.3892	0.08
						1" Ice	6.0361	7.2610	0.14
						2" Ice	7.0911	9.0462	0.27
						4" Ice	9.3593	12.8165	0.67
BXA-70080/6CF w/ Mount Pipe	A	From Face	4.0000 0.00 0.00	0.0000	130.0000	No Ice	6.0736	6.0983	0.04
						1/2" Ice	6.6306	7.2558	0.09
						1" Ice	7.1524	8.1258	0.16
						2" Ice	8.2495	9.9156	0.31
						4" Ice	10.7781	13.7095	0.75
BXA-70080/6CF w/ Mount Pipe	B	From Face	4.0000 0.00 0.00	0.0000	130.0000	No Ice	6.0736	6.0983	0.04
						1/2" Ice	6.6306	7.2558	0.09
						1" Ice	7.1524	8.1258	0.16
						2" Ice	8.2495	9.9156	0.31
						4" Ice	10.7781	13.7095	0.75
BXA-70080-6CF-EDIN-6 w/ Mount Pipe	C	From Face	4.0000 0.00 0.00	0.0000	130.0000	No Ice	6.0062	6.2035	0.04
						1/2" Ice	6.5619	7.3594	0.10
						1" Ice	7.0826	8.2293	0.16
						2" Ice	8.1672	10.0193	0.31
						4" Ice	10.6907	13.8398	0.75
(2) LPA-80080-6CF-EDIN-6 w/ Mount Pipe	C	From Face	4.0000 0.00 0.00	0.0000	130.0000	No Ice	4.5604	10.7396	0.05
						1/2" Ice	5.1019	12.0018	0.11
						1" Ice	5.6085	12.9809	0.19
						2" Ice	6.6479	14.9930	0.36
						4" Ice	8.8318	19.2318	0.86
(2) FD9R6004/2C-3L	A	From Face	4.0000 0.00 0.00	0.0000	130.0000	No Ice	0.3665	0.0846	0.00
						1/2" Ice	0.4506	0.1362	0.01
						1" Ice	0.5433	0.1965	0.01
						2" Ice	0.7546	0.3430	0.02
						4" Ice	1.2808	0.7396	0.06

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) FD9R6004/2C-3L	B	From Face	4.0000 0.00 0.00	0.0000	130.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.3665 0.4506 0.5433 0.7546 1.2808	0.0846 0.1362 0.1965 0.3430 0.7396	0.00 0.01 0.01 0.02 0.06
(2) FD9R6004/2C-3L	C	From Face	4.0000 0.00 0.00	0.0000	130.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.3665 0.4506 0.5433 0.7546 1.2808	0.0846 0.1362 0.1965 0.3430 0.7396	0.00 0.01 0.01 0.02 0.06
Platform Mount [LP 305-1]	C	None		0.0000	130.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	18.0100 23.3300 28.6500 39.2900 60.5700	18.0100 23.3300 28.6500 39.2900 60.5700	1.12 1.35 1.58 2.05 2.97
***									
Side Arm Mount [SO 701-1]	A	None		0.0000	100.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.8500 1.1400 1.4300 2.0100 3.1700	1.6700 2.3400 3.0100 4.3500 7.0300	0.07 0.08 0.09 0.12 0.18
KS24019-L112A	A	From Face	2.0000 0.00 2.00	0.0000	100.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.1556 0.2247 0.3025 0.4840 0.9506	0.1556 0.2247 0.3025 0.4840 0.9506	0.01 0.01 0.01 0.02 0.06

Tower Pressures - No Ice

$G_H = 1.690$

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg % %	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
L1 148.0000-117.2500	132.2079	1.487	24	63.072	A	0.000	63.072	63.072	100.00	0.000	0.000
					B	0.000	63.072		100.00	0.000	0.000
					C	0.000	63.072		100.00	0.000	0.000
L2 117.2500-97.2500	107.0516	1.4	23	47.586	A	0.000	47.586	47.586	100.00	0.000	0.000
					B	0.000	47.586		100.00	0.000	0.000
					C	0.000	47.586		100.00	0.000	0.783
L3 97.2500-80.7500	88.8782	1.327	22	43.524	A	0.000	43.524	43.524	100.00	0.000	0.000
					B	0.000	43.524		100.00	0.000	0.000
					C	0.000	43.524		100.00	0.000	5.739
L4 80.7500-40.0000	60.1817	1.187	19	121.723	A	0.000	121.723	121.723	100.00	0.000	0.000
					B	0.000	121.723		100.00	0.000	0.000

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
					C	0.000	121.723		100.00	0.000	14.173
L5 40.0000-13.2500	26.3617	1	16	91.493	A	0.000	91.493	91.493	100.00	0.000	0.000
					B	0.000	91.493		100.00	0.000	0.000
					C	0.000	91.493		100.00	0.000	9.304
L6 13.2500-12.7500	12.9999	1	16	1.813	A	0.000	1.813	1.813	100.00	0.000	0.000
					B	0.000	1.813		100.00	0.000	0.000
					C	0.000	1.813		100.00	0.000	0.174
L7 12.7500-5.3333	9.0240	1	16	27.308	A	0.000	27.308	27.308	100.00	0.000	0.000
					B	0.000	27.308		100.00	0.000	0.000
					C	0.000	27.308		100.00	0.000	2.579
L8 5.3333-4.7500	5.0415	1	16	2.181	A	0.000	2.181	2.181	100.00	0.000	0.000
					B	0.000	2.181		100.00	0.000	0.000
					C	0.000	2.181		100.00	0.000	0.203
L9 4.7500-0.0000	2.3679	1	16	17.938	A	0.000	17.938	17.938	100.00	0.000	0.000
					B	0.000	17.938		100.00	0.000	0.000
					C	0.000	17.938		100.00	0.000	1.652

Tower Pressure - With Ice

G_H = 1.690

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1 148.0000-117.2500	132.2079	1.487	3	1.1812	69.126	A	0.000	69.126	69.126	100.00	0.000	0.000
						B	0.000	69.126		100.00	0.000	0.000
						C	0.000	69.126		100.00	0.000	0.000
L2 117.2500-97.2500	107.0516	1.4	3	1.1517	51.524	A	0.000	51.524	51.524	100.00	0.000	0.000
						B	0.000	51.524		100.00	0.000	0.000
						C	0.000	51.524		100.00	0.000	1.568
L3 97.2500-80.7500	88.8782	1.327	3	1.1262	46.621	A	0.000	46.621	46.621	100.00	0.000	0.000
						B	0.000	46.621		100.00	0.000	0.000
						C	0.000	46.621		100.00	0.000	11.296
L4 80.7500-40.0000	60.1817	1.187	2	1.0748	129.372	A	0.000	129.372	129.372	100.00	0.000	0.000
						B	0.000	129.372		100.00	0.000	0.000
						C	0.000	129.372		100.00	0.000	27.898
L5 40.0000-13.2500	26.3617	1	2	1.0000	96.285	A	0.000	96.285	96.285	100.00	0.000	0.000
						B	0.000	96.285		100.00	0.000	0.000
						C	0.000	96.285		100.00	0.000	18.007
L6 13.2500-12.7500	12.9999	1	2	1.0000	1.896	A	0.000	1.896	1.896	100.00	0.000	0.000
						B	0.000	1.896		100.00	0.000	0.000
						C	0.000	1.896		100.00	0.000	0.328
L7 12.7500-5.3333	9.0240	1	2	1.0000	28.544	A	0.000	28.544	28.544	100.00	0.000	0.000
						B	0.000	28.544		100.00	0.000	0.000
						C	0.000	28.544		100.00	0.000	4.869
L8 5.3333-4.7500	5.0415	1	2	1.0000	2.278	A	0.000	2.278	2.278	100.00	0.000	0.000
						B	0.000	2.278		100.00	0.000	0.000
						C	0.000	2.278		100.00	0.000	0.383
L9 4.7500-0.0000	2.3679	1	2	1.0000	18.729	A	0.000	18.729	18.729	100.00	0.000	0.000
						B	0.000	18.729		100.00	0.000	0.000
						C	0.000	18.729		100.00	0.000	3.119

Tower Pressure - Service

G_H = 1.690

Section Elevation ft	z ft	K_z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1 148.0000-117.2500	132.2079	1.487	10	63.072	A	0.000	63.072	63.072	100.00	0.000	0.000
					B	0.000	63.072		100.00	0.000	0.000
					C	0.000	63.072		100.00	0.000	0.000
L2 117.2500-97.2500	107.0516	1.4	9	47.586	A	0.000	47.586	47.586	100.00	0.000	0.000
					B	0.000	47.586		100.00	0.000	0.000
					C	0.000	47.586		100.00	0.000	0.783
L3 97.2500-80.7500	88.8782	1.327	8	43.524	A	0.000	43.524	43.524	100.00	0.000	0.000
					B	0.000	43.524		100.00	0.000	0.000
					C	0.000	43.524		100.00	0.000	5.739
L4 80.7500-40.0000	60.1817	1.187	8	121.723	A	0.000	121.723	121.723	100.00	0.000	0.000
					B	0.000	121.723		100.00	0.000	0.000
					C	0.000	121.723		100.00	0.000	14.173
L5 40.0000-13.2500	26.3617	1	6	91.493	A	0.000	91.493	91.493	100.00	0.000	0.000
					B	0.000	91.493		100.00	0.000	0.000
					C	0.000	91.493		100.00	0.000	9.304
L6 13.2500-12.7500	12.9999	1	6	1.813	A	0.000	1.813	1.813	100.00	0.000	0.000
					B	0.000	1.813		100.00	0.000	0.000
					C	0.000	1.813		100.00	0.000	0.174
L7 12.7500-5.3333	9.0240	1	6	27.308	A	0.000	27.308	27.308	100.00	0.000	0.000
					B	0.000	27.308		100.00	0.000	0.000
					C	0.000	27.308		100.00	0.000	2.579
L8 5.3333-4.7500	5.0415	1	6	2.181	A	0.000	2.181	2.181	100.00	0.000	0.000
					B	0.000	2.181		100.00	0.000	0.000
					C	0.000	2.181		100.00	0.000	0.203
L9 4.7500-0.0000	2.3679	1	6	17.938	A	0.000	17.938	17.938	100.00	0.000	0.000
					B	0.000	17.938		100.00	0.000	0.000
					C	0.000	17.938		100.00	0.000	1.652

Load Combinations

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

Comb. No.	Description
21	Dead+Wind 180 deg+Ice+Temp
22	Dead+Wind 210 deg+Ice+Temp
23	Dead+Wind 240 deg+Ice+Temp
24	Dead+Wind 270 deg+Ice+Temp
25	Dead+Wind 300 deg+Ice+Temp
26	Dead+Wind 330 deg+Ice+Temp
27	Dead+Wind 0 deg - Service
28	Dead+Wind 30 deg - Service
29	Dead+Wind 60 deg - Service
30	Dead+Wind 90 deg - Service
31	Dead+Wind 120 deg - Service
32	Dead+Wind 150 deg - Service
33	Dead+Wind 180 deg - Service
34	Dead+Wind 210 deg - Service
35	Dead+Wind 240 deg - Service
36	Dead+Wind 270 deg - Service
37	Dead+Wind 300 deg - Service
38	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	148 - 117.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-15.25	0.00	-1.85
			Max. Mx	11	-6.69	220.00	-1.17
			Max. My	8	-6.69	0.00	-221.12
			Max. Vy	11	-12.30	220.00	-1.17
			Max. Vx	8	12.29	0.00	-221.12
			Max. Torque	11			1.13
L2	117.25 - 97.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-19.08	0.03	-1.87
			Max. Mx	11	-9.47	526.67	-1.21
			Max. My	8	-9.47	0.02	-527.53
			Max. Vy	11	-13.85	526.67	-1.21
			Max. Vx	8	13.84	0.02	-527.53
			Max. Torque	11			1.13
L3	97.25 - 80.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-21.79	0.03	-1.86
			Max. Mx	11	-11.67	702.14	-1.23
			Max. My	8	-11.67	0.02	-702.86
			Max. Vy	11	-14.81	702.14	-1.23
			Max. Vx	8	14.80	0.02	-702.86
			Max. Torque	11			1.14
L4	80.75 - 40	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-32.27	0.03	-1.80
			Max. Mx	11	-20.29	1355.42	-1.27
			Max. My	8	-20.29	0.02	-1355.66
			Max. Vy	11	-17.76	1355.42	-1.27
			Max. Vx	8	17.75	0.02	-1355.66
			Max. Torque	11			1.20
L5	40 - 13.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-42.17	0.03	-1.75
			Max. Mx	11	-28.63	1951.18	-1.28
			Max. My	8	-28.63	0.01	-1951.04

