1280 Route 46 West, Suite 9, Parsippany NJ, 07054

Ms. Melanie Bachman
Executive Director
CT Siting Council
10 Franklin Square
New Britain, CT 06051

Re: Notice of Exempt Modification Application
179 Shunpike Road, Cromwell, CT 06416

December 6, 2017

Dear Ms. Bachman:

Sprint Spectrum Realty Company, L.P. ("Sprint"), is submitting to the Connecticut Siting Council for a Notice of Exempt Modification for Proposed Modifications to an Existing Telecommunications Facility located at the above-referenced site. Sprint currently maintains 3 existing panel antenna and 3 remote radio units at the 170' level of the Tower. Sprint proposes to add 3 panel antennas and 6 remote radio units at 170' tower level as well as 2 fiber cable, 1 new battery string in a new ground based battery cabinet, and new 2.5 MHz radio equipment in a new ground based radio cabinet.

The earliest CT Siting Council approval for a Sprint Exempt Modification was approved on October 4, 2013. The building permit was approved on July 26, 2004 by the Cromwell Building Department. The structural and construction documents enclosed have been revised to reflect the current reality of the installations on the Tower.

If you have any questions, please feel free to contact me.

Thank you,

By: *Paul F. Sagristano*

Paul F. Sagristano
Cherundolo Consulting
917.841.0247
psagristano@lrivassoc.com

1280 Route 46 West, Suite 9, Parsippany NJ, 07054

Ms. Melanie Bachman
Executive Director
CT Siting Council
10 Franklin Square
New Britain, CT 06051

December 6, 2017

Re: Notice of Exempt Modification –
Existing Sprint Telecommunication Facility
179 Shunpike Road, Cromwell, CT 06416

Latitude : N41.62326
Longitude: W72.67934

Dear Ms. Bachman:

Sprint currently maintains 3 existing panel antenna and 3 remote radio units at the 170' level of the Tower. Sprint proposes to add 3 panel antennas and 6 remote radio units at 170' tower level as well as 2 fiber cable, 1 new battery string in a new ground based battery cabinet, and new 2.5 MHz radio equipment in a new ground based radio cabinet. Sprint is performing a new high-performance upgrade for cellular mobile communications. It is designed to increase the capacity and speed of mobile telephone networks.

The earliest CT Siting Council approval for a Sprint Exempt Modification was approved on October 4, 2013 and the original building permit was approved by the Cromwell Building Department on July 26, 2004. A copy of these approvals are attached.

Please accept this letter as notification to the Council, pursuant to R.C.S.A. Section 16-50j-73, for 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 is being sent to Enzo Faienza, Mayor for Cromwell, the property owner Stuart B. Popper, Director for Planning and Development for Cromwell and Michael Terenzio, the Fire Chief for Cromwell.
.
Attached is a summary of the planned modifications, including power density calculations reflecting the change in Sprint's operations at the site. Also included is documentation of the structural sufficiency of the tower with proposed modifications to accommodate the revised antenna configuration.

Existing Facility

The Fairfield facility is located at 179 Shunpike Road, Cromwell, CT, the Site coordinates are: N41. 62326, W – 72.67934. The facility is owned by the Town of Cromwell – Fire District, The existing facility consists of a 170' Self-Supporting Lattice Tower. Sprint currently operates wireless communications equipment on a concrete slab at the facility and has 3 antennas and 3 Remote Radio Heads mounted on at a centerline of 170' feet.

Statutory Considerations

The planned modifications to the facility fall within the activities explicitly provided for in R.C.S.A. 16-50j-72(b)(2)

1. The height of the overall structure will be unaffected.

2. The proposed changes will not require an extension of the property boundaries.

3. The proposed additions will not increase the noise level at the existing facility by

six decibels or more, or to levels that exceed state and/or local criteria

4. 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 Federal Communications Commission safety standard.

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

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

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

Respectfully submitted,

Paul F. Sagristano

Paul F. Sagristano
Charles Cherundolo Consulting
917-841-0247
psagristano@lrivassoc.com

PFS/mtf

Additional Recipients:
Town of Cromwell – Enzo Faienza, Mayor – Via Fed Ex
Town of Cromwell Fire District – Michael Terenzio – Fire Chief - Via Fed Ex
Town of Cromwell – Director of Planning and Development – Stuart Popper – Via Fed Ex

December 8,2017

Dear Customer:

The following is the proof-of-delivery for tracking number 770919200324.

Delivery Information:

Status:	Delivered	**Delivered to:**	Receptionist/Front Desk
Signed for by:	J.JONES	**Delivery location:**	1 WEST ST CROMWELL, CT 06416
Service type:	FedEx Express Saver	**Delivery date:**	Dec 7, 2017 16:09
Special Handling:	Deliver Weekday Direct Signature Required		

Shipping Information:

Tracking number:	770919200324	**Ship date:**	Dec 6, 2017
		Weight:	0.5 lbs/0.2 kg

Recipient:
Michael Terenzio
Town of Cromwell
One West St.
CROMWELL, CT 06416 US

Shipper:
Paul Sagristano
CCC
4 Davis Road West
Suite 5
OLD LYME, CT 06371 US

Reference
CT60XC931 CSC

Thank you for choosing FedEx.

December 7,2017

Dear Customer:

The following is the proof-of-delivery for tracking number 770919154192.

Delivery Information:

Status:	Delivered	**Delivered to:**	Receptionist/Front Desk
Signed for by:	L.DANAHER	**Delivery location:**	41 WEST ST 112 CROMWELL, CT 06416
Service type:	FedEx Express Saver	**Delivery date:**	Dec 7, 2017 14:43
Special Handling:	Deliver Weekday Direct Signature Required		

Shipping Information:

Tracking number:	770919154192	**Ship date:**	Dec 6, 2017
		Weight:	0.5 lbs/0.2 kg

Recipient:
Enzo Faienza
Town of Cromwell
41 West St.
CROMWELL, CT 06416 US

Shipper:
Paul Sagristano
CCC
4 Davis Road West
Suite 5
OLD LYME, CT 06371 US

Reference
CT60XC931 CSC

Thank you for choosing FedEx.

December 7,2017

Dear Customer:

The following is the proof-of-delivery for tracking number 770919174849.

Delivery Information:

Status:	Delivered	**Delivered to:**	Receptionist/Front Desk
Signed for by:	G.O CONNELL	**Delivery location:**	41 WEST ST 205 CROMWELL, CT 06416
Service type:	FedEx Express Saver	**Delivery date:**	Dec 7, 2017 14:46
Special Handling:	Deliver Weekday Direct Signature Required		

Shipping Information:

Tracking number:	770919174849	**Ship date:**	Dec 6, 2017
		Weight:	0.5 lbs/0.2 kg

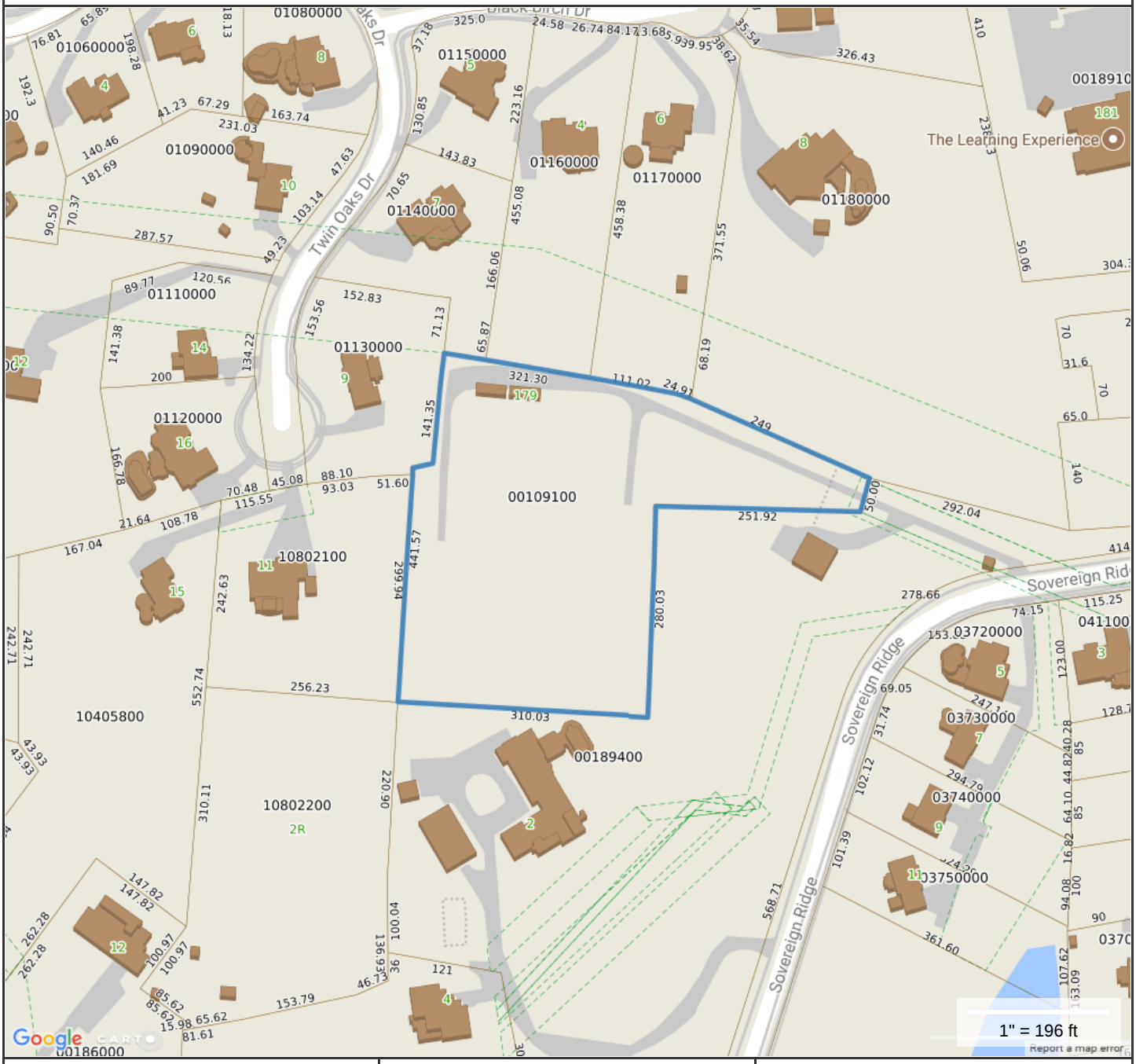
Recipient:
Stuart Popper, Planning Director
Town of Cromwell
41 West St.
CROMWELL, CT 06416 US

Shipper:
Paul Sagristano
CCC
4 Davis Road West
Suite 5
OLD LYME, CT 06371 US

Reference
CT60XC931 CSC

Thank you for choosing FedEx.

179 Shunpike Road



Property Information

Property ID	00109100
Location	179 SHUNPIKE ROAD
Owner	CROMWELL FIRE DISTRICT

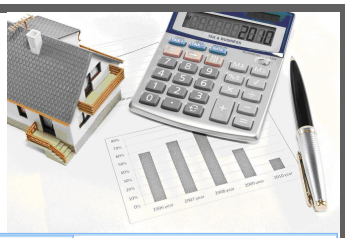
MAP FOR REFERENCE ONLY
NOT A LEGAL DOCUMENT

Town of Cromwell, CT makes no claims and no warranties, expressed or implied, concerning the validity or accuracy of the GIS data presented on this map.

Parcels updated 10/1/2016
Properties updated daily

NORTHEAST
REVALUATION GROUP LLC

Cromwell, CT



Disclaimer: This information is for tax assessing purposes and is not warranted

Parcel Identification

Map/Lot	00109110
Account	5812
State Code	920
Card	1/1

Assessment

Land	$700,000
Building	$199,500
Card Total	$285,000
Parcel Total	$1,285,000
Assessment(70%)	$899,500

Prior Assessments

Fiscal Year	Land Value	Building Value	Outbuilding Value	Total Value
2016	$140,000	$0	$453,110	$593,110
2015	$140,000	$0	$453,110	$593,110
2014	$140,000	$0	$453,110	$593,110
2013	$140,000	$0	$453,110	$593,110

Location and Owner

Location	179 SHUNPIKE ROAD
Owner	CROMWELL FIRE DISTRICT
Owner2	
Owner3	
Address	1 WEST STREET
Address2	
Address3	CROMWELL CT 06416

Building Information

Design	
Year Built	
Heat	
Fireplaces	0
Rooms	0
Bedrooms	0
Bathrooms	
Above Grade Living Area	0 SF

Sale Information

Sale Date	Sale Price	Legal Reference	Instrument
09/08/1881	$0	11-233	

Picture Not Available

Sketch Not Available

Building Sub Areas

Land Information

Yard Item(s)

Description	Quantity	Size	Year
Cell Site Carrier	1	1.00000	


Coles Rd
Edgewood Party Rentals
O'Leary's Digger
Mc Duffs Tvrn
Digger Mcduffs
3
SHUNPIKE
AUTO WASH &...
Mom and Pop's
Discount Liquors
The Learning Experience
Shunpike Rd
Court St
Google
Map data ©2017 Google

STATE OF CONNECTICUT
CONNECTICUT SITING COUNCIL
Ten Franklin Square, New Britain, CT 06051
Phone: (860) 827-2935 Fax: (860) 827-2950
E-Mail: siting.council@ct.gov
www.ct.gov/csc

October 4, 2013

Melanie Howlett
HPC Wireless Services
22 Shelter Rock Lane, Building C
Danbury, CT 06810

RE: **EM-SPRINT-033-130920** – Sprint Spectrum, L.P. notice of intent to modify an existing telecommunications facility located at 179 Shunpike Road, Cromwell, Connecticut.

Dear Ms. Howlett:

The Connecticut Siting Council (Council) hereby acknowledges your notice to modify this existing telecommunications facility, pursuant to Section 16-50j-73 of the Regulations of Connecticut State Agencies with the following conditions:

- Any deviation from the proposed modification as specified in this notice and supporting materials with the Council shall render this acknowledgement invalid;
- Any material changes to this modification as proposed shall require the filing of a new notice with the Council;
- Within 45 days after completion of construction, the Council shall be notified in writing that construction has been completed;
- The validity of this action shall expire one year from the date of this letter;
- The applicant may file a request for an extension of time beyond the one year deadline provided that such request is submitted to the Council not less than 60 days prior to the expiration;
- Prior to antenna installation, the tower modifications depicted on sheets SK-1 and SK-2 in Section 6 of the *Detailed Structural Analysis and Reinforcement of an Existing 170' Self Supporting Lattice Tower and Foundation for Proposed Antenna Arrangements* prepared by URS Corporation dated September 9, 2013, and stamped by Richard Sambor, shall be implemented; and
- Within 45 days following completion of the antenna installation, Sprint shall provide documentation certified by a professional engineer that its installation complied with the requirements of the structural analysis.

The proposed modifications including the placement of all necessary equipment and shelters within the tower compound are to be implemented as specified here and in your notice dated September 19, 2013. The modifications are in compliance with the exception criteria in Section 16-50j-72 (b) of the Regulations of Connecticut State Agencies as changes to an existing facility site that would not increase tower height, extend the boundaries of the tower site, increase noise levels at the tower site boundary by six decibels, and increase the total radio frequencies electromagnetic radiation power density measured at the tower site boundary to or above the standard adopted by the State Department of Environmental Protection pursuant to General Statutes § 22a-162. This facility has also been carefully modeled to ensure that radio frequency emissions are conservatively below State and federal standards applicable to the frequencies now used on this tower.

This decision is under the exclusive jurisdiction of the Council. Please be advised that the validity of this action shall expire one year from the date of this letter. Any additional change to this facility will require

explicit notice to this agency pursuant to Regulations of Connecticut State Agencies Section 16-50j-73. Such notice shall include all relevant information regarding the proposed change with cumulative worst-case modeling of radio frequency exposure at the closest point of uncontrolled access to the tower base, consistent with Federal Communications Commission, Office of Engineering and Technology, Bulletin 65. Thank you for your attention and cooperation.

Very truly yours,

Melanie A. Bachman
Acting Executive Director

MAB/CDM/cm

c: The Honorable Mertie Terry, First Selectman, Town of Cromwell
Frederic Curtin, Zoning Enforcement Officer, Town of Cromwell
Cromwell Fire District

HPC Wireless Services
22 Shelter Rock Lane.
Building C
Danbury, CT, 06810
P.: 203.797.1112

September 19, 2013

VIA OVERNIGHT COURIER

Connecticut Siting Council
10 Franklin Square
New Britain, Connecticut 06051
Attn: Ms. Melanie Bachman, Acting Executive Director

Re: Sprint Spectrum, L.P. – Exempt Modification
179 Shunpike Road, Cromwell, Connecticut

Dear Ms. Bachman:

This letter and attachments are submitted on behalf of Sprint Spectrum, L.P. ("Sprint"). Sprint is undertaking modifications to certain existing sites in its Connecticut system in order to implement updated technology. Please accept this letter and attachments as notification, pursuant to R.C.S.A. Section 16-50j-73, of construction that 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 attachments is being sent to the First Selectman of the Town of Cromwell.

Sprint plans to modify the existing wireless communications facility owned by the Town of Cromwell Fire District and located at 179 Shunpike Road, Cromwell, (coordinates 41°-37'-23.63" N, 72°-40'-44.5" W). Attached are plan and elevation drawings depicting the planned changes, and documentation of the structural sufficiency of the structure to accommodate the revised antenna configuration subject to modifications detailed in the attached structural documentation. Also included is a power density report reflecting the modification to Sprint's operations at the site.

The changes to the facility do not constitute a modification as defined in Connecticut General Statutes ("C.G.S.") Section 16-50i(d) because the general physical characteristics of the facility will not be significantly changed. Rather, the planned changes to the facility fall squarely within those activities explicitly provided for in R.C.S.A. Section 16-50j-72(b)(2).

1. Sprint will remove the existing six (6) CMDA antennas and add three (3) dual-band panel LTE antennas on the existing frame, at a centerline height of approximately 170'. Sprint will also install six (6) RRUs (remote radio heads) and three (3) Notch Filters on proposed tower mounts behind the antennas and attached to the existing frame, also at a centerline height of approximately 170'. During an interim period of up to one

year, the six (6) existing CDMA antennas will remain. Sprint will also install three (3) hybriflex cables along the existing coaxial cable run, and will remove the coaxial cable at the end of the interim period. The proposed modifications will not extend the height of the approximately 170' structure.

2. Sprint will replace related equipment, and place a new fiber/power junction box on a proposed H-frame, in the existing Equipment Room. The existing GPS antenna on the existing Ice Bridge Post will be replaced by another GPS antenna. These changes will have no effect on the site boundaries.

3. The proposed changes will not increase the noise level at the existing facility by six decibels or more. The incremental effect of the proposed changes will be negligible.

4. The changes to the facility 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. As indicated on the attached report prepared by EBI Consulting, Sprint's operations at the site will result in a power density of approximately 13.881%; the combined site operations will result in a total power density of approximately 58.321%.

Please contact me by phone at (203) 610-1071 or by e-mail at mjhowlett@optonline.net with questions concerning this matter. Thank you for your consideration.

Respectfully yours,

Melanie J. Howlett

Attachments

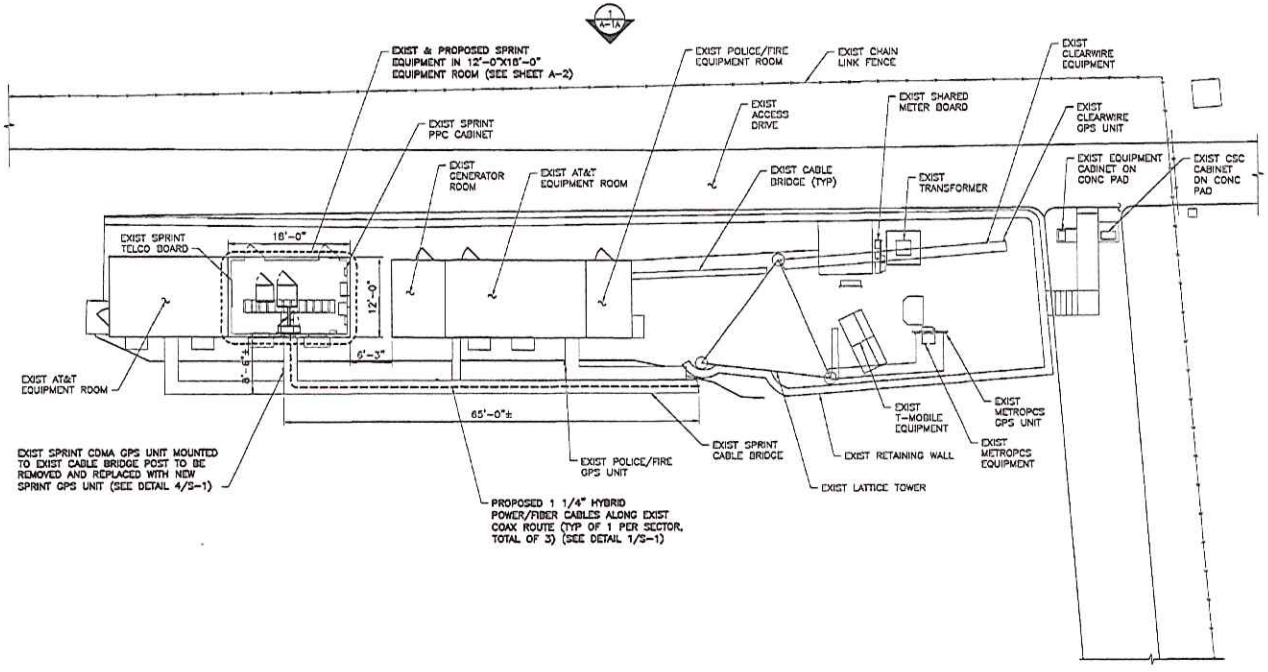
cc: Honorable Mertie Terry, First Selectman, Town of Cromwell
Town of Cromwell Fire District (underlying property owner)

N

NORTH NOTE:

NORTH SHOWN HAS BEEN ESTABLISHED USING THE USGS QUADRANGLE 7.5 MINUTE MAPS AND IS APPROXIMATE. VERIFY TRUE NORTH PRIOR TO INSTALLATION OF ANTENNAS.

TRUE



1/A-1A

1/A-1 SITE PLAN

SCALE: 1/8" = 1'-0"

Sprint
NETWORK VISION MEETS LAUNCH
1 INTERNATIONAL BLVD., SUITE 800
MAHWAH, NJ 07495
OFFICE:(201)684-4000
FAX:(201)648-4223

Alcatel-Lucent

HPC WIRELESS SERVICES

TECTONIC

TECTONIC Engineering & Surveying Consultants P.C.
1279 Route 300
Newburgh, NY 12550
Phone: (845) 567-4656
Fax: (845) 567-8703

SUBMITTALS

PROJECT NO: 6318.60-931

NO	DATE	DESCRIPTION	BY
0	9/27/12	FOR COMMENT	SL
1	12/05/12	PER COMMENTS	MJR
2	01/10/13	PER COMMENTS	DAC

SEAL

SITE NUMBER:
CT60XC931

SITE NAME:
CROMWELL - RT. 372

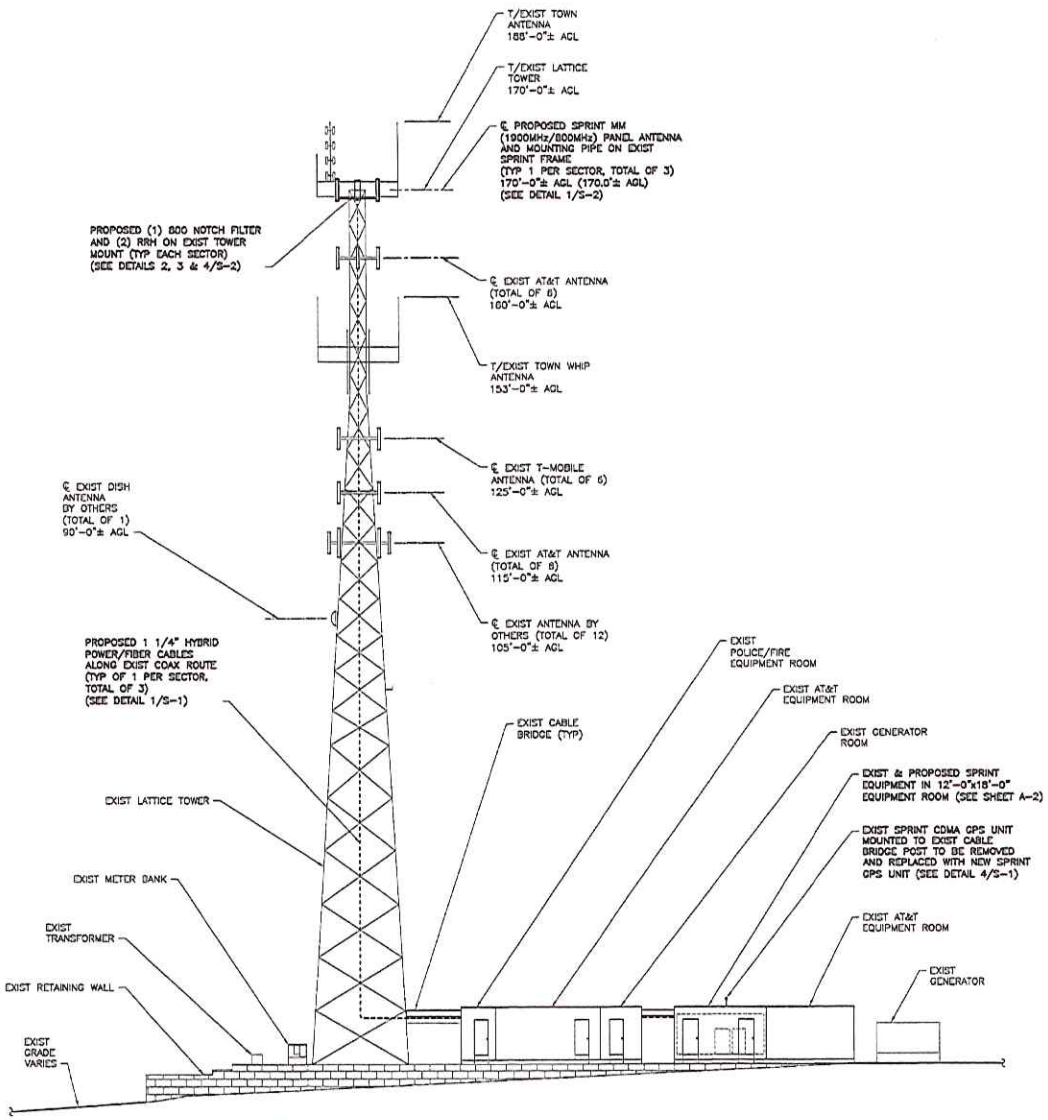
SITE ADDRESS:
179 SHUNPIKE ROAD
CROMWELL, CT 06416

SHEET TITLE:
SITE PLAN

SHEET NO:
A-1

NV_CT60XC931 CSC

THE PROPOSED INSTALLATION & EXISTING LATTICE TOWER SHALL BE ANALYZED BY URS CORPORATION (TO BE COORDINATED BY OTHERS).



1 A-1A ELEVATION
SCALE: 3/32" = 1'-0"

Sprint
NETWORK VISION MEETS LAUNCH
1 INTERNATIONAL BLVD., SUITE 800
MAHWAH, NJ 07495
OFFICE:(201)684-4000
FAX:(201)648-4223

Alcatel-Lucent
1 ROBBINS ROAD
WESTFORD, MA 01886
TEL:(978) 952-7000

HPC
WIRELESS SERVICES

TECTONIC
TECTONIC Engineering & Surveying Consultants P.C.
1279 Route 300
Newburgh, NY 12550
Phone: (845) 567-4535
Fax: (845) 567-4783
www.tectonicengineering.com

SUBMITTALS

PROJECT NO: 6318.60-931

NO	DATE	DESCRIPTION	BY
0	9/27/12	FOR COMMENT	SL
1	12/05/12	PER COMMENTS	MJR
2	01/10/13	PER COMMENTS	DAC

SEAL

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CT60XC931

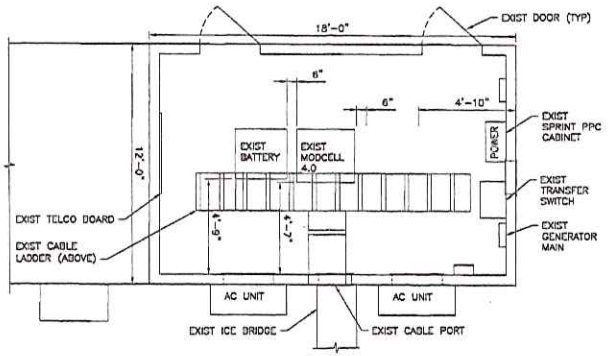
SITE NAME:
CROMWELL - RT. 372

SITE ADDRESS:
179 SHUNPIKE ROAD
CROMWELL, CT 06416

SHEET TITLE:
ELEVATION

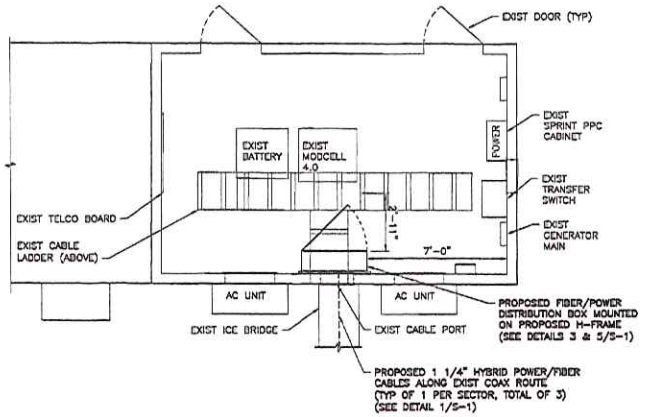
SHEET NO:
A-1A

NV_CT60XC931 CSC



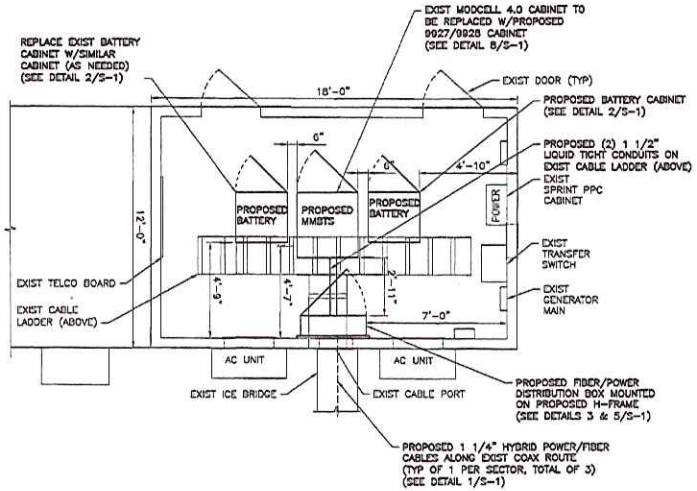
1 A-2 ENLARGED EQUIPMENT LAYOUT PLAN (EXIST)

SCALE: 3/8" = 1'-0"



2 A-2 ENLARGED EQUIPMENT LAYOUT PLAN (INTERIM)

SCALE: 3/8" = 1'-0"



3 A-2 ENLARGED EQUIPMENT LAYOUT PLAN (FINAL)

SCALE: 3/8" = 1'-0"

Sprint
NETWORK VISION MAKES IT LAUNCH
1 INTERNATIONAL BLVD., SUITE 800
MAHWAH, NJ 07495
OFFICE:(201)684-4000
FAX:(201)648-4223

Alcatel·Lucent
1 ROBBINS ROAD
WESTFORD, MA 01886
TEL:(978) 952-1900

HPC
WIRELESS SERVICES

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Fax: (845) 567-8703
www.tectonicengineering.com

SUBMITTALS

PROJECT NO: 6318.60-931

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2	01/10/13	PER COMMENTS	DAC

SEAL

SITE NUMBER:
CT60XC931

SITE NAME:
CROMWELL – RT. 372

SITE ADDRESS:
179 SHUNPIKE ROAD
CROMWELL, CT 06416

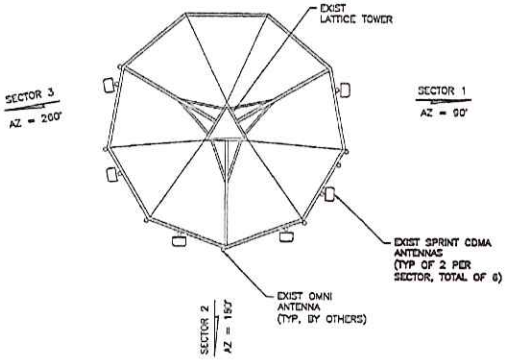
SHEET TITLE:
ENLARGED EQUIPMENT LAYOUT PLANS

SHEET NO:
A-2

NV_CT60XC931 CSC

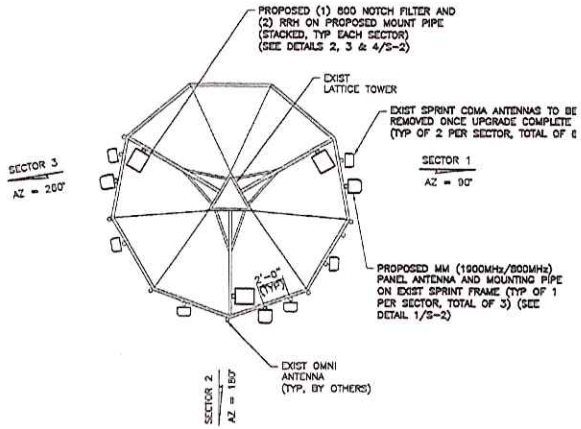
N

TRUE



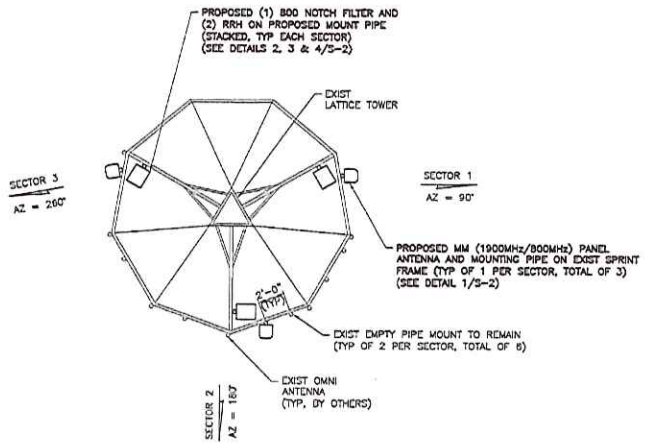
1 A-3 ANTENNA LAYOUT PLAN (EXIST)

SCALE: 1/4" = 1'-0"



2 A-3 ANTENNA LAYOUT PLAN (INTERIM)

SCALE: 1/4" = 1'-0"



3 A-3 ANTENNA LAYOUT PLAN (FINAL)

SCALE: 1/4" = 1'-0"

THE PROPOSED INSTALLATION & EXISTING LATTICE TOWER SHALL BE ANALYZED BY URS CORPORATION (TO BE COORDINATED BY OTHERS).

Sprint
NETWORK VISION MAKES LAUNCH
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Alcatel-Lucent
1 RIDGERS ROAD
WESTFORD, MA 01886
TEL:(978) 952-1000

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www.tectonicengineering.com

SUBMITTALS

PROJECT NO: 6318.60-931

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SEAL

SITE NUMBER:
CT60XC931

SITE NAME:
CROMWELL – RT. 372

SITE ADDRESS:
179 SHUNPIKE ROAD
CROMWELL, CT 06416

SHEET TITLE:
ANTENNA LAYOUT PLANS

SHEET NO:
A-3

NV_CT60XC931 CSC

DETAILED STRUCTURAL ANALYSIS AND REINFORCEMENT OF AN EXISTING 170' SELF SUPPORTING LATTICE TOWER AND FOUNDATION FOR PROPOSED ANTENNA ARRANGEMENTS

Sprint Site ID: CT60XC931
T-Mobile Site ID: CT11059C
Site Name: Cromwell - Route 372
Site Address: 179 Shunpike Road
Cromwell, CT

prepared for

Sprint

1 International Blvd.
Suite 800
Mahwah, NJ. 07495

T-Mobile

Northeast Site Solutions/T-Mobile
54 Main Street
Sturbridge, MA 01566

prepared by

URS

URS CORPORATION
500 ENTERPRISE DRIVE, SUITE 3B
ROCKY HILL, CT 06067
TEL. 860-529-8882

36922436
HPC-060 Rev. 1

September 9, 2013

TABLE OF CONTENTS

1. EXECUTIVE SUMMARY

This report summarizes the structural analysis and reinforcement of the existing 170' self supporting lattice tower located at 179 Shunpike Road in Cromwell, Connecticut. The analysis was conducted in accordance with the 2005 Connecticut State Building Code which requires a three second gust wind speed of 100 mph which converts to an 80 mph fastest mile per 2003 IBC (Table 1609.3.1) and the TIA/EIA-222-F standard for a wind velocity of 85 mph (fastest mile). The wind speed from the Connecticut State Building Code governs the design at 85 mph (fastest mile) and 74 mph (fastest mile) concurrent with ½ " ice. The antenna loading considered in the analysis consists of all existing and proposed antennas, transmission lines, and ancillary items as outlined in the Introduction Section of this report.

Proposed Antenna and Mount	Carrier	Antenna Center Elevation
Remove:		
(3) RFS APX16DWV-16DWVS-A20 Antennas **(3) RFS APX16DWV-16DWV-S Antennas** **(3) Andrew Twin AWS TMA's**	**T-Mobile (Existing)**	**@ 125'**
(3) CDMA Antennas	**Sprint (Existing)**	**@ 170'**
Install:		
(6) Ericsson AIR21 B4A/B2P Antennas **(1) 1 5/8 Hybrid Cable**	**T-Mobile (Existing)**	**@ 125'**
(3) APXVSPP18-C-A20 Antennas **(6) RRH's mounted behind Antennas** **(3) 800MHz Filter** **(3) RFS HB114-1-0804-MSF Hybrid Cables**	**Sprint (Proposed)**	**@ 170'**

The results of the analysis with modification indicates that the tower has the capacity to support the proposed loading conditions. **The tower and its foundation are considered structurally adequate once the modifications indicated on sheets SK-1 & SK-2 in Section 6 of this report are performed with the wind load classification specified above and the proposed antenna loading.**

This analysis is based on:

1) The tower structure's theoretical capacity, not including any assessment of the condition of the tower.
2) Tower geometry, structural member sizes, and Foundation information taken from a tower report prepared by PIROD Inc., ENG. File No. A-116398, dated November 18, 1999.
3) Foundation modification drawings prepared by Tectonic, dated May 5, 2004.
4) Existing inventory taken from a tower mapping and inventory prepared by Northeast Towers, Inc performed on February 9, 2012.
5) Structural analysis performed by URS Corp, project number CFD-006 / 36922435 signed and sealed April 10, 2012.
6) Structural analysis performed by URS Corp, project number CFD-003 / 36924489 signed and sealed May 29, 2012.
7) Structural analysis performed by URS Corp., project number HPC-060 / 36922436 signed and sealed on April 11, 2013.
8) Structural analysis performed by URS Corp., project number VZ5-133 (Rev. 2) / 36922291.00000 signed and sealed on May 20, 2013.
9) Structural analysis and tower modification performed by URS Corp. project number CFD-007 / 36928659, signed and sealed July 8, 2013.
10) Proposed additional antenna and mount configuration as specified in Section 2 of this report.

1. EXECUTIVE SUMMARY (continued)

This report is only valid as per the assumptions and data utilized in this report for antenna inventory, mounts and associated cables. The user of this report shall field verify the assumption of the antenna and mount configuration as well as the physical condition of the tower and connections. Notify the engineer in writing immediately if any of the information in this report is found to be other than specified.

If you should have any questions, please call.

Sincerely,

URS Corporation

Richard A. Sambor, P.E.
Senior Structural Engineer

RAS/mcd

2. INTRODUCTION

The subject tower is located at 179 Shunpike Road in Cromwell, Connecticut. The structure is a 170' self supporting lattice tower designed and manufactured by PiROD Inc.

The current inventory with proposed modification is summarized in the table below:

Antenna Type	*Carrier*	*Mount*	*Antenna Centerline Elevation*	*Cable*
(1) Tx Rx 101-90-08 antenna	Town (existing)	15' Mast pipe on 9 Arm Halo Mount	183'	(1) 7/8"
(1) 8 Bay Dipole (3" dia x 20')	Town (existing)	9 Arm Halo Mount	178'	(1) 7/8"
(1) 2 ½" dia x 20' Whip	Town (existing)	9 Arm Halo Mount	178'	(1) 1 1/2"
(3) 2 ½" dia x 15' Whip	Town (existing)	9 Arm Halo Mount	175'	(3) 7/8"
1 ½" dia x 12' Whip	Town (existing)	9 Arm Halo Mount	174'	(1) 7/8"
(3) RFS APXVSPP18-C-A20 Antennas (6) RRU RRH's (3) 800 MHz Filters	**Sprint (Proposed)**	9 Arm Halo Mount	**170'**	**(3) RFS HB114-1-0804-MSF Hybrid Cables**
(1) Radiowaves HPD2-4.7 w/ Radome (1) Cambium PTP49600 Antenna	CFD (existing)	Leg Mounted	168'	(1) WB3176A – Copper Clad Outdoor Cable (2) 4' 1/2" Jumper Cables
(1) SU-RA-HP-2.4 (1' x 1' Antenna)	Town (existing)	9 Arm Halo Mount	168'	(1) 3/8"
(6) Decibel 950G65VTZE-M antennas	Sprint (existing)	9 Arm Halo Mount	168'	(6) 1 5/8"
(3) APXV18-206517S	Unknown (existing)	Leg Mount	159'-6"	(6) 1 5/8"
(1) Sinclair SC420-HF1LDF Omni	CFD (existing)	Pipe mount	158'-6"	(1) 1 5/8" Low Density Foam Cable
(2) 3" dia x 20' Whip	Town (existing)	20' Platform	144'	(2) 7/8"
(1) 2 ½" x 20' Whip	Town (existing)	20' Platform	144'	(1) 1/2"
(1) 2" dia x 15' Whip	Town (existing)	20' Platform	141'	(1) 1/2"
(1) 1.5" dia x 10' Whip	Town (existing)	20' Platform	139'	(1) 1/2"
(1) 3.5" dia x 9' Whip	Town (existing)	20' Platform	138'6"	---
(3) Argus LLPX310R antennas (3) Samsung Remote Radio Heads U-RAS (3) Andrew VHLP2.5 Dish (2.5 dia) (1) Andrew VHLP2 dish (2' dia) Gamma Sector	Clearwire (existing)	20' Platform	134'	(6) CAT 5 Cable (4) 1/2"
(6) Ericsson AIR21 B4A/B2P Antennas	**T-Mobile (Proposed)**	Same as Below	**125'**	**(1) 1 5/8" Hybrid Cable**
(3) Twin PCS TMA's	T-Mobile (existing)	(3) T-Frames	125'	(18) 1 5/8"
(6) Powerwave 7770 (12) TMA's (3) KMW AM-X-CD-16-65-00T-RET (6) RRU (1) Surge Suppressor	AT&T (existing)	(3) T-Frames	115'	(12) 1 5/8" (3) Optic Fiber & (6) DC Cables (Located within 3" dia Flex Conduit)

Antenna Type	Carrier	Mount	Antenna Centerline Elevation	Cable
(2) SWCP 2x5514 antennas, (1) BXA-70063-6CF-2 Antenna (Beta Sector) (6) SC-E 6014 Rev 2 antennas, (3) BXA-171063-12BF _2 antennas, (6) FD9R6004/2C-3L Diplexers	Verizon (existing)	(3) T-Frames (PiROD part #800093)	101'	(12) 1 5/8"
(1) 3" x 2" x 22" Panel (1) TMA	AT&T (existing)	Pipe Mount	87'	(2) CAT 5
(1) 3' Dish (1) TMA	AT&T (existing)	3' Stand-off	83'	(2) CAT 5
(1) 3" x 2" x 22" Panel (1) TMA	AT&T (existing)	3' Stand-off	80'	(2) CAT 5
(1) Camera	Unknown (existing)	Leg Mounted	30'	(2) 1/2" (estimated from photographs)
(1) 3' Yagi	Unknown (existing)	Leg Mounted	24'	(1) 1/2"

This structural analysis of the communications tower was performed by URS Corporation (URS) for Sprint and T-Mobile. The purpose of this analysis was to investigate the structural integrity of the modified tower with its existing and proposed antenna loads. This analysis was conducted to evaluate stress on the tower and the effect of forces to the foundation of the tower resulting from existing and proposed antenna arrangements.

3. ANALYSIS METHODOLOGY AND LOADING CONDITIONS

The structural analysis was done in accordance with the Connecticut State Building Code, TIA/EIA-222-F - Structural Standard for Steel Antenna Towers and Antenna Supporting Structures, and the American Institute of Steel Construction (AISC) Manual of Steel Construction – Allowable Stress Design (ASD).

The analysis was conducted using TNX Tower 6.0. Two load conditions were evaluated as shown below which were compared to allowable stresses according to AISC and TIA/EIA.

Basic Wind Speed:

- Middlesex County; v = **85** mph (fastest mile) [Section 16 of TIA/EIA-222-F-1996]
- Cromwell; v = 100mph (3 second gust) equivalent to 80mph (fastest mile) [Appendix K, 2005 Connecticut State Building Code Supplement]

Loading Cases:

Load Condition 1 = 85 mph (fastest mile) Wind Load (without ice) + Tower Dead Load
Load Condition 2 = 74 mph (fastest mile) Wind Load (with ice) + Ice Load + Tower Dead Load

Please note that wind pressure is a function of velocity squared. Under Load Condition 2, a 25 percent reduction in wind pressure is allowed by code to account for the unlikelihood of the full wind pressure and ice load occurring at the same time. The same results may be achieved by utilizing a lower wind pressure without taking the 25 percent reduction, as shown above.

The TIA/EIA standard permits a one-third increase in allowable stresses for towers and monopoles less than 700 feet tall. For the purposes of this analysis, in computing the load capacity the allowable stresses of the tower members were increased by one-third.

4. FINDINGS AND EVALUATION

Stresses on the tower structure and foundation were evaluated to compare with allowable stresses in accordance with AISC. The results of the analysis indicate that the calculated stresses on the structure with the proposed loading are within the allowable stresses. Additionally, the anchor bolts were found to be within the allowable limits.

TABLE 1: Tower Component Stress vs. Capacity Summary:

Component/ (Section No.)	Existing Component Size	Controlling Component/Elevation	Percent Capacity	Pass/Fail
Tower Leg (T8)	PiROD Truss Leg	Compression 40' – 60'	**97.1%**	**Pass**
Diagonal (T4)	L3x3x3/16	Compression 100' – 120'	**96.0%**	**Pass**
Top Girt (T2)	L3x3x3/16	Compression 140'-150'	**2.0%**	**Pass**
Bottom Girt (T1)	7/8" SR	Compression 150'-170'	**4.6%**	**Pass**
Mid Girt (T4)	L3x3x3/16	Compression 100'-120'	**30.1%**	**Pass**
Bolt Checks				
Anchor Bolts	(6) 1-1/4"	Tension	**84.0%**	**Pass**

TABLE 2: Foundation Summary

Foundation	Component	Stress (% capacity/FOS)	Pass/Fail	Comments:
Drilled Concrete Caisson	Uplift	97.9%/2.04	**Pass**	Min. F.O.S of 2.0 req'd per IBC 2003 Section 3108.4.2

5. CONCLUSIONS AND RECOMMENDATIONS

The results of the analysis indicate that the modified tower structure has the capacity to support the proposed loading conditions. **The tower and its foundation are considered structurally adequate once the modifications indicated on sheets SK-1 & SK-2 in Section 6 of this report are performed with the wind load classification specified above and the proposed antenna loading.**

Limitations/Assumptions:

This report is based on the following:

1. Tower inventory as listed in this report.
2. Tower is properly installed and maintained.
3. All members are as specified in the original design documents and are in good condition.
4. All required members are in place.
5. All bolts are in place and are properly tightened.
6. Tower is in plumb condition.
7. All member protective coatings are in good condition.
8. All tower members were properly designed, detailed, fabricated, and installed and have been properly maintained since erection.
9. Foundations were properly constructed to support original design loads as specified in the original design documents.
10. All coaxial cable is installed as specified in Section 6 of this report.

URS is not responsible for any modifications completed prior to or hereafter in which URS is not or was not directly involved. Modifications include but are not limited to:

A. Adding antennas
B. Removing/replacing antennas
C. Adding coaxial cables

URS hereby states that this document represents the entire report and that it assumes no liability for any factual changes that may occur after the date of this report. All representations, recommendations, and conclusions are based upon information contained and set forth herein. If you are aware of any information which conflicts with that which is contained herein, or you are aware of any defects arising from original design, material, fabrication, or erection deficiencies, you should disregard this report and immediately contact URS. URS disclaims all liability for any representation, recommendation, or conclusion not expressly stated herein.

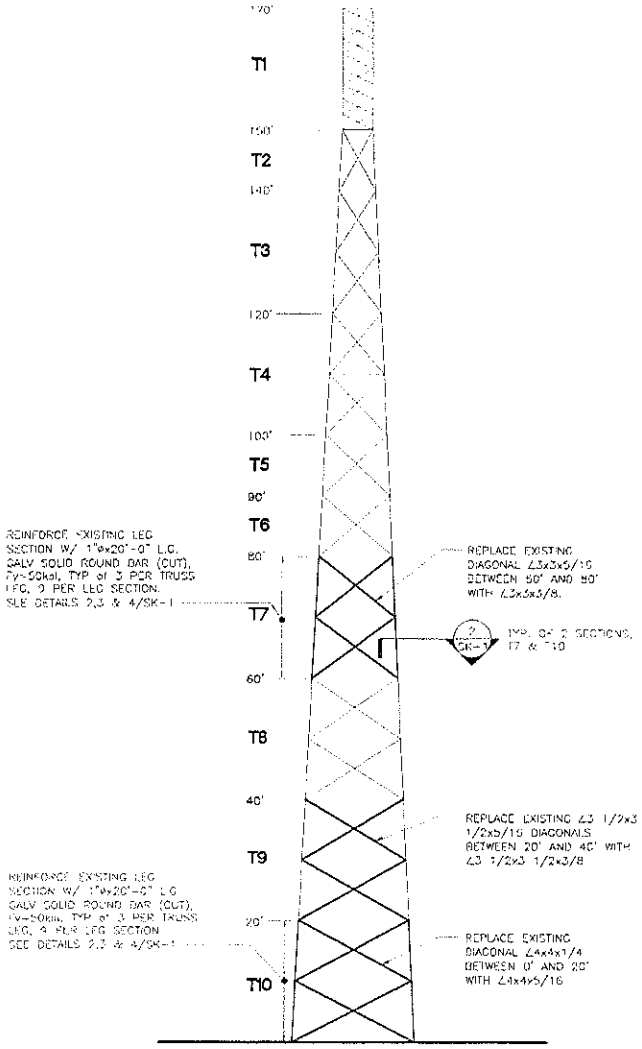
Ongoing and Periodic Inspection and Maintenance:

After the Contractor has successfully completed the installation and the work has been accepted, the owner will be responsible for the ongoing and periodic inspection and maintenance of the tower.

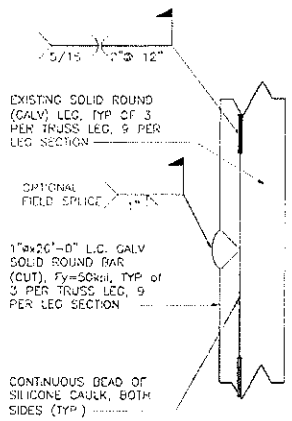
The owner shall refer to TIA/EIA-222-F for recommendations for maintenance and inspection. The frequency of the inspection and maintenance intervals is to be determined by the owner based upon actual site and environmental conditions. It is recommended that a complete and thorough inspection of the entire tower structural system be performed at least yearly and more frequently as conditions warrant. According to TIA/EIA-222-F section 14.1, Note 1: It is recommended that the structure be inspected after severe wind and/or ice storms or other extreme loading conditions.

6. DRAWINGS AND DATA

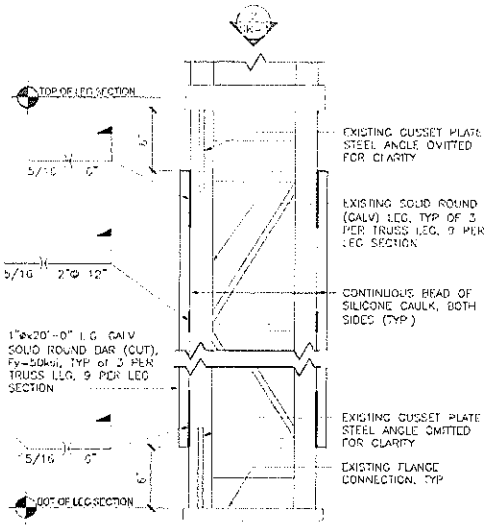
TOWER REINFORCEMEDNT DRAWING SK-1 & SK-2



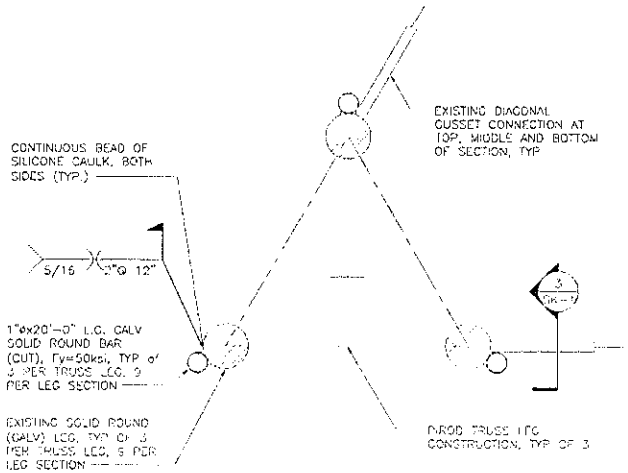
1 SK-1 **TOWER REINFORCEMENT**
SCALE: 1" = 10'-0"



4 SK-1 **SPLICE DETAIL**
SCALE: NTS



3 SK-1 **TRUSS LEG REINFORCEMENT**
SCALE: 1 1/2" = 1'-0"



2 SK-1 **TRUSS LEG REINFORCEMENT**
SCALE: NTS

ORS CORPORATION AES
500 ENTERPRISE DRIVE
ROCKY HILL, CONNECTICUT
1-(860)-529-8882

Sprint
1 INTERNATIONAL BLVD
SUITE 800
MAHWAH, NJ 07495

T-Mobile
NORTHEAST SITE SOLUTIONS-MIDDLE
54 MAIN STREET
STURBRIDGE, MA 01566

ARC SEAL

ORS PROJECT NUMBER: 36925004 (MPC-060) | DRAWN BY: MDO

NO.	DATE	ISSUED FOR
3	9/9/13	MPC-060 MDO

CHECKED BY | DATE

CT60XC931
CT11059C

179 SHUNPIKE ROAD
CROMWELL, CT

SHEET TITLE
REINFORCEMENT DETAILS

SHEET NUMBER
SK-1

STRUCTURAL NOTES

TOWER DESIGN CRITERIA

THIS TOWER IS DESIGNED AND REINFORCED IN ACCORDANCE WITH THE 2005 CONNECTICUT STATE BUILDING CODE, THE TIA/EIA-222-F FOR 90 MPH (FASTEST MILE) WIND SPEED CONCURRENT WITH 1/2" RADIAL ICE. ALLOWABLE STEEL STRESSES PER AISC ASD 9TH EDITION.

MATERIAL SPECIFICATIONS FOR REINFORCEMENT OF TOWER

STRUCTURAL STEEL, PLATES, ANGLES	ASTM A572 GRADE 50
SOLID ROUND (S.R.)	ASTM A572 GRADE 50
PIPE COLUMNS	ASTM A53 GRADE B
TUBE COLUMNS F=46 KSI	ASTM A500
BOLTS	ASTM A325-X (UNLESS NOTED OTHERWISE)
WELDING ELECTRODE	ASTM E 70

SHOP AND ERECTION DRAWINGS SHALL BE SUBMITTED FOR ALL STRUCTURAL STEEL WORK IN ACCORDANCE WITH THE CONTRACT DOCUMENTS. SUBMIT 6 SETS OF PRINTS TO THE ARCHITECT FOR REVIEW.

THE OMISSION OF ANY MATERIAL THAT WAS SHOWN ON THE CONTRACT DRAWINGS SHALL NOT RELIEVE THE CONTRACTOR OF PROVIDING SAME.

STRUCTURAL STEEL SHALL CONFORM TO THE CURRENT "AISC SPECIFICATION FOR THE DESIGN, FABRICATION, AND ERECTION OF STRUCTURAL STEEL FOR BUILDINGS", AND THE "AISC CODE OF STANDARD PRACTICE FOR STEEL BUILDINGS AND BRIDGES"

ALL WELDING SHALL BE DONE BY A CERTIFIED WELDER IN ACCORDANCE WITH A.W.S. STANDARDS.

CONNECTIONS SHALL CONFORM TO ALL REQUIREMENTS OF THE "AISC SPECIFICATION FOR THE DESIGN, FABRICATION, AND ERECTION OF STRUCTURAL STEEL FOR BUILDINGS", LATEST EDITION, AND THE "SPECIFICATION FOR STRUCTURAL STEEL JOINTS USING ASTM A325 OR A490 BOLTS".

BOLT HOLES SHALL BE PUNCHED OR DRILLED. FLAME CUT HOLES ARE NOT ACCEPTABLE.

ALL A-325/A490 BOLTS ARE TO BE TIGHTENED TO A SNUG TIGHT CONDITION AS DEFINED BY AISC SPECIFICATION USE LOCK NUT OR LOCKING DEVICE TO MATCH EXISTING.

ALL WELDING SHALL BE DONE USING E70XX ELECTRODES AND WELDING SHALL CONFORM TO AISC AND AWS D1.1 WHERE FILLET WELD SIZES ARE NOT SHOWN, PROVIDE THE MINIMUM SIZE PER TABLE J2.4 IN THE AISC "MANUAL OF STEEL CONSTRUCTION", 9TH EDITION. AT THE COMPLETION ALL WELDING, ALL DAMAGE TO GALVANIZED COATING SHALL BE REPAIRED.

USE PRECAUTIONS & PROCEDURES PER AWS D1.1 WHEN WELDING GALVANIZED METALS.

TOUCH-UP ALL DAMAGED GALVANIZED STEEL WITH APPROVED COLD ZINC, "GALVANOX", "DRY GALV", "ZINC-IT", OR APPROVED EQUIVALENT, IN ACCORDANCE WITH MANUFACTURERS GUIDELINES. TOUCH-UP DAMAGED NON GALVANIZED STEEL WITH SAME PAINT APPLIED IN SHOP OR FIELD.

ALL STEEL WORK SHALL BE GALVANIZED AND IN ACCORDANCE WITH THE SPECIFICATION ASTM A123 UNLESS OTHERWISE NOTED. (AFTER FABRICATION)

COMMENCEMENT OF STRUCTURAL STEEL WORK WITHOUT NOTIFYING THE ENGINEER OF ANY DISCREPANCIES WILL BE CONSIDERED ACCEPTANCE OF PRECEDING WORK.

SPECIAL INSPECTIONS REQUIRED PER THE 2005 CONNECTICUT STATE BUILDING CODE FOR STRUCTURAL STEEL WORK.

INSPECTION AND TESTING OF ALL WELDING AND HIGH STRENGTH BOLTING SHALL BE PERFORMED BY AN INDEPENDENT TESTING LABORATORY, BE PAID BY THE CONTRACTOR AND APPROVED BY THE ENGINEER. THE INSPECTOR SHALL OBSERVE INSTALLATION OF BOLTS AND TEST NOT LESS THAN 20% OF THE BOLTS AND NOT LESS THAN TWO BOLTS, SELECTED AT RANDOM, IN EACH CONNECTION.

FOUR COPIES OF ALL INSPECTION TEST REPORTS SHALL BE SUBMITTED TO THE ENGINEER WITHIN TEN (10) WORKING DAYS OF THE DATE OF INSPECTION.

REINFORCEMENT NOTES:

EXISTING DIMENSIONS OF THE TOWER STRUCTURE WERE OBTAINED FROM MANUFACTURERS ORIGINAL DESIGN DOCUMENTS, PREPARED BY PIROD INC., ENG FILE No. A-11030B, DATED NOVEMBER 18, 1999 AND ARE NOT GUARANTEED. CONTRACTOR SHALL TAKE FIELD MEASUREMENTS NECESSARY TO ASSURE PROPER FIT OF ALL FINISHED WORK.

CONTRACTOR SHALL VISIT THE SITE PRIOR TO THE START OF WORK WITH SUFFICIENT RIGGING EQUIPMENT AND PERSONNEL TO OBTAIN DETAILED FABRICATION MEASUREMENTS OF EXISTING TOWER STEEL MEMBERS TO BE REPLACED.

TOWER REINFORCING SHALL BE CONDUCTED BY FIELD CREWS EXPERIENCED IN THE ASSEMBLY AND ERECTION OF RADIO ANTENNAS, TRANSMISSION LINES AND SUPPORT STRUCTURES. ALL SAFETY PROCEDURES, RIGGING AND ERECTION METHODS SHALL BE STANDARD TO THE INDUSTRY AND IN COMPLIANCE WITH OSHA.

THE EXISTING COAXIAL CABLE AND ALL ACCESSORIES SHALL BE RELOCATED AND REINSTALLED BY THE CONTRACTOR WITHOUT INTERRUPTION IN SERVICE WHERE THEY ARE IN CONFLICT WITH TOWER REINFORCEMENT.

CONTRACTOR SHALL TAKE EXTREME CARE NOT TO DAMAGE THE EXISTING TOWER, THE EXISTING COMMUNICATION EQUIPMENT, COAXIAL CABLE AND THEIR COMPONENTS. IN THE EVENT THAT THE EXISTING COMMUNICATION EQUIPMENT IS DAMAGED DURING CONSTRUCTION THE CONTRACTOR SHALL REPAIR THE DAMAGE IMMEDIATELY (WITH THE APPROVAL OF THE COMMUNICATION CARRIER) AT NO ADDITIONAL COST TO THE CONTRACT.

THE REPLACEMENT OF TOWER MEMBERS SHALL BE DONE ONE AT A TIME AND SHALL BE DONE WITH LESS THAN 15 MPH WIND PRESENT. NO MEMBER SHALL BE LEFT DISCONNECTED FOR THE NEXT WORKING DAY.

ALL REINFORCEMENT SHOWN FOR DIAGONALS AND HORIZONTALS APPLY TO ALL SIDES OF THE TOWER.

NOTES:

1. ALL PROPOSED DIAGONAL MEMBERS SHALL BE INSTALLED WITH A325-X BOLTS (THREADS EXCLUDED FROM SHEAR PLANE). SIZE SHALL MATCH EXISTING).
2. REINFORCEMENT MAY REQUIRE TEMPORARY REMOVAL OF EXISTING EQUIPMENT. CONTRACTOR SHALL COORDINATE WORK WITH OWNER.
3. PROPOSED ANTENNAS AND APPURTENANCES SHALL NOT BE INSTALLED UNTIL ALL REINFORCEMENT WORK HAS BEEN INSPECTED AND IS DEEMED COMPLETE.
4. ANTENNAS AND APPURTENANCES NOT SHOWN FOR CLARITY.

A&E FIRM
URS CORPORATION AES
500 ENTERPRISE DRIVE
ROCKY HILL, CONNECTICUT
1-(860)-529-8882

Sprint
1 INTERNATIONAL BLVD
SUITE 800
MAHWAH, NJ 07495

T-Mobile
NORTHEAST SITE SOLUTIONS/T-MOBILE
54 MAIN STREET
STURBRIDGE, MA 01566

RFC SEAL

RFC PROJECT NUMBER	DRAWN BY
38926804 (MPC-060)	MCD

NO.	DATE	ISSUED FOR
0	8/29/13	MPC-060 MCD

RELEASED BY | DATE

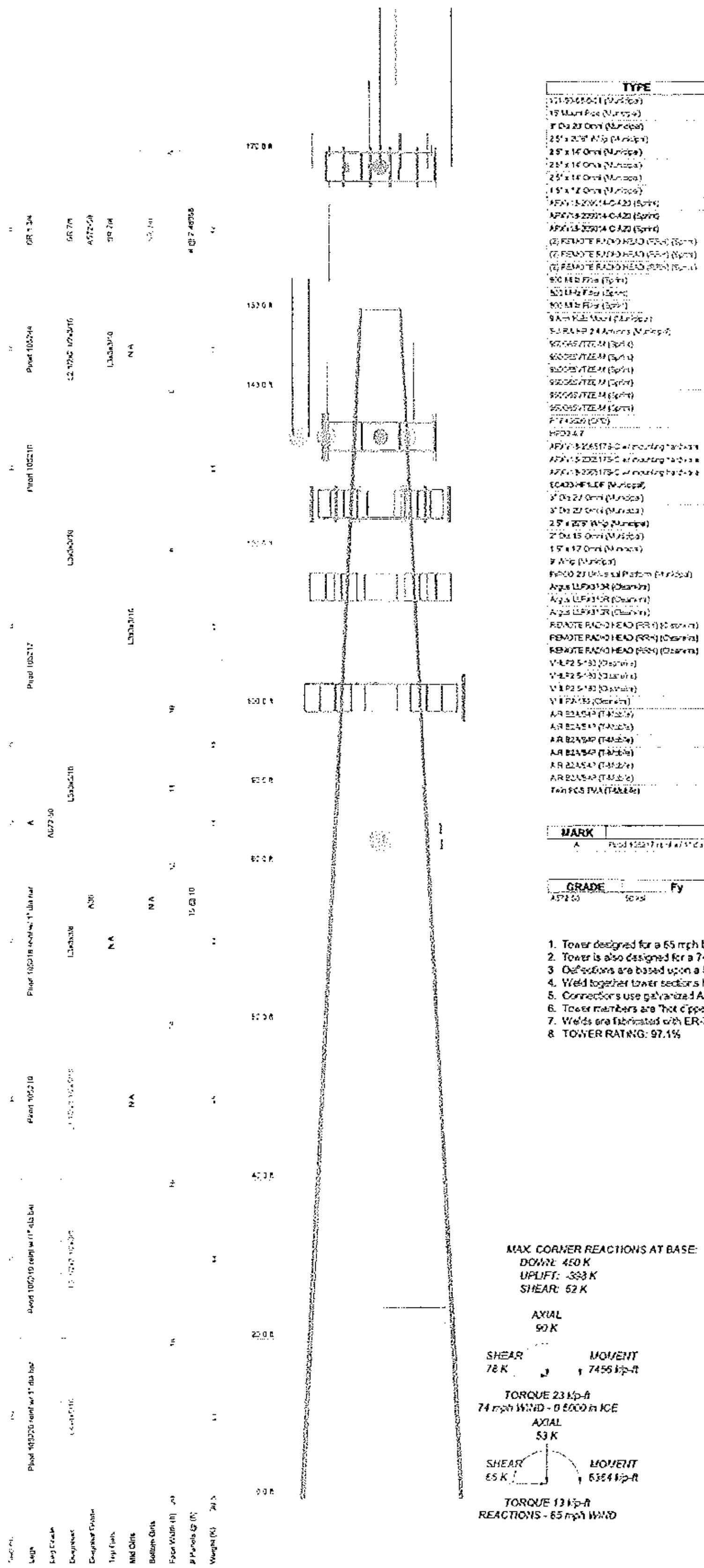
CT60XC931
CT11059C

179 SHUNPIKE ROAD
CROMWELL, CT

SHEET TITLE
REINFORCEMENT NOTES

SHEET NUMBER
SK-2

TNX TOWER INPUT/OUTPUT SUMMARY



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
[illegible] (Municipal)	183	Twin PCS TMA (T-Mobile)	125.5
15' Mast Pipe (Municipal)	178.75	Twin PCS TMA (T-Mobile)	125.5
3" Dia 20' Omni (Municipal)	178	PiROD 12' Lightweight T-Frame (T-Mobile)	125.5
2.5" x 20'8" Whip (Municipal)	175	PiROD 12' Lightweight T-Frame (T-Mobile)	125.5
2.5" x 14' Omni (Municipal)	175	PiROD 12' Lightweight T-Frame (T-Mobile)	125.5
2.5" x 14' Omni (Municipal)	175	(2) TMA (shielded) (ATT)	115
2.5" x 14' Omni (Municipal)	175	(2) TMA (shielded) (ATT)	115
1.5" x 12' Omni (Municipal)	174	(2) TMA (shielded) (ATT)	115
APXV18-209014-C-A20 (Sprint)	173	PiROD 12' Lightweight T-Frame (ATT)	115
APXV18-209014-C-A20 (Sprint)	173	(2) TMA (shielded) (ATT)	115
APXV18-209014-C-A20 (Sprint)	173	PiROD 12' Lightweight T-Frame (ATT)	115
(2) REMOTE RADIO HEAD (RRH) (Sprint)	173	7770.00 (ATT)	115
(2) REMOTE RADIO HEAD (RRH) (Sprint)	173	7770.00 (ATT)	115
(2) REMOTE RADIO HEAD (RRH) (Sprint)	173	7770.00 (ATT)	115
800 MHz Filter (Sprint)	170	7770.00 (ATT)	115
800 MHz Filter (Sprint)	170	7770.00 (ATT)	115
800 MHz Filter (Sprint)	170	7770.00 (ATT)	115
9 Arm Rate Mount (Municipal)	158	ANDREW CDH-15-65-00T-RET (5) (ATT)	115
SU RA HP 2.4 Antenna (Municipal)	158	ANDREW CDH-15-65-00T-RET (5) (ATT)	115
920065/TZE-M (Sprint)	158	ANDREW CDH-15-65-00T-RET (5) (ATT)	115
920065/TZE-M (Sprint)	158	(2) REMOTE RADIO HEAD (RRH) (ATT)	115
920065/TZE-M (Sprint)	158	(2) REMOTE RADIO HEAD (RRH) (ATT)	115
920065/TZE-M (Sprint)	158	(2) REMOTE RADIO HEAD (RRH) (ATT)	115
920065/TZE-M (Sprint)	158	Surge Suppressor (ATT)	115
920065/TZE-M (Sprint)	158	(2) TMA (shielded) (ATT)	115
[illegible] (GPS)	158	PiROD 12' Lightweight T-Frame (ATT)	115
HPD2.4.7	158	(2) TMA (shielded) (ATT)	115
APXV18-206517S-C w/ mounting hardware	153.5	PiROD 12' Lightweight T-Frame (Verizon)	101
APXV18-206517S-C w/ mounting hardware	153.5	PiROD 12' Lightweight T-Frame (Verizon)	101
APXV18-206517S-C w/ mounting hardware	153.5	(3) Diplexer (Verizon)	101
EC420-HF1LDF (Municipal)	153.5	(3) Diplexer (Verizon)	101
3" Dia 27' Omni (Municipal)	144	(3) Diplexer (Verizon)	101
3" Dia 27' Omni (Municipal)	144	SC-E 6014 rev2 (Verizon)	101
2.5" x 20'8" Whip (Municipal)	144	BXA-171063-12BF (Verizon)	101
2" Dia 15' Omni (Municipal)	141	SWCP 2x5514 (Verizon)	101
1.5" x 17' Omni (Municipal)	139	SC-E 6014 rev2 (Verizon)	101
9' Whip (Municipal)	138.5	SC-E 6014 rev2 (Verizon)	101
PiROD 23' Universal Platform (Municipal)	134	BXA-171063-12BF (Verizon)	101
Argus LLPX310R (Clearwire)	134	SC-E 6014 rev2 (Verizon)	101
Argus LLPX310R (Clearwire)	134	SC-E 6014 rev2 (Verizon)	101
Argus LLPX310R (Clearwire)	134	BXA-171063-12BF (Verizon)	101
REMOTE RADIO HEAD (RRH) (Clearwire)	134	BXA-70063-6CF (Verizon)	101
REMOTE RADIO HEAD (RRH) (Clearwire)	134	SWCP 2x5514 (Verizon)	101
REMOTE RADIO HEAD (RRH) (Clearwire)	134	SC-E 6014 rev2 (Verizon)	101
VHLP2.5-180 (Clearwire)	134	PiROD 12' Lightweight T-Frame (Verizon)	101
VHLP2.5-180 (Clearwire)	134	3'x2'x22" Panel	87
VHLP2.5-180 (Clearwire)	134	TMA	84.5
VHLP2-180 (Clearwire)	134	3' Stand-off	83.5
AIR B2A/B4P (T-Mobile)	125.5	3' Stand-off	83.5
AIR B2A/B4P (T-Mobile)	125.5	3' Dish	83
AIR B2A/B4P (T-Mobile)	125.5	TMA	83
AIR B2A/B4P (T-Mobile)	125.5	TMA	82.5
AIR B2A/B4P (T-Mobile)	125.5	3'x2'x22" Panel	80
AIR B2A/B4P (T-Mobile)	125.5	Camera	30
Twin PCS TMA (T-Mobile)	125.5	PC50196	26

SYMBOL LIST

MARK	SIZE	MARK	SIZE
A	Pirod 105217 (rebar w/ 1" dia bar)		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-50	50 ksi	65 ksi	A36	36 ksi	58 ksi

TOWER DESIGN NOTES

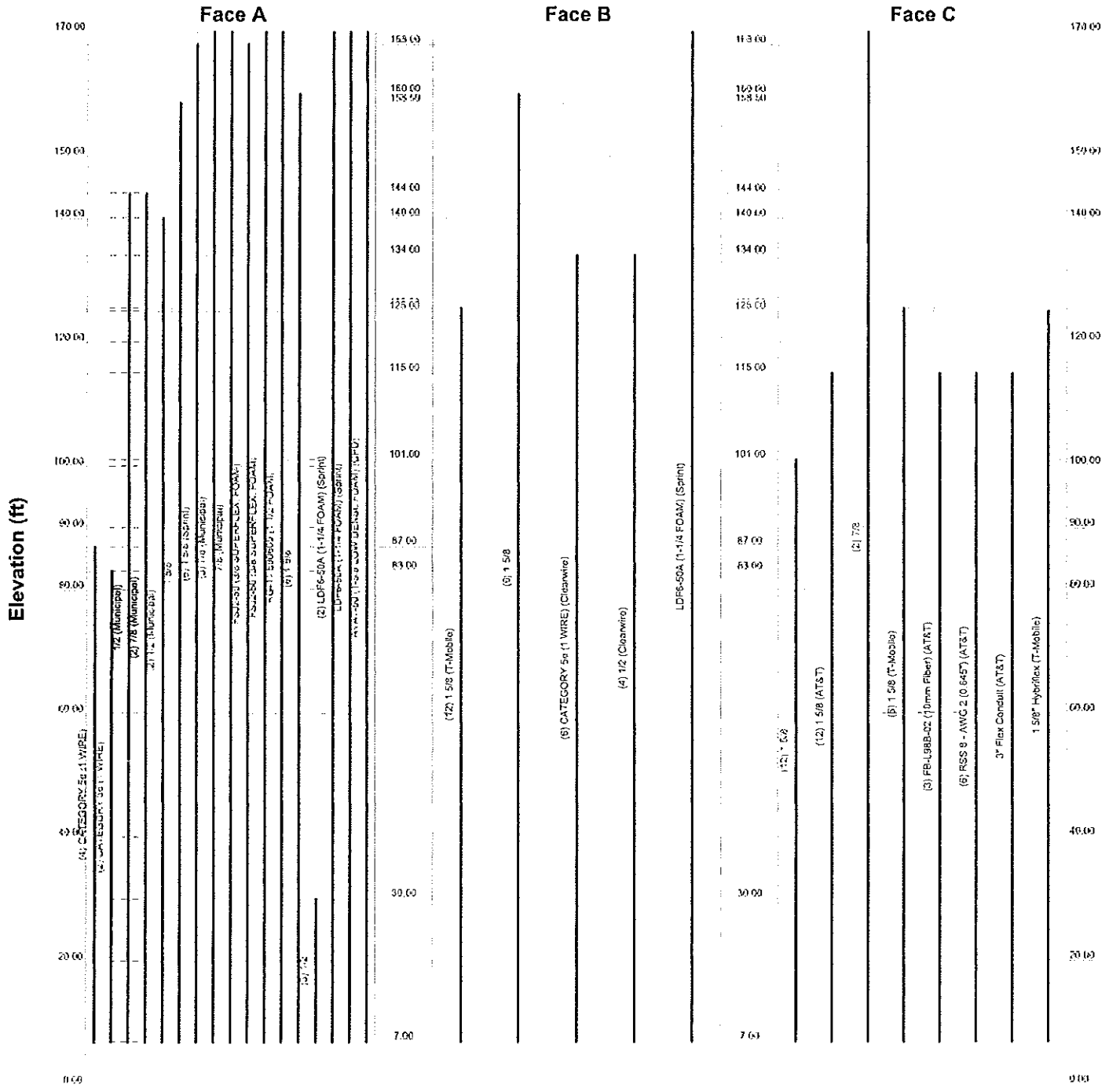
1. Tower designed for a 65 mph basic wind in accordance with the TIA/EIA-222-F Standard.
2. Tower is also designed for a 74 mph basic wind with 0.50 in ice.
3. Deflections are based upon a 50 mph wind.
4. Weld together tower sections have flange connections.
5. Connections use galvanized A325 bolts, nuts and locking devices. Installation per TIA/EIA-222 and AISC Specifications.
6. Tower members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards.
7. Welds are fabricated with ER-70S-6 electrodes.
8. TOWER RATING: 97.1%