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vy	11	-19.70	1951.18	-1.28
			Max. Vx	8	19.69	0.01	-1951.04
			Max. Torque	11			1.24
L6	13.25 - 12.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-42.31	0.03	-1.75
			Max. Mx	11	-28.76	1961.03	-1.28
			Max. My	8	-28.76	0.01	-1960.89
			Max. Vy	11	-19.73	1961.03	-1.28
			Max. Vx	8	19.72	0.01	-1960.89
			Max. Torque	11			1.24
L7	12.75 - 5.3333	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-44.43	0.03	-1.74
			Max. Mx	11	-30.56	2108.83	-1.28
			Max. My	8	-30.56	0.01	-2108.60
			Max. Vy	11	-20.15	2108.83	-1.28
			Max. Vx	8	20.14	0.01	-2108.60
			Max. Torque	11			1.25
L8	5.3333 - 4.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-44.60	0.03	-1.74
			Max. Mx	11	-30.71	2120.59	-1.28
			Max. My	8	-30.71	0.01	-2120.34
			Max. Vy	11	-20.18	2120.59	-1.28
			Max. Vx	8	20.17	0.01	-2120.34
			Max. Torque	11			1.25
L9	4.75 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-46.03	0.03	-1.73
			Max. Mx	11	-31.92	2217.04	-1.28
			Max. My	8	-31.92	0.01	-2216.74
			Max. Vy	11	-20.45	2217.04	-1.28
			Max. Vx	8	20.44	0.01	-2216.74
			Max. Torque	11			1.26

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	14	46.03	-0.00	0.00
	Max. H_x	11	31.93	20.44	-0.00
	Max. H_z	2	31.93	0.00	20.43
	Max. M_x	2	2214.18	0.00	20.43
	Max. M_z	5	2217.01	-20.44	-0.00
	Max. Torsion	11	1.26	20.44	-0.00
	Min. Vert	8	31.93	0.00	-20.43
	Min. H_x	5	31.93	-20.44	-0.00
	Min. H_z	8	31.93	0.00	-20.43
	Min. M_x	8	-2216.74	0.00	-20.43
	Min. M_z	11	-2217.04	20.44	-0.00
	Min. Torsion	5	-1.26	-20.44	-0.00

Tower Mast Reaction Summary

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 Only	31.93	0.00	-0.00	1.19	0.01	0.00
Dead+Wind 0 deg - No Ice	31.93	-0.00	-20.43	-2214.18	0.01	-0.27
Dead+Wind 30 deg - No Ice	31.93	10.22	-17.70	-1917.87	-1108.57	0.40
Dead+Wind 60 deg - No Ice	31.93	17.70	-10.22	-1106.74	-1920.10	0.96
Dead+Wind 90 deg - No Ice	31.93	20.44	0.00	1.28	-2217.01	1.26
Dead+Wind 120 deg - No Ice	31.93	17.70	10.22	1109.30	-1920.10	1.23
Dead+Wind 150 deg - No Ice	31.93	10.22	17.70	1920.43	-1108.57	0.86
Dead+Wind 180 deg - No Ice	31.93	-0.00	20.43	2216.74	0.01	0.27
Dead+Wind 210 deg - No Ice	31.93	-10.22	17.70	1920.43	1108.60	-0.40
Dead+Wind 240 deg - No Ice	31.93	-17.70	10.22	1109.30	1920.13	-0.96
Dead+Wind 270 deg - No Ice	31.93	-20.44	0.00	1.28	2217.04	-1.26
Dead+Wind 300 deg - No Ice	31.93	-17.70	-10.22	-1106.74	1920.13	-1.23
Dead+Wind 330 deg - No Ice	31.93	-10.22	-17.70	-1917.87	1108.59	-0.86
Dead+Ice+Temp	46.03	0.00	-0.00	1.73	0.03	-0.00
Dead+Wind 0 deg+Ice+Temp	46.03	0.00	-3.23	-368.88	0.03	-0.07
Dead+Wind 30 deg+Ice+Temp	46.03	1.62	-2.80	-319.19	-185.49	0.10
Dead+Wind 60 deg+Ice+Temp	46.03	2.80	-1.62	-183.43	-321.30	0.23
Dead+Wind 90 deg+Ice+Temp	46.03	3.23	-0.00	2.02	-371.01	0.31
Dead+Wind 120 deg+Ice+Temp	46.03	2.80	1.62	187.47	-321.30	0.30
Dead+Wind 150 deg+Ice+Temp	46.03	1.62	2.80	323.23	-185.49	0.21
Dead+Wind 180 deg+Ice+Temp	46.03	0.00	3.23	372.92	0.03	0.07
Dead+Wind 210 deg+Ice+Temp	46.03	-1.62	2.80	323.23	185.55	-0.10
Dead+Wind 240 deg+Ice+Temp	46.03	-2.80	1.62	187.47	321.37	-0.23
Dead+Wind 270 deg+Ice+Temp	46.03	-3.23	-0.00	2.02	371.08	-0.31
Dead+Wind 300 deg+Ice+Temp	46.03	-2.80	-1.62	-183.43	321.37	-0.30
Dead+Wind 330 deg+Ice+Temp	46.03	-1.62	-2.80	-319.19	185.55	-0.21
Dead+Wind 0 deg - Service	31.93	-0.00	-7.98	-865.03	0.01	-0.10
Dead+Wind 30 deg - Service	31.93	3.99	-6.91	-749.13	-433.45	0.16
Dead+Wind 60 deg - Service	31.93	6.92	-3.99	-431.96	-750.78	0.38
Dead+Wind 90 deg - Service	31.93	7.98	-0.00	1.29	-866.74	0.50
Dead+Wind 120 deg - Service	31.93	6.92	3.99	434.54	-750.78	0.48
Dead+Wind 150 deg - Service	31.93	3.99	6.91	751.70	-433.46	0.34
Dead+Wind 180 deg - Service	31.93	-0.00	7.98	867.61	0.01	0.10
Dead+Wind 210 deg - Service	31.93	-3.99	6.91	751.70	433.48	-0.16
Dead+Wind 240 deg - Service	31.93	-6.92	3.99	434.54	750.81	-0.38
Dead+Wind 270 deg - Service	31.93	-7.98	-0.00	1.29	866.77	-0.50
Dead+Wind 300 deg - Service	31.93	-6.92	-3.99	-431.96	750.81	-0.48
Dead+Wind 330 deg -	31.93	-3.99	-6.91	-749.13	433.48	-0.34

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
Service						

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX	PY	PZ	PX	PY	PZ	% Error
	K	K	K	K	K	K	
1	0.00	-31.93	0.00	-0.00	31.93	0.00	0.001%
2	0.00	-31.93	-20.43	0.00	31.93	20.43	0.013%
3	10.22	-31.93	-17.70	-10.22	31.93	17.70	0.000%
4	17.70	-31.93	-10.22	-17.70	31.93	10.22	0.000%
5	20.44	-31.93	0.00	-20.44	31.93	-0.00	0.003%
6	17.70	-31.93	10.22	-17.70	31.93	-10.22	0.000%
7	10.22	-31.93	17.70	-10.22	31.93	-17.70	0.000%
8	0.00	-31.93	20.43	0.00	31.93	-20.43	0.013%
9	-10.22	-31.93	17.70	10.22	31.93	-17.70	0.000%
10	-17.70	-31.93	10.22	17.70	31.93	-10.22	0.000%
11	-20.44	-31.93	0.00	20.44	31.93	-0.00	0.003%
12	-17.70	-31.93	-10.22	17.70	31.93	10.22	0.000%
13	-10.22	-31.93	-17.70	10.22	31.93	17.70	0.000%
14	0.00	-46.03	0.00	-0.00	46.03	0.00	0.003%
15	0.00	-46.03	-3.23	-0.00	46.03	3.23	0.001%
16	1.62	-46.03	-2.80	-1.62	46.03	2.80	0.001%
17	2.80	-46.03	-1.62	-2.80	46.03	1.62	0.001%
18	3.23	-46.03	0.00	-3.23	46.03	0.00	0.001%
19	2.80	-46.03	1.62	-2.80	46.03	-1.62	0.001%
20	1.62	-46.03	2.80	-1.62	46.03	-2.80	0.001%
21	0.00	-46.03	3.23	-0.00	46.03	-3.23	0.001%
22	-1.62	-46.03	2.80	1.62	46.03	-2.80	0.001%
23	-2.80	-46.03	1.62	2.80	46.03	-1.62	0.001%
24	-3.23	-46.03	0.00	3.23	46.03	0.00	0.001%
25	-2.80	-46.03	-1.62	2.80	46.03	1.62	0.001%
26	-1.62	-46.03	-2.80	1.62	46.03	2.80	0.001%
27	0.00	-31.93	-7.98	0.00	31.93	7.98	0.006%
28	3.99	-31.93	-6.91	-3.99	31.93	6.91	0.001%
29	6.92	-31.93	-3.99	-6.92	31.93	3.99	0.001%
30	7.99	-31.93	0.00	-7.98	31.93	0.00	0.006%
31	6.92	-31.93	3.99	-6.92	31.93	-3.99	0.001%
32	3.99	-31.93	6.91	-3.99	31.93	-6.91	0.001%
33	0.00	-31.93	7.98	0.00	31.93	-7.98	0.006%
34	-3.99	-31.93	6.91	3.99	31.93	-6.91	0.001%
35	-6.92	-31.93	3.99	6.92	31.93	-3.99	0.001%
36	-7.99	-31.93	0.00	7.98	31.93	0.00	0.006%
37	-6.92	-31.93	-3.99	6.92	31.93	3.99	0.001%
38	-3.99	-31.93	-6.91	3.99	31.93	6.91	0.001%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	6	0.00000001	0.00000001
2	Yes	15	0.00013068	0.00014312
3	Yes	21	0.00000001	0.00008630
4	Yes	21	0.00000001	0.00008345

5	Yes	17	0.00003244	0.00008520
6	Yes	21	0.00000001	0.00008797
7	Yes	21	0.00000001	0.00008443
8	Yes	15	0.00013071	0.00014348
9	Yes	21	0.00000001	0.00008478
10	Yes	21	0.00000001	0.00008775
11	Yes	17	0.00003244	0.00008520
12	Yes	21	0.00000001	0.00008326
13	Yes	21	0.00000001	0.00008668
14	Yes	6	0.00000001	0.00004087
15	Yes	17	0.00000001	0.00009404
16	Yes	17	0.00000001	0.00010442
17	Yes	17	0.00000001	0.00010428
18	Yes	17	0.00000001	0.00009541
19	Yes	17	0.00000001	0.00010685
20	Yes	17	0.00000001	0.00010642
21	Yes	17	0.00000001	0.00009634
22	Yes	17	0.00000001	0.00010648
23	Yes	17	0.00000001	0.00010682
24	Yes	17	0.00000001	0.00009544
25	Yes	17	0.00000001	0.00010429
26	Yes	17	0.00000001	0.00010452
27	Yes	15	0.00013578	0.00006957
28	Yes	17	0.00000001	0.00010607
29	Yes	17	0.00000001	0.00009688
30	Yes	15	0.00013584	0.00008787
31	Yes	17	0.00000001	0.00011180
32	Yes	17	0.00000001	0.00009999
33	Yes	15	0.00013590	0.00007003
34	Yes	17	0.00000001	0.00010109
35	Yes	17	0.00000001	0.00011102
36	Yes	15	0.00013584	0.00008788
37	Yes	17	0.00000001	0.00009632
38	Yes	17	0.00000001	0.00010737

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	148 - 117.25	34.160	33	2.0553	0.0074
L2	120.75 - 97.25	22.875	33	1.8207	0.0034
L3	97.25 - 80.75	14.809	33	1.4081	0.0018
L4	85 - 40	11.400	33	1.2473	0.0015
L5	45 - 13.25	3.264	34	0.6623	0.0006
L6	13.25 - 12.75	0.282	34	0.2054	0.0002
L7	12.75 - 5.3333	0.261	34	0.1978	0.0002
L8	5.3333 - 4.75	0.045	34	0.0803	0.0001
L9	4.75 - 0	0.036	34	0.0715	0.0001

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
150.0000	APXVSPP18-C-A20 w/ Mount	33	34.160	2.0553	0.0074	19955

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
	Pipe					
148.0000	(2) DB980H90E-M w/ Mount Pipe	33	34.160	2.0553	0.0074	19955
140.0000	(2) 7770.00 w/ Mount Pipe	33	30.738	2.0088	0.0061	12472
130.0000	(2) LPA-80080/6CF w/ Mount Pipe	33	26.555	1.9314	0.0046	5542
100.0000	Side Arm Mount [SO 701-1]	33	15.648	1.4523	0.0020	3133

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	148 - 117.25	87.041	8	5.2248	0.0188
L2	120.75 - 97.25	58.346	8	4.6403	0.0087
L3	97.25 - 80.75	37.795	8	3.5928	0.0047
L4	85 - 40	29.101	8	3.1834	0.0037
L5	45 - 13.25	8.336	10	1.6917	0.0015
L6	13.25 - 12.75	0.720	10	0.5247	0.0004
L7	12.75 - 5.3333	0.666	10	0.5055	0.0004
L8	5.3333 - 4.75	0.115	10	0.2051	0.0002
L9	4.75 - 0	0.091	10	0.1828	0.0001

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
150.0000	APXVSPP18-C-A20 w/ Mount Pipe	8	87.041	5.2248	0.0188	8029
148.0000	(2) DB980H90E-M w/ Mount Pipe	8	87.041	5.2248	0.0188	8029
140.0000	(2) 7770.00 w/ Mount Pipe	8	78.343	5.1107	0.0154	5017
130.0000	(2) LPA-80080/6CF w/ Mount Pipe	8	67.707	4.9185	0.0116	2228
100.0000	Side Arm Mount [SO 701-1]	8	39.934	3.7054	0.0050	1240