URS Corporation	Job: PiROD U20'-0"x170' Lattice Tower		
500 Enterprise Drive, Suite 3B	Project: HPC-060 / Cromwell, CT Tower MOD		
Rocky Hill, CT 06067	Client: Sprint / T-Mobile	Drawn by: Michael_DeFickas	App'd:
Phone: 860-529-8882	Code: TIA/EIA-222-F	Date: 03/09/13	Scale: NTS
FAX: 860-529-3991	Path:		Dwg No. E-1

TNX TOWER FEEDLINE DISTRIBUTION CHART

Feedline Distribution Chart
0' - 170'

Round Flat App In Face App Out Face Truss Leg



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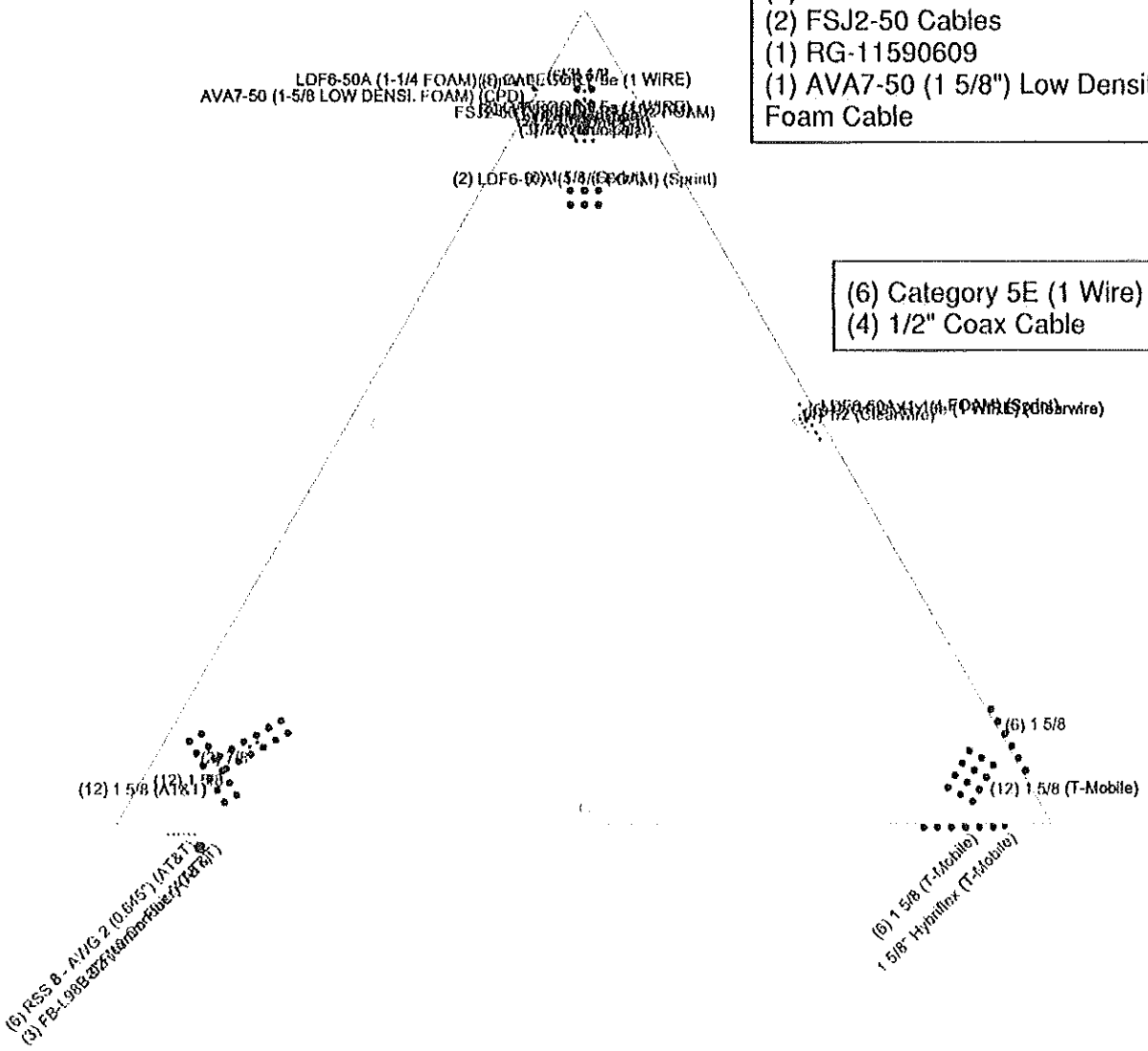
Job	***PiROD U20'-0"x170' Lattice Tower***
Project	***HPC-060 / Cromwell, CT Tower MOD***
Client	Sprint / T-Mobile
Drawn by	Michael Dalickas
App'd.	
Code	TIA/EIA-222-F
Date	09/09/13
Scale	NTS
Path:	
Dwg No.	E-7

TNX TOWER FEEDLINE PLAN

Feedline Plan

Round Flat App In Face App Out Face Truss-Leg

(6) Category 5E (1 Wire) Cables
(6) 7/8" Coax Cables
(4) 1/2" Coax Cables
(13) 1 5/8" Coax Cables
(3) 1 1/4" Coax Cables
(2) FSJ2-50 Cables
(1) RG-11590609
(1) AVA7-50 (1 5/8") Low Density Foam Cable



(6) RSS 8 - AWG 2 (0.645") Cables
(3) FB-L98B-02 (10mm Fiber) Cables
(1) 3" Flex Conduit
(24) 1 5/8" Coax Cables
(2) 7/8" Coax Cables

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PiROD U20'-0"x170' Lattice Tower
Project: *HPC-060 / Cromwell, CT Tower MOD*
Client: Sprint / T-Mobile Drawn by: Michael_Dalickas App'd:
Code: TIA/EIA-222-F Date: 09/09/13 Scale: NTS
Path: Dwg No E-7

TNX TOWER DETAILED OUTPUT

tnxTower

URS Corporation
500 Enterprise Drive, Suite 3B
Rocky Hill, CT 06067
Phone: 860-529-8882
FAX: 860-529-3991

Job	PiROD U20'-0"x170' Lattice Tower
Project	HPC-060 / Cromwell, CT Tower MOD
Client	Sprint / T-Mobile
Page	1 of 43
Date	13:13:23 09/09/13
Designed by	Michael_Dalickas

Tower Input Data

The main tower is a 3x free standing tower with an overall height of 170.00 ft above the ground line.
The base of the tower is set at an elevation of 0.00 ft above the ground line.
The face width of the tower is 5.00 ft at the top and 20.00 ft at the base.
This tower is designed using the TIA/EIA-222-F standard.
The following design criteria apply:

Basic wind speed of 85 mph.
Nominal ice thickness of 0.5000 in.
Ice density of 56 pcf.
A wind speed of 74 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 50 mph.
Weld together tower sections have flange connections..
Connections use galvanized A325 bolts, nuts and locking devices. Installation per TIA/EIA-222 and AISC Specifications..
Tower members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards..
Welds are fabricated with ER-70S-6 electrodes..
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in tower member 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		

tnxTower	Job	Page
URS Corporation 500 Enterprise Drive, Suite 3B Rocky Hill, CT 06067 Phone: 860-529-8882 FAX: 860-529-3991	PiROD U20'-0"x170' Lattice Tower	2 of 43
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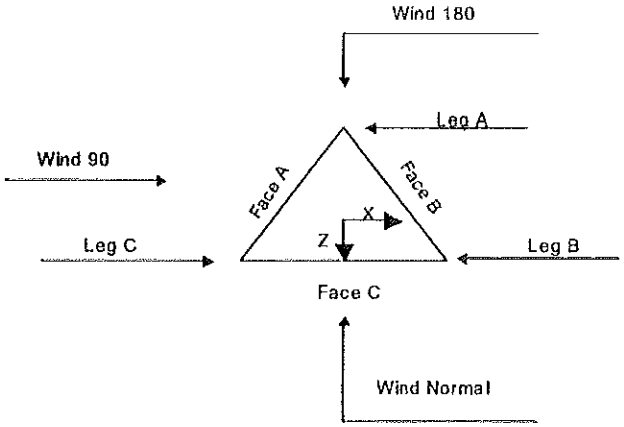
	Client Sprint / T-Mobile	**Designed by** Michael_Dalickas



Triangular Tower

Tower Section Geometry

Tower Section	Tower Elevation	Assembly Database	Description	Section Width	Number of Sections	Section Length
	ft			ft		ft
T1	170.00-150.00			5.00	1	20.00
T2	150.00-140.00		U6.0 105244	5.00	1	10.00
T3	140.00-120.00		U8.0 105216	6.00	1	20.00
T4	120.00-100.00		U10.0 105217 L3x3/16	8.00	1	20.00
T5	100.00-90.00		U12.0 105216	10.00	1	10.00
T6	90.00-80.00		U12.0 105216	11.00	1	10.00
T7	80.00-60.00		U14.0 105218	12.00	1	20.00
T8	60.00-40.00		U16.0 105219	14.00	1	20.00
T9	40.00-20.00		U18.0 105219	16.00	1	20.00
T10	20.00-0.00		U20.0 105219 L4x1/4	18.00	1	20.00

Tower Section Geometry *(cont'd)*

Tower Section	Tower Elevation	Diagonal Spacing	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset	Bottom Girt Offset
	ft	ft				in	in
T1	170.00-150.00	2.49	X Brace	No	No	0.0000	1.0000
T2	150.00-140.00	10.00	X Brace	No	No	0.0000	0.0000
T3	140.00-120.00	10.00	X Brace	No	No	0.0000	0.0000
T4	120.00-100.00	10.00	X Brace	No	No	0.0000	0.0000
T5	100.00-90.00	10.00	X Brace	No	No	0.0000	0.0000

tnxTower	Job	Page
URS Corporation 500 Enterprise Drive, Suite 3B Rocky Hill, CT 06067 Phone: 860-529-8882 FAX: 860-529-3991	PiROD U20'-0"x170' Lattice Tower	3 of 43
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	Client Sprint / T-Mobile	**Designed by** Michael_Dalickas

Tower Section	Tower Elevation ft	Diagonal Spacing ft	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset in	Bottom Girt Offset in
T6	90.00-80.00	10.00	X Brace	No	No	0.0000	0.0000
T7	80.00-60.00	10.00	X Brace	No	No	0.0000	0.0000
T8	60.00-40.00	10.00	X Brace	No	No	0.0000	0.0000
T9	40.00-20.00	10.00	X Brace	No	No	0.0000	0.0000
T10	20.00-0.00	10.00	X Brace	No	No	0.0000	0.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 170.00-150.00	Solid Round	1 3/4	A572-50 (50 ksi)	Solid Round	7/8	A572-50 (50 ksi)
T2 150.00-140.00	Truss Leg	Pirod 105244	A572-50 (50 ksi)	Single Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T3 140.00-120.00	Truss Leg	Pirod 105216	A572-50 (50 ksi)	Single Angle	L3x3x3/16	A36 (36 ksi)
T4 120.00-100.00	Truss Leg	Pirod 105217	A572-50 (50 ksi)	Single Angle	L3x3x3/16	A36 (36 ksi)
T5 100.00-90.00	Truss Leg	Pirod 105217	A572-50 (50 ksi)	Single Angle	L3x3x5/16	A36 (36 ksi)
T6 90.00-80.00	Truss Leg	Pirod 105217 reinf w/ 1" dia bar	A572-50 (50 ksi)	Single Angle	L3x3x5/16	A36 (36 ksi)
T7 80.00-60.00	Truss Leg	Pirod 105218 reinf w/ 1" dia bar	A572-50 (50 ksi)	Single Angle	L3x3x3/8	A36 (36 ksi)
T8 60.00-40.00	Truss Leg	Pirod 105219	A572-50 (50 ksi)	Single Angle	L3 1/2x3 1/2x5/16	A36 (36 ksi)
T9 40.00-20.00	Truss Leg	Pirod 105219 reinf w /1" dia bar	A572-50 (50 ksi)	Single Angle	L3 1/2x3 1/2x3/8	A36 (36 ksi)
T10 20.00-0.00	Truss Leg	Pirod 105220 reinf w/ 1" dia bar	A572-50 (50 ksi)	Single Angle	L4x4x5/16	A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Top Girt Type	Top Girt Size	Top Girt Grade	Bottom Girt Type	Bottom Girt Size	Bottom Girt Grade
T1 170.00-150.00	Solid Round	7/8	A572-50 (50 ksi)	Solid Round	7/8	A572-50 (50 ksi)
T2 150.00-140.00	Single Angle	L3x3x3/16	A36 (36 ksi)	Single Angle		A36 (36 ksi)

Tower Section Geometry *(cont'd)*

tnxTower	Job: PiROD U20'-0"x170' Lattice Tower	Page: 4 of 43
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	Client: Sprint / T-Mobile	Designed by: Michael_Dalickas

Tower Elevation ft	No. of Mid Girts	Mid Girt Type	Mid Girt Size	Mid Girt Grade	Horizontal Type	Horizontal Size	Horizontal Grade
T4 120.00-100.00	1	Single Angle	L3x3x3/16	A36 (36 ksi)	Single Angle		A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Gusset Area (per face) ft²	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
T1 170.00-150.00	0.00	0.0000	A36 (36 ksi)	1	1	1.05	Mid-Pt	Mid-Pt
T2 150.00-140.00	0.00	0.0000	A36 (36 ksi)	1	1	1.05	Mid-Pt	Mid-Pt
T3 140.00-120.00	0.00	0.0000	A36 (36 ksi)	1	1	1.05	Mid-Pt	Mid-Pt
T4 120.00-100.00	0.00	0.0000	A36 (36 ksi)	1	1	1.05	Mid-Pt	Mid-Pt
T5 100.00-90.00	0.00	0.0000	A36 (36 ksi)	1	1	1.05	Mid-Pt	Mid-Pt
T6 90.00-80.00	0.00	0.0000	A36 (36 ksi)	1	1	1.05	Mid-Pt	Mid-Pt
T7 80.00-60.00	0.00	0.0000	A36 (36 ksi)	1	1	1.05	Mid-Pt	Mid-Pt
T8 60.00-40.00	0.00	0.0000	A36 (36 ksi)	1	1	1.05	Mid-Pt	Mid-Pt
T9 40.00-20.00	0.00	0.0000	A36 (36 ksi)	1	1	1.05	Mid-Pt	Mid-Pt
T10 20.00-0.00	0.00	0.0000	A36 (36 ksi)	1	1	1.05	Mid-Pt	Mid-Pt

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	K Factors[1] Legs	X Brace Diags X Y	K Brace Diags X Y	Single Diags X Y	Girts X Y	Horiz X Y	Sec Horiz. X Y	Inner Brace X Y
T1 170.00-150.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T2 150.00-140.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T3 140.00-120.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T4 120.00-100.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T5 100.00-90.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T6 90.00-80.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1

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	Client: Sprint / T-Mobile	Designed by: Michael_Dalickas

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	Legs	K Factors[1] X Brace Diags X	X Brace Diags Y	Single Diags X	Single Diags Y	Girts X	Girts Y	Horiz X	Horiz Y	Sec Horiz. X	Sec Horiz. Y	Inner Brace X	Inner Brace Y
T7	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1
80.00-60.00				1	1	1	1	1	1	1	1	1	1	1	1
T8	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1
60.00-40.00				1	1	1	1	1	1	1	1	1	1	1	1
T9	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1
40.00-20.00				1	1	1	1	1	1	1	1	1	1	1	1
T10	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1
20.00-0.00				1	1	1	1	1	1	1	1	1	1	1	1

[1]*Note: K factors are applied to member segment lengths. K-braces without inner supporting members will have the K factor in the out-of-plane direction applied to the overall length.*

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Truss-Leg K Factors: Truss-Legs Used As Leg Members: Leg Panels	X Brace Diagonals	Z Brace Diagonals	Truss-Legs Used As Inner Members: Leg Panels	X Brace Diagonals	Z Brace Diagonals
T2	1	0.5	0.85	1	0.5	0.85
150.00-140.00						
T3	1	0.5	0.85	1	0.5	0.85
140.00-120.00						
T4	1	0.5	0.85	1	0.5	0.85
120.00-100.00						
T5	1	0.5	0.85	1	0.5	0.85
100.00-90.00						
T6	1	0.5	0.85	1	0.5	0.85
90.00-80.00						
T7	1	0.5	0.85	1	0.5	0.85
80.00-60.00						
T8	1	0.5	0.85	1	0.5	0.85
60.00-40.00						
T9	1	0.5	0.85	1	0.5	0.85
40.00-20.00						
T10	1	0.5	0.85	1	0.5	0.85
20.00-0.00						

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg: Net Width Deduct in	U	Diagonal: Net Width Deduct in	U	Top Girt: Net Width Deduct in	U	Bottom Girt: Net Width Deduct in	U	Mid Girt: Net Width Deduct in	U	Long Horizontal: Net Width Deduct in	U	Short Horizontal: Net Width Deduct in	U
T1	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
170.00-150.00														

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	Client: Sprint / T-Mobile	Designed by: Michael_Dalickas

Tower Elevation ft	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U
T2 150.00-140.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T3 140.00-120.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T4 120.00-100.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T5 100.00-90.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T6 90.00-80.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T7 80.00-60.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T8 60.00-40.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T9 40.00-20.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T10 20.00-0.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Connection Type	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
		Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No	Bolt Size in	No	Bolt Size in	No
T1 170.00-150.00	Flange	0.7500 A325N	0	0.6250 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T2 150.00-140.00	Flange	1.0000 A325N	6	1.0000 A325N	1	1.0000 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T3 140.00-120.00	Flange	1.0000 A325N	6	1.0000 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T4 120.00-100.00	Flange	1.0000 A325N	6	1.0000 A325N	1	0.6250 A325N	0	0.6250 A325N	0	1.0000 A325N	1	0.6250 A325N	0	0.6250 A325N	0
T5 100.00-90.00	Flange	1.0000 A325N	6	1.0000 A325N	1	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T6 90.00-80.00	Flange	1.0000 A325N	6	1.0000 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T7 80.00-60.00	Flange	1.0000 A325N	6	1.0000 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T8 60.00-40.00	Flange	1.2500 A325N	6	1.2500 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T9 40.00-20.00	Flange	1.2500 A325N	6	1.2500 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T10 20.00-0.00	Flange	0.0000 A325N	0	1.2500 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
CATEGORY	A	No	Ar (Leg)	87.00 - 7.00	0.0000	0.1	4	4	1.0000	1.0000		0.21

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	Client Sprint / T-Mobile	**Designed by** Michael_Dalickas

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
5e (1 WIRE) CATEGORY	A	No	Ar (Leg)	83.00 - 7.00	0.0000	0.12	2	2	1.0000	1.0000		0.21
5e (1 WIRE) 1/2 (Municipal)	A	No	Ar (Leg)	144.00 - 7.00	0.0000	0.125	1	1	0.5800	0.5800		0.25
7/8 (Municipal)	A	No	Ar (Leg)	144.00 - 7.00	0.0000	0.125	2	1	1.0000	1.1100		0.54
1/2 (Municipal)	A	No	Ar (Leg)	140.00 - 7.00	0.0000	0.13	2	1	0.5800	0.5800		0.25
1 5/8	A	No	Ar (Leg)	158.50 - 7.00	0.0000	0.13	1	1	1.5000	1.9800		1.04
1 5/8 (Sprint)	A	No	Ar (Leg)	168.00 - 7.00	0.0000	0.2	6	2	1.5000	1.9800		1.04
7/8 (Municipal)	A	No	Ar (Leg)	170.00 - 7.00	0.0000	0.14	3	1	1.0000	1.1100		0.54
7/8 (Municipal)	A	No	Ar (Leg)	170.00 - 7.00	0.0000	0.14	1	1	1.1100	1.1100		0.54
FSJ2-50 (3/8 SUPERFLEX. FOAM)	A	No	Ar (Leg)	168.00 - 7.00	0.0000	0.12	1	1	0.4300	0.4300		0.08
FSJ2-50 (3/8 SUPERFLEX. FOAM)	A	No	Ar (Leg)	170.00 - 7.00	0.0000	0.12	1	1	0.4300	0.4300		0.08
RG-11 590609 (1 1/2 FOAM)	A	No	Ar (Leg)	170.00 - 7.00	0.0000	0.12	1	1	1.5000	1.5900		0.94
1 5/8 (T-Mobile)	B	No	Ar (Leg)	125.50 - 7.00	0.0000	0.1	12	3	1.5000	1.9800		1.04
1 5/8	B	Yes	Ar (CfAe)	160.00 - 7.00	0.0000	0.4	6	6	1.5000	1.9800		1.04
1 5/8	C	No	Ar (Leg)	101.00 - 7.00	0.0000	0.17	12	6	1.5000	1.9800		1.04
1 5/8 (AT&T)	C	No	Ar (Leg)	115.00 - 7.00	0.0000	0.12	12	2	1.5000	1.9800		1.04
7/8	C	No	Ar (Leg)	170.00 - 7.00	0.0000	0.17	2	2	1.0000	1.1100		0.54
1 5/8	A	No	Ar (Leg)	160.00 - 7.00	0.0000	0.1	6	3	1.5000	1.9800		1.04
1 5/8 (T-Mobile)	C	Yes	Ar (CfAe)	125.50 - 7.00	0.0000	-0.4	6	6	1.5000	1.9800		1.04
CATEGORY 5e (1 WIRE) (Clearwire)	B	Yes	Ar (CfAe)	134.00 - 7.00	-2.0000	0	6	6	1.0000	1.0000		0.21
1/2 (Clearwire)	B	Yes	Ar (CfAe)	134.00 - 7.00	-4.0000	0	4	4	0.5800	0.5800		0.25
FB-L98B-02 (10mm Fiber) (AT&T)	C	Yes	Ar (CfAe)	115.00 - 7.00	3.0000	0.4	3	3	0.3937	0.3937		0.03
RSS 8 - AWG 2 (0.645") (AT&T)	C	Yes	Ar (CfAe)	115.00 - 7.00	2.0000	0.43	6	6	0.6450	0.6450		0.30
3" Flex Conduit (AT&T)	C	Yes	Ar (CfAe)	115.00 - 7.00	4.0000	0.41	1	1	0.0000	3.0000		3.00
1/2	A	No	Ar (Leg)	30.00 - 7.00	0.0000	0.08	3	1	0.5800	0.5800		0.25
LDF6-50A (1-1/4 FOAM) (Sprint)	A	No	Ar (Leg)	170.00 - 7.00	0.0000	0.2	2	2	1.5500	1.5500		0.66
LDF6-50A (1-1/4 FOAM) (Sprint)	B	Yes	Ar (CfAe)	170.00 - 7.00	0.0000	0	1	1	1.5500	1.5500		0.66
LDF6-50A (1-1/4 FOAM) (Sprint)	A	Yes	Ar (CfAe)	170.00 - 7.00	0.0000	0.4	1	1	1.5500	1.5500		0.66
AVA7-50 (1-5/8 LOW DENSI.	A	Yes	Ar (CfAe)	170.00 - 7.00	0.0000	0.38	1	1	1.5000	1.9800		0.72

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	Client: Sprint / T-Mobile	Designed by: Michael_Dalickas

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
FOAM) (CPD) 1 5/8" Hybriflex (T-Mobile)	C	Yes	Ar (CfAe)	125.00 - 7.00	0.0000	-0.45	1	1	1.5000	1.6250		0.21

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
T1	170.00-150.00	A	50.341	0.000	0.000	0.000	0.30
		B	53.241	0.000	0.000	0.000	0.08
		C	3.700	0.000	0.000	0.000	0.02
T2	150.00-140.00	A	31.969	0.000	0.000	0.000	0.20
		B	38.369	0.000	0.000	0.000	0.07
		C	1.850	0.000	0.000	0.000	0.01
T3	140.00-120.00	A	68.672	0.000	0.000	0.000	0.43
		B	97.837	0.000	0.000	0.000	0.24
		C	16.480	0.000	0.000	0.000	0.06
T4	120.00-100.00	A	94.971	0.000	0.000	0.000	0.43
		B	119.551	0.000	0.000	0.000	0.43
		C	86.784	0.000	0.000	0.000	0.42
T5	100.00-90.00	A	67.210	0.000	0.000	0.000	0.21
		B	59.775	0.000	0.000	0.000	0.22
		C	64.794	0.000	0.000	0.000	0.37
T6	90.00-80.00	A	70.044	0.000	0.000	0.000	0.22
		B	62.609	0.000	0.000	0.000	0.22
		C	64.794	0.000	0.000	0.000	0.37
T7	80.00-60.00	A	144.420	0.000	0.000	0.000	0.45
		B	129.551	0.000	0.000	0.000	0.43
		C	129.588	0.000	0.000	0.000	0.75
T8	60.00-40.00	A	144.420	0.000	0.000	0.000	0.45
		B	129.551	0.000	0.000	0.000	0.43
		C	129.588	0.000	0.000	0.000	0.75
T9	40.00-20.00	A	145.870	0.000	0.000	0.000	0.46
		B	131.001	0.000	0.000	0.000	0.43
		C	129.588	0.000	0.000	0.000	0.75
T10	20.00-0.00	A	95.758	0.000	0.000	0.000	0.30
		B	86.093	0.000	0.000	0.000	0.28
		C	84.232	0.000	0.000	0.000	0.49

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
T1	170.00-150.00	A	0.500	71.366	3.517	0.000	0.000	0.80
		B		77.783	0.000	0.000	0.000	0.19
		C		3.517	3.517	0.000	0.000	0.07
T2	150.00-140.00	A	0.500	44.544	1.758	0.000	0.000	0.52
		B		55.203	0.000	0.000	0.000	0.17
		C		1.758	1.758	0.000	0.000	0.03
T3	140.00-120.00	A	0.500	99.455	3.517	0.000	0.000	1.13

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	Client: Sprint / T-Mobile	Designed by: Michael_Dalickas

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft²	A_F ft²	C_AA_A In Face ft²	C_AA_A Out Face ft²	Weight K
		B		132.065	15.727	0.000	0.000	0.68
		C		19.922	3.517	0.000	0.000	0.16
T4	120.00-100.00	A	0.500	127.088	3.517	0.000	0.000	1.13
		B		152.617	22.467	0.000	0.000	1.20
		C		100.002	13.548	0.000	0.000	1.08
T5	100.00-90.00	A	0.500	84.269	1.758	0.000	0.000	0.57
		B		76.309	11.233	0.000	0.000	0.60
		C		72.192	8.446	0.000	0.000	0.94
T6	90.00-80.00	A	0.500	85.935	5.758	0.000	0.000	0.61
		B		77.975	15.233	0.000	0.000	0.60
		C		72.192	8.446	0.000	0.000	0.94
T7	80.00-60.00	A	0.500	175.204	16.850	0.000	0.000	1.29
		B		159.284	35.800	0.000	0.000	1.20
		C		144.384	16.891	0.000	0.000	1.88
T8	60.00-40.00	A	0.500	175.204	16.850	0.000	0.000	1.29
		B		159.284	35.800	0.000	0.000	1.20
		C		144.384	16.891	0.000	0.000	1.88
T9	40.00-20.00	A	0.500	178.454	16.850	0.000	0.000	1.32
		B		162.534	35.800	0.000	0.000	1.20
		C		144.384	16.891	0.000	0.000	1.88
T10	20.00-0.00	A	0.500	118.107	10.953	0.000	0.000	0.88
		B		107.760	23.270	0.000	0.000	0.78
		C		93.849	10.979	0.000	0.000	1.22

Feed Line Shielding

Section	Elevation ft	Face	A_R ft²	A_R Ice ft²	A_F ft²	A_F Ice ft²
T1	170.00-150.00	A	0.426	1.431	0.000	0.000
		B	0.904	2.973	0.000	0.000
		C	0.000	0.000	0.000	0.000
T2	150.00-140.00	A	0.000	0.198	0.328	0.513
		B	0.000	0.730	1.246	1.896
		C	0.000	0.000	0.000	0.000
T3	140.00-120.00	A	0.000	0.269	0.515	0.806
		B	0.000	1.573	2.807	4.720
		C	0.000	0.271	0.536	0.813
T4	120.00-100.00	A	0.000	0.268	0.514	0.805
		B	0.000	1.820	3.167	5.460
		C	0.000	1.544	2.846	4.631
T5	100.00-90.00	A	0.000	0.106	0.203	0.318
		B	0.000	0.719	1.251	2.157
		C	0.000	0.682	1.240	2.046
T6	90.00-80.00	A	0.000	0.102	0.195	0.305
		B	0.000	0.690	1.201	2.070
		C	0.000	0.655	1.190	1.964
T7	80.00-60.00	A	0.000	0.194	0.371	0.582
		B	0.000	1.315	2.288	3.944
		C	0.000	1.247	2.268	3.742
T8	60.00-40.00	A	0.000	0.185	0.413	0.646
		B	0.000	1.252	2.542	4.382
		C	0.000	1.188	2.520	4.158
T9	40.00-20.00	A	0.000	0.178	0.398	0.624
		B	0.000	1.209	2.454	4.230
		C	0.000	1.147	2.432	4.013

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Section	Elevation	Face	A_R	A_R Ice	A_F	A_F Ice
	ft		ft^2	ft^2	ft^2	ft^2
T10	20.00-0.00	A	0.000	0.113	0.288	0.451
		B	0.000	0.765	1.775	3.060
		C	0.000	0.726	1.760	2.903

Feed Line Center of Pressure

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
T1	170.00-150.00	1.3324	-7.2845	1.3182	-6.8187
T2	150.00-140.00	1.9049	-5.9259	1.9386	-5.6571
T3	140.00-120.00	4.4527	-6.4949	4.2213	-6.5952
T4	120.00-100.00	3.6336	-1.2098	4.0419	-2.3544
T5	100.00-90.00	-0.2492	1.1393	1.1550	-0.5151
T6	90.00-80.00	-0.2466	0.4575	1.2266	-1.2953
T7	80.00-60.00	-0.2498	-0.0930	1.3587	-1.9306
T8	60.00-40.00	-0.3128	-0.1477	1.5068	-2.2240
T9	40.00-20.00	-0.3264	-0.4447	1.6868	-2.8982
T10	20.00-0.00	-0.3337	-0.6702	1.4855	-3.0289

Discrete Tower Loads

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
PC9013N	A	From Leg	1.00 0.00 0.00	0.0000	24.00	No Ice 1/2" Ice	0.46 0.52	0.46 0.52	0.00 0.00
3"x2"x22" Panel	B	From Leg	2.00 0.00 0.00	0.0000	80.00	No Ice 1/2" Ice	0.65 0.81	0.47 0.61	0.05 0.05
TMA	B	From Leg	2.00 0.00 0.00	0.0000	82.50	No Ice 1/2" Ice	1.06 1.21	0.45 0.57	0.02 0.03
TMA	B	From Leg	2.00 0.00 0.00	0.0000	84.50	No Ice 1/2" Ice	1.06 1.21	0.45 0.57	0.02 0.03
3"x2"x22" Panel	B	From Leg	2.00 0.00 0.00	0.0000	87.00	No Ice 1/2" Ice	0.65 0.81	0.47 0.61	0.05 0.05
3' Stand-off	B	From Leg	1.50 0.00 0.00	0.0000	83.50	No Ice 1/2" Ice	1.00 1.20	2.00 2.70	0.05 0.07
3' Stand-off	A	From Leg	1.50 0.00 0.00	0.0000	83.50	No Ice 1/2" Ice	1.00 1.20	2.00 2.70	0.05 0.07
TMA	A	From Leg	2.00 0.00	0.0000	83.00	No Ice 1/2" Ice	1.06 1.21	0.45 0.57	0.02 0.03

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	Client: Sprint / T-Mobile	Designed by: Michael_Dalickas

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
			0.00						
SC-E 6014 rev2 (Verizon)	A	From Leg	4.00 6.00 0.00	0.0000	101.00	No Ice 1/2" Ice	3.55 3.89	3.34 3.68	0.02 0.04
BXA-171063-12BF (Verizon)	A	From Leg	4.00 0.00 0.00	0.0000	101.00	No Ice 1/2" Ice	4.73 5.18	3.57 4.01	0.02 0.04
SWCP 2x5514 (Verizon)	A	From Leg	4.00 -4.00 0.00	0.0000	101.00	No Ice 1/2" Ice	7.01 7.44	5.70 6.12	0.02 0.07
SC-E 6014 rev2 (Verizon)	A	From Leg	4.00 -6.00 0.00	0.0000	101.00	No Ice 1/2" Ice	3.55 3.89	3.34 3.68	0.02 0.04
SC-E 6014 rev2 (Verizon)	B	From Leg	4.00 6.00 0.00	0.0000	101.00	No Ice 1/2" Ice	3.55 3.89	3.34 3.68	0.02 0.04
BXA-171063-12BF (Verizon)	B	From Leg	4.00 0.00 0.00	0.0000	101.00	No Ice 1/2" Ice	4.73 5.18	3.57 4.01	0.02 0.04
SC-E 6014 rev2 (Verizon)	B	From Leg	4.00 -6.00 0.00	0.0000	101.00	No Ice 1/2" Ice	3.55 3.89	3.34 3.68	0.02 0.04
SC-E 6014 rev2 (Verizon)	C	From Leg	4.00 6.00 0.00	0.0000	101.00	No Ice 1/2" Ice	3.55 3.89	3.34 3.68	0.02 0.04
BXA-171063-12BF (Verizon)	C	From Leg	4.00 0.00 0.00	0.0000	101.00	No Ice 1/2" Ice	4.73 5.18	3.57 4.01	0.02 0.04
SWCP 2x5514 (Verizon)	C	From Leg	4.00 -4.00 0.00	0.0000	101.00	No Ice 1/2" Ice	7.01 7.44	5.70 6.12	0.02 0.07
SC-E 6014 rev2 (Verizon)	C	From Leg	4.00 -6.00 0.00	0.0000	101.00	No Ice 1/2" Ice	3.55 3.89	3.34 3.68	0.02 0.04
PiROD 12' Lightweight T-Frame (Verizon)	A	From Leg	2.00 0.00 0.00	0.0000	101.00	No Ice 1/2" Ice	10.20 16.20	10.20 16.20	0.25 0.35
PiROD 12' Lightweight T-Frame (Verizon)	B	From Leg	2.00 0.00 0.00	0.0000	101.00	No Ice 1/2" Ice	10.20 16.20	10.20 16.20	0.25 0.35
PiROD 12' Lightweight T-Frame (Verizon)	C	From Leg	2.00 0.00 0.00	0.0000	101.00	No Ice 1/2" Ice	10.20 16.20	10.20 16.20	0.25 0.35
(2) TMA (shielded) (AT&T)	A	From Leg	4.00 6.00 0.00	0.0000	115.00	No Ice 1/2" Ice	0.00 0.00	0.00 0.00	0.01 0.01
(2) TMA (shielded) (AT&T)	A	From Leg	4.00 -6.00 0.00	0.0000	115.00	No Ice 1/2" Ice	0.00 0.00	0.00 0.00	0.01 0.01
(2) TMA (shielded) (AT&T)	B	From Leg	4.00 6.00 0.00	0.0000	115.00	No Ice 1/2" Ice	0.00 0.00	0.00 0.00	0.01 0.01
(2) TMA (shielded) (AT&T)	B	From Leg	4.00 -6.00 0.00	0.0000	115.00	No Ice 1/2" Ice	0.00 0.00	0.00 0.00	0.01 0.01
(2) TMA (shielded) (AT&T)	C	From Leg	4.00 6.00	0.0000	115.00	No Ice 1/2" Ice	0.00 0.00	0.00 0.00	0.01 0.01

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	Client: Sprint / T-Mobile	Designed by: Michael_Dalickas

Description	Face or Leg	Offset Type	Offsets: Horz Lateral / Vert	Azimuth Adjustment	Placement		C_AA_A Front	C_AA_A Side	Weight
			ft / ft / ft	°	ft		ft^2	ft^2	K
			0.00						
(2) TMA (shielded)	C	From Leg	4.00	0.0000	115.00	No Ice	0.00	0.00	0.01
(AT&T)			-6.00			1/2" Ice	0.00	0.00	0.01
			0.00						
PiROD 12' Lightweight	A	From Leg	2.00	0.0000	115.00	No Ice	10.20	10.20	0.25
T-Frame			0.00			1/2" Ice	16.20	16.20	0.35
(AT&T)			0.00						
PiROD 12' Lightweight	B	From Leg	2.00	0.0000	115.00	No Ice	10.20	10.20	0.25
T-Frame			0.00			1/2" Ice	16.20	16.20	0.35
(AT&T)			0.00						
PiROD 12' Lightweight	C	From Leg	2.00	0.0000	115.00	No Ice	10.20	10.20	0.25
T-Frame			0.00			1/2" Ice	16.20	16.20	0.35
(AT&T)			0.00						
PiROD 10' Lightweight	A	From Leg	2.00	0.0000	125.50	No Ice	9.30	9.30	0.25
T-Frame			0.00			1/2" Ice	14.50	14.50	0.34
(T-Mobile)			0.00						
PiROD 10' Lightweight	B	From Leg	2.00	0.0000	125.50	No Ice	9.30	9.30	0.25
T-Frame			0.00			1/2" Ice	14.50	14.50	0.34
(T-Mobile)			0.00						
PiROD 10' Lightweight	C	From Leg	2.00	0.0000	125.50	No Ice	9.30	9.30	0.25
T-Frame			0.00			1/2" Ice	14.50	14.50	0.34
(T-Mobile)			0.00						
3" Dia 20' Omni	C	From Face	6.00	0.0000	144.00	No Ice	6.00	6.00	0.06
(Municipal)			9.00			1/2" Ice	8.03	8.03	0.10
			0.00						
PiROD 20' Universal	C	None		0.0000	134.00	No Ice	33.10	33.10	2.27
Platform						1/2" Ice	47.10	47.10	2.70
(Municipal)									
3" Dia 20' Omni	A	From Face	6.00	0.0000	144.00	No Ice	6.00	6.00	0.06
(Municipal)			-9.00			1/2" Ice	8.03	8.03	0.10
			0.00						
9' Whip	A	From Face	6.00	0.0000	138.50	No Ice	5.85	5.85	0.12
(Municipal)			0.00			1/2" Ice	7.66	7.66	0.17
			0.00						
2.5" x 20'6" Whip	A	From Face	6.00	0.0000	144.00	No Ice	5.14	5.14	0.15
(Municipal)			9.00			1/2" Ice	7.24	7.24	0.19
			0.00						
2" Dia 15' Omni	B	From Face	6.00	0.0000	141.00	No Ice	3.20	3.20	0.04
(Municipal)			-5.00			1/2" Ice	4.83	4.83	0.06
			0.00						
1.5" x 10' Omni	B	From Face	6.00	0.0000	139.00	No Ice	1.50	1.50	0.06
(Municipal)			5.00			1/2" Ice	2.52	2.52	0.07
			0.00						
SC420-HF1LDF	A	From Face	6.00	0.0000	158.50	No Ice	2.14	2.14	0.02
(Municipal)			0.00			1/2" Ice	3.02	3.02	0.03
			0.00						
APXV18-206517S-C w/	A	From Leg	1.00	0.0000	159.50	No Ice	5.08	4.46	0.05
mounting hardware			0.00			1/2" Ice	5.53	5.39	0.09
			0.00						
APXV18-206517S-C w/	B	From Leg	1.00	0.0000	159.50	No Ice	5.08	4.46	0.05
mounting hardware			0.00			1/2" Ice	5.53	5.39	0.09
			0.00						
APXV18-206517S-C w/	C	From Leg	1.00	0.0000	159.50	No Ice	5.08	4.46	0.05
mounting hardware			0.00			1/2" Ice	5.53	5.39	0.09
			0.00						
9 Arm Halo Mount	C	None		0.0000	168.00	No Ice	62.60	62.60	3.60
(Municipal)						1/2" Ice	80.40	80.40	4.80

tnxTower	Job: PiROD U20'-0"x170' Lattice Tower	Page: 13 of 43
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	Client: Sprint / T-Mobile	Designed by: Michael_Dalickas

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
SU-RA-HP-2.4 Antenna	B	From Face	3.00	0.0000	168.00	No Ice	0.80	0.37	0.00
(Municipal)			2.50			1/2" Ice	0.93	0.47	0.01
			0.00						
950G65VTZE-M	B	From Face	6.00	0.0000	168.00	No Ice	3.99	2.78	0.01
(Sprint)			1.25			1/2" Ice	4.37	3.15	0.03
			0.00						
950G65VTZE-M	B	From Leg	2.50	0.0000	168.00	No Ice	3.99	2.78	0.01
(Sprint)			0.00			1/2" Ice	4.37	3.15	0.03
			0.00						
950G65VTZE-M	C	From Face	6.00	0.0000	168.00	No Ice	3.99	2.78	0.01
(Sprint)			-1.25			1/2" Ice	4.37	3.15	0.03
			0.00						
950G65VTZE-M	C	From Face	6.00	0.0000	168.00	No Ice	3.99	2.78	0.01
(Sprint)			1.25			1/2" Ice	4.37	3.15	0.03
			0.00						
950G65VTZE-M	C	From Leg	2.50	0.0000	168.00	No Ice	3.99	2.78	0.01
(Sprint)			0.00			1/2" Ice	4.37	3.15	0.03
			0.00						
950G65VTZE-M	A	From Face	6.00	0.0000	168.00	No Ice	3.99	2.78	0.01
(Sprint)			0.00			1/2" Ice	4.37	3.15	0.03
			0.00						
101-90-08-0-01	A	From Leg	2.50	0.0000	183.00	No Ice	3.33	3.33	0.04
(Municipal)			2.00			1/2" Ice	4.31	4.31	0.06
			0.00						
3" Dia 20' Omni	B	From Face	9.00	0.0000	178.00	No Ice	6.00	6.00	0.06
(Municipal)			0.00			1/2" Ice	8.03	8.03	0.10
			0.00						
2.5" x 20'6" Whip	C	From Face	0.00	0.0000	178.00	No Ice	5.14	5.14	0.15
(Municipal)			0.00			1/2" Ice	7.24	7.24	0.19
			0.00						
2.5" x 14' Omni	C	From Face	0.00	0.0000	175.00	No Ice	3.50	3.50	0.03
(Municipal)			0.00			1/2" Ice	4.93	4.93	0.06
			0.00						
2.5" x 14' Omni	C	From Face	0.00	0.0000	175.00	No Ice	3.50	3.50	0.03
(Municipal)			0.00			1/2" Ice	4.93	4.93	0.06
			0.00						
15' Mount Pipe	A	From Leg	2.50	0.0000	179.75	No Ice	4.50	4.50	0.09
(Municipal)			2.00			1/2" Ice	6.03	6.03	0.12
			0.00						
2.5" x 14' Omni	C	From Face	0.00	0.0000	175.00	No Ice	3.50	3.50	0.03
(Municipal)			0.00			1/2" Ice	4.93	4.93	0.06
			0.00						
1.5" x 12' Omni	A	From Face	2.50	0.0000	174.00	No Ice	1.50	1.50	0.06
(Municipal)			4.00			1/2" Ice	2.52	2.52	0.07
			0.00						
AIR B2A/B4P	A	From Leg	4.00	0.0000	125.50	No Ice	6.42	4.22	0.08
(T-Mobile)			3.00			1/2" Ice	6.86	4.64	0.12
			0.00						
AIR B2A/B4P	B	From Leg	4.00	0.0000	125.50	No Ice	6.42	4.22	0.08
(T-Mobile)			3.00			1/2" Ice	6.86	4.64	0.12
			0.00						
AIR B2A/B4P	C	From Leg	4.00	0.0000	125.50	No Ice	6.42	4.22	0.08
(T-Mobile)			3.00			1/2" Ice	6.86	4.64	0.12
			0.00						
AIR B2A/B4P	A	From Leg	4.00	0.0000	125.50	No Ice	6.42	4.22	0.08
(T-Mobile)			-3.00			1/2" Ice	6.86	4.64	0.12
			0.00						

tnxTower	Job: PiROD U20'-0"x170' Lattice Tower	Page: 14 of 43
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	Client: Sprint / T-Mobile	Designed by: Michael_Dalickas

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
AIR B2A/B4P	B	From Leg	4.00	0.0000	125.50	No Ice	6.42	4.22	0.08
(T-Mobile)			-3.00			1/2" Ice	6.86	4.64	0.12
			0.00						
AIR B2A/B4P	C	From Leg	4.00	0.0000	125.50	No Ice	6.42	4.22	0.08
(T-Mobile)			-3.00			1/2" Ice	6.86	4.64	0.12
			0.00						
Twin PCS TMA	A	From Leg	4.00	0.0000	125.50	No Ice	0.77	0.36	0.01
(T-Mobile)			3.00			1/2" Ice	0.96	0.52	0.02
			0.00						
Twin PCS TMA	B	From Leg	4.00	0.0000	125.50	No Ice	0.77	0.36	0.01
(T-Mobile)			3.00			1/2" Ice	0.96	0.52	0.02
			0.00						
Twin PCS TMA	C	From Leg	4.00	0.0000	125.50	No Ice	0.77	0.36	0.01
(T-Mobile)			3.00			1/2" Ice	0.96	0.52	0.02
			0.00						
Argus LLPX310R	A	From Face	6.00	0.0000	134.00	No Ice	4.86	3.46	0.03
(Clearwire)			7.00			1/2" Ice	5.22	3.80	0.06
			0.00						
Argus LLPX310R	B	From Face	6.00	0.0000	134.00	No Ice	4.86	3.46	0.03
(Clearwire)			0.00			1/2" Ice	5.22	3.80	0.06
			0.00						
Argus LLPX310R	C	From Face	6.00	0.0000	134.00	No Ice	4.86	3.46	0.03
(Clearwire)			7.00			1/2" Ice	5.22	3.80	0.06
			0.00						
REMOTE RADIO HEAD	A	From Face	6.00	0.0000	134.00	No Ice	1.82	0.83	0.03
(RRH)			7.00			1/2" Ice	2.00	0.97	0.04
(Clearwire)			0.00						
REMOTE RADIO HEAD	B	From Face	6.00	0.0000	134.00	No Ice	1.82	0.83	0.03
(RRH)			0.00			1/2" Ice	2.00	0.97	0.04
(Clearwire)			0.00						
REMOTE RADIO HEAD	C	From Face	6.00	0.0000	134.00	No Ice	1.82	0.83	0.03
(RRH)			7.00			1/2" Ice	2.00	0.97	0.04
(Clearwire)			0.00						
7770.00	A	From Leg	4.00	0.0000	115.00	No Ice	10.03	5.60	0.02
(AT&T)			6.00			1/2" Ice	10.61	6.15	0.07
			0.00						
7770.00	A	From Leg	4.00	0.0000	115.00	No Ice	10.03	5.60	0.02
(AT&T)			-6.00			1/2" Ice	10.61	6.15	0.07
			0.00						
7770.00	B	From Leg	4.00	0.0000	115.00	No Ice	10.03	5.60	0.02
(AT&T)			6.00			1/2" Ice	10.61	6.15	0.07
			0.00						
7770.00	B	From Leg	4.00	0.0000	115.00	No Ice	10.03	5.60	0.02
(AT&T)			-6.00			1/2" Ice	10.61	6.15	0.07
			0.00						
7770.00	C	From Leg	4.00	0.0000	115.00	No Ice	10.03	5.60	0.02
(AT&T)			6.00			1/2" Ice	10.61	6.15	0.07
			0.00						
7770.00	C	From Leg	4.00	0.0000	115.00	No Ice	10.03	5.60	0.02
(AT&T)			-6.00			1/2" Ice	10.61	6.15	0.07
			0.00						
AM-X-CD-16-65-00T-RET	A	From Leg	4.00	0.0000	115.00	No Ice	8.26	4.64	0.05
(6')			0.00			1/2" Ice	8.81	5.09	0.10
(AT&T)			0.00						
AM-X-CD-16-65-00T-RET	B	From Leg	4.00	0.0000	115.00	No Ice	8.26	4.64	0.05
(6')			0.00			1/2" Ice	8.81	5.09	0.10
(AT&T)			0.00						

tnxTower	Job: PiROD U20'-0"x170' Lattice Tower	Page: 15 of 43
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	Client: Sprint / T-Mobile	Designed by: Michael_Dalickas

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft²	C_AA_A Side ft²	Weight K
AM-X-CD-16-65-00T-RET	C	From Leg	4.00	0.0000	115.00	No Ice	8.26	4.64	0.05
(6')			0.00			1/2" Ice	8.81	5.09	0.10
(AT&T)			0.00						
(2) REMOTE RADIO HEAD	A	From Leg	0.00	0.0000	115.00	No Ice	1.82	0.83	0.03
(RRH)			0.00			1/2" Ice	2.00	0.97	0.04
(AT&T)			0.00						
(2) REMOTE RADIO HEAD	B	From Leg	0.00	0.0000	115.00	No Ice	1.82	0.83	0.03
(RRH)			0.00			1/2" Ice	2.00	0.97	0.04
(AT&T)			0.00						
(2) REMOTE RADIO HEAD	C	From Leg	0.00	0.0000	115.00	No Ice	1.82	0.83	0.03
(RRH)			0.00			1/2" Ice	2.00	0.97	0.04
(AT&T)			0.00						
Surge Suppressor	C	From Leg	0.00	0.0000	115.00	No Ice	0.80	0.80	0.03
(AT&T)			0.00			1/2" Ice	0.94	0.94	0.04
			0.00						
Camera	A	From Leg	0.00	0.0000	30.00	No Ice	0.50	0.50	0.01
			0.00			1/2" Ice	0.60	0.60	0.02
			0.00						
(2) Diplexer	A	From Leg	4.00	0.0000	101.00	No Ice	0.23	0.17	0.01
(Verizon)			6.00			1/2" Ice	0.30	0.24	0.01
			0.00						
(2) Diplexer	B	From Leg	4.00	0.0000	101.00	No Ice	0.23	0.17	0.01
(Verizon)			6.00			1/2" Ice	0.30	0.24	0.01
			0.00						
(2) Diplexer	C	From Leg	4.00	0.0000	101.00	No Ice	0.23	0.17	0.01
(Verizon)			6.00			1/2" Ice	0.30	0.24	0.01
			0.00						
PTP49600	C	From Leg	2.00	0.0000	168.00	No Ice	2.04	0.53	0.01
(CPD)			0.00			1/2" Ice	2.24	0.65	0.02
			0.00						
APXV18-209014-C-A20	A	From Face	7.00	0.0000	170.00	No Ice	3.51	2.00	0.02
(Sprint)			-2.50			1/2" Ice	3.85	2.33	0.04
			0.00						
APXV18-209014-C-A20	B	From Face	7.00	0.0000	170.00	No Ice	3.51	2.00	0.02
(Sprint)			-2.50			1/2" Ice	3.85	2.33	0.04
			0.00						
APXV18-209014-C-A20	C	From Face	7.00	0.0000	170.00	No Ice	3.51	2.00	0.02
(Sprint)			-2.50			1/2" Ice	3.85	2.33	0.04
			0.00						
(2) REMOTE RADIO HEAD	A	From Face	6.00	0.0000	170.00	No Ice	1.82	0.83	0.03
(RRH)			0.00			1/2" Ice	2.00	0.97	0.04
(Sprint)			0.00						
(2) REMOTE RADIO HEAD	B	From Face	6.00	0.0000	170.00	No Ice	1.82	0.83	0.03
(RRH)			0.00			1/2" Ice	2.00	0.97	0.04
(Sprint)			0.00						
(2) REMOTE RADIO HEAD	C	From Face	6.00	0.0000	170.00	No Ice	1.82	0.83	0.03
(RRH)			0.00			1/2" Ice	2.00	0.97	0.04
(Sprint)			0.00						
800 MHz Filter	A	From Face	6.00	0.0000	170.00	No Ice	0.52	0.38	0.01
(Sprint)			0.00			1/2" Ice	0.65	0.50	0.01
			0.00						
800 MHz Filter	B	From Face	6.00	0.0000	170.00	No Ice	0.52	0.38	0.01
(Sprint)			0.00			1/2" Ice	0.65	0.50	0.01
			0.00						
800 MHz Filter	C	From Face	6.00	0.0000	170.00	No Ice	0.52	0.38	0.01
(Sprint)			0.00			1/2" Ice	0.65	0.50	0.01
			0.00						

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	Client: Sprint / T-Mobile	Designed by: Michael_Dalickas

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
BXA-70063-6CF (Verizon)	B	From Leg	4.00 -4.00 0.00	0.0000	101.00	No Ice 1/2" Ice	7.73 8.27	4.16 4.60	0.02 0.06

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
3' Dish	A	Paraboloid w/o Radome	From Leg	2.00 0.00 0.00	0.0000		83.00	3.00	No Ice 1/2" Ice	7.07 7.47	0.23 0.27
VHLP2.5-180 (Clearwire)	A	Paraboloid w/o Radome	From Face	6.00 0.00 0.00	0.0000		134.00	2.50	No Ice 1/2" Ice	4.90 5.24	0.07 0.10
VHLP2.5-180 (Clearwire)	A	Paraboloid w/o Radome	From Face	6.00 -7.00 0.00	0.0000		134.00	2.50	No Ice 1/2" Ice	4.90 5.24	0.07 0.10
VHLP2.5-180 (Clearwire)	B	Paraboloid w/o Radome	From Face	6.00 -7.00 0.00	0.0000		134.00	2.50	No Ice 1/2" Ice	4.90 5.24	0.07 0.10
VHLP2-180 (Clearwire)	C	Paraboloid w/o Radome	From Face	6.00 0.00 0.00	0.0000		134.00	2.00	No Ice 1/2" Ice	3.14 3.41	0.03 0.04
HPD2-4.7	C	Paraboloid w/Radome	From Face	2.00 0.00 0.00	0.0000		168.00	2.00	No Ice 1/2" Ice	3.14 3.41	0.03 0.04

Truss-Leg Properties

Section Designation	Area in^2	Area Ice in^2	Self Weight K	Ice Weight K	Equiv. Diameter in	Equiv. Diameter Ice in	Leg Area in^2
Pirod 105244	1026.8606	1727.9786	0.56	0.21	7.1310	11.9999	3.6816
Pirod 105216	1998.0891	3357.4497	0.51	0.43	6.9378	11.6578	3.6816
Pirod 105217	2130.7479	3520.4599	0.62	0.44	7.3984	12.2238	5.3014
Pirod 105217	2130.7479	3520.4599	0.62	0.44	7.3984	12.2238	5.3014
Pirod 105217 reinf w/ 1" dia bar	2291.5652	3727.7657	0.79	0.46	7.9568	12.9436	7.6570
Pirod 105218 reinf w/ 1" dia bar	2425.8928	3907.6826	0.95	0.48	8.4232	13.5683	9.9280
Pirod 105219	2441.8688	3942.2854	0.94	0.49	8.4787	13.6885	9.4248
Pirod 105219 reinf w /1" dia bar	2571.0468	4121.6676	1.11	0.50	8.9272	14.3113	11.7803
Pirod 105220 reinf	2697.7688	4300.8949	1.29	0.51	9.3673	14.9337	14.2843

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	Client: Sprint / T-Mobile	Designed by: Michael_Dalickas

Section Designation	Area	Area Ice	Self Weight	Ice Weight	Equiv. Diameter	Equiv. Diameter Ice	Leg Area
	in^2	in^2	K	K	in	in	in^2
w/ 1" dia bar							

Tower Pressures - No Ice

$G_H = 1.125$

Section Elevation	z	K_Z	q_z	A_G	Face	A_F	A_R	A_{Leg}	Leg %	C_AA_A In Face	C_AA_A Out Face
ft	ft		psf	ft^2		ft^2	ft^2	ft^2		ft^2	ft^2
T1	160.00	1.57	29	102.917	A	0.000	62.782	5.833	9.29	0.000	0.000
170.00-150.00					B	0.000	65.204		8.95	0.000	0.000
					C	0.000	16.568		35.21	0.000	0.000
T2	145.00	1.526	28	66.055	A	5.148	43.874	11.905	24.28	0.000	0.000
150.00-140.00					B	4.229	50.274		21.84	0.000	0.000
					C	5.476	13.755		61.91	0.000	0.000
T3	130.00	1.48	27	162.111	A	9.952	91.836	23.165	22.76	0.000	0.000
140.00-120.00					B	7.660	121.001		18.00	0.000	0.000
					C	9.931	39.645		46.72	0.000	0.000
T4	110.00	1.411	26	202.528	A	13.450	119.674	24.703	18.56	0.000	0.000
120.00-100.00					B	10.797	144.253		15.93	0.000	0.000
					C	11.118	111.486		20.15	0.000	0.000
T5	95.00	1.353	25	116.264	A	6.358	79.561	12.351	14.38	0.000	0.000
100.00-90.00					B	5.310	72.127		15.95	0.000	0.000
					C	5.321	77.145		14.98	0.000	0.000
T6 90.00-80.00	85.00	1.31	24	126.517	A	6.764	83.327	13.283	14.74	0.000	0.000
					B	5.758	75.892		16.27	0.000	0.000
					C	5.769	78.077		15.84	0.000	0.000
T7 80.00-60.00	70.00	1.24	23	283.450	A	14.773	172.545	28.124	15.01	0.000	0.000
					B	12.856	157.675		16.49	0.000	0.000
					C	12.876	157.712		16.49	0.000	0.000
T8 60.00-40.00	50.00	1.126	21	323.362	A	19.222	172.730	28.309	14.75	0.000	0.000
					B	17.092	157.860		16.18	0.000	0.000
					C	17.115	157.897		16.18	0.000	0.000
T9 40.00-20.00	30.00	1	18	363.756	A	21.262	175.677	29.807	15.14	0.000	0.000
					B	19.207	160.808		16.56	0.000	0.000
					C	19.229	159.395		16.69	0.000	0.000
T10 20.00-0.00	10.00	1	18	404.134	A	26.837	127.034	31.276	20.33	0.000	0.000
					B	25.350	117.369		21.91	0.000	0.000
					C	25.366	115.508		22.20	0.000	0.000

Tower Pressure - With Ice

$G_H = 1.125$

Section Elevation	z	K_Z	q_z	t_Z	A_G	Face	A_F	A_R	A_{Leg}	Leg %	C_AA_A In Face	C_AA_A Out Face
ft	ft		psf	in	ft^2		ft^2	ft^2	ft^2		ft^2	ft^2
T1	160.00	1.57	22	0.5000	104.583	A	3.517	94.175	9.167	9.38	0.000	0.000
170.00-150.00						B	0.000	99.050		9.25	0.000	0.000
						C	3.517	27.757		29.31	0.000	0.000
T2	145.00	1.526	21	0.5000	66.890	A	6.721	66.489	20.033	27.36	0.000	0.000

tnxTower	Job: PiROD U20'-0"x170' Lattice Tower	Page: 18 of 43
URS Corporation 500 Enterprise Drive, Suite 3B Rocky Hill, CT 06067 Phone: 860-529-8882 FAX: 860-529-3991	Project: HPC-060 / Cromwell, CT Tower MOD	Date: 13:13:23 09/09/13
	Client: Sprint / T-Mobile	Designed by: Michael_Dalickas

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
150.00-140.00						B	3.579	76.615		24.98	0.000	0.000
						C	7.234	23.901		64.34	0.000	0.000
T3	130.00	1.48	21	0.5000	163.780	A	13.177	141.599	38.924	25.15	0.000	0.000
140.00-120.00						B	21.474	172.905		20.02	0.000	0.000
						C	13.171	62.064		51.74	0.000	0.000
T4	110.00	1.411	20	0.5000	204.197	A	16.676	172.288	40.814	21.60	0.000	0.000
120.00-100.00						B	30.971	196.266		17.96	0.000	0.000
						C	22.881	143.927		24.47	0.000	0.000
T5 100.00-90.00	95.00	1.353	19	0.5000	117.098	A	8.001	106.756	20.407	17.78	0.000	0.000
						B	15.638	98.184		17.93	0.000	0.000
						C	12.961	94.104		19.06	0.000	0.000
T6 90.00-80.00	85.00	1.31	18	0.5000	127.351	A	12.412	109.762	21.609	17.69	0.000	0.000
						B	20.122	101.214		17.81	0.000	0.000
						C	13.441	95.465		19.84	0.000	0.000
T7 80.00-60.00	70.00	1.24	17	0.5000	285.119	A	31.412	225.361	45.303	17.64	0.000	0.000
						B	47.000	208.320		17.74	0.000	0.000
						C	28.294	193.488		20.43	0.000	0.000
T8 60.00-40.00	50.00	1.126	16	0.5000	325.031	A	35.838	226.333	45.704	17.43	0.000	0.000
						B	51.053	209.346		17.55	0.000	0.000
						C	32.368	194.510		20.14	0.000	0.000
T9 40.00-20.00	30.00	1	14	0.5000	365.425	A	37.887	232.248	47.784	17.69	0.000	0.000
						B	53.231	215.298		17.79	0.000	0.000
						C	34.539	197.210		20.62	0.000	0.000
T10 20.00-0.00	10.00	1	14	0.5000	405.803	A	37.626	174.638	49.862	23.49	0.000	0.000
						B	47.335	163.638		23.63	0.000	0.000
						C	35.201	149.767		26.96	0.000	0.000

Tower Pressure - Service

$G_H = 1.125$

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
T1	160.00	1.57	10	102.917	A	0.000	62.782	5.833	9.29	0.000	0.000
170.00-150.00					B	0.000	65.204		8.95	0.000	0.000
					C	0.000	16.568		35.21	0.000	0.000
T2	145.00	1.526	10	66.055	A	5.148	43.874	11.905	24.28	0.000	0.000
150.00-140.00					B	4.229	50.274		21.84	0.000	0.000
					C	5.476	13.755		61.91	0.000	0.000
T3	130.00	1.48	9	162.111	A	9.952	91.836	23.165	22.76	0.000	0.000
140.00-120.00					B	7.660	121.001		18.00	0.000	0.000
					C	9.931	39.645		46.72	0.000	0.000
T4	110.00	1.411	9	202.528	A	13.450	119.674	24.703	18.56	0.000	0.000
120.00-100.00					B	10.797	144.253		15.93	0.000	0.000
					C	11.118	111.486		20.15	0.000	0.000
T5	95.00	1.353	9	116.264	A	6.358	79.561	12.351	14.38	0.000	0.000
100.00-90.00					B	5.310	72.127		15.95	0.000	0.000
					C	5.321	77.145		14.98	0.000	0.000
T6 90.00-80.00	85.00	1.31	8	126.517	A	6.764	83.327	13.283	14.74	0.000	0.000
					B	5.758	75.892		16.27	0.000	0.000
					C	5.769	78.077		15.84	0.000	0.000
T7 80.00-60.00	70.00	1.24	8	283.450	A	14.773	172.545	28.124	15.01	0.000	0.000
					B	12.856	157.675		16.49	0.000	0.000

tnxTower	Job: PiROD U20'-0"x170' Lattice Tower	Page: 19 of 43
URS Corporation 500 Enterprise Drive, Suite 3B Rocky Hill, CT 06067 Phone: 860-529-8882 FAX: 860-529-3991	Project: HPC-060 / Cromwell, CT Tower MOD	Date: 13:13:23 09/09/13
	Client: Sprint / T-Mobile	Designed by: Michael Dalickas

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	12.876	157.712		16.49	0.000	0.000
T8 60.00-40.00	50.00	1.126	7	323.362	A	19.222	172.730	28.309	14.75	0.000	0.000
					B	17.092	157.860		16.18	0.000	0.000
					C	17.115	157.897		16.18	0.000	0.000
T9 40.00-20.00	30.00	1	6	363.756	A	21.262	175.677	29.807	15.14	0.000	0.000
					B	19.207	160.808		16.56	0.000	0.000
					C	19.229	159.395		16.69	0.000	0.000
T10 20.00-0.00	10.00	1	6	404.134	A	26.837	127.034	31.276	20.33	0.000	0.000
					B	25.350	117.369		21.91	0.000	0.000
					C	25.366	115.508		22.20	0.000	0.000

Tower Forces - No Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl Face
T1	0.40	1.16	A	0.61	1.798	0.76	1	1	47.701	2.95	147.41	B
170.00-150.00			B	0.634	1.787	0.775	1	1	50.515			
			C	0.161	2.732	0.583	1	1	9.663			
T2	0.28	1.12	A	0.742	1.785	0.851	1	1	42.480	2.94	293.61	B
150.00-140.00			B	0.825	1.837	0.917	1	1	50.341			
			C	0.291	2.32	0.613	1	1	13.910			
T3	0.72	2.09	A	0.628	1.789	0.771	1	1	80.764	6.44	321.98	B
140.00-120.00			B	0.794	1.811	0.891	1	1	115.502			
			C	0.306	2.281	0.618	1	1	34.420			
T4	1.28	2.60	A	0.657	1.78	0.79	1	1	108.034	7.17	358.45	B
120.00-100.00			B	0.766	1.795	0.869	1	1	136.140			
			C	0.605	1.801	0.757	1	1	95.502			
T5	0.80	1.48	A	0.739	1.784	0.849	1	1	73.868	3.71	370.73	A
100.00-90.00			B	0.666	1.778	0.796	1	1	62.740			
			C	0.709	1.777	0.827	1	1	69.088			
T6	0.81	1.76	A	0.712	1.777	0.829	1	1	75.809	3.67	367.27	A
90.00-80.00			B	0.645	1.783	0.782	1	1	65.137			
			C	0.663	1.778	0.794	1	1	67.762			
T7	1.63	4.33	A	0.661	1.779	0.793	1	1	151.553	6.95	347.63	A
80.00-60.00			B	0.602	1.803	0.755	1	1	131.837			
			C	0.602	1.803	0.755	1	1	131.905			
T8	1.63	4.45	A	0.594	1.808	0.75	1	1	148.720	6.30	314.95	A
60.00-40.00			B	0.541	1.852	0.719	1	1	130.640			
			C	0.541	1.852	0.719	1	1	130.705			
T9	1.64	5.44	A	0.541	1.852	0.719	1	1	147.661	5.69	284.45	A
40.00-20.00			B	0.495	1.907	0.695	1	1	130.952			
			C	0.491	1.912	0.693	1	1	129.686			
T10	1.07	6.08	A	0.381	2.103	0.644	1	1	108.639	4.75	237.68	A
20.00-0.00			B	0.353	2.164	0.634	1	1	99.715			
			C	0.349	2.175	0.632	1	1	98.363			
Sum Weight:	10.27	30.51						OTM	4207.41 kip-ft	50.57		

Tower Forces - No Ice - Wind 45 To Face

tnxTower	Job: PiROD U20'-0"x170' Lattice Tower	Page: 20 of 43
URS Corporation 500 Enterprise Drive, Suite 3B Rocky Hill, CT 06067 Phone: 860-529-8882 FAX: 860-529-3991	Project: HPC-060 / Cromwell, CT Tower MOD	Date: 13:13:23 09/09/13
	Client: Sprint / T-Mobile	Designed by: Michael_Dalickas

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.40	1.16	A	0.61	1.798	0.76	0.825	1	47.701	2.95	147.41	B
170.00-150.00			B	0.634	1.787	0.775	0.825	1	50.515			
			C	0.161	2.732	0.583	0.825	1	9.663			
T2	0.28	1.12	A	0.742	1.785	0.851	0.825	1	41.579	2.89	289.29	B
150.00-140.00			B	0.825	1.837	0.917	0.825	1	49.601			
			C	0.291	2.32	0.613	0.825	1	12.952			
T3	0.72	2.09	A	0.628	1.789	0.771	0.825	1	79.023	6.36	318.25	B
140.00-120.00			B	0.794	1.811	0.891	0.825	1	114.161			
			C	0.306	2.281	0.618	0.825	1	32.682			
T4	1.28	2.60	A	0.657	1.78	0.79	0.825	1	105.680	7.07	353.48	B
120.00-100.00			B	0.766	1.795	0.869	0.825	1	134.251			
			C	0.605	1.801	0.757	0.825	1	93.557			
T5	0.80	1.48	A	0.739	1.784	0.849	0.825	1	72.755	3.65	365.15	A
100.00-90.00			B	0.666	1.778	0.796	0.825	1	61.811			
			C	0.709	1.777	0.827	0.825	1	68.157			
T6	0.81	1.76	A	0.712	1.777	0.829	0.825	1	74.625	3.62	361.54	A
90.00-80.00			B	0.645	1.783	0.782	0.825	1	64.129			
			C	0.663	1.778	0.794	0.825	1	66.752			
T7	1.63	4.33	A	0.661	1.779	0.793	0.825	1	148.968	6.83	341.70	A
80.00-60.00			B	0.602	1.803	0.755	0.825	1	129.587			
			C	0.602	1.803	0.755	0.825	1	129.651			
T8	1.63	4.45	A	0.594	1.808	0.75	0.825	1	145.356	6.16	307.83	A
60.00-40.00			B	0.541	1.852	0.719	0.825	1	127.648			
			C	0.541	1.852	0.719	0.825	1	127.710			
T9	1.64	5.44	A	0.541	1.852	0.719	0.825	1	143.940	5.55	277.28	A
40.00-20.00			B	0.495	1.907	0.695	0.825	1	127.591			
			C	0.491	1.912	0.693	0.825	1	126.321			
T10	1.07	6.08	A	0.381	2.103	0.644	0.825	1	103.942	4.55	227.41	A
20.00-0.00			B	0.353	2.164	0.634	0.825	1	95.279			
			C	0.349	2.175	0.632	0.825	1	93.924			
Sum Weight:	10.27	30.51						OTM	4148.53 kip-ft	49.63		

Tower Forces - No Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.40	1.16	A	0.61	1.798	0.76	0.8	1	47.701	2.95	147.41	B
170.00-150.00			B	0.634	1.787	0.775	0.8	1	50.515			
			C	0.161	2.732	0.583	0.8	1	9.663			
T2	0.28	1.12	A	0.742	1.785	0.851	0.8	1	41.450	2.89	288.67	B
150.00-140.00			B	0.825	1.837	0.917	0.8	1	49.495			
			C	0.291	2.32	0.613	0.8	1	12.815			
T3	0.72	2.09	A	0.628	1.789	0.771	0.8	1	78.774	6.35	317.71	B
140.00-120.00			B	0.794	1.811	0.891	0.8	1	113.970			
			C	0.306	2.281	0.618	0.8	1	32.434			
T4	1.28	2.60	A	0.657	1.78	0.79	0.8	1	105.344	7.06	352.77	B
120.00-100.00			B	0.766	1.795	0.869	0.8	1	133.981			
			C	0.605	1.801	0.757	0.8	1	93.279			
T5	0.80	1.48	A	0.739	1.784	0.849	0.8	1	72.596	3.64	364.35	A
100.00-90.00			B	0.666	1.778	0.796	0.8	1	61.678			
			C	0.709	1.777	0.827	0.8	1	68.024			
T6	0.81	1.76	A	0.712	1.777	0.829	0.8	1	74.456	3.61	360.72	A
90.00-80.00			B	0.645	1.783	0.782	0.8	1	63.986			

tnxTower	Job: PiROD U20'-0"x170' Lattice Tower	Page: 21 of 43
URS Corporation 500 Enterprise Drive, Suite 3B Rocky Hill, CT 06067 Phone: 860-529-8882 FAX: 860-529-3991	Project: HPC-060 / Cromwell, CT Tower MOD	Date: 13:13:23 09/09/13
	Client: Sprint / T-Mobile	Designed by: Michael_Dalickas

Section Elevation ft	Add Weight K	Self Weight K	Face	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
			C	0.663	1.778	0.794	0.8	1	66.608			
T7	1.63	4.33	A	0.661	1.779	0.793	0.8	1	148.599	6.82	340.85	A
80.00-60.00			B	0.602	1.803	0.755	0.8	1	129.266			
			C	0.602	1.803	0.755	0.8	1	129.329			
T8	1.63	4.45	A	0.594	1.808	0.75	0.8	1	144.875	6.14	306.81	A
60.00-40.00			B	0.541	1.852	0.719	0.8	1	127.221			
			C	0.541	1.852	0.719	0.8	1	127.282			
T9	1.64	5.44	A	0.541	1.852	0.719	0.8	1	143.408	5.53	276.26	A
40.00-20.00			B	0.495	1.907	0.695	0.8	1	127.111			
			C	0.491	1.912	0.693	0.8	1	125.840			
T10	1.07	6.08	A	0.381	2.103	0.644	0.8	1	103.271	4.52	225.94	A
20.00-0.00			B	0.353	2.164	0.634	0.8	1	94.645			
			C	0.349	2.175	0.632	0.8	1	93.290			
Sum Weight:	10.27	30.51						OTM	4140.12 kip-ft	49.49		

Tower Forces - No Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.40	1.16	A	0.61	1.798	0.76	0.85	1	47.701	2.95	147.41	B
170.00-150.00			B	0.634	1.787	0.775	0.85	1	50.515			
			C	0.161	2.732	0.583	0.85	1	9.663			
T2	0.28	1.12	A	0.742	1.785	0.851	0.85	1	41.708	2.90	289.91	B
150.00-140.00			B	0.825	1.837	0.917	0.85	1	49.707			
			C	0.291	2.32	0.613	0.85	1	13.089			
T3	0.72	2.09	A	0.628	1.789	0.771	0.85	1	79.272	6.38	318.78	B
140.00-120.00			B	0.794	1.811	0.891	0.85	1	114.353			
			C	0.306	2.281	0.618	0.85	1	32.930			
T4	1.28	2.60	A	0.657	1.78	0.79	0.85	1	106.017	7.08	354.19	B
120.00-100.00			B	0.766	1.795	0.869	0.85	1	134.521			
			C	0.605	1.801	0.757	0.85	1	93.835			
T5	0.80	1.48	A	0.739	1.784	0.849	0.85	1	72.914	3.66	365.95	A
100.00-90.00			B	0.666	1.778	0.796	0.85	1	61.943			
			C	0.709	1.777	0.827	0.85	1	68.290			
T6	0.81	1.76	A	0.712	1.777	0.829	0.85	1	74.794	3.62	362.36	A
90.00-80.00			B	0.645	1.783	0.782	0.85	1	64.273			
			C	0.663	1.778	0.794	0.85	1	66.896			
T7	1.63	4.33	A	0.661	1.779	0.793	0.85	1	149.338	6.85	342.54	A
80.00-60.00			B	0.602	1.803	0.755	0.85	1	129.908			
			C	0.602	1.803	0.755	0.85	1	129.973			
T8	1.63	4.45	A	0.594	1.808	0.75	0.85	1	145.836	6.18	308.85	A
60.00-40.00			B	0.541	1.852	0.719	0.85	1	128.076			
			C	0.541	1.852	0.719	0.85	1	128.138			
T9	1.64	5.44	A	0.541	1.852	0.719	0.85	1	144.471	5.57	278.30	A
40.00-20.00			B	0.495	1.907	0.695	0.85	1	128.071			
			C	0.491	1.912	0.693	0.85	1	126.801			
T10	1.07	6.08	A	0.381	2.103	0.644	0.85	1	104.613	4.58	228.88	A
20.00-0.00			B	0.353	2.164	0.634	0.85	1	95.913			
			C	0.349	2.175	0.632	0.85	1	94.558			
Sum Weight:	10.27	30.51						OTM	4156.94 kip-ft	49.76		

tnxTower	Job	Page
URS Corporation 500 Enterprise Drive, Suite 3B Rocky Hill, CT 06067 Phone: 860-529-8882 FAX: 860-529-3991	PiROD U20'-0"x170' Lattice Tower	22 of 43
	Project HPC-060 / Cromwell, CT Tower MOD	Date 13:13:23 09/09/13
	Client Sprint / T-Mobile	Designed by Michael_Dalickas