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
L1	148 - 117.25 (1)	TP27.227x22x0.1875	30.7500	0.0000	0.0	36.000	15.7378	-6.69	566.56	0.012
L2	117.25 - 97.25 (2)	TP30.2515x26.2571x0.25	23.5000	0.0000	0.0	36.000	23.8062	-9.47	857.02	0.011
L3	97.25 - 80.75 (3)	TP33.056x30.2515x0.443	16.5000	0.0000	0.0	34.290	44.8438	-11.67	1537.69	0.008

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
L4	80.75 - 40 (4)	TP39.483x31.4476x0.4385	45.0000	0.0000	0.0	34.578	53.0935	-20.29	1835.87	0.011
L5	40 - 13.25 (5)	TP43.4677x37.7133x0.4502	31.7500	0.0000	0.0	34.728	61.4719	-28.63	2134.80	0.013
L6	13.25 - 12.75 (6)	TP43.5527x43.4677x0.4516	0.5000	0.0000	0.0	34.332	61.7774	-28.76	2120.94	0.014
L7	12.75 - 5.3333 (7)	TP44.8134x43.5527x0.4254	7.4167	0.0000	0.0	35.532	59.9377	-30.56	2129.71	0.014
L8	5.3333 - 4.75 (8)	TP44.9126x44.8134x0.4467	0.5833	0.0000	0.0	34.368	63.0407	-30.71	2166.58	0.014
L9	4.75 - 0 (9)	TP45.72x44.9126x0.4425	4.7500	0.0000	0.0	34.776	63.5892	-31.92	2211.38	0.014

Pole Bending Design Data

Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
L1	148 - 117.25 (1)	TP27.227x22x0.1875	221.12	25.818	36.000	0.717	0.00	0.000	36.000	0.000
L2	117.25 - 97.25 (2)	TP30.2515x26.2571x0.25	527.55	35.937	36.000	0.998	0.00	0.000	36.000	0.000
L3	97.25 - 80.75 (3)	TP33.056x30.2515x0.443	702.97	24.047	34.290	0.701	0.00	0.000	34.290	0.000
L4	80.75 - 40 (4)	TP39.483x31.4476x0.4385	1356.04	32.673	34.578	0.945	0.00	0.000	34.578	0.000
L5	40 - 13.25 (5)	TP43.4677x37.7133x0.4502	1951.68	35.985	34.728	1.036	0.00	0.000	34.728	0.000
L6	13.25 - 12.75 (6)	TP43.5527x43.4677x0.4516	1961.53	35.918	34.332	1.046	0.00	0.000	34.332	0.000
L7	12.75 - 5.3333 (7)	TP44.8134x43.5527x0.4254	2109.33	38.621	35.532	1.087	0.00	0.000	35.532	0.000
L8	5.3333 - 4.75 (8)	TP44.9126x44.8134x0.4467	2121.08	36.877	34.368	1.073	0.00	0.000	34.368	0.000
L9	4.75 - 0 (9)	TP45.72x44.9126x0.4425	2217.53	37.526	34.776	1.079	0.00	0.000	34.776	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V K	Actual f_v ksi	Allow. F_v ksi	Ratio $\frac{f_v}{F_v}$	Actual T kip-ft	Actual f_{vt} ksi	Allow. F_{vt} ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
L1	148 - 117.25 (1)	TP27.227x22x0.1875	12.29	0.781	24.000	0.065	0.00	0.000	24.000	0.000
L2	117.25 - 97.25 (2)	TP30.2515x26.2571x0.25	13.84	0.582	24.000	0.048	0.54	0.018	24.000	0.001
L3	97.25 - 80.75 (3)	TP33.056x30.2515x0.443	14.81	0.330	22.860	0.029	0.53	0.009	22.860	0.000
L4	80.75 - 40 (4)	TP39.483x31.4476x0.4385	17.76	0.334	23.052	0.029	0.47	0.006	23.052	0.000
L5	40 - 13.25 (5)	TP43.4677x37.7133x0.4502	19.70	0.321	23.152	0.028	0.96	0.009	23.152	0.000
L6	13.25 - 12.75 (6)	TP43.5527x43.4677x0.4516	19.72	0.319	22.888	0.028	0.96	0.009	22.888	0.000
L7	12.75 -	TP44.8134x43.5527x0.42	20.15	0.336	23.688	0.028	0.96	0.009	23.688	0.000

Section No.	Elevation ft	Size	Actual V K	Actual f_v ksi	Allow. F_v ksi	Ratio $\frac{f_v}{F_v}$	Actual T kip-ft	Actual f_{vt} ksi	Allow. F_{vt} ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
	5.3333 (7)	54								
L8	5.3333 - 4.75 (8)	TP44.9126x44.8134x0.44 67	20.18	0.320	22.912	0.028	0.96	0.008	22.912	0.000
L9	4.75 - 0 (9)	TP45.72x44.9126x0.4425	20.45	0.322	23.184	0.028	0.96	0.008	23.184	0.000

Pole Interaction Design Data

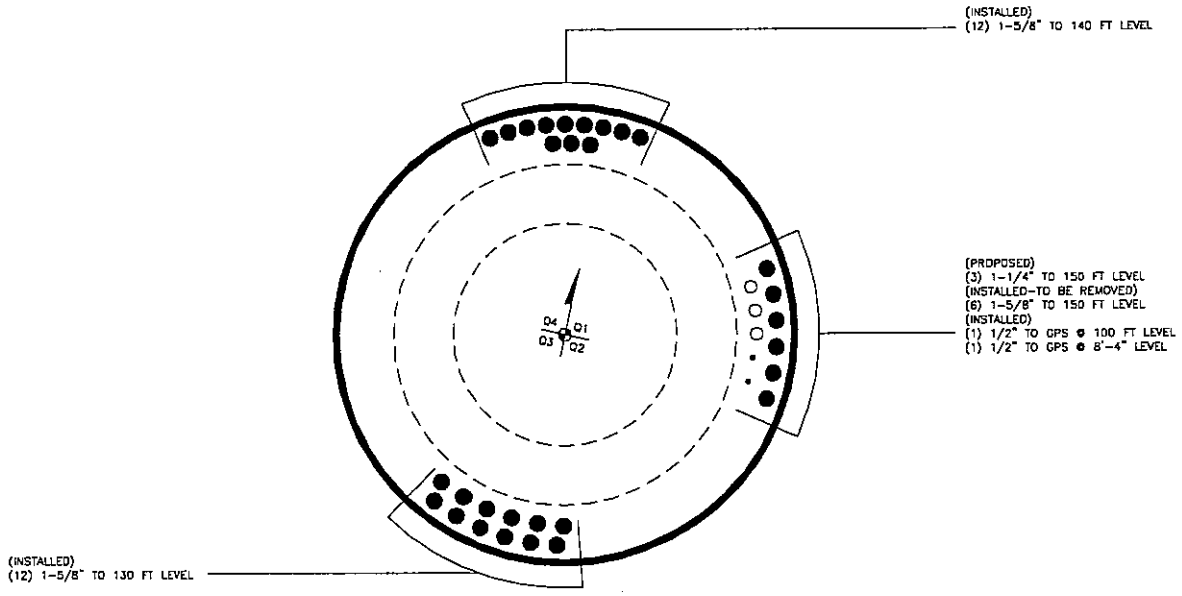
Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	148 - 117.25 (1)	0.012	0.717	0.000	0.065	0.000	0.730 ✔	1.333	H1-3+VT ✔
L2	117.25 - 97.25 (2)	0.011	0.998	0.000	0.048	0.001	1.010 ✔	1.333	H1-3+VT ✔
L3	97.25 - 80.75 (3)	0.008	0.701	0.000	0.029	0.000	0.709 ✔	1.333	H1-3+VT ✔
L4	80.75 - 40 (4)	0.011	0.945	0.000	0.029	0.000	0.956 ✔	1.333	H1-3+VT ✔
L5	40 - 13.25 (5)	0.013	1.036	0.000	0.028	0.000	1.050 ✔	1.333	H1-3+VT ✔
L6	13.25 - 12.75 (6)	0.014	1.046	0.000	0.028	0.000	1.060 ✔	1.333	H1-3+VT ✔
L7	12.75 - 5.3333 (7)	0.014	1.087	0.000	0.028	0.000	1.102 ✔	1.333	H1-3+VT ✔
L8	5.3333 - 4.75 (8)	0.014	1.073	0.000	0.028	0.000	1.087 ✔	1.333	H1-3+VT ✔
L9	4.75 - 0 (9)	0.014	1.079	0.000	0.028	0.000	1.094 ✔	1.333	H1-3+VT ✔

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
L1	148 - 117.25	Pole	TP27.227x22x0.1875	1	-6.69	755.23	54.8	Pass
L2	117.25 - 97.25	Pole	TP30.2515x26.2571x0.25	2	-9.47	1142.41	75.8	Pass
L3	97.25 - 80.75	Pole	TP33.056x30.2515x0.443	3	-11.67	2049.74	53.2	Pass
L4	80.75 - 40	Pole	TP39.483x31.4476x0.4385	4	-20.29	2447.21	71.7	Pass
L5	40 - 13.25	Pole	TP43.4677x37.7133x0.4502	5	-28.63	2845.69	78.8	Pass
L6	13.25 - 12.75	Pole	TP43.5527x43.4677x0.4516	6	-28.76	2827.21	79.5	Pass
L7	12.75 - 5.3333	Pole	TP44.8134x43.5527x0.4254	7	-30.56	2838.90	82.6	Pass
L8	5.3333 - 4.75	Pole	TP44.9126x44.8134x0.4467	8	-30.71	2888.05	81.6	Pass
L9	4.75 - 0	Pole	TP45.72x44.9126x0.4425	9	-31.92	2947.77	82.0	Pass
						Summary		
						Pole (L7)	82.6	Pass
						RATING =	**82.6**	**Pass**

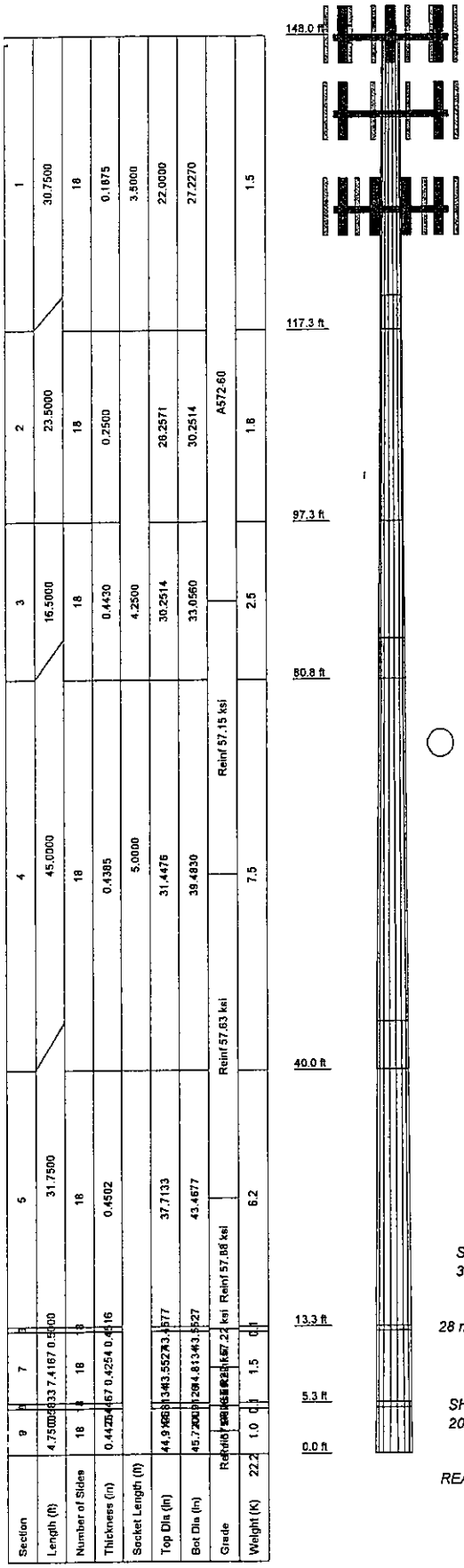
APPENDIX B

BASE LEVEL DRAWING

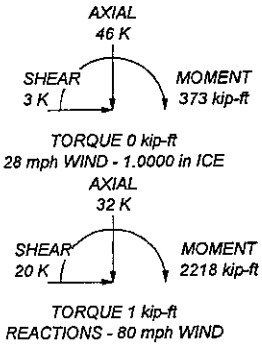

(INSTALLED)
(12) 1-5/8" TO 140 FT LEVEL
(PROPOSED)
(3) 1-1/4" TO 150 FT LEVEL
(INSTALLED-TO BE REMOVED)
(6) 1-5/8" TO 150 FT LEVEL
(INSTALLED)
(1) 1/2" TO GPS @ 100 FT LEVEL
(1) 1/2" TO GPS @ 8'-4" LEVEL
(INSTALLED)
(12) 1-5/8" TO 130 FT LEVEL
Q4
Q1
Q3
Q2

APPENDIX C

ADDITIONAL CALCULATIONS



Section	9	8	7	6	5	4	3	2	1
Length (ft)	4.7500	3.3333	7.4167	0.5000	31.7500	45.0000	16.5000	23.5000	30.7500
Number of Sides	18	18	18	18	18	18	18	18	18
Thickness (in)	0.4425	0.4467	0.4254	0.4516	0.4502	0.4385	0.4430	0.2500	0.1875
Socket Length (ft)						5.0000	4.2500		3.5000
Top Dia (in)	44.9268	43.5524	43.3577		37.7133	31.4476	30.2514	28.2571	22.0000
Bot Dia (in)	45.7200	44.8105	43.5527		43.4677	39.4930	33.0560	30.2514	27.2270
Grade	Reinf 57.22 ksi	Reinf 57.88 ksi	Reinf 57.22 ksi	Reinf 57.88 ksi	Reinf 57.88 ksi	Reinf 57.63 ksi	Reinf 57.15 ksi	A572-60	
Weight (K)	22.2	1.0	0.1	1.5	0.1	6.2	7.5	2.5	1.8	1.5



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
APXVSPP18-C-A20 w/ Mount Pipe	150	(2) LGP 17201	140
APXVSPP18-C-A20 w/ Mount Pipe	150	(2) LGP21901	140
APXVSPP18-C-A20 w/ Mount Pipe	150	(2) LGP21901	140
1900MHz RRH (25MHz)	150	(2) LGP21901	140
1900MHz RRH (25MHz)	150	T-Arm Mount [TA 602-3]	140
1900MHz RRH (25MHz)	150	(2) LPA-80080/6CF w/ Mount Pipe	130
(3) ACU-A20-N	150	(2) LPA-80080/6CF w/ Mount Pipe	130
(3) ACU-A20-N	150	BXA-171085-12BF-EDIN-2 w/ Mount Pipe	130
(3) ACU-A20-N	150	BXA-171085-12BF-EDIN-2 w/ Mount Pipe	130
800MHZ RRH	150	BXA-171085-12BF-EDIN-2 w/ Mount Pipe	130
800MHZ RRH	150	BXA-70080/6CF w/ Mount Pipe	130
800MHZ RRH	150	BXA-70080/6CF w/ Mount Pipe	130
800 EXTERNAL NOTCH FILTER	150	BXA-70080-6CF-EDIN-6 w/ Mount Pipe	130
800 EXTERNAL NOTCH FILTER	150	(2) LPA-80080-6CF-EDIN-6 w/ Mount Pipe	130
800 EXTERNAL NOTCH FILTER	150	(2) FD9R6004/2C-3L	130
Miscellaneous (NA507-1)	150	(2) FD9R6004/2C-3L	130
(2) DB980H90E-M w/ Mount Pipe	148	(2) FD9R6004/2C-3L	130
(2) DB980H90E-M w/ Mount Pipe	148	Platform Mount [LP 305-1]	130
(2) DB980H90E-M w/ Mount Pipe	148	Side Arm Mount [SO 701-1]	100
Platform Mount [LP 401-1]	148	KS24019-L112A	100
(2) 7770.00 w/ Mount Pipe	140		
(2) 7770.00 w/ Mount Pipe	140		
(2) 7770.00 w/ Mount Pipe	140		
(2) LGP 17201	140		
(2) LGP 17201	140		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-60	60 ksi	75 ksi	Reinf 57.22 ksi	57 ksi	72 ksi
Reinf 57.15 ksi	57 ksi	72 ksi	Reinf 59.22 ksi	59 ksi	75 ksi
Reinf 57.53 ksi	58 ksi	73 ksi	Reinf 57.28 ksi	57 ksi	65 ksi
Reinf 57.88 ksi	58 ksi	73 ksi	Reinf 57.96 ksi	58 ksi	73 ksi

TOWER DESIGN NOTES

1. Tower is located in Litchfield County, Connecticut.
2. Tower designed for a 80 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 28 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 82.6%

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Columbus, OH 43215
Phone: 614.221.6679
FAX: 614.448.4105

Job: *Ex. 148-ft Monopole / Horton 2 / Fredsall Property*		
Project: *PJF#37512-1619 / BU#876377*		
Client: Crown Castle	Drawn by: Lohengri Gimeno	App'd:
Code: TIA/EIA-222-F	Date: 06/06/12	Scale: NTS
Path: T:\875 Crown Castle\001\37512-1619 BU#876377A\37512-1619A Reinforced.er		Dwg No. E-1

Square, Stiffened / Unstiffened Base Plate, Any Rod Material - Rev. F /G

Assumptions: 1) Rod groups at corners. Total # rods divisible by 4. Maximum total # of rods = 48 (12 per Corner).
2) Rod Spacing = Straight Center-to-Center distance between any (2) adjacent rods (same corner)
3) Clear space between bottom of leveling nut and top of concrete **not** exceeding (1)*(Rod Diameter)

Site Data

BU#:
Site Name:
App #:

Anchor Rod Data		
Qty:	12	
Diam:	2.25	in
Rod Material:	A615-J	
Yield, Fy:	75	ksi
Strength, Fu:	100	ksi
Bolt Circle:	52	in
Anchor Spacing:	6	in

Plate Data		
W=Side:	51	in
Thick:	2.75	in
Grade:	55	ksi
Clip Distance:	8	in

Stiffener Data (Welding at both sides)		
Configuration:	Unstiffened	
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

Pole Data		
Diam:	45.72	in
Thick:	0.3125	in
Grade:	65	ksi
# of Sides:	18	"0" IF Round

Stress Increase Factor		
ASD ASIF:	1.333	

Base Reactions		
TIA Revision:	F	
Unfactored Moment, M:	2218	ft-kips
Unfactored Axial, P:	32	kips
Unfactored Shear, V:	20	kips

Anchor Rod Results

TIA F --> Maximum Rod Tension	167.9 Kips
Allowable Tension:	195.0 Kips
Anchor Rod Stress Ratio:	86.1% Pass

Base Plate Results Flexural Check

Base Plate Stress:	41.2 ksi
Allowable PL Bending Stress:	55.0 ksi
Base Plate Stress Ratio:	74.9% Pass

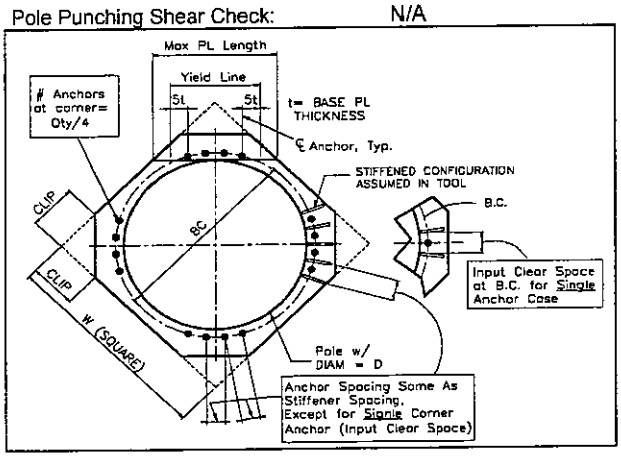
PL Ref. Data
Yield Line (in):
26.40
Max PL Length:
26.40

N/A - Unstiffened
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



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

PAUL J. FORD AND COMPANY
STRUCTURAL ENGINEERS
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Phone 614-221-6679 • Fax 614-448-4105 • www.PJFweb.com

Job Number: 37512-1619 A
Site Number: 876377
Site Name: Horton 2 / Fredsall Property

By: LGR
Date: 6/6/2012

DRILLED PIER SOIL AND STEEL ANALYSIS - TIA/EIA-222-F

Unfactored Base Reactions from RISA

	Comp. (+)	Tension (-)	
Moment, M =	2218.0		k-ft
Shear, V =	20.0		kips
Axial Load, P =	32.0		kips
OTM =	2228.0	0.0	k-ft @ Ground

Safety Factors / Load Factors / Φ Factors

Tower Type =	Monopole
ACI Code =	ACI 318-02
Seismic Design Category =	D
Reference Standard =	TIA/EIA-222-F
Use 1.3 Load Factor?	Yes
Load Factor =	1.30

Drilled Pier Parameters

Diameter =	6 ft
Height Above Grade =	0.5 ft
Depth Below Grade =	18.5 ft
fc' =	3 ksi
εc =	0.003 in/in
Mat Ftdn. Cap Width =	10 ft
Mat Ftdn. Cap Length =	10 ft
Depth Below Grade =	5.5 ft

	Safety Factor	Φ Factor
Soil Lateral Resistance =	2.00	0.75
Skin Friction =	2.00	0.75
End Bearing =	2.00	0.75
Concrete Wt. Resist Uplift =	1.25	

Load Combinations Checked per TIA/EIA-222-F

1. Ult. Skin Friction/2.00 + Ult. End Bearing/2.00 + Effective Soil Wt. - Buoyant Conc. Wt. ≥ Compression
2. Ult. Skin Friction/2.00 + Buoyant Conc. Wt./1.25 ≥ Uplift
3. Ult. Skin Friction/1.50 + Buoyant Conc. Wt./1.50 ≥ Uplift

Steel Parameters

Number of Bars =	16
Rebar Size =	#11
Rebar Fy =	60 ksi
Rebar MOE =	29000 ksi
Tie Size =	#5
Side Clear Cover to Ties =	3 in

Soil Parameters

Water Table Depth =	11.00 ft
Depth to Ignore Soil =	3.33 ft
Depth to Full Cohesion =	0 ft
Full Cohesion Starts at?	Ground

Above Full Cohesion Lateral Resistance = 4(Cohesion)(Dia)(H)
Below Full Cohesion Lateral Resistance = 8(Cohesion)(Dia)(H)

Maximum Capacity Ratios

Maximum Soil Ratio =	100.0%
Maximum Steel Ratio =	100.0%

Define Soil Layers

Note: Cohesion = Undrained Shear Strength = Unconfined Compressive Strength / 2

Layer	Thickness ft	Unit Weight pcf	Cohesion psf	Friction Angle degrees	Soil Type	Ultimate End Bearing psf	Comp. Ult. Skin Friction psf	Tension Ult. Skin Friction psf	Depth ft
1	3	100	0	0	Sand				3
2	8	140	0	38	Sand	8000			11
3	3	139	0	38	Sand	8000			14
4	4	160	0	40	Sand	12000			18
5	6	160	0	40	Sand	12000			24
6									
7									
8									
9									
10									
11									
12									

Soil Results: Overturning

Depth to COR =	13.29	ft, from Grade
Bending Moment, M =	2493.87	k-ft, from COR
Resisting Moment, Ma =	2832.27	k-ft, from COR

MOMENT RATIO = 88.1% OK

Shear, V =	20.00	kips
Resisting Shear, Va =	22.71	kips

SHEAR RATIO = 88.1% OK

Soil Results: Uplift

Uplift, T =	0.00	kips
Allowable Uplift Cap., Ta =	105.52	kips

UPLIFT RATIO = 0.0% OK

Soil Results: Compression

Compression, C =	32.00	kips
Allowable Comp. Cap., Ca =	430.33	kips

COMPRESSION RATIO = 7.4% OK

Steel Results (ACI 318-02):

Minimum Steel Area =	20.36	sq in
Actual Steel Area =	24.96	sq in
Allowable Min Axial, Pa =	-1036.80	kips, Where Ma = 0 k-ft
Allowable Max Axial, Pa =	4726.51	kips, Where Ma = 0 k-ft
Axial Load, P =	38.79	kips @ 5.50 ft Below Grade
Moment, M =	2279.64	k-ft @ 5.50 ft Below Grade
Allowable Moment, Ma =	2613.61	k-ft

MOMENT RATIO = 87.2% OK

Moment Capacity of Drilled Concrete Shaft (Caisson) for TIA Rev F or G

Note: Shaft assumed to have ties, not spiral, transverse reinforcing

Site Data

BU#: *876377*
Site Name: *Horton 2 / Fredsall Property*
App #:

Maximum Shaft Superimposed Forces		
TIA Revision:	F	
Max. Service Shaft M:	2279.64	ft-kips (* Note)
Max. Service Shaft P:	38.79	kips
Max Axial Force Type:	Comp.	

(*) Note: Max Shaft Superimposed Moment does not necessarily equal to the shaft top reaction moment

Enter Load Factors Below:		
For M (WL)	1.3	<— Enter Factor
For P (DL)	1.3	<— Enter Factor

Load Factor	Shaft Factored Loads		
1.30	Mu:	2963.532	ft-kips
1.30	Pu:	50.427	kips

Pier Properties

Concrete:

Pier Diameter =	6.0	ft
Concrete Area =	4071.5	in^2

Reinforcement:

Clear Cover to **Tie**=	3.00	in
Horiz. **Tie** Bar Size=	5	
Vert. Cage Diameter =	5.28	ft
Vert. Cage Diameter =	63.34	in
Vertical Bar Size =	11	
Bar Diameter =	1.41	in
Bar Area =	1.56	in^2
Number of Bars =	16	
As Total=	24.96	in^2
A s/ Aconc, Rho:	0.0061	0.61%

Material Properties

Concrete Comp. strength, f'c =	3000	psi
Reinforcement yield strength, Fy =	60	ksi
Reinforcing Modulus of Elasticity, E =	29000	ksi
Reinforcement yield strain =	0.00207	
Limiting compressive strain =	0.003	

ACI 318 Code

Select Analysis ACI Code= 2002

Seismic Properties

Seismic Design Category = D
Seismic Risk = **High**

Solve (Run) <-- Press Upon Completing All Input

ACI 10.5 , ACI 21.10.4, and IBC 1810.