Tower Forces - With Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	1.06	1.49	A	0.934	1.976	1	1	1	97.692	4.85	242.43	B
170.00-150.00			B	0.947	1.998	1	1	1	99.050			
			C	0.299	2.299	0.616	1	1	20.604			
T2	0.73	1.64	A	1	2.1	1	1	1	73.210	3.19*	318.60	B
150.00-140.00			B	1	2.1	1	1	1	80.194			
			C	0.465	1.949	0.68	1	1	23.498			
T3	1.97	3.77	A	0.945	1.995	1	1	1	154.777	7.56*	378.07	B
140.00-120.00			B	1	2.1	1	1	1	194.378			
			C	0.459	1.958	0.678	1	1	55.227			
T4	3.41	4.44	A	0.925	1.962	1	1	1	188.964	8.99*	449.40	B
120.00-100.00			B	1	2.1	1	1	1	227.237			
			C	0.817	1.829	0.91	1	1	153.901			
T5	2.10	2.39	A	0.98	2.059	1	1	1	114.758	4.94*	494.28	A
100.00-90.00			B	0.972	2.044	1	1	1	113.821			
			C	0.914	1.945	0.996	1	1	106.720			
T6	2.15	2.70	A	0.959	2.02	1	1	1	122.173	5.05	504.63	A
90.00-80.00			B	0.953	2.008	1	1	1	121.336			
			C	0.855	1.867	0.943	1	1	103.462			
T7	4.37	6.30	A	0.901	1.925	0.984	1	1	253.085	9.42	471.11	A
80.00-60.00			B	0.895	1.918	0.979	1	1	250.939			
			C	0.778	1.801	0.879	1	1	198.288			
T8	4.37	6.58	A	0.807	1.821	0.902	1	1	239.948	7.68	383.84	A
60.00-40.00			B	0.801	1.817	0.897	1	1	238.907			
			C	0.698	1.776	0.818	1	1	191.573			
T9	4.40	7.67	A	0.739	1.784	0.849	1	1	234.995	6.54	327.07	B
40.00-20.00			B	0.735	1.782	0.845	1	1	235.243			
			C	0.634	1.787	0.775	1	1	187.400			
T10	2.88	8.52	A	0.523	1.872	0.71	1	1	161.538	4.77	238.73	B
20.00-0.00			B	0.52	1.875	0.708	1	1	163.165			
			C	0.456	1.964	0.676	1	1	136.437			
Sum Weight:	27.45	45.51			*2A_g limit			OTM	5395.28 kip-ft	62.99		

Tower Forces - With Ice - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	1.06	1.49	A	0.934	1.976	1	0.825	1	97.076	4.85	242.43	B
170.00-150.00			B	0.947	1.998	1	0.825	1	99.050			
			C	0.299	2.299	0.616	0.825	1	19.988			
T2	0.73	1.64	A	1	2.1	1	0.825	1	72.033	3.19*	318.60	B
150.00-140.00			B	1	2.1	1	0.825	1	79.568			
			C	0.465	1.949	0.68	0.825	1	22.232			
T3	1.97	3.77	A	0.945	1.995	1	0.825	1	152.471	7.56*	378.07	B
140.00-120.00			B	1	2.1	1	0.825	1	190.620			
			C	0.459	1.958	0.678	0.825	1	52.922			
T4	3.41	4.44	A	0.925	1.962	1	0.825	1	186.046	8.99*	449.40	B
120.00-100.00			B	1	2.1	1	0.825	1	221.817			

tnxTower	Job: PiROD U20'-0"x170' Lattice Tower	Page: 23 of 43
URS Corporation 500 Enterprise Drive, Suite 3B Rocky Hill, CT 06067 Phone: 860-529-8882 FAX: 860-529-3991	Project: HPC-060 / Cromwell, CT Tower MOD	Date: 13:13:23 09/09/13
	Client: Sprint / T-Mobile	Designed by: Michael_Dalickas

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
			C	0.817	1.829	0.91	0.825	1	149.897			
T5	2.10	2.39	A	0.98	2.059	1	0.825	1	113.358	4.93	492.69	A
100.00-90.00			B	0.972	2.044	1	0.825	1	111.085			
			C	0.914	1.945	0.996	0.825	1	104.452			
T6	2.15	2.70	A	0.959	2.02	1	0.825	1	120.001	4.96	495.65	A
90.00-80.00			B	0.953	2.008	1	0.825	1	117.814			
			C	0.855	1.867	0.943	0.825	1	101.109			
T7	4.37	6.30	A	0.901	1.925	0.984	0.825	1	247.588	9.22	460.88	A
80.00-60.00			B	0.895	1.918	0.979	0.825	1	242.714			
			C	0.778	1.801	0.879	0.825	1	193.336			
T8	4.37	6.58	A	0.807	1.821	0.902	0.825	1	233.677	7.48	373.81	A
60.00-40.00			B	0.801	1.817	0.897	0.825	1	229.973			
			C	0.698	1.776	0.818	0.825	1	185.908			
T9	4.40	7.67	A	0.739	1.784	0.849	0.825	1	228.365	6.35	317.75	A
40.00-20.00			B	0.735	1.782	0.845	0.825	1	225.927			
			C	0.634	1.787	0.775	0.825	1	181.356			
T10	2.88	8.52	A	0.523	1.872	0.71	0.825	1	154.954	4.53	226.61	B
20.00-0.00			B	0.52	1.875	0.708	0.825	1	154.881			
			C	0.456	1.964	0.676	0.825	1	130.277			
Sum Weight:	27.45	45.51			$^{*}2A_g$ limit			OTM	5353.77 kip-ft	62.05		

Tower Forces - With Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T1	1.06	1.49	A	0.934	1.976	1	0.8	1	96.988	4.85	242.43	B
170.00-150.00			B	0.947	1.998	1	0.8	1	99.050			
			C	0.299	2.299	0.616	0.8	1	19.901			
T2	0.73	1.64	A	1	2.1	1	0.8	1	71.865	3.19*	318.60	B
150.00-140.00			B	1	2.1	1	0.8	1	79.478			
			C	0.465	1.949	0.68	0.8	1	22.051			
T3	1.97	3.77	A	0.945	1.995	1	0.8	1	152.141	7.56*	378.07	B
140.00-120.00			B	1	2.1	1	0.8	1	190.084			
			C	0.459	1.958	0.678	0.8	1	52.593			
T4	3.41	4.44	A	0.925	1.962	1	0.8	1	185.629	8.99*	449.40	B
120.00-100.00			B	1	2.1	1	0.8	1	221.043			
			C	0.817	1.829	0.91	0.8	1	149.325			
T5	2.10	2.39	A	0.98	2.059	1	0.8	1	113.157	4.92	491.82	A
100.00-90.00			B	0.972	2.044	1	0.8	1	110.694			
			C	0.914	1.945	0.996	0.8	1	104.128			
T6	2.15	2.70	A	0.959	2.02	1	0.8	1	119.691	4.94	494.37	A
90.00-80.00			B	0.953	2.008	1	0.8	1	117.311			
			C	0.855	1.867	0.943	0.8	1	100.773			
T7	4.37	6.30	A	0.901	1.925	0.984	0.8	1	246.803	9.19	459.42	A
80.00-60.00			B	0.895	1.918	0.979	0.8	1	241.539			
			C	0.778	1.801	0.879	0.8	1	192.629			
T8	4.37	6.58	A	0.807	1.821	0.902	0.8	1	232.781	7.45	372.38	A
60.00-40.00			B	0.801	1.817	0.897	0.8	1	228.696			
			C	0.698	1.776	0.818	0.8	1	185.099			
T9	4.40	7.67	A	0.739	1.784	0.849	0.8	1	227.418	6.33	316.43	A
40.00-20.00			B	0.735	1.782	0.845	0.8	1	224.597			
			C	0.634	1.787	0.775	0.8	1	180.493			
T10	2.88	8.52	A	0.523	1.872	0.71	0.8	1	154.013	4.50	224.89	A

tnxTower	Job: PiROD U20'-0"x170' Lattice Tower	Page: 24 of 43
URS Corporation 500 Enterprise Drive, Suite 3B Rocky Hill, CT 06067 Phone: 860-529-8882 FAX: 860-529-3991	Project: HPC-060 / Cromwell, CT Tower MOD	Date: 13:13:23 09/09/13
	Client: Sprint / T-Mobile	Designed by: Michael_Dalickas

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
20.00-0.00			B	0.52	1.875	0.708	0.8	1	153.698			
			C	0.456	1.964	0.676	0.8	1	129.397			
Sum Weight:	27.45	45.51			*2A_g limit			OTM	5347.24 kip-ft	61.91		

Tower Forces - With Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	1.06	1.49	A	0.934	1.976	1	0.85	1	97.164	4.85	242.43	B
170.00-150.00			B	0.947	1.998	1	0.85	1	99.050			
			C	0.299	2.299	0.616	0.85	1	20.076			
T2	0.73	1.64	A	1	2.1	1	0.85	1	72.202	3.19*	318.60	B
150.00-140.00			B	1	2.1	1	0.85	1	79.657			
			C	0.465	1.949	0.68	0.85	1	22.413			
T3	1.97	3.77	A	0.945	1.995	1	0.85	1	152.800	7.56*	378.07	B
140.00-120.00			B	1	2.1	1	0.85	1	191.157			
			C	0.459	1.958	0.678	0.85	1	53.252			
T4	3.41	4.44	A	0.925	1.962	1	0.85	1	186.462	8.99*	449.40	B
120.00-100.00			B	1	2.1	1	0.85	1	222.592			
			C	0.817	1.829	0.91	0.85	1	150.469			
T5	2.10	2.39	A	0.98	2.059	1	0.85	1	113.558	4.94	493.56	A
100.00-90.00			B	0.972	2.044	1	0.85	1	111.476			
			C	0.914	1.945	0.996	0.85	1	104.776			
T6	2.15	2.70	A	0.959	2.02	1	0.85	1	120.312	4.97	496.94	A
90.00-80.00			B	0.953	2.008	1	0.85	1	118.318			
			C	0.855	1.867	0.943	0.85	1	101.445			
T7	4.37	6.30	A	0.901	1.925	0.984	0.85	1	248.373	9.25	462.34	A
80.00-60.00			B	0.895	1.918	0.979	0.85	1	243.889			
			C	0.778	1.801	0.879	0.85	1	194.044			
T8	4.37	6.58	A	0.807	1.821	0.902	0.85	1	234.573	7.50	375.24	A
60.00-40.00			B	0.801	1.817	0.897	0.85	1	231.249			
			C	0.698	1.776	0.818	0.85	1	186.717			
T9	4.40	7.67	A	0.739	1.784	0.849	0.85	1	229.312	6.38	319.07	A
40.00-20.00			B	0.735	1.782	0.845	0.85	1	227.258			
			C	0.634	1.787	0.775	0.85	1	182.219			
T10	2.88	8.52	A	0.523	1.872	0.71	0.85	1	155.894	4.57	228.34	B
20.00-0.00			B	0.52	1.875	0.708	0.85	1	156.065			
			C	0.456	1.964	0.676	0.85	1	131.157			
Sum Weight:	27.45	45.51			*2A_g limit			OTM	5360.30 kip-ft	62.19		

Tower Forces - Service - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl Face
T1	0.40	1.16	A	0.61	1.798	0.76	1	1	47.701	1.02	51.01	B

tnxTower	Job: PiROD U20'-0"x170' Lattice Tower	Page: 25 of 43
URS Corporation 500 Enterprise Drive, Suite 3B Rocky Hill, CT 06067 Phone: 860-529-8882 FAX: 860-529-3991	Project: HPC-060 / Cromwell, CT Tower MOD	Date: 13:13:23 09/09/13
	Client: Sprint / T-Mobile	Designed by: Michael_Dalickas

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl Face
170.00-150.00			B	0.634	1.787	0.775	1	1	50.515			
			C	0.161	2.732	0.583	1	1	9.663			
T2	0.28	1.12	A	0.742	1.785	0.851	1	1	42.480	1.02	101.59	B
150.00-140.00			B	0.825	1.837	0.917	1	1	50.341			
			C	0.291	2.32	0.613	1	1	13.910			
T3	0.72	2.09	A	0.628	1.789	0.771	1	1	80.764	2.23	111.41	B
140.00-120.00			B	0.794	1.811	0.891	1	1	115.502			
			C	0.306	2.281	0.618	1	1	34.420			
T4	1.28	2.60	A	0.657	1.78	0.79	1	1	108.034	2.48	124.03	B
120.00-100.00			B	0.766	1.795	0.869	1	1	136.140			
			C	0.605	1.801	0.757	1	1	95.502			
T5	0.80	1.48	A	0.739	1.784	0.849	1	1	73.868	1 28	128.28	A
100.00-90.00			B	0.666	1.778	0.796	1	1	62.740			
			C	0.709	1.777	0.827	1	1	69.088			
T6	0.81	1.76	A	0.712	1.777	0.829	1	1	75.809	1.27	127.08	A
90.00-80.00			B	0.645	1.783	0.782	1	1	65.137			
			C	0.663	1.778	0.794	1	1	67.762			
T7	1.63	4.33	A	0.661	1.779	0.793	1	1	151.553	2.41	120.29	A
80.00-60.00			B	0.602	1.803	0.755	1	1	131.837			
			C	0.602	1.803	0.755	1	1	131.905			
T8	1.63	4.45	A	0.594	1.808	0.75	1	1	148.720	2.18	108.98	A
60.00-40.00			B	0.541	1.852	0.719	1	1	130.640			
			C	0.541	1.852	0.719	1	1	130.705			
T9	1.64	5.44	A	0.541	1.852	0.719	1	1	147.661	1.97	98.42	A
40.00-20.00			B	0.495	1.907	0.695	1	1	130.952			
			C	0.491	1.912	0.693	1	1	129.686			
T10	1.07	6.08	A	0.381	2.103	0.644	1	1	108.639	1.64	82.24	A
20.00-0.00			B	0.353	2.164	0.634	1	1	99.715			
			C	0.349	2.175	0.632	1	1	98.363			
Sum Weight:	10.27	30.51						OTM	1455.85 kip-ft	17.50		

Tower Forces - Service - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl Face
T1	0.40	1.16	A	0.61	1.798	0.76	0.825	1	47.701	1.02	51.01	B
170.00-150.00			B	0.634	1.787	0.775	0.825	1	50.515			
			C	0.161	2.732	0.583	0.825	1	9.663			
T2	0.28	1.12	A	0.742	1.785	0.851	0.825	1	41.579	1.00	100.10	B
150.00-140.00			B	0.825	1.837	0.917	0.825	1	49.601			
			C	0.291	2.32	0.613	0.825	1	12.952			
T3	0.72	2.09	A	0.628	1.789	0.771	0.825	1	79.023	2.20	110.12	B
140.00-120.00			B	0.794	1.811	0.891	0.825	1	114.161			
			C	0.306	2.281	0.618	0.825	1	32.682			
T4	1.28	2.60	A	0.657	1.78	0.79	0.825	1	105.680	2.45	122.31	B
120.00-100.00			B	0.766	1.795	0.869	0.825	1	134.251			
			C	0.605	1.801	0.757	0.825	1	93.557			
T5	0.80	1.48	A	0.739	1.784	0.849	0.825	1	72.755	1 26	126.35	A
100.00-90.00			B	0.666	1.778	0.796	0.825	1	61.811			
			C	0.709	1.777	0.827	0.825	1	68.157			
T6	0.81	1.76	A	0.712	1.777	0.829	0.825	1	74.625	1.25	125.10	A
90.00-80.00			B	0.645	1.783	0.782	0.825	1	64.129			
			C	0.663	1.778	0.794	0.825	1	66.752			

tnxTower	Job: PiROD U20'-0"x170' Lattice Tower	Page: 26 of 43
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	Client: Sprint / T-Mobile	Designed by: Michael_Dalickas

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T7	1.63	4.33	A	0.661	1.779	0.793	0.825	1	148.968	2.36	118.23	A
80.00-60.00			B	0.602	1.803	0.755	0.825	1	129.587			
			C	0.602	1.803	0.755	0.825	1	129.651			
T8	1.63	4.45	A	0.594	1.808	0.75	0.825	1	145.356	2.13	106.52	A
60.00-40.00			B	0.541	1.852	0.719	0.825	1	127.648			
			C	0.541	1.852	0.719	0.825	1	127.710			
T9	1.64	5.44	A	0.541	1.852	0.719	0.825	1	143.940	1.92	95.94	A
40.00-20.00			B	0.495	1.907	0.695	0.825	1	127.591			
			C	0.491	1.912	0.693	0.825	1	126.321			
T10	1.07	6.08	A	0.381	2.103	0.644	0.825	1	103.942	1.57	78.69	A
20.00-0.00			B	0.353	2.164	0.634	0.825	1	95.279			
			C	0.349	2.175	0.632	0.825	1	93.924			
Sum Weight:	10.27	30.51						OTM	1435.48 kip-ft	17.17		

Tower Forces - Service - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl Face
T1	0.40	1.16	A	0.61	1.798	0.76	0.8	1	47.701	1.02	51.01	B
170.00-150.00			B	0.634	1.787	0.775	0.8	1	50.515			
			C	0.161	2.732	0.583	0.8	1	9.663			
T2	0.28	1.12	A	0.742	1.785	0.851	0.8	1	41.450	1.00	99.89	B
150.00-140.00			B	0.825	1.837	0.917	0.8	1	49.495			
			C	0.291	2.32	0.613	0.8	1	12.815			
T3	0.72	2.09	A	0.628	1.789	0.771	0.8	1	78.774	2.20	109.93	B
140.00-120.00			B	0.794	1.811	0.891	0.8	1	113.970			
			C	0.306	2.281	0.618	0.8	1	32.434			
T4	1.28	2.60	A	0.657	1.78	0.79	0.8	1	105.344	2.44	122.06	B
120.00-100.00			B	0.766	1.795	0.869	0.8	1	133.981			
			C	0.605	1.801	0.757	0.8	1	93.279			
T5	0.80	1.48	A	0.739	1.784	0.849	0.8	1	72.596	1.26	126.07	A
100.00-90.00			B	0.666	1.778	0.796	0.8	1	61.678			
			C	0.709	1.777	0.827	0.8	1	68.024			
T6	0.81	1.76	A	0.712	1.777	0.829	0.8	1	74.456	1.25	124.82	A
90.00-80.00			B	0.645	1.783	0.782	0.8	1	63.986			
			C	0.663	1.778	0.794	0.8	1	66.608			
T7	1.63	4.33	A	0.661	1.779	0.793	0.8	1	148.599	2.36	117.94	A
80.00-60.00			B	0.602	1.803	0.755	0.8	1	129.266			
			C	0.602	1.803	0.755	0.8	1	129.329			
T8	1.63	4.45	A	0.594	1.808	0.75	0.8	1	144.875	2.12	106.16	A
60.00-40.00			B	0.541	1.852	0.719	0.8	1	127.221			
			C	0.541	1.852	0.719	0.8	1	127.282			
T9	1.64	5.44	A	0.541	1.852	0.719	0.8	1	143.408	1.91	95.59	A
40.00-20.00			B	0.495	1.907	0.695	0.8	1	127.111			
			C	0.491	1.912	0.693	0.8	1	125.840			
T10	1.07	6.08	A	0.381	2.103	0.644	0.8	1	103.271	1.56	78.18	A
20.00-0.00			B	0.353	2.164	0.634	0.8	1	94.645			
			C	0.349	2.175	0.632	0.8	1	93.290			
Sum Weight:	10.27	30.51						OTM	1432.57 kip-ft	17.13		

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	Client Sprint / T-Mobile	**Designed by** Michael_Dalickas

Tower Forces - Service - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl Face
T1	0.40	1.16	A	0.61	1.798	0.76	0.85	1	47.701	1.02	51.01	B
170.00-150.00			B	0.634	1.787	0.775	0.85	1	50.515			
			C	0.161	2.732	0.583	0.85	1	9.663			
T2	0.28	1.12	A	0.742	1.785	0.851	0.85	1	41.708	1.00	100.31	B
150.00-140.00			B	0.825	1.837	0.917	0.85	1	49.707			
			C	0.291	2.32	0.613	0.85	1	13.089			
T3	0.72	2.09	A	0.628	1.789	0.771	0.85	1	79.272	2.21	110.30	B
140.00-120.00			B	0.794	1.811	0.891	0.85	1	114.353			
			C	0.306	2.281	0.618	0.85	1	32.930			
T4	1.28	2.60	A	0.657	1.78	0.79	0.85	1	106.017	2.45	122.56	B
120.00-100.00			B	0.766	1.795	0.869	0.85	1	134.521			
			C	0.605	1.801	0.757	0.85	1	93.835			
T5	0.80	1.48	A	0.739	1.784	0.849	0.85	1	72.914	1.27	126.62	A
100.00-90.00			B	0.666	1.778	0.796	0.85	1	61.943			
			C	0.709	1.777	0.827	0.85	1	68.290			
T6	0.81	1.76	A	0.712	1.777	0.829	0.85	1	74.794	1.25	125.38	A
90.00-80.00			B	0.645	1.783	0.782	0.85	1	64.273			
			C	0.663	1.778	0.794	0.85	1	66.896			
T7	1.63	4.33	A	0.661	1.779	0.793	0.85	1	149.338	2.37	118.53	A
80.00-60.00			B	0.602	1.803	0.755	0.85	1	129.908			
			C	0.602	1.803	0.755	0.85	1	129.973			
T8	1.63	4.45	A	0.594	1.808	0.75	0.85	1	145.836	2.14	106.87	A
60.00-40.00			B	0.541	1.852	0.719	0.85	1	128.076			
			C	0.541	1.852	0.719	0.85	1	128.138			
T9	1.64	5.44	A	0.541	1.852	0.719	0.85	1	144.471	1.93	96.30	A
40.00-20.00			B	0.495	1.907	0.695	0.85	1	128.071			
			C	0.491	1.912	0.693	0.85	1	126.801			
T10	1.07	6.08	A	0.381	2.103	0.644	0.85	1	104.613	1.58	79.20	A
20.00-0.00			B	0.353	2.164	0.634	0.85	1	95.913			
			C	0.349	2.175	0.632	0.85	1	94.558			
Sum Weight:	10.27	30.51						OTM	1438.39 kip-ft	17.22		

Force Totals

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Leg Weight	19.74					
Bracing Weight	10.77					
Total Member Self-Weight	30.51			-3.19	-0.23	
Total Weight	52.73			-3.19	-0.23	
Wind 0 deg - No Ice		-0.03	-66.24	-6320.60	1.91	0.02
Wind 30 deg - No Ice		32.62	-56.61	-5426.03	-3124.00	-6.21
Wind 45 deg - No Ice		46.30	-46.02	-4412.00	-4446.65	-8.16
Wind 60 deg - No Ice		56.64	-32.40	-3106.01	-5445.22	-9.43
Wind 90 deg - No Ice		65.46	0.23	24.99	-6276.05	-11.11
Wind 120 deg - No Ice		57.44	33.40	3179.32	-5484.67	-9.95
Wind 135 deg - No Ice		46.31	46.30	4428.72	-4447.53	-8.13
Wind 150 deg - No Ice		32.90	56.74	5425.74	-3161.19	-5.44

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Load Case	*Vertical Forces* K	*Sum of Forces X* K	*Sum of Forces Z* K	*Sum of Overturning Moments, M_x* kip-ft	*Sum of Overturning Moments, M_z* kip-ft	*Sum of Torques* kip-ft
Wind 180 deg - No Ice		0.21	65.38	6270.38	-25.58	2.23
Wind 210 deg - No Ice		-32.71	56.66	5417.67	3138.89	6.45
Wind 225 deg - No Ice		-46.18	46.20	4418.30	4432.82	8.77
Wind 240 deg - No Ice		-57.32	33.29	3169.14	5470.84	11.29
Wind 270 deg - No Ice		-65.39	0.09	10.16	6266.11	13.34
Wind 300 deg - No Ice		-56.55	-32.58	-3127.08	5430.54	11.97
Wind 315 deg - No Ice		-46.24	-46.15	-4426.77	4435.11	9.88
Wind 330 deg - No Ice		-32.68	-56.68	-5433.35	3127.72	6.25
Member Ice	15.00					
Total Weight Ice	89.90			-8.37	-3.22	
Wind 0 deg - Ice		-0.02	-77.82	-7402.73	-1.84	7.32
Wind 30 deg - Ice		38.44	-66.66	-6378.41	-3675.42	-4.39
Wind 45 deg - Ice		54.47	-54.24	-5194.64	-5219.54	-9.45
Wind 60 deg - Ice		66.63	-38.23	-3664.13	-6391.37	-13.76
Wind 90 deg - Ice		77.05	0.18	13.88	-7369.77	-20.27
Wind 120 deg - Ice		67.45	39.13	3707.34	-6417.58	-21.56
Wind 135 deg - Ice		54.47	54.46	5195.55	-5219.87	-19.66
Wind 150 deg - Ice		38.66	66.75	6365.93	-3704.78	-16.32
Wind 180 deg - Ice		0.16	76.91	7356.57	-23.23	-5.43
Wind 210 deg - Ice		-38.51	66.70	6359.78	3681.38	4.58
Wind 225 deg - Ice		-54.37	54.39	5187.65	5202.45	9.95
Wind 240 deg - Ice		-67.36	39.05	3699.73	6400.73	15.33
Wind 270 deg - Ice		-76.99	0.07	2.63	7355.71	22.00
Wind 300 deg - Ice		-66.55	-38.37	-3680.46	6373.18	23.02
Wind 315 deg - Ice		-54.42	-54.34	-5206.02	5203.74	21.05
Wind 330 deg - Ice		-38.48	-66.71	-6383.96	3671.75	16.96
Total Weight	52.73			-3.19	-0.23	
Wind 0 deg - Service		-0.01	-22.92	-2191.37	1.67	0.01
Wind 30 deg - Service		11.29	-19.59	-1881.83	-1079.96	-2.15
Wind 45 deg - Service		16.02	-15.92	-1530.95	-1537.62	-2.82
Wind 60 deg - Service		19.60	-11.21	-1079.05	-1883.14	-3.26
Wind 90 deg - Service		22.65	0.08	4.34	-2170.63	-3.85
Wind 120 deg - Service		19.87	11.56	1095.80	-1896.80	-3.44
Wind 135 deg - Service		16.02	16.02	1528.12	-1537.92	-2.81
Wind 150 deg - Service		11.38	19.63	1873.11	-1092.82	-1.88
Wind 180 deg - Service		0.07	22.62	2165.37	-7.84	0.77
Wind 210 deg - Service		-11.32	19.61	1870.32	1087.14	2.23
Wind 225 deg - Service		-15.98	15.99	1524.51	1534.86	3.04
Wind 240 deg - Service		-19.83	11.52	1092.28	1894.04	3.91
Wind 270 deg - Service		-22.63	0.03	-0.79	2169.22	4.62
Wind 300 deg - Service		-19.57	-11.27	-1086.34	1880.09	4.14
Wind 315 deg - Service		-16.00	-15.97	-1536.06	1535.65	3.42
Wind 330 deg - Service		-11.31	-19.61	-1884.36	1083.27	2.16

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 45 deg - No Ice
5	Dead+Wind 60 deg - No Ice
6	Dead+Wind 90 deg - No Ice
7	Dead+Wind 120 deg - No Ice
8	Dead+Wind 135 deg - No Ice

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	Client: Sprint / T-Mobile	Designed by: Michael_Dalickas

Comb. No	Description
9	Dead+Wind 150 deg - No Ice
10	Dead+Wind 180 deg - No Ice
11	Dead+Wind 210 deg - No Ice
12	Dead+Wind 225 deg - No Ice
13	Dead+Wind 240 deg - No Ice
14	Dead+Wind 270 deg - No Ice
15	Dead+Wind 300 deg - No Ice
16	Dead+Wind 315 deg - No Ice
17	Dead+Wind 330 deg - No Ice
18	Dead+Ice+Temp
19	Dead+Wind 0 deg+Ice+Temp
20	Dead+Wind 30 deg+Ice+Temp
21	Dead+Wind 45 deg+Ice+Temp
22	Dead+Wind 60 deg+Ice+Temp
23	Dead+Wind 90 deg+Ice+Temp
24	Dead+Wind 120 deg+Ice+Temp
25	Dead+Wind 135 deg+Ice+Temp
26	Dead+Wind 150 deg+Ice+Temp
27	Dead+Wind 180 deg+Ice+Temp
28	Dead+Wind 210 deg+Ice+Temp
29	Dead+Wind 225 deg+Ice+Temp
30	Dead+Wind 240 deg+Ice+Temp
31	Dead+Wind 270 deg+Ice+Temp
32	Dead+Wind 300 deg+Ice+Temp
33	Dead+Wind 315 deg+Ice+Temp
34	Dead+Wind 330 deg+Ice+Temp
35	Dead+Wind 0 deg - Service
36	Dead+Wind 30 deg - Service
37	Dead+Wind 45 deg - Service
38	Dead+Wind 60 deg - Service
39	Dead+Wind 90 deg - Service
40	Dead+Wind 120 deg - Service
41	Dead+Wind 135 deg - Service
42	Dead+Wind 150 deg - Service
43	Dead+Wind 180 deg - Service
44	Dead+Wind 210 deg - Service
45	Dead+Wind 225 deg - Service
46	Dead+Wind 240 deg - Service
47	Dead+Wind 270 deg - Service
48	Dead+Wind 300 deg - Service
49	Dead+Wind 315 deg - Service
50	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
T1	170 - 150	Leg	Max Tension	22	30.59	-0.37	0.26
			Max. Compression	19	-36.45	0.02	0.48
			Max. Mx	30	-35.39	0.39	-0.27
			Max. My	19	-36.45	0.02	0.48
			Max. Vy	30	-4.12	0.39	-0.27
			Max. Vx	19	-4.90	0.02	0.48
		Diagonal	Max Tension	34	3.98	0.00	0.00
			Max. Compression	34	-4.04	0.00	0.00
			Max. Mx	19	3.23	-0.00	0.00
			Max. My	33	-3.67	-0.00	0.00
			Max. Vy	19	0.01	-0.00	0.00

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	Client: Sprint / T-Mobile	Designed by: Michael_Dalickas

Section No	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vx	33	0.00	0.00	0.00
		Top Girt	Max Tension	21	0.02	0.00	0.00
			Max. Compression	32	-0.04	0.00	0.00
			Max. Mx	18	-0.02	0.01	0.00
			Max. My	31	0.01	0.00	-0.00
			Max. Vy	18	-0.01	0.00	0.00
			Max. Vx	31	0.00	0.00	0.00
		Bottom Girt	Max Tension	22	0.15	0.00	0.00
			Max. Compression	19	-0.16	0.00	0.00
			Max. Mx	18	-0.01	0.01	0.00
			Max. My	31	-0.01	0.00	-0.00
			Max. Vy	18	-0.01	0.00	0.00
			Max. Vx	31	0.00	0.00	0.00
T2	150 - 140	Leg	Max Tension	22	36.47	-0.45	0.04
			Max. Compression	19	-43.02	2.92	0.23
			Max. Mx	22	35.93	-3.40	0.27
			Max. My	31	-4.37	-0.23	-4.03
			Max. Vy	27	0.61	-3.35	-0.27
			Max. Vx	31	0.82	-0.23	-4.03
		Diagonal	Max Tension	32	6.01	0.00	0.00
			Max. Compression	24	-6.58	0.00	0.00
			Max. Mx	22	4.42	0.05	0.00
			Max. My	33	-5.34	-0.02	-0.03
			Max. Vy	22	0.02	0.05	0.00
			Max. Vx	33	0.01	0.00	0.00
		Top Girt	Max Tension	22	0.42	0.00	0.00
			Max. Compression	19	-0.36	0.00	0.00
			Max. Mx	18	0.03	-0.02	0.00
			Max. My	31	0.03	0.00	0.00
			Max. Vy	18	-0.02	0.00	0.00
			Max. Vx	31	-0.00	0.00	0.00
T3	140 - 120	Leg	Max Tension	32	74.29	-3.66	-0.22
			Max. Compression	19	-88.00	3.11	-0.05
			Max. Mx	32	73.24	-3.90	-0.14
			Max. My	23	-8.84	-0.36	5.81
			Max. Vy	27	0.65	-3.61	-0.10
			Max. Vx	23	-0.73	-0.36	5.81
		Diagonal	Max Tension	28	9.38	0.00	0.00
			Max. Compression	29	-9.90	0.00	0.00
			Max. Mx	19	6.51	0.12	0.00
			Max. My	22	-6.98	-0.03	0.03
			Max. Vy	19	-0.03	0.12	0.00
			Max. Vx	22	-0.01	0.00	0.00
T4	120 - 100	Leg	Max Tension	22	123.12	-5.18	-0.00
			Max. Compression	19	-143.19	4.24	-0.05
			Max. Mx	19	-114.35	6.10	-0.02
			Max. My	31	-11.61	-0.43	-8.10
			Max. Vy	19	-0.89	6.10	-0.02
			Max. Vx	31	1.60	-0.43	-8.10
		Diagonal	Max Tension	33	11.92	0.00	0.00
			Max. Compression	25	-12.75	0.00	0.00
			Max. Mx	19	7.76	0.10	-0.01
			Max. My	33	-11.33	-0.03	-0.04
			Max. Vy	22	0.03	0.10	0.00
			Max. Vx	33	0.01	0.00	0.00
		Mid Girt	Max Tension	22	3.48	0.00	0.00
			Max. Compression	19	-2.77	0.00	0.00
			Max. Mx	22	3.48	-0.07	0.00
			Max. My	31	0.29	0.00	0.00
			Max. Vy	22	0.03	0.00	0.00
			Max. Vx	31	0.00	0.00	0.00

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	Client: Sprint / T-Mobile	Designed by: Michael_Dalickas

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T5	100 - 90	Leg	Max Tension	22	151.92	-5.08	0.16
			Max. Compression	19	-175.67	4.40	-0.01
			Max. Mx	22	151.92	-5.08	0.16
			Max. My	31	-12.86	-0.43	-8.10
			Max. Vy	32	-0.25	-5.08	-0.29
			Max. Vx	31	-0.54	-0.43	-8.10
		Diagonal	Max Tension	26	13.77	0.00	0.00
			Max. Compression	26	-14.14	0.00	0.00
			Max. Mx	19	10.70	0.18	-0.01
			Max. My	31	-7.12	0.04	-0.02
			Max. Vy	19	-0.05	0.18	-0.01
			Max. Vx	31	0.00	0.00	0.00
T6	90 - 80	Leg	Max Tension	22	181.44	-4.27	-0.04
			Max. Compression	19	-208.57	6.08	-0.04
			Max. Mx	24	-207.61	6.08	0.12
			Max. My	23	-14.78	0.02	4.72
			Max. Vy	27	0.45	-6.03	0.05
			Max. Vx	31	0.28	0.03	-4.72
		Diagonal	Max Tension	26	13.84	0.00	0.00
			Max. Compression	26	-14.20	0.00	0.00
			Max. Mx	19	10.99	0.15	-0.01
			Max. My	24	-0.59	0.08	0.02
			Max. Vy	19	-0.05	0.15	-0.01
			Max. Vx	24	0.00	0.00	0.00
T7	80 - 60	Leg	Max Tension	22	237.84	-5.21	-0.01
			Max. Compression	19	-272.12	5.78	-0.01
			Max. Mx	24	-238.83	6.08	0.12
			Max. My	20	-15.62	-0.09	-5.39
			Max. Vy	27	-0.25	-6.03	0.05
			Max. Vx	23	-0.22	-0.08	5.38
		Diagonal	Max Tension	26	14.95	0.00	0.00
			Max. Compression	26	-15.37	0.00	0.00
			Max. Mx	19	11.86	0.15	-0.01
			Max. My	32	-13.31	0.03	-0.02
			Max. Vy	22	0.05	0.15	0.01
			Max. Vx	32	0.00	0.00	0.00
T8	60 - 40	Leg	Max Tension	22	291.49	-5.31	-0.02
			Max. Compression	19	-333.64	5.84	-0.03
			Max. Mx	22	290.77	-7.34	0.03
			Max. My	20	-20.47	0.05	-6.29
			Max. Vy	32	0.33	-7.33	-0.08
			Max. Vx	23	-0.22	0.06	6.29
		Diagonal	Max Tension	26	15.42	0.00	0.00
			Max. Compression	26	-15.82	0.00	0.00
			Max. Mx	24	11.77	0.22	0.01
			Max. My	32	-13.64	0.02	-0.03
			Max. Vy	24	-0.06	0.22	0.01
			Max. Vx	32	0.00	0.00	0.00
T9	40 - 20	Leg	Max Tension	22	340.44	-3.43	-0.02
			Max. Compression	24	-393.52	0.11	-0.01
			Max. Mx	22	339.63	-11.99	-0.02
			Max. My	23	-21.98	-0.76	6.21
			Max. Vy	32	0.97	-11.98	0.00
			Max. Vx	23	0.27	2.47	6.10
		Diagonal	Max Tension	26	16.85	0.00	0.00
			Max. Compression	26	-16.46	0.00	0.00
			Max. Mx	24	12.00	0.23	0.02
			Max. My	32	-12.73	0.07	-0.03
			Max. Vy	22	0.08	0.22	0.02
			Max. Vx	32	0.00	0.00	0.00
T10	20 - 0	Leg	Max Tension	22	382.86	3.30	-0.03

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Section No	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Compression	24	-450.01	-0.00	-0.00
			Max. Mx	24	-418.77	15.85	0.00
			Max. My	23	-31.42	9.51	10.65
			Max. Vy	24	1.65	15.85	0.00
			Max. Vx	23	1.16	9.51	10.65
		Diagonal	Max Tension	33	20.64	0.00	0.00
			Max. Compression	26	-18.39	0.00	0.00
			Max. Mx	22	9.02	0.30	0.02
			Max. My	32	-16.89	0.14	-0.04
			Max. Vy	22	0.09	0.30	0.02
			Max. Vx	32	0.01	0.00	0.00

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Leg C	Max. Vert	30	459.35	36.70	-21.71
	Max. H_x	30	459.35	36.70	-21.71
	Max. H_z	21	-383.47	-43.35	26.59
	Min. Vert	22	-397.97	-45.19	26.55
	Min. H_x	22	-397.97	-45.19	26.55
	Min. H_z	30	459.35	36.70	-21.71
Leg B	Max. Vert	24	460.42	-36.68	-21.91
	Max. H_x	32	-397.53	45.04	26.78
	Max. H_z	33	-383.01	43.17	26.88
	Min. Vert	32	-397.53	45.04	26.78
	Min. H_x	24	460.42	-36.68	-21.91
	Min. H_z	24	460.42	-36.68	-21.91
Leg A	Max. Vert	19	459.92	0.21	42.63
	Max. H_x	31	29.81	4.65	-5.01
	Max. H_z	19	459.92	0.21	42.63
	Min. Vert	27	-397.35	-0.16	-52.44
	Min. H_x	23	29.15	-4.59	-5.08
	Min. H_z	27	-397.35	-0.16	-52.44

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	52.67	0.00	0.00	-3.20	-0.23	-0.00
Dead+Wind 0 deg - No Ice	52.67	-0.03	-66.24	-6345.33	1.91	0.02
Dead+Wind 30 deg - No Ice	52.67	32.62	-56.61	-5447.36	-3136.24	-6.23
Dead+Wind 45 deg - No Ice	52.67	46.30	-46.02	-4429.38	-4464.09	-8.20
Dead+Wind 60 deg - No Ice	52.67	56.64	-32.40	-3118.28	-5466.59	-9.49
Dead+Wind 90 deg - No Ice	52.67	65.46	0.23	24.98	-6300.66	-11.20
Dead+Wind 120 deg - No Ice	52.67	57.44	33.40	3191.62	-5506.13	-10.02
Dead+Wind 135 deg - No Ice	52.67	46.31	46.30	4445.97	-4464.99	-8.17
Dead+Wind 150 deg - No Ice	52.67	32.90	56.74	5446.93	-3173.60	-5.46
Dead+Wind 180 deg - No Ice	52.67	0.21	65.38	6294.94	-25.66	2.23
Dead+Wind 210 deg - No Ice	52.67	-32.71	56.66	5438.83	3151.24	6.46
Dead+Wind 225 deg - No Ice	52.67	-46.18	46.20	4435.51	4450.25	8.81

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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+Wind 240 deg - No Ice	52.67	-57.32	33.29	3181.40	5492.27	11.36
Dead+Wind 270 deg - No Ice	52.67	-65.39	0.09	10.09	6290.67	13.43
Dead+Wind 300 deg - No Ice	52.67	-56.55	-32.58	-3139.43	5451.84	12.04
Dead+Wind 315 deg - No Ice	52.67	-46.24	-46.15	-4444.19	4452.49	9.91
Dead+Wind 330 deg - No Ice	52.67	-32.68	-56.68	-5454.69	3139.96	6.27
Dead+Ice+Temp	89.84	-0.00	0.00	-8.43	-3.23	-0.00
Dead+Wind 0 deg+Ice+Temp	89.84	-0.02	-77.82	-7447.38	-1.89	7.35
Dead+Wind 30 deg+Ice+Temp	89.84	38.44	-66.66	-6417.03	-3697.63	-4.41
Dead+Wind 45 deg+Ice+Temp	89.84	54.47	-54.24	-5226.16	-5251.10	-9.52
Dead+Wind 60 deg+Ice+Temp	89.84	66.63	-38.23	-3686.45	-6430.04	-13.88
Dead+Wind 90 deg+Ice+Temp	89.84	77.05	0.18	13.74	-7414.31	-20.46
Dead+Wind 120 deg+Ice+Temp	89.84	67.45	39.13	3729.43	-6456.29	-21.71
Dead+Wind 135 deg+Ice+Temp	89.84	54.47	54.46	5226.73	-5251.47	-19.77
Dead+Wind 150 deg+Ice+Temp	89.84	38.66	66.75	6404.21	-3727.22	-16.39
Dead+Wind 180 deg+Ice+Temp	89.84	0.16	76.91	7400.96	-23.40	-5.46
Dead+Wind 210 deg+Ice+Temp	89.84	-38.51	66.70	6398.05	3703.64	4.60
Dead+Wind 225 deg+Ice+Temp	89.84	-54.37	54.39	5218.81	5233.92	10.01
Dead+Wind 240 deg+Ice+Temp	89.84	-67.36	39.05	3721.80	6439.32	15.45
Dead+Wind 270 deg+Ice+Temp	89.84	-76.99	0.07	2.42	7400.14	22.25
Dead+Wind 300 deg+Ice+Temp	89.84	-66.55	-38.37	-3702.91	6411.69	23.17
Dead+Wind 315 deg+Ice+Temp	89.84	-54.42	-54.34	-5237.63	5235.14	21.16
Dead+Wind 330 deg+Ice+Temp	89.84	-38.48	-66.71	-6422.62	3693.88	17.03
Dead+Wind 0 deg - Service	52.67	-0.01	-22.92	-2197.80	0.51	0.01
Dead+Wind 30 deg - Service	52.67	11.29	-19.59	-1887.06	-1085.38	-2.17
Dead+Wind 45 deg - Service	52.67	16.02	-15.92	-1534.80	-1544.86	-2.84
Dead+Wind 60 deg - Service	52.67	19.60	-11.21	-1081.12	-1891.75	-3.28
Dead+Wind 90 deg - Service	52.67	22.65	0.08	6.54	-2180.36	-3.86
Dead+Wind 120 deg - Service	52.67	19.87	11.56	1102.29	-1905.43	-3.47
Dead+Wind 135 deg - Service	52.67	16.02	16.02	1536.33	-1545.16	-2.84
Dead+Wind 150 deg - Service	52.67	11.38	19.63	1882.68	-1098.30	-1.90
Dead+Wind 180 deg - Service	52.67	0.07	22.62	2176.11	-9.03	0.77
Dead+Wind 210 deg - Service	52.67	-11.32	19.61	1879.88	1090.27	2.25
Dead+Wind 225 deg - Service	52.67	-15.98	15.99	1532.71	1539.77	3.06
Dead+Wind 240 deg - Service	52.67	-19.83	11.52	1098.76	1900.34	3.93
Dead+Wind 270 deg - Service	52.67	-22.63	0.03	1.39	2176.61	4.64
Dead+Wind 300 deg - Service	52.67	-19.57	-11.27	-1088.44	1886.35	4.17
Dead+Wind 315 deg - Service	52.67	-16.00	-15.97	-1539.93	1540.55	3.44
Dead+Wind 330 deg - Service	52.67	-11.31	-19.61	-1889.60	1086.37	2.18

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
1	0.00	-52.67	0.00	0.00	52.67	0.00	0.000%
2	-0.03	-52.67	-66.24	0.03	52.67	66.24	0.000%
3	32.62	-52.67	-56.61	-32.62	52.67	56.61	0.000%
4	46.30	-52.67	-46.02	-46.30	52.67	46.02	0.000%
5	56.64	-52.67	-32.40	-56.64	52.67	32.40	0.000%
6	65.46	-52.67	0.23	-65.46	52.67	-0.23	0.000%
7	57.44	-52.67	33.40	-57.44	52.67	-33.40	0.000%
8	46.31	-52.67	46.30	-46.31	52.67	-46.30	0.000%
9	32.90	-52.67	56.74	-32.90	52.67	-56.74	0.000%
10	0.21	-52.67	65.38	-0.21	52.67	-65.38	0.000%
11	-32.71	-52.67	56.66	32.71	52.67	-56.66	0.000%
12	-46.18	-52.67	46.20	46.18	52.67	-46.20	0.000%
13	-57.32	-52.67	33.29	57.32	52.67	-33.29	0.000%
14	-65.39	-52.67	0.09	65.39	52.67	-0.09	0.000%

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	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
15	-56.55	-52.67	-32.58	56.55	52.67	32.58	0.000%
16	-46.24	-52.67	-46.15	46.24	52.67	46.15	0.000%
17	-32.68	-52.67	-56.68	32.68	52.67	56.68	0.000%
18	0.00	-89.84	0.00	0.00	89.84	-0.00	0.000%
19	-0.02	-89.84	-77.82	0.02	89.84	77.82	0.000%
20	38.44	-89.84	-66.66	-38.44	89.84	66.66	0.000%
21	54.47	-89.84	-54.24	-54.47	89.84	54.24	0.000%
22	66.63	-89.84	-38.23	-66.63	89.84	38.23	0.000%
23	77.05	-89.84	0.18	-77.05	89.84	-0.18	0.000%
24	67.45	-89.84	39.13	-67.45	89.84	-39.13	0.000%
25	54.47	-89.84	54.46	-54.47	89.84	-54.46	0.000%
26	38.66	-89.84	66.75	-38.66	89.84	-66.75	0.000%
27	0.16	-89.84	76.91	-0.16	89.84	-76.91	0.000%
28	-38.51	-89.84	66.70	38.51	89.84	-66.70	0.000%
29	-54.37	-89.84	54.39	54.37	89.84	-54.39	0.000%
30	-67.36	-89.84	39.05	67.36	89.84	-39.05	0.000%
31	-76.99	-89.84	0.07	76.99	89.84	-0.07	0.000%
32	-66.55	-89.84	-38.37	66.55	89.84	38.37	0.000%
33	-54.42	-89.84	-54.34	54.42	89.84	54.34	0.000%
34	-38.48	-89.84	-66.71	38.48	89.84	66.71	0.000%
35	-0.01	-52.67	-22.92	0.01	52.67	22.92	0.000%
36	11.29	-52.67	-19.59	-11.29	52.67	19.59	0.000%
37	16.02	-52.67	-15.92	-16.02	52.67	15.92	0.000%
38	19.60	-52.67	-11.21	-19.60	52.67	11.21	0.000%
39	22.65	-52.67	0.08	-22.65	52.67	-0.08	0.000%
40	19.87	-52.67	11.56	-19.87	52.67	-11.56	0.000%
41	16.02	-52.67	16.02	-16.02	52.67	-16.02	0.000%
42	11.38	-52.67	19.63	-11.38	52.67	-19.63	0.000%
43	0.07	-52.67	22.62	-0.07	52.67	-22.62	0.000%
44	-11.32	-52.67	19.61	11.32	52.67	-19.61	0.000%
45	-15.98	-52.67	15.99	15.98	52.67	-15.99	0.000%
46	-19.83	-52.67	11.52	19.83	52.67	-11.52	0.000%
47	-22.63	-52.67	0.03	22.63	52.67	-0.03	0.000%
48	-19.57	-52.67	-11.27	19.57	52.67	11.27	0.000%
49	-16.00	-52.67	-15.97	16.00	52.67	15.97	0.000%
50	-11.31	-52.67	-19.61	11.31	52.67	19.61	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	4	0.00000001	0.00000001
3	Yes	4	0.00000001	0.00000001
4	Yes	4	0.00000001	0.00000001
5	Yes	4	0.00000001	0.00000001
6	Yes	4	0.00000001	0.00000069
7	Yes	4	0.00000001	0.00000001
8	Yes	4	0.00000001	0.00000001
9	Yes	4	0.00000001	0.00000001
10	Yes	4	0.00000001	0.00000001
11	Yes	4	0.00000001	0.00000001
12	Yes	4	0.00000001	0.00000001
13	Yes	4	0.00000001	0.00000001
14	Yes	4	0.00000001	0.00000071
15	Yes	4	0.00000001	0.00000001

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16	Yes	4	0.00000001	0.00000001
17	Yes	4	0.00000001	0.00000001
18	Yes	4	0.00000001	0.00000001
19	Yes	4	0.00000001	0.00000076
20	Yes	4	0.00000001	0.00000117
21	Yes	4	0.00000001	0.00000112
22	Yes	4	0.00000001	0.00000114
23	Yes	4	0.00000001	0.00000139
24	Yes	4	0.00000001	0.00000113
25	Yes	4	0.00000001	0.00000109
26	Yes	4	0.00000001	0.00000114
27	Yes	4	0.00000001	0.00000108
28	Yes	4	0.00000001	0.00000116
29	Yes	4	0.00000001	0.00000106
30	Yes	4	0.00000001	0.00000110
31	Yes	4	0.00000001	0.00000141
32	Yes	4	0.00000001	0.00000118
33	Yes	4	0.00000001	0.00000111
34	Yes	4	0.00000001	0.00000114
35	Yes	4	0.00000001	0.00000001
36	Yes	4	0.00000001	0.00000001
37	Yes	4	0.00000001	0.00000001
38	Yes	4	0.00000001	0.00000001
39	Yes	4	0.00000001	0.00000001
40	Yes	4	0.00000001	0.00000001
41	Yes	4	0.00000001	0.00000001
42	Yes	4	0.00000001	0.00000001
43	Yes	4	0.00000001	0.00000001
44	Yes	4	0.00000001	0.00000001
45	Yes	4	0.00000001	0.00000001
46	Yes	4	0.00000001	0.00000001
47	Yes	4	0.00000001	0.00000001
48	Yes	4	0.00000001	0.00000001
49	Yes	4	0.00000001	0.00000001
50	Yes	4	0.00000001	0.00000001

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb	Tilt °	Twist °
T1	170 - 150	6.283	35	0.3482	0.0543
T2	150 - 140	4.837	35	0.3199	0.0462
T3	140 - 120	4.171	35	0.3001	0.0388
T4	120 - 100	2.987	35	0.2457	0.0223
T5	100 - 90	2.010	35	0.1960	0.0113
T6	90 - 80	1.614	35	0.1660	0.0088
T7	80 - 60	1.275	40	0.1437	0.0070
T8	60 - 40	0.718	40	0.1064	0.0044
T9	40 - 20	0.325	40	0.0643	0.0025
T10	20 - 0	0.096	40	0.0293	0.0012

Critical Deflections and Radius of Curvature - Service Wind

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Elevation ft	Appurtenance	Gov Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
183.00	101-90-08-0-01	35	6.283	0.3482	0.0543	97724
179.75	15' Mount Pipe	35	6.283	0.3482	0.0543	97724
178.00	3" Dia 20' Omni	35	6.283	0.3482	0.0543	97724
175.00	2.5" x 14' Omni	35	6.283	0.3482	0.0543	97724
174.00	1.5" x 12' Omni	35	6.283	0.3482	0.0543	97724
170.00	APXV18-209014-C-A20	35	6.283	0.3482	0.0543	97724
168.00	HPD2-4.7	35	6.135	0.3456	0.0537	97724
159.50	APXV18-206517S-C w/ mounting hardware	35	5.511	0.3344	0.0509	46535
158.50	SC420-HF1LDF	35	5.439	0.3330	0.0505	42489
144.00	3" Dia 20' Omni	35	4.431	0.3088	0.0420	24224
141.00	2" Dia 15' Omni	35	4.235	0.3024	0.0396	24100
139.00	1.5" x 10' Omni	35	4.107	0.2977	0.0380	24079
138.50	9' Whip	35	4.075	0.2965	0.0376	24086
134.00	VHLP2.5-180	35	3.795	0.2847	0.0338	24267
125.50	PiROD 10' Lightweight T-Frame	35	3.293	0.2607	0.0266	24683
115.00	(2) TMA (shielded)	35	2.722	0.2333	0.0188	22714
101.00	SC-E 6014 rev2	35	2.053	0.1988	0.0116	18370
87.00	3"x2"x22" Panel	35	1.507	0.1584	0.0082	23284
84.50	TMA	40	1.422	0.1528	0.0078	25684
83.50	3' Stand-off	40	1.388	0.1507	0.0076	26774
83.00	3' Dish	40	1.372	0.1496	0.0075	27327
82.50	TMA	40	1.355	0.1486	0.0074	27876
80.00	3"x2"x22" Panel	40	1.275	0.1437	0.0070	30198
30.00	Camera	40	0.190	0.0457	0.0018	29689
24.00	PC9013N	40	0.129	0.0356	0.0014	30164

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	170 - 150	20.862	22	1.1416	0.2054
T2	150 - 140	16.116	22	1.0548	0.1712
T3	140 - 120	13.915	22	0.9913	0.1400
T4	120 - 100	9.998	19	0.8152	0.0836
T5	100 - 90	6.759	24	0.6527	0.0456
T6	90 - 80	5.443	24	0.5543	0.0373
T7	80 - 60	4.306	24	0.4810	0.0305
T8	60 - 40	2.433	24	0.3578	0.0202
T9	40 - 20	1.103	24	0.2171	0.0118
T10	20 - 0	0.326	24	0.0991	0.0057

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
183.00	101-90-08-0-01	22	20.862	1.1416	0.2054	32921
179.75	15' Mount Pipe	22	20.862	1.1416	0.2054	32921
178.00	3" Dia 20' Omni	22	20.862	1.1416	0.2054	32921
175.00	2.5" x 14' Omni	22	20.862	1.1416	0.2054	32921

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	Client: Sprint / T-Mobile	Designed by: Michael_Dalickas

Elevation	Appurtenance	Gov. Load Comb.	Deflection	Tilt	Twist	Radius of Curvature
ft			in	°	°	ft
174.00	1.5" x 12' Omni	22	20.862	1.1416	0.2054	32921
170.00	APXV18-209014-C-A20	22	20.862	1.1416	0.2054	32921
168.00	HPD2-4.7	22	20.378	1.1339	0.2030	32921
159.50	APXV18-206517S-C w/ mounting hardware	22	18.334	1.0999	0.1912	15677
158.50	SC420-HF1LDF	22	18.096	1.0956	0.1895	14313
144.00	3" Dia 20' Omni	22	14.777	1.0195	0.1531	7578
141.00	2" Dia 15' Omni	22	14.128	0.9988	0.1433	7337
139.00	1.5" x 10' Omni	22	13.704	0.9836	0.1368	7267
138.50	9' Whip	22	13.599	0.9796	0.1352	7262
134.00	VHLP2.5-180	22	12.672	0.9415	0.1214	7330
125.50	PiROD 10' Lightweight T-Frame	19	11.010	0.8639	0.0976	7522
115.00	(2) TMA (shielded)	19	9.119	0.7751	0.0718	6960
101.00	SC-E 6014 rev2	24	6.902	0.6621	0.0468	5600
87.00	3"x2"x22" Panel	24	5.085	0.5294	0.0352	7157
84.50	TMA	24	4.798	0.5109	0.0334	7879
83.50	3' Stand-off	24	4.687	0.5040	0.0328	8206
83.00	3' Dish	24	4.631	0.5006	0.0324	8371
82.50	TMA	24	4.576	0.4972	0.0321	8535
80.00	3"x2"x22" Panel	24	4.306	0.4810	0.0305	9222
30.00	Camera	24	0.646	0.1544	0.0086	8775
24.00	PC9013N	24	0.438	0.1205	0.0068	8891

Bolt Design Data

Section No.	Elevation	Component Type	Bolt Grade	Bolt Size	Number Of Bolts	Maximum Load per Bolt	Allowable Load	Ratio Load / Allowable	Allowable Ratio	Criteria
	ft			in		K	K			
T1	170	Diagonal	A325N	0.6250	1	4.04	6.44	0.627 ✓	1.333	Bolt Shear
T2	150	Leg	A325N	1.0000	6	6.08	34.56	0.176 ✓	1.333	Bolt Tension
		Diagonal	A325N	1.0000	1	6.01	9.52	0.632 ✓	1.333	Member Bearing
		Top Girt	A325N	1.0000	1	0.42	9.52	0.044 ✓	1.333	Member Bearing
T3	140	Leg	A325N	1.0000	6	9.02	34.56	0.261 ✓	1.333	Bolt Tension
		Diagonal	A325N	1.0000	1	9.38	9.52	0.985 ✓	1.333	Member Bearing
T4	120	Leg	A325N	1.0000	6	16.25	34.56	0.470 ✓	1.333	Bolt Tension
		Diagonal	A325N	1.0000	1	11.92	9.52	1.253 ✓	1.333	Member Bearing
		Mid Girt	A325N	1.0000	1	3.48	9.52	0.365 ✓	1.333	Member Bearing
T5	100	Leg	A325N	1.0000	6	25.32	34.56	0.733 ✓	1.333	Bolt Tension
		Diagonal	A325N	1.0000	1	13.77	15.86	0.868 ✓	1.333	Member Bearing
T6	90	Leg	A325N	1.0000	6	30.24	34.56	0.875 ✓	1.333	Bolt Tension
		Diagonal	A325N	1.0000	1	13.84	15.86	0.873 ✓	1.333	Member Bearing
T7	80	Leg	A325N	1.0000	6	34.93	34.56	1.011 ✓	1.333	Bolt Tension
		Diagonal	A325N	1.0000	1	15.37	16.49	0.932 ✓	1.333	Bolt Shear
T8	60	Leg	A325N	1.2500	6	44.21	54.00	0.819 ✓	1.333	Bolt Tension
		Diagonal	A325N	1.2500	1	15.42	20.39	0.756 ✓	1.333	Member Bearing
T9	40	Leg	A325N	1.2500	6	52.95	54.00	0.981 ✓	1.333	Bolt Tension

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Section No	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt K	Allowable Load K	Ratio Load / Allowable	Allowable Ratio	Criteria
		Diagonal	A325N	1.2500	1	16.85	24.47	0.689 ✓	1.333	Member Bearing
T10	20	Diagonal	A325N	1.2500	1	20.64	20.39	1.012 ✓	1.333	Member Bearing

Compression Checks

Leg Design Data (Compression)

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 P / P_a
T1	170 - 150	1 3/4	20.00	2.49	68.3 K=1.00	21.253	2.4053	-36.45	51.12	0.713 ✓
T2	150 - 140	Pirod 105244	10.02	10.02	45.4 K=1.00	25.051	3.6816	-43.02	92.23	0.466 ✓
T3	140 - 120	Pirod 105216	20.03	10.02	45.4 K=1.00	25.051	3.6816	-88.00	92.23	0.954 ✓
T4	120 - 100	Pirod 105217	20.03	10.02	37.8 K=1.00	26.132	5.3014	-143.19	138.54	1.034 ✓
T5	100 - 90	Pirod 105217	10.02	10.02	37.8 K=1.00	26.132	5.3014	-175.68	138.54	1.268 ✓
T6	90 - 80	Pirod 105217 reinf w/ 1" dia bar	10.02	10.02	31.5 K=1.00	26.968	7.6570	-208.57	206.49	1.010 ✓
T7	80 - 60	Pirod 105218 reinf w/ 1" dia bar	20.03	10.02	27.6 K=1.00	27.439	9.9280	-272.12	272.41	0.999 ✓
T8	60 - 40	Pirod 105219	20.03	10.02	28.4 K=1.00	27.351	9.4248	-333.64	257.78	1.294 ✓
T9	40 - 20	Pirod 105219 reinf w /1" dia bar	20.03	10.02	25.4 K=1.00	27.705	11.7803	-393.52	326.37	1.206 ✓
T10	20 - 0	Pirod 105220 reinf w/ 1" dia bar	20.03	10.02	24.3 K=1.00	27.824	14.2843	-450.01	397.44	1.132 ✓

Truss-Leg Diagonal Data

Section No	Elevation ft	Diagonal Size	L_d ft	Kl/r	F_a ksi	A in^2	Actual V K	Allow V_a K	Stress Ratio
T2	150 - 140	0.5	1.48	121.0	10.193	0.1963	0.88	2.24	0.394 ✓
T3	140 - 120	0.5	1.48	121.0	10.133	0.1963	0.74	2.23	0.334 ✓
T4	120 - 100	0.5	1.47	120.0	10.279	0.1963	1.61	2.26	0.711 ✓
T5	100 - 90	0.5	1.47	120.0	10.279	0.1963	0.54	2.26	0.239

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Section No.	Elevation ft	Diagonal Size	L_d ft	Kl/r	F_a ksi	A in^2	Actual V K	Allow. V_a K	Stress Ratio
T6	90 - 80	0.5	1.46	118.8	10.452	0.1963	0.45	2.30	0.196 ✓
T7	80 - 60	0.5	1.44	117.8	10.592	0.1963	0.25	2.33	0.106 ✓
T8	60 - 40	0.625	1.45	94.4	13.671	0.3068	0.33	4.69	0.071 ✓
T9	40 - 20	0.625	1.44	93.7	16.133	0.3068	0.97	5.54	0.176 ✓
T10	20 - 0	0.625	1.42	93.0	13.845	0.3068	1.72	4.75	0.361 ✓

Diagonal Design Data (Compression)

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 $\frac{P}{P_a}$
T1	170 - 150	7/8	5.59	2.71	111.6 K=0.75	12.001	0.6013	-4.04	7.22	0.559 ✓
T2	150 - 140	L2 1/2x2 1/2x3/16	11.42	5.00	121.3 K=1.00	10.097	0.9020	-6.58	9.11	0.722 ✓
T3	140 - 120	L3x3x3/16	12.50	5.65	115.3 K=1.01	10.840	1.0900	-9.90	11.82	0.838 ✓
T4	120 - 100	L3x3x3/16	13.80	6.35	127.8 K=1.00	9.141	1.0900	-12.75	9.96	1.279 ✓
T5	100 - 90	L3x3x5/16	14.50	6.72	136.9 K=1.00	7.969	1.7800	-14.14	14.19	0.997 ✓
T6	90 - 80	L3x3x5/16	15.24	7.10	144.7 K=1.00	7.132	1.7800	-14.20	12.69	1.119 ✓
T7	80 - 60	L3x3x3/8	16.80	7.90	161.6 K=1.00	5.721	2.1100	-15.37	12.07	1.273 ✓
T8	60 - 40	L3 1/2x3 1/2x5/16	18.45	8.70	151.3 K=1.00	6.527	2.0900	-15.82	13.64	1.160 ✓
T9	40 - 20	L3 1/2x3 1/2x3/8	20.16	9.56	167.0 K=1.00	5.353	2.4800	-15.16	13.28	1.142 ✓
T10	20 - 0	L4x4x5/16	21.03	10.01	151.8 K=1.00	6.477	2.4000	-18.39	15.54	1.183 ✓

Top Girt Design Data (Compression)

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 $\frac{P}{P_a}$
T1	170 - 150	7/8	5.00	4.85	186.4 K=0.70	4.298	0.6013	-0.04	2.58	0.014 ✓
T2	150 - 140	L3x3x3/16	5.00	4.48	105.1 K=1.17	12.131	1.0900	-0.36	13.22	0.027 ✓

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Section No	Elevation	Size	L	L_u	Kl/r	F_a	A	Actual P	Allow. P_a	Ratio P / P_a
	ft		ft	ft		ksi	in^2	K	K	

Bottom Girt Design Data (Compression)

Section No.	Elevation	Size	L	L_u	Kl/r	F_a	A	Actual P	Allow P_a	Ratio P / P_a
	ft		ft	ft		ksi	in^2	K	K	
T1	170 - 150	7/8	5.00	4.85	186.4 K=0.70	4.298	0.6013	-0.16	2.58	0.061 ✓

Mid Girt Design Data (Compression)

Section No.	Elevation	Size	L	L_u	Kl/r	F_a	A	Actual P	Allow P_a	Ratio P / P_a
	ft		ft	ft		ksi	in^2	K	K	
T4	120 - 100	L3x3x3/16	9.00	7.63	153.5 K=1.00	6.336	1.0900	-2.77	6.91	0.401 ✓

Tension Checks

Leg Design Data (Tension)

Section No	Elevation	Size	L	L_u	Kl/r	F_a	A	Actual P	Allow. P_a	Ratio P / P_a
	ft		ft	ft		ksi	in^2	K	K	
T1	170 - 150	1 3/4	20.00	2.49	68.3	30.000	2.4053	30.59	72.16	0.424 ✓
T2	150 - 140	Pirod 105244	10.02	10.02	45.4	30.000	3.6816	36.47	110.45	0.330 ✓
T3	140 - 120	Pirod 105216	20.03	10.02	45.4	30.000	3.6816	74.29	110.45	0.673 ✓
T4	120 - 100	Pirod 105217	20.03	10.02	37.8	30.000	5.3014	123.12	159.04	0.774 ✓
T5	100 - 90	Pirod 105217	10.02	10.02	37.8	30.000	5.3014	151.92	159.04	0.955 ✓
T6	90 - 80	Pirod 105217 reinf w/ 1" dia bar	10.02	10.02	31.5	30.000	7.6570	181.44	229.71	0.790 ✓
T7	80 - 60	Pirod 105218 reinf w/ 1" dia bar	20.03	10.02	27.6	30.000	9.9280	237.84	297.84	0.799 ✓
T8	60 - 40	Pirod 105219	20.03	10.02	28.4	30.000	9.4248	291.49	282.74	1.031 ✓
T9	40 - 20	Pirod 105219 reinf w /1" dia bar	20.03	10.02	25.4	30.000	11.7803	340.44	353.41	0.963 ✓
T10	20 - 0	Pirod 105220 reinf w/ 1" dia	20.03	10.02	24.3	30.000	14.2843	382.86	428.53	0.893

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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 $\frac{P}{P_a}$
		bar								✓

Truss-Leg Diagonal Data

Section No	Elevation ft	Diagonal Size	L_d ft	Kl/r	F_a ksi	A in^2	Actual V K	Allow. V_a K	Stress Ratio
T2	150 - 140	0.5	1.48	121.0	10.193	0.1963	0.88	2.24	0.394 ✓
T3	140 - 120	0.5	1.48	121.0	10.133	0.1963	0.74	2.23	0.334 ✓
T4	120 - 100	0.5	1.47	120.0	10.279	0.1963	1.61	2.26	0.711 ✓
T5	100 - 90	0.5	1.47	120.0	10.279	0.1963	0.54	2.26	0.239 ✓
T6	90 - 80	0.5	1.46	118.8	10.452	0.1963	0.45	2.30	0.196 ✓
T7	80 - 60	0.5	1.44	117.8	10.592	0.1963	0.25	2.33	0.106 ✓
T8	60 - 40	0.625	1.45	94.4	13.671	0.3068	0.33	4.69	0.071 ✓
T9	40 - 20	0.625	1.44	93.7	16.133	0.3068	0.97	5.54	0.176 ✓
T10	20 - 0	0.625	1.42	93.0	13.845	0.3068	1.72	4.75	0.361 ✓

Diagonal Design Data (Tension)

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 $\frac{P}{P_a}$
T1	170 - 150	7/8	5.59	2.71	148.7	30.000	0.6013	3.98	18.04	0.221 ✓
T2	150 - 140	L2 1/2x2 1/2x3/16	11.42	5.00	80.1	21.600	0.9020	6.01	19.48	0.308 ✓
T3	140 - 120	L3x3x3/16	12.50	5.65	74.6	21.600	1.0900	9.38	23.54	0.398 ✓
T4	120 - 100	L3x3x3/16	13.80	6.35	83.5	21.600	1.0900	11.92	23.54	0.506 ✓
T5	100 - 90	L3x3x5/16	14.50	6.72	89.9	21.600	1.7800	13.77	38.45	0.358 ✓
T6	90 - 80	L3x3x5/16	15.24	7.10	94.9	21.600	1.7800	13.84	38.45	0.360 ✓
T7	80 - 60	L3x3x3/8	16.80	7.90	106.3	21.600	2.1100	14.95	45.58	0.328 ✓
T8	60 - 40	L3 1/2x3 1/2x5/16	18.45	8.70	99.2	21.600	2.0900	15.42	45.14	0.342 ✓

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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 $\frac{P}{P_a}$
T9	40 - 20	L3 1/2x3 1/2x3/8	20.16	9.56	109.8	21.600	2.4800	16.85	53.57	0.315 ✓
T10	20 - 0	L4x4x5/16	21.92	10.45	103.3	21.600	2.4000	20.64	51.84	0.398 ✓

Top Girt Design Data (Tension)

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 $\frac{P}{P_a}$
T1	170 - 150	7/8	5.00	4.85	266.3	30.000	0.6013	0.02	18.04	0.001 ✓
T2	150 - 140	L3x3x3/16	5.00	4.48	62.0	21.600	1.0900	0.42	23.54	0.018 ✓

Bottom Girt Design Data (Tension)

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 $\frac{P}{P_a}$
T1	170 - 150	7/8	5.00	4.85	266.3	30.000	0.6013	0.15	18.04	0.008 ✓

Mid Girt Design Data (Tension)

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 $\frac{P}{P_a}$
T4	120 - 100	L3x3x3/16	9.00	7.63	102.2	21.600	1.0900	3.48	23.54	0.148 ✓

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	SF*P_{allow} K	% Capacity	Pass Fail
T1	170 - 150	Leg	1 3/4	3	-36.45	68.14	53.5	Pass
T2	150 - 140	Leg	Pirod 105244	60	-43.02	122.94	35.0	Pass
T3	140 - 120	Leg	Pirod 105216	72	-88.00	122.94	71.6	Pass
T4	120 - 100	Leg	Pirod 105217	87	-143.19	184.67	77.5	Pass
T5	100 - 90	Leg	Pirod 105217	105	-175.68	184.67	95.1	Pass
T6	90 - 80	Leg	Pirod 105217 reinf w/ 1" dia bar	114	-208.57	275.26	75.8	Pass
T7	80 - 60	Leg	Pirod 105218 reinf w/ 1" dia bar	123	-272.12	363.13	74.9	Pass

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Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
T8	60 - 40	Leg	Pirod 105219	138	-333.64	343.62	97.1	Pass
T9	40 - 20	Leg	Pirod 105219 reinf w /1" dia bar	152	-393.52	435.06	90.5	Pass
T10	20 - 0	Leg	Pirod 105220 reinf w/ 1" dia bar	167	-450.01	529.79	84.9	Pass
T1	170 - 150	Diagonal	7/8	13	-4.04	9.62	42.0	Pass
T2	150 - 140	Diagonal	L2 1/2x2 1/2x3/16	66	-6.58	12.14	54.2	Pass
T3	140 - 120	Diagonal	L3x3x3/16	78	-9.90	15.75	62.9	Pass
T4	120 - 100	Diagonal	L3x3x3/16	93	-12.75	13.28	96.0	Pass
T5	100 - 90	Diagonal	L3x3x5/16	108	-14.14	18.91	74.8	Pass
T6	90 - 80	Diagonal	L3x3x5/16	117	-14.20	16.92	83.9	Pass
T7	80 - 60	Diagonal	L3x3x3/8	126	-15.37	16.09	95.5	Pass
T8	60 - 40	Diagonal	L3 1/2x3 1/2x5/16	141	-15.82	18.18	87.0	Pass
T9	40 - 20	Diagonal	L3 1/2x3 1/2x3/8	156	-15.16	17.70	85.6	Pass
T10	20 - 0	Diagonal	L4x4x5/16	177	-18.39	20.72	88.8	Pass
T1	170 - 150	Top Girt	7/8	6	-0.04	3.45	1.0	Pass
T2	150 - 140	Top Girt	L3x3x3/16	61	-0.36	17.63	2.0	Pass
T1	170 - 150	Bottom Girt	7/8	7	-0.16	3.45	4.6	Pass
T4	120 - 100	Mid Girt	L3x3x3/16	88	-2.77	9.21	30.1	Pass
							Summary	
						Leg (T8)	97.1	Pass
						Diagonal (T4)	96.0	Pass
						Top Girt (T2)	2.0	Pass
						Bottom Girt (T1)	4.6	Pass
						Mid Girt (T4)	30.1	Pass
						Bolt Checks	94.0	Pass
						RATING =	**97.1**	**Pass**

ANCHOR BOLT EVALUATION

URS

Job	170' Self-Supporting Lattice Tower - Cromwell, CT	Project No.	HPC-060 Rev. 1	Page / Sheet	of / 1 of 3
Description	Anchor Bolt Analysis	Computed by	MCD	Date	09/09/13
		Checked by		Date	

ANCHOR BOLT ANALYSIS

Input Data

Max Pier Reactions:

Uplift:	Uplift:= 398 kips	*user input*	
Shear:	Shear := 53 kips	*user input*	
Compression:	Compression := 460 kips	*user input*	

Anchor Bolt Data:

Use ASTM A687 Grade

Number of Anchor Bolts = N	N := 6	*user input*	
Bolt Ultimate Strength:	F_u := 150 ksi	*user input*	
Bolt Yield Strength:	Fy := 105 ksi	*user input*	
Bolt Modulus:	E := 29000 ksi	*user input*	
Thickness of Anchor Bolts	D := 1.25in	*user input*	
Threads per Inch:	n := 7	*user input*	
Coefficient of Friction:	μ := 0.55	*user input*	(for baseplate with grout ASCE 10-97)

URS

Job	170' Self-Supporting Lattice Tower - Cromwell, CT	Project No.	HPC-060 Rev. 1	Page / Sheet	of / 2 of 3
Description	Anchor Bolt Analysis	Computed by	MCD	Date	09/09/13
		Checked by		Date	

Anchor Bolt Area:

Gross Area of Bolt:

$$A_g := \frac{\pi}{4} \cdot D^2 \qquad A_g = 1.227 \cdot in^2$$

Net Area of Bolt:

$$A_n := \frac{\pi}{4} \cdot \left(D - \frac{0.9743 \cdot in}{n} \right)^2 \qquad A_n = 0.969 \cdot in^2$$

Check Tensile Forces:

Maximum Tensile Force (Gross Area):

$$AllowableTension := 1.33 \cdot (0.33 \cdot A_g \cdot F_u) \qquad AllowableTension = 80.8 \cdot kips$$

Note: 1.33 increase allowed per TIA/EIA

Maximum Tensile Force (Net Area):

$$F_{net.area} := 1.33 \cdot (0.60 \cdot A_n \cdot Fy) \qquad F_{net.area} = 81.2 \cdot kips$$

Note: 1.33 increase allowed per TIA/EIA

Applied Tension:

$$MaxTension := \frac{Uplift}{N} \qquad MaxTension = 66.3 \cdot kips$$

Check Stresses:

$$\frac{MaxTension}{F_{net.area}} = 0.82$$

$$Condition1 := if\left(\frac{MaxTension}{F_{net.area}} \le 1.00, "OK", "Overstressed" \right)$$

Condition1 = "OK"

URS

Job	170' Self-Supporting Lattice Tower - Cromwell, CT	Project No.	HPC-060 Rev.1	Page	of
Description	Anchor Bolt Analysis	Computed by	MCD	Sheet	3 of 3
		Checked by		Date	09/09/13

Check Anchor Bolt Area:

Based on the ASCE 10-97 Design of Latticed Stell Transmission Structures

Required Area:

$$A_{s1} := \frac{Uplift}{Fy} + \frac{Shear}{\mu \cdot 0.85 \cdot Fy} \qquad A_{s1} = 4.9 \cdot in^2$$

$$A_{s2} := \left| \frac{Shear - (0.3 \cdot Compression)}{\mu \cdot 0.85 \cdot Fy} \right| \qquad A_{s2} = 1.7 \cdot in^2$$

Provided Area:

$$A_{sprovided} := A_n \cdot N \qquad A_{sprovided} = 5.8 \cdot in^2$$

$$Condition2 := if\left(\frac{A_{s1}}{A_{sprovided}} \le 1.00, "OK", "Overstressed"\right) \qquad \frac{A_{s1}}{A_{sprovided}} = 0.84$$

Condition2 = "OK"

$$Condition3 := if\left(\frac{A_{s2}}{A_{sprovided}} \le 1.00, "OK", "Overstressed"\right) \qquad \frac{A_{s2}}{A_{sprovided}} = 0.30$$

Condition3 = "OK"

FOUNDATION EVALUATION

URS

Job	170' Self-Supporting Lattice Tower - Cromwell, CT	Project No.	HPC-060 Rev. 1	Page	of
Description	Drilled Pier Caisson Evaluation	Computed by	MCD	Sheet	1 of 2
		Checked by		Date	09/09/13
				Date	

FOUNDATION ANALYSIS

Input Data

Maximum Pier Reactions:

Compression: $C_t := 460\,kips$ *user input*

Uplift: $U_t := 398\,kips$ *user input*

Foundation Dimensions:

Drilled Caisson Length: $C_{Length} := 41.5\,ft$ *user input*

Diameter of Pier: $d_p := 5.5ft$ *user input*

Extension of Pier Above Grade: $L_{pag} := 0.5ft$ *user input*

Additional Concrete $Conc_{addl} := 5ft \cdot \left(13ft \cdot 13ft - \frac{\pi \cdot d_p^{\,2}}{4} \right)$

$Conc_{addl} = 726.2\,ft^3$

Material Properties:

Unit Weight of Concrete: $\gamma c := 150pcf$ *user input*

Unit Weight of Water: $\gamma w := 62.4pcf$ *user input*

Unit Weight of Soil: $\gamma s := 100pcf$ *user input*

Allowable Soil Bearing Capacity (Allowable Bearing Pressure at Depth 41') $q_s := 6\,ksf$ *user input*

Water Table Below Grade: $Wd := 41 \cdot ft$ *user input*

Average Allowable Shear: $fl := 859\,psf$ *user input*

Depth Neglected for Skin Friction at Top: $Depthunbond := 4\,ft$ *user input*

Foundation reinforcement per drawings by Tectonic, dated May 5, 2004

Loading:

$$TotalDownLoad := C_t + \pi \cdot \frac{d_p^{\,2}}{4} \cdot \left[L_{pag} \cdot \gamma c + \left[\gamma c \cdot \left(C_{Length} - L_{pag} \right) \right] \right]$$

$TotalDownLoad = 607.9\,kips$

$$PierWeight := \pi \cdot \frac{d_p^{\,2}}{4} \cdot \left[\left(Wd + L_{pag} \right) \cdot \gamma c + \left(C_{Length} - Wd - L_{pag} \right) \cdot \left(\gamma c - \gamma w \right) \right] + Conc_{addl} \cdot \gamma c$$

$PierWeight = 256.8 \cdot kips$

$$SoilShear := \pi \, d_p \cdot \left[fl \cdot \left(C_{Length} - Depthunbond \right) \right]$$

$SoilShear = 556.6 \cdot kips$

URS

Job	170' Self-Supporting Lattice Tower - Cromwell, CT	Project No.	HPC-060 Rev. 1	Page / Sheet	2 of 2
Description	Drilled Pier Caisson Evaluation	Computed by	MCD	Date	09/09/13
		Checked by		Date	

Compression Capacity:

$$TotalDownLoadCapacity := SoilShear + q_s \cdot \left(\pi \cdot \frac{d_p^{\,2}}{4}\right)$$

$TotalDownLoadCapacity = 699.1 \cdot kips$

$CheckDownLoadCapacity := if(TotalDownLoad < TotalDownLoadCapacity, "Okay", "No Good")$

$CheckDownLoadCapacity = "Okay"$

Tension Capacity:

$TotalUpLiftCapacity := SoilShear + PierWeight$

$TotalUpLiftCapacity = 813.4 \cdot kips$

$CheckUpLiftCapacity := if(U_t < TotalUpLiftCapacity, "Okay", "No Good")$

$CheckUpLiftCapacity = "Okay"$

$$SafetyFactor_{provided} := \frac{TotalUpLiftCapacity}{U_t}$$

$SafetyFactor_{provided} = 2.04$

Check Cone Failure:

$$ConeFailureCapacity := \frac{\left[\left(C_{Length} - L_{pag}\right) \cdot \tan(30deg) \cdot 2 + d_p\right]^2 \cdot \pi}{4} \cdot \frac{C_{Length} - L_{pag}}{3} \cdot \gamma_s$$

$ConeFailureCapacity = 2997.25 \cdot kips$

$CheckConeFailureCapacity := if(U_t < ConeFailureCapacity, "Okay", "No Good")$

$CheckConeFailureCapacity = "Okay"$

$$ConeSafetyFactor_{provided} := \frac{ConeFailureCapacity}{U_t}$$

$ConeSafetyFactor_{provided} = 7.53$

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

Sprint Existing Facility

Site ID: CT60XC931

Cromwell Rt 372
179 Shunpike Road
Cromwell, CT 06416

November 12, 2012

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

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November 12, 2012

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

Re: Emissions Values for Site: **CT60XC931 – Cromwell Rt 372**

EBI Consulting was directed to analyze the proposed upgrades to the existing Sprint facility located at 179 Shunpike Road, Cromwell, 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 179 Shunpike Road, Cromwell, 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) 4 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 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.