Min As for Flexural, Tension Controlled, Shafts:

(3)*(Sqrt(f'c)/Fy:	0.0027	
200 / Fy:	0.0033	
IBC 1810.1.2:	0.0050	SDC D, E, or F
Governing:	0.0050	**0.50%**

ACI 10.8 and 10.9

Min As for Columns, Comp. Controlled, Shafts:

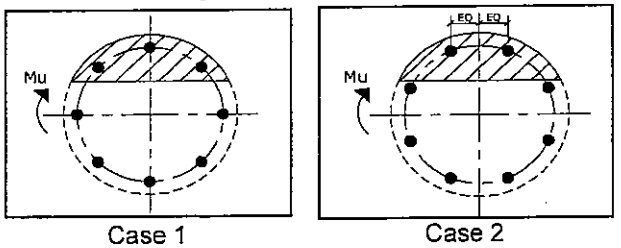
Min As: 0.0100 **1.00%**

Minimum Rho Check:

Actual Req'd Min. Rho:	0.50%	Flexural
Provided Rho:	0.61%	OK

Results:

Governing Orientation Case: **2**



Case 1 Case 2

Dist. From Edge to Neutral Axis: **12.24** in
Extreme Steel Strain, εt: **0.0134**
εt > 0.0050, Tension Controlled
Reduction Factor,φ: **0.900**

<-- Comment Box

Ref. Shaft Max Axial Capacities, ϕ Max(Pn or Tn):		
Max Pu = (φ=0.65) Pn.		
Pn per ACI 318 (10-2)	6144.47	kips
at Mu=(ϕ=0.65)Mn=	3192.16	ft-kips
Max Tu, (φ=0.9) Tn =	1347.84	kips
at Mu=ϕ=(0.90)Mn=	0.00	ft-kips

Output Note: Negative Pu=Tension

For Axial Compression, φ Pn = Pu:	50.43	kips
Drilled Shaft Moment Capacity, φMn:	**3397.68**	ft-kips
Drilled Shaft Superimposed Mu:	**2963.53**	ft-kips

(Mu/φMn, Drilled Shaft Flexure CSR: 87.22%

PAUL J. FORD AND COMPANY
STRUCTURAL ENGINEERS
250 East Broad Street • Suite 1500 • Columbus, Ohio 43215-3708

Date: **June 05, 2012**

James Williams
Crown Castle USA Inc.
3530 Toringdon Way, Suite 300
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Subject: **Structural Analysis Report**

Carrier Designation:	***Sprint PCS* Co-Locate**	
	Carrier Site Number:	CT33XC115
	Carrier Site Name:	N/A
Crown Castle Designation:	**Crown Castle BU Number:**	876377
	Crown Castle Site Name:	HORTON 2 / FREDSALL PROPERTY
	Crown Castle JDE Job Number:	189142
	Crown Castle Work Order Number:	498936
	Crown Castle Application Number:	151587 Rev. 0
Engineering Firm Designation:	**Paul J Ford and Company Project Number:**	37512-1619 B
Site Data:	**161 Pinney Street, COLEBROOK, Litchfield County, CT**	
	Latitude *41° 57' 58.57"*, Longitude *-73° 7' 19.65"*	
	148 Foot - Monopole Tower	

Dear James Williams,

Paul J Ford and Company 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 468185, in accordance with application 151587, revision 0.

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 I and Table II for the proposed and existing/reserved loading, respectively.

The structural analysis was performed for this tower in accordance with the requirements of TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures and 2005 CT State Building Code using a fastest mile wind speed of 80 mph with no ice, 28.1 mph with 1 inch ice thickness and 50 mph under service loads.

We at *Paul J Ford and Company* appreciate the opportunity of providing our continuing professional services to you and Crown Castle USA Inc.. If you have any questions or need further assistance on this or any other projects please give us a call.

Respectfully submitted by:

Lohengri Gimeno
Project Engineer

tnxTower Report - version 6.0.3.0

STATE OF CONNECTICUT
KEVIN P. BAUMAN
NO. 17891
LICENSED PROFESSIONAL ENGINEER

6-14-2012

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 148 ft Monopole tower designed by PJF in September of 2000 and manufactured by SUMMIT. The tower was originally designed for a wind speed of 85 mph per TIA/EIA-222-F.

2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures and 2005 CT State Building Code using a fastest mile wind speed of 80 mph with no ice, 28.1 mph with 1 inch ice thickness and 50 mph under service loads.

Table 1 - Proposed Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
150.0	148.0	1	tower mounts	Miscellaneous (NA507-1)	3	1-1/4	-
		3	alcatel lucent	1900MHz RRH (65MHz)			
		3	alcatel lucent	800 EXTERNAL NOTCH FILTER			
		3	alcatel lucent	800MHZ RRH			
		9	rfs celwave	ACU-A20-N			
		3	rfs celwave	APXVSPP18-C-A20 w/ Mount Pipe			

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
150.0	148.0	6	decibel	DB980H90E-M w/ Mount Pipe	6	1-5/8	3
		1	tower mounts	Platform Mount [LP 401-1]	-	-	1
140.0	140.0	6	powerwave technologies	7770.00 w/ Mount Pipe	12	1-5/8	1
		6	powerwave technologies	LGP 17201			
		6	powerwave technologies	LGP21901			
		1	tower mounts	T-Arm Mount [TA 602-3]			
130.0	130.0	3	antel	BXA-171085-12BF-EDIN-2 w/ Mount Pipe	-	-	2
		1	antel	BXA-70080-6CF-EDIN-6 w/ Mount Pipe			
		2	antel	BXA-70080/6CF w/ Mount Pipe			
		2	antel	LPA-80080-6CF-EDIN-6 w/ Mount Pipe			
		6	rfs celwave	FD9R6004/2C-3L			
		6	antel	LPA-185080/12CFx2 w/ Mount Pipe	-	-	3
		4	antel	LPA-80080/6CF w/ Mount Pipe	12	1-5/8	1
		1	tower mounts	Platform Mount [LP 305-1]			
100.0	102.0	1	lucent	KS24019-L112A	1	1/2	1
	100.0	1	tower mounts	Side Arm Mount [SO 701-1]			

Notes:
1) Existing Equipment
2) Reserved Equipment
3) Equipment to be Removed

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	SEA Cpmsultants, 99674.03-A, 09/05/2000	1532992	CCISITES
4-POST-MODIFICATION INSPECTION	PJF, 41708-0177_Record, 02/11/2009	2385953	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	PJF/Summit, 29200-1364/11163, 09/11/2000	1629428	CCISITES
4-TOWER MANUFACTURER DRAWINGS	PJF/Summit, 29200-1364/11163, 09/11/2000	1883532	CCISITES
4-TOWER STRUCTURAL ANALYSIS REPORTS	PJF, 41708-0177_Record, 02/11/2009	2385952	CCISITES

3.1) Analysis Method

tnxTower (version 6.0.3.0), 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) Monopole was reinforced in conformance with the referenced modification drawings.

This analysis may be affected if any assumptions are not valid or have been made in error. Paul J Ford and Company should be notified to determine the effect on the structural integrity of the tower.

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	148 - 117.25	Pole	TP27.227x22x0.1875	1	-6.46	755.23	47.3	Pass
L2	117.25 - 97.25	Pole	TP30.2515x26.2571x0.25	2	-9.09	1142.41	67.6	Pass
L3	97.25 - 80.75	Pole	TP33.056x30.2515x0.443	3	-11.22	2049.74	47.8	Pass
L4	80.75 - 40	Pole	TP39.483x31.4476x0.4385	4	-19.58	2447.21	65.6	Pass
L5	40 - 13.25	Pole	TP43.4677x37.7133x0.4502	5	-27.72	2845.69	72.7	Pass
L6	13.25 - 12.75	Pole	TP43.5527x43.4677x0.4516	6	-27.85	2827.21	73.4	Pass
L7	12.75 - 5.3333	Pole	TP44.8134x43.5527x0.4254	7	-29.59	2838.90	76.4	Pass
L8	5.3333 - 4.75	Pole	TP44.9126x44.8134x0.4467	8	-29.74	2888.05	75.4	Pass
L9	4.75 - 0	Pole	TP45.72x44.9126x0.4425	9	-30.92	2947.77	76.0	Pass
							Summary	
						Pole (L7)	76.4	Pass
						Rating =	76.4	Pass

Table 5 - Tower Component Stresses vs. Capacity – LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	76.9	Pass
1	Base Plate	0	69.3	Pass
1	Base Foundation Steel	0	80.8	Pass
1,2	Base Foundation Soil Interaction	0	81.7	Pass

Structure Rating (max from all components) =	81.7%

Notes:
1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity consumed.
2) According to the procedures prescribed and agreed to by the Crown Castle Engineering Foundation Committee, held in January 2010, the existing caisson foundation was analyzed using the methodology in the software 'PLS-Caisson' (Version 8.10, or newer, by Power Line Systems, Inc.). Per the methods in PLS-Caisson, the soil reactions of cohesive soils are calculated using 8CD independent of the depth of the soil layer. The depth of soil to be ignored at the top of the caisson is the greater of the geotechnical report's recommendation, the frost depth of the site or half of the caisson diameter.

APPENDIX A

TNXTOWER OUTPUT

Tower Input Data

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

Tower is located in Litchfield County, Connecticut.
Basic wind speed of 80 mph.
Nominal ice thickness of 1.0000 in.
Ice thickness is considered to increase with height.
Ice density of 56 pcf.
A wind speed of 28 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 50 mph.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.333.
Local bending stresses due to climbing loads, feedline supports, and appurtenance mounts are not considered.

Options

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

Tapered Pole Section Geometry

Section	Elevation	Section Length	Splice Length	Number of Sides	Top Diameter	Bottom Diameter	Wall Thickness	Bend Radius	Pole Grade
	ft	ft	ft		in	in	in	in	
L1	148.0000-117.2500	30.7500	3.50	18	22.0000	27.2270	0.1875	0.7500	A572-60 (60 ksi)
L2	117.2500-97.2500	23.5000	0.00	18	26.2571	30.2514	0.2500	1.0000	A572-60 (60 ksi)
L3	97.2500-80.7500	16.5000	4.25	18	30.2514	33.0560	0.4430	1.7721	Reinf 57.15 ksi (57 ksi)
L4	80.7500-40.0000	45.0000	5.00	18	31.4476	39.4830	0.4385	1.7538	Reinf 57.63 ksi (58 ksi)
L5	40.0000-13.2500	31.7500	0.00	18	37.7133	43.4677	0.4502	1.8009	Reinf 57.88 ksi (58 ksi)
L6	13.2500-12.7500	0.5000	0.00	18	43.4677	43.5527	0.4516	1.8063	Reinf 57.22 ksi (57 ksi)
L7	12.7500-5.3333	7.4167	0.00	18	43.5527	44.8134	0.4254	1.7017	Reinf 59.22 ksi (59 ksi)

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
L8	5.3333-4.7500	0.5833	0.00	18	44.8134	44.9126	0.4467	1.7867	Reinf 57.28 ksi (57 ksi)
L9	4.7500-0.0000	4.7500		18	44.9126	45.7200	0.4425	1.7699	Reinf 57.96 ksi (58 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/ft
L1	22.3394	12.9812	780.3007	7.7434	11.1760	69.8193	1561.6281	6.4918	3.5420	18.891
	27.6470	16.0919	1486.4203	9.5990	13.8313	107.4677	2974.7964	8.0475	4.4620	23.797
L2	27.2662	20.6366	1763.4297	9.2325	13.3386	132.2051	3529.1798	10.3203	4.1812	16.725
	30.7181	23.6062	2707.1425	10.6505	15.3677	176.1575	5417.8471	11.9053	4.8843	19.537
L3	30.7181	41.9159	4705.3765	10.5820	15.3677	306.1854	9416.9444	20.9619	4.5445	10.258
	33.5659	45.8596	6162.3812	11.5776	16.7924	366.9734	12332.871 1	22.9342	5.0381	11.372
L4	32.7033	43.1535	5242.4214	11.0082	15.9754	328.1568	10491.741 0	21.5809	4.7631	10.863
	40.0921	54.3360	10465.156 1	13.8608	20.0574	521.7613	20944.082 6	27.1731	6.1773	14.089
L5	39.2153	53.2488	9341.2437	13.2284	19.1583	487.5809	18694.778 9	26.6295	5.8452	12.983
	44.1382	61.4719	14371.544 6	15.2712	22.0816	650.8386	28761.999 6	30.7418	6.8579	15.232
L6	44.1382	61.6556	14413.590 2	15.2707	22.0816	652.7427	28846.146 2	30.8337	6.8555	15.181
	44.2245	61.7774	14499.193 0	15.3009	22.1248	655.3380	29017.464 5	30.8946	6.8705	15.214
L7	44.2245	58.2354	13684.454 2	15.3102	22.1248	618.5132	27386.914 8	29.1232	6.9165	16.258
	45.5047	59.9377	14919.993 3	15.7577	22.7652	655.3856	29859.618 8	29.9746	7.1384	16.779
L8	45.5047	62.9001	15642.411 7	15.7502	22.7652	687.1191	31305.406 2	31.4560	7.1010	15.898
	45.6054	63.0407	15747.518 4	15.7854	22.8156	690.2090	31515.757 8	31.5263	7.1185	15.937
L9	45.6054	62.4552	15604.208 7	15.7869	22.8156	683.9278	31228.949 8	31.2335	7.1258	16.104
	46.4253	63.5892	16469.708 5	16.0735	23.2258	709.1139	32961.088 2	31.8006	7.2680	16.425

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
L1 148.0000-117.2500				1	1	1		
L2 117.2500-97.2500				1	1	1		
L3 97.2500-80.7500				1	1	1		
L4 80.7500-40.0000				1	1	1		
L5 40.0000-13.2500				1	1	1		

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
L6 13.2500-12.7500				1	1	1		
L7 12.7500-5.3333				1	1	1		
L8 5.3333-4.7500				1	1	1		
L9 4.7500-0.0000				1	1	1		

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 plf
HB114-1-0813U4-M5J(1 1/4")	C	No	Inside Pole	148.0000 - 0.0000	3	No Ice	0.0000	1.20
						1/2" Ice	0.0000	1.20
						1" Ice	0.0000	1.20
						2" Ice	0.0000	1.20
						4" Ice	0.0000	1.20
***								
LCF158-50A(1-5/8")	C	No	Inside Pole	140.0000 - 0.0000	12	No Ice	0.0000	0.80
						1/2" Ice	0.0000	0.80
						1" Ice	0.0000	0.80
						2" Ice	0.0000	0.80
						4" Ice	0.0000	0.80
***								
LDF7-50A(1-5/8")	C	No	Inside Pole	130.0000 - 0.0000	12	No Ice	0.0000	0.82
						1/2" Ice	0.0000	0.82
						1" Ice	0.0000	0.82
						2" Ice	0.0000	0.82
						4" Ice	0.0000	0.82
***								
LDF4-50A(1/2")	C	No	Inside Pole	100.0000 - 0.0000	1	No Ice	0.0000	0.15
						1/2" Ice	0.0000	0.15
						1" Ice	0.0000	0.15
						2" Ice	0.0000	0.15
						4" Ice	0.0000	0.15
***								
LDF4-50A(1/2")	C	No	Inside Pole	8.2500 - 0.0000	1	No Ice	0.0000	0.15
						1/2" Ice	0.0000	0.15
						1" Ice	0.0000	0.15
						2" Ice	0.0000	0.15
						4" Ice	0.0000	0.15
**********								
Aero MP3-05	C	No	CaAa (Out Of Face)	99.5000 - 0.0000	1	No Ice	0.3478	0.00
						1/2" Ice	0.4001	0.00
						1" Ice	0.6566	0.00
						2" Ice	0.8788	0.00
						4" Ice	1.3232	0.00

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	148.0000-117.2500	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.45
L2	117.2500-97.2500	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.783	0.46
L3	97.2500-80.7500	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	5.739	0.38
L4	80.7500-40.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	14.173	0.94
L5	40.0000-13.2500	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	9.304	0.62
L6	13.2500-12.7500	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.174	0.01
L7	12.7500-5.3333	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	2.579	0.17
L8	5.3333-4.7500	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.203	0.01
L9	4.7500-0.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	1.652	0.11

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	148.0000-117.2500	A	1.181	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.45
L2	117.2500-97.2500	A	1.152	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	1.568	0.46
L3	97.2500-80.7500	A	1.126	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	11.296	0.38
L4	80.7500-40.0000	A	1.075	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	27.898	0.94
L5	40.0000-13.2500	A	1.000	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	18.007	0.62
L6	13.2500-12.7500	A	1.000	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.328	0.01
L7	12.7500-5.3333	A	1.000	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	4.869	0.17
L8	5.3333-4.7500	A	1.000	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.383	0.01

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
L9	4.7500-0.0000	A	1.000	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	3.119	0.11

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	148.0000-117.2500	0.0000	0.0000	0.0000	0.0000
L2	117.2500-97.2500	-0.0526	0.0304	-0.0961	0.0555
L3	97.2500-80.7500	-0.3992	0.2305	-0.6683	0.3859
L4	80.7500-40.0000	-0.4047	0.2336	-0.6883	0.3974
L5	40.0000-13.2500	-0.4101	0.2368	-0.7000	0.4042
L6	13.2500-12.7500	-0.4123	0.2380	-0.6951	0.4013
L7	12.7500-5.3333	-0.4128	0.2383	-0.6970	0.4024
L8	5.3333-4.7500	-0.4133	0.2386	-0.6990	0.4036
L9	4.7500-0.0000	-0.4137	0.2388	-0.7002	0.4043

Discrete Tower Loads

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
Platform Mount [LP 401-1]	C	None		0.0000	148.0000	No Ice	24.3300	24.3300	1.65
						1/2" Ice	30.2200	30.2200	2.03
						1" Ice	36.1100	36.1100	2.41
						2" Ice	47.8900	47.8900	3.18
						4" Ice	71.4500	71.4500	4.72
***									
APXVSPP18-C-A20 w/ Mount Pipe	A	From Face	4.0000 0.00 -2.00	0.0000	150.0000	No Ice	8.4975	6.9458	0.08
						1/2" Ice	9.1490	8.1266	0.15
						1" Ice	9.7672	9.0212	0.22
						2" Ice	11.0311	10.8440	0.41
						4" Ice	13.6786	14.8507	0.91
APXVSPP18-C-A20 w/ Mount Pipe	B	From Face	4.0000 0.00 -2.00	0.0000	150.0000	No Ice	8.4975	6.9458	0.08
						1/2" Ice	9.1490	8.1266	0.15
						1" Ice	9.7672	9.0212	0.22
						2" Ice	11.0311	10.8440	0.41
						4" Ice	13.6786	14.8507	0.91
APXVSPP18-C-A20 w/ Mount Pipe	C	From Face	4.0000 0.00 -2.00	0.0000	150.0000	No Ice	8.4975	6.9458	0.08
						1/2" Ice	9.1490	8.1266	0.15
						1" Ice	9.7672	9.0212	0.22
						2" Ice	11.0311	10.8440	0.41
						4" Ice	13.6786	14.8507	0.91

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			Vert ft						
			ft						
						4" Ice			
1900MHz RRH (65MHz)	A	From Face	4.0000	0.0000	150.0000	No Ice	2.6979	2.7708	0.06
			0.00			1/2" Ice	2.9362	3.0111	0.08
			-2.00			1" Ice	3.1832	3.2600	0.11
						2" Ice	3.7030	3.7837	0.18
						4" Ice	4.8463	4.9348	0.35
1900MHz RRH (65MHz)	B	From Face	4.0000	0.0000	150.0000	No Ice	2.6979	2.7708	0.06
			0.00			1/2" Ice	2.9362	3.0111	0.08
			-2.00			1" Ice	3.1832	3.2600	0.11
						2" Ice	3.7030	3.7837	0.18
						4" Ice	4.8463	4.9348	0.35
1900MHz RRH (65MHz)	C	From Face	4.0000	0.0000	150.0000	No Ice	2.6979	2.7708	0.06
			0.00			1/2" Ice	2.9362	3.0111	0.08
			-2.00			1" Ice	3.1832	3.2600	0.11
						2" Ice	3.7030	3.7837	0.18
						4" Ice	4.8463	4.9348	0.35
(3) ACU-A20-N	A	From Face	4.0000	0.0000	150.0000	No Ice	0.0778	0.1361	0.00
			0.00			1/2" Ice	0.1210	0.1890	0.00
			-2.00			1" Ice	0.1728	0.2506	0.00
						2" Ice	0.3025	0.3997	0.01
						4" Ice	0.6654	0.8015	0.04
(3) ACU-A20-N	B	From Face	4.0000	0.0000	150.0000	No Ice	0.0778	0.1361	0.00
			0.00			1/2" Ice	0.1210	0.1890	0.00
			-2.00			1" Ice	0.1728	0.2506	0.00
						2" Ice	0.3025	0.3997	0.01
						4" Ice	0.6654	0.8015	0.04
(3) ACU-A20-N	C	From Face	4.0000	0.0000	150.0000	No Ice	0.0778	0.1361	0.00
			0.00			1/2" Ice	0.1210	0.1890	0.00
			-2.00			1" Ice	0.1728	0.2506	0.00
						2" Ice	0.3025	0.3997	0.01
						4" Ice	0.6654	0.8015	0.04
800MHZ RRH	A	From Face	4.0000	0.0000	150.0000	No Ice	2.4899	2.0685	0.05
			0.00			1/2" Ice	2.7061	2.2705	0.07
			-2.00			1" Ice	2.9310	2.4812	0.10
						2" Ice	3.4068	2.9284	0.16
						4" Ice	4.4620	3.9265	0.32
800MHZ RRH	B	From Face	4.0000	0.0000	150.0000	No Ice	2.4899	2.0685	0.05
			0.00			1/2" Ice	2.7061	2.2705	0.07
			-2.00			1" Ice	2.9310	2.4812	0.10
						2" Ice	3.4068	2.9284	0.16
						4" Ice	4.4620	3.9265	0.32
800MHZ RRH	C	From Face	4.0000	0.0000	150.0000	No Ice	2.4899	2.0685	0.05
			0.00			1/2" Ice	2.7061	2.2705	0.07
			-2.00			1" Ice	2.9310	2.4812	0.10
						2" Ice	3.4068	2.9284	0.16
						4" Ice	4.4620	3.9265	0.32
800 EXTERNAL NOTCH	A	From Face	4.0000	0.0000	150.0000	No Ice	0.7701	0.3747	0.01

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
FILTER			0.00	-2.00			1/2" Ice	0.8898	0.4647	0.02
							1" Ice	1.0181	0.5634	0.02
							2" Ice	1.3007	0.7868	0.04
							4" Ice	1.9696	1.3372	0.11
800 EXTERNAL NOTCH FILTER	B	From Face	4.0000	-2.00	0.0000	150.0000	No Ice	0.7701	0.3747	0.01
			0.00				1/2" Ice	0.8898	0.4647	0.02
							1" Ice	1.0181	0.5634	0.02
							2" Ice	1.3007	0.7868	剔脈氈
							4" Ice	1.9696	1.3372	0.11
800 EXTERNAL NOTCH FILTER	C	From Face	4.0000	-2.00	0.0000	150.0000	No Ice	0.7701	0.3747	0.01
			0.00				1/2" Ice	0.8898	0.4647	0.02
							1" Ice	1.0181	0.5634	0.02
							2" Ice	1.3007	0.7868	0.04
							4" Ice	1.9696	1.3372	0.11
Miscellaneous (NA507-1)	C	From Face	4.0000	-2.00	0.0000	150.0000	No Ice	4.8000	4.8000	0.25
			0.00				1/2" Ice	6.7000	6.7000	0.29
							1" Ice	8.6000	8.6000	0.34
							2" Ice	12.4000	12.4000	0.44
							4" Ice	20.0000	20.0000	0.64
**										
**										
***										
(2) 7770.00 w/ Mount Pipe	A	From Face	4.0000	0.00	0.0000	140.0000	No Ice	6.1194	4.2543	0.06
			0.00				1/2" Ice	6.6258	5.0137	0.10
							1" Ice	7.1283	5.7109	0.16
							2" Ice	8.1643	7.1553	0.29
							4" Ice	10.3599	10.4117	0.66
(2) 7770.00 w/ Mount Pipe	B	From Face	4.0000	0.00	0.0000	140.0000	No Ice	6.1194	4.2543	0.06
			0.00				1/2" Ice	6.6258	5.0137	0.10
							1" Ice	7.1283	5.7109	0.16
							2" Ice	8.1643	7.1553	0.29
							4" Ice	10.3599	10.4117	0.66
(2) 7770.00 w/ Mount Pipe	C	From Face	4.0000	0.00	0.0000	140.0000	No Ice	6.1194	4.2543	0.06
			0.00				1/2" Ice	6.6258	5.0137	0.10
							1" Ice	7.1283	5.7109	0.16
							2" Ice	8.1643	7.1553	0.29
							4" Ice	10.3599	10.4117	0.66
(2) LGP 17201	A	From Face	4.0000	0.00	0.0000	140.0000	No Ice	1.9460	0.5180	0.03
			0.00				1/2" Ice	2.1337	0.6396	0.04
							1" Ice	2.3301	0.7699	0.06
							2" Ice	2.7488	1.0564	0.09
							4" Ice	3.6900	1.7331	0.19
(2) LGP 17201	B	From Face	4.0000	0.00	0.0000	140.0000	No Ice	1.9460	0.5180	0.03
			0.00				1/2" Ice	2.1337	0.6396	0.04
							1" Ice	2.3301	0.7699	0.06
							2" Ice	2.7488	1.0564	0.09
							4" Ice	3.6900	1.7331	0.19