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6) The antenna mounting height centerline of the proposed antennas is **170 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	CT60XC931 - Cromwell Rt 372
Site Addresss	179 Shunpike Road, Cromwell, CT, 06416
Site Type	Self Support Tower

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	4	80	15.9	170	164	1/2 "	0.5	0	2773.8948	37.07731	3.70773%
1a	RFS	APXVSPP18-C-A20	RRH	850 MHz	CDMA / LTE	20	1	20	13.4	170	164	1/2 "	0.5	0	389.96892	5.212527	0.91932%
															Sector total Power Density Value:		4.627%

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	4	80	15.9	170	164	1/2 "	0.5	0	2773.8948	37.07731	3.70773%
2a	RFS	APXVSPP18-C-A20	RRH	850 MHz	CDMA / LTE	20	1	20	13.4	170	164	1/2 "	0.5	0	389.96892	5.212527	0.91932%
															Sector total Power Density Value:		4.627%

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	4	80	15.9	170	164	1/2 "	0.5	0	2773.8948	37.07731	3.70773%
3a	RFS	APXVSPP18-C-A20	RRH	850 MHz	CDMA / LTE	20	1	20	13.4	170	164	1/2 "	0.5	0	389.96892	5.212527	0.91932%
															Sector total Power Density Value:		4.627%

Site Composite MPE %	
Carrier	MPE %
Sprint	13.881%
AT&T	6.930%
Pocket	2.660%
T-Mobile	5.820%
CR Fire	7.950%
Clearwire	1.040%
Verizon Wireless	20.040%
Total Site MPE %	58.321%

NV_CT60XC931 CSC

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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 **13.881 % (4.627 % 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 **58.321 %** 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

BUILDING PERMIT

№ 014608

Date July 26, 20 04

Estimated Cost of Construction (Including Value of Labor & Material) $ 22,000.00

Building Fee $ 225.00

Plan Review Fee $

Cert. of Occupancy Fee $

State Education Fund Fee $ 3.52

TOTAL $ 228.52

TO PUBLIC WORKS DEPARTMENT – BUILDING DIVISION, TOWN OF CROMWELL

The undersigned, hereby applies for a permit to do work according to the following specifications:

Address 179 Shunpike Road Lot No. _____ Side of Street _____ Zone _____

Nearest Cross Street or Name of Development _____

Owner of Building Cromwell Fire District Address 1 West Street, Cromwell, CT. 06416

Contractor SBA Network Services Address 900 Cummings Center, Suite 316u, Beverly, MA. 01915

Architect _____ Address _____

Purpose of this Permit Install telecommunication equipment and six antennas on existing tower.

Size of Main Building _____ Area-Sq. Ft. 1st fl. _____ 2nd fl. _____ Garage _____ Size & Location _____

No. of Families _____ No. of Stories _____ Frame _____ No. of Rooms: 1st _____ 2nd _____ 3rd _____

Size of Lot _____

	CONTRACTORS	LICENSE NUMBERS
Plumbing		
Heating and/or Air Conditioning		
Electrical		
Home Improvement	SBA Network Services	

I hereby agree to conform to all the requirements of the Laws of the State of Connecticut, the Ordinances of the Town of Cromwell, all regulations listed on the reverse side of this permit, and to notify the Building Official of any alteration in the plans or specifications of the Building for which this permit is asked. And agree that this building is to be located the proper distance from all street lines, side yard lines and required distances from all other zones and is located in a zone in which this building and its use is allowed.

Signed _____

Permit Approved July 26, 20 04 Permit Revoked _____ 20 _____

David N. Deary

Building Official

Building Official

Instructions on Reverse Side

BUILDING DEPARTMENT REGULATIONS

1. Before a building permit will be issued, a plot plan certified by a registered land surveyor must be submitted for review.
2. Plan must indicate first floor elevation of building to be two (2') feet above elevation of road.
3. Existing and proposed contours must be indicated.
4. Lot and driveway grading must be such so as not to allow road surface water from entering property. When this is not possible, a letter relieving the Town of Cromwell from any responsibility for road surface water entering the property must be submitted by the owner/builder.
5. Lot grading to be responsiblity of owner/builder Drainage controls must be such so as not to adversely effect adjacent property owners. The Public Works Department will instruct owner/builder with regards to drainage controls. Driveways connecting onto town roads must be constructed so as not to interfere with water flowage along the side of the street. A Driveway Permit must be obtained from the Public Works Department before a Building Permit is issued. A $300.00 Bond must be posted with this permit.
6. ONCE A BUILDING PERMIT IS ISSUED, FOOTINGS AND FOUNDATIONS CAN BE INSTALLED, BUT LOCATION OF SAME MUST BE CERTIFIED ON AN AS-BUILT DRAWING, PREPARED BY A REGISTERED LAND SURVEYOR, AND SUBMITTED TO THE BUILDING DEPARTMENT BEFORE ANY ADDITIONAL WORK CAN BE DONE ON STRUCTURE.
7. All lot soil testing, as required by the Town, shall be the responsibility of the owner/builder. Testing must be done by a registered professional engineer and/or licensed sanitarian.
8. No building permits will be issued until two (2) sets of sanitary system plans, when required, have been submitted and approved.
9. Care must be taken during construction to protect adjacent property owners from the nuisance of dust from the lot being built upon. The Town of Cromwell will insist that the owner/builder topsoil and grade at any time the need may occur
10. At least twenty-four (24) hours notice must be given the Building Department before any inspections will be performed
11. All requests for certificates of occupancy must be in writing and ten (10) days must be allowed for final inspections to be made and reported.
12. All building plans, review of same, and issuance of building permits shall be in accordance with the State of Connecticut Basic Building Codes, and issuance of permits is also subject to approvals from local agencies when required.
13. UPON COMPLETION OF THE PROJECT, AN AS-BUILT MUST BE SUBMITTED TO THE BUILDING DEPARTMENT BEFORE A CERTIFICATE OF OCCAPANCY WILL BE ISSUED.

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

SPRINT Existing Facility

Site ID: CT60XC931

Cromwell - RT. 372
179 Shunpike Road
Cromwell, CT 06416

November 17, 2017

EBI Project Number: 6217005210

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general population allowable limit:	16.97 %

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

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November 17, 2017

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

Emissions Analysis for Site: **CT60XC931 – Cromwell - RT. 372**

EBI Consulting was directed to analyze the proposed SPRINT facility located at **179 Shunpike Road, Cromwell, CT**, for the purpose of determining whether the emissions from the Proposed SPRINT Antenna Installation located on this property are within specified federal limits.

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

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

General population/uncontrolled exposure limits apply to situations in which the general population 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 population would always be considered under this category when exposure is not employment related, for example, in the case of a telecommunications tower that exposes persons in a nearby residential area.

Public exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ($\mu W/cm^2$). The general population exposure limits for the 850 MHz Band is approximately 567 $\mu W/cm^2$. The general population exposure limit for the 1900 MHz (PCS) and 2500 MHz (BRS) bands is 1000 $\mu W/cm^2$. Because each carrier will be using different frequency bands, and each frequency band has different exposure limits, it is necessary to report percent of MPE rather than power density.

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

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were done for the proposed SPRINT Wireless antenna facility located at **179 Shunpike Road, Cromwell, CT**, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since SPRINT is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was focused at the base of the tower. For this report the sample point is the top of a 6-foot person standing at the base of the tower.

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

1) 1 CDMA channels (850 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 20 Watts per Channel.

2) 2 LTE channels (850 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 20 Watts per Channel.

3) 5 CDMA channels (1900 MHz (PCS)) were considered for each sector of the proposed installation. These Channels have a transmit power of 16 Watts per Channel.

4) 2 LTE channels (1900 MHz (PCS)) were considered for each sector of the proposed installation. These Channels have a transmit power of 40 Watts per Channel.

5) 8 LTE channels (2500 MHz (BRS)) were considered for each sector of the proposed installation. These Channels have a transmit power of 20 Watts per Channel.

6) 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.

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

8) The antennas used in this modeling are the **RFS APXVSPP18-C-A20 and the Commscope DT465B-2XR** for transmission in the 850 MHz, 1900 MHz (PCS) and 2500 MHz (BRS) frequency bands. This is based on feedback from the carrier with regards to anticipated antenna selection. Maximum gain values for all antennas are listed in the Inventory and Power Data table below. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

9) The antenna mounting height centerlines of the proposed antennas are **170 feet** above ground level (AGL) for **Sector A**, **170 feet** above ground level (AGL) for **Sector B** and **170 feet** above ground level (AGL) for Sector C.

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

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

SPRINT Site Inventory and Power Data by Antenna

Sector:	A	Sector:	B	Sector:	C
Antenna #:	**1**	Antenna #:	**1**	Antenna #:	**1**
Make / Model:	RFS APXVSPP18-C-A20	Make / Model:	RFS APXVSPP18-C-A20	Make / Model:	RFS APXVSPP18-C-A20
Gain:	13.4 / 15.9 dBd	Gain:	13.4 / 15.9 dBd	Gain:	13.4 / 15.9 dBd
Height (AGL):	**170 feet**	Height (AGL):	**170 feet**	Height (AGL):	**170 feet**
Frequency Bands	850 MHz / 1900 MHz (PCS)	Frequency Bands	850 MHz / 1900 MHz (PCS)	Frequency Bands	850 MHz / 1900 MHz (PCS)
Channel Count	10	Channel Count	10	Channel Count	10
Total TX Power(W):	220 Watts	Total TX Power(W):	220 Watts	Total TX Power(W):	220 Watts
ERP (W):	7,537.38	ERP (W):	7,537.38	ERP (W):	7,537.38
Antenna A1 MPE%	**1.14 %**	Antenna B1 MPE%	**1.14 %**	Antenna C1 MPE%	**1.14 %**
Antenna #:	**2**	Antenna #:	**2**	Antenna #:	**2**
Make / Model:	Commscope DT465B-2XR	Make / Model:	Commscope DT465B-2XR	Make / Model:	Commscope DT465B-2XR
Gain:	15.05 dBd	Gain:	15.05 dBd	Gain:	15.05 dBd
Height (AGL):	**170 feet**	Height (AGL):	**170 feet**	Height (AGL):	**170 feet**
Frequency Bands	2500 MHz (BRS)	Frequency Bands	2500 MHz (BRS)	Frequency Bands	2500 MHz (BRS)
Channel Count	8	Channel Count	8	Channel Count	8
Total TX Power(W):	160 Watts	Total TX Power(W):	160 Watts	Total TX Power(W):	160 Watts
ERP (W):	5,118.23	ERP (W):	5,118.23	ERP (W):	5,118.23
Antenna A2 MPE%	**0.68 %**	Antenna B2 MPE%	**0.68 %**	Antenna C2 MPE%	**0.68 %**

Site Composite MPE%	
Carrier	**MPE%**
SPRINT – Max per sector	**1.83 %**
AT&T	5.67 %
T-Mobile	2.85 %
CR Police Dept	0.23 %
CR Fire Dept	0.12 %
CR Fire Dept	0.12 %
CR Fire Alarm	0.40 %
Clearwire	0.11 %
Verizon Wireless	5.64 %
Site Total MPE %*:	**16.97 %**

SPRINT Sector A Total:	1.83 %
SPRINT Sector B Total:	1.83 %
SPRINT Sector C Total:	1.83 %
Site Total:	16.97 %

SPRINT _ Max Values per Frequency Band / Technology Per Sector	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ($\mu W/cm^2$)	Frequency (MHz)	Allowable MPE ($\mu W/cm^2$)	Calculated % MPE
Sprint 850 MHz CDMA	1	437.55	170	0.58	850 MHz	567	0.10%
Sprint 850 MHz LTE	2	437.55	170	1.17	850 MHz	567	0.21%
Sprint 1900 MHz (PCS) CDMA	5	622.47	170	4.16	1900 MHz (PCS)	1000	0.42%
Sprint 1900 MHz (PCS) LTE	2	1,556.18	170	4.16	1900 MHz (PCS)	1000	0.42%
Sprint 2500 MHz (BRS) LTE	8	639.78	170	6.84	2500 MHz (BRS)	1000	0.68%
						Total:*	**1.83%**

*NOTE: Totals may vary by 0.01% due to summing of remainders

Summary

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

The anticipated maximum composite contributions from the SPRINT facility as well as the site composite emissions value with regards to compliance with FCC's allowable limits for general population exposure to RF Emissions are shown here:

SPRINT Sector	Power Density Value (%)
Sector A:	1.83 %
Sector B:	1.83 %
Sector C:	1.83 %
SPRINT Maximum Total (per sector):	1.83 %
Site Total:	16.97 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **16.97 %** of the allowable FCC established general population 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.

RAMAKER & ASSOCIATES, INC.

November 13, 2017

Tom Jupin
Charles Cherundolo Consulting, Inc.
1280 Rt. 46 West
Parsippany, NJ 07054

Ramaker & Associates, Inc.
855 Community Drive
Sauk City, WI 53583

SUBJECT: **MOUNT ASSESSMENT**

CARRIER: **SPRINT**

SITE: **CROMWELL – RT. 372 (CT60XC931-A)**
179 SHUNPIKE ROAD
CROMWELL, MIDDLESEX COUNTY, CONNECTICUT 06416
RAMAKER & ASSOCIATES PROJECT NUMBER: 29431

RESULTS: **MOUNT:** **PASS**

Dear Tom Jupin:

Ramaker & Associates, Inc. (RAMAKER) respectfully submits this mount assessment for the above mentioned site. The purpose of this report is to determine the structural integrity of the mounting structure with the proposed loading configurations. Engineering recommendations regarding the analysis results are provided in the following pages.

RAMAKER developed a finite element model of the mount(s) using RISA analysis software. All information contained herein is valid only for the described structure configuration and loading conditions. RAMAKER reserves the right to modify our recommendations should alterations to the mount loading occur.

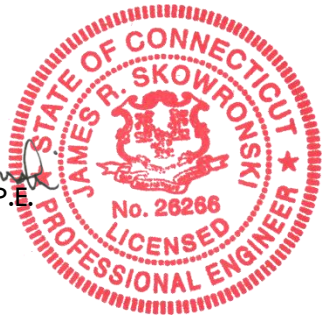
If you have any questions or comments, please do not hesitate to contact our office.

Sincerely,

RAMAKER & ASSOCIATES, INC.

James M. Alvin
Structural Designer

James R. Skowronski, P.E.
Supervising Engineer



ANALYSIS CRITERIA

State Building Code	2016 CT State Building Code
Adopted Building Code	2012 IBC
Referenced Standard	TIA-222-G
Risk Category	II
Ultimate Design Wind Speed, V_{ult}	125 mph (3 sec. gust)
Nominal Design Wind Speed, V_{asd}	97 mph (3 sec. gust)
Design Wind Speed w/ Ice	50 mph (3 sec. gust)
Ice Thickness	3/4 inch
Exposure Category	C
Topographic Category	1
Crest Height	N/A

SUPPORTING DOCUMENTATION

- Construction drawings by RAMAKER, project number 29431
- Site visit(s) conducted by RAMAKER
- Other pertinent data procured or assumed by RAMAKER during site due diligence activities

MOUNT LOADING

RAMAKER understands that the loading to be used for this analysis will consist of the antennas and equipment configurations as shown in the following chart(s):

Antenna Mount – Alpha Sector				
Elevation	**Position**	**Appurtenance**	**Mount Type**	**Status**
170	1	(1) RFS APXVSPP18-C-A20	Pipe Mount on 9 Arm Candelabra	Existing
	--	(1) ALU RRH1900-4x45	Pipe Mount on 9 Arm Candelabra	
		(1) ALU RRH2x50-800		
	2	**(1) Commscope DT465B-2XR**	**Pipe Mount on 9 Arm Candelabra**	**Proposed**
		(1) ALU TD-RRH8x20-25		
		(1) ALU RRH2x50-800		

Antenna Mount – Beta & Gamma Sectors				
Elevation	**Position**	**Appurtenance**	**Mount Type**	**Status**
170	1	**(1) Commscope DT465B-2XR**	**Pipe Mount on 9 Arm Candelabra**	**Proposed**
		(1) ALU TD-RRH8x20-25		
		(1) ALU RRH2x50-800		
	2	(1) RFS APXVSPP18-C-A20	Pipe Mount on 9 Arm Candelabra	Existing
	--	(1) ALU RRH1900-4x45	Pipe Mount on 9 Arm Candelabra	
		(1) ALU RRH2x50-800		

MOUNT RESULTS

By engineering calculation and inspection, the antenna and equipment mounting structure(s) are capable of supporting the proposed loading configurations without causing an overstress condition in the antenna and equipment mounting structure(s).

LIMITATIONS

The recommendations contained within this report were developed using the supporting documentation as previously described. All recommendations pertain only to the proposed antenna installation activities as described in this report. RAMAKER assumes no responsibility for failures caused by factors beyond our control. These include but are not limited to the following:

- Missing, corroding, and/or deteriorating members
- Improper manufacturing and/or construction
- Improper maintenance
- Member grades less than assumed grades show below:

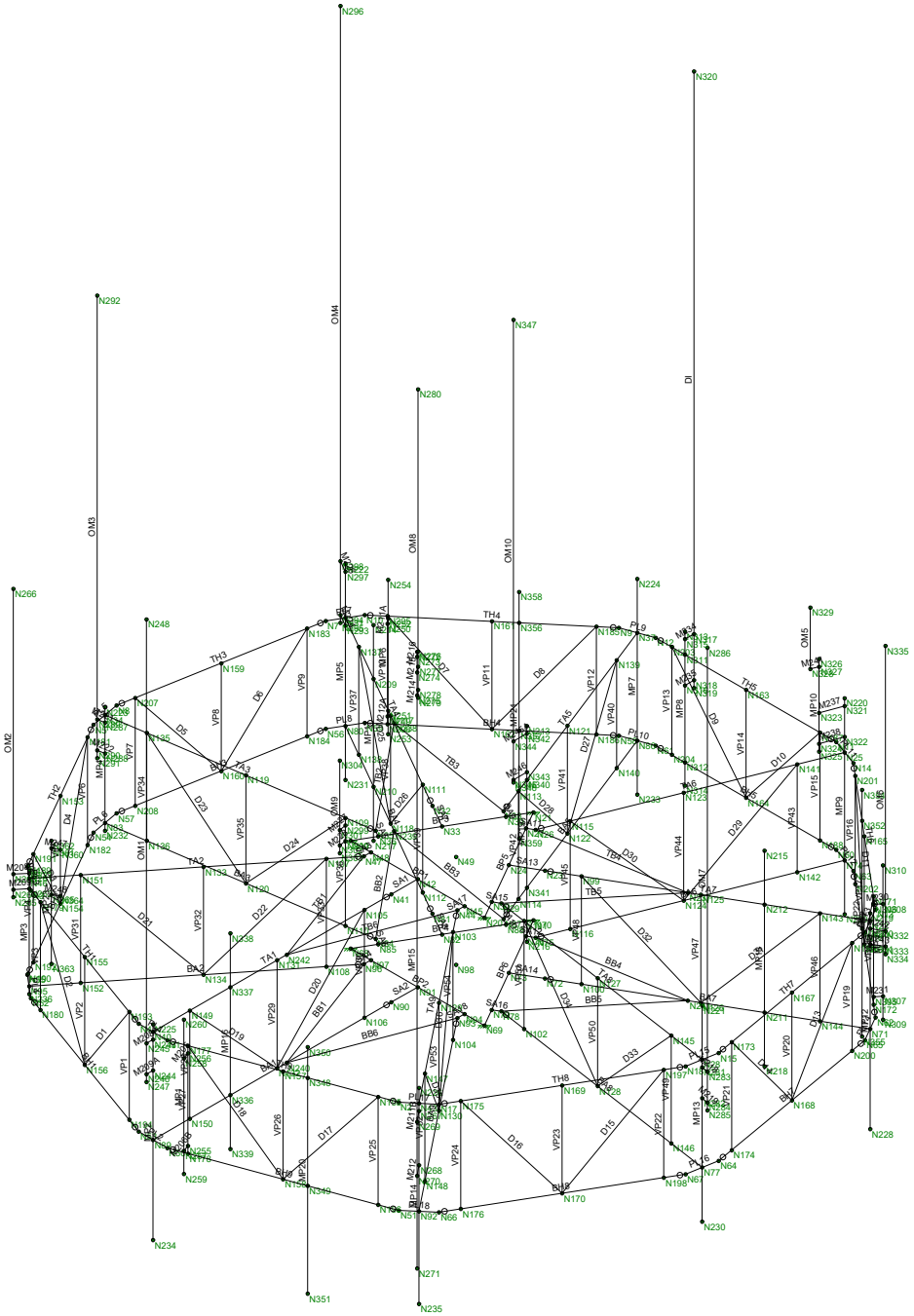
Assumed Steel Member Grades	
Angles/Plates	ASTM A36, 36 ksi
HSS (Square Tube)	ASTM A36, 36 ksi
Pipes	ASTM A53 Gr. B, 35 ksi

RAMAKER is not responsible for verifying that the loading on the structure is consistent with the loading applied to the structure within this report. If there is any information contrary to that contained herein, or if there are any defects arising from the original design, material, fabrication and erection deficiencies, this report should be disregarded and RAMAKER should be contacted immediately. RAMAKER is not liable for any representation, recommendation, or conclusion not expressly stated herein.

This analysis pertains only to the mounting structure, and no analyses or conclusions were made regarding the supporting structure. Analysis and certification of the supporting structure is performed and submitted separately.

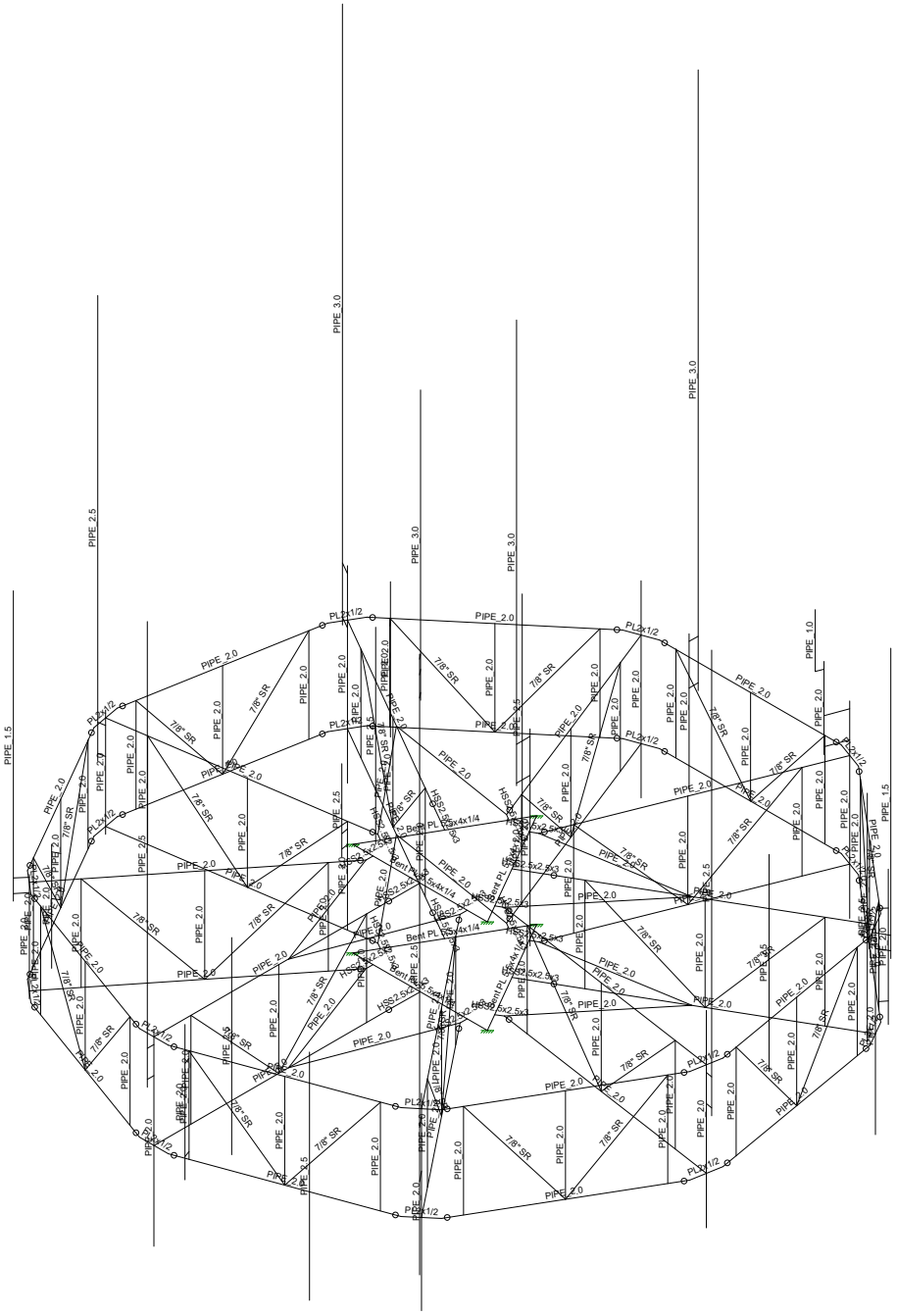
ATTACHMENTS

- Analysis Figures
- Analysis Calculations



Envelope Only Solution

Ramaker & Associates	CROMWELL - RT. 372 (CT60XC931-A)	SK - 1
JMA		Nov 7, 2017 at 3:56 PM
29431		29431 Mount - 9 Arm Candelabra_...



Envelope Only Solution

Ramaker & Associates	CROMWELL - RT. 372 (CT60XC931-A)	SK - 2
JMA		Nov 7, 2017 at 3:57 PM
29431		29431 Mount - 9 Arm Candelabra_...

RAMAKER & ASSOCIATES, INC.
855 Community Drive, Sauk City, WI 53583
Phone: 608-643-4100 Fax: 608-643-7999

Job: Cromwell-RT. 372 (CT60XC931)
Project: 29431
By: JMA
Date: 11/7/17

Wind Load on Antennas TIA-222-G

$q_z = 0.00256\ K_z\ K_{zt}\ K_d\ V^2\ I$

$F = q_z\ G_h\ C_a\ A_a$

Occupancy:	II		Classification of Structures (Table 2-1)
Exposure:	C		Exposure Category
V:	97	mph	Basic Wind Speed (Annex B)
z:	170	ft	Height above ground level to the center of the antenna
I:	1.00		Importance Factor (Table 2-3)
K_z:	1.42		Velocity Pressure Coefficient (2.6.5.2)
K_{zt}:	1.00		Topographic Factor (2.6.6.4)
K_d:	0.95		Wind Direction Probability Factor (Table 2-2)
q_z:	32.4	psf	Velocity Pressure at Height z
G_h:	1.00		Strength Design of Appurtenances and their Connections

Mount & Antenna Wind Loads

Appurtenance	Height	Width	h/D	Shape	C_a	A_f	Force	Force
	in	*in*				*sq ft*	*lb*	*plf*
APXVSPP18-C-A20	72.0	11.9	6.1	Flat	1.358	5.95	261.5	
1900MHz 4x45W RRH	25.1	11.1	2.3	Flat	1.200	1.93	75.2	
800MHz 2x50W RRH	19.0	13.0	1.5	Flat	1.200	1.72	66.7	
DT465B-2XR	71.9	13.8	5.2	Flat	1.320	6.89	294.6	
TD-RRH8x20-25	26.1	18.6	1.4	Flat	1.200	3.37	131.0	
Camera and Mount	24.0	24.0	1.0	Flat	1.200	4.00	155.4	
1' x 1' Panel	12.0	12.0	1.0	Flat	1.200	1.00	38.9	
TMA 10"x8"x5"	10.0	8.0	1.3	Flat	1.200	0.56	21.6	
Pipe3STD x 20 ft	240.0	3.5	68.6	Round	1.141	5.83	215.5	10.8
Pipe3STD x 15 ft	180.0	3.5	51.4	Round	1.141	4.38	161.6	10.8
Pipe3STD x 10 ft	120.0	3.5	34.3	Round	1.141	2.92	107.8	10.8
Pipe2-1/2STD x 20 ft	240.0	2.9	83.5	Round	1.200	4.79	186.2	9.3
Pipe2-1/2STD x 15 ft	180.0	2.9	62.6	Round	1.200	3.59	139.7	9.3
Pipe2-1/2STD x 8 ft	96.0	2.9	33.4	Round	1.200	1.92	74.5	9.3
Pipe2-1/2STD x 7 ft	84.0	2.9	29.2	Round	1.200	1.68	65.2	9.3
Pipe2-1/2STD x 3 ft	36.0	2.9	12.5	Round	0.923	0.72	21.5	7.2
Pipe2STD x 8.917 ft	107.0	2.4	45.1	Round	1.200	1.76	68.6	7.7
Pipe2STD x 7 ft	84.0	2.4	35.4	Round	1.200	1.39	53.8	7.7
Pipe2STD x 5 ft	60.0	2.4	25.3	Round	1.200	0.99	38.5	7.7
Pipe2STD x 4 ft	48.0	2.4	20.2	Round	1.094	0.79	28.0	7.0
Pipe2STD x 3.5 ft	42.0	2.4	17.7	Round	1.037	0.69	23.3	6.6

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Wind Load on Antennas TIA-222-G

$q_z = 0.00256\ K_z\ K_{zt}\ K_d\ V^2\ I$

$F = q_z\ G_h\ C_a\ A_a$

Occupancy:	II		Classification of Structures (Table 2-1)
Exposure:	C		Exposure Category
V:	97	mph	Basic Wind Speed (Annex B)
z:	170	ft	Height above ground level to the center of the antenna
I:	1.00		Importance Factor (Table 2-3)
K_z:	1.42		Velocity Pressure Coefficient (2.6.5.2)
K_{zt}:	1.00		Topographic Factor (2.6.6.4)
K_d:	0.95		Wind Direction Probability Factor (Table 2-2)
q_z:	32.4	psf	Velocity Pressure at Height z
G_h:	1.00		Strength Design of Appurtenances and their Connections

Mount & Antenna Wind Loads

Appurtenance	Height	Width	h/D	Shape	C_a	A_f	Force	Force
	in	*in*				*sq ft*	*lb*	*plf*
Pipe1-1/2STD x 10 ft	120.0	1.9	63.2	Round	1.200	1.58	61.5	6.2
Pipe1STD x 2 ft	24.0	1.3	18.3	Round	1.050	0.22	7.5	3.7
SR 7/8 x 4.79 ft	57.5	0.9	65.7	Round	1.200	0.35	13.6	2.8
L6X4X5/16 x 5 ft	60.0	6.0	10.0	Flat	1.500	2.50	121.4	24.3
HSS2-1/2X2-1/2X3/16 x 1 ft	12.0	2.5	4.8	Flat	1.302	0.21	8.8	8.8

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Wind Load on Antennas TIA-222-G

$q_z = 0.00256\ K_z\ K_{zt}\ K_d\ V^2\ I$

$F = q_z\ G_h\ C_a\ A_a$

Occupancy:	II		Classification of Structures (Table 2-1)
Exposure:	C		Exposure Category
V:	97	mph	Basic Wind Speed (Annex B)
z:	170	ft	Height above ground level to the center of the antenna
I:	1.00		Importance Factor (Table 2-3)
K_z:	1.42		Velocity Pressure Coefficient (2.6.5.2)
K_{zt}:	1.00		Topographic Factor (2.6.6.4)
K_d:	0.95		Wind Direction Probability Factor (Table 2-2)
q_z:	32.4	psf	Velocity Pressure at Height z
G_h:	1.00		Strength Design of Appurtenances and their Connections

Mount & Antenna Wind Loads

Appurtenance	Height	Depth	h/D	Shape	C_a	A_f	Force	Force
	in	*in*				*sq ft*	*lb*	*plf*
APXVSPP18-C-A20	72.0	7.0	10.3	Flat	1.509	3.50	171.3	
1900MHz 4x45W RRH	25.1	10.7	2.3	Flat	1.200	1.86	72.4	
800MHz 2x50W RRH	19.0	12.2	1.6	Flat	1.200	1.61	62.6	
DT465B-2XR	71.9	8.2	8.8	Flat	1.459	4.09	193.4	
TD-RRH8x20-25	26.1	6.7	3.9	Flat	1.262	1.21	49.6	
Camera and Mount	24.0	24.0	1.0	Flat	1.200	4.00	155.4	
1' x 1' Panel	12.0	4.0	3.0	Flat	1.222	0.33	13.2	
TMA 10"x8"x5"	10.0	5.0	2.0	Flat	1.200	0.35	13.5	
Pipe3STD x 20 ft	240.0	3.5	68.6	Round	1.141	5.83	215.5	10.8
Pipe3STD x 15 ft	180.0	3.5	51.4	Round	1.141	4.38	161.6	10.8
Pipe3STD x 10 ft	120.0	3.5	34.3	Round	1.141	2.92	107.8	10.8
Pipe2-1/2STD x 20 ft	240.0	2.9	83.5	Round	1.200	4.79	186.2	9.3
Pipe2-1/2STD x 15 ft	180.0	2.9	62.6	Round	1.200	3.59	139.7	9.3
Pipe2-1/2STD x 8 ft	96.0	2.9	33.4	Round	1.200	1.92	74.5	9.3
Pipe2-1/2STD x 7 ft	84.0	2.9	29.2	Round	1.200	1.68	65.2	9.3
Pipe2-1/2STD x 3 ft	36.0	2.9	12.5	Round	0.923	0.72	21.5	7.2
Pipe2STD x 8.917 ft	107.0	2.4	45.1	Round	1.200	1.76	68.6	7.7
Pipe2STD x 7 ft	84.0	2.4	35.4	Round	1.200	1.39	53.8	7.7
Pipe2STD x 5 ft	60.0	2.4	25.3	Round	1.200	0.99	38.5	7.7
Pipe2STD x 4 ft	48.0	2.4	20.2	Round	1.094	0.79	28.0	7.0
Pipe2STD x 3.5 ft	42.0	2.4	17.7	Round	1.037	0.69	23.3	6.6

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Wind Load on Antennas TIA-222-G

$q_z = 0.00256\ K_z\ K_{zt}\ K_d\ V^2\ I$

$F = q_z\ G_h\ C_a\ A_a$

Occupancy:	II		Classification of Structures (Table 2-1)
Exposure:	C		Exposure Category
V:	97	mph	Basic Wind Speed (Annex B)
z:	170	ft	Height above ground level to the center of the antenna
I:	1.00		Importance Factor (Table 2-3)
K_z:	1.42		Velocity Pressure Coefficient (2.6.5.2)
K_{zt}:	1.00		Topographic Factor (2.6.6.4)
K_d:	0.95		Wind Direction Probability Factor (Table 2-2)
q_z:	32.4	psf	Velocity Pressure at Height z
G_h:	1.00		Strength Design of Appurtenances and their Connections

Mount & Antenna Wind Loads

Appurtenance	Height	Depth	h/D	Shape	C_a	A_f	Force	Force
	in	*in*				*sq ft*	*lb*	*plf*
Pipe1-1/2STD x 10 ft	120.0	1.9	63.2	Round	1.200	1.58	61.5	6.2
Pipe1STD x 2 ft	24.0	1.3	18.3	Round	1.050	0.22	7.5	3.7
SR 7/8 x 4.79 ft	57.5	0.9	65.7	Round	1.200	0.35	13.6	2.8
L6X4X5/16 x 5 ft	60.0	4.0	15.0	Flat	1.667	1.67	90.0	18.0
HSS2-1/2X2-1/2X3/16 x 1 ft	12.0	2.5	4.8	Flat	1.302	0.21	8.8	8.8

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By: JMA
Date: 11/7/17

Ice Wind Load on Antennas TIA-222-G

$q_z = 0.00256\ K_z\ K_{zt}\ K_d\ V^2\ I$

$F = q_z\ G_h\ C_a\ A_a$

Occupancy:	II		Classification of Structures (Table 2-1)
Exposure:	C		Exposure Category
V_i:	50	mph	Basic Wind Speed (Annex B)
z:	170	ft	Height above ground level to the center of the antenna
I:	1.00		Importance Factor (Table 2-3)
K_z:	1.42		Velocity Pressure Coefficient (2.6.5.2)
K_{zt}:	1.00		Topographic Factor (2.6.6.4)
K_d:	0.95		Wind Direction Probability Factor (Table 2-2)
q_z:	8.60	psf	Velocity Pressure at Height z
G_h:	1.00		Strength Design of Appurtenances and their Connections
K_{iz}:	1.18		Height Escalation Factor for Ice Thickness
t_{iz}:	1.77	in	Factored Thickness of Radial Glaze Ice at Height z

Mount & Antenna Ice Wind Loads

Appurtenance	Height	Width	h/D	Shape	C_a	A_f	Force	Force
	in	*in*				*sq ft*	*lb*	*plf*
APXVSPP18-C-A20	75.5	15.4	4.9	Flat	1.307	8.09	91.0	
1900MHz 4x45W RRH	28.6	14.6	2.0	Flat	1.200	2.91	30.0	
800MHz 2x50W RRH	22.5	16.5	1.4	Flat	1.200	2.59	26.7	
DT465B-2XR	75.4	17.3	4.4	Flat	1.282	9.08	100.2	
TD-RRH8x20-25	29.6	22.1	1.3	Flat	1.200	4.56	47.0	
Camera and Mount	27.5	27.5	1.0	Flat	1.200	5.26	54.4	
1' x 1' Panel	15.5	15.5	1.0	Flat	1.200	1.68	17.3	
TMA 10"x8"x5"	13.5	11.5	1.2	Flat	1.200	1.08	11.2	
Pipe3STD x 20 ft	243.5	7.0	34.6	Round	1.200	11.90	122.8	6.1
Pipe3STD x 15 ft	183.5	7.0	26.1	Round	1.200	8.97	92.6	6.1
Pipe3STD x 10 ft	123.5	7.0	17.6	Round	1.035	6.03	53.7	5.2
Pipe2-1/2STD x 20 ft	243.5	6.4	38.0	Round	1.200	10.84	111.9	5.5
Pipe2-1/2STD x 15 ft	183.5	6.4	28.6	Round	1.200	8.17	84.3	5.5
Pipe2-1/2STD x 8 ft	99.5	6.4	15.5	Round	0.990	4.43	37.7	4.5
Pipe2-1/2STD x 7 ft	87.5	6.4	13.7	Round	0.948	3.90	31.8	4.4
Pipe2-1/2STD x 3 ft	39.5	6.4	6.2	Round	0.782	1.76	11.8	3.6
Pipe2STD x 8.917 ft	110.5	5.9	18.7	Round	1.060	4.54	41.4	4.5
Pipe2STD x 7 ft	87.5	5.9	14.8	Round	0.974	3.59	30.1	4.1
Pipe2STD x 5 ft	63.5	5.9	10.8	Round	0.883	2.61	19.8	3.7
Pipe2STD x 4 ft	51.5	5.9	8.7	Round	0.838	2.11	15.3	3.6
Pipe2STD x 3.5 ft	45.5	5.9	7.7	Round	0.816	1.87	13.1	3.5

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Date:	11/7/17

Ice Wind Load on Antennas TIA-222-G

$q_z = 0.00256\ K_z\ K_{zt}\ K_d\ V^2\ I$

$F = q_z\ G_h\ C_a\ A_a$

Occupancy:	II		Classification of Structures (Table 2-1)
Exposure:	C		Exposure Category
V_i:	50	mph	Basic Wind Speed (Annex B)
z:	170	ft	Height above ground level to the center of the antenna
I:	1.00		Importance Factor (Table 2-3)
K_z:	1.42		Velocity Pressure Coefficient (2.6.5.2)
K_{zt}:	1.00		Topographic Factor (2.6.6.4)
K_d:	0.95		Wind Direction Probability Factor (Table 2-2)
q_z:	8.60	psf	Velocity Pressure at Height z
G_h:	1.00		Strength Design of Appurtenances and their Connections
K_{iz}:	1.18		Height Escalation Factor for Ice Thickness
t_{iz}:	1.77	in	Factored Thickness of Radial Glaze Ice at Height z

Mount & Antenna Ice Wind Loads

Appurtenance	Height	Width	h/D	Shape	C_a	A_f	Force	Force
	in	*in*				*sq ft*	*lb*	*plf*
Pipe1-1/2STD x 10 ft	123.5	5.4	22.7	Round	1.150	4.66	46.1	4.5
Pipe1STD x 2 ft	27.5	4.8	5.7	Round	0.771	0.93	6.1	2.7
SR 7/8 x 4.79 ft	61.0	4.4	13.8	Round	0.952	1.87	15.3	3.0
L6X4X5/16 x 5 ft	63.5	9.5	6.7	Flat	1.385	4.21	50.1	9.5
HSS2-1/2X2-1/2X3/16 x 1 ft	15.5	6.0	2.6	Flat	1.203	0.65	6.7	5.2

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Ice Wind Load on Antennas TIA-222-G

$q_z = 0.00256\ K_z\ K_{zt}\ K_d\ V^2\ I$

$F = q_z\ G_h\ C_a\ A_a$

Occupancy:	II		Classification of Structures (Table 2-1)
Exposure:	C		Exposure Category
V_i:	50	mph	Basic Wind Speed (Annex B)
z:	170	ft	Height above ground level to the center of the antenna
I:	1.00		Importance Factor (Table 2-3)
K_z:	1.42		Velocity Pressure Coefficient (2.6.5.2)
K_{zt}:	1.00		Topographic Factor (2.6.6.4)
K_d:	0.95		Wind Direction Probability Factor (Table 2-2)
q_z:	8.60	psf	Velocity Pressure at Height z
G_h:	1.00		Strength Design of Appurtenances and their Connections
K_{iz}:	1.18		Height Escalation Factor for Ice Thickness
t_{iz}:	1.77	in	Factored Thickness of Radial Glaze Ice at Height z

Mount & Antenna Ice Wind Loads

Appurtenance	Height	Depth	h/D	Shape	C_a	A_f	Force	Force
	in	*in*				*sq ft*	*lb*	*plf*
APXVSPP18-C-A20	75.5	10.5	7.2	Flat	1.406	5.53	66.9	
1900MHz 4x45W RRH	28.6	14.2	2.0	Flat	1.200	2.83	29.2	
800MHz 2x50W RRH	22.5	15.7	1.4	Flat	1.200	2.46	25.4	
DT465B-2XR	75.4	11.7	6.4	Flat	1.375	6.15	72.7	
TD-RRH8x20-25	29.6	10.2	2.9	Flat	1.218	2.11	22.1	
Camera and Mount	27.5	27.5	1.0	Flat	1.200	5.26	54.4	
1' x 1' Panel	15.5	7.5	2.1	Flat	1.200	0.81	8.4	
TMA 10"x8"x5"	13.5	8.5	1.6	Flat	1.200	0.80	8.3	
Pipe3STD x 20 ft	243.5	7.0	34.6	Round	1.200	11.90	122.8	6.1
Pipe3STD x 15 ft	183.5	7.0	26.1	Round	1.200	8.97	92.6	6.1
Pipe3STD x 10 ft	123.5	7.0	17.6	Round	1.035	6.03	53.7	5.2
Pipe2-1/2STD x 20 ft	243.5	6.4	38.0	Round	1.200	10.84	111.9	5.5
Pipe2-1/2STD x 15 ft	183.5	6.4	28.6	Round	1.200	8.17	84.3	5.5
Pipe2-1/2STD x 8 ft	99.5	6.4	15.5	Round	0.990	4.43	37.7	4.5
Pipe2-1/2STD x 7 ft	87.5	6.4	13.7	Round	0.948	3.90	31.8	4.4
Pipe2-1/2STD x 3 ft	39.5	6.4	6.2	Round	0.782	1.76	11.8	3.6
Pipe2STD x 8.917 ft	110.5	5.9	18.7	Round	1.060	4.54	41.4	4.5
Pipe2STD x 7 ft	87.5	5.9	14.8	Round	0.974	3.59	30.1	4.1
Pipe2STD x 5 ft	63.5	5.9	10.8	Round	0.883	2.61	19.8	3.7
Pipe2STD x 4 ft	51.5	5.9	8.7	Round	0.838	2.11	15.3	3.6
Pipe2STD x 3.5 ft	45.5	5.9	7.7	Round	0.816	1.87	13.1	3.5

RAMAKER & ASSOCIATES, INC.
855 Community Drive, Sauk City, WI 53583
Phone: 608-643-4100 Fax: 608-643-7999

Job:	Cromwell-RT. 372 (CT60XC931)
Project:	29431
By:	JMA
Date:	11/7/17

Ice Wind Load on Antennas TIA-222-G

$q_z = 0.00256\ K_z\ K_{zt}\ K_d\ V^2\ I$

$F = q_z\ G_h\ C_a\ A_a$

Occupancy:	II		Classification of Structures (Table 2-1)
Exposure:	C		Exposure Category
V_i:	50	mph	Basic Wind Speed (Annex B)
z:	170	ft	Height above ground level to the center of the antenna
I:	1.00		Importance Factor (Table 2-3)
K_z:	1.42		Velocity Pressure Coefficient (2.6.5.2)
K_{zt}:	1.00		Topographic Factor (2.6.6.4)
K_d:	0.95		Wind Direction Probability Factor (Table 2-2)
q_z:	8.60	psf	Velocity Pressure at Height z
G_h:	1.00		Strength Design of Appurtenances and their Connections
K_{iz}:	1.18		Height Escalation Factor for Ice Thickness
t_{iz}:	1.77	in	Factored Thickness of Radial Glaze Ice at Height z

Mount & Antenna Ice Wind Loads

Appurtenance	Height	Depth	h/D	Shape	C_a	A_f	Force	Force
	in	*in*				*sq ft*	*lb*	*plf*
Pipe1-1/2STD x 10 ft	123.5	5.4	22.7	Round	1.150	4.66	46.1	4.5
Pipe1STD x 2 ft	27.5	4.8	5.7	Round	0.771	0.93	6.1	2.7
SR 7/8 x 4.79 ft	61.0	4.4	13.8	Round	0.952	1.87	15.3	3.0
L6X4X5/16 x 5 ft	63.5	7.5	8.4	Flat	1.448	3.32	41.4	7.8
HSS2-1/2X2-1/2X3/16 x 1 ft	15.5	6.0	2.6	Flat	1.203	0.65	6.7	5.2

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By: JMA
Date: 11/7/17

Ice Load on Antennas TIA-222-G

Ice Weight:	56	pcf	Ice Density
t_i:	0.75		Design Ice Thickness
Occupancy:	II		Classification of Structures (Table 2-1)
Exposure:	C		Exposure Category
V_i:	50	mph	Basic Wind Speed (Annex B)
z:	170	ft	Height above ground level to the center of the antenna
I:	1.00		Importance Factor (Table 2-3)
K_{iz}:	1.18		Height Escalation Factor for Ice Thickness
K_{zt}:	1.00		Topographic Factor (2.6.6.4)
t_{iz}:	1.77	in	Factored Thickness of Radial Glaze Ice at Height z

Platform Grating: None
Ice Load: psf

Mount & Antenna Ice Wind Loads

Appurtenance	Height	Width	Depth	Diam.	Area	Perim.	Ice Weight	
	in	*in*	*in*	*in*	*sq in*	*in*	*lb*	*plf*
APXVSPP18-C-A20	75.5	15.4	10.5	13.80	86.43	44.86	201.7	
1900MHz 4x45W RRH	28.6	14.6	14.2	15.41	95.37	50.65	77.6	
800MHz 2x50W RRH	22.5	16.5	15.7	17.83	108.79	57.47	67.0	
DT465B-2XR	75.4	17.3	11.7	16.05	98.93	51.07	230.5	
TD-RRH8x20-25	29.6	22.1	10.2	19.77	119.57	57.67	101.1	
Camera and Mount	27.5	27.5	27.5	33.94	198.25	103.07	154.2	
1' x 1' Panel	15.5	15.5	7.5	12.65	80.04	39.07	31.1	
TMA 10"x8"x5"	13.5	11.5	8.5	9.43	62.19	33.07	20.2	
Pipe3STD x 20 ft	243.5	7.0	7.0	3.50	29.24	16.55	227.4	11.4
Pipe3STD x 15 ft	183.5	7.0	7.0	3.50	29.24	16.55	170.6	11.4
Pipe3STD x 10 ft	123.5	7.0	7.0	3.50	29.24	16.55	113.7	11.4
Pipe2-1/2STD x 20 ft	243.5	6.4	6.4	2.88	25.77	14.58	200.5	10.0
Pipe2-1/2STD x 15 ft	183.5	6.4	6.4	2.88	25.77	14.58	150.3	10.0
Pipe2-1/2STD x 8 ft	99.5	6.4	6.4	2.88	25.77	14.58	80.2	10.0
Pipe2-1/2STD x 7 ft	87.5	6.4	6.4	2.88	25.77	14.58	70.2	10.0
Pipe2-1/2STD x 3 ft	39.5	6.4	6.4	2.88	25.77	14.58	30.1	10.0
Pipe2STD x 8.917 ft	110.5	5.9	5.9	2.38	23.00	13.01	79.7	8.9
Pipe2STD x 7 ft	87.5	5.9	5.9	2.38	23.00	13.01	62.6	8.9
Pipe2STD x 5 ft	63.5	5.9	5.9	2.38	23.00	13.01	44.7	8.9
Pipe2STD x 4 ft	51.5	5.9	5.9	2.38	23.00	13.01	35.8	8.9
Pipe2STD x 3.5 ft	45.5	5.9	5.9	2.38	23.00	13.01	31.3	8.9

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Ice Load on Antennas TIA-222-G

Ice Weight:	56	pcf	Ice Density
t_i:	0.75		Design Ice Thickness
Occupancy:	II		Classification of Structures (Table 2-1)
Exposure:	C		Exposure Category
V_i:	50	mph	Basic Wind Speed (Annex B)
z:	170	ft	Height above ground level to the center of the antenna
I:	1.00		Importance Factor (Table 2-3)
K_{iz}:	1.18		Height Escalation Factor for Ice Thickness
K_{zt}:	1.00		Topographic Factor (2.6.6.4)
t_{iz}:	1.77	in	Factored Thickness of Radial Glaze Ice at Height z

Platform Grating: None
Ice Load: psf

Mount & Antenna Ice Wind Loads

Appurtenance	Height	Width	Depth	Diam.	Area	Perim.	Ice Weight	
	in	*in*	*in*	*in*	*sq in*	*in*	*lb*	*plf*
Pipe1-1/2STD x 10 ft	123.5	5.4	5.4	1.90	20.36	11.52	79.2	7.9
Pipe1STD x 2 ft	27.5	4.8	4.8	1.32	17.11	9.68	13.3	6.7
SR 7/8 x 4.79 ft	61.0	4.4	4.4	0.88	14.67	8.30	27.3	5.7
L6X4X5/16 x 5 ft	63.5	9.5	7.5	7.21	49.85	27.07	96.9	19.4
HSS2-1/2X2-1/2X3/16 x 1 ft	15.5	6.0	6.0	3.19	27.50	21.77	10.7	10.7

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (\1...	Density[k/ft...	Yield[ksi]	Ry	Fu[ksi]	Rt
1	A36 Gr.36	29000	11154	.3	.65	.49	36	1.5	58	1.2
2	A572 Gr.50	29000	11154	.3	.65	.49	50	1.1	65	1.1
3	A992	29000	11154	.3	.65	.49	50	1.1	65	1.1
4	A500 Gr.42	29000	11154	.3	.65	.49	42	1.4	58	1.3
5	A500 Gr.46	29000	11154	.3	.65	.49	46	1.4	58	1.3
6	A53 Gr. B	29000	11154	.3	.65	.49	35	1.5	60	1.2

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design R...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	Pipe_1.0	PIPE_1.0	Beam	Pipe	A53 Gr. B	Typical	.469	.083	.083	.166
2	Pipe_1.5	PIPE_1.5	Beam	Pipe	A53 Gr. B	Typical	.749	.293	.293	.586
3	Pipe_2.0	PIPE_2.0	Beam	Pipe	A53 Gr. B	Typical	1.02	.627	.627	1.25
4	Pipe_3.0	PIPE_3.0	Beam	Pipe	A53 Gr. B	Typical	2.07	2.85	2.85	5.69
5	Pipe_2.5	PIPE_2.5	Beam	Pipe	A53 Gr. B	Typical	1.61	1.45	1.45	2.89
6	HSS	HSS2.5x2.5x3	Beam	SquareTube	A36 Gr.36	Typical	1.54	1.35	1.35	2.25
7	Solid rod	7/8" SR	Beam	BAR	A36 Gr.36	Typical	.601	.029	.029	.058
8	plate	PL2x1/2	Beam	RECT	A36 Gr.36	Typical	1	.021	.333	.07
9	angle	Bent PL 5.5x4x1/4	Beam	Single Angle	A36 Gr.36	Typical	2.313	3.336	7.312	.047

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rules
1	PL1	N1	N4		90	plate	Beam	RECT	A36 Gr.36	Typical
2	PL3	N3	N6		90	plate	Beam	RECT	A36 Gr.36	Typical
3	PL5	N5	N8		90	plate	Beam	RECT	A36 Gr.36	Typical
4	PL7	N7	N10		90	plate	Beam	RECT	A36 Gr.36	Typical
5	PL9	N9	N12		90	plate	Beam	RECT	A36 Gr.36	Typical
6	PL11	N11	N14		90	plate	Beam	RECT	A36 Gr.36	Typical
7	PL13	N13	N16		90	plate	Beam	RECT	A36 Gr.36	Typical
8	PL15	N15	N18		90	plate	Beam	RECT	A36 Gr.36	Typical
9	TH9	N1	N2			Pipe_2.0	Beam	Pipe	A53 Gr. B	Typical
10	TH1	N3	N4			Pipe_2.0	Beam	Pipe	A53 Gr. B	Typical
11	TH2	N5	N6			Pipe_2.0	Beam	Pipe	A53 Gr. B	Typical
12	TH3	N7	N8			Pipe_2.0	Beam	Pipe	A53 Gr. B	Typical
13	TH4	N9	N10			Pipe_2.0	Beam	Pipe	A53 Gr. B	Typical
14	TH5	N11	N12			Pipe_2.0	Beam	Pipe	A53 Gr. B	Typical
15	TH6	N13	N14			Pipe_2.0	Beam	Pipe	A53 Gr. B	Typical
16	TH7	N15	N16			Pipe_2.0	Beam	Pipe	A53 Gr. B	Typical
17	TH8	N17	N18			Pipe_2.0	Beam	Pipe	A53 Gr. B	Typical
18	BP1	N20	N19		91	angle	Beam	Single Angle	A36 Gr.36	Typical
19	BP3	N19	N21		90	angle	Beam	Single Angle	A36 Gr.36	Typical
20	BP5	N21	N20		90	angle	Beam	Single Angle	A36 Gr.36	Typical
21	TA7	N22	N23			Pipe_2.0	Beam	Pipe	A53 Gr. B	Typical
22	SA13	N23	N24			HSS	Beam	SquareTube	A36 Gr.36	Typical
23	TA6	N25	N26			Pipe_2.0	Beam	Pipe	A53 Gr. B	Typical
24	SA11	N26	N27			HSS	Beam	SquareTube	A36 Gr.36	Typical
25	TA8	N28	N29			Pipe_2.0	Beam	Pipe	A53 Gr. B	Typical
26	SA15	N29	N30			HSS	Beam	SquareTube	A36 Gr.36	Typical
27	TA4	N31	N32			Pipe_2.0	Beam	Pipe	A53 Gr. B	Typical
28	SA7	N32	N33			HSS	Beam	SquareTube	A36 Gr.36	Typical
29	TA3	N34	N35			Pipe_2.0	Beam	Pipe	A53 Gr. B	Typical
30	SA5	N35	N36			HSS	Beam	SquareTube	A36 Gr.36	Typical
31	TA5	N37	N38			Pipe_2.0	Beam	Pipe	A53 Gr. B	Typical
32	SA9	N38	N39			HSS	Beam	SquareTube	A36 Gr.36	Typical

Member Primary Data (Continued)

	Label	I Joint	J Joint	K Joint	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rules
33	TA1	N40	N41			Pipe_2.0	Beam	Pipe	A53 Gr. B	Typical
34	SA1	N41	N42			HSS	Beam	SquareTube	A36 Gr.36	Typical
35	TA9	N43	N44			Pipe_2.0	Beam	Pipe	A53 Gr. B	Typical
36	SA17	N44	N45			HSS	Beam	SquareTube	A36 Gr.36	Typical
37	TA2	N46	N47			Pipe_2.0	Beam	Pipe	A53 Gr. B	Typical
38	SA3	N47	N48			HSS	Beam	SquareTube	A36 Gr.36	Typical
39	PL17	N17	N2		90	plate	Beam	RECT	A36 Gr.36	Typical
40	PL2	N50	N53		90	plate	Beam	RECT	A36 Gr.36	Typical
41	PL4	N52	N55		90	plate	Beam	RECT	A36 Gr.36	Typical
42	PL6	N54	N57		90	plate	Beam	RECT	A36 Gr.36	Typical
43	PL8	N56	N59		90	plate	Beam	RECT	A36 Gr.36	Typical
44	PL10	N58	N61		90	plate	Beam	RECT	A36 Gr.36	Typical
45	PL12	N60	N63		90	plate	Beam	RECT	A36 Gr.36	Typical
46	PL14	N62	N65		90	plate	Beam	RECT	A36 Gr.36	Typical
47	PL16	N64	N67		90	plate	Beam	RECT	A36 Gr.36	Typical
48	BH9	N50	N51			Pipe_2.0	Beam	Pipe	A53 Gr. B	Typical
49	BH1	N52	N53			Pipe_2.0	Beam	Pipe	A53 Gr. B	Typical
50	BH2	N54	N55			Pipe_2.0	Beam	Pipe	A53 Gr. B	Typical
51	BH3	N56	N57			Pipe_2.0	Beam	Pipe	A53 Gr. B	Typical
52	BH4	N58	N59			Pipe_2.0	Beam	Pipe	A53 Gr. B	Typical
53	BH5	N60	N61			Pipe_2.0	Beam	Pipe	A53 Gr. B	Typical
54	BH6	N62	N63			Pipe_2.0	Beam	Pipe	A53 Gr. B	Typical
55	BH7	N64	N65			Pipe_2.0	Beam	Pipe	A53 Gr. B	Typical
56	BH8	N66	N67			Pipe_2.0	Beam	Pipe	A53 Gr. B	Typical
57	BP2	N69	N68		91	angle	Beam	Single Angle	A36 Gr.36	Typical
58	BP4	N68	N70		90	angle	Beam	Single Angle	A36 Gr.36	Typical
59	BP6	N70	N69		90	angle	Beam	Single Angle	A36 Gr.36	Typical
60	BA7	N71	N72			Pipe_2.0	Beam	Pipe	A53 Gr. B	Typical
61	SA14	N72	N73			HSS	Beam	SquareTube	A36 Gr.36	Typical
62	BA6	N74	N75			Pipe_2.0	Beam	Pipe	A53 Gr. B	Typical
63	SA12	N75	N76			HSS	Beam	SquareTube	A36 Gr.36	Typical
64	BA8	N77	N78			Pipe_2.0	Beam	Pipe	A53 Gr. B	Typical
65	SA16	N78	N79			HSS	Beam	SquareTube	A36 Gr.36	Typical
66	BA4	N80	N81			Pipe_2.0	Beam	Pipe	A53 Gr. B	Typical
67	SA8	N81	N82			HSS	Beam	SquareTube	A36 Gr.36	Typical
68	BA3	N83	N84			Pipe_2.0	Beam	Pipe	A53 Gr. B	Typical
69	SA6	N84	N85			HSS	Beam	SquareTube	A36 Gr.36	Typical
70	BA5	N86	N87			Pipe_2.0	Beam	Pipe	A53 Gr. B	Typical
71	SA10	N87	N88			HSS	Beam	SquareTube	A36 Gr.36	Typical
72	BA1	N89	N90			Pipe_2.0	Beam	Pipe	A53 Gr. B	Typical
73	SA2	N90	N91			HSS	Beam	SquareTube	A36 Gr.36	Typical
74	BA9	N92	N93			Pipe_2.0	Beam	Pipe	A53 Gr. B	Typical
75	SA18	N93	N94			HSS	Beam	SquareTube	A36 Gr.36	Typical
76	BA2	N95	N96			Pipe_2.0	Beam	Pipe	A53 Gr. B	Typical
77	SA4	N96	N97			HSS	Beam	SquareTube	A36 Gr.36	Typical
78	PL18	N66	N51		90	plate	Beam	RECT	A36 Gr.36	Typical
79	VP48	N100	N99			Pipe_2.0	Beam	Pipe	A53 Gr. B	Typical
80	VP51	N102	N101			Pipe_2.0	Beam	Pipe	A53 Gr. B	Typical
81	VP54	N104	N103			Pipe_2.0	Beam	Pipe	A53 Gr. B	Typical
82	VP30	N106	N105			Pipe_2.0	Beam	Pipe	A53 Gr. B	Typical
83	VP33	N108	N107			Pipe_2.0	Beam	Pipe	A53 Gr. B	Typical
84	VP36	N110	N109			Pipe_2.0	Beam	Pipe	A53 Gr. B	Typical
85	VP39	N112	N111			Pipe_2.0	Beam	Pipe	A53 Gr. B	Typical
86	VP42	N114	N113			Pipe_2.0	Beam	Pipe	A53 Gr. B	Typical
87	VP45	N116	N115			Pipe_2.0	Beam	Pipe	A53 Gr. B	Typical
88	VP38	N118	N117			Pipe_2.0	Beam	Pipe	A53 Gr. B	Typical
89	VP35	N120	N119			Pipe_2.0	Beam	Pipe	A53 Gr. B	Typical

Member Primary Data (Continued)

	Label	I Joint	J Joint	K Joint	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rules
90	VP41	N122	N121			Pipe_2.0	Beam	Pipe	A53 Gr. B	Typical
91	VP44	N124	N123			Pipe_2.0	Beam	Pipe	A53 Gr. B	Typical
92	VP47	N126	N125			Pipe_2.0	Beam	Pipe	A53 Gr. B	Typical
93	VP50	N128	N127			Pipe_2.0	Beam	Pipe	A53 Gr. B	Typical
94	VP53	N130	N129			Pipe_2.0	Beam	Pipe	A53 Gr. B	Typical
95	VP29	N132	N131			Pipe_2.0	Beam	Pipe	A53 Gr. B	Typical
96	VP32	N134	N133			Pipe_2.0	Beam	Pipe	A53 Gr. B	Typical
97	VP34	N136	N135			Pipe_2.0	Beam	Pipe	A53 Gr. B	Typical
98	VP37	N138	N137			Pipe_2.0	Beam	Pipe	A53 Gr. B	Typical
99	VP40	N140	N139			Pipe_2.0	Beam	Pipe	A53 Gr. B	Typical
100	VP43	N142	N141			Pipe_2.0	Beam	Pipe	A53 Gr. B	Typical
101	VP46	N144	N143			Pipe_2.0	Beam	Pipe	A53 Gr. B	Typical
102	VP49	N146	N145			Pipe_2.0	Beam	Pipe	A53 Gr. B	Typical
103	VP52	N148	N147			Pipe_2.0	Beam	Pipe	A53 Gr. B	Typical
104	VP28	N150	N149			Pipe_2.0	Beam	Pipe	A53 Gr. B	Typical
105	VP31	N152	N151			Pipe_2.0	Beam	Pipe	A53 Gr. B	Typical
106	VP5	N154	N153			Pipe_2.0	Beam	Pipe	A53 Gr. B	Typical
107	VP2	N156	N155			Pipe_2.0	Beam	Pipe	A53 Gr. B	Typical
108	VP26	N158	N157			Pipe_2.0	Beam	Pipe	A53 Gr. B	Typical
109	VP8	N160	N159			Pipe_2.0	Beam	Pipe	A53 Gr. B	Typical
110	VP11	N162	N161			Pipe_2.0	Beam	Pipe	A53 Gr. B	Typical
111	VP14	N164	N163			Pipe_2.0	Beam	Pipe	A53 Gr. B	Typical
112	VP17	N166	N165			Pipe_2.0	Beam	Pipe	A53 Gr. B	Typical
113	VP20	N168	N167			Pipe_2.0	Beam	Pipe	A53 Gr. B	Typical
114	VP23	N170	N169			Pipe_2.0	Beam	Pipe	A53 Gr. B	Typical
115	VP18	N172	N171			Pipe_2.0	Beam	Pipe	A53 Gr. B	Typical
116	VP21	N174	N173			Pipe_2.0	Beam	Pipe	A53 Gr. B	Typical
117	VP24	N176	N175			Pipe_2.0	Beam	Pipe	A53 Gr. B	Typical
118	VP27	N178	N177			Pipe_2.0	Beam	Pipe	A53 Gr. B	Typical
119	VP3	N180	N179			Pipe_2.0	Beam	Pipe	A53 Gr. B	Typical
120	VP6	N182	N181			Pipe_2.0	Beam	Pipe	A53 Gr. B	Typical
121	VP9	N184	N183			Pipe_2.0	Beam	Pipe	A53 Gr. B	Typical
122	VP12	N186	N185			Pipe_2.0	Beam	Pipe	A53 Gr. B	Typical
123	VP15	N188	N187			Pipe_2.0	Beam	Pipe	A53 Gr. B	Typical
124	VP4	N192	N191			Pipe_2.0	Beam	Pipe	A53 Gr. B	Typical
125	VP1	N194	N193			Pipe_2.0	Beam	Pipe	A53 Gr. B	Typical
126	VP25	N196	N195			Pipe_2.0	Beam	Pipe	A53 Gr. B	Typical
127	VP22	N198	N197			Pipe_2.0	Beam	Pipe	A53 Gr. B	Typical
128	VP19	N200	N199			Pipe_2.0	Beam	Pipe	A53 Gr. B	Typical
129	VP16	N202	N201			Pipe_2.0	Beam	Pipe	A53 Gr. B	Typical
130	VP13	N204	N203			Pipe_2.0	Beam	Pipe	A53 Gr. B	Typical
131	VP10	N206	N205			Pipe_2.0	Beam	Pipe	A53 Gr. B	Typical
132	VP7	N208	N207			Pipe_2.0	Beam	Pipe	A53 Gr. B	Typical
133	D9	N164	N203			Solid rod	Beam	BAR	A36 Gr.36	Typical
134	D10	N164	N187			Solid rod	Beam	BAR	A36 Gr.36	Typical
135	D11	N166	N201			Solid rod	Beam	BAR	A36 Gr.36	Typical
136	D12	N166	N171			Solid rod	Beam	BAR	A36 Gr.36	Typical
137	D13	N168	N199			Solid rod	Beam	BAR	A36 Gr.36	Typical
138	D14	N168	N173			Solid rod	Beam	BAR	A36 Gr.36	Typical
139	D15	N170	N197			Solid rod	Beam	BAR	A36 Gr.36	Typical
140	D16	N170	N175			Solid rod	Beam	BAR	A36 Gr.36	Typical
141	D17	N158	N195			Solid rod	Beam	BAR	A36 Gr.36	Typical
142	D18	N158	N177			Solid rod	Beam	BAR	A36 Gr.36	Typical
143	D1	N156	N193			Solid rod	Beam	BAR	A36 Gr.36	Typical
144	D2	N156	N179			Solid rod	Beam	BAR	A36 Gr.36	Typical
145	D3	N154	N191			Solid rod	Beam	BAR	A36 Gr.36	Typical
146	D4	N154	N181			Solid rod	Beam	BAR	A36 Gr.36	Typical

Member Primary Data (Continued)

	Label	I Joint	J Joint	K Joint	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rules
147	D5	N160	N207			Solid rod	Beam	BAR	A36 Gr.36	Typical
148	D6	N160	N183			Solid rod	Beam	BAR	A36 Gr.36	Typical
149	D7	N162	N205			Solid rod	Beam	BAR	A36 Gr.36	Typical
150	D8	N162	N185			Solid rod	Beam	BAR	A36 Gr.36	Typical
151	D27	N122	N139			Solid rod	Beam	BAR	A36 Gr.36	Typical
152	D28	N122	N113			Solid rod	Beam	BAR	A36 Gr.36	Typical
153	D29	N124	N141			Solid rod	Beam	BAR	A36 Gr.36	Typical
154	D30	N124	N115			Solid rod	Beam	BAR	A36 Gr.36	Typical
155	D25	N118	N137			Solid rod	Beam	BAR	A36 Gr.36	Typical
156	D26	N118	N111			Solid rod	Beam	BAR	A36 Gr.36	Typical
157	D23	N120	N135			Solid rod	Beam	BAR	A36 Gr.36	Typical
158	D24	N120	N109			Solid rod	Beam	BAR	A36 Gr.36	Typical
159	D22	N134	N107			Solid rod	Beam	BAR	A36 Gr.36	Typical
160	D21	N134	N151			Solid rod	Beam	BAR	A36 Gr.36	Typical
161	D20	N132	N105			Solid rod	Beam	BAR	A36 Gr.36	Typical
162	D19	N132	N149			Solid rod	Beam	BAR	A36 Gr.36	Typical
163	D35	N130	N147			Solid rod	Beam	BAR	A36 Gr.36	Typical
164	D36	N130	N103			Solid rod	Beam	BAR	A36 Gr.36	Typical
165	D33	N128	N145			Solid rod	Beam	BAR	A36 Gr.36	Typical
166	D34	N128	N101			Solid rod	Beam	BAR	A36 Gr.36	Typical
167	D31	N126	N143			Solid rod	Beam	BAR	A36 Gr.36	Typical
168	D32	N126	N99			Solid rod	Beam	BAR	A36 Gr.36	Typical
169	MP17	N217	N214			Pipe_2.5	Beam	Pipe	A53 Gr. B	Typical
170	MP19	N216	N213			Pipe_2.0	Beam	Pipe	A53 Gr. B	Typical
171	MP9	N229	N220			Pipe_2.0	Beam	Pipe	A53 Gr. B	Typical
172	MP12	N228	N219			Pipe_2.0	Beam	Pipe	A53 Gr. B	Typical
173	MP13	N230	N221			Pipe_2.0	Beam	Pipe	A53 Gr. B	Typical
174	MP14	N235	N226			Pipe_2.0	Beam	Pipe	A53 Gr. B	Typical
175	MP2	N234	N225			Pipe_2.0	Beam	Pipe	A53 Gr. B	Typical
176	MP3	N236	N227			Pipe_2.0	Beam	Pipe	A53 Gr. B	Typical
177	MP4	N232	N223			Pipe_2.0	Beam	Pipe	A53 Gr. B	Typical
178	MP7	N233	N224			Pipe_2.0	Beam	Pipe	A53 Gr. B	Typical
179	MP5	N231	N222			Pipe_2.0	Beam	Pipe	A53 Gr. B	Typical
180	TB5	N29	N237			Pipe_2.0	Beam	Pipe	A53 Gr. B	Typical
181	TB4	N26	N237			Pipe_2.0	Beam	Pipe	A53 Gr. B	Typical
182	TB3	N38	N238			Pipe_2.0	Beam	Pipe	A53 Gr. B	Typical
183	TB2	N35	N238			Pipe_2.0	Beam	Pipe	A53 Gr. B	Typical
184	BB3	N87	N239			Pipe_2.0	Beam	Pipe	A53 Gr. B	Typical
185	BB2	N84	N239			Pipe_2.0	Beam	Pipe	A53 Gr. B	Typical
186	BB1	N96	N240			Pipe_2.0	Beam	Pipe	A53 Gr. B	Typical
187	BB6	N93	N240			Pipe_2.0	Beam	Pipe	A53 Gr. B	Typical
188	BB5	N78	N241			Pipe_2.0	Beam	Pipe	A53 Gr. B	Typical
189	BB4	N75	N241			Pipe_2.0	Beam	Pipe	A53 Gr. B	Typical
190	TB1	N47	N242			Pipe_2.0	Beam	Pipe	A53 Gr. B	Typical
191	TB6	N44	N242			Pipe_2.0	Beam	Pipe	A53 Gr. B	Typical
192	M208A	N245	N243			RIGID	None	None	RIGID	Typical
193	M209A	N246	N244			RIGID	None	None	RIGID	Typical
194	OM1	N247	N248			Pipe_2.5	Beam	Pipe	A53 Gr. B	Typical
195	M211A	N250	N252			RIGID	None	None	RIGID	Typical
196	M212A	N249	N251			RIGID	None	None	RIGID	Typical
197	MP6	N253	N254			Pipe_2.0	Beam	Pipe	A53 Gr. B	Typical
198	M205	N256	N258			RIGID	None	None	RIGID	Typical
199	M206B	N255	N257			RIGID	None	None	RIGID	Typical
200	MP1	N259	N260			Pipe_2.0	Beam	Pipe	A53 Gr. B	Typical
201	M208B	N263	N261			RIGID	None	None	RIGID	Typical
202	M209	N264	N262			RIGID	None	None	RIGID	Typical
203	OM2	N265	N266			Pipe_1.5	Beam	Pipe	A53 Gr. B	Typical

Member Primary Data (Continued)

	Label	I Joint	J Joint	K Joint	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rules
204	M211B	N269	N267			RIGID	None	None	RIGID	Typical
205	M212	N270	N268			RIGID	None	None	RIGID	Typical
206	MP15	N271	N272			Pipe_2.5	Beam	Pipe	A53 Gr. B	Typical
207	M214	N275	N278			RIGID	None	None	RIGID	Typical
208	M215	N274	N277			RIGID	None	None	RIGID	Typical
209	M216	N273	N276			RIGID	None	None	RIGID	Typical
210	OM8	N279	N280			Pipe_3.0	Beam	Pipe	A53 Gr. B	Typical
211	M218	N283	N281			RIGID	None	None	RIGID	Typical
212	M219	N284	N282			RIGID	None	None	RIGID	Typical
213	OM7	N285	N286			Pipe_2.5	Beam	Pipe	A53 Gr. B	Typical
214	M221	N289	N287			RIGID	None	None	RIGID	Typical
215	M222	N290	N288			RIGID	None	None	RIGID	Typical
216	OM3	N291	N292			Pipe_2.5	Beam	Pipe	A53 Gr. B	Typical
217	M224	N294	N293			RIGID	None	None	RIGID	Typical
218	OM4	N295	N296			Pipe_3.0	Beam	Pipe	A53 Gr. B	Typical
219	M226	N298	N297			RIGID	None	None	RIGID	Typical
220	M227	N299	N301			RIGID	None	None	RIGID	Typical
221	M228	N300	N302			RIGID	None	None	RIGID	Typical
222	OM9	N303	N304			Pipe_2.5	Beam	Pipe	A53 Gr. B	Typical
223	M230	N306	N308			RIGID	None	None	RIGID	Typical
224	M231	N305	N307			RIGID	None	None	RIGID	Typical
225	MP11	N309	N310			Pipe_2.0	Beam	Pipe	A53 Gr. B	Typical
226	MP8	N314	N313			Pipe_2.0	Beam	Pipe	A53 Gr. B	Typical
227	M234	N315	N317			RIGID	None	None	RIGID	Typical
228	M235	N316	N318			RIGID	None	None	RIGID	Typical
229	DI	N319	N320			Pipe_3.0	Beam	Pipe	A53 Gr. B	Typical
230	M237	N323	N321			RIGID	None	None	RIGID	Typical
231	M238	N324	N322			RIGID	None	None	RIGID	Typical
232	MP10	N325	N326			Pipe_2.0	Beam	Pipe	A53 Gr. B	Typical
233	OM5	N328	N329			Pipe_1.0	Beam	Pipe	A53 Gr. B	Typical
234	M241	N328	N327			RIGID	None	None	RIGID	Typical
235	M242	N332	N330			RIGID	None	None	RIGID	Typical
236	M243	N333	N331			RIGID	None	None	RIGID	Typical
237	OM6	N334	N335			Pipe_1.5	Beam	Pipe	A53 Gr. B	Typical
238	MP16	N339	N338			Pipe_2.5	Beam	Pipe	A53 Gr. B	Typical
239	M245A	N344	N342			RIGID	None	None	RIGID	Typical
240	M246	N345	N343			RIGID	None	None	RIGID	Typical
241	OM10	N346	N347			Pipe_3.0	Beam	Pipe	A53 Gr. B	Typical
242	MP18	N218	N215			Pipe_2.5	Beam	Pipe	A53 Gr. B	Typical
243	MP20	N351	N350			Pipe_2.5	Beam	Pipe	A53 Gr. B	Typical
244	MP22	N355	N354			Pipe_2.5	Beam	Pipe	A53 Gr. B	Typical
245	MP21	N359	N358			Pipe_2.5	Beam	Pipe	A53 Gr. B	Typical
246	MP23	N363	N362			Pipe_2.0	Beam	Pipe	A53 Gr. B	Typical
247	M247	N360	N361			RIGID	None	None	RIGID	Typical
248	M248	N364	N365			RIGID	None	None	RIGID	Typical

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distributed	Area(Mem...	Surface(Pl...
1	Dead Load	None		-1			28			
2	Antenna Wind 0	None					56			
3	Antenna Wind 30	None					56			
4	Antenna Wind 45	None					56			
5	Antenna Wind 60	None					56			
6	Antenna Wind 90	None					56			
7	Antenna Wind 120	None					56			

Basic Load Cases (Continued)

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distributed	Area(Mem...	Surface(Pl...
8	Antenna Wind 135	None					56			
9	Antenna Wind 150	None					56			
10	Antenna Wind 180	None					56			
11	Antenna Wind 210	None					56			
12	Antenna Wind 225	None					56			
13	Antenna Wind 240	None					56			
14	Antenna Wind 270	None					56			
15	Antenna Wind 300	None					56			
16	Antenna Wind 315	None					56			
17	Antenna Wind 330	None					56			
18	Antenna Ice Dead Load	None					28			
19	Antenna Wind w/Ice 0	None					56			
20	Antenna Wind w/Ice 30	None					56			
21	Antenna Wind w/Ice 45	None					56			
22	Antenna Wind w/Ice 60	None					56			
23	Antenna Wind w/Ice 90	None					56			
24	Antenna Wind w/Ice 120	None					56			
25	Antenna Wind w/Ice 135	None					56			
26	Antenna Wind w/Ice 150	None					56			
27	Antenna Wind w/Ice 180	None					56			
28	Antenna Wind w/Ice 210	None					56			
29	Antenna Wind w/Ice 225	None					56			
30	Antenna Wind w/Ice 240	None					56			
31	Antenna Wind w/Ice 270	None					56			
32	Antenna Wind w/Ice 300	None					56			
33	Antenna Wind w/Ice 315	None					56			
34	Antenna Wind w/Ice 330	None					56			
35	Member Wind 0	None						392		
36	Member Wind 30	None						392		
37	Member Wind 45	None						392		
38	Member Wind 60	None						392		
39	Member Wind 90	None						392		
40	Member Wind 120	None						392		
41	Member Wind 135	None						392		
42	Member Wind 150	None						392		
43	Member Wind 180	None						392		
44	Member Wind 210	None						392		
45	Member Wind 225	None						392		
46	Member Wind 240	None						392		
47	Member Wind 270	None						392		
48	Member Wind 300	None						392		
49	Member Wind 315	None						392		
50	Member Wind 330	None						392		
51	Member Ice Dead Load	None						196		
52	Member Wind w/Ice 0	None						392		
53	Member Wind w/Ice 30	None						392		
54	Member Wind w/Ice 45	None						392		
55	Member Wind w/Ice 60	None						392		
56	Member Wind w/Ice 90	None						392		
57	Member Wind w/Ice 120	None						392		
58	Member Wind w/Ice 135	None						392		
59	Member Wind w/Ice 150	None						392		
60	Member Wind w/Ice 180	None						392		
61	Member Wind w/Ice 210	None						392		
62	Member Wind w/Ice 225	None						392		
63	Member Wind w/Ice 240	None						392		
64	Member Wind w/Ice 270	None						392		

Basic Load Cases (Continued)

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distributed	Area(Mem...	Surface(Pl...
65	Member Wind w/Ice 300	None						392		
66	Member Wind w/Ice 315	None						392		
67	Member Wind w/Ice 330	None						392		
68	Live Load - Area	None								
69	Live Load - Point 1	None					3			
70	Live Load - Point 2	None					1			
71	Live Load - Point 3	None					1			
72	Railing Dist. LL z	None								
73	Railing Dist. LL x	None								
74	Railing Point LL z	None								
75	Railing Point LL x	None								

Load Combinations

	Description	So...	P...	S...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...
1	1.4D	Yes	Y		1	1.4																		
2	0.9D + 1.6 (0-Wind)	Yes	Y		1	.9	2	1.6	35	1.6														
3	0.9D + 1.6 (30-Wind)	Yes	Y		1	.9	3	1.6	36	1.6														
4	0.9D + 1.6 (45-Wind)	Yes	Y		1	.9	4	1.6	37	1.6														
5	0.9D + 1.6 (60-Wind)	Yes	Y		1	.9	5	1.6	38	1.6														
6	0.9D + 1.6 (90-Wind)	Yes	Y		1	.9	6	1.6	39	1.6														
7	0.9D + 1.6 (120-Wi...	Yes	Y		1	.9	7	1.6	40	1.6														
8	0.9D + 1.6 (135-Wi...	Yes	Y		1	.9	8	1.6	41	1.6														
9	0.9D + 1.6 (150-Wi...	Yes	Y		1	.9	9	1.6	42	1.6														
10	0.9D + 1.6 (180-Wi...	Yes	Y		1	.9	10	1.6	43	1.6														
11	0.9D + 1.6 (210-Wi...	Yes	Y		1	.9	11	1.6	44	1.6														
12	0.9D + 1.6 (225-Wi...	Yes	Y		1	.9	12	1.6	45	1.6														
13	0.9D + 1.6 (240-Wi...	Yes	Y		1	.9	13	1.6	46	1.6														
14	0.9D + 1.6 (270-Wi...	Yes	Y		1	.9	14	1.6	47	1.6														
15	0.9D + 1.6 (300-Wi...	Yes	Y		1	.9	15	1.6	48	1.6														
16	0.9D + 1.6 (315-Wi...	Yes	Y		1	.9	16	1.6	49	1.6														
17	0.9D + 1.6 (330-Wi...	Yes	Y		1	.9	17	1.6	50	1.6														
18	1.2D + 1.6 (0-Wind)	Yes	Y		1	1.2	2	1.6	35	1.6														
19	1.2D + 1.6 (30-Wind)	Yes	Y		1	1.2	3	1.6	36	1.6														
20	1.2D + 1.6 (45-Wind)	Yes	Y		1	1.2	4	1.6	37	1.6														
21	1.2D + 1.6 (60-Wind)	Yes	Y		1	1.2	5	1.6	38	1.6														
22	1.2D + 1.6 (90-Wind)	Yes	Y		1	1.2	6	1.6	39	1.6														
23	1.2D + 1.6 (120-Wi...	Yes	Y		1	1.2	7	1.6	40	1.6														
24	1.2D + 1.6 (135-Wi...	Yes	Y		1	1.2	8	1.6	41	1.6														
25	1.2D + 1.6 (150-Wi...	Yes	Y		1	1.2	9	1.6	42	1.6														
26	1.2D + 1.6 (180-Wi...	Yes	Y		1	1.2	10	1.6	43	1.6														
27	1.2D + 1.6 (210-Wi...	Yes	Y		1	1.2	11	1.6	44	1.6														
28	1.2D + 1.6 (225-Wi...	Yes	Y		1	1.2	12	1.6	45	1.6														
29	1.2D + 1.6 (240-Wi...	Yes	Y		1	1.2	13	1.6	46	1.6														
30	1.2D + 1.6 (270-Wi...	Yes	Y		1	1.2	14	1.6	47	1.6														
31	1.2D + 1.6 (300-Wi...	Yes	Y		1	1.2	15	1.6	48	1.6														
32	1.2D + 1.6 (315-Wi...	Yes	Y		1	1.2	16	1.6	49	1.6														
33	1.2D + 1.6 (330-Wi...	Yes	Y		1	1.2	17	1.6	50	1.6														
34	1.2D + 1.0Di + 1.0 (...	Yes	Y		1	1.2	18	1	51	1	19	1	52	1										
35	1.2D + 1.0Di + 1.0 (...	Yes	Y		1	1.2	18	1	51	1	20	1	53	1										
36	1.2D + 1.0Di + 1.0 (...	Yes	Y		1	1.2	18	1	51	1	21	1	54	1										
37	1.2D + 1.0Di + 1.0 (...	Yes	Y		1	1.2	18	1	51	1	22	1	55	1										
38	1.2D + 1.0Di + 1.0 (...	Yes	Y		1	1.2	18	1	51	1	23	1	56	1										
39	1.2D + 1.0Di + 1.0 (...	Yes	Y		1	1.2	18	1	51	1	24	1	57	1										
40	1.2D + 1.0Di + 1.0 (...	Yes	Y		1	1.2	18	1	51	1	25	1	58	1										
41	1.2D + 1.0Di + 1.0 (...	Yes	Y		1	1.2	18	1	51	1	26	1	59	1										

Load Combinations (Continued)

	Description	So...	P...	S...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...
42	1.2D + 1.0Di + 1.0 (...	Yes	Y		1	1.2	18	1	51	1	27	1	60	1												
43	1.2D + 1.0Di + 1.0 (...	Yes	Y		1	1.2	18	1	51	1	28	1	61	1												
44	1.2D + 1.0Di + 1.0 (...	Yes	Y		1	1.2	18	1	51	1	29	1	62	1												
45	1.2D + 1.0Di + 1.0 (...	Yes	Y		1	1.2	18	1	51	1	30	1	63	1												
46	1.2D + 1.0Di + 1.0 (...	Yes	Y		1	1.2	18	1	51	1	31	1	64	1												
47	1.2D + 1.0Di + 1.0 (...	Yes	Y		1	1.2	18	1	51	1	32	1	65	1												
48	1.2D + 1.0Di + 1.0 (...	Yes	Y		1	1.2	18	1	51	1	33	1	66	1												
49	1.2D + 1.0Di + 1.0 (...	Yes	Y		1	1.2	18	1	51	1	34	1	67	1												
50	1.0D + 1.5LL + 1.5 ...	Yes	Y		1	1	68	1.5	72	1.5																
51	1.0D + 1.5LL + 1.5 ...	Yes	Y		1	1	68	1.5	73	1.5																
52	1.0D + 1.5LL + 1.5 ...	Yes	Y		1	1	68	1.5	74	1.5																
53	1.0D + 1.5LL + 1.5 ...	Yes	Y		1	1	68	1.5	75	1.5																
54	1.0D + 1.5LL + 1.5 ...	Yes	Y		1	1	69	1.5	72	1.5																
55	1.0D + 1.5LL + 1.5 ...	Yes	Y		1	1	69	1.5	73	1.5																
56	1.0D + 1.5LL + 1.5 ...	Yes	Y		1	1	69	1.5	74	1.5																
57	1.0D + 1.5LL + 1.5 ...	Yes	Y		1	1	69	1.5	75	1.5																
58	1.0D + 1.5LL + 1.5 ...	Yes	Y		1	1	70	1.5	72	1.5																
59	1.0D + 1.5LL + 1.5 ...	Yes	Y		1	1	70	1.5	73	1.5																
60	1.0D + 1.5LL + 1.5 ...	Yes	Y		1	1	70	1.5	74	1.5																
61	1.0D + 1.5LL + 1.5 ...	Yes	Y		1	1	70	1.5	75	1.5																
62	1.0D + 1.5LL + 1.5 ...	Yes	Y		1	1	71	1.5	72	1.5																
63	1.0D + 1.5LL + 1.5 ...	Yes	Y		1	1	71	1.5	73	1.5																
64	1.0D + 1.5LL + 1.5 ...	Yes	Y		1	1	71	1.5	74	1.5																
65	1.0D + 1.5LL + 1.5 ...	Yes	Y		1	1	71	1.5	75	1.5																
66	Serviceability (0-Wi...	Yes	Y		1	1	2	.344	35	.344																
67	Serviceability (30-...	Yes	Y		1	1	3	.344	36	.344																
68	Serviceability (45-...	Yes	Y		1	1	4	.344	37	.344																
69	Serviceability (60-...	Yes	Y		1	1	5	.344	38	.344																
70	Serviceability (90-...	Yes	Y		1	1	6	.344	39	.344																
71	Serviceability (120-...	Yes	Y		1	1	7	.344	40	.344																
72	Serviceability (135-...	Yes	Y		1	1	8	.344	41	.344																
73	Serviceability (150-...	Yes	Y		1	1	9	.344	42	.344																
74	Serviceability (180-...	Yes	Y		1	1	10	.344	43	.344																
75	Serviceability (210-...	Yes	Y		1	1	11	.344	44	.344																
76	Serviceability (225-...	Yes	Y		1	1	12	.344	45	.344																
77	Serviceability (240-...	Yes	Y		1	1	13	.344	46	.344																
78	Serviceability (270-...	Yes	Y		1	1	14	.344	47	.344																
79	Serviceability (300-...	Yes	Y		1	1	15	.344	48	.344																
80	Serviceability (315-...	Yes	Y		1	1	16	.344	49	.344																
81	Serviceability (330-...	Yes	Y		1	1	17	.344	50	.344																

Envelope Joint Reactions

	Joint		X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	N19	max	5904.808	46	3144.71	45	3139.357	2	.895	45	2.087	9	1.432	44
2		min	-2103.982	6	511.411	5	-4538.121	26	.105	5	-2.329	33	.219	4
3	N20	max	2221.081	14	3089.21	39	3175.86	2	.795	37	2.44	3	-.294	17
4		min	-6080.003	38	653.502	15	-5150.608	26	.131	13	-2.741	27	-1.407	41
5	N21	max	5372.238	30	3547.894	36	8018.097	34	-.389	7	3.3	30	.089	5
6		min	-4914.75	6	491.838	12	-2325.846	10	-1.741	47	-2.982	6	-.14	29
7	N68	max	-639.263	17	2780.341	44	2239.089	49	.707	43	.706	25	1.179	43
8		min	-4434.324	42	533.008	4	-425.187	9	.141	3	-.488	17	.238	3
9	N69	max	4640.159	42	2816.475	39	3094.206	35	.668	37	.668	19	-.292	17
10		min	494.41	3	661.212	15	-212.748	11	.138	13	-.388	11	-1.179	41
11	N70	max	1392.227	14	3113.608	48	-1532.773	10	-.36	2	.813	14	.048	3
12		min	-1819.269	22	715.033	9	-6284.06	34	-1.435	42	-1.093	22	-.08	27

Envelope Joint Reactions (Continued)

	Joint		X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
13	Totals:	max	13399.406	14	18052.448	34	13384.422	18						
14		min	-13399.41	6	4762.219	10	-13352.3...	26						

Envelope AISC 13th(360-05): LRFD Steel Code Checks

	Member	Shape	Code Check	Loc[ft]	LC	Shear Check	Loc.....		L..	phi*Pn..	phi*Pn..	phi*M...	phi*M...	...	Eqn
1	PL1	PL2x1/2	.507	.537	29	.145	0	y	18	21296...	32400	.338	1.35	1..	H1-1b
2	PL3	PL2x1/2	.796	.537	34	.202	.548	y	44	21296...	32400	.338	1.35	1..	H1-1b
3	PL5	PL2x1/2	.821	.537	41	.178	0	y	46	21296...	32400	.338	1.35	1..	H1-1b
4	PL7	PL2x1/2	1.030	.537	28	.459	.537	y	31	21296...	32400	.338	1.35	1..	H1-1b
5	PL9	PL2x1/2	.937	.537	42	.553	.537	y	26	21296...	32400	.338	1.35	1..	H1-1b
6	PL11	PL2x1/2	.896	.537	44	.231	0	y	42	21296...	32400	.338	1.35	1..	H1-1b
7	PL13	PL2x1/2	.510	.537	28	.119	0	y	29	21296...	32400	.338	1.35	1..	H1-1b
8	PL15	PL2x1/2	.818	.537	43	.173	0	y	40	21296...	32400	.338	1.35	1..	H1-1b
9	TH9	PIPE_2.0	.417	4.08	26	.128	6.7...		37	18598...	32130	1.872	1.872	2..	H1-1b
10	TH1	PIPE_2.0	.237	.563	47	.096	0		46	18598...	32130	1.872	1.872	3	H1-1b
11	TH2	PIPE_2.0	.142	3.376	13	.055	6.7...		42	18598...	32130	1.872	1.872	3	H1-1b
12	TH3	PIPE_2.0	.262	6.19	43	.104	6.7...		44	18598...	32130	1.872	1.872	3	H1-1b
13	TH4	PIPE_2.0	.433	2.673	32	.128	0		34	18598...	32130	1.872	1.872	2..	H1-1b
14	TH5	PIPE_2.0	.675	5.698	27	.442	6.12		18	18598...	32130	1.872	1.872	3	H3-6
15	TH6	PIPE_2.0	.438	4.08	4	.119	6.7...		34	18598...	32130	1.872	1.872	2..	H1-1b
16	TH7	PIPE_2.0	.229	.563	43	.086	0		41	18598...	32130	1.872	1.872	3	H1-1b
17	TH8	PIPE_2.0	.156	.563	21	.055	6.7...		36	18598...	32130	1.872	1.872	2..	H1-1b
18	BP1	Bent PL ...	.574	0	41	.329	0	y	42	46792...	74925	3.552	9.423	3	H2-1
19	BP3	Bent PL ...	.636	5	32	.372	5	y	47	46792...	74925	3.552	9.423	3	H2-1
20	BP5	Bent PL ...	.529	0	37	.317	0	y	37	46792...	74925	3.552	9.423	2..	H2-1
21	TA7	PIPE_2.0	.616	7.988	37	.062	8.9...		38	12371...	32130	1.872	1.872	3	H1-1b
22	SA13	HSS2.5x...	.166	0	37	.046	.987	y	38	49477...	49896	3.564	3.564	1..	H1-1b
23	TA6	PIPE_2.0	.578	7.988	35	.316	8.9...		35	12371...	32130	1.872	1.872	3	H1-1b
24	SA11	HSS2.5x...	.195	.265	34	.284	.265	z	34	49865...	49896	3.564	3.564	1..	H1-1b
25	TA8	PIPE_2.0	.517	7.988	38	.287	8.9...		38	12371...	32130	1.872	1.872	3	H1-1b
26	SA15	HSS2.5x...	.154	.265	39	.228	.265	z	39	49865...	49896	3.564	3.564	1..	H1-1b
27	TA4	PIPE_2.0	.918	0	22	.459	1.3		20	12371...	32130	1.872	1.872	3	H3-6
28	SA7	HSS2.5x...	.174	0	46	.048	.987	y	39	49477...	49896	3.564	3.564	1..	H1-1b
29	TA3	PIPE_2.0	.582	7.988	45	.330	8.9...		44	12371...	32130	1.872	1.872	3	H1-1b
30	SA5	HSS2.5x...	.172	.265	44	.250	.265	z	44	49865...	49896	3.564	3.564	1..	H1-1b
31	TA5	PIPE_2.0	.921	7.988	36	.647	7.8...		21	12371...	32130	1.872	1.872	3	H3-6
32	SA9	HSS2.5x...	.385	.265	20	.388	.265	z	20	49865...	49896	3.564	3.564	1..	H3-6
33	TA1	PIPE_2.0	.620	7.988	42	.124	0		22	12371...	32130	1.872	1.872	3	H1-1b
34	SA1	HSS2.5x...	.167	0	42	.046	.987	y	43	49477...	49896	3.564	3.564	1..	H1-1b
35	TA9	PIPE_2.0	.621	0	33	.307	8.9...		38	12371...	32130	1.872	1.872	3	H1-1a
36	SA17	HSS2.5x...	.223	.265	39	.298	.265	z	39	49865...	49896	3.564	3.564	1..	H1-1b
37	TA2	PIPE_2.0	.509	7.988	44	.284	8.9...		44	12371...	32130	1.872	1.872	3	H1-1b
38	SA3	HSS2.5x...	.153	.265	46	.212	.265	z	46	49865...	49896	3.564	3.564	1..	H1-1b
39	PL17	PL2x1/2	1.041	.537	36	.169	.537	y	38	21296...	32400	.338	1.35	1..	H1-1b
40	PL2	PL2x1/2	.410	.537	25	.110	.537	y	26	21296...	32400	.338	1.35	1..	H1-1b
41	PL4	PL2x1/2	.836	.537	44	.200	.548	y	45	21296...	32400	.338	1.35	1..	H1-1b
42	PL6	PL2x1/2	.873	.537	46	.182	.537	y	37	21296...	32400	.338	1.35	1..	H1-1b
43	PL8	PL2x1/2	.534	.537	18	.078	.537	y	31	21296...	32400	.338	1.35	1..	H1-1b
44	PL10	PL2x1/2	.909	.537	34	.233	0	y	49	21296...	32400	.338	1.35	1..	H1-1b
45	PL12	PL2x1/2	.920	.537	35	.238	.537	y	35	21296...	32400	.338	1.35	1..	H1-1b
46	PL14	PL2x1/2	.367	.537	37	.086	.537	y	21	21296...	32400	.338	1.35	1..	H1-1b
47	PL16	PL2x1/2	.760	.537	38	.190	.548	y	46	21296...	32400	.338	1.35	1..	H1-1b
48	BH9	PIPE_2.0	.572	4.15	26	.137	3.3...		18	18598...	32130	1.872	1.872	2..	H1-1b
49	BH1	PIPE_2.0	.258	.563	45	.089	0		45	18598...	32130	1.872	1.872	3	H1-1b
50	BH2	PIPE_2.0	.340	3.376	29	.066	.633		21	18598...	32130	1.872	1.872	2..	H1-1b

Envelope AISC 13th(360-05): LRFD Steel Code Checks (Continued)

	Member	Shape	Code Check	Loc[ft]	LC	Shear Check	Loc.....		L..	phi*Pn..	phi*Pn..	phi*M...	phi*M...	...	Eqn
51	BH3	PIPE_2.0	.277	6.19	46	.094	6.7...		45	18598...	32130	1.872	1.872	3	H1-1b
52	BH4	PIPE_2.0	.586	2.673	32	.125	0		34	18598...	32130	1.872	1.872	2..	H1-1b
53	BH5	PIPE_2.0	.313	5.698	22	.198	6.12		20	18598...	32130	1.872	1.872	3	H1-1b
54	BH6	PIPE_2.0	.596	4.15	20	.123	6.12		20	18598...	32130	1.872	1.872	2..	H1-1b
55	BH7	PIPE_2.0	.229	.563	40	.078	0		46	18598...	32130	1.872	1.872	3	H1-1b
56	BH8	PIPE_2.0	.156	6.19	38	.047	6.7...		37	18598...	32130	1.872	1.872	3	H1-1b
57	BP2	Bent PL ...	.951	0	40	.286	.729	y	40	46792...	74925	2.597	6.89	2..	H2-1
58	BP4	Bent PL ...	1.037	5	34	.314	4.2...	y	49	46792...	74925	2.597	6.89	2..	H2-1
59	BP6	Bent PL ...	.928	0	46	.279	0	y	47	46792...	74925	2.597	6.89	2..	H2-1
60	BA7	PIPE_2.0	.572	7.988	36	.058	8.9...		40	12371...	32130	1.872	1.872	3	H1-1b
61	SA14	HSS2.5x...	.162	0	36	.042	.987	y	39	49477...	49896	3.564	3.564	1..	H1-1b
62	BA6	PIPE_2.0	.706	7.988	34	.330	8.9...		34	12371...	32130	1.872	1.872	3	H1-1a
63	SA12	HSS2.5x...	.159	.265	41	.271	.265	z	39	49865...	49896	3.564	3.564	1..	H1-1b
64	BA8	PIPE_2.0	.612	7.988	37	.299	8.9...		39	12371...	32130	1.872	1.872	3	H1-1a
65	SA16	HSS2.5x...	.132	0	46	.214	.265	z	36	49865...	49896	3.564	3.564	1..	H1-1b
66	BA4	PIPE_2.0	.615	7.988	41	.185	1.3		29	12371...	32130	1.872	1.872	3	H1-1b
67	SA8	HSS2.5x...	.174	0	41	.045	.987	y	40	49477...	49896	3.564	3.564	1..	H1-1b
68	BA3	PIPE_2.0	.662	7.988	44	.316	8.9...		44	12371...	32130	1.872	1.872	3	H1-1a
69	SA6	HSS2.5x...	.145	0	43	.216	0	z	45	49865...	49896	3.564	3.564	1..	H1-1b
70	BA5	PIPE_2.0	.976	7.988	47	.380	8.9...		49	12371...	32130	1.872	1.872	3	H3-6
71	SA10	HSS2.5x...	.172	0	46	.316	0	z	34	49865...	49896	3.564	3.564	1..	H1-1b
72	BA1	PIPE_2.0	.577	7.988	43	.106	0		30	12371...	32130	1.872	1.872	3	H1-1b
73	SA2	HSS2.5x...	.163	0	43	.043	.987	y	44	49477...	49896	3.564	3.564	1..	H1-1b
74	BA9	PIPE_2.0	.727	7.988	40	.320	8.9...		41	12371...	32130	1.872	1.872	3	H1-1a
75	SA18	HSS2.5x...	.168	.265	41	.278	0	z	41	49865...	49896	3.564	3.564	1..	H1-1b
76	BA2	PIPE_2.0	.593	7.988	45	.297	8.9...		45	12371...	32130	1.872	1.872	3	H1-1a
77	SA4	HSS2.5x...	.135	0	46	.196	.265	y	45	49865...	49896	3.564	3.564	1..	H1-1b
78	PL18	PL2x1/2	.961	.537	43	.207	0	y	48	21296...	32400	.338	1.35	1..	H1-1b
79	VP48	PIPE_2.0	.364	3.5	37	.039	3.5		37	30196...	32130	1.872	1.872	2..	H1-1b
80	VP51	PIPE_2.0	.365	3.5	38	.080	3.5		37	30196...	32130	1.872	1.872	2..	H1-1b
81	VP54	PIPE_2.0	.393	3.5	41	.087	0		46	30196...	32130	1.872	1.872	2..	H1-1b
82	VP30	PIPE_2.0	.367	3.5	43	.039	3.5		43	30196...	32130	1.872	1.872	2..	H1-1b
83	VP33	PIPE_2.0	.361	3.5	44	.079	3.5		43	30196...	32130	1.872	1.872	2..	H1-1b
84	VP36	PIPE_2.0	.449	3.5	45	.094	2.7...		46	30196...	32130	1.872	1.872	2..	H1-1b
85	VP39	PIPE_2.0	.386	3.5	42	.042	0		39	30196...	32130	1.872	1.872	2..	H1-1b
86	VP42	PIPE_2.0	.448	3.5	46	.181	3.5		29	30196...	32130	1.872	1.872	2..	H1-1b
87	VP45	PIPE_2.0	.404	3.5	35	.086	0		45	30196...	32130	1.872	1.872	2..	H1-1b
88	VP38	PIPE_2.0	.038	3.5	19	.020	3.5		19	30196...	32130	1.872	1.872	2..	H1-1b
89	VP35	PIPE_2.0	.048	3.5	41	.016	3.5		41	30196...	32130	1.872	1.872	2..	H1-1b
90	VP41	PIPE_2.0	.080	3.5	32	.044	0		31	30196...	32130	1.872	1.872	1..	H1-1b
91	VP44	PIPE_2.0	.056	3.5	46	.019	0		34	30196...	32130	1.872	1.872	2..	H1-1b
92	VP47	PIPE_2.0	.025	3.5	34	.006	3.5		49	30196...	32130	1.872	1.872	2..	H1-1b
93	VP50	PIPE_2.0	.050	3.5	47	.017	0		42	30196...	32130	1.872	1.872	2..	H1-1b
94	VP53	PIPE_2.0	.057	3.5	34	.018	0		37	30196...	32130	1.872	1.872	2..	H1-1b
95	VP29	PIPE_2.0	.028	3.5	39	.008	3.5		22	30196...	32130	1.872	1.872	2..	H1-1b
96	VP32	PIPE_2.0	.049	0	44	.016	3.5		49	30196...	32130	1.872	1.872	2..	H1-1b
97	VP34	PIPE_2.0	.226	3.5	45	.045	3.5		46	30196...	32130	1.872	1.872	2..	H1-1b
98	VP37	PIPE_2.0	.235	3.5	19	.015	3.5		20	30196...	32130	1.872	1.872	1..	H1-1b
99	VP40	PIPE_2.0	.261	3.5	34	.082	0		28	30196...	32130	1.872	1.872	2..	H1-1b
100	VP43	PIPE_2.0	.266	3.5	34	.052	0		44	30196...	32130	1.872	1.872	2..	H1-1b
101	VP46	PIPE_2.0	.029	3.5	30	.009	3.5		32	30196...	32130	1.872	1.872	2..	H1-1b
102	VP49	PIPE_2.0	.212	3.5	38	.042	3.5		38	30196...	32130	1.872	1.872	2..	H1-1b
103	VP52	PIPE_2.0	.242	3.5	45	.049	0		46	30196...	32130	1.872	1.872	2..	H1-1b
104	VP28	PIPE_2.0	.048	3.5	22	.010	0		30	30196...	32130	1.872	1.872	1..	H1-1b
105	VP31	PIPE_2.0	.220	0	44	.045	3.5		44	30196...	32130	1.872	1.872	2..	H1-1b
106	VP5	PIPE_2.0	.127	.219	21	.076	0		9	30196...	32130	1.872	1.872	2..	H1-1b
107	VP2	PIPE_2.0	.025	3.5	46	.005	0		39	30196...	32130	1.872	1.872	2..	H1-1b

Envelope AISC 13th(360-05): LRFD Steel Code Checks (Continued)

	Member	Shape	Code Check	Loc[ft]	LC	Shear Check	Loc.....	L..	phi*Pn..	phi*Pn..	phi*M...	phi*M...	...	Eqn
108	VP26	PIPE_2.0	.050	0	45	.021	3.5	18	30196...	32130	1.872	1.872	2..	H1-1b
109	VP8	PIPE_2.0	.033	3.5	27	.008	3.5	22	30196...	32130	1.872	1.872	1..	H1-1b
110	VP11	PIPE_2.0	.053	0	45	.027	3.5	25	30196...	32130	1.872	1.872	2..	H1-1b
111	VP14	PIPE_2.0	.117	0	18	.064	0	18	30196...	32130	1.872	1.872	1..	H1-1b
112	VP17	PIPE_2.0	.050	0	39	.023	3.5	28	30196...	32130	1.872	1.872	2..	H1-1b
113	VP20	PIPE_2.0	.023	3.5	42	.005	0	34	30196...	32130	1.872	1.872	2..	H1-1b
114	VP23	PIPE_2.0	.022	3.5	20	.007	3.5	21	30196...	32130	1.872	1.872	3	H1-1b
115	VP18	PIPE_2.0	.073	3.281	24	.117	3.5	29	30196...	32130	1.872	1.872	3	H1-1b
116	VP21	PIPE_2.0	.131	3.5	42	.018	0	43	30196...	32130	1.872	1.872	2..	H1-1b
117	VP24	PIPE_2.0	.059	3.5	20	.011	0	30	30196...	32130	1.872	1.872	1..	H1-1b
118	VP27	PIPE_2.0	.096	3.281	29	.119	3.5	18	30196...	32130	1.872	1.872	3	H1-1b
119	VP3	PIPE_2.0	.146	3.5	46	.020	0	46	30196...	32130	1.872	1.872	2..	H1-1b
120	VP6	PIPE_2.0	.058	3.5	34	.076	0	21	30196...	32130	1.872	1.872	1..	H1-1b
121	VP9	PIPE_2.0	.103	3.5	44	.013	3.5	49	30196...	32130	1.872	1.872	2..	H1-1b
122	VP12	PIPE_2.0	.205	0	35	.072	0	23	30196...	32130	1.872	1.872	2..	H1-1b
123	VP15	PIPE_2.0	.103	3.5	18	.110	3.5	18	30196...	32130	1.872	1.872	2..	H1-1b
124	VP4	PIPE_2.0	.070	3.5	40	.075	0	21	30196...	32130	1.872	1.872	2..	H1-1b
125	VP1	PIPE_2.0	.089	3.5	46	.011	0	34	30196...	32130	1.872	1.872	2..	H1-1b
126	VP25	PIPE_2.0	.201	3.5	37	.093	0	18	30196...	32130	1.872	1.872	2..	H1-1b
127	VP22	PIPE_2.0	.075	3.5	36	.015	0	36	30196...	32130	1.872	1.872	2..	H1-1b
128	VP19	PIPE_2.0	.071	3.5	42	.010	3.5	46	30196...	32130	1.872	1.872	2..	H1-1b
129	VP16	PIPE_2.0	.190	0	49	.078	0	29	30196...	32130	1.872	1.872	2..	H1-1b
130	VP13	PIPE_2.0	.253	3.5	18	.197	3.5	18	30196...	32130	1.872	1.872	2..	H1-1b
131	VP10	PIPE_2.0	.133	3.281	27	.117	3.5	23	30196...	32130	1.872	1.872	2..	H1-1b
132	VP7	PIPE_2.0	.164	3.5	44	.022	0	43	30196...	32130	1.872	1.872	1..	H1-1b
133	D9	7/8" SR	.076	0	30	.061	0	18	5351....	19482...	.284	.284	2..	H1-1...
134	D10	7/8" SR	.058	0	36	.034	0	18	5352....	19482...	.284	.284	2..	H1-1b
135	D11	7/8" SR	.084	0	49	.070	4.4...	20	5351....	19482...	.284	.284	1..	H1-1b
136	D12	7/8" SR	.052	0	37	.060	4.4...	20	5352....	19482...	.284	.284	2..	H1-1b
137	D13	7/8" SR	.158	0	42	.010	4.4...	22	5351....	19482...	.284	.284	3	H1-1...
138	D14	7/8" SR	.074	0	43	.010	4.4...	22	5352....	19482...	.284	.284	2..	H1-1b
139	D15	7/8" SR	.057	0	34	.011	4.4...	23	5351....	19482...	.284	.284	2..	H1-1b
140	D16	7/8" SR	.067	0	20	.011	4.4...	23	5352....	19482...	.284	.284	2..	H1-1...
141	D17	7/8" SR	.089	0	36	.066	4.4...	26	5351....	19482...	.284	.284	1..	H1-1b
142	D18	7/8" SR	.063	0	21	.058	4.4...	26	5352....	19482...	.284	.284	1..	H1-1...
143	D1	7/8" SR	.189	0	46	.010	4.4...	11	5351....	19482...	.284	.284	3	H1-1...
144	D2	7/8" SR	.077	0	46	.011	4.4...	27	5352....	19482...	.284	.284	2..	H1-1b
145	D3	7/8" SR	.057	0	39	.026	4.4...	29	5351....	19482...	.284	.284	2..	H1-1b
146	D4	7/8" SR	.054	0	34	.026	4.4...	29	5352....	19482...	.284	.284	2..	H1-1b
147	D5	7/8" SR	.083	0	44	.013	4.4...	30	5351....	19482...	.284	.284	2..	H1-1b
148	D6	7/8" SR	.219	0	45	.013	4.4...	30	5352....	19482...	.284	.284	3	H1-1a
149	D7	7/8" SR	.074	0	19	.060	4.4...	32	5351....	19482...	.284	.284	1..	H1-1...
150	D8	7/8" SR	.089	0	35	.070	4.4...	32	5352....	19482...	.284	.284	1..	H1-1b
151	D27	7/8" SR	.694	4.791	34	.041	0	13	4655....	19482...	.284	.284	3	H1-1a
152	D28	7/8" SR	.138	0	44	.063	0	29	4655....	19482...	.284	.284	1..	H1-1b
153	D29	7/8" SR	.716	4.791	34	.030	4.7...	30	4655....	19482...	.284	.284	3	H1-1a
154	D30	7/8" SR	.144	0	45	.022	4.7...	23	4655....	19482...	.284	.284	1..	H1-1b
155	D25	7/8" SR	.159	0	38	.044	0	6	4655....	19482...	.284	.284	2..	H1-1...
156	D26	7/8" SR	.129	0	41	.026	0	22	4655....	19482...	.284	.284	2	H1-1b
157	D23	7/8" SR	.648	4.791	45	.029	4.7...	26	4655....	19482...	.284	.284	3	H1-1a
158	D24	7/8" SR	.133	0	40	.023	0	18	4655....	19482...	.284	.284	1..	H1-1b
159	D22	7/8" SR	.131	0	34	.021	4.7...	23	4655....	19482...	.284	.284	1..	H1-1b
160	D21	7/8" SR	.602	4.791	45	.025	4.7...	31	4655....	19482...	.284	.284	3	H1-1a
161	D20	7/8" SR	.122	0	48	.022	4.7...	22	4655....	19482...	.284	.284	2..	H1-1b
162	D19	7/8" SR	.142	0	43	.065	4.7...	22	4655....	19482...	.284	.284	2..	H1-1...
163	D35	7/8" SR	.681	4.791	38	.040	4.7...	20	4655....	19482...	.284	.284	3	H1-1a
164	D36	7/8" SR	.144	0	34	.024	0	28	4655....	19482...	.284	.284	1..	H1-1b

Envelope AISC 13th(360-05): LRFD Steel Code Checks (Continued)

	Member	Shape	Code Check	Loc[ft]	LC	Shear Check	Loc.....	L..	phi*Pn..	phi*Pn..	phi*M...	phi*M...	...	Eqn
165	D33	7/8" SR	.609	4.791	39	.027	4.7...	26	4655....	19482...	.284	.284	3	H1-1a
166	D34	7/8" SR	.134	0	49	.021	0	18	4655....	19482...	.284	.284	1..	H1-1b
167	D31	7/8" SR	.133	0	37	.052	0	22	4655....	19482...	.284	.284	2..	H1-1...
168	D32	7/8" SR	.122	0	47	.027	0	30	4655....	19482...	.284	.284	2..	H1-1b
169	MP17	PIPE_2.5	.065	5.25	19	.034	5.25	19	33961...	50715	3.596	3.596	1..	H1-1b
170	MP9	PIPE_2.0	.308	5.25	35	.067	1.75	42	17855...	32130	1.872	1.872	1..	H1-1b
171	MP12	PIPE_2.0	.117	6.563	25	.042	6.7...	30	17855...	32130	1.872	1.872	2..	H1-1b
172	MP13	PIPE_2.0	.372	5.25	46	.121	5.25	19	17855...	32130	1.872	1.872	1..	H1-1b
173	MP14	PIPE_2.0	.795	6.271	29	.404	6.49	29	17855...	32130	1.872	1.872	2..	H3-6
174	MP2	PIPE_2.0	.320	5.469	23	.097	6.7...	22	17855...	32130	1.872	1.872	2..	H1-1b
175	MP3	PIPE_2.0	.301	3.417	43	.073	3.4...	44	26521...	32130	1.872	1.872	1..	H1-1b
176	MP4	PIPE_2.0	.405	2.5	30	.130	3.75	32	26521...	32130	1.872	1.872	2..	H1-1b
177	MP7	PIPE_2.0	.306	5.25	49	.166	1.75	26	17855...	32130	1.872	1.872	1..	H1-1b
178	TB5	PIPE_2.0	.197	4.958	22	.052	4.9...	38	23929...	32130	1.872	1.872	1..	H1-1b
179	TB4	PIPE_2.0	.186	4.958	30	.056	4.9...	34	23929...	32130	1.872	1.872	1..	H1-1b
180	TB3	PIPE_2.0	.207	4.958	22	.062	4.9...	49	23929...	32130	1.872	1.872	2..	H1-1b
181	TB2	PIPE_2.0	.208	4.958	30	.056	4.9...	46	23929...	32130	1.872	1.872	1..	H1-1b
182	BB3	PIPE_2.0	.197	0	47	.045	4.9...	46	23929...	32130	1.872	1.872	1..	H1-1b
183	BB2	PIPE_2.0	.176	4.958	22	.036	0	43	23929...	32130	1.872	1.872	1..	H1-1b
184	BB1	PIPE_2.0	.138	0	46	.035	0	46	23929...	32130	1.872	1.872	1..	H1-1b
185	BB6	PIPE_2.0	.169	0	38	.037	4.9...	38	23929...	32130	1.872	1.872	1..	H1-1b
186	BB5	PIPE_2.0	.174	4.958	30	.036	4.9...	47	23929...	32130	1.872	1.872	1..	H1-1b
187	BB4	PIPE_2.0	.174	4.958	30	.040	4.9...	38	23929...	32130	1.872	1.872	1..	H1-1b
188	TB1	PIPE_2.0	.123	2.427	42	.049	4.9...	43	23929...	32130	1.872	1.872	1..	H1-1b
189	TB6	PIPE_2.0	.141	0	41	.055	4.9...	41	23929...	32130	1.872	1.872	1..	H1-1b
190	MP6	PIPE_2.0	.126	3.75	15	.062	3.75	24	23808...	32130	1.872	1.872	2..	H1-1b
191	MP1	PIPE_2.0	.125	3.75	10	.062	3.75	18	23808...	32130	1.872	1.872	1..	H1-1b
192	OM9	PIPE_2.5	.122	.75	45	.034	.75	46	47114...	50715	3.596	3.596	2..	H1-1b
193	MP11	PIPE_2.0	.124	3.75	5	.061	3.75	28	23808...	32130	1.872	1.872	2..	H1-1b
194	MP8	PIPE_2.0	.826	3.229	18	.276	4.2...	21	28308...	32130	1.872	1.872	1..	H1-1b
195	MP10	PIPE_2.0	.043	.25	30	.009	1.25	30	28843...	32130	1.872	1.872	1..	H1-1b
196	MP16	PIPE_2.5	.023	5.25	22	.019	1.75	22	33961...	50715	3.596	3.596	1..	H1-1b
197	MP18	PIPE_2.5	.015	5.25	18	.016	1.75	32	33961...	50715	3.596	3.596	1..	H1-1b
198	MP20	PIPE_2.5	.215	3.5	18	.051	3.5	18	30038...	50715	3.596	3.596	1..	H1-1b
199	MP22	PIPE_2.5	.185	3.5	21	.046	3.5	29	30038...	50715	3.596	3.596	2..	H1-1b
200	MP21	PIPE_2.5	.185	3.5	31	.042	3.5	7	30038...	50715	3.596	3.596	2..	H1-1b
201	MP23	PIPE_2.0	.186	2.25	21	.033	2.25	33	26521...	32130	1.872	1.872	2..	H1-1b

RAMAKER & ASSOCIATES, INC.

November 8, 2017

Tom Jupin
Charles Cherundolo Consulting, Inc.
1280 Rt. 46 West
Parsippany, NJ 07054

Ramaker & Associates, Inc.
855 Community Drive
Sauk City, WI 53583

SUBJECT: **STRUCTURAL ASSESSMENT**
170-FOOT SELF-SUPPORT TOWER

CARRIER: **SPRINT**

SITE: **CROMWELL – RT. 372 (CT60XC931-A)**
179 SHUNPIKE ROAD
CROMWELL, MIDDLESEX COUNTY, CONNECTICUT 06416
RAMAKER & ASSOCIATES PROJECT NUMBER: 29431

RESULTS:			
	TOWER:	**90.7%**	**PASS**
	FOUNDATION:	**57.7%**	**PASS**

Dear Tom Jupin:

Ramaker & Associates, Inc. (RAMAKER) respectfully submits this structural assessment for the above mentioned site. The purpose of this report is to determine the structural integrity of the existing structure with the existing and proposed loading. Engineering recommendations regarding the analysis results are provided in the following pages.

RAMAKER developed a finite element model of the tower using tnxTower analysis software. All information contained herein is valid only for the described structure configuration and loading conditions. RAMAKER reserves the right to modify our recommendations should alterations to the tower loading occur.

If you have any questions or comments, please do not hesitate to contact our office.

Sincerely,

RAMAKER & ASSOCIATES, INC.

James M. Alvin
Structural Designer

James R. Skowronski, P.E.
Supervising Engineer

STATE OF CONNECTICUT
JAMES R. SKOWRONSKI
No. 26266
LICENSED
PROFESSIONAL ENGINEER

ANALYSIS CRITERIA

State Building Code	2016 CT State Building Code
Adopted Building Code	2012 IBC
Referenced Standard	TIA-222-G
Risk Category	II
Ultimate Design Wind Speed, V_{ult}	125 mph (3 sec. gust)
Nominal Design Wind Speed, V_{asd}	97 mph (3 sec. gust)
Design Wind Speed w/ Ice	50 mph (3 sec. gust)
Ice Thickness	3/4 inch
Exposure Category	C
Topographic Category	1
Crest Height	N/A

SUPPORTING DOCUMENTATION

- Structural analysis by URS Corporation, job number 36931260.00000, dated September 23, 2014
- Construction drawings by RAMAKER, project number 29431
- Site visit(s) conducted by RAMAKER
- Other pertinent data procured or assumed by RAMAKER during site due diligence activities

TOWER LOADING

RAMAKER understands that the loading to be used for this analysis will consist of the antenna equipment, mount, and cable configurations as shown in the following chart:

Elevation	Appurtenance	Mount	Coax	Owner	Status
170	(1) 15' Omni	Leg Mount	(1) 1-5/8	Town	Existing
	(1) 2' Omni	Halo-Mount	(7) 1-1/2 (11) 7/8		
	(1) 20' Omni				
	(3) 15' Omni				
	(1) 20' Dipole				
	(2) 10' Omni				
	(1) 10' Omni on 15' Mount Pipe				
	(1) 2.5' Omni				
	(1) Security Camera and Mount				
	(3) RFS APXVSPP18-C		(3) Hybrid	Sprint	Existing
	(3) ALU 1900MHz 4x45W				
	(3) ALU 800MHz 2x50W				
	(3) Commscope DT465B-2XR		**(2) Hybrid**		**Proposed**
	(3) ALU TD-RRH8x20-25				
	(3) ALU 800MHz 2x50W				
133	(2) 20' Omni	Platform w/Handrail	(4) 1-5/8 (3) 7/8 (1) 1/2	Town	Existing
	(1) 10' Omni				
	(1) 10' Omni				
	(2) 5' Omni				
	(1) 6' Yagi				
	(1) 5' Whip				
	(2) Andrew 2' Dish		(5) 1-5/8	Clearwire	Existing
	(1) Andrew VHLP2.5				
	(1) Andrew VHLP2				
	(3) Argus LLPX310R		(6) 1-5/8		
	(3) Samsung RRU U-RAS				
125	(2) Ericsson AIR21 B2A/B4P	(3) T-Frame	(12) 1-5/8	T-Mobile	Existing
	(3) Twin PCS TMA				
	(3) Andrew LNX-6514DS-VTM				
	(3) Ericsson RRUS-11				

Elevation	Appurtenance	Mount	Coax	Owner	Status
115	(6) Powerwave RA21.7770.00	(3) T-Frame	(12) 1-5/8	AT&T	Existing
	(3) Quintel QS6658-3				
	(6) 10"x9"x3" TMA				
	(6) 4"x8"x4" TMA				
	(3) Ericsson RRUS-12 w/A2				
	(3) Ericsson RRUS-32				
	(3) Ericsson RRUS-12	(3) 2' Standoff			
	(1) Raycap DC6-48-60-18-8F				
101	(3) Andrew HBX-6517DS-VTM	(3) T-Frame	(12) 1-5/8	Verizon	Existing
	(3) Antel BXA-70063-6CF				
	(3) Antel BXA-171063-12CF				
	(3) Andrew LNX-6514DS-T4M				
	(3) ALU RRH 2x40				
	(6) Diplexer				
92	(1) 1' Dish	Pipe Mount	(1) 7/8	Unknown	Existing
30	(1) Security Camera	Leg Mount	(1) 1-5/8	Town	Existing

TOWER RESULTS

The maximum tower member stress capacities under the loading conditions previously described are as follows:

Component Type	Percent Capacity	Pass/Fail
Leg	81.6	Pass
Diagonal	78.5	Pass
Horizontal	24.3	Pass
Bolt	90.7	Pass
Anchor Rods	63.2	Pass
RATING	**90.7**	**PASS**

Results of the analysis show that the existing tower will be stressed to a maximum of 90.7 percent of capacity. Therefore, the existing tower will pass the TIA-222-G analysis requirements under proposed loading conditions.

DISH TWIST/SWAY RESULTS

The twist/sway results for a 60 mph service wind speed are as follows:

Elevation	Dish	Deflection (in)	Tilt (deg)	Twist (deg)
137	Andrew VHLP2.5	3.013	0.2251	0.0357
136	2' Dish	2.965	0.2230	0.0350
133	Andrew VHLP2	2.825	0.2165	0.0331
92	1' Dish	1.276	0.1303	0.0153

FOUNDATION RESULTS

The maximum foundation stress capacities are as follows:

Component Type	Percent Capacity	Pass/Fail
Soil Interaction	57.7	Pass
Structural	33.9	Pass
RATING	**57.7**	**PASS**

The foundations were analyzed utilizing the previous structural analysis referenced above. Results of the analysis show that the existing foundation will be stressed to a maximum of 57.7 percent of capacity. Therefore, the existing foundation will pass the TIA-222-G analysis requirements under proposed loading conditions.

LIMITATIONS

The recommendations contained within this report were developed using the supporting documentation as previously described. All recommendations pertain only to the proposed antenna installation activities as described in this report. RAMAKER assumes no responsibility for failures caused by factors beyond our control. These include but are not limited to the following:

- Missing, corroding, and/or deteriorating members
- Improper manufacturing and/or construction
- Improper maintenance

RAMAKER assumes no responsibility for modifications completed prior to or hereafter in which RAMAKER was not directly involved. These modifications include but are not limited to the following:

- Replacing or strengthening bracing members
- Reinforcing or extending vertical members
- Installing or removing antenna mounting gates or side arms
- Changing loading configurations

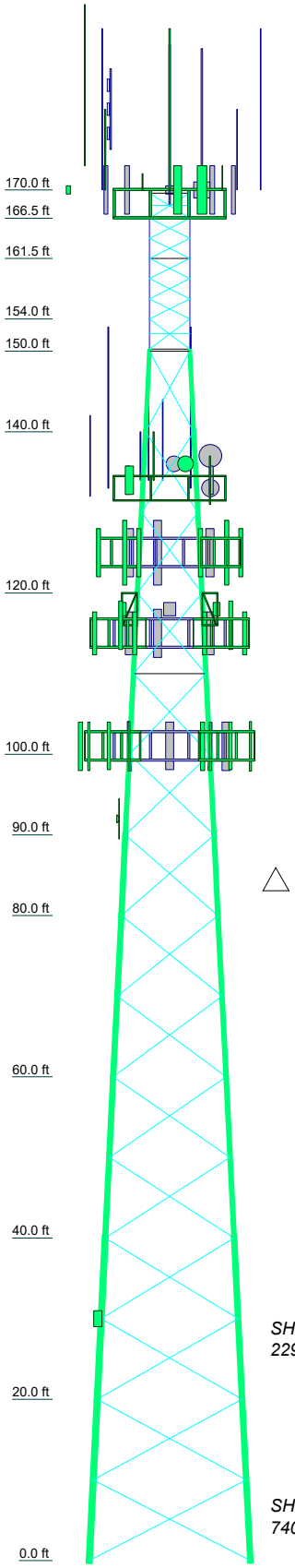
The tower owner is responsible for verifying that the existing loading on the structure is consistent with the loading applied to the structure within this report. If there is any information contrary to that contained herein, or if there are any defects arising from the original design, material, fabrication and erection deficiencies, this report should be disregarded and RAMAKER should be contacted immediately. RAMAKER is not liable for any representation, recommendation, or conclusion not expressly stated herein.

This analysis pertains only to the tower structure, and no analyses or conclusions were made regarding the antenna and equipment mounting structure(s). Analysis and certification of the antenna and equipment mounting structure(s) is performed and submitted separately.

ATTACHMENTS

- Analysis Figures
- Analysis Calculations

Section	T13	T12	T11	T10	T9	T8	T7	T6	T5	T4	T3	T2	T1
Legs	E	D	Pirod 105219	C	B	Pirod 105217	Pirod 105216	A	F	I	5 @ 2.5	H	373.0
Leg Grade	A572-50												
Diagonals	L4x4x5/16	L3 1/2x3 1/2x3/8	L3 1/2x3 1/2x5/16	L3x3x3/8	L3x3x5/16		L3x3x3/16		SR 7/8			475.0	
Diagonal Grade	A36								A572-50				
Top Girts	N.A.								L3x3x3/16	N.A.		L6x4x3/8	
Mid Girts	N.A.						L3x3x3/16		N.A.				
Bottom Girts	N.A.									G	N.A.	G	N.A.
Sec. Horizontals	N.A.									G	N.A.	G	G
Face Width (ft)	20	18	16	14	12	10	8	6	5				
# Panels @ (ft)				15 @ 10									
Weight (lb)	30271.7	6190.9	5579.4	4673.0	3967.0	1635.6	1374.4	2394.0	1911.8	1071.2	236.3	390.0	373.0



ALL RE
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198

SHEAR
22927 lb

TORQUE
50 mph WIND

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69

SHEAR
74045 lb

TORQUE
REACTIONS

DESIGNED APPURTENANCE LOADING

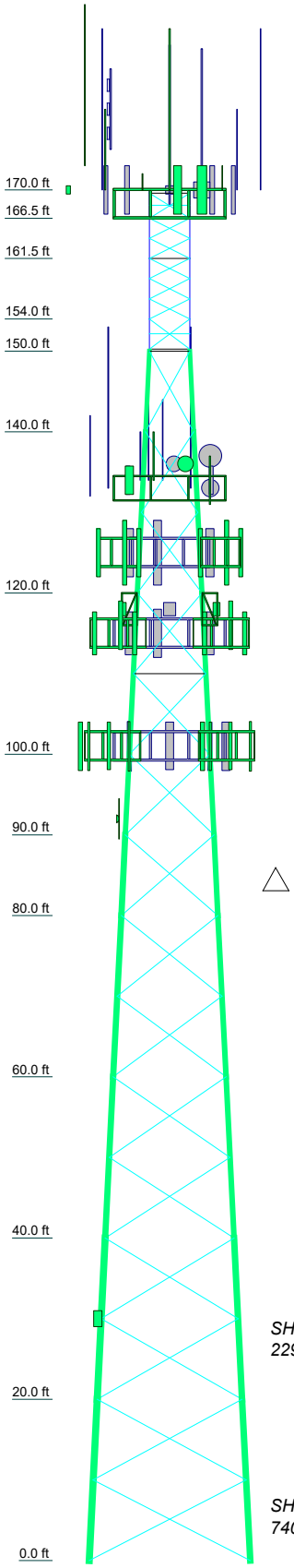
TYPE	ELEVATION	TYPE	ELEVATION
15' Omni (Municipal)	170	ETW190VS12UB (T-Mobile)	125
2' Omni (Municipal)	170	2' Standoff (ATT)	118
15' Omni (Municipal)	170	2' Standoff (ATT)	118
20' Omni (Municipal)	170	2' Standoff (ATT)	118
SU-RA (Municipal)	170	RRUS-12 (ATT)	118
20' Dipole (Municipal)	170	RRUS-12 (ATT)	118
3' Omni (Municipal)	170	RRUS-12 (ATT)	118
10' Omni (Municipal)	170	DC6-48-60-18-8F (ATT)	118
15' Omni (Municipal)	170	QS6658-3 w/Mount Pipe (ATT)	115
15'x2-1/2" Pipe Mount	170	QS6658-3 w/Mount Pipe (ATT)	115
10' Omni (Municipal)	170	TMA 10"x9"x3" (ATT)	115
15' Omni (Municipal)	170	TMA 10"x9"x3" (ATT)	115
10' Omni (Municipal)	170	TMA 4"x8"x4" (ATT)	115
SU-RA (Municipal)	170	TMA 4"x8"x4" (ATT)	115
Camera and Mount	170	TMA 10"x9"x3" (ATT)	115
APXVSPP18-C w/Mount Pipe (Sprint)	170	TMA 10"x9"x3" (ATT)	115
APXVSPP18-C w/Mount Pipe (Sprint)	170	TMA 4"x8"x4" (ATT)	115
APXVSPP18-C w/Mount Pipe (Sprint)	170	TMA 4"x8"x4" (ATT)	115
1900MHz 4x45W RRH (Sprint)	170	TMA 10"x9"x3" (ATT)	115
1900MHz 4x45W RRH (Sprint)	170	TMA 10"x9"x3" (ATT)	115
1900MHz 4x45W RRH (Sprint)	170	TMA 4"x8"x4" (ATT)	115
800MHz 2x50W RRH (Sprint)	170	TMA 4"x8"x4" (ATT)	115
800MHz 2x50W RRH (Sprint)	170	RRUS-12 w/ A2 Box (ATT)	115
800MHz 2x50W RRH (Sprint)	170	RRUS-12 w/ A2 Box (ATT)	115
DT465B-2XR w/Mount Pipe (Sprint)	170	RRUS-12 w/ A2 Box (ATT)	115
DT465B-2XR w/Mount Pipe (Sprint)	170	RRUS-32 (ATT)	115
DT465B-2XR w/Mount Pipe (Sprint)	170	RRUS-32 (ATT)	115
TD-RRH 8x20 (Sprint)	170	RRUS-32 (ATT)	115
TD-RRH 8x20 (Sprint)	170	Sector Mount [SM 408-1] (ATT)	115
TD-RRH 8x20 (Sprint)	170	Sector Mount [SM 408-1] (ATT)	115
800MHz 2x50W RRH (Sprint)	170	Sector Mount [SM 408-1] (ATT)	115
800MHz 2x50W RRH (Sprint)	170	(2) RA21.7770.00 w/Mount Pipe (ATT)	115
800MHz 2x50W RRH (Sprint)	170	(2) RA21.7770.00 w/Mount Pipe (ATT)	115
Sector Mount [SM 412-1] (Halo Mount)	168.25	(2) RA21.7770.00 w/Mount Pipe (ATT)	115
20' Omni (Municipal)	133	QS6658-3 w/Mount Pipe (ATT)	115
5' Omni (Municipal)	133	BXA-70063-6CF-EDIN-X w/Mount Pipe (Verizon)	101
10' Omni (Municipal)	133	BXA-70063-6CF-EDIN-X w/Mount Pipe (Verizon)	101
20' Omni (Municipal)	133	BXA-171063-12CF w/Mount Pipe (Verizon)	101
5' Omni (Municipal)	133	BXA-171063-12CF w/Mount Pipe (Verizon)	101
5' Omni (Municipal)	133	BXA-171063-12CF w/Mount Pipe (Verizon)	101
10' Omni (Municipal)	133	LNX-6514DS-T4M w/Mount Pipe (Verizon)	101
6' Yagi (Municipal)	133	LNX-6514DS-T4M w/Mount Pipe (Verizon)	101
LLPX310R w/Mount Pipe (Clearwire)	133	LNX-6514DS-T4M w/Mount Pipe (Verizon)	101
LLPX310R w/Mount Pipe (Clearwire)	133	RRH 2x40 AWS (Verizon)	101
LLPX310R w/Mount Pipe (Clearwire)	133	RRH 2x40 AWS (Verizon)	101
RRH U-RAS (Clearwire)	133	RRH 2x40 AWS (Verizon)	101
RRH U-RAS (Clearwire)	133	FD9R6004/2C-3L (Verizon)	101
RRH U-RAS (Clearwire)	133	FD9R6004/2C-3L (Verizon)	101
6' x 2" Pipe Mount (Clearwire dish)	133	FD9R6004/2C-3L (Verizon)	101
6' x 2" Pipe Mount (Clearwire dish)	133	FD9R6004/2C-3L (Verizon)	101
6' x 2" Pipe Mount (Clearwire dish)	133	FD9R6004/2C-3L (Verizon)	101
6' x 2" Pipe Mount (Clearwire dish)	133	FD9R6004/2C-3L (Verizon)	101
PiROD 20' Universal Platform	133	Sector Mount [SM 408-1] (Verizon)	101
VHLP2.5 (Clearwire dish)	133	Sector Mount [SM 408-1] (Verizon)	101
VHLP2 (Clearwire dish)	133	Sector Mount [SM 408-1] (Verizon)	101
2 FT DISH (Clearwire dish)	133	HBX-6517DS-VTM w/Mount Pipe (Verizon)	101
2 FT DISH (Clearwire dish)	133	HBX-6517DS-VTM w/Mount Pipe (Verizon)	101
ETW190VS12UB (T-Mobile)	125	HBX-6517DS-VTM w/Mount Pipe (Verizon)	101
ETW190VS12UB (T-Mobile)	125	BXA-70063-6CF-EDIN-X w/Mount Pipe (Verizon)	101
RRUS-11 (T-Mobile)	125	5' x 2" Pipe Mount (ATT)	92
RRUS-11 (T-Mobile)	125	1' Dish	92
RRUS-11 (T-Mobile)	125	Camera and Mount (Unk.)	30
LNX-6515DS-A1M w/Mount Pipe (T-Mobile)	125		
LNX-6515DS-A1M w/Mount Pipe (T-Mobile)	125		
LNX-6515DS-A1M w/Mount Pipe (T-Mobile)	125		
Sector Mount [SM 405-1] (T-Mobile)	125		
Sector Mount [SM 405-1] (T-Mobile)	125		
Sector Mount [SM 405-1] (T-Mobile)	125		
(2) AIR B2A/B4P w/ Mount Pipe (T-Mobile)	125		
(2) AIR B2A/B4P w/ Mount Pipe (T-Mobile)	125		
(2) AIR B2A/B4P w/ Mount Pipe (T-Mobile)	125		

SYMBOL LIST

MARK	SIZE	MARK	SIZE

Ramaker & Associates, Inc.
855 Community Drive
Sauk City, WI 53583
Phone: (608) 643-4100
FAX: (608) 643 7999

Job: *Cromwell - RT. 372 (CT60xc931)*			
Project: *29431*			
Client: Sprint	Drawn by: JMA	App'd:	
Code: TIA-222-G	Date: 11/08/17	Scale: NTS	
Path: I:\29400\29431\Structural\tnx\29431 Original_Rev2.eri		Dwg No. E-1	



Section	T13	T12	T11	T10	T9	T8	T7	T6	T5	T4	T3	T2	T1
Legs	E	D	Pirod 105219	C	B	Pirod 105217		Pirod 105216	A	I	5 @ 2.5	H	373.0
Leg Grade	A572-50												
Diagonals	L4x4x5/16	L3 1/2x3 1/2x3/8	L3 1/2x3 1/2x5/16	L3x3x3/8	L3x3x5/16		L3x3x3/16		F		SR 7/8		475.0
Diagonal Grade	A572-50			A36							A572-50		390.0
Top Girts				N.A.					L3x3x3/16	N.A.		L6x4x3/8	236.3
Mid Girts			N.A.				L3x3x3/16		N.A.				1071.2
Bottom Girts				N.A.						G	N.A.	G	N.A.
Sec. Horizontals				N.A.						G	N.A.	G	G
Face Width (ft)	20	18	16	14	12	10	8	6	5				
# Panels @ (ft)				15 @ 10									
Weight (lb)	30271.7	6190.9	5579.4	4673.0	3967.0	1635.6	1374.4	2394.0	1911.8				

SYMBOL LIST

MARK	SIZE	MARK	SIZE
A	Pirod 105244	F	L2 1/2x2 1/2x3/16
B	Pirod 105217 w/ 1" Reinf Rod	G	SR 7/8
C	Pirod 105218 w/ 1" Reinf Rod	H	1 @ 3.08333
D	Pirod 105219 w/ 1" Reinf Rod	I	1 @ 3.75
E	Pirod 105220 w/ 1" Reinf Rod		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-50	50 ksi	65 ksi	A36	36 ksi	58 ksi

TOWER DESIGN NOTES

1. Tower designed for Exposure C to the TIA-222-G Standard.
2. Tower designed for a 97 mph basic wind in accordance with the TIA-222-G Standard.
3. Tower is also designed for a 50 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 60 mph wind.
5. Tower Structure Class II.
6. Topographic Category 1 with Crest Height of 0.00 ft
7. TOWER RATING: 90.7%

ALL REACTIONS ARE FACTORED

MAX. CORNER REACTIONS AT BASE:
DOWN: 420760 lb
SHEAR: 46769 lb

UPLIFT: -364081 lb
SHEAR: 42153 lb

AXIAL 198006 lb
SHEAR 22927 lb *MOMENT 2299330 lb-ft*
TORQUE 13598 lb-ft
50 mph WIND - 0.7500 in ICE

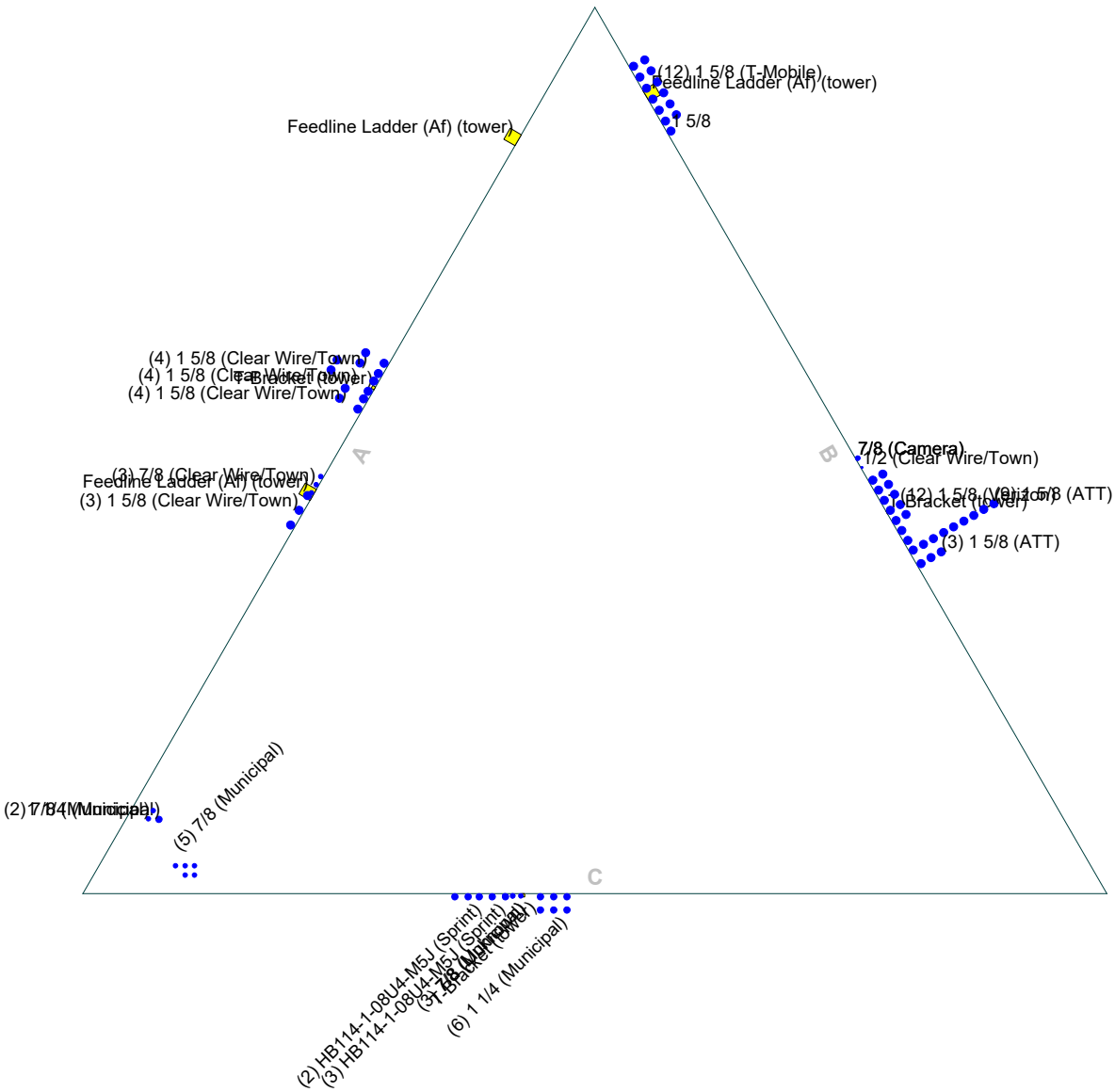
AXIAL 69903 lb
SHEAR 74045 lb *MOMENT 6884241 lb-ft*
TORQUE 52175 lb-ft
REACTIONS - 97 mph WIND

Ramaker & Associates, Inc.
855 Community Drive
Sauk City, WI 53583
Phone: (608) 643-4100
FAX: (608) 643 7999

Job: **Cromwell - RT. 372 (CT60xc931)**			
Project: **29431**			
Client: Sprint	Drawn by: JMA	App'd:	
Code: TIA-222-G	Date: 11/08/17	Scale: NTS	
Path: I:\29400\29431\Structural\tnx\29431 Original_Rev2.eri		Dwg No. E-1	

Feed Line Plan

Round Flat App In Face App Out Face Truss-Leg



Ramaker & Associates, Inc.
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Phone: (608) 643-4100
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Job: ***Cromwell - RT. 372 (CT60xc931)***			
Project: ***29431***			
Client: Sprint	Drawn by: JMA	App'd:	
Code: TIA-222-G	Date: 11/08/17	Scale: NTS	
Path: I:\29400\29431\Structural\tnx\29431 Original_Rev2.eri		Dwg No. E-7	

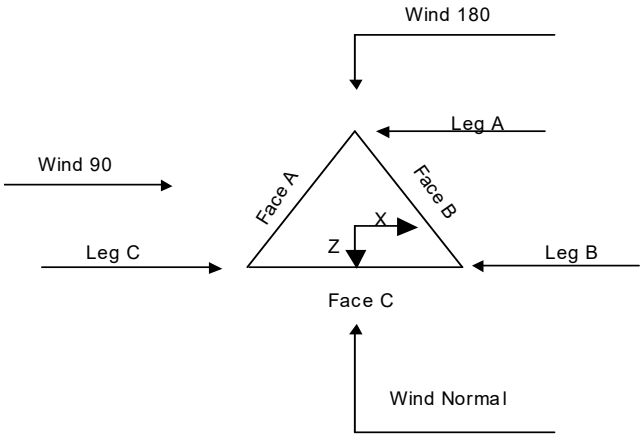
Tower Input Data

The main tower is a 3x free standing tower with an overall height of 170.00 ft above the ground line.
The base of the tower is set at an elevation of 0.00 ft above the ground line.
The face width of the tower is 5.00 ft at the top and 20.00 ft at the base.
This tower is designed using the TIA-222-G standard.
The following design criteria apply:

ASCE 7-10 Wind Data is used (wind speeds converted to nominal values).
Basic wind speed of 97 mph.
Structure Class II.
Exposure Category C.
Topographic Category 1.
Crest Height 0.00 ft.
Nominal ice thickness of 0.7500 in.
Ice thickness is considered to increase with height.
Ice density of 56 pcf.
A wind speed of 50 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 60 mph.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in tower member design is 1.
Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

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



Triangular Tower

Tower Section Geometry

Tower Section	Tower Elevation	Assembly Database	Description	Section Width	Number of Sections	Section Length
	ft			ft		ft
T1	170.00-166.50			5.00	1	3.50
T2	166.50-161.50			5.00	1	5.00
T3	161.50-154.00			5.00	1	7.50
T4	154.00-150.00			5.00	1	4.00
T5	150.00-140.00			5.00	1	10.00
T6	140.00-120.00			6.00	1	20.00
T7	120.00-100.00			8.00	1	20.00
T8	100.00-90.00			10.00	1	10.00
T9	90.00-80.00			11.00	1	10.00
T10	80.00-60.00			12.00	1	20.00
T11	60.00-40.00			14.00	1	20.00
T12	40.00-20.00			16.00	1	20.00
T13	20.00-0.00			18.00	1	20.00

Tower Section Geometry *(cont'd)*

Tower Section	Tower Elevation	Diagonal Spacing	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset	Bottom Girt Offset
	ft	ft				in	in
T1	170.00-166.50	3.08	X Brace	No	Yes	5.0000	0.0000
T2	166.50-161.50	2.50	X Brace	No	No	0.0000	0.0000