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) LGP 17201	C	From Face	4.0000 0.00 0.00	0.0000	140.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.9460 2.1337 2.3301 2.7488 3.6900	0.5180 0.6396 0.7699 1.0564 1.7331	0.03 0.04 0.06 0.09 0.19
(2) LGP21901	A	From Face	4.0000 0.00 0.00	0.0000	140.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.2695 0.3432 0.4255 0.6160 1.1009	0.1838 0.2483 0.3216 0.4940 0.9425	0.01 0.01 0.01 0.02 0.07
(2) LGP21901	B	From Face	4.0000 0.00 0.00	0.0000	140.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.2695 0.3432 0.4255 0.6160 1.1009	0.1838 0.2483 0.3216 0.4940 0.9425	0.01 0.01 0.01 0.02 0.07
(2) LGP21901	C	From Face	4.0000 0.00 0.00	0.0000	140.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.2695 0.3432 0.4255 0.6160 1.1009	0.1838 0.2483 0.3216 0.4940 0.9425	0.01 0.01 0.01 0.02 0.07
T-Arm Mount [TA 602-3]	C	None		0.0000	140.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	11.5900 15.4400 19.2900 26.9900 42.3900	11.5900 15.4400 19.2900 26.9900 42.3900	0.77 0.99 1.21 1.64 2.50
***									
(2) LPA-80080/6CF w/ Mount Pipe	A	From Face	4.0000 0.00 0.00	0.0000	130.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.5639 5.1051 5.6116 6.6508 8.8342	10.7282 11.9896 12.9683 14.9795 19.2168	0.05 0.11 0.19 0.36 0.86
(2) LPA-80080/6CF w/ Mount Pipe	B	From Face	4.0000 0.00 0.00	0.0000	130.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.5639 5.1051 5.6116 6.6508 8.8342	10.7282 11.9896 12.9683 14.9795 19.2168	0.05 0.11 0.19 0.36 0.86
BXA-171085-12BF-EDIN-2 w/ Mount Pipe	A	From Face	4.0000 0.00 0.00	0.0000	130.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.9710 5.5211 6.0361 7.0911 9.3593	5.2283 6.3892 7.2610 9.0462 12.8165	0.04 0.08 0.14 0.27 0.67
BXA-171085-12BF-EDIN-2 w/ Mount Pipe	B	From Face	4.0000 0.00 0.00	0.0000	130.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.9710 5.5211 6.0361 7.0911 9.3593	5.2283 6.3892 7.2610 9.0462 12.8165	0.04 0.08 0.14 0.27 0.67
BXA-171085-12BF-EDIN-2	C	From Face	4.0000	0.0000	130.0000	No Ice	4.9710	5.2283	0.04

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
w/ Mount Pipe			0.00 0.00			1/2" Ice	5.5211 6.0361	6.3892 7.2610	0.08 0.14
						1" Ice	7.0911	9.0462	0.27
						2" Ice	9.3593	12.8165	0.67
						4" Ice			
BXA-70080/6CF w/ Mount Pipe	A	From Face	4.0000 0.00 0.00	0.0000	130.0000	No Ice 1/2" Ice	6.0736 6.6306	6.0983 7.2558	0.04 0.09
						1" Ice	7.1524	8.1258	0.16
						2" Ice	8.2495	9.9156	0.31
						4" Ice	10.7781	13.7095	0.75
BXA-70080/6CF w/ Mount Pipe	B	From Face	4.0000 0.00 0.00	0.0000	130.0000	No Ice 1/2" Ice	6.0736 6.6306	6.0983 7.2558	0.04 0.09
						1" Ice	7.1524	8.1258	0.16
						2" Ice	8.2495	9.9156	0.31
						4" Ice	10.7781	13.7095	0.75
BXA-70080-6CF-EDIN-6 w/ Mount Pipe	C	From Face	4.0000 0.00 0.00	0.0000	130.0000	No Ice 1/2" Ice	6.0062 6.5619	6.2035 7.3594	0.04 0.10
						1" Ice	7.0826	8.2293	0.16
						2" Ice	8.1672	10.0193	0.31
						4" Ice	10.6907	13.8398	0.75
(2) LPA-80080-6CF-EDIN-6 w/ Mount Pipe	C	From Face	4.0000 0.00 0.00	0.0000	130.0000	No Ice 1/2" Ice	4.5604 5.1019	10.7396 12.0018	0.05 0.11
						1" Ice	5.6085	12.9809	0.19
						2" Ice	6.6479	14.9930	0.36
						4" Ice	8.8318	19.2318	0.86
(2) FD9R6004/2C-3L	A	From Face	4.0000 0.00 0.00	0.0000	130.0000	No Ice 1/2" Ice	0.3665 0.4506	0.0846 0.1362	0.00 0.01
						1" Ice	0.5433	0.1965	0.01
						2" Ice	0.7546	0.3430	0.02
						4" Ice	1.2808	0.7396	0.06
(2) FD9R6004/2C-3L	B	From Face	4.0000 0.00 0.00	0.0000	130.0000	No Ice 1/2" Ice	0.3665 0.4506	0.0846 0.1362	0.00 0.01
						1" Ice	0.5433	0.1965	0.01
						2" Ice	0.7546	0.3430	0.02
						4" Ice	1.2808	0.7396	0.06
(2) FD9R6004/2C-3L	C	From Face	4.0000 0.00 0.00	0.0000	130.0000	No Ice 1/2" Ice	0.3665 0.4506	0.0846 0.1362	0.00 0.01
						1" Ice	0.5433	0.1965	0.01
						2" Ice	0.7546	0.3430	0.02
						4" Ice	1.2808	0.7396	0.06
Platform Mount [LP 305-1]	C	None		0.0000	130.0000	No Ice 1/2" Ice	18.0100 23.3300	18.0100 23.3300	1.12 1.35
						1" Ice	28.6500	28.6500	1.58
						2" Ice	39.2900	39.2900	2.05
						4" Ice	60.5700	60.5700	2.97
***									
Side Arm Mount [SO 701-1]	A	None		0.0000	100.0000	No Ice 1/2"	0.8500 1.1400	1.6700 2.3400	0.07 0.08

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
						Ice	1.4300	3.0100	0.09
						1" Ice	2.0100	4.3500	0.12
						2" Ice	3.1700	7.0300	0.18
						4" Ice			
KS24019-L112A	A	From Face	2.0000 0.00 2.00	0.0000	100.0000	No Ice	0.1556	0.1556	0.01
						1/2" Ice	0.2247	0.2247	0.01
						1" Ice	0.3025	0.3025	0.01
						2" Ice	0.4840	0.4840	0.02
						4" Ice	0.9506	0.9506	0.06

Tower Pressures - No Ice

G_H = 1.690

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg %	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
L1 148.0000-117.2500	132.2079	1.487	24	63.072	A	0.000	63.072	63.072	100.00	0.000	0.000
					B	0.000	63.072		100.00	0.000	0.000
					C	0.000	63.072		100.00	0.000	0.000
L2 117.2500-97.2500	107.0516	1.4	23	47.586	A	0.000	47.586	47.586	100.00	0.000	0.000
					B	0.000	47.586		100.00	0.000	0.000
					C	0.000	47.586		100.00	0.000	0.783
L3 97.2500-80.7500	88.8782	1.327	22	43.524	A	0.000	43.524	43.524	100.00	0.000	0.000
					B	0.000	43.524		100.00	0.000	0.000
					C	0.000	43.524		100.00	0.000	5.739
L4 80.7500-40.0000	60.1817	1.187	19	121.723	A	0.000	121.723	121.723	100.00	0.000	0.000
					B	0.000	121.723		100.00	0.000	0.000
					C	0.000	121.723		100.00	0.000	14.173
L5 40.0000-13.2500	26.3617	1	16	91.493	A	0.000	91.493	91.493	100.00	0.000	0.000
					B	0.000	91.493		100.00	0.000	0.000
					C	0.000	91.493		100.00	0.000	9.304
L6 13.2500-12.7500	12.9999	1	16	1.813	A	0.000	1.813	1.813	100.00	0.000	0.000
					B	0.000	1.813		100.00	0.000	0.000
					C	0.000	1.813		100.00	0.000	0.174
L7 12.7500-5.3333	9.0240	1	16	27.308	A	0.000	27.308	27.308	100.00	0.000	0.000
					B	0.000	27.308		100.00	0.000	0.000
					C	0.000	27.308		100.00	0.000	2.579
L8 5.3333-4.7500	5.0415	1	16	2.181	A	0.000	2.181	2.181	100.00	0.000	0.000
					B	0.000	2.181		100.00	0.000	0.000
					C	0.000	2.181		100.00	0.000	0.203
L9 4.7500-0.0000	2.3679	1	16	17.938	A	0.000	17.938	17.938	100.00	0.000	0.000
					B	0.000	17.938		100.00	0.000	0.000
					C	0.000	17.938		100.00	0.000	1.652

Tower Pressure - With Ice

G_H = 1.690

Section Elevation ft	z ft	K_z	q_z psf	t_z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1 148.0000-117.2500	132.2079	1.487	3	1.1812	69.126	A	0.000	69.126	69.126	100.00	0.000	0.000
						B	0.000	69.126		100.00	0.000	0.000
						C	0.000	69.126		100.00	0.000	0.000
L2 117.2500-97.2500	107.0516	1.4	3	1.1517	51.524	A	0.000	51.524	51.524	100.00	0.000	0.000
						B	0.000	51.524		100.00	0.000	0.000
						C	0.000	51.524		100.00	0.000	1.568
L3 97.2500-80.7500	88.8782	1.327	3	1.1262	46.621	A	0.000	46.621	46.621	100.00	0.000	0.000
						B	0.000	46.621		100.00	0.000	0.000
						C	0.000	46.621		100.00	0.000	11.296
L4 80.7500-40.0000	60.1817	1.187	2	1.0748	129.372	A	0.000	129.372	129.372	100.00	0.000	0.000
						B	0.000	129.372		100.00	0.000	0.000
						C	0.000	129.372		100.00	0.000	27.898
L5 40.0000-13.2500	26.3617	1	2	1.0000	96.285	A	0.000	96.285	96.285	100.00	0.000	0.000
						B	0.000	96.285		100.00	0.000	0.000
						C	0.000	96.285		100.00	0.000	18.007
L6 13.2500-12.7500	12.9999	1	2	1.0000	1.896	A	0.000	1.896	1.896	100.00	0.000	0.000
						B	0.000	1.896		100.00	0.000	0.000
						C	0.000	1.896		100.00	0.000	0.328
L7 12.7500-5.3333	9.0240	1	2	1.0000	28.544	A	0.000	28.544	28.544	100.00	0.000	0.000
						B	0.000	28.544		100.00	0.000	0.000
						C	0.000	28.544		100.00	0.000	4.869
L8 5.3333-4.7500	5.0415	1	2	1.0000	2.278	A	0.000	2.278	2.278	100.00	0.000	0.000
						B	0.000	2.278		100.00	0.000	0.000
						C	0.000	2.278		100.00	0.000	0.383
L9 4.7500-0.0000	2.3679	1	2	1.0000	18.729	A	0.000	18.729	18.729	100.00	0.000	0.000
						B	0.000	18.729		100.00	0.000	0.000
						C	0.000	18.729		100.00	0.000	3.119

Tower Pressure - Service

G_H = 1.690

Section Elevation ft	z ft	K_z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1 148.0000-117.2500	132.2079	1.487	10	63.072	A	0.000	63.072	63.072	100.00	0.000	0.000
					B	0.000	63.072		100.00	0.000	0.000
					C	0.000	63.072		100.00	0.000	0.000
L2 117.2500-97.2500	107.0516	1.4	9	47.586	A	0.000	47.586	47.586	100.00	0.000	0.000
					B	0.000	47.586		100.00	0.000	0.000
					C	0.000	47.586		100.00	0.000	0.783
L3 97.2500-80.7500	88.8782	1.327	8	43.524	A	0.000	43.524	43.524	100.00	0.000	0.000
					B	0.000	43.524		100.00	0.000	0.000
					C	0.000	43.524		100.00	0.000	5.739
L4 80.7500-40.0000	60.1817	1.187	8	121.723	A	0.000	121.723	121.723	100.00	0.000	0.000
					B	0.000	121.723		100.00	0.000	0.000
					C	0.000	121.723		100.00	0.000	14.173
L5 40.0000-13.2500	26.3617	1	6	91.493	A	0.000	91.493	91.493	100.00	0.000	0.000
					B	0.000	91.493		100.00	0.000	0.000
					C	0.000	91.493		100.00	0.000	9.304
L6 13.2500-12.7500	12.9999	1	6	1.813	A	0.000	1.813	1.813	100.00	0.000	0.000
					B	0.000	1.813		100.00	0.000	0.000

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
					C	0.000	1.813		100.00	0.000	0.174
L7 12.7500-5.3333	9.0240	1	6	27.308	A	0.000	27.308	27.308	100.00	0.000	0.000
					B	0.000	27.308		100.00	0.000	0.000
					C	0.000	27.308		100.00	0.000	2.579
L8 5.3333-4.7500	5.0415	1	6	2.181	A	0.000	2.181	2.181	100.00	0.000	0.000
					B	0.000	2.181		100.00	0.000	0.000
					C	0.000	2.181		100.00	0.000	0.203
L9 4.7500-0.0000	2.3679	1	6	17.938	A	0.000	17.938	17.938	100.00	0.000	0.000
					B	0.000	17.938		100.00	0.000	0.000
					C	0.000	17.938		100.00	0.000	1.652