Tower Section	Tower Elevation ft	Diagonal Spacing ft	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset in	Bottom Girt Offset in
T3	161.50-154.00	2.50	X Brace	No	No	0.0000	0.0000
T4	154.00-150.00	3.75	X Brace	No	Yes	0.0000	3.0000
T5	150.00-140.00	10.00	X Brace	No	No	0.0000	0.0000
T6	140.00-120.00	10.00	X Brace	No	No	0.0000	0.0000
T7	120.00-100.00	10.00	X Brace	No	No	0.0000	0.0000
T8	100.00-90.00	10.00	X Brace	No	No	0.0000	0.0000
T9	90.00-80.00	10.00	X Brace	No	No	0.0000	0.0000
T10	80.00-60.00	10.00	X Brace	No	No	0.0000	0.0000
T11	60.00-40.00	10.00	X Brace	No	No	0.0000	0.0000
T12	40.00-20.00	10.00	X Brace	No	No	0.0000	0.0000
T13	20.00-0.00	10.00	X Brace	No	No	0.0000	0.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 170.00-166.50	Solid Round	1 3/4	A572-50 (50 ksi)	Solid Round	7/8	A572-50 (50 ksi)
T2 166.50-161.50	Solid Round	1 3/4	A572-50 (50 ksi)	Solid Round	7/8	A572-50 (50 ksi)
T3 161.50-154.00	Solid Round	1 3/4	A572-50 (50 ksi)	Solid Round	7/8	A572-50 (50 ksi)
T4 154.00-150.00	Solid Round	1 3/4	A572-50 (50 ksi)	Solid Round	7/8	A572-50 (50 ksi)
T5 150.00-140.00	Truss Leg	Pirod 105244	A572-50 (50 ksi)	Equal Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T6 140.00-120.00	Truss Leg	Pirod 105216	A572-50 (50 ksi)	Equal Angle	L3x3x3/16	A36 (36 ksi)
T7 120.00-100.00	Truss Leg	Pirod 105217	A572-50 (50 ksi)	Equal Angle	L3x3x3/16	A36 (36 ksi)
T8 100.00-90.00	Truss Leg	Pirod 105217	A572-50 (50 ksi)	Equal Angle	L3x3x5/16	A36 (36 ksi)
T9 90.00-80.00	Truss Leg	Pirod 105217 w/ 1" Reinf Rod	A572-50 (50 ksi)	Equal Angle	L3x3x5/16	A36 (36 ksi)
T10 80.00-60.00	Truss Leg	Pirod 105218 w/ 1" Reinf Rod	A572-50 (50 ksi)	Equal Angle	L3x3x3/8	A36 (36 ksi)
T11 60.00-40.00	Truss Leg	Pirod 105219	A572-50 (50 ksi)	Equal Angle	L3 1/2x3 1/2x5/16	A36 (36 ksi)
T12 40.00-20.00	Truss Leg	Pirod 105219 w/ 1" Reinf Rod	A572-50 (50 ksi)	Equal Angle	L3 1/2x3 1/2x3/8	A36 (36 ksi)
T13 20.00-0.00	Truss Leg	Pirod 105220 w/ 1" Reinf Rod	A572-50 (50 ksi)	Equal Angle	L4x4x5/16	A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Top Girt Type	Top Girt Size	Top Girt Grade	Bottom Girt Type	Bottom Girt Size	Bottom Girt Grade
T1 170.00-166.50	Single Angle	L6x4x3/8	A36 (36 ksi)	Equal Angle		A36 (36 ksi)
T2 166.50-161.50	Single Angle	L6x4x3/8	A36	Solid Round	7/8	A572-50

Tower Elevation ft	Top Girt Type	Top Girt Size	Top Girt Grade	Bottom Girt Type	Bottom Girt Size	Bottom Girt Grade
T4 154.00-150.00	Solid Round		(36 ksi) A36 (36 ksi)	Solid Round	7/8	(50 ksi) A572-50 (50 ksi)
T5 150.00-140.00	Equal Angle	L3x3x3/16	A36 (36 ksi)	Solid Round		A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	No. of Mid Girts	Mid Girt Type	Mid Girt Size	Mid Girt Grade	Horizontal Type	Horizontal Size	Horizontal Grade
T7 120.00-100.00	1	Equal Angle	L3x3x3/16	A572-50 (50 ksi)	Solid Round		A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Secondary Horizontal Type	Secondary Horizontal Size	Secondary Horizontal Grade	Inner Bracing Type	Inner Bracing Size	Inner Bracing Grade
T1 170.00-166.50	Solid Round	7/8	A572-50 (50 ksi)	Solid Round		A572-50 (50 ksi)
T4 154.00-150.00	Solid Round	7/8	A572-50 (50 ksi)	Solid Round		A572-50 (50 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
T1 170.00-166.50	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T2 166.50-161.50	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T3 161.50-154.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T4 154.00-150.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T5 150.00-140.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T6 140.00-120.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T7 120.00-100.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000

Tower Elevation ft	Gusset Area (per face) ft²	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
T8 100.00-90.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T9 90.00-80.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T10 80.00-60.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T11 60.00-40.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T12 40.00-20.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T13 20.00-0.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	K Factors[1] Legs	X Brace Diags X Y	K Brace Diags X Y	Single Diags X Y	Girts X Y	Horiz. X Y	Sec. Horiz. X Y	Inner Brace X Y
T1 170.00-166.50	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T2 166.50-161.50	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T3 161.50-154.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T4 154.00-150.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T5 150.00-140.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T6 140.00-120.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T7 120.00-100.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T8 100.00-90.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T9 90.00-80.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T10 80.00-60.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T11 60.00-40.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T12 40.00-20.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T13 20.00-0.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1

[1]*Note: K factors are applied to member segment lengths. K-braces without inner supporting members will have the K factor in the out-of-plane direction applied to the overall length.*

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Truss-Leg K Factors: Truss-Legs Used As Leg Members: Leg Panels	X Brace Diagonals	Z Brace Diagonals	Truss-Legs Used As Inner Members: Leg Panels	X Brace Diagonals	Z Brace Diagonals
T5 150.00-140.00	1	1	1	1	0.85	0.85
T6 140.00-120.00	1	1	1	1	0.85	0.85
T7 120.00-100.00	1	1	1	1	0.85	0.85
T8 100.00-90.00	1	1	1	1	0.85	0.85
T9 90.00-80.00	1.832	1	1	1	0.85	0.85
T10 80.00-60.00	1.896	1	1	1	0.85	0.85
T11 60.00-40.00	1	1	1	1	0.85	0.85
T12 40.00-20.00	1.989	1	1	1	0.85	0.85
T13 20.00-0.00	2.066	1	1	1	0.85	0.85

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg: Net Width Deduct in	U	Diagonal: Net Width Deduct in	U	Top Girt: Net Width Deduct in	U	Bottom Girt: Net Width Deduct in	U	Mid Girt: Net Width Deduct in	U	Long Horizontal: Net Width Deduct in	U	Short Horizontal: Net Width Deduct in	U
T1 170.00-166.50	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T2 166.50-161.50	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T3 161.50-154.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T4 154.00-150.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T5 150.00-140.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T6 140.00-120.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T7 120.00-100.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T8 100.00-90.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T9 90.00-80.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T10 80.00-60.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T11 60.00-40.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T12 40.00-20.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T13 20.00-0.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Connection Type	Leg Bolt Size in	Leg No.	Diagonal Bolt Size in	Diagonal No.	Top Girt Bolt Size in	Top Girt No.	Bottom Girt Bolt Size in	Bottom Girt No.	Mid Girt Bolt Size in	Mid Girt No.	Long Horizontal Bolt Size in	Long Horizontal No.	Short Horizontal Bolt Size in	Short Horizontal No.
T1 170.00-166.50	Sleeve DS	0.5000 A325N	0	0.6250 A325X	0	0.6250 A325X	0	0.0000 A325X	0	0.6250 A325X	0	0.6250 A325X	0	0.6250 A325X	0
T2 166.50-161.50	Sleeve DS	0.6250 A325N	0	0.6250 A325X	0	0.6250 A325X	0	0.0000 A325X	0	0.6250 A325X	0	0.6250 A325X	0	0.6250 A325X	0
T3 161.50-154.00	Sleeve DS	0.6250 A325N	0	0.6250 A325X	0	0.6250 A325X	0	0.6250 A325X	0	0.6250 A325X	0	0.6250 A325X	0	0.6250 A325X	0
T4 154.00-150.00	Flange	0.7500 A325N	6	0.6250 A325X	0	0.6250 A325X	0	0.6250 A325X	0	0.6250 A325X	0	0.6250 A325X	0	0.6250 A325X	0
T5 150.00-140.00	Flange	1.0000 A325N	6	1.0000 A325N	1	1.0000 A325N	1	0.6250 A325X	0	0.6250 A325X	0	0.6250 A325X	0	0.6250 A325X	0
T6 140.00-120.00	Flange	1.0000 A325N	6	1.0000 A325N	1	1.0000 A325N	0	0.6250 A325X	0	1.0000 A325X	1	0.6250 A325X	0	0.6250 A325X	0
T7 120.00-100.00	Flange	1.0000 A325N	6	1.0000 A325N	1	1.0000 A325N	0	0.6250 A325X	0	0.6250 A325X	0	0.6250 A325X	0	0.6250 A325X	0
T8 100.00-90.00	Flange	1.0000 A325N	6	1.0000 A325N	1	1.0000 A325N	0	0.6250 A325X	0	0.6250 A325X	0	0.6250 A325X	0	0.6250 A325X	0
T9 90.00-80.00	Flange	1.0000 A325N	6	1.0000 A325N	1	1.0000 A325N	0	0.6250 A325X	0	0.6250 A325X	0	0.6250 A325X	0	0.6250 A325X	0
T10 80.00-60.00	Flange	1.0000 A325N	6	1.0000 A325N	1	1.0000 A325N	0	0.6250 A325X	0	0.6250 A325X	0	0.6250 A325X	0	0.6250 A325X	0
T11 60.00-40.00	Flange	1.2500 A325N	6	1.2500 A325N	1	1.0000 A325N	0	0.6250 A325X	0	0.6250 A325X	0	0.6250 A325X	0	0.6250 A325X	0
T12 40.00-20.00	Flange	1.2500 A325N	6	1.2500 A325N	1	1.0000 A325N	0	0.6250 A325X	0	0.6250 A325X	0	0.6250 A325X	0	0.6250 A325X	0
T13 20.00-0.00	Flange	1.5000 A325N	6	1.2500 A325N	1	1.0000 A325N	0	0.6250 A325X	0	0.6250 A325X	0	0.6250 A325X	0	0.6250 A325X	0

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
T-Bracket (tower)	A	No	Af (CaAa)	150.00 - 0.00	0.0000	0.07	1	1	0.7500	0.7500		1.50
T-Bracket (tower)	B	No	Af (CaAa)	160.00 - 0.00	0.0000	0.07	1	1	0.7500	0.7500		1.50
T-Bracket (tower)	C	No	Af (CaAa)	170.00 - 0.00	0.0000	0.07	1	1	0.7500	0.7500		1.50
Feedline Ladder (Af) (tower)	A	No	Af (CaAa)	140.00 - 0.00	0.0000	-0.05	1	1	3.0000	3.0000		8.40
Feedline Ladder (Af) (tower)	A	No	Af (CaAa)	140.00 - 0.00	0.0000	0.35	1	1	3.0000	3.0000		8.40
Feedline Ladder (Af) (tower)	B	No	Af (CaAa)	100.00 - 0.00	0.0000	-0.4	1	1	3.0000	3.0000		8.40
******												
HB114-1-08U4-M5J (Sprint)	C	No	Ar (CaAa)	170.00 - 0.00	0.0000	0.1	3	3	1.5400	1.5400		1.08
1 1/4	C	No	Ar (CaAa)	170.00 - 0.00	0.0000	0.04	6	3	1.5500	1.5500		0.66

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
(Municipal) 7/8	C	No	Ar (CaAa)	170.00 - 0.00	0.0000	0.08	3	3	0.7500	1.1100		0.54
(Municipal) 7/8	C	No	Ar (CaAa)	170.00 - 0.00	-6.0000	0.4	5	3	1.1100	1.1100		0.54
(Municipal) 1 1/4	A	No	Ar (CaAa)	170.00 - 0.00	-6.0000	-0.4	1	1	1.5500	1.5500		0.66
(Municipal) 7/8	A	No	Ar (CaAa)	170.00 - 0.00	-4.0000	-0.4	2	2	1.1100	1.1100		0.54
(Municipal) 7/8	B	No	Ar (CaAa)	170.00 - 0.00	0.0000	0.01	1	1	1.1100	1.1100		0.54
(Camera) ***												
HB114-1-08U4-M5J (Sprint) ****** ******	C	No	Ar (CaAa)	170.00 - 0.00	0.0000	0.13	2	2	1.5400	1.5400		1.08
1 5/8 (Clear Wire/Town)	A	No	Ar (CaAa)	133.00 - 0.00	0.0000	0.05	4	2	0.7500 3.0000	1.9800		1.04
1 5/8 (Clear Wire/Town)	A	No	Ar (CaAa)	133.00 - 0.00	0.0000	0.07	4	2	0.7500 8.0000	1.9800		1.04
1 5/8 (Clear Wire/Town)	A	No	Ar (CaAa)	133.00 - 0.00	0.0000	0.09	4	2	0.7500 3.0000	1.9800		1.04
1 5/8 (Clear Wire/Town)	A	No	Ar (CaAa)	133.00 - 0.00	0.0000	-0.07	3	3	1.9800	1.9800		1.04
7/8 (Clear Wire/Town)	A	No	Ar (CaAa)	133.00 - 0.00	0.0000	-0.04	3	3	1.1100	1.1100		0.54
1/2 (Clear Wire/Town) ******	B	No	Ar (CaAa)	133.00 - 0.00	0.0000	0.02	1	1	0.5800	0.5800		0.25
1 5/8 (T-Mobile)	B	No	Ar (CaAa)	125.00 - 0.00	0.0000	-0.4	12	6	1.0000	1.9800		1.04
1 5/8 ******	B	No	Ar (CaAa)	125.00 - 0.00	0.0000	-0.358	1	1	1.9800	1.9800		1.04
1 5/8 (ATT)	B	No	Ar (CaAa)	115.00 - 0.00	0.0000	0.115	9	1	0.7500	1.9800		1.04
1 5/8 (ATT) ******	B	No	Ar (CaAa)	115.00 - 0.00	0.0000	0.13	3	1	0.7500	1.9800		1.04
1 5/8 (Verizon) ******	B	No	Ar (CaAa)	101.00 - 0.00	0.0000	0.07	12	7	0.7500	1.9800		1.04
7/8 (Unknown) ******	C	No	Ar (CaAa)	92.00 - 0.00	0.0000	0.08	1	1	5.0000	1.1100		0.54
7/8 (Camera)	B	No	Ar (CaAa)	30.00 - 0.00	0.0000	0.01	1	1	1.1100	1.1100		0.54

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 lb
T1	170.00-166.50	A	0.000	0.000	1.319	0.000	6.09
		B	0.000	0.000	0.389	0.000	1.89
		C	0.000	0.000	9.495	0.000	53.13
T2	166.50-161.50	A	0.000	0.000	1.885	0.000	8.70
		B	0.000	0.000	0.555	0.000	2.70

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 lb
		C	0.000	0.000	13.565	0.000	75.90
T3	161.50-154.00	A	0.000	0.000	2.828	0.000	13.05
		B	0.000	0.000	1.583	0.000	13.05
		C	0.000	0.000	20.348	0.000	113.85
T4	154.00-150.00	A	0.000	0.000	1.508	0.000	6.96
		B	0.000	0.000	0.944	0.000	8.16
		C	0.000	0.000	10.852	0.000	60.72
T5	150.00-140.00	A	0.000	0.000	5.020	0.000	32.40
		B	0.000	0.000	2.360	0.000	20.40
		C	0.000	0.000	27.130	0.000	151.80
T6	140.00-120.00	A	0.000	0.000	72.979	0.000	624.66
		B	0.000	0.000	18.344	0.000	111.65
		C	0.000	0.000	54.260	0.000	303.60
T7	120.00-100.00	A	0.000	0.000	96.100	0.000	745.20
		B	0.000	0.000	95.376	0.000	515.88
		C	0.000	0.000	54.260	0.000	303.60
T8	100.00-90.00	A	0.000	0.000	48.050	0.000	372.60
		B	0.000	0.000	81.200	0.000	491.70
		C	0.000	0.000	27.352	0.000	152.88
T9	90.00-80.00	A	0.000	0.000	48.050	0.000	372.60
		B	0.000	0.000	81.200	0.000	491.70
		C	0.000	0.000	28.240	0.000	157.20
T10	80.00-60.00	A	0.000	0.000	96.100	0.000	745.20
		B	0.000	0.000	162.400	0.000	983.40
		C	0.000	0.000	56.480	0.000	314.40
T11	60.00-40.00	A	0.000	0.000	96.100	0.000	745.20
		B	0.000	0.000	162.400	0.000	983.40
		C	0.000	0.000	56.480	0.000	314.40
T12	40.00-20.00	A	0.000	0.000	96.100	0.000	745.20
		B	0.000	0.000	163.510	0.000	988.80
		C	0.000	0.000	56.480	0.000	314.40
T13	20.00-0.00	A	0.000	0.000	96.100	0.000	745.20
		B	0.000	0.000	164.620	0.000	994.20
		C	0.000	0.000	56.480	0.000	314.40

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 lb
T1	170.00-166.50	A	1.765	0.000	0.000	5.402	0.000	65.53
		B		0.000	0.000	1.624	0.000	23.60
		C		0.000	0.000	26.523	0.000	391.34
T2	166.50-161.50	A	1.761	0.000	0.000	7.705	0.000	93.31
		B		0.000	0.000	2.316	0.000	33.58
		C		0.000	0.000	37.847	0.000	557.73
T3	161.50-154.00	A	1.754	0.000	0.000	11.529	0.000	139.26
		B		0.000	0.000	6.318	0.000	98.53
		C		0.000	0.000	56.673	0.000	833.62
T4	154.00-150.00	A	1.748	0.000	0.000	6.135	0.000	73.92
		B		0.000	0.000	3.740	0.000	58.70
		C		0.000	0.000	30.176	0.000	443.08
T5	150.00-140.00	A	1.739	0.000	0.000	20.020	0.000	263.52
		B		0.000	0.000	9.317	0.000	145.77
		C		0.000	0.000	75.282	0.000	1102.93
T6	140.00-120.00	A	1.720	0.000	0.000	184.558	0.000	3021.24
		B		0.000	0.000	40.164	0.000	707.50
		C		0.000	0.000	149.841	0.000	2184.00

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 lb
T7	120.00-100.00	A	1.692	0.000	0.000	242.724	0.000	3861.75
		B		0.000	0.000	169.236	0.000	3392.34
		C		0.000	0.000	148.751	0.000	2151.21
T8	100.00-90.00	A	1.667	0.000	0.000	120.661	0.000	1905.65
		B		0.000	0.000	132.433	0.000	2671.36
		C		0.000	0.000	74.794	0.000	1073.94
T9	90.00-80.00	A	1.649	0.000	0.000	120.136	0.000	1886.87
		B		0.000	0.000	132.013	0.000	2643.49
		C		0.000	0.000	77.960	0.000	1112.04
T10	80.00-60.00	A	1.617	0.000	0.000	238.467	0.000	3709.61
		B		0.000	0.000	262.584	0.000	5191.88
		C		0.000	0.000	154.581	0.000	2184.92
T11	60.00-40.00	A	1.564	0.000	0.000	235.424	0.000	3602.69
		B		0.000	0.000	260.152	0.000	5033.56
		C		0.000	0.000	152.324	0.000	2119.61
T12	40.00-20.00	A	1.486	0.000	0.000	230.998	0.000	3364.73
		B		0.000	0.000	260.697	0.000	4860.49
		C		0.000	0.000	149.042	0.000	2026.36
T13	20.00-0.00	A	1.331	0.000	0.000	222.226	0.000	3046.37
		B		0.000	0.000	257.154	0.000	4467.35
		C		0.000	0.000	142.540	0.000	1847.49

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
T1	170.00-166.50	-3.9414	6.8989	-1.6858	3.4535
T2	166.50-161.50	-4.2874	7.5046	-1.7870	3.6320
T3	161.50-154.00	-5.5973	10.3077	-1.9172	4.9917
T4	154.00-150.00	-5.2845	9.8615	-1.3893	4.4035
T5	150.00-140.00	-3.7970	6.4288	-1.1464	1.9009
T6	140.00-120.00	-8.2162	-1.5297	-5.3885	-2.5750
T7	120.00-100.00	-3.6096	-8.4257	-1.8046	-6.1625
T8	100.00-90.00	1.5575	-11.0328	1.4030	-9.1003
T9	90.00-80.00	1.5284	-11.5278	1.3692	-9.2627
T10	80.00-60.00	1.5662	-12.6077	1.4127	-10.2277
T11	60.00-40.00	1.5851	-13.7245	1.4524	-11.4187
T12	40.00-20.00	1.7433	-14.9882	1.7228	-12.6135
T13	20.00-0.00	1.8627	-15.7694	1.9597	-13.6618

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T1	3	T-Bracket	166.50 - 170.00	0.6000	0.3222
T1	8	HB114-1-08U4-M5J	166.50 - 170.00	0.6000	0.3222
T1	9	1 1/4	166.50 - 170.00	0.6000	0.3222
T1	10	7/8	166.50 - 170.00	0.6000	0.3222
T1	11	7/8	166.50 - 170.00	0.6000	0.3222
T1	12	1 1/4	166.50 - 170.00	0.6000	0.3222

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T1	13	7/8	166.50 - 170.00	0.6000	0.3222
T1	14	7/8	166.50 - 170.00	0.6000	0.3222
T1	16	HB114-1-08U4-M5J	166.50 - 170.00	0.6000	0.3222
T2	3	T-Bracket	161.50 - 166.50	0.6000	0.3390
T2	8	HB114-1-08U4-M5J	161.50 - 166.50	0.6000	0.3390
T2	9	1 1/4	161.50 - 166.50	0.6000	0.3390
T2	10	7/8	161.50 - 166.50	0.6000	0.3390
T2	11	7/8	161.50 - 166.50	0.6000	0.3390
T2	12	1 1/4	161.50 - 166.50	0.6000	0.3390
T2	13	7/8	161.50 - 166.50	0.6000	0.3390
T2	14	7/8	161.50 - 166.50	0.6000	0.3390
T2	16	HB114-1-08U4-M5J	161.50 - 166.50	0.6000	0.3390
T3	2	T-Bracket	154.00 - 160.00	0.6000	0.5472
T3	3	T-Bracket	154.00 - 161.50	0.6000	0.5472
T3	8	HB114-1-08U4-M5J	154.00 - 161.50	0.6000	0.5472
T3	9	1 1/4	154.00 - 161.50	0.6000	0.5472
T3	10	7/8	154.00 - 161.50	0.6000	0.5472
T3	11	7/8	154.00 - 161.50	0.6000	0.5472
T3	12	1 1/4	154.00 - 161.50	0.6000	0.5472
T3	13	7/8	154.00 - 161.50	0.6000	0.5472
T3	14	7/8	154.00 - 161.50	0.6000	0.5472
T3	16	HB114-1-08U4-M5J	154.00 - 161.50	0.6000	0.5472
T4	2	T-Bracket	150.00 - 154.00	0.6000	0.4735
T4	3	T-Bracket	150.00 - 154.00	0.6000	0.4735
T4	8	HB114-1-08U4-M5J	150.00 - 154.00	0.6000	0.4735
T4	9	1 1/4	150.00 - 154.00	0.6000	0.4735
T4	10	7/8	150.00 - 154.00	0.6000	0.4735
T4	11	7/8	150.00 - 154.00	0.6000	0.4735
T4	12	1 1/4	150.00 - 154.00	0.6000	0.4735
T4	13	7/8	150.00 - 154.00	0.6000	0.4735
T4	14	7/8	150.00 - 154.00	0.6000	0.4735
T4	16	HB114-1-08U4-M5J	150.00 - 154.00	0.6000	0.4735
T5	1	T-Bracket	140.00 - 150.00	0.6000	0.2833
T5	2	T-Bracket	140.00 - 150.00	0.6000	0.2833
T5	3	T-Bracket	140.00 - 150.00	0.6000	0.2833
T5	8	HB114-1-08U4-M5J	140.00 - 150.00	0.6000	0.2833
T5	9	1 1/4	140.00 - 150.00	0.6000	0.2833
T5	10	7/8	140.00 - 150.00	0.6000	0.2833
T5	11	7/8	140.00 - 150.00	0.6000	0.2833
T5	12	1 1/4	140.00 - 150.00	0.6000	0.2833
T5	13	7/8	140.00 - 150.00	0.6000	0.2833
T5	14	7/8	140.00 - 150.00	0.6000	0.2833
T5	16	HB114-1-08U4-M5J	140.00 - 150.00	0.6000	0.2833
T6	1	T-Bracket	120.00 - 140.00	0.6000	0.4425
T6	2	T-Bracket	120.00 - 140.00	0.6000	0.4425
T6	3	T-Bracket	120.00 - 140.00	0.6000	0.4425
T6	4	Feedline Ladder (Af)	120.00 - 140.00	0.6000	0.4425
T6	5	Feedline Ladder (Af)	120.00 - 140.00	0.6000	0.4425
T6	8	HB114-1-08U4-M5J	120.00 - 140.00	0.6000	0.4425
T6	9	1 1/4	120.00 - 140.00	0.6000	0.4425
T6	10	7/8	120.00 - 140.00	0.6000	0.4425
T6	11	7/8	120.00 - 140.00	0.6000	0.4425
T6	12	1 1/4	120.00 - 140.00	0.6000	0.4425
T6	13	7/8	120.00 - 140.00	0.6000	0.4425
T6	14	7/8	120.00 - 140.00	0.6000	0.4425
T6	16	HB114-1-08U4-M5J	120.00 - 140.00	0.6000	0.4425
T6	20	1 5/8	120.00 - 133.00	0.6000	0.4425
T6	21	1 5/8	120.00 - 133.00	0.6000	0.4425
T6	22	1 5/8	120.00 - 133.00	0.6000	0.4425
T6	23	1 5/8	120.00 - 133.00	0.6000	0.4425
T6	24	7/8	120.00 - 133.00	0.6000	0.4425
T6	25	1/2	120.00 - 133.00	0.6000	0.4425

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T6	27	1 5/8	120.00 - 125.00	0.6000	0.4425
T6	28	1 5/8	120.00 - 125.00	0.6000	0.4425
T7	1	T-Bracket	100.00 - 120.00	0.6000	0.5128
T7	2	T-Bracket	100.00 - 120.00	0.6000	0.5128
T7	3	T-Bracket	100.00 - 120.00	0.6000	0.5128
T7	4	Feedline Ladder (Af)	100.00 - 120.00	0.6000	0.5128
T7	5	Feedline Ladder (Af)	100.00 - 120.00	0.6000	0.5128
T7	8	HB114-1-08U4-M5J	100.00 - 120.00	0.6000	0.5128
T7	9	1 1/4	100.00 - 120.00	0.6000	0.5128
T7	10	7/8	100.00 - 120.00	0.6000	0.5128
T7	11	7/8	100.00 - 120.00	0.6000	0.5128
T7	12	1 1/4	100.00 - 120.00	0.6000	0.5128
T7	13	7/8	100.00 - 120.00	0.6000	0.5128
T7	14	7/8	100.00 - 120.00	0.6000	0.5128
T7	16	HB114-1-08U4-M5J	100.00 - 120.00	0.6000	0.5128
T7	20	1 5/8	100.00 - 120.00	0.6000	0.5128
T7	21	1 5/8	100.00 - 120.00	0.6000	0.5128
T7	22	1 5/8	100.00 - 120.00	0.6000	0.5128
T7	23	1 5/8	100.00 - 120.00	0.6000	0.5128
T7	24	7/8	100.00 - 120.00	0.6000	0.5128
T7	25	1/2	100.00 - 120.00	0.6000	0.5128
T7	27	1 5/8	100.00 - 120.00	0.6000	0.5128
T7	28	1 5/8	100.00 - 120.00	0.6000	0.5128
T7	30	1 5/8	100.00 - 115.00	0.6000	0.5128
T7	31	1 5/8	100.00 - 115.00	0.6000	0.5128
T7	33	1 5/8	100.00 - 101.00	0.6000	0.5128
T8	1	T-Bracket	90.00 - 100.00	0.6000	0.5833
T8	2	T-Bracket	90.00 - 100.00	0.6000	0.5833
T8	3	T-Bracket	90.00 - 100.00	0.6000	0.5833
T8	4	Feedline Ladder (Af)	90.00 - 100.00	0.6000	0.5833
T8	5	Feedline Ladder (Af)	90.00 - 100.00	0.6000	0.5833
T8	6	Feedline Ladder (Af)	90.00 - 100.00	0.6000	0.5833
T8	8	HB114-1-08U4-M5J	90.00 - 100.00	0.6000	0.5833
T8	9	1 1/4	90.00 - 100.00	0.6000	0.5833
T8	10	7/8	90.00 - 100.00	0.6000	0.5833
T8	11	7/8	90.00 - 100.00	0.6000	0.5833
T8	12	1 1/4	90.00 - 100.00	0.6000	0.5833
T8	13	7/8	90.00 - 100.00	0.6000	0.5833
T8	14	7/8	90.00 - 100.00	0.6000	0.5833
T8	16	HB114-1-08U4-M5J	90.00 - 100.00	0.6000	0.5833
T8	20	1 5/8	90.00 - 100.00	0.6000	0.5833
T8	21	1 5/8	90.00 - 100.00	0.6000	0.5833
T8	22	1 5/8	90.00 - 100.00	0.6000	0.5833
T8	23	1 5/8	90.00 - 100.00	0.6000	0.5833
T8	24	7/8	90.00 - 100.00	0.6000	0.5833
T8	25	1/2	90.00 - 100.00	0.6000	0.5833
T8	27	1 5/8	90.00 - 100.00	0.6000	0.5833
T8	28	1 5/8	90.00 - 100.00	0.6000	0.5833
T8	30	1 5/8	90.00 - 100.00	0.6000	0.5833
T8	31	1 5/8	90.00 - 100.00	0.6000	0.5833
T8	33	1 5/8	90.00 - 100.00	0.6000	0.5833
T8	35	7/8	90.00 - 92.00	0.6000	0.5833
T9	1	T-Bracket	80.00 - 90.00	0.6000	0.5987
T9	2	T-Bracket	80.00 - 90.00	0.6000	0.5987
T9	3	T-Bracket	80.00 - 90.00	0.6000	0.5987
T9	4	Feedline Ladder (Af)	80.00 - 90.00	0.6000	0.5987
T9	5	Feedline Ladder (Af)	80.00 - 90.00	0.6000	0.5987
T9	6	Feedline Ladder (Af)	80.00 - 90.00	0.6000	0.5987
T9	8	HB114-1-08U4-M5J	80.00 - 90.00	0.6000	0.5987
T9	9	1 1/4	80.00 - 90.00	0.6000	0.5987
T9	10	7/8	80.00 - 90.00	0.6000	0.5987
T9	11	7/8	80.00 - 90.00	0.6000	0.5987

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T9	12	1 1/4	80.00 - 90.00	0.6000	0.5987
T9	13	7/8	80.00 - 90.00	0.6000	0.5987
T9	14	7/8	80.00 - 90.00	0.6000	0.5987
T9	16	HB114-1-08U4-M5J	80.00 - 90.00	0.6000	0.5987
T9	20	1 5/8	80.00 - 90.00	0.6000	0.5987
T9	21	1 5/8	80.00 - 90.00	0.6000	0.5987
T9	22	1 5/8	80.00 - 90.00	0.6000	0.5987
T9	23	1 5/8	80.00 - 90.00	0.6000	0.5987
T9	24	7/8	80.00 - 90.00	0.6000	0.5987
T9	25	1/2	80.00 - 90.00	0.6000	0.5987
T9	27	1 5/8	80.00 - 90.00	0.6000	0.5987
T9	28	1 5/8	80.00 - 90.00	0.6000	0.5987
T9	30	1 5/8	80.00 - 90.00	0.6000	0.5987
T9	31	1 5/8	80.00 - 90.00	0.6000	0.5987
T9	33	1 5/8	80.00 - 90.00	0.6000	0.5987
T9	35	7/8	80.00 - 90.00	0.6000	0.5987
T10	1	T-Bracket	60.00 - 80.00	0.6000	0.6000
T10	2	T-Bracket	60.00 - 80.00	0.6000	0.6000
T10	3	T-Bracket	60.00 - 80.00	0.6000	0.6000
T10	4	Feedline Ladder (Af)	60.00 - 80.00	0.6000	0.6000
T10	5	Feedline Ladder (Af)	60.00 - 80.00	0.6000	0.6000
T10	6	Feedline Ladder (Af)	60.00 - 80.00	0.6000	0.6000
T10	8	HB114-1-08U4-M5J	60.00 - 80.00	0.6000	0.6000
T10	9	1 1/4	60.00 - 80.00	0.6000	0.6000
T10	10	7/8	60.00 - 80.00	0.6000	0.6000
T10	11	7/8	60.00 - 80.00	0.6000	0.6000
T10	12	1 1/4	60.00 - 80.00	0.6000	0.6000
T10	13	7/8	60.00 - 80.00	0.6000	0.6000
T10	14	7/8	60.00 - 80.00	0.6000	0.6000
T10	16	HB114-1-08U4-M5J	60.00 - 80.00	0.6000	0.6000
T10	20	1 5/8	60.00 - 80.00	0.6000	0.6000
T10	21	1 5/8	60.00 - 80.00	0.6000	0.6000
T10	22	1 5/8	60.00 - 80.00	0.6000	0.6000
T10	23	1 5/8	60.00 - 80.00	0.6000	0.6000
T10	24	7/8	60.00 - 80.00	0.6000	0.6000
T10	25	1/2	60.00 - 80.00	0.6000	0.6000
T10	27	1 5/8	60.00 - 80.00	0.6000	0.6000
T10	28	1 5/8	60.00 - 80.00	0.6000	0.6000
T10	30	1 5/8	60.00 - 80.00	0.6000	0.6000
T10	31	1 5/8	60.00 - 80.00	0.6000	0.6000
T10	33	1 5/8	60.00 - 80.00	0.6000	0.6000
T10	35	7/8	60.00 - 80.00	0.6000	0.6000
T11	1	T-Bracket	40.00 - 60.00	0.6000	0.6000
T11	2	T-Bracket	40.00 - 60.00	0.6000	0.6000
T11	3	T-Bracket	40.00 - 60.00	0.6000	0.6000
T11	4	Feedline Ladder (Af)	40.00 - 60.00	0.6000	0.6000
T11	5	Feedline Ladder (Af)	40.00 - 60.00	0.6000	0.6000
T11	6	Feedline Ladder (Af)	40.00 - 60.00	0.6000	0.6000
T11	8	HB114-1-08U4-M5J	40.00 - 60.00	0.6000	0.6000
T11	9	1 1/4	40.00 - 60.00	0.6000	0.6000
T11	10	7/8	40.00 - 60.00	0.6000	0.6000
T11	11	7/8	40.00 - 60.00	0.6000	0.6000
T11	12	1 1/4	40.00 - 60.00	0.6000	0.6000
T11	13	7/8	40.00 - 60.00	0.6000	0.6000
T11	14	7/8	40.00 - 60.00	0.6000	0.6000
T11	16	HB114-1-08U4-M5J	40.00 - 60.00	0.6000	0.6000
T11	20	1 5/8	40.00 - 60.00	0.6000	0.6000
T11	21	1 5/8	40.00 - 60.00	0.6000	0.6000
T11	22	1 5/8	40.00 - 60.00	0.6000	0.6000
T11	23	1 5/8	40.00 - 60.00	0.6000	0.6000
T11	24	7/8	40.00 - 60.00	0.6000	0.6000
T11	25	1/2	40.00 - 60.00	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T11	27	1 5/8	40.00 - 60.00	0.6000	0.6000
T11	28	1 5/8	40.00 - 60.00	0.6000	0.6000
T11	30	1 5/8	40.00 - 60.00	0.6000	0.6000
T11	31	1 5/8	40.00 - 60.00	0.6000	0.6000
T11	33	1 5/8	40.00 - 60.00	0.6000	0.6000
T11	35	7/8	40.00 - 60.00	0.6000	0.6000
T12	1	T-Bracket	20.00 - 40.00	0.6000	0.6000
T12	2	T-Bracket	20.00 - 40.00	0.6000	0.6000
T12	3	T-Bracket	20.00 - 40.00	0.6000	0.6000
T12	4	Feedline Ladder (Af)	20.00 - 40.00	0.6000	0.6000
T12	5	Feedline Ladder (Af)	20.00 - 40.00	0.6000	0.6000
T12	6	Feedline Ladder (Af)	20.00 - 40.00	0.6000	0.6000
T12	8	HB114-1-08U4-M5J	20.00 - 40.00	0.6000	0.6000
T12	9	1 1/4	20.00 - 40.00	0.6000	0.6000
T12	10	7/8	20.00 - 40.00	0.6000	0.6000
T12	11	7/8	20.00 - 40.00	0.6000	0.6000
T12	12	1 1/4	20.00 - 40.00	0.6000	0.6000
T12	13	7/8	20.00 - 40.00	0.6000	0.6000
T12	14	7/8	20.00 - 40.00	0.6000	0.6000
T12	16	HB114-1-08U4-M5J	20.00 - 40.00	0.6000	0.6000
T12	20	1 5/8	20.00 - 40.00	0.6000	0.6000
T12	21	1 5/8	20.00 - 40.00	0.6000	0.6000
T12	22	1 5/8	20.00 - 40.00	0.6000	0.6000
T12	23	1 5/8	20.00 - 40.00	0.6000	0.6000
T12	24	7/8	20.00 - 40.00	0.6000	0.6000
T12	25	1/2	20.00 - 40.00	0.6000	0.6000
T12	27	1 5/8	20.00 - 40.00	0.6000	0.6000
T12	28	1 5/8	20.00 - 40.00	0.6000	0.6000
T12	30	1 5/8	20.00 - 40.00	0.6000	0.6000
T12	31	1 5/8	20.00 - 40.00	0.6000	0.6000
T12	33	1 5/8	20.00 - 40.00	0.6000	0.6000
T12	35	7/8	20.00 - 40.00	0.6000	0.6000
T12	37	7/8	20.00 - 30.00	0.6000	0.6000
T13	1	T-Bracket	0.00 - 20.00	0.6000	0.6000
T13	2	T-Bracket	0.00 - 20.00	0.6000	0.6000
T13	3	T-Bracket	0.00 - 20.00	0.6000	0.6000
T13	4	Feedline Ladder (Af)	0.00 - 20.00	0.6000	0.6000
T13	5	Feedline Ladder (Af)	0.00 - 20.00	0.6000	0.6000
T13	6	Feedline Ladder (Af)	0.00 - 20.00	0.6000	0.6000
T13	8	HB114-1-08U4-M5J	0.00 - 20.00	0.6000	0.6000
T13	9	1 1/4	0.00 - 20.00	0.6000	0.6000
T13	10	7/8	0.00 - 20.00	0.6000	0.6000
T13	11	7/8	0.00 - 20.00	0.6000	0.6000
T13	12	1 1/4	0.00 - 20.00	0.6000	0.6000
T13	13	7/8	0.00 - 20.00	0.6000	0.6000
T13	14	7/8	0.00 - 20.00	0.6000	0.6000
T13	16	HB114-1-08U4-M5J	0.00 - 20.00	0.6000	0.6000
T13	20	1 5/8	0.00 - 20.00	0.6000	0.6000
T13	21	1 5/8	0.00 - 20.00	0.6000	0.6000
T13	22	1 5/8	0.00 - 20.00	0.6000	0.6000
T13	23	1 5/8	0.00 - 20.00	0.6000	0.6000
T13	24	7/8	0.00 - 20.00	0.6000	0.6000
T13	25	1/2	0.00 - 20.00	0.6000	0.6000
T13	27	1 5/8	0.00 - 20.00	0.6000	0.6000
T13	28	1 5/8	0.00 - 20.00	0.6000	0.6000
T13	30	1 5/8	0.00 - 20.00	0.6000	0.6000
T13	31	1 5/8	0.00 - 20.00	0.6000	0.6000
T13	33	1 5/8	0.00 - 20.00	0.6000	0.6000
T13	35	7/8	0.00 - 20.00	0.6000	0.6000
T13	37	7/8	0.00 - 20.00	0.6000	0.6000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
15' Omni	A	From Leg	0.00	0.0000	170.00	No Ice	3.75	3.75	40.00
(Municipal)			0.00			1/2" Ice	5.28	5.28	67.80
			8.00			1" Ice	6.83	6.83	105.17
2' Omni	C	From Leg	1.00	0.0000	170.00	No Ice	0.36	0.36	10.00
(Municipal)			0.00			1/2" Ice	0.49	0.49	13.98
			1.00			1" Ice	0.63	0.63	19.58
15' Omni	A	From Leg	7.00	0.0000	170.00	No Ice	3.75	3.75	40.00
(Municipal)			4.00			1/2" Ice	5.28	5.28	67.80
			10.00			1" Ice	6.83	6.83	105.17
20' Omni	A	From Face	8.25	0.0000	170.00	No Ice	5.00	5.00	55.00
(Municipal)			0.00			1/2" Ice	7.03	7.03	91.96
			10.00			1" Ice	9.07	9.07	141.55
SU-RA	A	From Leg	7.00	0.0000	170.00	No Ice	1.21	0.30	5.50
(Municipal)			0.00			1/2" Ice	1.35	0.38	13.29
			0.00			1" Ice	1.49	0.47	23.01
20' Dipole	A	From Face	7.00	0.0000	170.00	No Ice	4.00	4.00	55.00
(Municipal)			0.00			1/2" Ice	6.00	6.00	100.00
			10.00			1" Ice	8.00	8.00	145.00
3' Omni	B	From Leg	7.00	0.0000	170.00	No Ice	0.52	0.52	10.00
(Municipal)			4.00			1/2" Ice	0.71	0.71	14.81
			1.50			1" Ice	0.90	0.90	21.81
10' Omni	B	From Face	8.25	0.0000	170.00	No Ice	2.50	2.50	30.00
(Municipal)			0.00			1/2" Ice	3.53	3.53	48.64
			5.00			1" Ice	4.58	4.58	73.79
15' Omni	B	From Face	7.00	0.0000	170.00	No Ice	3.75	3.75	40.00
(Municipal)			8.00			1/2" Ice	5.28	5.28	67.80
			10.00			1" Ice	6.83	6.83	105.17
15'x2-1/2" Pipe Mount	C	From Leg	7.00	0.0000	170.00	No Ice	4.32	4.32	87.00
			4.00			1/2" Ice	5.85	5.85	118.35
			8.00			1" Ice	7.40	7.40	159.32
10' Omni	C	From Leg	7.00	0.0000	170.00	No Ice	2.50	2.50	30.00
(Municipal)			4.00			1/2" Ice	3.53	3.53	48.64
			13.00			1" Ice	4.58	4.58	73.79
15' Omni	C	From Face	8.25	0.0000	170.00	No Ice	3.75	3.75	40.00
(Municipal)			0.00			1/2" Ice	5.28	5.28	67.80
			10.00			1" Ice	6.83	6.83	105.17
10' Omni	C	From Face	7.00	0.0000	170.00	No Ice	2.50	2.50	30.00
(Municipal)			8.00			1/2" Ice	3.53	3.53	48.64
			5.00			1" Ice	4.58	4.58	73.79
SU-RA	C	From Leg	7.00	0.0000	170.00	No Ice	1.21	0.30	5.50
(Municipal)			8.00			1/2" Ice	1.35	0.38	13.29
			0.00			1" Ice	1.49	0.47	23.01
Camera and Mount	A	From Leg	7.00	0.0000	170.00	No Ice	4.80	4.80	150.00
			4.00			1/2" Ice	5.07	5.07	208.37
			0.00			1" Ice	5.35	5.35	271.59
Sector Mount [SM 412-1]	C	None		0.0000	168.25	No Ice	70.47	70.47	3080.00
(Halo Mount)						1/2" Ice	100.14	100.14	4498.00
						1" Ice	129.81	129.81	5916.00

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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 lb
APXVSPP18-C w/Mount Pipe	A	From Face	8.25	0.0000	170.00	No Ice	8.02	6.71	78.90
(Sprint)			1.00			1/2" Ice	8.48	7.66	144.31
			0.00			1" Ice	8.94	8.49	217.47
APXVSPP18-C w/Mount Pipe	B	From Face	8.25	0.0000	170.00	No Ice	8.02	6.71	78.90
(Sprint)			-1.00			1/2" Ice	8.48	7.66	144.31
			0.00			1" Ice	8.94	8.49	217.47
APXVSPP18-C w/Mount Pipe	C	From Face	8.25	0.0000	170.00	No Ice	8.02	6.71	78.90
(Sprint)			-1.00			1/2" Ice	8.48	7.66	144.31
			0.00			1" Ice	8.94	8.49	217.47
1900MHz 4x45W RRH	A	From Face	6.00	0.0000	170.00	No Ice	2.32	2.24	60.00
(Sprint)			0.00			1/2" Ice	2.53	2.44	83.12
			0.00			1" Ice	2.74	2.65	109.48
1900MHz 4x45W RRH	B	From Face	6.00	0.0000	170.00	No Ice	2.32	2.24	60.00
(Sprint)			0.00			1/2" Ice	2.53	2.44	83.12
			0.00			1" Ice	2.74	2.65	109.48
1900MHz 4x45W RRH	C	From Face	6.00	0.0000	170.00	No Ice	2.32	2.24	60.00
(Sprint)			0.00			1/2" Ice	2.53	2.44	83.12
			0.00			1" Ice	2.74	2.65	109.48
800MHz 2x50W RRH	A	From Face	6.00	0.0000	170.00	No Ice	2.06	1.93	64.00
(Sprint)			0.00			1/2" Ice	2.24	2.11	86.12
			2.00			1" Ice	2.43	2.29	111.30
800MHz 2x50W RRH	B	From Face	6.00	0.0000	170.00	No Ice	2.06	1.93	64.00
(Sprint)			0.00			1/2" Ice	2.24	2.11	86.12
			2.00			1" Ice	2.43	2.29	111.30
800MHz 2x50W RRH	C	From Face	6.00	0.0000	170.00	No Ice	2.06	1.93	64.00
(Sprint)			0.00			1/2" Ice	2.24	2.11	86.12
			2.00			1" Ice	2.43	2.29	111.30
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DT465B-2XR w/Mount Pipe	A	From Face	7.00	0.0000	170.00	No Ice	9.34	7.64	83.55
(Sprint)			4.00			1/2" Ice	9.91	8.82	160.05
			0.00			1" Ice	10.44	9.72	244.71
DT465B-2XR w/Mount Pipe	B	From Face	7.00	0.0000	170.00	No Ice	9.34	7.64	83.55
(Sprint)			-4.00			1/2" Ice	9.91	8.82	160.05
			0.00			1" Ice	10.44	9.72	244.71
DT465B-2XR w/Mount Pipe	C	From Face	7.00	0.0000	170.00	No Ice	9.34	7.64	83.55
(Sprint)			-4.00			1/2" Ice	9.91	8.82	160.05
			0.00			1" Ice	10.44	9.72	244.71
TD-RRH 8x20	A	From Face	7.00	0.0000	170.00	No Ice	4.32	1.41	66.13
(Sprint)			4.00			1/2" Ice	4.60	1.61	90.06
			-3.00			1" Ice	4.89	1.83	117.33
TD-RRH 8x20	B	From Face	7.00	0.0000	170.00	No Ice	4.32	1.41	66.13
(Sprint)			-4.00			1/2" Ice	4.60	1.61	90.06
			-3.00			1" Ice	4.89	1.83	117.33
TD-RRH 8x20	C	From Face	7.00	0.0000	170.00	No Ice	4.32	1.41	66.13
(Sprint)			-4.00			1/2" Ice	4.60	1.61	90.06
			-3.00			1" Ice	4.89	1.83	117.33
800MHz 2x50W RRH	A	From Face	7.00	0.0000	170.00	No Ice	2.06	1.93	64.00
(Sprint)			4.00			1/2" Ice	2.24	2.11	86.12
			0.00			1" Ice	2.43	2.29	111.30
800MHz 2x50W RRH	B	From Face	7.00	0.0000	170.00	No Ice	2.06	1.93	64.00
(Sprint)			-4.00			1/2" Ice	2.24	2.11	86.12
			0.00			1" Ice	2.43	2.29	111.30
800MHz 2x50W RRH	C	From Face	7.00	0.0000	170.00	No Ice	2.06	1.93	64.00
(Sprint)			-4.00			1/2" Ice	2.24	2.11	86.12
			0.00			1" Ice	2.43	2.29	111.30
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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 lb
20' Omni	A	From Face	4.00	0.0000	133.00	No Ice	5.00	5.00	55.00
(Municipal)			-5.00			1/2" Ice	7.03	7.03	91.96
			10.00			1" Ice	9.07	9.07	141.55
5' Omni	A	From Face	4.00	0.0000	133.00	No Ice	1.00	1.00	25.00
(Municipal)			3.00			1/2" Ice	1.39	1.39	32.86
			4.00			1" Ice	1.70	1.70	44.14
10' Omni	A	From Face	4.00	0.0000	133.00	No Ice	2.50	2.50	30.00
(Municipal)			5.00			1/2" Ice	3.53	3.53	48.64
			6.00			1" Ice	4.58	4.58	73.79
20' Omni	B	From Face	4.00	0.0000	133.00	No Ice	5.00	5.00	55.00
(Municipal)			-5.00			1/2" Ice	7.03	7.03	91.96
			10.00			1" Ice	9.07	9.07	141.55
5' Omni	C	From Face	4.00	0.0000	133.00	No Ice	1.00	1.00	25.00
(Municipal)			-5.00			1/2" Ice	1.39	1.39	32.86
			1.00			1" Ice	1.70	1.70	44.14
5' Omni	C	From Face	4.00	0.0000	133.00	No Ice	1.00	1.00	25.00
(Municipal)			2.00			1/2" Ice	1.39	1.39	32.86
			4.00			1" Ice	1.70	1.70	44.14
10' Omni	A	From Face	4.00	0.0000	133.00	No Ice	2.50	2.50	30.00
(Municipal)			8.50			1/2" Ice	3.53	3.53	48.64
			6.00			1" Ice	4.58	4.58	73.79
6' Yagi	A	From Face	4.00	0.0000	133.00	No Ice	3.00	3.00	10.00
(Municipal)			-9.50			1/2" Ice	4.00	4.00	20.00
			4.00			1" Ice	5.00	5.00	30.00
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LLPX310R w/Mount Pipe	A	From Face	4.00	0.0000	133.00	No Ice	4.66	3.14	46.85
(Clearwire)			0.00			1/2" Ice	5.05	3.72	86.10
			1.00			1" Ice	5.44	4.31	130.80
LLPX310R w/Mount Pipe	B	From Face	4.00	0.0000	133.00	No Ice	4.66	3.14	46.85
(Clearwire)			0.00			1/2" Ice	5.05	3.72	86.10
			1.00			1" Ice	5.44	4.31	130.80
LLPX310R w/Mount Pipe	C	From Face	4.00	0.0000	133.00	No Ice	4.66	3.14	46.85
(Clearwire)			5.00			1/2" Ice	5.05	3.72	86.10
			1.00			1" Ice	5.44	4.31	130.80
RRH U-RAS	A	From Face	4.00	0.0000	133.00	No Ice	1.82	0.83	33.00
(Clearwire)			0.00			1/2" Ice	2.00	0.97	44.91
			-2.00			1" Ice	2.19	1.12	59.16
RRH U-RAS	B	From Face	4.00	0.0000	133.00	No Ice	1.82	0.83	33.00
(Clearwire)			0.00			1/2" Ice	2.00	0.97	44.91
			-2.00			1" Ice	2.19	1.12	59.16
RRH U-RAS	C	From Face	4.00	0.0000	133.00	No Ice	1.82	0.83	33.00
(Clearwire)			5.00			1/2" Ice	2.00	0.97	44.91
			-2.00			1" Ice	2.19	1.12	59.16
6' x 2" Pipe Mount	B	From Face	4.00	0.0000	133.00	No Ice	1.43	1.43	21.90
(Clearwire dish)			-9.00			1/2" Ice	1.92	1.92	32.73
			0.00			1" Ice	2.29	2.29	47.61
6' x 2" Pipe Mount	B	From Face	4.00	0.0000	133.00	No Ice	1.43	1.43	21.90
(Clearwire dish)			-2.00			1/2" Ice	1.92	1.92	32.73
			0.00			1" Ice	2.29	2.29	47.61
6' x 2" Pipe Mount	B	From Face	4.00	0.0000	133.00	No Ice	1.43	1.43	21.90
(Clearwire dish)			6.00			1/2" Ice	1.92	1.92	32.73
			0.00			1" Ice	2.29	2.29	47.61
6' x 2" Pipe Mount	C	From Face	4.00	0.0000	133.00	No Ice	1.43	1.43	21.90
(Clearwire dish)			-2.00			1/2" Ice	1.92	1.92	32.73
			0.00			1" Ice	2.29	2.29	47.61
PiROD 20' Universal Platform	C	None		0.0000	133.00	No Ice	33.10	33.10	2270.00
						1/2" Ice	47.10	47.10	2701.00

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 lb
						1" Ice	61.10	61.10	3132.00
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(2) AIR B2A/B4P w/ Mount Pipe	A	From Leg	3.00	0.0000	125.00	No Ice	7.23	6.12	112.20
(T-Mobile)			0.00			1/2" Ice	8.02	7.36	174.30
			0.00			1" Ice	8.75	8.46	243.53
(2) AIR B2A/B4P w/ Mount Pipe	B	From Leg	3.00	0.0000	125.00	No Ice	7.23	6.12	112.20
(T-Mobile)			0.00			1/2" Ice	8.02	7.36	174.30
			0.00			1" Ice	8.75	8.46	243.53
(2) AIR B2A/B4P w/ Mount Pipe	C	From Leg	3.00	0.0000	125.00	No Ice	7.23	6.12	112.20
(T-Mobile)			0.00			1/2" Ice	8.02	7.36	174.30
			0.00			1" Ice	8.75	8.46	243.53
ETW190VS12UB	A	From Leg	3.00	0.0000	125.00	No Ice	0.57	0.32	14.60
(T-Mobile)			5.00			1/2" Ice	0.67	0.40	19.55
			0.00			1" Ice	0.77	0.49	26.03
ETW190VS12UB	B	From Leg	3.00	0.0000	125.00	No Ice	0.57	0.32	14.60
(T-Mobile)			5.00			1/2" Ice	0.67	0.40	19.55
			0.00			1" Ice	0.77	0.49	26.03
ETW190VS12UB	C	From Leg	3.00	0.0000	125.00	No Ice	0.57	0.32	14.60
(T-Mobile)			5.00			1/2" Ice	0.67	0.40	19.55
			0.00			1" Ice	0.77	0.49	26.03
RRUS-11	A	From Leg	3.00	0.0000	125.00	No Ice	2.52	1.07	55.00
(T-Mobile)			-1.50			1/2" Ice	2.72	1.21	74.32
			-3.00			1" Ice	2.92	1.36	96.56
RRUS-11	B	From Leg	3.00	0.0000	125.00	No Ice	2.52	1.07	55.00
(T-Mobile)			-1.50			1/2" Ice	2.72	1.21	74.32
			-3.00			1" Ice	2.92	1.36	96.56
RRUS-11	C	From Leg	3.00	0.0000	125.00	No Ice	2.52	1.07	55.00
(T-Mobile)			-1.50			1/2" Ice	2.72	1.21	74.32
			-3.00			1" Ice	2.92	1.36	96.56
LNX-6515DS-A1M w/Mount Pipe	A	From Leg	3.00	0.0000	125.00	No Ice	11.43	9.59	92.20
			-1.50			1/2" Ice	12.05	11.01	179.10
(T-Mobile)			0.00			1" Ice	12.67	12.28	275.75
LNX-6515DS-A1M w/Mount Pipe	B	From Leg	3.00	0.0000	125.00	No Ice	11.43	9.59	92.20
			-1.50			1/2" Ice	12.05	11.01	179.10
(T-Mobile)			0.00			1" Ice	12.67	12.28	275.75
LNX-6515DS-A1M w/Mount Pipe	C	From Leg	3.00	0.0000	125.00	No Ice	11.43	9.59	92.20
			-1.50			1/2" Ice	12.05	11.01	179.10
(T-Mobile)			0.00			1" Ice	12.67	12.28	275.75
Sector Mount [SM 405-1]	A	From Leg	3.00	0.0000	125.00	No Ice	8.27	8.37	286.93
(T-Mobile)			0.00			1/2" Ice	12.24	11.93	420.81
			0.00			1" Ice	16.21	15.49	554.68
Sector Mount [SM 405-1]	B	From Leg	3.00	0.0000	125.00	No Ice	8.27	8.37	286.93
(T-Mobile)			0.00			1/2" Ice	12.24	11.93	420.81
			0.00			1" Ice	16.21	15.49	554.68
Sector Mount [SM 405-1]	C	From Leg	3.00	0.0000	125.00	No Ice	8.27	8.37	286.93
(T-Mobile)			0.00			1/2" Ice	12.24	11.93	420.81
			0.00			1" Ice	16.21	15.49	554.68
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RRUS-12	A	From Leg	2.00	0.0000	118.00	No Ice	3.16	1.27	57.90
(ATT)			0.00			1/2" Ice	3.38	1.42	81.09
			0.00			1" Ice	3.61	1.58	107.47
RRUS-12	B	From Leg	2.00	0.0000	118.00	No Ice	3.16	1.27	57.90
(ATT)			0.00			1/2" Ice	3.38	1.42	81.09
			0.00			1" Ice	3.61	1.58	107.47
RRUS-12	C	From Leg	2.00	0.0000	118.00	No Ice	3.16	1.27	57.90
(ATT)			0.00			1/2" Ice	3.38	1.42	81.09
			0.00			1" Ice	3.61	1.58	107.47

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 lb
DC6-48-60-18-8F	B	From Leg	1.00	0.0000	118.00	No Ice	0.92	0.92	33.00
(ATT)			0.00			1/2" Ice	1.46	1.46	50.72
			0.00			1" Ice	1.64	1.64	70.92
2' Standoff	A	From Leg	1.00	0.0000	118.00	No Ice	1.80	1.80	33.00
(ATT)			0.00			1/2" Ice	3.30	3.30	59.00
			0.00			1" Ice	4.80	4.80	85.00
2' Standoff	B	From Leg	1.00	0.0000	118.00	No Ice	1.80	1.80	33.00
(ATT)			0.00			1/2" Ice	3.30	3.30	59.00
			0.00			1" Ice	4.80	4.80	85.00
2' Standoff	C	From Leg	1.00	0.0000	118.00	No Ice	1.80	1.80	33.00
(ATT)			0.00			1/2" Ice	3.30	3.30	59.00
			0.00			1" Ice	4.80	4.80	85.00
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(2) RA21.7770.00 w/Mount Pipe	A	From Leg	3.00	0.0000	115.00	No Ice	7.17	5.41	66.40
(ATT)			0.00			1/2" Ice	7.86	6.63	124.83
			0.00			1" Ice	8.50	7.70	190.68
(2) RA21.7770.00 w/Mount Pipe	B	From Leg	3.00	0.0000	115.00	No Ice	7.17	5.41	66.40
(ATT)			0.00			1/2" Ice	7.86	6.63	124.83
			0.00			1" Ice	8.50	7.70	190.68
(2) RA21.7770.00 w/Mount Pipe	C	From Leg	3.00	0.0000	115.00	No Ice	7.17	5.41	66.40
(ATT)			0.00			1/2" Ice	7.86	6.63	124.83
			0.00			1" Ice	8.50	7.70	190.68
QS6658-3 w/Mount Pipe	A	From Leg	3.00	0.0000	115.00	No Ice	8.61	8.35	106.20
(ATT)			-1.50			1/2" Ice	9.27	9.64	182.85
			0.00			1" Ice	9.90	10.79	267.79
QS6658-3 w/Mount Pipe	B	From Leg	3.00	0.0000	115.00	No Ice	8.61	8.35	106.20
(ATT)			-1.50			1/2" Ice	9.27	9.64	182.85
			1.00			1" Ice	9.90	10.79	267.79
QS6658-3 w/Mount Pipe	C	From Leg	3.00	0.0000	115.00	No Ice	8.61	8.35	106.20
(ATT)			-1.50			1/2" Ice	9.27	9.64	182.85
			1.00			1" Ice	9.90	10.79	267.79
TMA 10"x9"x3"	A	From Leg	3.00	0.0000	115.00	No Ice	0.75	0.26	25.00
(ATT)			-7.50			1/2" Ice	0.86	0.33	30.51
			0.00			1" Ice	0.98	0.41	37.64
TMA 10"x9"x3"	A	From Leg	3.00	0.0000	115.00	No Ice	0.75	0.26	25.00
(ATT)			-7.50			1/2" Ice	0.86	0.33	30.51
			0.00			1" Ice	0.98	0.41	37.64
TMA 4"x8"x4"	A	From Leg	3.00	0.0000	115.00	No Ice	0.27	0.13	5.00
(ATT)			0.00			1/2" Ice	0.34	0.18	8.14
			0.00			1" Ice	0.41	0.24	12.52
TMA 4"x8"x4"	A	From Leg	3.00	0.0000	115.00	No Ice	0.27	0.13	5.00
(ATT)			0.00			1/2" Ice	0.34	0.18	8.14
			0.00			1" Ice	0.41	0.24	12.52
TMA 10"x9"x3"	B	From Leg	3.00	0.0000	115.00	No Ice	0.75	0.26	25.00
(ATT)			-7.50			1/2" Ice	0.86	0.33	30.51
			0.00			1" Ice	0.98	0.41	37.64
TMA 10"x9"x3"	B	From Leg	3.00	0.0000	115.00	No Ice	0.75	0.26	25.00
(ATT)			-7.50			1/2" Ice	0.86	0.33	30.51
			0.00			1" Ice	0.98	0.41	37.64
TMA 4"x8"x4"	B	From Leg	3.00	0.0000	115.00	No Ice	0.27	0.13	5.00
(ATT)			0.00			1/2" Ice	0.34	0.18	8.14
			0.00			1" Ice	0.41	0.24	12.52
TMA 4"x8"x4"	B	From Leg	3.00	0.0000	115.00	No Ice	0.27	0.13	5.00
(ATT)			0.00			1/2" Ice	0.34	0.18	8.14
			0.00			1" Ice	0.41	0.24	12.52
TMA 10"x9"x3"	C	From Leg	3.00	0.0000	115.00	No Ice	0.75	0.26	25.00
(ATT)			-7.50			1/2" Ice	0.86	0.33	30.51

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 lb
			0.00			1" Ice	0.98	0.41	37.64
TMA 10"x9"x3"	C	From Leg	3.00	0.0000	115.00	No Ice	0.75	0.26	25.00
(ATT)			-7.50			1/2" Ice	0.86	0.33	30.51
			0.00			1" Ice	0.98	0.41	37.64
TMA 4"x8"x4"	C	From Leg	3.00	0.0000	115.00	No Ice	0.27	0.13	5.00
(ATT)			0.00			1/2" Ice	0.34	0.18	8.14
			0.00			1" Ice	0.41	0.24	12.52
TMA 4"x8"x4"	C	From Leg	3.00	0.0000	115.00	No Ice	0.27	0.13	5.00
(ATT)			0.00			1/2" Ice	0.34	0.18	8.14
			0.00			1" Ice	0.41	0.24	12.52
RRUS-12 w/ A2 Box	A	From Leg	3.00	0.0000	115.00	No Ice	3.15	1.82	80.00
(ATT)			-1.50			1/2" Ice	3.36	2.00	107.36
			0.00			1" Ice	3.59	2.18	138.13
RRUS-12 w/ A2 Box	B	From Leg	3.00	0.0000	115.00	No Ice	3.15	1.82	80.00
(ATT)			-1.50			1/2" Ice	3.36	2.00	107.36
			0.00			1" Ice	3.59	2.18	138.13
RRUS-12 w/ A2 Box	C	From Leg	3.00	0.0000	115.00	No Ice	3.15	1.82	80.00
(ATT)			-1.50			1/2" Ice	3.36	2.00	107.36
			0.00			1" Ice	3.59	2.18	138.13
RRUS-32	A	From Leg	3.00	0.0000	115.00	No Ice	2.69	1.59	50.80
(ATT)			-1.50			1/2" Ice	2.91	1.78	71.33
			-3.00			1" Ice	3.14	1.97	95.01
RRUS-32	B	From Leg	3.00	0.0000	115.00	No Ice	2.69	1.59	50.80
(ATT)			-1.50			1/2" Ice	2.91	1.78	71.33
			-3.00			1" Ice	3.14	1.97	95.01
RRUS-32	C	From Leg	3.00	0.0000	115.00	No Ice	2.69	1.59	50.80
(ATT)			-1.50			1/2" Ice	2.91	1.78	71.33
			-3.00			1" Ice	3.14	1.97	95.01
Sector Mount [SM 408-1]	A	From Leg	2.50	0.0000	115.00	No Ice	11.70	8.25	339.80
(ATT)			0.00			1/2" Ice	17.51	12.27	491.56
			0.00			1" Ice	23.32	16.29	643.31
Sector Mount [SM 408-1]	B	From Leg	2.50	0.0000	115.00	No Ice	11.70	8.25	339.80
(ATT)			0.00			1/2" Ice	17.51	12.27	491.56
			0.00			1" Ice	23.32	16.29	643.31
Sector Mount [SM 408-1]	C	From Leg	2.50	0.0000	115.00	No Ice	11.70	8.25	339.80
(ATT)			0.00			1/2" Ice	17.51	12.27	491.56
			0.00			1" Ice	23.32	16.29	643.31
******									
HBX-6517DS-VTM w/Mount Pipe	A	From Leg	3.00	0.0000	101.00	No Ice	5.30	4.84	42.43
			-5.00			1/2" Ice	5.80	5.91	86.88
(Verizon)			0.00			1" Ice	6.28	6.76	138.79
HBX-6517DS-VTM w/Mount Pipe	B	From Leg	3.00	0.0000	101.00	No Ice	5.30	4.84	42.43
			-5.00			1/2" Ice	5.80	5.91	86.88
(Verizon)			0.00			1" Ice	6.28	6.76	138.79
HBX-6517DS-VTM w/Mount Pipe	C	From Leg	3.00	0.0000	101.00	No Ice	5.30	4.84	42.43
			-5.00			1/2" Ice	5.80	5.91	86.88
(Verizon)			0.00			1" Ice	6.28	6.76	138.79
BXA-70063-6CF-EDIN-X w/Mount Pipe	A	From Leg	3.00	0.0000	101.00	No Ice	7.83	5.82	42.55
			0.00			1/2" Ice	8.39	6.99	103.53
(Verizon)			0.00			1" Ice	8.91	7.87	172.25
BXA-70063-6CF-EDIN-X w/Mount Pipe	B	From Leg	3.00	0.0000	101.00	No Ice	7.83	5.82	42.55
			0.00			1/2" Ice	8.39	6.99	103.53
(Verizon)			0.00			1" Ice	8.91	7.87	172.25
BXA-70063-6CF-EDIN-X w/Mount Pipe	C	From Leg	3.00	0.0000	101.00	No Ice	7.83	5.82	42.55
			0.00			1/2" Ice	8.39	6.99	103.53
(Verizon)			0.00			1" Ice	8.91	7.87	172.25
BXA-171063-12CF w/Mount	A	From Leg	3.00	0.0000	101.00	No Ice	5.03	5.29	38.35

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 lb
Pipe			5.00			1/2" Ice	5.58	6.46	84.33
(Verizon)			0.00			1" Ice	6.10	7.34	137.75
BXA-171063-12CF w/Mount	B	From Leg	3.00	0.0000	101.00	No Ice	5.03	5.29	38.35
Pipe			5.00			1/2" Ice	5.58	6.46	84.33
(Verizon)			0.00			1" Ice	6.10	7.34	137.75
BXA-171063-12CF w/Mount	C	From Leg	3.00	0.0000	101.00	No Ice	5.03	5.29	38.35
Pipe			5.00			1/2" Ice	5.58	6.46	84.33
(Verizon)			0.00			1" Ice	6.10	7.34	137.75
LNX-6514DS-T4M w/Mount	A	From Leg	3.00	0.0000	101.00	No Ice	8.17	6.83	60.30
Pipe			7.00			1/2" Ice	8.63	7.79	126.69
(Verizon)			0.00			1" Ice	9.10	8.62	200.90
LNX-6514DS-T4M w/Mount	B	From Leg	3.00	0.0000	101.00	No Ice	8.17	6.83	60.30
Pipe			7.00			1/2" Ice	8.63	7.79	126.69
(Verizon)			0.00			1" Ice	9.10	8.62	200.90
LNX-6514DS-T4M w/Mount	C	From Leg	3.00	0.0000	101.00	No Ice	8.17	6.83	60.30
Pipe			7.00			1/2" Ice	8.63	7.79	126.69
(Verizon)			0.00			1" Ice	9.10	8.62	200.90
RRH 2x40 AWS	A	From Leg	3.00	0.0000	101.00	No Ice	2.16	1.42	44.00
(Verizon)			-5.00			1/2" Ice	2.36	1.59	61.40
			-1.00			1" Ice	2.57	1.77	81.69
RRH 2x40 AWS	B	From Leg	3.00	0.0000	101.00	No Ice	2.16	1.42	44.00
(Verizon)			-5.00			1/2" Ice	2.36	1.59	61.40
			-1.00			1" Ice	2.57	1.77	81.69
RRH 2x40 AWS	C	From Leg	3.00	0.0000	101.00	No Ice	2.16	1.42	44.00
(Verizon)			-5.00			1/2" Ice	2.36	1.59	61.40
			-1.00			1" Ice	2.57	1.77	81.69
FD9R6004/2C-3L	A	From Leg	3.00	0.0000	101.00	No Ice	0.37	0.08	2.60
(Verizon)			0.00			1/2" Ice	0.45	0.14	4.90
			2.00			1" Ice	0.54	0.20	8.29
FD9R6004/2C-3L	A	From Leg	3.00	0.0000	101.00	No Ice	0.37	0.08	2.60
(Verizon)			0.00			1/2" Ice	0.45	0.14	4.90
			2.00			1" Ice	0.54	0.20	8.29
FD9R6004/2C-3L	B	From Leg	3.00	0.0000	101.00	No Ice	0.37	0.08	2.60
(Verizon)			0.00			1/2" Ice	0.45	0.14	4.90
			2.00			1" Ice	0.54	0.20	8.29
FD9R6004/2C-3L	B	From Leg	3.00	0.0000	101.00	No Ice	0.37	0.08	2.60
(Verizon)			0.00			1/2" Ice	0.45	0.14	4.90
			2.00			1" Ice	0.54	0.20	8.29
FD9R6004/2C-3L	C	From Leg	3.00	0.0000	101.00	No Ice	0.37	0.08	2.60
(Verizon)			0.00			1/2" Ice	0.45	0.14	4.90
			2.00			1" Ice	0.54	0.20	8.29
FD9R6004/2C-3L	C	From Leg	3.00	0.0000	101.00	No Ice	0.37	0.08	2.60
(Verizon)			0.00			1/2" Ice	0.45	0.14	4.90
			2.00			1" Ice	0.54	0.20	8.29
Sector Mount [SM 408-1]	A	From Leg	2.50	0.0000	101.00	No Ice	11.70	8.25	339.80
(Verizon)			0.00			1/2" Ice	17.51	12.27	491.56
			0.00			1" Ice	23.32	16.29	643.31
Sector Mount [SM 408-1]	B	From Leg	2.50	0.0000	101.00	No Ice	11.70	8.25	339.80
(Verizon)			0.00			1/2" Ice	17.51	12.27	491.56
			0.00			1" Ice	23.32	16.29	643.31
Sector Mount [SM 408-1]	C	From Leg	2.50	0.0000	101.00	No Ice	11.70	8.25	339.80
(Verizon)			0.00			1/2" Ice	17.51	12.27	491.56
			0.00			1" Ice	23.32	16.29	643.31
******									
5' x 2" Pipe Mount	C	From Leg	1.00	0.0000	92.00	No Ice	1.19	1.19	29.00
(ATT)			0.00			1/2" Ice	1.50	1.50	38.07
			0.00			1" Ice	1.81	1.81	50.59

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 lb
******									
Camera and Mount (Unk.)	C	From Leg	0.50 0.00 0.00	0.0000	30.00	No Ice 1/2" Ice 1" Ice	4.80 5.07 5.35	4.80 5.07 5.35	150.00 208.37 271.59

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight lb
VHLP2.5 (Clearwire dish)	B	Paraboloid w/Shroud (HP)	From Face	4.00 0.00 4.00	0.0000		133.00	2.92	No Ice 1/2" Ice 1" Ice	6.68 7.07 7.46	48.00 76.00 104.00
VHLP2 (Clearwire dish)	B	Paraboloid w/Shroud (HP)	From Face	4.00 0.00 0.00	0.0000		133.00	2.18	No Ice 1/2" Ice 1" Ice	3.72 4.01 4.30	27.00 54.00 81.00
2 FT DISH (Clearwire dish)	B	Paraboloid w/o Radome	From Face	4.00 -9.00 3.00	0.0000		133.00	2.00	No Ice 1/2" Ice 1" Ice	3.14 3.41 3.68	70.00 87.50 105.01
2 FT DISH (Clearwire dish)	C	Paraboloid w/o Radome	From Face	4.00 -2.00 3.00	0.0000		133.00	2.00	No Ice 1/2" Ice 1" Ice	3.14 3.41 3.68	70.00 87.50 105.01
*****											
1' Dish	C	Paraboloid w/o Radome	From Leg	1.00 0.00 0.00	0.0000		92.00	1.00	No Ice 1/2" Ice 1" Ice	0.79 0.92 1.06	25.00 29.72 34.45

Truss-Leg Properties

Section Designation	Area in^2	Area Ice in^2	Self Weight lb	Ice Weight lb	Equiv. Diameter in	Equiv. Diameter Ice in	Leg Area in^2
Pirod 105244	1026.8606	3157.6269	535.96	594.80	7.1310	21.9280	3.6816
Pirod 105216	2176.9293	6133.0364	455.27	1082.75	7.5588	21.2953	3.6816
Pirod 105217	2303.9214	6184.7622	563.95	1070.13	7.9997	21.4749	5.3014
Pirod 105217	2303.9214	6167.2470	563.95	1040.61	7.9997	21.4141	5.3014
Pirod 105217 w/ 1" Reinf Rod	2481.3473	6476.6418	719.91	999.02	8.6158	22.4883	7.6341
Pirod 105218 w/ 1" Reinf Rod	2589.5550	6479.4859	849.73	979.58	8.9915	22.4982	9.5686
Pirod 105219	2608.7859	6237.5146	1042.97	971.92	9.0583	21.6580	9.4248
Pirod 105219 w/ 1" Reinf Rod	2744.1041	6427.9428	1191.91	873.17	9.5281	22.3192	11.7171
Pirod 105220 w/ 1" Reinf Rod	2867.7293	6364.1159	1359.89	755.28	9.9574	22.0976	14.2124

Force Totals

Load Case	Vertical Forces lb	Sum of Forces X lb	Sum of Forces Z lb	Sum of Overturning Moments, M_x lb-ft	Sum of Overturning Moments, M_z lb-ft	Sum of Torques lb-ft
Leg Weight	19643.84					
Bracing Weight	10627.83					
Total Member Self-Weight	30271.67			-30080.55	4547.61	
Total Weight	58252.63			-30080.55	4547.61	
Wind 0 deg - No Ice		141.31	-46148.72	-4287868.58	-13975.41	-3471.43
Wind 30 deg - No Ice		22532.69	-38952.44	-3635261.83	-2082083.40	-19436.50
Wind 60 deg - No Ice		38402.73	-22294.32	-2096949.22	-3545864.54	-29912.10
Wind 90 deg - No Ice		43399.23	-105.83	-44164.15	-4000508.09	-32185.57
Wind 120 deg - No Ice		38459.30	22066.75	2007324.41	-3554741.33	-26415.80
Wind 150 deg - No Ice		21868.45	37849.02	3506398.67	-2039075.83	-12665.28
Wind 180 deg - No Ice		-264.04	44782.24	4130704.37	40594.80	4627.00
Wind 210 deg - No Ice		-22660.67	38939.62	3573358.38	2109232.47	20115.14
Wind 240 deg - No Ice		-39678.71	22933.95	2079683.17	3652119.56	31324.33
Wind 270 deg - No Ice		-43486.48	169.03	-6841.57	4021793.94	32452.09
Wind 300 deg - No Ice		-37353.11	-21383.43	-2018252.14	3490746.81	26184.62
Wind 330 deg - No Ice		-21789.90	-37934.04	-3578119.94	2037493.53	12969.27
Member Ice	41820.70					
Total Weight Ice	186355.42			-97488.76	16367.88	
Wind 0 deg - Ice		48.20	-22884.81	-2257865.08	10132.47	-1467.32
Wind 30 deg - Ice		11170.94	-19323.74	-1930636.64	-1043647.02	-8173.52
Wind 60 deg - Ice		18787.05	-10888.63	-1135635.33	-1771666.08	-12305.27
Wind 90 deg - Ice		21580.63	-35.69	-102181.88	-2036246.64	-13300.42
Wind 120 deg - Ice		19200.01	11037.94	945887.54	-1801075.42	-11102.83
Wind 150 deg - Ice		11234.49	19449.49	1742679.40	-1046652.77	-5624.53
Wind 180 deg - Ice		-88.00	22600.48	2043354.53	28363.86	1887.29
Wind 210 deg - Ice		-11213.08	19318.46	1734943.35	1082384.46	8411.47
Wind 240 deg - Ice		-19063.02	11014.50	948345.07	1825596.92	12617.38
Wind 270 deg - Ice		-21608.98	56.18	-89773.79	2072973.90	13388.24
Wind 300 deg - Ice		-18979.13	-10897.91	-1131088.37	1820518.24	11176.11
Wind 330 deg - Ice		-11208.32	-19478.27	-1941570.89	1075830.39	5729.31
Total Weight	58252.63			-30080.55	4547.61	
Wind 0 deg - Service		54.07	-17657.07	-1632678.94	-5585.71	-1328.21
Wind 30 deg - Service		8621.29	-14903.68	-1382983.51	-796869.45	-7436.65
Wind 60 deg - Service		14693.36	-8530.08	-794406.04	-1356930.26	-11444.74
Wind 90 deg - Service		16605.08	-40.49	-8985.03	-1530882.51	-12314.60
Wind 120 deg - Service		14715.00	8443.01	775939.92	-1360326.63	-10107.01
Wind 150 deg - Service		8367.14	14481.50	1349504.30	-780414.23	-4845.89
Wind 180 deg - Service		-101.03	17134.24	1588371.40	15293.53	1770.35
Wind 210 deg - Service		-8670.25	14898.78	1375123.92	806779.94	7696.30
Wind 240 deg - Service		-15181.56	8774.81	803625.27	1397107.66	11985.08
Wind 270 deg - Service		-16638.47	64.67	5295.05	1538549.66	12416.57
Wind 300 deg - Service		-14291.76	-8181.57	-764295.56	1335364.45	10018.56
Wind 330 deg - Service		-8337.09	-14514.03	-1361120.31	779331.73	4962.20

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.6 Wind 0 deg - No Ice

Comb. No.	Description
3	0.9 Dead+1.6 Wind 0 deg - No Ice
4	1.2 Dead+1.6 Wind 30 deg - No Ice
5	0.9 Dead+1.6 Wind 30 deg - No Ice
6	1.2 Dead+1.6 Wind 60 deg - No Ice
7	0.9 Dead+1.6 Wind 60 deg - No Ice
8	1.2 Dead+1.6 Wind 90 deg - No Ice
9	0.9 Dead+1.6 Wind 90 deg - No Ice
10	1.2 Dead+1.6 Wind 120 deg - No Ice
11	0.9 Dead+1.6 Wind 120 deg - No Ice
12	1.2 Dead+1.6 Wind 150 deg - No Ice
13	0.9 Dead+1.6 Wind 150 deg - No Ice
14	1.2 Dead+1.6 Wind 180 deg - No Ice
15	0.9 Dead+1.6 Wind 180 deg - No Ice
16	1.2 Dead+1.6 Wind 210 deg - No Ice
17	0.9 Dead+1.6 Wind 210 deg - No Ice
18	1.2 Dead+1.6 Wind 240 deg - No Ice
19	0.9 Dead+1.6 Wind 240 deg - No Ice
20	1.2 Dead+1.6 Wind 270 deg - No Ice
21	0.9 Dead+1.6 Wind 270 deg - No Ice
22	1.2 Dead+1.6 Wind 300 deg - No Ice
23	0.9 Dead+1.6 Wind 300 deg - No Ice
24	1.2 Dead+1.6 Wind 330 deg - No Ice
25	0.9 Dead+1.6 Wind 330 deg - No Ice
26	1.2 Dead+1.0 Ice+1.0 Temp
27	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
28	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
29	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
30	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
31	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
32	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
33	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
34	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
39	Dead+Wind 0 deg - Service
40	Dead+Wind 30 deg - Service
41	Dead+Wind 60 deg - Service
42	Dead+Wind 90 deg - Service
43	Dead+Wind 120 deg - Service
44	Dead+Wind 150 deg - Service
45	Dead+Wind 180 deg - Service
46	Dead+Wind 210 deg - Service
47	Dead+Wind 240 deg - Service
48	Dead+Wind 270 deg - Service
49	Dead+Wind 300 deg - Service
50	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial lb	Major Axis Moment lb-ft	Minor Axis Moment lb-ft
T1	170 - 166.5	Leg	Max Tension	7	4709.48	-319.96	530.07
			Max. Compression	27	-9595.25	8.02	-15.24
			Max. Mx	20	-1611.56	911.24	-2.79
			Max. My	16	-4551.60	201.44	-680.84
			Max. Vy	20	-2186.48	911.24	-2.79

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial lb	Major Axis Moment lb-ft	Minor Axis Moment lb-ft
			Max. Vx	16	1635.32	201.45	-680.84
		Diagonal	Max Tension	7	3215.54	-1.74	0.11
			Max. Compression	18	-3428.41	0.00	0.00
			Max. Mx	28	734.19	-7.89	-0.11
			Max. My	20	-2163.42	-2.68	1.59
			Max. Vy	28	12.92	-7.89	-0.11
			Max. Vx	20	0.55	0.00	0.00
		Secondary Horizontal	Max Tension	6	680.71	0.00	0.00
			Max. Compression	18	-712.71	-2.17	0.10
			Max. Mx	29	-58.99	-6.58	-0.10
			Max. My	6	92.24	-1.42	-1.07
			Max. Vy	29	12.82	-6.58	-0.10
			Max. Vx	6	-0.43	-1.42	-1.07
		Top Girt	Max Tension	18	1041.86	0.00	0.00
			Max. Compression	15	-951.08	0.00	0.00
			Max. Mx	27	393.51	-106.57	0.00
			Max. My	20	107.99	0.00	0.00
			Max. Vy	27	85.25	0.00	0.00
			Max. Vx	20	0.00	0.00	0.00
T2	166.5 - 161.5	Leg	Max Tension	7	12865.23	-4.35	-1.68
			Max. Compression	2	-17570.00	-3.19	26.55
			Max. Mx	12	-14112.59	-25.19	-1.10
			Max. My	2	-17570.00	-3.19	26.55
			Max. Vy	10	25.03	-24.25	-8.57
			Max. Vx	24	33.75	10.19	25.70
		Diagonal	Max Tension	4	3488.61	0.00	0.00
			Max. Compression	4	-3506.52	0.00	0.00
			Max. Mx	27	1007.34	-8.00	-0.17
			Max. My	6	-3289.96	-1.88	-1.69
			Max. Vy	27	13.05	-8.00	-0.17
			Max. Vx	6	-0.60	0.00	0.00
		Top Girt	Max Tension	37	283.37	0.00	0.00
			Max. Compression	5	-25.76	0.00	0.00
			Max. Mx	27	120.44	-106.38	0.00
			Max. My	20	55.58	0.00	0.00
			Max. Vy	27	85.11	0.00	0.00
			Max. Vx	20	0.00	0.00	0.00
		Bottom Girt	Max Tension	7	2.27	0.00	0.00
			Max. Compression	33	-36.39	0.00	0.00
			Max. Mx	27	-24.49	25.39	0.00
			Max. My	20	-6.43	0.00	-0.00
			Max. Vy	27	-20.31	0.00	0.00
			Max. Vx	20	0.00	0.00	0.00
T3	161.5 - 154	Leg	Max Tension	7	27398.18	-33.01	14.20
			Max. Compression	2	-32995.54	-2.55	-44.11
			Max. Mx	20	-3390.01	70.34	-11.13
			Max. My	22	-16648.02	13.17	74.75
			Max. Vy	12	-50.18	-50.42	-0.12
			Max. Vx	22	-62.79	13.17	74.75
		Diagonal	Max Tension	18	3828.86	0.00	0.00
			Max. Compression	18	-3750.43	0.00	0.00
			Max. Mx	38	432.20	-8.45	-0.19
			Max. My	6	-3678.05	-1.81	-2.81
			Max. Vy	27	13.16	-8.45	-0.14
			Max. Vx	6	-1.01	0.00	0.00
T4	154 - 150	Leg	Max Tension	7	37698.38	114.19	-80.83
			Max. Compression	2	-43897.15	-50.94	1089.46
			Max. Mx	10	-42539.49	-891.72	-621.78
			Max. My	2	-43897.15	-50.94	1089.46
			Max. Vy	10	4056.29	-891.72	-621.78
			Max. Vx	2	-4952.63	-50.94	1089.46

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial lb	Major Axis Moment lb-ft	Minor Axis Moment lb-ft
		Diagonal	Max Tension	7	4371.36	-3.23	-0.11
			Max. Compression	18	-4627.64	0.00	0.00
			Max. Mx	27	1113.76	-9.65	0.11
			Max. My	8	-2941.53	-0.56	-1.99
			Max. Vy	27	13.20	-9.65	0.11
			Max. Vx	8	0.64	-0.56	-1.99
		Secondary Horizontal	Max Tension	2	679.74	0.00	0.00
			Max. Compression	2	-679.74	-1.82	1.38
			Max. Mx	35	49.34	-7.11	0.22
			Max. My	18	660.35	-1.84	1.74
			Max. Vy	35	-12.91	-7.11	0.22
			Max. Vx	18	0.69	-1.84	1.74
		Bottom Girt	Max Tension	7	374.15	0.00	0.00
			Max. Compression	18	-394.33	0.00	0.00
			Max. Mx	27	-155.54	25.17	0.00
			Max. My	20	-0.52	0.00	-0.00
			Max. Vy	27	20.14	0.00	0.00
			Max. Vx	20	0.00	0.00	0.00
T5	150 - 140	Leg	Max Tension	7	41777.44	-1004.53	136.18
			Max. Compression	2	-48028.91	2903.43	144.46
			Max. Mx	6	41029.58	-3185.37	317.83
			Max. My	20	-3459.87	-224.57	-4700.76
			Max. Vy	6	350.56	-3185.37	317.83
			Max. Vx	24	-592.36	-229.96	4490.86
		Diagonal	Max Tension	7	5153.94	46.28	8.92
			Max. Compression	18	-5852.66	0.00	0.00
			Max. Mx	22	3412.60	48.87	-0.06
			Max. My	18	-5832.41	-35.44	-26.48
			Max. Vy	37	29.23	41.71	-6.09
			Max. Vx	18	5.29	0.00	0.00
		Top Girt	Max Tension	6	585.38	0.00	0.00
			Max. Compression	3	-508.01	0.00	0.00
			Max. Mx	27	-56.54	-53.61	0.00
			Max. My	35	222.82	0.00	1.55
			Max. Vy	27	42.89	0.00	0.00
			Max. Vx	35	-1.24	0.00	0.00
T6	140 - 120	Leg	Max Tension	7	72314.82	-4215.76	257.07
			Max. Compression	2	-85401.33	3439.06	84.96
			Max. Mx	18	-65717.29	4421.54	-215.68
			Max. My	24	-5624.05	-396.09	5883.20
			Max. Vy	14	973.62	-4162.49	-293.97
			Max. Vx	20	982.08	26.42	-3548.96
		Diagonal	Max Tension	16	8240.08	0.00	0.00
			Max. Compression	18	-8662.15	0.00	0.00
			Max. Mx	2	4823.88	107.05	6.85
			Max. My	18	-8638.20	-73.65	-19.22
			Max. Vy	27	-46.07	94.32	11.40
			Max. Vx	35	4.16	0.00	0.00
T7	120 - 100	Leg	Max Tension	7	115497.16	-5156.66	39.95
			Max. Compression	2	-135746.16	4105.63	201.00
			Max. Mx	2	-109378.61	6000.04	12.19
			Max. My	20	-9134.80	-398.98	-7340.57
			Max. Vy	14	1072.13	-4614.42	-299.81
			Max. Vx	20	1765.28	-398.98	-7340.57
		Diagonal	Max Tension	7	10591.04	0.00	0.00
			Max. Compression	18	-11706.91	0.00	0.00
			Max. Mx	27	2158.81	101.04	-11.35
			Max. My	16	-11061.54	-38.24	-40.60
			Max. Vy	37	53.24	82.19	-10.75
			Max. Vx	16	6.62	0.00	0.00
		Mid Girt	Max Tension	6	3279.24	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial lb	Major Axis Moment lb-ft	Minor Axis Moment lb-ft
			Max. Compression	3	-2834.15	0.00	0.00
			Max. Mx	26	857.58	-169.20	0.00
			Max. My	35	1383.68	0.00	4.88
			Max. Vy	26	75.20	0.00	0.00
			Max. Vx	35	2.17	0.00	0.00
T8	100 - 90	Leg	Max Tension	7	141506.93	-4528.21	406.15
			Max. Compression	2	-165466.93	4406.29	-31.96
			Max. Mx	6	139449.72	-4634.06	418.22
			Max. My	20	-9844.38	-399.02	-7340.57
			Max. Vy	33	-245.75	-2526.48	-156.48
			Max. Vx	20	-555.14	-399.02	-7340.57
		Diagonal	Max Tension	16	12642.62	0.00	0.00
			Max. Compression	16	-12942.58	0.00	0.00
			Max. Mx	2	9280.89	163.17	6.79
			Max. My	35	32.67	89.40	-18.50
			Max. Vy	27	-71.38	158.61	-13.12
			Max. Vx	35	4.69	0.00	0.00
T9	90 - 80	Leg	Max Tension	7	168071.65	-4097.19	58.40
			Max. Compression	2	-194971.15	6389.74	68.59
			Max. Mx	18	-194487.71	6400.61	-171.66
			Max. My	20	-11343.17	5.66	-4736.56
			Max. Vy	14	363.89	-6042.00	-114.57
			Max. Vx	20	297.10	5.66	-4736.56
		Diagonal	Max Tension	16	12360.08	0.00	0.00
			Max. Compression	16	-12641.23	0.00	0.00
			Max. Mx	27	3284.20	147.98	-15.83
			Max. My	29	2759.37	125.42	20.05
			Max. Vy	37	73.63	128.27	17.42
			Max. Vx	28	-4.82	0.00	0.00
T10	80 - 60	Leg	Max Tension	7	217566.53	-5152.50	94.31
			Max. Compression	2	-250618.05	5688.44	14.06
			Max. Mx	18	-221779.29	6400.61	-171.66
			Max. My	20	-12496.77	-74.91	-5484.24
			Max. Vy	19	263.54	6381.31	-178.23
			Max. Vx	20	310.94	-74.91	-5484.24
		Diagonal	Max Tension	16	13022.12	0.00	0.00
			Max. Compression	16	-13330.45	0.00	0.00
			Max. Mx	27	3369.30	174.58	-19.18
			Max. My	36	-1989.94	124.48	-24.19
			Max. Vy	37	89.82	166.25	-22.27
			Max. Vx	36	5.38	0.00	0.00
T11	60 - 40	Leg	Max Tension	7	264885.70	-4822.98	84.34
			Max. Compression	2	-304417.32	6390.52	43.69
			Max. Mx	18	-303464.12	6392.79	-160.53
			Max. My	20	-16438.11	39.04	-5807.87
			Max. Vy	18	-297.90	6392.79	-160.53
			Max. Vx	8	-270.02	-72.42	5386.91
		Diagonal	Max Tension	16	13475.99	0.00	0.00
			Max. Compression	16	-13927.35	0.00	0.00
			Max. Mx	27	3458.06	233.66	-25.12
			Max. My	35	13.71	174.87	-29.23
			Max. Vy	37	106.70	216.76	25.26
			Max. Vx	35	-6.00	0.00	0.00
T12	40 - 20	Leg	Max Tension	7	310102.02	-5892.74	70.31
			Max. Compression	2	-356824.04	6255.39	8.15
			Max. Mx	37	49705.74	-7700.57	-57.54
			Max. My	20	-18030.01	-169.01	-5854.17
			Max. Vy	33	897.87	-7571.14	-29.08
			Max. Vx	8	374.49	-109.01	5824.37
		Diagonal	Max Tension	16	14369.74	0.00	0.00
			Max. Compression	16	-14852.33	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial lb	Major Axis Moment lb-ft	Minor Axis Moment lb-ft
			Max. Mx	27	4383.93	267.52	29.97
			Max. My	36	-2331.35	194.02	-33.24
			Max. Vy	37	122.94	257.21	28.84
			Max. Vx	35	-6.51	0.00	0.00
T13	20 - 0	Leg	Max Tension	7	352704.41	-6167.85	92.85
			Max. Compression	2	-407134.87	0.00	0.00
			Max. Mx	27	-180825.30	11508.99	-19.69
			Max. My	4	-20437.82	-446.97	-9809.26
			Max. Vy	33	-1601.71	-7571.14	-29.08
			Max. Vx	20	-1165.53	-447.82	-9790.89
		Diagonal	Max Tension	7	15639.28	0.00	0.00
			Max. Compression	18	-17071.81	0.00	0.00
			Max. Mx	27	1601.60	330.15	-37.54
			Max. My	36	-5106.55	296.60	-43.91
			Max. Vy	37	130.97	329.17	-41.22
			Max. Vx	36	7.41	0.00	0.00

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical lb	Horizontal, X lb	Horizontal, Z lb
Leg C	Max. Vert	18	419519.42	39839.41	-24688.09
	Max. H_x	18	419519.42	39839.41	-24688.09
	Max. H_z	7	-364080.59	-35794.03	22263.69
	Min. Vert	7	-364080.59	-35794.03	22263.69
	Min. H_x	7	-364080.59	-35794.03	22263.69
	Min. H_z	18	419519.42	39839.41	-24688.09
Leg B	Max. Vert	10	416213.55	-39748.84	-24369.73
	Max. H_x	23	-363381.04	35805.25	22070.08
	Max. H_z	23	-363381.04	35805.25	22070.08
	Min. Vert	23	-363381.04	35805.25	22070.08
	Min. H_x	10	416213.55	-39748.84	-24369.73
	Min. H_z	10	416213.55	-39748.84	-24369.73
Leg A	Max. Vert	2	420760.44	-165.04	46768.78
	Max. H_x	21	16895.50	5449.36	1225.85
	Max. H_z	2	420760.44	-165.04	46768.78
	Min. Vert	15	-361104.70	215.67	-42010.05
	Min. H_x	9	20359.49	-5445.74	1518.77
	Min. H_z	15	-361104.70	215.67	-42010.05

Tower Mast Reaction Summary

Load Combination	Vertical lb	$Shear_x$ lb	$Shear_z$ lb	Overturning Moment, M_x lb-ft	Overturning Moment, M_z lb-ft	Torque lb-ft
Dead Only	58252.63	0.00	0.00	-30103.36	4551.69	-0.07
1.2 Dead+1.6 Wind 0 deg - No Ice	69903.16	226.08	-73837.94	-6884198.52	-24295.87	-5592.87
0.9 Dead+1.6 Wind 0 deg - No Ice	52427.37	226.09	-73837.95	-6866111.82	-25628.88	-5593.06
1.2 Dead+1.6 Wind 30 deg - No Ice	69903.16	34843.25	-60229.76	-5628994.17	-3231724.68	-31227.88
0.9 Dead+1.6 Wind 30 deg - No Ice	52427.37	34843.25	-60229.76	-5612536.37	-3228843.83	-31188.78
1.2 Dead+1.6 Wind 60 deg - No Ice	69903.16	61444.37	-35670.91	-3360672.41	-5704763.41	-48079.80
0.9 Dead+1.6 Wind 60 deg - No Ice	52427.37	61444.37	-35670.91	-3347180.79	-5698631.95	-48022.39

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	lb	lb	lb	lb-ft	lb-ft	lb-ft
1.2 Dead+1.6 Wind 90 deg - No Ice	69903.16	69438.77	-169.35	-59099.76	-6435992.25	-51741.33
0.9 Dead+1.6 Wind 90 deg - No Ice	52427.37	69438.77	-169.34	-49947.12	-6428912.23	-51685.74
1.2 Dead+1.6 Wind 120 deg - No Ice	69903.16	63923.00	36685.58	3356611.42	-5920309.30	-42438.57
0.9 Dead+1.6 Wind 120 deg - No Ice	52427.37	63923.00	36685.59	3361285.94	-5913926.35	-42401.77
1.2 Dead+1.6 Wind 150 deg - No Ice	69903.16	34668.45	60002.34	5525278.11	-3208440.23	-20315.70
0.9 Dead+1.6 Wind 150 deg - No Ice	52427.37	34668.45	60002.33	5527089.16	-3205609.43	-20297.03
1.2 Dead+1.6 Wind 180 deg - No Ice	69903.16	-422.47	70934.58	6556764.57	63579.18	7444.69
0.9 Dead+1.6 Wind 180 deg - No Ice	52427.37	-422.47	70934.58	6557206.39	62104.19	7431.96
1.2 Dead+1.6 Wind 210 deg - No Ice	69903.16	-35048.02	60209.25	5553531.13	3271900.76	32311.86
0.9 Dead+1.6 Wind 210 deg - No Ice	52427.37	-35048.02	60209.25	5555296.67	3266218.37	32272.19
1.2 Dead+1.6 Wind 240 deg - No Ice	69903.16	-64106.90	37052.78	3406266.64	5957758.34	50344.28
0.9 Dead+1.6 Wind 240 deg - No Ice	52427.37	-64106.88	37052.81	3410862.61	5948565.29	50293.29
1.2 Dead+1.6 Wind 270 deg - No Ice	69903.16	-69578.37	270.43	994.74	6466613.12	52174.71
0.9 Dead+1.6 Wind 270 deg - No Ice	52427.37	-69578.37	270.44	10050.94	6456738.40	52118.88
1.2 Dead+1.6 Wind 300 deg - No Ice	69903.16	-61532.15	-35233.77	-3300748.94	5728093.57	42076.68
0.9 Dead+1.6 Wind 300 deg - No Ice	52427.37	-61532.15	-35233.77	-3287353.02	5719182.35	42031.14
1.2 Dead+1.6 Wind 330 deg - No Ice	69903.16	-34542.78	-60138.37	-5616485.49	3202230.67	20797.96
0.9 Dead+1.6 Wind 330 deg - No Ice	52427.37	-34542.78	-60138.37	-5600049.34	3196652.96	20779.65
1.2 Dead+1.0 Ice+1.0 Temp	198005.94	0.00	0.00	-104772.89	17735.28	1.67
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	198005.94	48.20	-22884.79	-2299301.79	11474.53	-1542.59
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	198005.94	10816.23	-18709.53	-1913796.40	-1028077.36	-8341.11
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	198005.94	18787.04	-10888.62	-1159647.78	-1798329.86	-12523.13
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	198005.94	21580.62	-35.69	-109948.23	-2067052.97	-13509.20
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	198005.94	19814.23	11392.56	985301.31	-1881347.29	-11254.12
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	198005.94	10779.19	18660.89	1696806.23	-1023129.25	-5667.97
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	198005.94	-88.00	21689.88	1991852.26	30059.39	1959.43
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	198005.94	-10858.51	18704.18	1702775.91	1069855.30	8579.84
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	198005.94	-19851.59	11469.79	995807.35	1922499.21	12843.75
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	198005.94	-21608.96	56.18	-97293.54	2106778.84	13598.03
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	198005.94	-18804.76	-10797.24	-1147010.22	1836551.35	11323.10
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	198005.93	-10752.94	-18689.71	-1911080.21	1055168.85	5772.88
Dead+Wind 0 deg - Service	58252.63	54.07	-17657.07	-1666401.81	-2547.07	-1338.53
Dead+Wind 30 deg - Service	58252.63	8332.16	-14402.91	-1366476.12	-768902.03	-7474.26

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	lb	lb	lb	lb-ft	lb-ft	lb-ft
Dead+Wind 60 deg - Service	58252.63	14693.36	-8530.08	-824491.74	-1359782.10	-11489.73
Dead+Wind 90 deg - Service	58252.63	16605.08	-40.49	-35645.74	-1534490.08	-12354.30
Dead+Wind 120 deg - Service	58252.63	15286.08	8772.73	780468.18	-1411278.73	-10145.01
Dead+Wind 150 deg - Service	58252.63	8290.36	14348.52	1298606.34	-763327.67	-4867.39
Dead+Wind 180 deg - Service	58252.63	-101.03	16962.78	1545053.92	18443.82	1779.76
Dead+Wind 210 deg - Service	58252.63	-8381.13	14398.00	1305361.90	785003.66	7734.04
Dead+Wind 240 deg - Service	58252.63	-15330.05	8860.54	792337.50	1426746.82	12033.38
Dead+Wind 270 deg - Service	58252.63	-16638.47	64.67	-21289.55	1548330.76	12456.83
Dead+Wind 300 deg - Service	58252.63	-14714.35	-8425.55	-810181.19	1371878.43	10054.49
Dead+Wind 330 deg - Service	58252.63	-8260.31	-14381.05	-1363492.68	768373.79	4983.16

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX lb	PY lb	PZ lb	PX lb	PY lb	PZ lb	% Error
1	0.00	-58252.63	0.00	-0.00	58252.63	-0.00	0.000%
2	226.09	-69903.16	-73837.95	-226.08	69903.16	73837.94	0.000%
3	226.09	-52427.37	-73837.95	-226.09	52427.37	73837.95	0.000%
4	34843.25	-69903.16	-60229.76	-34843.25	69903.16	60229.76	0.000%
5	34843.25	-52427.37	-60229.76	-34843.25	52427.37	60229.76	0.000%
6	61444.37	-69903.16	-35670.91	-61444.37	69903.16	35670.91	0.000%
7	61444.37	-52427.37	-35670.91	-61444.37	52427.37	35670.91	0.000%
8	69438.76	-69903.16	-169.33	-69438.77	69903.16	169.35	0.000%
9	69438.76	-52427.37	-169.33	-69438.77	52427.37	169.34	0.000%
10	63923.00	-69903.16	36685.59	-63923.00	69903.16	-36685.58	0.000%
11	63923.00	-52427.37	36685.59	-63923.00	52427.37	-36685.59	0.000%
12	34668.45	-69903.16	60002.33	-34668.45	69903.16	-60002.34	0.000%
13	34668.45	-52427.37	60002.33	-34668.45	52427.37	-60002.33	0.000%
14	-422.47	-69903.16	70934.58	422.47	69903.16	-70934.58	0.000%
15	-422.47	-52427.37	70934.58	422.47	52427.37	-70934.58	0.000%
16	-35048.02	-69903.16	60209.25	35048.02	69903.16	-60209.25	0.000%
17	-35048.02	-52427.37	60209.25	35048.02	52427.37	-60209.25	0.000%
18	-64106.87	-69903.16	37052.82	64106.90	69903.16	-37052.78	0.000%
19	-64106.87	-52427.37	37052.82	64106.88	52427.37	-37052.81	0.000%
20	-69578.37	-69903.16	270.45	69578.37	69903.16	-270.43	0.000%
21	-69578.37	-52427.37	270.45	69578.37	52427.37	-270.44	0.000%
22	-61532.15	-69903.16	-35233.77	61532.15	69903.16	35233.77	0.000%
23	-61532.15	-52427.37	-35233.77	61532.15	52427.37	35233.77	0.000%
24	-34542.78	-69903.16	-60138.37	34542.78	69903.16	60138.37	0.000%
25	-34542.78	-52427.37	-60138.37	34542.78	52427.37	60138.37	0.000%
26	0.00	-198005.94	0.00	-0.00	198005.94	-0.00	0.000%
27	48.20	-198005.94	-22884.81	-48.20	198005.94	22884.79	0.000%
28	10816.31	-198005.94	-18709.50	-10816.23	198005.94	18709.53	0.000%
29	18787.05	-198005.94	-10888.63	-18787.04	198005.94	10888.62	0.000%
30	21580.63	-198005.94	-35.69	-21580.62	198005.94	35.69	0.000%
31	19814.24	-198005.94	11392.56	-19814.23	198005.94	-11392.56	0.000%
32	10779.19	-198005.94	18660.90	-10779.19	198005.94	-18660.89	0.000%
33	-88.00	-198005.94	21689.89	88.00	198005.94	-21689.88	0.000%
34	-10858.45	-198005.94	18704.23	10858.51	198005.94	-18704.18	0.000%
35	-19851.60	-198005.94	11469.79	19851.59	198005.94	-11469.79	0.000%
36	-21608.98	-198005.94	56.18	21608.96	198005.94	-56.18	0.000%
37	-18804.78	-198005.94	-10797.25	18804.76	198005.94	10797.24	0.000%
38	-10753.03	-198005.94	-18689.68	10752.94	198005.93	18689.71	0.000%
39	54.07	-58252.63	-17657.07	-54.07	58252.63	17657.07	0.000%
40	8332.16	-58252.63	-14402.91	-8332.16	58252.63	14402.91	0.000%
41	14693.36	-58252.63	-8530.08	-14693.36	58252.63	8530.08	0.000%
42	16605.08	-58252.63	-40.49	-16605.08	58252.63	40.49	0.000%

Load Comb.	Sum of Applied Forces PX lb	PY lb	PZ lb	Sum of Reactions PX lb	PY lb	PZ lb	% Error
43	15286.08	-58252.63	8772.73	-15286.08	58252.63	-8772.73	0.000%
44	8290.36	-58252.63	14348.52	-8290.36	58252.63	-14348.52	0.000%
45	-101.03	-58252.63	16962.78	101.03	58252.63	-16962.78	0.000%
46	-8381.13	-58252.63	14398.00	8381.13	58252.63	-14398.00	0.000%
47	-15330.05	-58252.63	8860.54	15330.05	58252.63	-8860.54	0.000%
48	-16638.47	-58252.63	64.67	16638.47	58252.63	-64.67	0.000%
49	-14714.35	-58252.63	-8425.55	14714.35	58252.63	8425.55	0.000%
50	-8260.31	-58252.63	-14381.05	8260.31	58252.63	14381.05	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	4	0.00000001	0.00000075
3	Yes	4	0.00000001	0.00000001
4	Yes	4	0.00000001	0.00000001
5	Yes	4	0.00000001	0.00000001
6	Yes	4	0.00000001	0.00000079
7	Yes	4	0.00000001	0.00000001
8	Yes	4	0.00000001	0.00000111
9	Yes	4	0.00000001	0.00000087
10	Yes	4	0.00000001	0.00000076
11	Yes	4	0.00000001	0.00000001
12	Yes	4	0.00000001	0.00000068
13	Yes	4	0.00000001	0.00000001
14	Yes	4	0.00000001	0.00000066
15	Yes	4	0.00000001	0.00000001
16	Yes	4	0.00000001	0.00000001
17	Yes	4	0.00000001	0.00000001
18	Yes	4	0.00000001	0.00000137
19	Yes	4	0.00000001	0.00000090
20	Yes	4	0.00000001	0.00000111
21	Yes	4	0.00000001	0.00000088
22	Yes	4	0.00000001	0.00000069
23	Yes	4	0.00000001	0.00000001
24	Yes	4	0.00000001	0.00000068
25	Yes	4	0.00000001	0.00000001
26	Yes	4	0.00000001	0.00000001
27	Yes	4	0.00000001	0.00001268
28	Yes	4	0.00000001	0.00001309
29	Yes	4	0.00000001	0.00001298
30	Yes	4	0.00000001	0.00001251
31	Yes	4	0.00000001	0.00001217
32	Yes	4	0.00000001	0.00001219
33	Yes	4	0.00000001	0.00001260
34	Yes	4	0.00000001	0.00001291
35	Yes	4	0.00000001	0.00001250
36	Yes	4	0.00000001	0.00001283
37	Yes	4	0.00000001	0.00001320
38	Yes	4	0.00000001	0.00001321
39	Yes	4	0.00000001	0.00000001
40	Yes	4	0.00000001	0.00000001
41	Yes	4	0.00000001	0.00000001
42	Yes	4	0.00000001	0.00000001
43	Yes	4	0.00000001	0.00000001

44	Yes	4	0.00000001	0.00000001
45	Yes	4	0.00000001	0.00000001
46	Yes	4	0.00000001	0.00000001
47	Yes	4	0.00000001	0.00000001
48	Yes	4	0.00000001	0.00000001
49	Yes	4	0.00000001	0.00000001
50	Yes	4	0.00000001	0.00000001

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	170 - 166.5	4.831	39	0.2809	0.0706
T2	166.5 - 161.5	4.618	39	0.2791	0.0625
T3	161.5 - 154	4.323	39	0.2739	0.0572
T4	154 - 150	3.891	39	0.2600	0.0498
T5	150 - 140	3.673	39	0.2494	0.0463
T6	140 - 120	3.158	39	0.2309	0.0378
T7	120 - 100	2.259	39	0.1867	0.0262
T8	100 - 90	1.520	39	0.1487	0.0173
T9	90 - 80	1.220	39	0.1261	0.0148
T10	80 - 60	0.962	39	0.1092	0.0126
T11	60 - 40	0.542	39	0.0802	0.0091
T12	40 - 20	0.246	39	0.0486	0.0057
T13	20 - 0	0.073	39	0.0222	0.0029

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
170.00	15' Omni	39	4.831	0.2809	0.0706	36356
168.25	Sector Mount [SM 412-1]	39	4.724	0.2801	0.0662	36356
137.00	VHLP2.5	39	3.013	0.2251	0.0357	26712
136.00	2 FT DISH	39	2.965	0.2230	0.0350	27013
133.00	VHLP2	39	2.825	0.2165	0.0331	28055
125.00	(2) AIR B2A/B4P w/ Mount Pipe	39	2.469	0.1978	0.0287	31291
118.00	RRUS-12	39	2.178	0.1826	0.0252	32137
115.00	(2) RA21.7770.00 w/Mount Pipe	39	2.059	0.1769	0.0237	30472
101.00	HBX-6517DS-VTM w/Mount Pipe	39	1.553	0.1508	0.0176	24315
92.00	1' Dish	39	1.276	0.1303	0.0153	26961
30.00	Camera and Mount	39	0.144	0.0346	0.0043	39711

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	170 - 166.5	19.892	2	1.1439	0.2960
T2	166.5 - 161.5	19.025	2	1.1383	0.2618

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T3	161.5 - 154	17.816	2	1.1198	0.2398
T4	154 - 150	16.050	2	1.0659	0.2086
T5	150 - 140	15.154	2	1.0238	0.1938
T6	140 - 120	13.038	2	0.9491	0.1586
T7	120 - 100	9.335	2	0.7692	0.1098
T8	100 - 90	6.284	2	0.6131	0.0725
T9	90 - 80	5.046	2	0.5200	0.0621
T10	80 - 60	3.982	2	0.4507	0.0528
T11	60 - 40	2.243	2	0.3309	0.0380
T12	40 - 20	1.020	2	0.2007	0.0239
T13	20 - 0	0.305	18	0.0916	0.0121

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
170.00	15' Omni	2	19.892	1.1439	0.2960	9516
168.25	Sector Mount [SM 412-1]	2	19.457	1.1416	0.2773	9516
137.00	VHLP2.5	2	12.438	0.9257	0.1495	6581
136.00	2 FT DISH	2	12.242	0.9173	0.1467	6654
133.00	VHLP2	2	11.665	0.8905	0.1387	6908
125.00	(2) AIR B2A/B4P w/ Mount Pipe	2	10.199	0.8146	0.1203	7696
118.00	RRUS-12	2	8.999	0.7527	0.1056	7880
115.00	(2) RA21.7770.00 w/Mount Pipe	2	8.508	0.7293	0.0993	7452
101.00	HBX-6517DS-VTM w/Mount Pipe	2	6.419	0.6220	0.0739	5893
92.00	1' Dish	2	5.279	0.5376	0.0639	6546
30.00	Camera and Mount	2	0.600	0.1429	0.0178	9627

Bolt Design Data

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt lb	Allowable Load lb	Ratio Load / Allowable	Allowable Ratio	Criteria
T4	154	Leg	A325N	0.7500	6	6283.06	29820.60	0.211 ✔	1	Bolt Tension
T5	150	Leg	A325N	1.0000	6	6962.91	53014.40	0.131 ✔	1	Bolt Tension
		Diagonal	A325N	1.0000	1	5153.94	10662.90	0.483 ✔	1	Member Block Shear
		Top Girt	A325N	1.0000	1	585.38	10163.70	0.058 ✔	1	Member Block Shear
T6	140	Leg	A325N	1.0000	6	12052.50	53014.40	0.227 ✔	1	Bolt Tension
		Diagonal	A325N	1.0000	1	8240.08	11682.40	0.705 ✔	1	Member Block Shear
T7	120	Leg	A325N	1.0000	6	19249.50	53014.40	0.363 ✔	1	Bolt Tension
		Diagonal	A325N	1.0000	1	10591.00	11682.40	0.907 ✔	1	Member Block Shear
T8	100	Leg	A325N	1.0000	6	23584.50	53014.40	0.445 ✔	1	Bolt Tension
		Diagonal	A325N	1.0000	1	12642.60	19470.70	0.649 ✔	1	Member Block Shear

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt lb	Allowable Load lb	Ratio Load / Allowable	Allowable Ratio	Criteria
T9	90	Leg	A325N	1.0000	6	28011.90	53014.40	0.528 ✔	1	Bolt Tension
		Diagonal	A325N	1.0000	1	12360.10	19470.70	0.635 ✔	1	Member Block Shear
T10	80	Leg	A325N	1.0000	6	36261.10	53014.40	0.684 ✔	1	Bolt Tension
		Diagonal	A325N	1.0000	1	13022.10	23364.80	0.557 ✔	1	Member Block Shear
T11	60	Leg	A325N	1.2500	6	44147.60	82835.00	0.533 ✔	1	Bolt Tension
		Diagonal	A325N	1.2500	1	13476.00	23701.20	0.569 ✔	1	Member Block Shear
T12	40	Leg	A325N	1.2500	6	51660.90	82835.00	0.624 ✔	1	Bolt Tension
		Diagonal	A325N	1.2500	1	14369.70	28441.40	0.505 ✔	1	Member Block Shear
T13	20	Leg	A325N	1.5000	6	58784.10	119282.00	0.493 ✔	1	Bolt Tension
		Diagonal	A325N	1.2500	1	15639.30	23701.20	0.660 ✔	1	Member Block Shear

Compression Checks

Leg Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $P_u / \phi P_n$
T1	170 - 166.5	1 3/4	3.50	1.54	42.3 K=1.00	2.4053	-9595.25	94972.70	0.101 [1] ✔
T2	166.5 - 161.5	1 3/4	5.00	2.50	68.6 K=1.00	2.4053	-17570.00	76748.10	0.229 [1] ✔
T3	161.5 - 154	1 3/4	7.50	2.50	68.6 K=1.00	2.4053	-32995.50	76748.10	0.430 [1] ✔
T4	154 - 150	1 3/4	4.00	1.88	51.4 K=1.00	2.4053	-43897.10	89205.40	0.492 [1] ✔
T5	150 - 140	Pirod 105244	10.02	10.02	45.4 K=1.00	3.6816	-48028.90	142493.00	0.337 [1] ✔
T6	140 - 120	Pirod 105216	20.03	10.02	45.4 K=1.00	3.6816	-85401.30	142493.00	0.599 [1] ✔
T7	120 - 100	Pirod 105217	20.03	10.02	37.8 K=1.00	5.3014	-135746.00	214859.00	0.632 [1] ✔
T8	100 - 90	Pirod 105217	10.02	10.02	37.8 K=1.00	5.3014	-165467.00	214859.00	0.770 [1] ✔
T9	90 - 80	Pirod 105217 w/ 1" Reinf Rod	10.02	10.02	57.8 K=1.00	7.6341	-194971.00	269174.00	0.724 [1] ✔
T10	80 - 60	Pirod 105218 w/ 1" Reinf Rod	20.03	10.02	53.4 K=1.00	9.5686	-250618.00	349569.00	0.717 [1] ✔
T11	60 - 40	Pirod 105219	20.03	10.02	28.4 K=1.00	9.4248	-304417.00	399868.00	0.761 [1] ✔
T12	40 - 20	Pirod 105219 w/ 1" Reinf Rod	20.03	10.02	50.6	11.7171	-356824.00	437196.00	0.816 [1]

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T13	20 - 0	Pirod 105220 w/ 1" Reinf Rod	20.03	10.02	K=1.00 47.7 K=1.00	14.2124	-407135.00	541394.00	0.752 [1]

[1] P_u / ϕP_n controls

Truss-Leg Diagonal Data

Section No.	Elevation ft	Diagonal Size	L_d ft	Kl/r	ϕP_n lb	A in^2	V_u lb	ϕV_n lb	Stress Ratio
T5	150 - 140	0.5	1.48	142.4	165670.00	0.1963	593.43	2448.25	0.243
T6	140 - 120	0.5	1.48	142.4	165670.00	0.1963	1113.13	2448.25	0.455
T7	120 - 100	0.5	1.47	141.2	238565.00	0.1963	1770.01	2490.00	0.711
T8	100 - 90	0.5	1.47	141.2	238565.00	0.1963	558.97	2490.00	0.225
T9	90 - 80	0.5	1.49	143.2	343533.00	0.1963	364.61	2502.27	0.146
T10	80 - 60	0.5	1.48	141.6	430586.00	0.1963	325.50	2545.74	0.128
T11	60 - 40	0.625	1.45	111.1	424115.00	0.3068	309.75	5809.85	0.053
T12	40 - 20	0.625	1.46	112.2	527270.00	0.3068	897.88	5877.70	0.153
T13	20 - 0	0.625	1.45	111.2	639559.00	0.3068	1602.00	5935.87	0.270

Diagonal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	170 - 166.5	7/8	5.87	2.85	140.8 K=0.90	0.6013	-3428.41	6854.23	0.500 [1]
T2	166.5 - 161.5	7/8	5.59	2.71	134.0 K=0.90	0.6013	-3506.52	7568.59	0.463 [1]
T3	161.5 - 154	7/8	5.59	2.71	134.0 K=0.90	0.6013	-3750.43	7568.59	0.496 [1]
T4	154 - 150	7/8	6.25	3.03	149.8 K=0.90	0.6013	-4627.64	6054.87	0.764 [1]
T5	150 - 140	L2 1/2x2 1/2x3/16	11.42	4.98	120.8 K=1.00	0.9020	-5852.66	13558.30	0.432 [1]
T6	140 - 120	L3x3x3/16	12.50	5.63	115.0 K=1.01	1.0900	-8662.15	17418.80	0.497 [1]
T7	120 - 100	L3x3x3/16	13.80	6.33	127.4 K=1.00	1.0900	-11706.90	14946.80	0.783 [1]
T8	100 - 90	L3x3x5/16	14.50	6.70	136.5 K=1.00	1.7800	-12942.60	21593.90	0.599 [1]
T9	90 - 80	L3x3x5/16	15.24	7.04	143.5 K=1.00	1.7800	-12641.20	19532.90	0.647 [1]
T10	80 - 60	L3x3x3/8	16.80	7.85	160.5	2.1100	-13330.50	18505.20	0.720 [1]

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T11	60 - 40	L3 1/2x3 1/2x5/16	18.45	8.68	150.9 K=1.00	2.0900	-13927.30	20735.80	0.672 [1] ✓
T12	40 - 20	L3 1/2x3 1/2x3/8	20.16	9.52	166.2 K=1.00	2.4800	-14852.30	20282.40	0.732 [1] ✓
T13	20 - 0	L4x4x5/16	21.92	10.40	157.8 K=1.00	2.4000	-17071.80	21761.10	0.785 [1] ✓

[1] P_u / ϕP_n controls

Secondary Horizontal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	170 - 166.5	7/8	5.00	4.85	186.4 K=0.70	0.6013	-712.71	3909.80	0.182 [1] ✓
T4	154 - 150	7/8	5.00	4.85	186.4 K=0.70	0.6013	-679.74	3909.80	0.174 [1] ✓

[1] P_u / ϕP_n controls

Top Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	170 - 166.5	L6x4x3/8	5.00	4.85	93.2 K=1.40	3.6100	-951.08	72641.30	0.013 [1] ✓
T2	166.5 - 161.5	L6x4x3/8	5.00	4.85	93.2 K=1.40	3.6100	-25.76	72641.30	0.000 [1] ✓
T5	150 - 140	L3x3x3/16	5.00	4.52	105.5 K=1.16	1.0900	-508.01	19368.80	0.026 [1] ✓

[1] P_u / ϕP_n controls

Bottom Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T2	166.5 - 161.5	7/8	5.00	4.85	186.4 K=0.70	0.6013	-36.39	3909.80	0.009 [1] ✓

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T4	154 - 150	7/8	5.00	4.85	186.4 K=0.70	0.6013	-394.33	3909.80	0.101 [1] ✔

[1] $P_u / \phi P_n$ controls

Mid Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T7	120 - 100	L3x3x3/16	9.00	8.00	145.3 K=0.90	1.0900	-2834.15	11670.00	0.243 [1] ✔

[1] $P_u / \phi P_n$ controls

Tension Checks

Leg Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	170 - 166.5	1 3/4	3.50	1.54	42.3	2.4053	4709.48	108238.00	0.044 [1] ✔
T2	166.5 - 161.5	1 3/4	5.00	2.50	68.6	2.4053	12865.20	108238.00	0.119 [1] ✔
T3	161.5 - 154	1 3/4	7.50	2.50	68.6	2.4053	27398.20	108238.00	0.253 [1] ✔
T4	154 - 150	1 3/4	4.00	1.88	51.4	2.4053	37698.40	108238.00	0.348 [1] ✔
T5	150 - 140	Pirod 105244	10.02	10.02	45.4	3.6816	41777.40	165670.00	0.252 [1] ✔
T6	140 - 120	Pirod 105216	20.03	10.02	45.4	3.6816	72314.80	165670.00	0.436 [1] ✔
T7	120 - 100	Pirod 105217	20.03	10.02	37.8	5.3014	115497.00	238565.00	0.484 [1] ✔
T8	100 - 90	Pirod 105217	10.02	10.02	37.8	5.3014	141507.00	238565.00	0.593 [1] ✔
T9	90 - 80	Pirod 105217 w/ 1" Reinf Rod	10.02	10.02	57.8	7.6341	168072.00	343533.00	0.489 [1] ✔
T10	80 - 60	Pirod 105218 w/ 1" Reinf Rod	20.03	10.02	53.4	9.5686	217567.00	430586.00	0.505 [1] ✔
T11	60 - 40	Pirod 105219	20.03	10.02	28.4	9.4248	264886.00	424115.00	0.625 [1] ✔
T12	40 - 20	Pirod 105219 w/ 1" Reinf Rod	20.03	10.02	50.6	11.7171	309965.00	527270.00	0.588 [1]

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T13	20 - 0	Pirod 105220 w/ 1" Reinf Rod	20.03	10.02	47.7	14.2124	352704.00	639559.00	0.551 [1]

[1] P_u / ϕP_n controls

Truss-Leg Diagonal Data

Section No.	Elevation ft	Diagonal Size	L_d ft	Kl/r	ϕP_n lb	A in^2	V_u lb	ϕV_n lb	Stress Ratio
T5	150 - 140	0.5	1.48	142.4	165670.00	0.1963	593.43	2448.25	0.243
T6	140 - 120	0.5	1.48	142.4	165670.00	0.1963	1113.13	2448.25	0.455
T7	120 - 100	0.5	1.47	141.2	238565.00	0.1963	1770.01	2490.00	0.711
T8	100 - 90	0.5	1.47	141.2	238565.00	0.1963	558.97	2490.00	0.225
T9	90 - 80	0.5	1.49	143.2	343533.00	0.1963	364.61	2502.27	0.146
T10	80 - 60	0.5	1.48	141.6	430586.00	0.1963	325.50	2545.74	0.128
T11	60 - 40	0.625	1.45	111.1	424115.00	0.3068	309.75	5809.85	0.053
T12	40 - 20	0.625	1.46	112.2	527270.00	0.3068	897.88	5877.70	0.153
T13	20 - 0	0.625	1.45	111.2	639559.00	0.3068	1602.00	5935.87	0.270

Diagonal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	170 - 166.5	7/8	5.87	2.85	156.4	0.6013	3215.54	27059.40	0.119 [1]
T2	166.5 - 161.5	7/8	5.59	2.71	148.9	0.6013	3488.61	27059.40	0.129 [1]
T3	161.5 - 154	7/8	5.59	2.71	148.9	0.6013	3828.86	27059.40	0.141 [1]
T4	154 - 150	7/8	6.25	3.03	166.4	0.6013	4371.36	27059.40	0.162 [1]
T5	150 - 140	L2 1/2x2 1/2x3/16	11.42	4.98	80.1	0.9020	5153.94	29224.80	0.176 [1]
T6	140 - 120	L3x3x3/16	12.50	5.63	74.6	1.0900	8240.08	35316.00	0.233 [1]
T7	120 - 100	L3x3x3/16	13.80	6.33	83.5	1.0900	10591.00	35316.00	0.300 [1]
T8	100 - 90	L3x3x5/16	14.50	6.70	89.9	1.7800	12642.60	57672.00	0.219 [1]
T9	90 - 80	L3x3x5/16	15.24	7.04	94.4	1.7800	12360.10	57672.00	0.214 [1]
T10	80 - 60	L3x3x3/8	16.80	7.85	105.9	2.1100	13022.10	68364.00	0.190 [1]

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T11	60 - 40	L3 1/2x3 1/2x5/16	18.45	8.68	99.2	2.0900	13476.00	67716.00	0.199 [1]
T12	40 - 20	L3 1/2x3 1/2x3/8	20.16	9.52	109.5	2.4800	14369.70	80352.00	0.179 [1]
T13	20 - 0	L4x4x5/16	21.92	10.40	103.1	2.4000	15639.30	77760.00	0.201 [1]

[1] P_u / ϕP_n controls

Secondary Horizontal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	170 - 166.5	7/8	5.00	4.85	266.3	0.6013	680.71	27059.40	0.025 [1]
T4	154 - 150	7/8	5.00	4.85	266.3	0.6013	679.74	27059.40	0.025 [1]

[1] P_u / ϕP_n controls

Top Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	170 - 166.5	L6x4x3/8	5.00	4.85	50.0	3.6100	1041.86	116964.00	0.009 [1]
T2	166.5 - 161.5	L6x4x3/8	5.00	4.85	50.0	3.6100	283.37	116964.00	0.002 [1]
T5	150 - 140	L3x3x3/16	5.00	4.52	62.0	1.0900	585.38	35316.00	0.017 [1]

[1] P_u / ϕP_n controls

Bottom Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T2	166.5 - 161.5	7/8	5.00	4.85	266.3	0.6013	2.27	27059.40	0.000 [1]

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T4	154 - 150	7/8	5.00	4.85	266.3	0.6013	374.14	27059.40	0.014 [1] ✔

[1] P_u / ϕP_n controls

Mid Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T7	120 - 100	L3x3x3/16	9.00	8.00	102.2	1.0900	3279.24	49050.00	0.067 [1] ✔

[1] P_u / ϕP_n controls

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	ϕP_{allow} lb	% Capacity	Pass Fail
T1	170 - 166.5	Leg	1 3/4	3	-9595.25	94972.70	10.1	Pass
		Diagonal	7/8	12	-3428.41	6854.23	50.0	Pass
		Secondary Horizontal	7/8	13	-712.71	3909.80	18.2	Pass
		Top Girt	L6x4x3/8	4	-951.08	72641.30	1.3	Pass
T2	166.5 - 161.5	Leg	1 3/4	18	-17570.00	76748.10	22.9	Pass
		Diagonal	7/8	29	-3506.52	7568.59	46.3	Pass
		Top Girt	L6x4x3/8	19	173.99	116964.00	0.3	Pass
		Bottom Girt	7/8	22	-36.39	3909.80	0.9	Pass
T3	161.5 - 154	Leg	1 3/4	39	-32995.50	76748.10	43.0	Pass
		Diagonal	7/8	51	-3750.43	7568.59	49.6	Pass
T4	154 - 150	Leg	1 3/4	60	-43897.10	89205.40	49.2	Pass
		Diagonal	7/8	69	-4627.64	6054.87	76.4	Pass
		Secondary Horizontal	7/8	71	-679.74	3909.80	17.4	Pass
		Bottom Girt	7/8	62	-394.33	3909.80	10.1	Pass
T5	150 - 140	Leg	Pirod 105244	75	-48028.90	142493.00	33.7	Pass
		Diagonal	L2 1/2x2 1/2x3/16	84	-5852.66	13558.30	43.2	Pass
		Top Girt	L3x3x3/16	76	-508.01	19368.80	2.6	Pass
T6	140 - 120	Leg	Pirod 105216	87	-85401.30	142493.00	59.9	Pass
		Diagonal	L3x3x3/16	93	-8662.15	17418.80	49.7	Pass
T7	120 - 100	Leg	Pirod 105217	102	-135746.00	214859.00	71.1	Pass
		Diagonal	L3x3x3/16	111	-11706.90	14946.80	78.3	Pass
		Mid Girt	L3x3x3/16	103	-2834.15	11670.00	24.3	Pass
T8	100 - 90	Leg	Pirod 105217	120	-165467.00	214859.00	77.0	Pass
		Diagonal	L3x3x5/16	126	-12942.60	21593.90	59.9	Pass
T9	90 - 80	Leg	Pirod 105217 w/ 1" Reinf Rod	129	-194971.00	269174.00	72.4	Pass
		Diagonal	L3x3x5/16	135	-12641.20	19532.90	64.7	Pass
T10	80 - 60	Leg	Pirod 105218 w/ 1" Reinf Rod	138	-250618.00	349569.00	71.7	Pass
		Diagonal	L3x3x3/8	144	-13330.50	18505.20	72.0	Pass
T11	60 - 40	Leg	Pirod 105219	153	-304417.00	399868.00	76.1	Pass
		Diagonal	L3 1/2x3 1/2x5/16	159	-13927.30	20735.80	67.2	Pass
T12	40 - 20	Leg	Pirod 105219 w/ 1" Reinf Rod	168	-356824.00	437196.00	81.6	Pass
		Diagonal	L3 1/2x3 1/2x3/8	174	-14852.30	20282.40	73.2	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	ϕP_{allow} lb	% Capacity	Pass Fail
T13	20 - 0	Leg	Pirod 105220 w/ 1" Reinf Rod	183	-407135.00	541394.00	75.2	Pass
		Diagonal	L4x4x5/16	189	-17071.80	21761.10	78.5	Pass
							Summary	
							Leg (T12) 81.6	Pass
							Diagonal (T13) 78.5	Pass
							Secondary Horizontal (T1) 18.2	Pass
							Top Girt (T5) 2.6	Pass
							Bottom Girt (T4) 10.1	Pass
							Mid Girt (T7) 24.3	Pass
							Bolt Checks 90.7	Pass
							RATING = 90.7	**Pass**

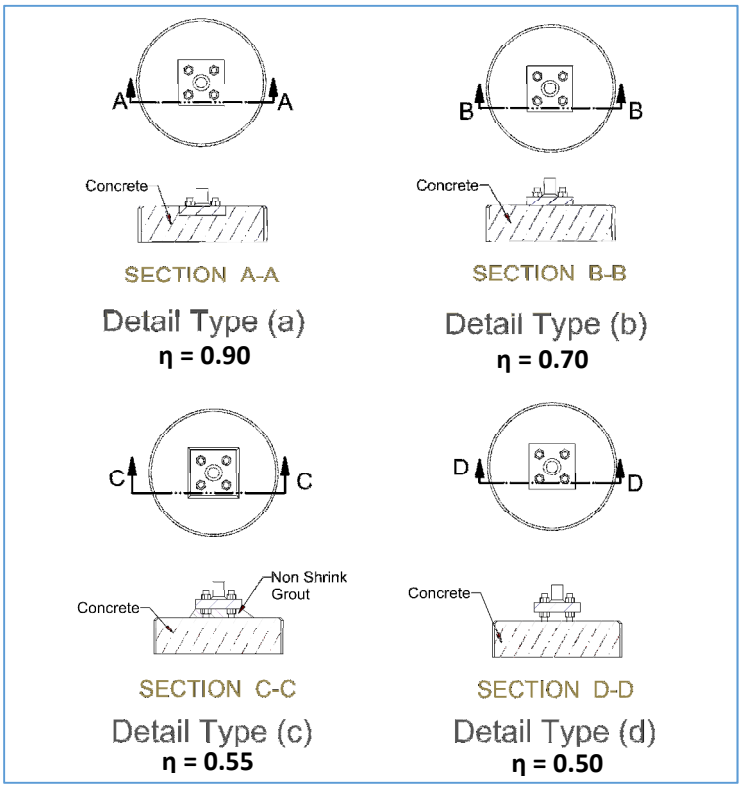
Ramaker & Associates, Inc.
855 Community Drive
Sauk City, WI 53583

Site:	Cromwell - RT. 372 (CT60XC931-A)
Project:	29431
Date:	11/8/17

Self Support Tower Anchor Rod Check - TIA-222-G

Eta, η:	0.55	
Tension, Pu:	364.081	kip
Shear, Vu:	42.153	kip
Quantity:	6	
Diameter:	1.25	in
Grade:	A687	
Fy:	105	ksi
Fu:	150	ksi
Anchor Force:	73.5	kip
Design Capacity:	116.3	kip
Stress Ratio:	63.2%	
Length, lar:		in
Moment, Mu:		kip-in
Stress Ratio:		
Maximum Acceptable:	105%	
Governing Stress Ratio:	**63.2%**	Pass

Anchor Rod Detail Types



Drilled Pier Foundation

Project #:	29431
Site Name:	CT60XC931-A

TIA-222 Revison:	G
Tower Type:	Self Support

Applied Loads	Comp.	Uplift
Moment (kip-ft)	0	0
Axial Force (kips)	420.76	364.081
Shear Force (kips)	46.769	42.153

Material Properties		
Concrete Strength, f'c:	3	ksi
Rebar Strength, Fy:	60	ksi

Pier Design Data		
Depth	41	ft
Ext. Above Grade	0.5	ft
Pier Section 1		
From 0.5' above grade to 41' below grade		
Pier Diameter	5.5	ft
Rebar Quantity	22	
Rebar Size	8	
Clear Cover to Ties	3	in
Tie Size	4	

Analysis Results		
Soil Lateral Capacity	*Compression*	*Uplift*
$D_{v=0}$ (ft from TOC)	21.31	21.31
Soil Safety Factor	22.07	24.49
Max Moment (kip-ft)	687.55	619.69
Rating	*6.0%*	*5.4%*
Soil Vertical Capacity	*Compression*	*Uplift*
Skin Friction (kips)	823.76	823.76
End Bearing (kips)	213.82	-
Weight of Concrete (kips)	177.47	133.11
Total Capacity (kips)	1037.58	956.86
Axial (kips)	598.23	364.08
Rating	*57.7%*	*38.0%*
Reinforced Concrete Capacity	*Compression*	*Uplift*
Critical Depth (ft from TOC)	22.20	19.48
Critical Moment (kip-ft)	685.68	612.87
Critical Moment Capacity	2591.50	1805.85
Rating	*26.5%*	*33.9%*

Min. Steel is assumed

Soil Interaction Rating	**57.7%**
Structural Foundation Rating	**33.9%**

Soil Profile

Groundwater Depth	n/a	ft	# of Layers	2	

Layer	Top (ft)	Bottom (ft)	Thickness (ft)	γ_{soil} (pcf)	$\gamma_{concrete}$ (pcf)	Cohesion (ksf)	Angle of Friction (degrees)	Calculated Ultimate Skin Friction Comp (ksf)	Calculated Ultimate Skin Friction Uplift (ksf)	Ultimate Skin Friction Comp Override (ksf)	Ultimate Skin Friction Uplift Override (ksf)	Ultimate Bearing Capacity (ksf)	SPT Blow Count	Soil Type
1	0	4	4	100	150	0	0	0.00	0.00					Cohesionless
2	4	41	37	100	150	0	30	0.00	0.00	1.72	1.72	12		Cohesionless

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PROJECT: DO MACRO UPGRADE

SITE NAME: CROMWELL - RT. 372

SITE CASCADE: CT60XC931-A

SITE ADDRESS: 179 SHUNPIKE ROAD
CROMWELL, CT 06416

SITE TYPE: 170'-0" SELF SUPPORT

SITE INFORMATION

PROPERTY OWNER:
CROMWELL FIRE DEPARTMENT
1 WEST STREET
CROMWELL, CT 06416

SITE ADDRESS:
179 SHUNPIKE ROAD
CROMWELL, CT 06416
MIDDLESEX COUNTY

GEOGRAPHIC COORDINATES:
LATITUDE: 41° 37' 23.74" N (41.623261° N)
LONGITUDE: -72° 40' 45.62" W (-72.679339° W)

ZONING JURISDICTION:
CROMWELL

ZONING DISTRICT:
A-25 RESIDENTIAL

POWER COMPANY:
CONNECTICUT LIGHT AND POWER
PH.: (800) 286-2000

AAV PROVIDER:
AT&T
PH.: (888) 949-0447

SPRINT CONSTRUCTION MANAGER:
NAME: MIKE DELIA
PHONE: (781) 316-6348
E-MAIL: Michael.Delia@Sprint.com

EQUIPMENT SUPPLIER:
ALCATEL-LUCENT
600-700 MOUNTAIN AVENUE
MURRAY HILL, NJ 07974
PH.: (908) 508-8080

SITE ACQUISITION:
CHARLES CHERUNDOLO CONSULTING, INC.
1280 RT. 46 WEST
PARSIPPANY, NJ 07054
CONTACT: TOM JUPIN, PMP, PROJECT MANAGER
CELL: (973) 819-9033
EMAIL: tom.jupin@cherundoloconsulting.com

PLANS PREPARED BY:
RAMAKER & ASSOCIATES, INC.
CONTACT: KEITH BOHNSACK, PROJECT MANAGER
PH.: (608) 643-4100
EMAIL: kbohnsack@ramaker.com

AREA MAP

LOCATION MAP

PROJECT DESCRIPTION

- REPLACE EXSISTING BTS CABINET
- REPLACE EXISTING BATTERY CABINET
- INSTALL (3) PANEL ANTENNAS
- INSTALL (6) RRH'S ON TOWER
- INSTALL (2) HYBRID CABLES

APPLICABLE CODES

* ALL WORK SHALL BE PERFORMED AND MATERIALS INSTALLED IN ACCORDANCE WITH THE FOLLOWING CODES AS ADOPTED BY THE LOCAL GOVERNING AUTHORITIES. NOTHING IN THESE PLANS IS TO BE CONSTRUED TO PERMIT WORK NOT CONFORMING TO THESE CODES.

1. INTERNATIONAL BUILDING CODE
2. ANSI/TIA-222 STRUCTURAL STANDARD FOR ANTENNA STRUCTURES
3. NFPA 780 - LIGHTNING PROTECTION CODE
4. NATIONAL ELECTRIC CODE

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SHEET INDEX

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A-10	EQUIPMENT DETAILS	-	JRS
E-1	EQUIPMENT UTILITY & GROUNDING PLAN	-	JRS
E-2	GROUNDING DETAILS	-	JRS
E-3	DC POWER DETAILS & PANEL SCHEDULES	-	JRS

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6580 SPRINT PARKWAY
OVERLAND PARK, KANSAS 66251

RAMAKER & ASSOCIATES, INC.
855 Community Drive, Sauk City, WI 53583
Phone: 608-643-4100 Fax: 608-643-7999
www.Ramaker.com

Charles Cherundolo Consulting, Inc.
713 Clover Lane, Moscow, PA 18444
Phone: 570-840-5084 Fax: 570-842-5592

Certification & Seal:
I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Connecticut.

STATE OF CONNECTICUT · JAMES R. SKOWRONSKI · 26266 · LICENSED PROFESSIONAL ENGINEER

Signature: Date: 11/02/2017

MARK	DATE	DESCRIPTION

ISSUE PHASE: FINAL DATE ISSUED: 11/02/2017

PROJECT TITLE:
CROMWELL - RT. 372
CT60XC931-A

PROJECT INFORMATION:
179 SHUNPIKE ROAD
CROMWELL, CT 06416
MIDDLESEX COUNTY

SHEET TITLE:
TITLE SHEET

SCALE: NONE

PROJECT NUMBER: 29431
SHEET NUMBER: T-1

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SECTION 01 100 - SCOPE OF WORK

THE WORK:
THESE STANDARD CONSTRUCTION SPECIFICATIONS IN CONJUNCTION WITH THE CONSTRUCTION DRAWINGS AND ASSOCIATED OUTLINE SPECIFICATIONS AND THE SITE SPECIFIC WORK ORDER, DESCRIBE THE WORK TO BE PERFORMED BY THIS CONSTRUCTION CONTRACTOR (SUPPLIER).

RELATED DOCUMENTS:
A. THE REQUIREMENTS OF EACH SECTION OF THIS SPECIFICATION APPLY TO ALL SECTIONS, INDIVIDUALLY AND COLLECTIVELY.
B. RELATED DOCUMENTS: THE CONTRACTOR SHALL COMPLY WITH THE MOST CURRENT VERSION OF THE FOLLOWING SUPPLEMENTAL REQUIREMENTS FOR INSTALLATION AND TESTING.
   1. EN-2012-001: (FIBER OPTIC, DC CABLE, AND DC CIRCUIT BREAKER TAGGING STANDARDS)
   2. TS-0200 - (TRANSMISSION ANTENNA LINE ACCEPTANCE STANDARDS)
   3. EL-0568: (FIBER TESTING POLICY)
   4. NP-312-201: (EXTERIOR GROUNDING SYSTEM TESTING)
   5. NP-760-500: ETHERNET, MICROWAVE, TESTING AND ACCEPTANCE

PRECEDENCE:
SHOULD CONFLICTS OCCUR BETWEEN THE STANDARD CONSTRUCTION SPECIFICATIONS FOR WIRELESS SITES AND THE CONSTRUCTION DRAWINGS, INFORMATION ON THE CONSTRUCTION DRAWINGS SHALL TAKE PRECEDENCE. NOTIFY SPRINT CONSTRUCTION MANAGER IF THIS OCCURS.

NATIONALLY RECOGNIZED CODES AND STANDARDS:
THE WORK SHALL COMPLY WITH APPLICABLE NATIONAL AND LOCAL CODES AND STANDARDS, LATEST EDITION, AND PORTIONS THEREOF, INCLUDED BUT NOT LIMITED TO THE FOLLOWING:
A. GR-63-CORE NEBS REQUIREMENTS: PHYSICAL PROTECTION
B. GR-78-CORE GENERIC REQUIREMENTS FOR THE PHYSICAL DESIGN AND MANUFACTURE OF TELECOMMUNICATIONS EQUIPMENT.
C. GR-1089 CORE, ELECTROMAGNETIC COMPATIBILITY AND ELECTRICAL SAFETY -GENERIC CRITERIA FOR NETWORK TELECOMMUNICATIONS EQUIPMENT.
D. NATIONAL FIRE PROTECTION ASSOCIATION CODES AND STANDARDS (NFPA) INCLUDING NFPA 70 (NATIONAL ELECTRICAL CODE - "NEC") AND NFPA 101 (LIFE SAFETY CODE).
E. AMERICAN SOCIETY FOR TESTING OF MATERIALS (ASTM)
F. INSTITUTE OF ELECTRONIC AND ELECTRICAL ENGINEERS (IEEE)
G. AMERICAN CONCRETE INSTITUTE (ACI)
H. AMERICAN WIRE PRODUCERS ASSOCIATION (AWPA)
I. CONCRETE REINFORCING STEEL INSTITUTE (CRSI)
J. AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)
K. PORTLAND CEMENT ASSOCIATION (PCA)
L. NATIONAL CONCRETE MASONRY ASSOCIATION (NCMA)
M. BRICK INDUSTRY ASSOCIATION (BIA)
N. AMERICAN WELDING SOCIETY (AWS)
O. NATIONAL ROOFING CONTRACTORS ASSOCIATION (NRCA)
P. SHEET METAL AND AIR CONDITIONING CONTRACTORS' NATIONAL ASSOCIATION (SMACNA)
Q. DOOR AND HARDWARE INSTITUTE (DHI)
R. OCCUPATIONAL SAFETY AND HEALTH ACT (OSHA)
S. APPLICABLE BUILDING CODES INCLUDING UNIFORM BUILDING CODE, SOUTHERN BUILDING CODE, BOCA, AND THE INTERNATIONAL BUILDING CODE.

DEFINITIONS:
A. WORK: THE SUM OF TASKS AND RESPONSIBILITIES IDENTIFIED IN THE CONTRACT DOCUMENTS.
B. COMPANY: "SPRINT"; SPRINT NEXTEL CORPORATION AND IT'S OPERATING ENTITIES.
C. ENGINEER: SYNONYMOUS WITH ARCHITECT & ENGINEER AND "A&E". THE DESIGN PROFESSIONAL HAVING PROFESSIONAL RESPONSIBILITY FOR DESIGN OF THE PROJECT.
D. CONTRACTOR: CONSTRUCTION CONTRACTOR, SUPPLIER, CONSTRUCTION VENDOR; INDIVIDUAL OR ENTITY WHO AFTER EXECUTION OF A CONTRACT IS BOUND TO ACCOMPLISH THE WORK.
E. THIRD PARTY VENDOR OR AGENCY: A VENDOR OR AGENCY ENGAGED SEPARATELY BY THE COMPANY, A&E, OR CONTRACTOR TO PROVIDE MATERIALS OR TO ACCOMPLISH SPECIFIC TASKS RELATED TO BUT NOT INCLUDED IN THE WORK.
F. CONSTRUCTION MANAGER - ALL PROJECTS RELATED COMMUNICATION TO FLOW THROUGH SPRINT REPRESENTATIVE IN CHARGE OF PROJECT.

SITE FAMILIARITY:
CONTRACTOR SHALL BE RESPONSIBLE FOR FAMILIARIZING HIMSELF WITH ALL CONTRACT DOCUMENTS, FIELD CONDITIONS AND DIMENSIONS PRIOR TO PROCEEDING WITH CONSTRUCTION. ANY DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE SPRINT CONSTRUCTION MANAGER PRIOR TO THE COMMENCEMENT OF WORK. NO COMPENSATION WILL BE AWARDED BASED ON CLAIM OF LACK OF KNOWLEDGE OR FIELD CONDITIONS.

POINT OF CONTACT:
COMMUNICATION BETWEEN SPRINT AND THE CONTRACTOR SHALL FLOW THROUGH THE SINGLE SPRINT CONSTRUCTION MANAGER APPOINTED TO MANAGE THE PROJECT FOR SPRINT.

ON-SITE SUPERVISION:
THE CONTRACTOR SHALL SUPERVISE AND DIRECT THE WORK AND SHALL BE RESPONSIBLE FOR CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES, AND PROCEDURES IN ACCORDANCE WITH THE CONTRACT DOCUMENTS. THE CONTRACTOR SHALL EMPLOY A COMPETENT SUPERINTENDENT WHO SHALL BE IN ATTENDANCE AT THE SITE AT ALL TIMES DURING PERFORMANCE OF THE WORK.

DRAWINGS REQUIRED AT JOBSITE:
THE CONSTRUCTION CONTRACTOR SHALL MAINTAIN A FULL SET OF THE CONSTRUCTION DRAWINGS FOR WIRELESS SITES AND THE STANDARD CONSTRUCTION SPECIFICATIONS FOR WIRELESS SITES AT THE JOBSITE FROM MOBILIZATION THROUGH CONSTRUCTION COMPLETION.
A. THE JOBSITE DRAWINGS SHALL BE CLEARLY MARKED DAILY IN RED PENCIL WITH ANY CHANGES IN CONSTRUCTION OVER WHAT IS DEPICTED IN THE DOCUMENTS. AT CONSTRUCTION COMPLETION, THIS JOBSITE MARKUP SET SHALL BE DELIVERED TO THE COMPANY OR COMPANY'S DESIGNATED REPRESENTATIVE TO BE FORWARDED TO THE COMPANY'S A&E VENDOR FOR PRODUCTION OF "AS-BUILT" DRAWINGS.
B. DIMENSIONS SHOWN ARE TO FINISH SURFACES UNLESS NOTED OTHERWISE. SPACING BETWEEN EQUIPMENT IS THE REQUIRED CLEARANCE. SHOULD THERE BE ANY QUESTIONS REGARDING THE CONTRACT DOCUMENTS, EXISTING CONDITIONS AND/OR DESIGN INTENT, THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING A CLARIFICATION FROM THE SPRINT CONSTRUCTION MANAGER PRIOR TO PROCEEDING WITH THE WORK.

USE OF JOB SITE:
THE CONTRACTOR SHALL CONFINE ALL CONSTRUCTION AND RELATED OPERATIONS INCLUDING STAGING AND STORAGE OF MATERIALS AND EQUIPMENT, PARKING, TEMPORARY FACILITIES, AND WASTE STORAGE TO THE LEASE PARCEL UNLESS OTHERWISE PERMITTED BY THE CONTRACT DOCUMENTS.

UTILITY SERVICES:
WHERE NECESSARY TO CUT EXISTING PIPES, ELECTRICAL WIRES, CONDUITS, CABLES, ETC., OF UTILITY SERVICES, OR OF FIRE PROTECTION OR COMMUNICATIONS SYSTEMS, THEY SHALL BE CUT AND CAPPED AT SUITABLE PLACES OR WHERE SHOWN. ALL SUCH ACTIONS SHALL BE COORDINATED WITH THE UTILITY COMPANY INVOLVED:

PERMITS/FEES:
WHEN REQUIRED THAT A PERMIT OR CONNECTION FEE BE PAID TO A PUBLIC UTILITY PROVIDER FOR NEW SERVICE TO THE CONSTRUCTION PROJECT, PAYMENT OF SUCH FEE SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.

CONTRACTOR:
CONTRACTOR SHALL TAKE ALL MEASURES AND PROVIDE ALL MATERIAL NECESSARY FOR PROTECTING EXISTING EQUIPMENT AND PROPERTY.

USE OF ELECTRONIC PROJECT MANAGEMENT SYSTEMS:
CONTRACTOR WILL UTILIZE ITS BEST EFFORTS TO WORK WITH SPRINT ELECTRONIC PROJECT MANAGEMENT SYSTEMS. CONTRACTOR UNDERSTANDS THAT SUFFICIENT INTERNET ACCESS, EQUIVALENT TO "BROADBAND" OR BETTER, IS REQUIRED TO TIMELY AND EFFECTIVELY UTILIZE SPRINT DATA AND DOCUMENT MANAGEMENT SYSTEMS AND AGREES TO MAINTAIN APPROPRIATE CONNECTIONS FOR CONTRACTOR'S STAFF AND OFFICES THAT ARE COMPATIBLE WITH SPRINT DATA AND DOCUMENT MANAGEMENT SYSTEMS

TEMPORARY UTILITIES AND FACILITIES:
THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL TEMPORARY UTILITIES AND FACILITIES NECESSARY EXCEPT AS OTHERWISE INDICATED IN THE CONSTRUCTION DOCUMENTS. TEMPORARY UTILITIES AND FACILITIES INCLUDE POTABLE WATER, HEAT, HVAC, ELECTRICITY, SANITARY FACILITIES, WASTE DISPOSAL FACILITIES, AND TELEPHONE/COMMUNICATION SERVICES. PROVIDE TEMPORARY UTILITIES AND FACILITIES IN ACCORDANCE WITH OSHA AND THE AUTHORITY HAVING JURISDICTION. CONTRACTOR MAY UTILIZE THE COMPANY ELECTRICAL SERVICE IN THE COMPLETION OF THE WORK WHEN IT BECOMES AVAILABLE. USE OF THE LESSOR'S OR SITE OWNER'S UTILITIES OR FACILITIES IS EXPRESSLY FORBIDDEN EXCEPT AS OTHERWISE ALLOWED IN THE CONTRACT DOCUMENTS.

ACCESS TO WORK:
THE CONTRACTOR SHALL PROVIDE ACCESS TO THE JOB SITE FOR AUTHORIZED COMPANY PERSONNEL AND AUTHORIZED REPRESENTATIVES OF THE ARCHITECT/ENGINEER DURING ALL PHASES OF THE WORK.

DIMENSIONS:
VERIFY DIMENSIONS INDICATED ON DRAWINGS WITH FIELD DIMENSIONS BEFORE FABRICATION OR ORDERING OF MATERIALS. DO NOT SCALE DRAWINGS.

EXISTING CONDITIONS:
NOTIFY THE SPRINT CONSTRUCTION MANAGER OF EXISTING CONDITIONS DIFFERING FROM THOSE INDICATED ON THE DRAWINGS. DO NOT REMOVE OR ALTER STRUCTURAL COMPONENTS WITHOUT PRIOR WRITTEN APPROVAL FROM THE ARCHITECT AND ENGINEER.

SECTION 01 200 - COMPANY FURNISHED MATERIAL AND EQUIPMENT

FURNISHED MATERIALS:
COMPANY FURNISHED MATERIALS AND EQUIPMENT TO BE INSTALLED BY THE CONTRACTOR (OFIC) IS IDENTIFIED ON THE RF DATA SHEET IN THE CONSTRUCTION DOCUMENTS.