Load Combinations

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

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	148 - 117.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-14.20	0.00	-1.84
			Max. Mx	11	-6.46	189.53	-1.18
			Max. My	8	-6.46	0.00	-190.66
			Max. Vy	11	-11.17	189.53	-1.18
			Max. Vx	8	11.16	0.00	-190.66
			Max. Torque	11			1.12
L2	117.25 - 97.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-17.91	0.03	-1.86
			Max. Mx	11	-9.09	469.46	-1.21
			Max. My	8	-9.09	0.02	-470.35
			Max. Vy	11	-12.71	469.46	-1.21
			Max. Vx	8	12.70	0.02	-470.35
			Max. Torque	11			1.12
L3	97.25 - 80.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-20.57	0.03	-1.85
			Max. Mx	11	-11.22	630.98	-1.23
			Max. My	8	-11.22	0.02	-631.75
			Max. Vy	11	-13.67	630.98	-1.23
			Max. Vx	8	13.67	0.02	-631.75
			Max. Torque	11			1.13
L4	80.75 - 40	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-30.85	0.03	-1.80
			Max. Mx	11	-19.58	1238.71	-1.27
			Max. My	8	-19.58	0.02	-1239.07
			Max. Vy	11	-16.63	1238.71	-1.27
			Max. Vx	8	16.62	0.02	-1239.07
			Max. Torque	11			1.19
L5	40 - 13.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-40.59	0.03	-1.75
			Max. Mx	11	-27.72	1799.25	-1.28
			Max. My	8	-27.72	0.01	-1799.28
			Max. Vy	11	-18.62	1799.25	-1.28
			Max. Vx	8	18.61	0.01	-1799.28
			Max. Torque	11			1.23
L6	13.25 - 12.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-40.74	0.03	-1.75
			Max. Mx	11	-27.85	1808.56	-1.28
			Max. My	8	-27.85	0.01	-1808.58
			Max. Vy	11	-18.64	1808.56	-1.28
			Max. Vx	8	18.63	0.01	-1808.58
			Max. Torque	11			1.23
L7	12.75 - 5.3333	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-42.81	0.03	-1.74
			Max. Mx	11	-29.59	1948.38	-1.28
			Max. My	8	-29.59	0.01	-1948.33
			Max. Vy	11	-19.08	1948.38	-1.28
			Max. Vx	8	19.07	0.01	-1948.33
			Max. Torque	11			1.24
L8	5.3333 - 4.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-42.98	0.03	-1.74
			Max. Mx	11	-29.74	1959.52	-1.28

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. My	8	-29.74	0.01	-1959.46
			Max. Vy	11	-19.11	1959.52	-1.28
			Max. Vx	8	19.10	0.01	-1959.46
			Max. Torque	11			1.25
L9	4.75 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-44.39	0.03	-1.74
			Max. Mx	11	-30.92	2050.93	-1.28
			Max. My	8	-30.92	0.01	-2050.82
			Max. Vy	11	-19.40	2050.93	-1.28
			Max. Vx	8	19.39	0.01	-2050.82
			Max. Torque	11			1.25

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	14	44.39	-0.00	0.00
	Max. H_x	11	30.93	19.38	-0.00
	Max. H_z	2	30.93	0.00	19.37
	Max. M_x	2	2048.27	0.00	19.37
	Max. M_z	5	2050.90	-19.38	-0.00
	Max. Torsion	11	1.25	19.38	-0.00
	Min. Vert	8	30.93	0.00	-19.37
	Min. H_x	5	30.93	-19.38	-0.00
	Min. H_z	8	30.93	0.00	-19.37
	Min. M_x	8	-2050.82	0.00	-19.37
	Min. M_z	11	-2050.93	19.38	-0.00
	Min. Torsion	5	-1.25	-19.38	-0.00

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	30.93	0.00	-0.00	1.19	0.01	0.00
Dead+Wind 0 deg - No Ice	30.93	-0.00	-19.37	-2048.27	0.01	-0.27
Dead+Wind 30 deg - No Ice	30.93	9.69	-16.78	-1774.11	-1025.56	0.40
Dead+Wind 60 deg - No Ice	30.93	16.79	-9.69	-1023.74	-1776.33	0.95
Dead+Wind 90 deg - No Ice	30.93	19.38	0.00	1.28	-2050.90	1.25
Dead+Wind 120 deg - No Ice	30.93	16.79	9.69	1026.29	-1776.34	1.22
Dead+Wind 150 deg - No Ice	30.93	9.69	16.78	1776.66	-1025.56	0.86
Dead+Wind 180 deg - No Ice	30.93	-0.00	19.37	2050.82	0.01	0.27
Dead+Wind 210 deg - No Ice	30.93	-9.69	16.78	1776.66	1025.59	-0.40
Dead+Wind 240 deg - No Ice	30.93	-16.79	9.69	1026.29	1776.36	-0.95
Dead+Wind 270 deg - No Ice	30.93	-19.38	0.00	1.28	2050.93	-1.25
Dead+Wind 300 deg - No Ice	30.93	-16.79	-9.69	-1023.74	1776.36	-1.22
Dead+Wind 330 deg - No Ice	30.93	-9.69	-16.78	-1774.11	1025.59	-0.86
Dead+Ice+Temp	44.39	0.00	-0.00	1.74	0.03	-0.00
Dead+Wind 0 deg+Ice+Temp	44.39	0.00	-3.05	-339.02	0.03	-0.07
Dead+Wind 30 deg+Ice+Temp	44.39	1.53	-2.64	-293.37	-170.57	0.09

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 60 deg+Ice+Temp	44.39	2.64	-1.53	-168.53	-295.47	0.23
Dead+Wind 90 deg+Ice+Temp	44.39	3.05	-0.00	2.00	-341.18	0.30
Dead+Wind 120 deg+Ice+Temp	44.39	2.64	1.53	172.54	-295.47	0.30
Dead+Wind 150 deg+Ice+Temp	44.39	1.53	2.64	297.38	-170.58	0.21
Dead+Wind 180 deg+Ice+Temp	44.39	0.00	3.05	343.07	0.03	0.07
Dead+Wind 210 deg+Ice+Temp	44.39	-1.53	2.64	297.38	170.64	-0.09
Dead+Wind 240 deg+Ice+Temp	44.39	-2.64	1.53	172.54	295.53	-0.23
Dead+Wind 270 deg+Ice+Temp	44.39	-3.05	-0.00	2.00	341.25	-0.30
Dead+Wind 300 deg+Ice+Temp	44.39	-2.64	-1.53	-168.53	295.53	-0.30
Dead+Wind 330 deg+Ice+Temp	44.39	-1.53	-2.64	-293.37	170.64	-0.21
Dead+Wind 0 deg - Service	30.93	-0.00	-7.57	-799.99	0.01	-0.10
Dead+Wind 30 deg - Service	30.93	3.79	-6.55	-692.73	-400.89	0.16
Dead+Wind 60 deg - Service	30.93	6.56	-3.78	-399.41	-694.38	0.37
Dead+Wind 90 deg - Service	30.93	7.57	-0.00	1.28	-801.70	0.49
Dead+Wind 120 deg - Service	30.93	6.56	3.78	402.00	-694.42	0.48
Dead+Wind 150 deg - Service	30.93	3.79	6.55	695.30	-400.89	0.34
Dead+Wind 180 deg - Service	30.93	-0.00	7.57	802.56	0.01	0.10
Dead+Wind 210 deg - Service	30.93	-3.79	6.55	695.30	400.92	-0.16
Dead+Wind 240 deg - Service	30.93	-6.56	3.78	402.00	694.45	-0.37
Dead+Wind 270 deg - Service	30.93	-7.57	-0.00	1.28	801.73	-0.49
Dead+Wind 300 deg - Service	30.93	-6.56	-3.78	-399.41	694.41	-0.48
Dead+Wind 330 deg - Service	30.93	-3.79	-6.56	-692.78	400.95	-0.34

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX	PY	PZ	PX	PY	PZ	% Error
	K	K	K	K	K	K	
1	0.00	-30.93	0.00	-0.00	30.93	0.00	0.001%
2	0.00	-30.93	-19.38	0.00	30.93	19.37	0.012%
3	9.69	-30.93	-16.78	-9.69	30.93	16.78	0.000%
4	16.79	-30.93	-9.69	-16.79	30.93	9.69	0.000%
5	19.39	-30.93	0.00	-19.38	30.93	-0.00	0.006%
6	16.79	-30.93	9.69	-16.79	30.93	-9.69	0.000%
7	9.69	-30.93	16.78	-9.69	30.93	-16.78	0.000%
8	0.00	-30.93	19.38	0.00	30.93	-19.37	0.012%
9	-9.69	-30.93	16.78	9.69	30.93	-16.78	0.000%
10	-16.79	-30.93	9.69	16.79	30.93	-9.69	0.000%
11	-19.39	-30.93	0.00	19.38	30.93	-0.00	0.006%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
12	-16.79	-30.93	-9.69	16.79	30.93	9.69	0.000%
13	-9.69	-30.93	-16.78	9.69	30.93	16.78	0.000%
14	0.00	-44.39	0.00	-0.00	44.39	0.00	0.003%
15	0.00	-44.39	-3.05	-0.00	44.39	3.05	0.001%
16	1.53	-44.39	-2.64	-1.53	44.39	2.64	0.001%
17	2.64	-44.39	-1.53	-2.64	44.39	1.53	0.001%
18	3.05	-44.39	0.00	-3.05	44.39	0.00	0.001%
19	2.64	-44.39	1.53	-2.64	44.39	-1.53	0.001%
20	1.53	-44.39	2.64	-1.53	44.39	-2.64	0.001%
21	0.00	-44.39	3.05	-0.00	44.39	-3.05	0.001%
22	-1.53	-44.39	2.64	1.53	44.39	-2.64	0.001%
23	-2.64	-44.39	1.53	2.64	44.39	-1.53	0.001%
24	-3.05	-44.39	0.00	3.05	44.39	0.00	0.001%
25	-2.64	-44.39	-1.53	2.64	44.39	1.53	0.001%
26	-1.53	-44.39	-2.64	1.53	44.39	2.64	0.001%
27	0.00	-30.93	-7.57	0.00	30.93	7.57	0.005%
28	3.79	-30.93	-6.56	-3.79	30.93	6.55	0.003%
29	6.56	-30.93	-3.78	-6.56	30.93	3.78	0.003%
30	7.57	-30.93	0.00	-7.57	30.93	0.00	0.005%
31	6.56	-30.93	3.78	-6.56	30.93	-3.78	0.001%
32	3.79	-30.93	6.56	-3.79	30.93	-6.55	0.003%
33	0.00	-30.93	7.57	0.00	30.93	-7.57	0.005%
34	-3.79	-30.93	6.56	3.79	30.93	-6.55	0.003%
35	-6.56	-30.93	3.78	6.56	30.93	-3.78	0.001%
36	-7.57	-30.93	0.00	7.57	30.93	0.00	0.005%
37	-6.56	-30.93	-3.78	6.56	30.93	3.78	0.003%
38	-3.79	-30.93	-6.56	3.79	30.93	6.56	0.001%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	6	0.00000001	0.00000001
2	Yes	15	0.00012320	0.00013070
3	Yes	20	0.00000001	0.00013296
4	Yes	20	0.00000001	0.00012778
5	Yes	16	0.00006177	0.00014794
6	Yes	20	0.00000001	0.00013598
7	Yes	20	0.00000001	0.00012949
8	Yes	15	0.00012324	0.00013106
9	Yes	20	0.00000001	0.00013014
10	Yes	20	0.00000001	0.00013557
11	Yes	16	0.00006177	0.00014795
12	Yes	20	0.00000001	0.00012743
13	Yes	20	0.00000001	0.00013367
14	Yes	6	0.00000001	0.00003874
15	Yes	16	0.00000001	0.00014854
16	Yes	17	0.00000001	0.00008807
17	Yes	17	0.00000001	0.00008807
18	Yes	17	0.00000001	0.00008204
19	Yes	17	0.00000001	0.00009021
20	Yes	17	0.00000001	0.00008996
21	Yes	17	0.00000001	0.00008291
22	Yes	17	0.00000001	0.00009000
23	Yes	17	0.00000001	0.00009019
24	Yes	17	0.00000001	0.00008206

25	Yes	17	0.00000001	0.00008809
26	Yes	17	0.00000001	0.00008815
27	Yes	15	0.00012714	0.00006261
28	Yes	16	0.00000001	0.00014827
29	Yes	16	0.00000001	0.00013275
30	Yes	15	0.00012720	0.00007856
31	Yes	17	0.00000001	0.00008298
32	Yes	16	0.00000001	0.00013767
33	Yes	15	0.00012726	0.00006307
34	Yes	16	0.00000001	0.00013953
35	Yes	17	0.00000001	0.00008226
36	Yes	15	0.00012720	0.00007857
37	Yes	16	0.00000001	0.00013182
38	Yes	17	0.00000001	0.00007913

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	148 - 117.25	31.059	33	1.8425	0.0073
L2	120.75 - 97.25	20.905	33	1.6480	0.0034
L3	97.25 - 80.75	13.579	33	1.2841	0.0018
L4	85 - 40	10.467	33	1.1401	0.0015
L5	45 - 13.25	3.008	33	0.6093	0.0006
L6	13.25 - 12.75	0.260	33	0.1897	0.0002
L7	12.75 - 5.3333	0.241	33	0.1827	0.0002
L8	5.3333 - 4.75	0.041	33	0.0742	0.0001
L9	4.75 - 0	0.033	33	0.0661	0.0001

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
150.0000	APXVSPP18-C-A20 w/ Mount Pipe	33	31.059	1.8425	0.0073	23506
148.0000	Platform Mount [LP 401-1]	33	31.059	1.8425	0.0073	23506
140.0000	(2) 7770.00 w/ Mount Pipe	33	27.985	1.8060	0.0060	14691
130.0000	(2) LPA-80080/6CF w/ Mount Pipe	33	24.223	1.7426	0.0045	6529
100.0000	Side Arm Mount [SO 701-1]	33	14.344	1.3235	0.0019	3511

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	148 - 117.25	79.159	8	4.6830	0.0187
L2	120.75 - 97.25	53.332	8	4.2007	0.0086
L3	97.25 - 80.75	34.662	8	3.2770	0.0047
L4	85 - 40	26.722	8	2.9104	0.0037
L5	45 - 13.25	7.684	10	1.5566	0.0015