RECEIPT OF MATERIAL AND EQUIPMENT:
A. THE CONTRACTOR IS RESPONSIBLE FOR SPRINT PROVIDED MATERIAL AND EQUIPMENT AND UPON RECEIPT SHALL:
   1. ACCEPT DELIVERIES AS SHIPPED AND TAKE RECEIPT.
   2. VERIFY COMPLETENESS AND CONDITION OF ALL DELIVERIES.
   3. TAKE RESPONSIBILITY FOR EQUIPMENT AND PROVIDE INSURANCE PROTECTION AS REQUIRED IN AGREEMENT.
B. RECORD ANY DEFECTS OR DAMAGES AND WITHIN TWENTY-FOUR HOURS AFTER RECEIPT, REPORT TO SPRINT OR ITS DESIGNATED PROJECT REPRESENTATIVE OF SUCH.
C. PROVIDE SECURE AND NECESSARY WEATHER PROTECTED WAREHOUSING.
D. COORDINATE SAFE AND SECURE TRANSPORTATION OF MATERIAL AND EQUIPMENT, DELIVERING AND OFF-LOADING FROM CONTRACTOR'S WAREHOUSE TO SITE.

DELIVERABLES:
A. COMPLETE SHIPPING AND RECEIPT DOCUMENTATION IN ACCORDANCE WITH COMPANY PRACTICE.
B. IF APPLICABLE, COMPLETE LOST/STOLEN/DAMAGED DOCUMENTATION REPORT AS NECESSARY IN ACCORDANCE WITH COMPANY PRACTICE, AND AS DIRECTED BY COMPANY.

SECTION 01 300 - CELL SITE CONSTRUCTION

NOTICE TO PROCEED:
A. NO WORK SHALL COMMENCE PRIOR TO COMPANY'S ISSUANCE OF THE WORK ORDER.
B. UPON RECEIVING NOTICE TO PROCEED, CONTRACTOR SHALL FULLY PERFORM ALL WORK NECESSARY TO PROVIDE SPRINT WITH AN OPERATIONAL WIRELESS FACILITY.

GENERAL REQUIREMENTS FOR CONSTRUCTION:
A. CONTRACTOR SHALL KEEP THE SITE FREE FROM ACCUMULATING WASTE MATERIAL, DEBRIS, AND TRASH. AT THE COMPLETION OF THE WORK, CONTRACTOR SHALL REMOVE FROM THE SITE ALL REMAINING RUBBISH, IMPLEMENTS, TEMPORARY FACILITIES, AND SURPLUS MATERIALS.
B. EQUIPMENT ROOMS SHALL AT ALL TIMES BE MAINTAINED "BROOM CLEAN" AND CLEAR OF DEBRIS.
C. CONTRACTOR SHALL TAKE ALL REASONABLE PRECAUTIONS TO DISCOVER AND LOCATE ANY HAZARDOUS CONDITION.
   1. IN THE EVENT CONTRACTOR ENCOUNTERS ANY HAZARDOUS CONDITION WHICH HAS NOT BEEN ABATED OR OTHERWISE MITIGATED, CONTRACTOR AND ALL OTHER PERSONS SHALL IMMEDIATELY STOP WORK IN THE AFFECTED AREA AND NOTIFY COMPANY IN WRITING. THE WORK IN THE AFFECTED AREA SHALL NOT BE RESUMED EXCEPT BY WRITTEN NOTIFICATION BY COMPANY.
   2. CONTRACTOR AGREES TO USE CARE WHILE ON THE SITE AND SHALL NOT TAKE ANY ACTION THAT WILL OR MAY RESULT IN OR CAUSE THE HAZARDOUS CONDITION TO BE FURTHER RELEASED IN THE ENVIRONMENT, OR TO FURTHER EXPOSE INDIVIDUALS TO THE HAZARD.
D. CONTRACTOR'S ACTIVITIES SHALL BE RESTRICTED TO THE PROJECT LIMITS. SHOULD AREAS OUTSIDE THE PROJECT LIMITS BE AFFECTED BY CONTRACTOR'S ACTIVITIES, CONTRACTOR SHALL IMMEDIATELY RETURN THEM TO ORIGINAL CONDITION

FUNCTIONAL REQUIREMENTS:
A. THE ACTIVITIES DESCRIBED IN THIS PARAGRAPH REPRESENT MINIMUM ACTIONS AND PROCESSES REQUIRED TO SUCCESSFULLY COMPLETE THE WORK. CONTRACTOR SHALL TAKE ALL ACTIONS AS NECESSARY TO SUCCESSFULLY COMPLETE THE CONSTRUCTION OF A FULLY FUNCTIONING WIRELESS FACILITY AT THE SITE IN ACCORDANCE WITH COMPANY PROCESSES.
B. SUBMIT SPECIFIC DOCUMENTATION AS INDICATED HEREIN, AND OBTAIN REQUIRED APPROVALS WHILE THE WORK IS BEING PERFORMED.
C. MANAGE AND CONDUCT ALL FIELD CONSTRUCTION SERVICE RELATED ACTIVITIES
D. PROVIDE CONSTRUCTION ACTIVITIES TO THE EXTENT REQUIRED BY THE CONTRACT DOCUMENTS, INCLUDING BUT NOT LIMITED TO THE FOLLOWING:
   1. PERFORM ANY REQUIRED SITE ENVIRONMENTAL MITIGATION.
   2. PREPARE GROUND SITES; PROVIDE DE-GRUBBING; AND ROUGH AND FINAL GRADING, AND COMPOUND SURFACE TREATMENTS.
   3. MANAGE AND CONDUCT ALL ACTIVITIES FOR INSTALLATION OF UTILITIES INCLUDING ELECTRICAL AND BACKHAUL (FIBER, COPPER, OR MICROWAVE).
   4. INSTALL UNDERGROUND FACILITIES INCLUDING UNDERGROUND POWER AND COMMUNICATIONS CONDUITS, AND UNDERGROUND GROUNDING SYSTEM.
   5. INSTALL ABOVE GROUND GROUNDING SYSTEMS, CONDUIT AND BOXES.
   6. PROVIDE NEW HVAC INSTALLATIONS AND MODIFICATIONS.
   7. INSTALL "H-FRAMES", CABINETS AND PADS AND PLATFORMS AS INDICATED.
   8. INSTALL ROADS, ACCESS WAYS, CURBS AND DRAINS AS INDICATED.
   9. ACCOMPLISH REQUIRED MODIFICATION OF EXISTING FACILITIES.
   10. PROVIDE ANTENNA SUPPORT STRUCTURE FOUNDATIONS.
   11. PROVIDE SLABS AND EQUIPMENT PLATFORMS.
   12. INSTALL COMPOUND FENCING, SIGHT SHIELDING, LANDSCAPING AND ACCESS BARRIERS.
   13. PERFORM INSPECTION AND MATERIAL TESTING AS REQUIRED HEREINAFTER.
   14. CONDUCT SITE RESISTANCE TO EARTH TESTING AS REQUIRED HEREINAFTER
   15. INSTALL FIXED GENERATOR SETS AND OTHER STANDBY POWER SOLUTIONS.
   16. INSTALL TOWERS, ANTENNA SUPPORT STRUCTURES AND PLATFORMS ON EXISTING TOWERS AS REQUIRED.
   17. INSTALL CELL SITE RADIOS, MICROWAVE, GPS, COAXIAL MAINLINE, ANTENNAS, CROSS BAND COUPLERS, TOWER TOP AMPLIFIERS, LOW NOISE AMPLIFIERS AND RELATED EQUIPMENT.
   18. CONDUCT ALL REQUIRED TESTS AND INSPECTIONS
   19. PERFORM, DOCUMENT, AND CLOSE OUT ALL JURISDICTIONAL PERMITTING REQUIREMENTS AND ANY CONSTRUCTION CONTROL DOCUMENTS THAT MAY BE REQUIRED BY GOVERNMENT AGENCIES AND LANDLORDS.
   20. PERFORM ALL ADDITIONAL WORK AS IDENTIFIED IN SCOPE OF SERVICES ATTACHED TO THE SUPPLIER AGREEMENT FOR THIS PROJECT. THIS WORK MAY INCLUDE COMMISSIONING, INTEGRATION, SPECIAL WAREHOUSING, REVERSE LOGISTICS ACTIVITIES, ETC. PERFORM COMMISSIONING AND INTEGRATION ACTIVITIES PER APPLICABLE MOPS.

DELIVERABLES:
A. THE CONTRACTOR SHALL PROVIDE ALL REQUIRED TEST REPORTS AND DOCUMENTATION INCLUDED BUT NOT LIMITED TO THE FOLLOWING:
   1. PRODUCT SPECIFICATIONS FOR MATERIALS OR SPECIAL CONSTRUCTION IF REQUESTED BY SPRINT
   2. ACTUALIZE ALL CONSTRUCTION RELATED MILESTONES IN SITERRA AND COMPLETE ALL ON-LINE FORMS AND COMPLETE DOCUMENT UP-LOADS. UPLOAD ALL REQUIRED CLOSEOUT DOCUMENTS AND FINAL SITE PHOTOS
   3. SCANABLE BARCODE PHOTOGRAPHS OF TOWER TOP AND INACCESSIBLE SERIALIZED EQUIPMENT LEFT ON SITE INSIDE BASE OF MAIN RF CABINET IN A PROTECTIVE POUCH.
   4. ALL REQUIRED TEST REPORTS.
   5. REQUIRED CLOSEOUT DOCUMENTATION INCLUDING BUT NOT LIMITED TO:
      a. ALL JURISDICTIONAL PERMITTING AND OCCUPANCY INFORMATION
      b. PDF SCAN OF REDLINES PRODUCED IN THE FIELD
      c. ELECTRONIC AS-BUILT DRAWINGS IN AUTOCAD AND PDF FORMATS
      d. LIEN WAIVERS
      e. FINAL PAYMENT APPLICATION
      f. REQUIRED FINAL CONSTRUCTION PHOTOS
      g. CONSTRUCTION AND COMMISSIONING CHECKLIST COMPLETE WITH NO DEFICIENT ITEMS
      h. LISTS OF SUBCONTRACTORS
B. PROVIDE ADDITIONAL DOCUMENTATION INCLUDING, BUT NOT LIMITED TO, THE FOLLOWING. DOCUMENTATION SHALL BE FORWARDED IN ORIGINAL FORMAT AND/OR UPLOADED INTO SMS.
   1. ALL CORRESPONDENCE AND PRELIMINARY CONSTRUCTION REPORTS.
   2. PROJECT PROGRESS REPORTS.
   3. PRE-CONSTRUCTION MEETING NOTES.

SECTION 01 400 - TESTS, INSPECTIONS, SUBMITTALS, AND PROJECT CLOSEOUT

TESTS AND INSPECTIONS:
A. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL CONSTRUCTION TESTS, INSPECTIONS AND PROJECT DOCUMENTATION.
B. CONTRACTOR SHALL ACCOMPLISH TESTING INCLUDING BUT NOT LIMITED TO THE FOLLOWING:
   1. COAX SWEEPS AND FIBER TESTS PER TS-0200 (CURRENT VERSION) ANTENNA LINE ACCEPTANCE STANDARDS
   2. POST CONSTRUCTION HEIGHT VERIFICATION, AZIMUTH AND DOWNTILT USING ELECTRONIC COMMERCIAL MADE-FOR-THE-PURPOSE ANTENNA ALIGNMENT TOOL.
   3. CONCRETE BREAK TESTS
   4. SITE RESISTANCE TO EARTH TEST
   5. STRUCTURAL BACKFILL COMPACTION TESTS
   6. CONTRACTOR SHALL BE RESPONSIBLE FOR ANY AND ALL CORRECTIONS TO ANY WORK IDENTIFIED AS UNACCEPTABLE IN SITE INSPECTION ACTIVITIES AND/OR AS A RESULT OF TESTING.
   7. ADDITIONAL TESTING AS REQUIRED ELSEWHERE IN THIS SPECIFICATION.

SUBMITTALS:
A. THE WORK IN ALL ASPECTS SHALL COMPLY WITH THE CONSTRUCTION DRAWINGS AND THESE SPECIFICATIONS.
B. UPLOAD THE FOLLOWING TO SITERRA AS APPLICABLE INCLUDING BUT NOT LIMITED TO THE FOLLOWING:
   1. CONCRETE MIX-DESIGNS FOR TOWER FOUNDATIONS, ANCHORS PIERS, AND CONCRETE PAVING.
   2. CONCRETE BREAK TESTS AS SPECIFIED HEREIN.
   3. CHEMICAL GROUNDING SYSTEM .
   4. REINFORCEMENT CERTIFICATIONS
   5. STRUCTURAL BACKFILL TEST RESULTS
   6. SWEEP AND FIBER TESTS
   7. ANTENNA AZIMUTH AND DOWN-TILT VERIFICATION
   8. POST CONSTRUCTION HEIGHT VERIFICATION
   9. ADDITIONAL SUBMITTALS MAY BE REQUIRED FOR SPECIAL CONSTRUCTION OR MINOR MATERIALS
C. ALTERNATES: AT THE COMPANY'S REQUEST, ANY ALTERNATIVES TO THE MATERIALS OR METHODS SPECIFIED SHALL BE SUBMITTED TO SPRINT'S CONSTRUCTION MANAGER FOR APPROVAL PRIOR TO BEING SHIPPED TO SITE. SPRINT WILL REVIEW AND APPROVE ONLY THOSE REQUESTS MADE IN WRITING. NO VERBAL APPROVALS WILL BE CONSIDERED. SUBMITTAL FOR APPROVAL SHALL INCLUDE A STATEMENT OF COST REDUCTION PROPOSED FOR USE OF ALTERNATE PRODUCT.

TESTING BY THIRD PARTY AGENCY:
A. EMPLOY AN AGENCY OF ENGINEERS AND SCIENTISTS WHO IS REGULARLY ENGAGED IN FIELD AND LABORATORY TESTING AND ANALYSIS. AGENCY SHALL HAVE BEEN IN BUSINESS A MINIMUM OF FIVE YEARS, AND BE LICENSED AS PROFESSIONAL ENGINEERS IN THE STATE WHERE THE PROJECT IS LOCATED. AGENCY IS SUBJECT TO APPROVAL BY COMPANY.
   1. AGENCY MUST HAVE A THOROUGH UNDERSTANDING OF LOCAL AVAILABLE MATERIALS, INCLUDING THE SOIL, ROCK, AND GROUNDWATER CONDITIONS.
   2. AGENCY IS TO BE FAMILIAR WITH THE APPLICABLE REQUIREMENTS FOR THE TESTS TO BE DONE, EQUIPMENT TO BE USED, AND ASSOCIATED HEALTH AND SAFETY ISSUES.
   3. EXPERIENCE IN SOILS, CONCRETE, MASONRY, AGGREGATE, AND ASPHALT TESTING USING ASTM, AASJTO, AND OTHER METHODS IS NEEDED.
B. REQUIRED THIRD PARTY TESTS:
   1. SITE RESISTANCE TO EARTH TEST PER NP-312-201
   2. CONCRETE CYLINDER BREAK TESTS FOR TOWER PIER AND ANCHORS PER NATIONALLY RECOGNIZED STANDARDS
   3. STRUCTURAL SOILS COMPACTION TESTS PER NATIONALLY RECOGNIZED STANDARDS
   4. REBAR PLACEMENT VERIFICATION WITH REPORT
   5. TESTING TENSION STUDY FOR ROCK ANCHORS
   6. ALL THIRD PARTY TESTS AS REQUIRED BY LOCAL JURISDICTION
C. REQUIRED TESTS BY CONTRACTOR
   1. COAX SWEEP TESTS PER SPRINT STANDARD TS-0200
   2. FIBER TESTS PER SPRINT STANDARD EL-0568
   3. MICROWAVE LINK TESTS PER NP-760-500
   4. ANTENNA AZIMUTHS AND DOWN TILT USING ELECTRONIC ALIGNMENT TOOL PER ANTENNA INSTALLATION SPECIFICATION HEREIN.

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Certification & Seal:
I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Connecticut.

STATE OF CONNECTICUT · JAMES R. SKOWRONSKI · 26266 · LICENSED PROFESSIONAL ENGINEER

Signature: Date: 11/02/2017

MARK	DATE	DESCRIPTION
.		

ISSUE PHASE: FINAL DATE ISSUED: 11/02/2017

PROJECT TITLE:
CROMWELL - RT. 372
CT60XC931-A

PROJECT INFORMATION:
179 SHUNPIKE ROAD
CROMWELL, CT 06416
MIDDLESEX COUNTY

SHEET TITLE:
SPRINT SPECIFICATIONS

SCALE: NONE

PROJECT NUMBER: 29431
SHEET NUMBER: SP-1

DRAWN BY: SLS CHECKED BY: KAB

5. POST CONSTRUCTION HEIGHT VERIFICATION AS REQUIRED HEREWITH IN THE TOWER INSTALLATION SPECIFICATIONS.
6. ASPHALT ROADWAY COMPACTED THICKNESS, SURFACE SMOOTHNESS, AND COMPACTED DENSITY TESTING AS SPECIFIED HEREWITH IN THE ASPHALT PAVING SPECIFICATIONS.
7. FIELD QUALITY CONTROL TESTING AS SPECIFIED HEREWITH IN THE CONCRETE PAVING SPECIFICATIONS.
8. TESTING REQUIRED HEREWITH UNDER SPECIFICATIONS FOR AGGREGATE BASE FOR ROADWAYS
9. ALL OTHER TESTS REQUIRED BY LOCAL JURISDICTION

D. INSPECTIONS BY COMPANY: THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY AND ALL CORRECTIONS TO ANY WORK IDENTIFIED AS UNACCEPTABLE IN INSPECTION ACTIVITIES, FINAL ACCEPTANCE / PUNCH WALK REVIEW, AND/OR AS A RESULT OF TESTING

E. SPRINT RESERVES THE RIGHT TO INSPECT THE CONSTRUCTION SITE AT ANY TIME VIA SITE WALKS AND/OR PHOTO REVIEWS. CONTRACTOR SHALL GIVE SPRINT 24 HOURS NOTICE PRIOR TO THE COMMENCEMENT OF THE FOLLOWING CONSTRUCTION ACTIVITIES AND PHOTOGRAPHS OF THE IN-PROGRESS WORK.
1. GROUNDING SYSTEM AND BURIED UTILITIES INSTALLATION PRIOR TO EARTH CONCEALMENT DOCUMENTED WITH DIGITAL PHOTOGRAPHS BY CONTRACTOR, APPROVED BY A&E OR SPRINT REPRESENTATIVE.
2. FORMING FOR CONCRETE AND REBAR PLACEMENT PRIOR TO POUR DOCUMENTED WITH DIGITAL PHOTOGRAPHS BY CONTRACTOR, APPROVED BY A&E OR SPRINT REPRESENTATIVE.
3. COMPACTION OF BACKFILL MATERIALS, AGGREGATE BASE FOR ROADS, PADS, AND ANCHORS, ASPHALT PAVING, AND SHAFT BACKFILL FOR CONCRETE AND WOOD POLES, BY INDEPENDENT THIRD PARTY AGENCY.
4. PRE AND POST CONSTRUCTION ROOFTOP AND STRUCTURAL INSPECTIONS ON EXISTING FACILITIES. PRIOR TO CONSTRUCTION ACTIVITIES AND AFTER CONSTRUCTION IS COMPLETE, PROVIDE PHOTOGRAPHIC DOCUMENTATION OF ROOF, FLASHINGS, AND PARAPETS, BOTH BEFORE AND AFTER CONSTRUCTION IS COMPLETE.
5. TOWER ERECTION SECTION STACKING AND PLATFORM ATTACHMENT DOCUMENTED BY DIGITAL PHOTOGRAPHS BY THIRD PARTY AGENCY.
6. TOWER TOP AND INACCESSIBLE EQUIPMENT (RRUS, ANTENNAS, AND CABLING): PROVIDE PHOTOS OF THE BACKS OF ALL ANTENNAS, RRUS, COMBINERS, FILTERS, FIBER AND DC CABLING, CABLE COLOR CODING, EQUIPMENT GROUNDING AND CONNECTOR WATER PROOFING INCLUDING NAME PLATE AND SERIAL NUMBER FOR ALL SERIALIZED EQUIPMENT.

PROJECT CLOSEOUT:

A. FINAL ACCEPTANCE PUNCH WALK AND INSPECTION: AS IDENTIFIED IN THE SCOPE OF SERVICES, SPRINT WILL CONDUCT A FINAL PUNCH WALK OR FINAL DESK TOP PHOTO REVIEW (SITE MODIFICATIONS). PUNCH WALKS MUST BE SCHEDULED IN ADVANCE AS REQUIRED. AT THE PUNCH WALK / REVIEW, SPRINT MAY IDENTIFY CRITICAL DEFICIENCIES WHICH MUST BE CORRECTED PRIOR TO PUTTING SITE ON AIR. MINOR DEFICIENCIES MUST BE CORRECTED WITHIN 30 DAYS EXCEPT AS OTHERWISE REQUIRED. VERIFICATIONS OF CORRECTIONS MAY BE MADE BY COMPANY DURING A REPEAT SITE WALK OR DESK TOP PHOTO REVIEW AT COMPANY'S SOLE DISCRETION.

B. CLOSEOUT DOCUMENTATION: ALL CLOSEOUT DOCUMENTATION AND PHOTOGRAPHS SHALL BE UPLOADED PRIOR TO FINAL ACCEPTANCE. SPRINT WILL REVIEW CLOSEOUT DOCUMENTATION FOR PRESENCE AND CONTENT. CLOSEOUT DOCUMENTATION SHALL INCLUDE BUT IS NOT LIMITED TO THE FOLLOWING AS APPLICABLE:
1. COAX SWEEP TESTS:
2. FIBER TESTS:
3. JURISDICTION FINAL INSPECTION DOCUMENTATION
4. REINFORCEMENT CERTIFICATION (MILL CERTIFICATION)
5. CONCRETE MIX DESIGN AND PRODUCT DATA (TOWER FOUNDATION)
6. LIEN WAIVERS AND RELEASES.
7. POST -CONSTRUCTION HEIGHT VERIFICATION
8. JURISDICTION CERTIFICATE OF OCCUPANCY
9. ELECTRONIC ANTENNA AZIMUTH AND DOWN TILT VERIFICATION
10. STRUCTURAL BACKFILL TEST RESULTS (IF APPLICABLE)
11. CELL SITE UTILITY SETUP
12. AS-BUILT REDLINE CONSTRUCTION DRAWINGS (PDF SCAN OF FIELD MARKS)
13. AS-BUILT CONSTRUCTION DRAWINGS IN DWG AND PDF FORMATS
14. LIST OF SUB CONTRACTORS
15. APPROVED PERMITTING DOCUMENTS
16. FINAL SITE PHOTOS UP-LOADED TO SITERRA. INCLUDE THE FOLLOWING AS APPLICABLE:
    a. TOWER, ANTENNAS, RRUS, AND MAINLINE: INSPECTION AND PHOTOGRAPHS OF SECTION STACKING; INSPECTION AND PHOTOGRAPHS OF PLATFORM COMPONENT ATTACHMENT POINTS; PHOTOGRAPHS OF TOWER TOP GROUNDING; PHOTOS OF TOWER COAX/CABLE LINE COLOR CODING AT THE TOP AND AT GROUND LEVEL; INSPECTION AND PHOTOGRAPHS OF OPERATIONAL OF TOWER LIGHTING, AND PLACEMENT OF FAA REGISTRATION SIGN; PHOTOGRAPHS SHOWING ADDITIONAL GROUNDING POINTS FOR TOWERS GREATER THAN 200 FEET.; PHOTOS OF ANTENNA GROUND BAR, EQUIPMENT GROUND BAR, AND MASTER GROUND BAR; PHOTOS OF GPS ANTENNA(S); PHOTOS OF EACH SECTOR OF ANTENNAS; ONE PHOTOGRAPH LOOKING AT THE SECTOR AND ONE FROM BEHIND SHOWING THE PROJECTED COVERAGE AREA; PHOTOS OF COAX WEATHERPROOFING - TOP AND BOTTOM; PHOTOS OF COAX GROUNDING--TOP AND BOTTOM; PHOTOS OF ANTENNA AND MAST GROUNDING; PHOTOS OF COAX CABLE ENTRY INTO SHELTER; PHOTOS OF PLATFORM MECHANICAL CONNECTIONS TO TOWER/MONOPOLE.
    b. ROOF TOPS: PRE-CONSTRUCTION AND POST-CONSTRUCTION VISUAL INSPECTION AND PHOTOGRAPHS OF THE ROOF AND INTERIOR TO DETERMINE AND DOCUMENT CONDITIONS; ROOF TOP CONSTRUCTION INSPECTIONS AS REQUIRED BY THE JURISDICTION; PHOTOGRAPHS OF CABLE TRAY AND/OR ICE BRIDGE; PHOTOGRAPHS OF DOGHOUSE/CABLE EXIT FROM ROOF;
    c. SITE LAYOUT - PHOTOGRAPHS OF THE OVERALL COMPOUND, INCLUDING EQUIPMENT PLATFORM FROM ALL FOUR CORNERS.
    d. FINISHED UTILITIES: CLOSE-UP PHOTOGRAPHS OF THE PPC BREAKER PANEL; CLOSE-UP PHOTOGRAPH OF THE INSIDE OF THE TELCO PANEL AND NIU; CLOSE-UP PHOTOGRAPH OF THE POWER METER AND DISCONNECT; PHOTOS OF POWER AND TELCO ENTRANCE TO COMPANY ENCLOSURE; PHOTOGRAPHS AT METER BOX AND/OR FACILITY DISTRIBUTION PANEL.

PROJECT PHOTOGRAPHS:

A. PROVIDE PROJECT CLOSEOUT GENERAL ARRANGEMENT PHOTOS OF ALL NEW WORK. THE FOLLOWING LIST REPRESENTS MINIMUM REQUIREMENTS AND MINIMUM QUANTITY. ADDITIONAL PHOTOS MAY BE REQUIRED TO ADEQUATELY DOCUMENT THE WORK.
1. ASR AND RF MPE SIGNAGE (IF NOT IN PLACE, SUPPLIER NOTIFIES EMS FIELD REPRESENTATIVE)
2. BACK OF ANTENNAS AND RRUS (1 EACH SECTOR)
3. BACK OF ANTENNAS AND RRUS (1 EACH SECTOR) CLOSE UP SHOWING WEATHERPROOFING AND GROUNDING (AS REQUIRED). CLOSE-UP OF BACK SIDE OF EACH PERMANENT RRU SHOWING SERIAL NUMBER/BAR CODE.
4. VIEW (1 EACH SECTOR) ALONG THE AZIMUTH AND TILT OF THE ANTENNAS
5. TOP OF TOWER FROM GROUND, 1 EACH SECTOR
6. MAINLINE HYBRID CABLE ROUTE DOWN TOWER SHOWING FASTENERS AND SUPPORT
7. MAINLINE/HYBRID CABLE ROUTE ALONG ICE BRIDGE OR IN CABLE TRAY SHOWING FASTENERS AND SUPPORT
8. GROUND MOUNTED RRU RACKS (FRONT AND BACK)
9. FRONT, SIDE AND BACK ELEVATIONS OF ALL GROUND CABINETS
10. VIEW OF COMPOUND FROM A DISTANCE
11. VIEW OF EACH GROUND CABINET (POWER, RF, FIBER SPOOL, PPC POWER, PPC TELCO WITH DOOR OPEN)
12. BACKHAUL FIBER MEET-ME-POINT AND CONDUIT ROUTE (MICROWAVE INSTALLATION IF NOT FIBER)
13. AAV NETWORK INTERFACE DEVICE OR MICROWAVE RADIO INSTALLATION

DEFICIENCY CORRECTIONS:

CONTRACTOR IS RESPONSIBLE FOR ALL CORRECTIONS TO DEFICIENCIES IDENTIFIED THROUGH TESTING, REVIEW OF SUBMITTALS, INSPECTIONS AND CLOSEOUT REVIEWS.

SECTION 01 500 - PROJECT REPORTING

WEEKLY REPORTS:

A. CONTRACTOR SHALL REPORT TO SPRINT AT MINIMUM ON A WEEKLY BASIS VIA SITERRA BY UPDATING ALL APPLICABLE POST END KEEPING MILESTONES WITH ACTUAL AND FORECASTED COMPLETION DATES.

B. ADDITIONAL REQUIREMENTS FOR REPORTING MAY BE IDENTIFIED ELSEWHERE OR REQUIRED BY THE SCOPE OF SERVICES OR SPRINTS LOCAL MARKET CONSTRUCTION MANAGER. THIS INFORMATION WILL PROVIDE A BASIS FOR PROGRESS MONITORING AND PAYMENT.

PROJECT CONFERENCE CALLS:

SPRINT MAY HOLD PERIODIC PROJECT CONFERENCE CALLS. CONTRACTOR WILL BE REQUIRED TO COMMUNICATE SITE STATUS, MILESTONE COMPLETIONS AND UPCOMING MILESTONE PROJECTIONS, AND ANSWER ANY OTHER SITE STATUS QUESTIONS AS NECESSARY.

FINAL PROJECT ACCEPTANCE: PRIOR TO SPRINTS FINAL PROJECT ACCEPTANCE. ALL REQUIRED MILESTONE ACTUALS MUST BE UPDATED IN SITERRA AND ALL REQUIRED REPORTING TASKS MUST BE COMPLETE.

SECTION 11 700 - ANTENNA ASSEMBLY, REMOTE RADIO UNITS AND CABLE INSTALLATION

SUMMARY:

THIS SECTION SPECIFIES INSTALLATION OF ANTENNAS, RRU'S, AND CABLE EQUIPMENT, INSTALLATION, AND TESTING OF COAXIAL FIBER CABLE.

ANTENNAS AND RRU'S:

THE NUMBER AND TYPE OF ANTENNAS AND RRU'S TO BE INSTALLED IS DETAILED ON THE CONSTRUCTION DRAWINGS.

HYBRID CABLE:

HYBRID CABLE WILL BE DC/FIBER AND FURNISHED FOR INSTALLATION AT EACH SITE. CABLE SHALL BE INSTALLED PER THE CONSTRUCTION DRAWINGS AND THE APPLICABLE MANUFACTURER'S REQUIREMENTS.

JUMPERS AND CONNECTORS:

FURNISH AND INSTALL 1/2" COAX JUMPER CABLES BETWEEN THE RRU'S AND ANTENNAS. JUMPERS SHALL BE TYPE LDF 4, FLC 12-50, CR 540, OR FXL 540. SUPER-FLEX CABLES ARE NOT ACCEPTABLE. JUMPERS BETWEEN THE RRU'S AND ANTENNAS OR TOWER TOP AMPLIFIERS SHALL CONSIST OF 1/2 INCH FOAM DIELECTRIC, OUTDOOR RATED COAXIAL CABLE, MIN. LENGTH FOR JUMPER SHALL BE 10'-0".

REMOTE ELECTRICAL TILT (RET) CABLES:

MISCELLANEOUS:

INSTALL SPLITTERS, COMBINERS, FILTERS PER RF DATA SHEET, FURNISHED BY SPRINT.

ANTENNA INSTALLATION:

THE CONTRACTOR SHALL ASSEMBLE ALL ANTENNAS ONSITE IN ACCORDANCE WITH THE INSTRUCTIONS SUPPLIED BY THE MANUFACTURER. ANTENNA HEIGHT, AZIMUTH, AND FEED ORIENTATION INFORMATION SHALL BE A DESIGNATED ON THE CONSTRUCTION DRAWINGS.

A. THE CONTRACTOR SHALL POSITION THE ANTENNA ON TOWER PIPE MOUNTS SO THAT THE BOTTOM STRUT IS LEVEL. THE PIPE MOUNTS SHALL BE PLUMB TO WITHIN 1 DEGREE.

B. ANTENNA MOUNTING REQUIREMENTS: PROVIDE ANTENNA MOUNTING HARDWARE AS INDICATED ON THE DRAWINGS.

HYBRID CABLE INSTALLATION:

A. THE CONTRACTOR SHALL ROUTE, TEST, AND INSTALL ALL CABLES AS INDICATED ON THE CONSTRUCTION DRAWINGS AND IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.

B. THE INSTALLED RADIUS OF THE CABLES SHALL NOT BE LESS THAN THE MANUFACTURER'S SPECIFICATIONS FOR BENDING RADII.

C. EXTREME CARE SHALL BE TAKEN TO AVOID DAMAGE TO THE CABLES DURING HANDLING AND INSTALLATION.

1. FASTENING MAIN HYBRID CABLES: ALL CABLES SHALL BE INSTALLED INSIDE MONOPOLE WITH CABLE SUPPORT GRIPS AS REQUIRED BY THE MANUFACTURER.
2. FASTENING INDIVIDUAL FIBER AND DC CABLES ABOVE BREAKOUT ENCLOSURE (MEDUSA), WITHIN THE MMBS CABINET AND ANY INTERMEDIATE DISTRIBUTION BOXES:
    a. FIBER: SUPPORT FIBER BUNDLES USING 1/2" VELCRO STRAPS OF THE REQUIRED LENGTH AT 18" O.C. STRAPS SHALL BE UV, OIL AND WATER RESISTANT AND SUITABLE FOR INDUSTRIAL INSTALLATIONS AS MANUFACTURED BY TEXTOL OR APPROVED EQUAL.
    b. DC: SUPPORT DC BUNDLES WITH ZIP TIES OF THE ADEQUATE LENGTH. ZIP TIES TO BE UV STABILIZED, BLACK NYLON, WITH TENSILE STRENGTH AT 12,000 PSI AS MANUFACTURED BY NELCO PRODUCTS OR EQUAL.
3. FASTENING JUMPERS: SECURE JUMPERS TO THE SIDE ARMS OR HEAD FRAMES USING STAINLESS STEEL TIE WRAPS OR STAINLESS STEEL BUTTERFLY CLIPS.
4. CABLE INSTALLATION:
    a. INSPECT CABLE PRIOR TO USE FOR SHIPPING DAMAGE, NOTIFY THE CONSTRUCTION MANAGER.
    b. CABLE ROUTING: CABLE INSTALLATION SHALL BE PLANNED TO ENSURE THAT THE LINES WILL BE PROPERLY ROUTED IN THE CABLE ENVELOP AS INDICATED ON THE DRAWINGS. AVOID TWISTING AND CROSSOVERS.
    c. HOIST CABLE USING PROPER HOISTING GRIPS. DO NOT EXCEED MANUFACTURER'S RECOMMENDED MAXIMUM BEND RADIUS.
5. GROUNDING OF TRANSMISSION LINES: ALL TRANSMISSION LINES SHALL BE GROUNDED AS INDICATED ON DRAWINGS.
6. HYBRID CABLE COLOR CODING: ALL COLOR CODING SHALL BE AS REQUIRED IN TS 0200 (CURRENT VERSION).
7. HYBRID CABLE LABELING: INDIVIDUAL HYBRID AND DC BUNDLES SHALL BE LABELED ALPHA-NUMERICALLY ACCORDING TO SPRINT CELL SITE ENGINEERING NOTICE - EN 2012-001, REV 1

WEATHERPROOFING EXTERIOR CONNECTORS AND HYBRID CABLE GROUND KITS:

A. ALL FIBER & COAX CONNECTORS AND GROUND KITS SHALL BE WEATHERPROOFED.

B. WEATHERPROOFED USING ONE OF THE FOLLOWING METHODS. ALL INSTALLATIONS MUST BE DONE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS AND INDUSTRY BEST PRACTICES.
1. COLD SHRINK: ENCOMPASS CONNECTOR IN COLD SHRINK TUBING AND PROVIDE A DOUBLE WRAP OF 2" ELECTRICAL TAPE EXTENDING 2" BEYOND TUBING. PROVIDE 3M COLD SHRINK CXS SERIES OR EQUAL.
2. SELF-AMALGAMATING TAPE: CLEAN SURFACES. APPLY A DOUBLE WRAP OF SELF-AMALGAMATING TAPE 2" BEYOND CONNECTOR. APPLY A SECOND WRAP OF SELF-AMALGAMATING TAPE IN OPPOSITE DIRECTION. APPLY DOUBLE WRAP OF 2" WIDE ELECTRICAL TAPE EXTENDING 2" BEYOND THE SELF-AMALGAMATING TAPE.
3. 3M SLIM LOCK CLOSURE 716: SUBSTITUTIONS WILL NOT BE ALLOWED.
4. OPEN FLAME ON JOB SITE IS NOT ACCEPTABLE

SECTION 11 800 - INSTALLATION OF MULTIMODAL BASE STATIONS (MMBS) AND RELATED EQUIPMENT

SUMMARY:

A. THIS SECTION SPECIFIES MMBS CABINETS, POWER CABINETS, AND INTERNAL EQUIPMENT INCLUDING BY NOT LIMITED TO RECTIFIERS, POWER DISTRIBUTION UNITS, BASE BAND UNITS, SURGE ARRESTORS, BATTERIES, AND SIMILAR EQUIPMENT FURNISHED BY THE COMPANY FOR INSTALLATION BY THE CONTRACTOR (OFCI).

B. CONTRACTOR SHALL PROVIDE AND INSTALL ALL MISCELLANEOUS MATERIALS AND PROVIDE ALL LABOR REQUIRED FOR INSTALLATION EQUIPMENT IN EXISTING CABINET OR NEW CABINET AS SHOWN ON DRAWINGS AND AS REQUIRED BY THE APPLICABLE INSTALLATION MOPS.

C. COMPLY WITH MANUFACTURER'S INSTALLATION AND START-UP REQUIREMENTS.

DC CIRCUIT BREAKER LABELING

A. NEW DC CIRCUIT IS REQUIRED IN MMBS CABINET SHALL BE CLEARLY IDENTIFIED AS TO RRU BEING SERVICED.

SECTION 26 100 - BASIC ELECTRICAL REQUIREMENTS

SUMMARY:

THIS SECTION SPECIFIES BASIC ELECTRICAL REQUIREMENTS FOR SYSTEMS AND COMPONENTS

QUALITY ASSURANCE:

A. ALL EQUIPMENT FURNISHED UNDER DIVISION 26 SHALL CARRY UL LABELS AND LISTINGS WHERE SUCH LABELS AND LISTINGS ARE AVAILABLE IN THE INDUSTRY.

B. MANUFACTURERS OF EQUIPMENT SHALL HAVE A MINIMUM OF THREE YEARS EXPERIENCE WITH THEIR EQUIPMENT INSTALLED AND OPERATING IN THE FIELD IN A USE SIMILAR TO THE PROPOSED USE FOR THIS PROJECT.

C. MATERIALS AND EQUIPMENT: ALL MATERIALS AND EQUIPMENT SPECIFIED IN DIVISION 26 OF THE SAME TYPE SHALL BE OF THE SAME MANUFACTURER AND SHALL BE NEW, OF THE BEST QUALITY AND DESIGN, AND FREE FROM DEFECTS.

SUPPORTING DEVICES:

A. MANUFACTURED STRUCTURAL SUPPORT MATERIALS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY THE FOLLOWING:
1. ALLIED TUBE AND CONDUIT.
2. B-LINE SYSTEM.
3. UNISTRUT DIVERSIFIED PRODUCTS.
4. THOMAS & BETTS.

B. FASTENERS: TYPES, MATERIALS, AND CONSTRUCTION FEATURES AS FOLLOWS:
1. EXPANSION ANCHORS: CARBON STEEL WEDGE OR SLEEVE TYPE.
2. POWER-DRIVEN THREADED STUDS: HEAT-TREATED STEEL, DESIGNED SPECIFICALLY FOR THE INTENDED SERVICE.
3. FASTEN BY MEANS OF WOOD SCREWS ON WOOD.
4. TOGGLE BOLTS ON HOLLOW MASONRY UNITS.
5. CONCRETE INSERTS OR EXPANSION BOLTS ON CONCRETE OR SOLID MASONRY.
6. MACHINE SCREWS, WELDED THREADED STUDS, OR SPRING-TENSION CLAMPS ON STEEL.
7. EXPLOSIVE DEVICES FOR ATTACHING HANGERS TO STRUCTURE SHALL NOT BE PERMITTED.
8. DO NOT WELD CONDUIT, PIPE STRAPS, OR ITEMS OTHER THAN THREADED STUDS TO STEEL STRUCTURES.
9. IN PARTITIONS OF LIGHT STEEL CONSTRUCTION, USE SHEET METAL SCREWS.

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Certification & Seal:

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STATE OF CONNECTICUT · JAMES R. SKOWRONSKI · 26266 · LICENSED PROFESSIONAL ENGINEER

Signature: Date: 11/02/2017

MARK	DATE	DESCRIPTION

ISSUE PHASE: FINAL DATE ISSUED: 11/02/2017

PROJECT TITLE:

CROMWELL - RT. 372
CT60XC931-A

PROJECT INFORMATION:
179 SHUNPIKE ROAD
CROMWELL, CT 06416
MIDDLESEX COUNTY

SHEET TITLE:

SPRINT SPECIFICATIONS

SCALE: NONE

PROJECT NUMBER: 29431

SHEET NUMBER: SP-2

SUPPORTING DEVICES:

A. INSTALL SUPPORTING DEVICES TO FASTEN ELECTRICAL COMPONENTS SECURELY AND PERMANENTLY IN ACCORDANCE WITH NEC.

B. COORDINATE WITH THE BUILDING STRUCTURAL SYSTEM AND WITH OTHER TRADES.

C. UNLESS OTHERWISE INDICATED ON THE DRAWINGS, FASTEN ELECTRICAL ITEMS AND THEIR SUPPORTING HARDWARE SECURELY TO THE STRUCTURE IN ACCORDANCE WITH THE FOLLOWING:

1. ENSURE THAT THE LOAD APPLIED BY ANY FASTENER DOES NOT EXCEED 25 PERCENT OF THE PROOF TEST LOAD.

2. USE VIBRATION AND SHOCK-RESISTANT FASTENERS FOR ATTACHMENTS TO CONCRETE SLABS.

ELECTRICAL IDENTIFICATION:

A. UPDATE AND PROVIDE TYPED CIRCUIT BREAKER SCHEDULES IN THE MOUNTING BRACKET, INSIDE DOORS OF AC PANEL BOARDS WITH ANY CHANGES MADE TO THE AC SYSTEM.

B. BRANCH CIRCUITS FEEDING AVIATION OBSTRUCTION LIGHTING EQUIPMENT SHALL BE CLEARLY IDENTIFIED AS SUCH AT THE BRANCH CIRCUIT PANELBOARD.

SECTION 26 200 - ELECTRICAL MATERIALS AND EQUIPMENT

A. RIGID GALVANIZED STEEL (RGS) CONDUIT SHALL BE USED FOR EXTERIOR LOCATIONS ABOVE GROUND AND IN UNFINISHED INTERIOR LOCATIONS AND FOR UNDERGROUND RUNS. RIGID CONDUIT AND FITTINGS SHALL BE STEEL, COATED WITH ZINC EXTERIOR AND INTERIOR BY THE HOT DIP GALVANIZING PROCESS. CONDUIT SHALL BE PRODUCED TO ANSI SPECIFICATIONS C80.1, FEDERAL SPECIFICATION WW-C-581 AND SHALL BE LISTED WITH THE UNDERWRITERS' LABORATORIES. FITTINGS SHALL BE THREADED - SET SCREW OR COMPRESSION FITTINGS WILL NOT BE ACCEPTABLE. RGS CONDUITS SHALL BE MANUFACTURED BY ALLIED, REPUBLIC OR WHEATLAND.

B. UNDERGROUND CONDUIT IN CONCRETE SHALL BE POLYVINYLCHLORIDE (PVC) SUITABLE FOR DIRECT BURIAL AS APPLICABLE. JOINTS SHALL BE BELLED, AND FLUSH SOLVENT WELDED IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS. CONDUIT SHALL BE CARLON ELECTRICAL PRODUCTS OR APPROVED EQUAL.

C. TRANSITIONS BETWEEN PVC AND RIGID (RGS) SHALL BE MADE WITH PVC COATED METALLIC LONG SWEEP RADIUS ELBOWS.

D. EMT OR RIGID GALVANIZED STEEL CONDUIT MAY BE USED IN FINISHED SPACES CONCEALED IN WALLS AND CEILINGS. EMT SHALL BE MILD STEEL, ELECTRICALLY WELDED, ELECTRO-GALVANIZED OR HOT-DIPPED GALVANIZED AND PRODUCED TO ANSI SPECIFICATION C80.3, FEDERAL SPECIFICATION WW-C-563, AND SHALL BE UL LISTED. EMT SHALL BE MANUFACTURED BY ALLIED, REPUBLIC OR WHEATLAND, OR APPROVED EQUAL. FITTINGS SHALL BE METALLIC COMPRESSION. SET SCREW CONNECTIONS SHALL NOT BE ACCEPTABLE.

E. LIQUID TIGHT FLEXIBLE METALLIC CONDUIT SHALL BE USED FOR FINAL CONNECTION TO EQUIPMENT. FITTINGS SHALL BE METALLIC GLAND TYPE COMPRESSION FITTINGS, MAINTAINING THE INTEGRITY OF CONDUIT SYSTEM. SET SCREW CONNECTIONS SHALL NOT BE ACCEPTABLE. MAXIMUM LENGTH OF FLEXIBLE CONDUIT SHALL NOT EXCEED 6-FEET. LFMC SHALL BE PROTECTED AND SUPPORTED AS REQUIRED BY NEC. MANUFACTURERS OF FLEXIBLE CONDUITS SHALL BE CAROL, ANACONDA METAL HOSE OR UNIVERSAL METAL HOSE, OR APPROVED EQUAL.

F. MINIMUM SIZE CONDUIT SHALL BE 3/4 INCH (21MM).

HUBS AND BOXES:

A. AT ENTRANCES TO CABINETS OR OTHER EQUIPMENT NOT HAVING INTEGRAL THREADED HUBS PROVIDE METALLIC THREADED HUBS OF THE SIZE AND CONFIGURATION REQUIRED. HUB SHALL INCLUDE LOCKNUT AND NEOPRENE O-RING SEAL. PROVIDE IMPACT RESISTANT 105 DEGREE C PLASTIC BUSHINGS TO PROTECT CABLE INSULATION.

B. CABLE TERMINATION FITTINGS FOR CONDUIT

1. CABLE TERMINATORS FOR RGS CONDUITS SHALL BE TYPE CRC BY O-Z/GEDNEY OR EQUAL BY ROXTEC.

2. CABLE TERMINATORS FOR LFMC SHALL BE ETCO - CL2075; OR MADE FOR THE PURPOSE PRODUCTS BY ROXTEC.

C. EXTERIOR PULL BOXES AND PULL BOXES IN INTERIOR INDUSTRIAL AREAS SHALL BE PLATED CAST ALLOY, HEAVY DUTY, WEATHERPROOF, DUST PROOF, WITH GASKET, PLATED IRON ALLOY COVER AND STAINLESS STEEL COVER SCREWS, CROUSE-HINDS WAB SERIES OR EQUAL.

D. CONDUIT OUTLET BODIES SHALL BE PLATED CAST ALLOY WITH SIMILAR GASKET COVERS. OUTLET BODIES SHALL BE OF THE CONFIGURATION AND SIZE SUITABLE FOR THE APPLICATION. PROVIDE CROUSE-HINDS FORM 8 OR EQUAL.

E. MANUFACTURER FOR BOXES AND COVERS SHALL BE HOFFMAN, SQUARE "D", CROUSE-HINDS, COOPER, ADALET, APPLETON, O-Z GEDNEY, RACO, OR APPROVED EQUAL.

SUPPLEMENTAL GROUNDING SYSTEM:

A. FURNISH AND INSTALL A SUPPLEMENTAL GROUNDING SYSTEM TO THE EXTENT INDICATED ON THE DRAWINGS. SUPPORT SYSTEM WITH NON-MAGNETIC STAINLESS STEEL CLIPS WITH RUBBER GROMMETS. GROUNDING CONNECTORS SHALL BE TINNED COPPER WIRE, SIZES AS INDICATED ON THE DRAWINGS. PROVIDE STRANDED OR SOLID BARE OR INSULATED CONDUCTORS EXCEPT AS OTHERWISE NOTED.

B. SUPPLEMENTAL GROUNDING SYSTEM: ALL CONNECTIONS TO BE MADE WITH CAD WELDS, EXCEPT AT EQUIPMENT USE LUGS OR OTHER AVAILABLE GROUNDING MEANS AS REQUIRED BY MANUFACTURER; AT GROUND BARS USE TWO HOLE SPADES WITH NO-OX.

C. STOLEN GROUND-BARS: IN THE EVENT OF STOLEN GROUND BARS, CONTACT SPRINT CM FOR REPLACEMENT INSTRUCTION USING THREADED ROD KITS.

EXISTING STRUCTURE:

A. EXISTING EXPOSED WIRING AND ALL EXPOSED OUTLETS, RECEPTACLES, SWITCHES, DEVICES, BOXES, AND OTHER EQUIPMENT THAT ARE NOT TO BE UTILIZED IN THE COMPLETED PROJECT SHALL BE REMOVED OR DE-ENERGIZED AND CAPPED IN THE WALL, CEILING, OR FLOOR SO THAT THEY ARE CONCEALED AND SAFE. WALL, CEILING, OR FLOOR SHALL BE PATCHED TO MATCH THE ADJACENT CONSTRUCTION.

CONDUIT AND CONDUCTOR INSTALLATION:

A. CONDUITS SHALL BE FASTENED SECURELY IN PLACE WITH APPROVED NON-PERFORATED STRAPS AND HANGERS. EXPLOSIVE DEVICES FOR ATTACHING HANGERS TO STRUCTURE WILL NOT BE PERMITTED. CLOSELY FOLLOW THE LINES OF THE STRUCTURE, MAINTAIN CLOSE PROXIMITY TO THE STRUCTURE AND KEEP CONDUITS IN TIGHT ENVELOPES. CHANGES IN DIRECTION TO ROUTE AROUND OBSTACLES SHALL BE MADE WITH CONDUIT OUTLET BODIES. CONDUIT SHALL BE INSTALLED IN A NEAT AND WORKMANLIKE MANNER, PARALLEL AND PERPENDICULAR TO STRUCTURE WALL AND CEILING LINES. ALL CONDUIT SHALL BE FISHED TO CLEAR OBSTRUCTIONS. ENDS OF CONDUITS SHALL BE TEMPORARILY CAPPED TO PREVENT CONCRETE, PLASTER OR DIRT FROM ENTERING. CONDUITS SHALL BE RIGIDLY CLAMPED TO BOXES BY GALVANIZED MALLEABLE IRON BUSHING ON INSIDE AND GALVANIZED MALLEABLE IRON LOCKNUT ON OUTSIDE AND INSIDE.

B. CONDUCTORS SHALL BE PULLED IN ACCORDANCE WITH ACCEPTED GOOD PRACTICE.

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STATE OF CONNECTICUT · JAMES R. SKOWRONSKI · 26266 · LICENSED PROFESSIONAL ENGINEER

Signature: Date: 11/02/2017

MARK	DATE	DESCRIPTION

ISSUE PHASE: FINAL DATE ISSUED: 11/02/2017

PROJECT TITLE:

CROMWELL - RT. 372
CT60XC931-A

PROJECT INFORMATION:
179 SHUNPIKE ROAD
CROMWELL, CT 06416
MIDDLESEX COUNTY

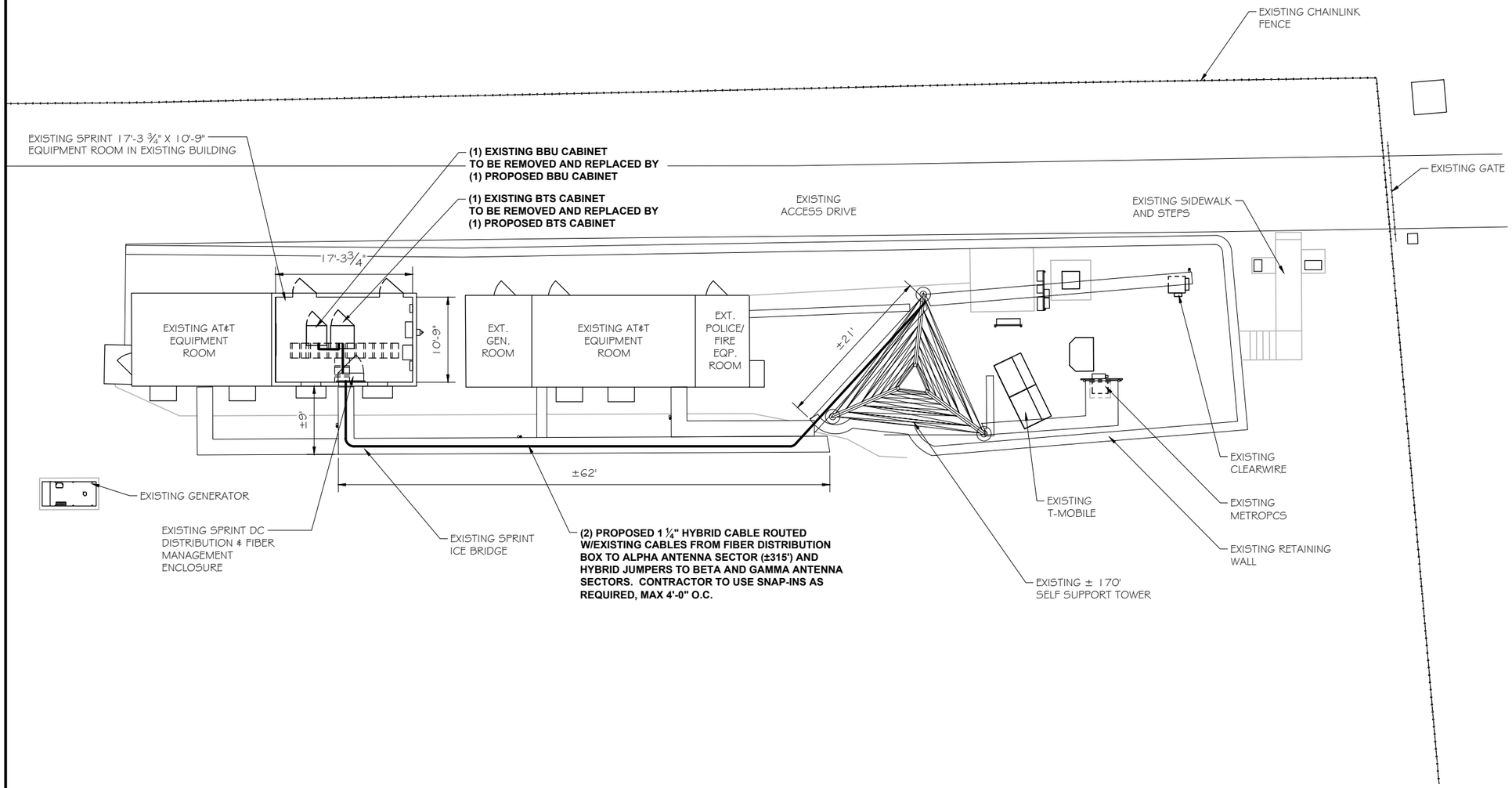
SHEET TITLE:

SPRINT SPECIFICATIONS

SCALE: NONE

PROJECT NUMBER: 29431

SHEET NUMBER: SP-3



SITE PLAN
SCALE: 1" = 15'

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MARK	DATE	DESCRIPTION

ISSUE PHASE: FINAL
DATE ISSUED: 11/02/2017

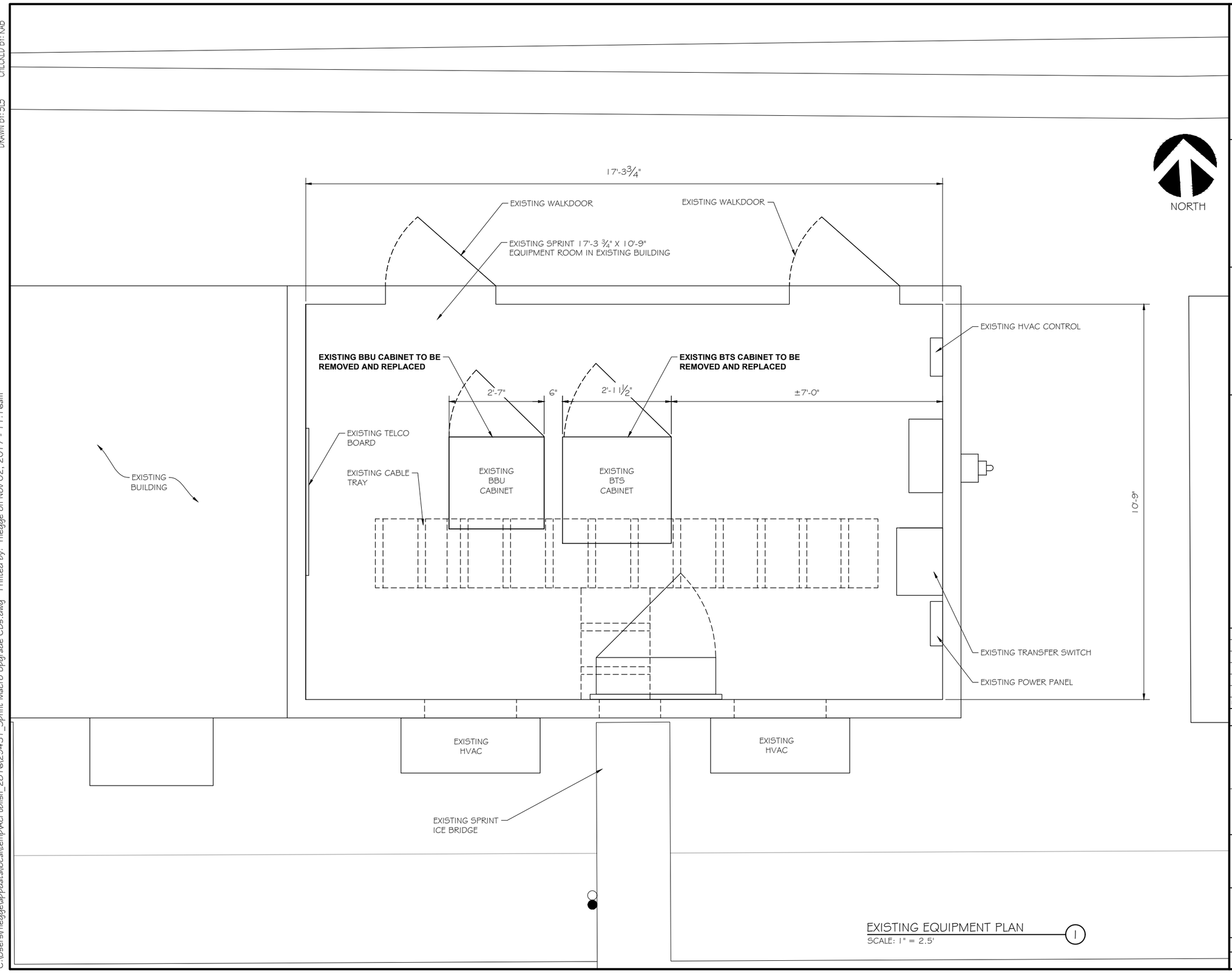
PROJECT TITLE:
CROMWELL - RT. 372
CT60XC931-A

PROJECT INFORMATION:
179 SHUNPIKE ROAD
CROMWELL, CT 06416
MIDDLESEX COUNTY

SHEET TITLE:
SITE PLAN

0 7.5' 15' 30'
11" x 17" - 1" = 15'
22" x 34" - 1" = 7.5'

PROJECT NUMBER: 29431
SHEET NUMBER: A-1



EXISTING EQUIPMENT PLAN
SCALE: 1" = 2.5'

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MARK	DATE	DESCRIPTION

ISSUE PHASE: FINAL
DATE ISSUED: 11/02/2017

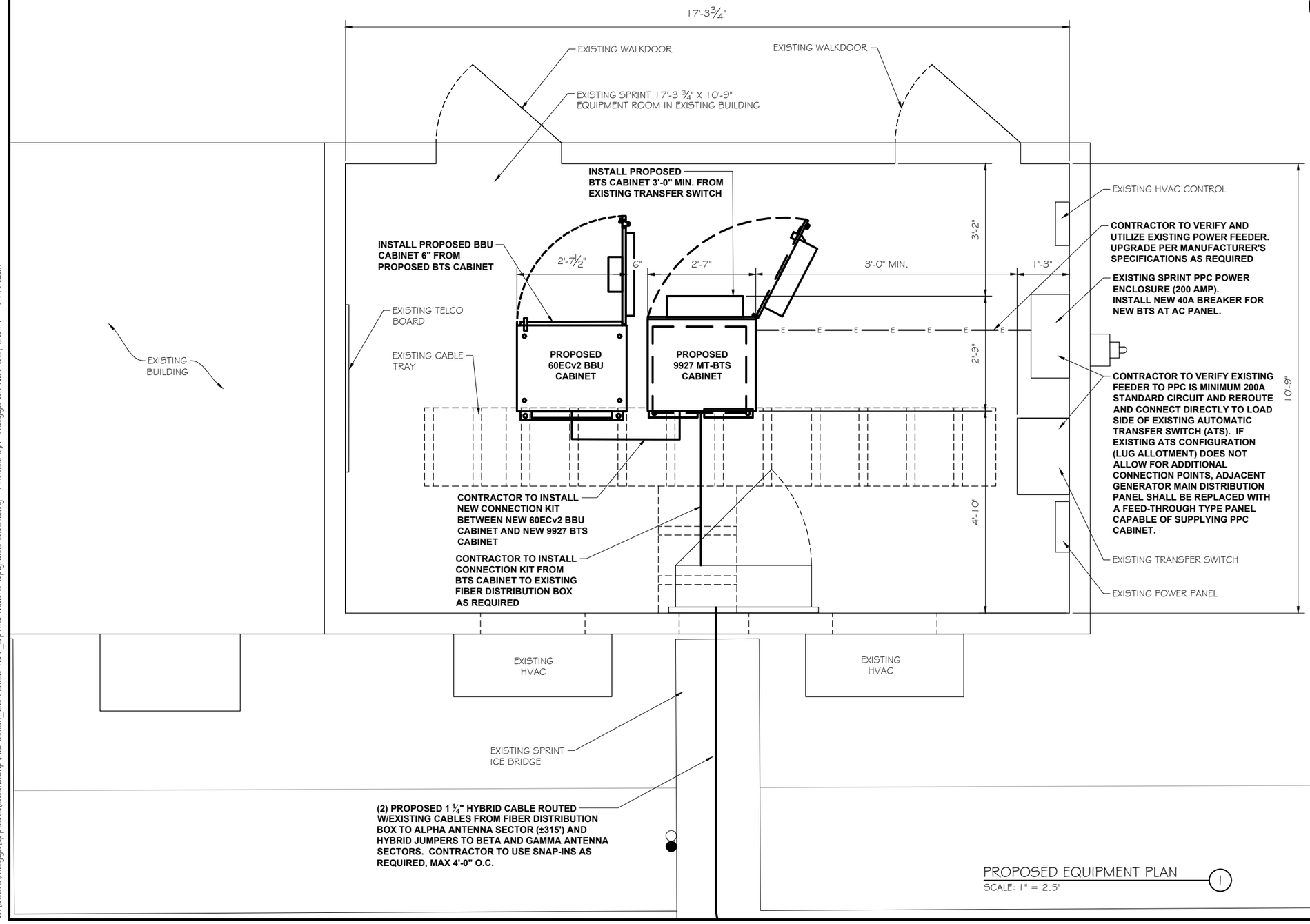
PROJECT TITLE:
CROMWELL - RT. 372
CT60XC931-A

PROJECT INFORMATION:
179 SHUNPIKE ROAD
CROMWELL, CT 06416
MIDDLESEX COUNTY

SHEET TITLE:
EXISTING EQUIPMENT PLAN

0 1.25' 2.5' 5'
11" x 17" - 1" = 2.5'
22" x 34" - 1" = 1.25'

PROJECT NUMBER: 29431
SHEET NUMBER: A-2



PROPOSED EQUIPMENT PLAN
SCALE: 1" = 2.5'

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ISSUE PHASE: FINAL
DATE ISSUED: 11/02/2017

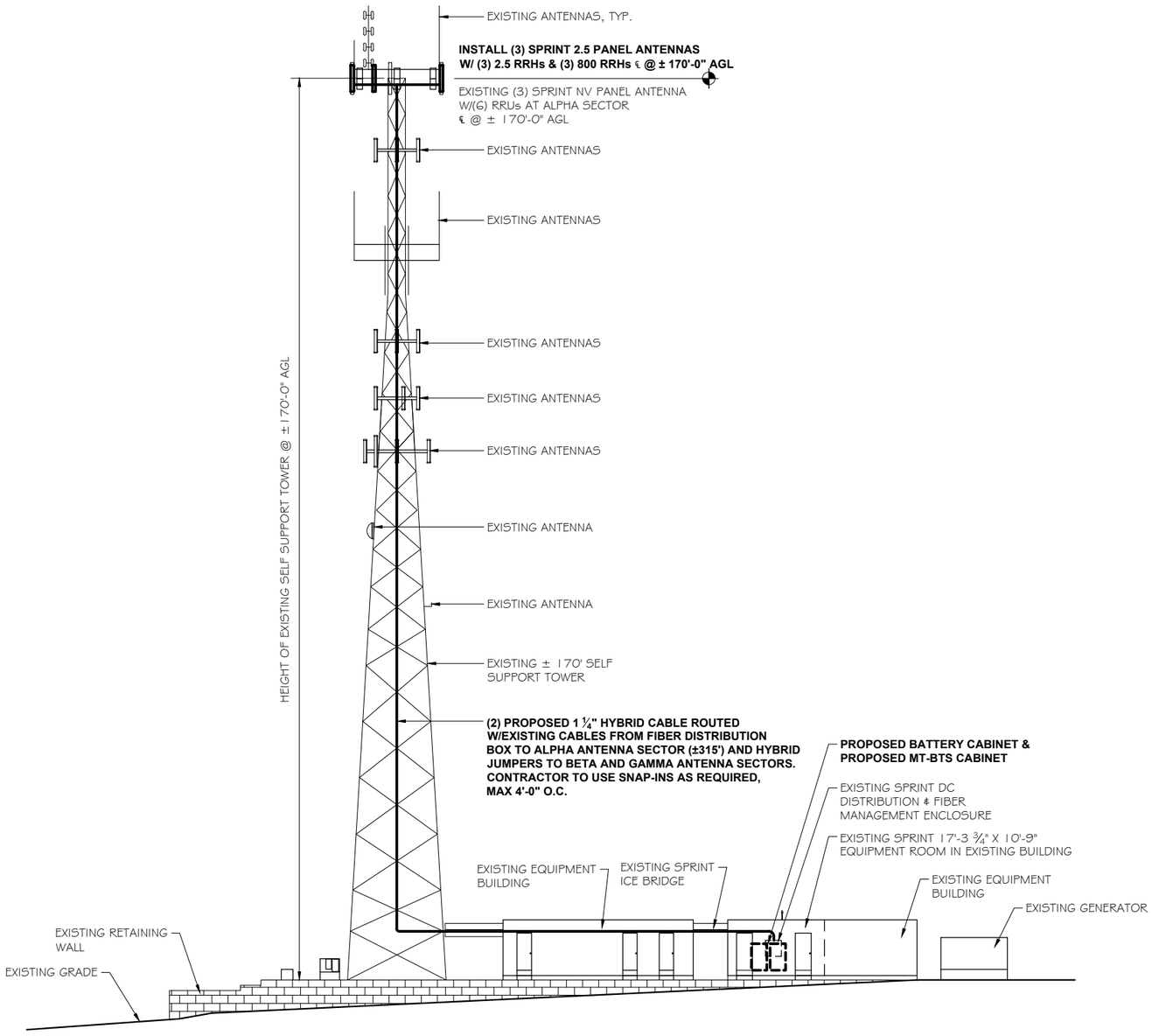
PROJECT TITLE:
CROMWELL - RT. 372
CT60XC931-A

PROJECT INFORMATION:
179 SHUNPIKE ROAD
CROMWELL, CT 06416
MIDDLESEX COUNTY

SHEET TITLE:
PROPOSED EQUIPMENT PLAN

0 1.25' 2.5' 5'
11" x 17" - 1" = 2.5'
22" x 34" - 1" = 1.25'

PROJECT NUMBER: 29431
SHEET NUMBER: A-3



BUILDING ELEVATION (1)
SCALE: 1" = 25'

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MARK	DATE	DESCRIPTION
.		

ISSUE PHASE: FINAL DATE ISSUED: 11/02/2017

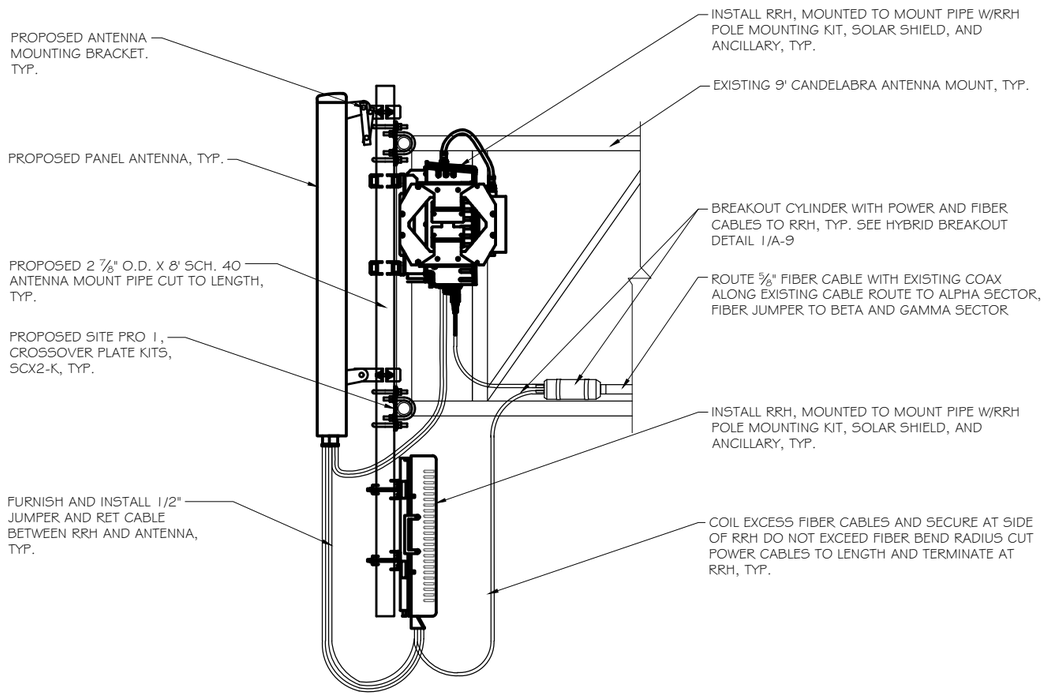
PROJECT TITLE:
CROMWELL - RT. 372
CT60XC931-A

PROJECT INFORMATION:
179 SHUNPIKE ROAD
CROMWELL, CT 06416
MIDDLESEX COUNTY

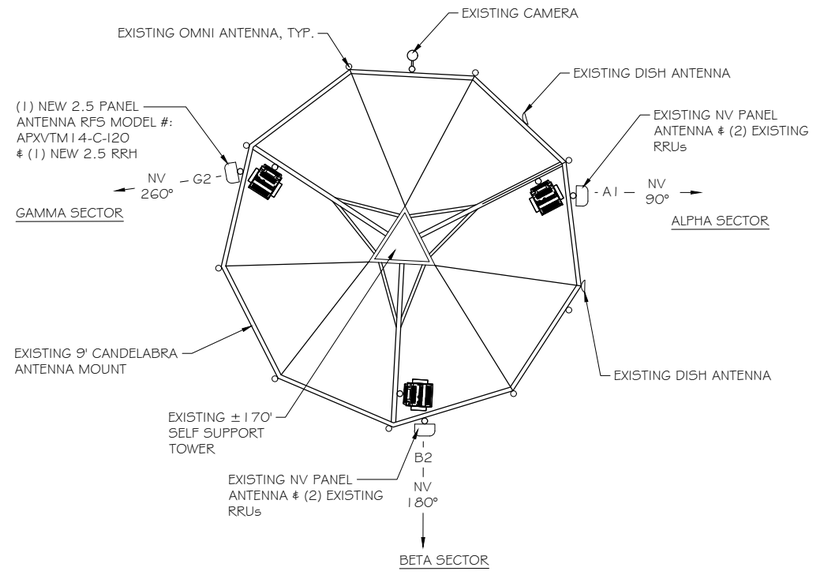
SHEET TITLE:
TOWER ELEVATION

0 12.5' 25' 50'
11" x 17" - 1" = 25'
22" x 34" - 1" = 12.5'

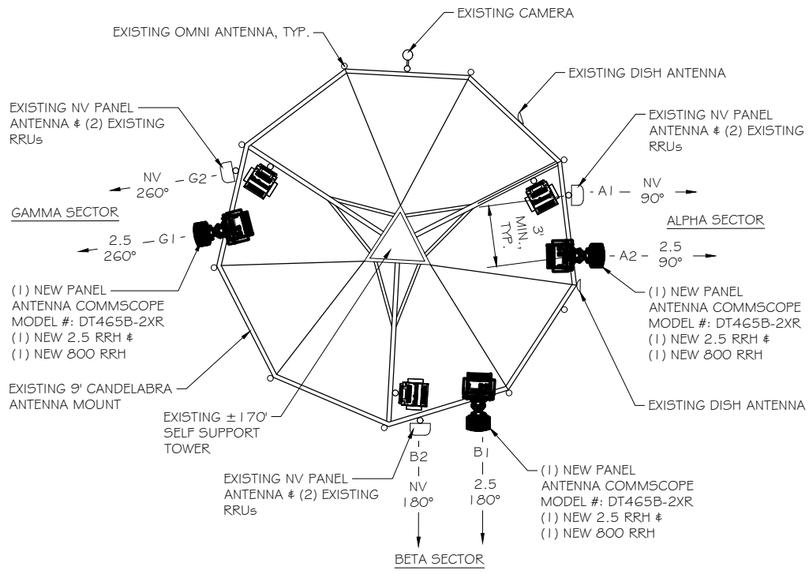
PROJECT NUMBER: 29431
SHEET NUMBER: A-4



ANTENNA & RRH MOUNTING DETAILS (1)
SCALE: NTS



EXISTING ANTENNA ARRAY (2)
SCALE: NTS



PROPOSED ANTENNA ARRAY (3)
SCALE: NTS

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PROJECT TITLE:
CROMWELL - RT. 372
CT60XC931-A

PROJECT INFORMATION:
179 SHUNPIKE ROAD
CROMWELL, CT 06416
MIDDLESEX COUNTY

SHEET TITLE:
ANTENNA DETAILS

SCALE: NONE

PROJECT NUMBER: 29431
SHEET NUMBER: A-5

Sprint

RFDS Sheet

General Site Information

Site ID	CT60XC931	Equipment Vendor	Alcatel-Lucent
Market	Southern Connecticut	ıde	41.623261
Region	Northeast	Longitude	-72.679339
MLA	N/A	LL SITE ID	N/A
Structure Type	Self Support		
BTS Type			

Solution ID		Siterra SR Equipment type		Incremental Power Draw needed by added Equipment
		Equipment Vendor	Alcatel-Lucent	40 amp

Base Equipment

BBU Kit	ALU BBU Kit	Top Hat	None
BBU Kit Qty	1	Top Hat Qty	N/A
		Top Hat Dimenstions	N/A
Growth Cabinet	9927 MT-BTS	Top Hat Weight (lbs)	N/A
Growth Cabinet Qty	1		
Growth Cabinet Dimensions	75.8"x35.4"x37.8"		
Growth Cabinet Weight	864		

RF Path Information

RRH	TD-RRH8x20-25	TD-RRH2x50-800	
RRH Qty	3	3	
RRH Dimensions	26.1"x18.6"x6.7"	19"x13"x12.2"	
RRH Weight. lbs.	70	64	
Power and Fiber Cable	ALU Hybrid Cable	ALU Hybrid Cable	
Cable Qty	1	1	
Weight per foot. Lbs.	0.992	0.992	
Diameter. Inches.	1.25	1.25	
Length Ft.	315	315	(calculated as coax run & antenna height plus 20%)
Coax Jumper	0.625	0.625	
Coax Jumper Qty	27	27	
Coax Jumper Length. Feet.	8	8	
Coax Jumper Weight	1.7	1.7	
Coax Jumper Diameter. Inches	0.5	0.5	
AISG Cable	Commscope ATCB-B01-006	Commscope ATCB-B01-006	
AISG Cable Qty	3	3	
AISG Diameter. Inches.	0.315	0.315	
AISG Cable length.	8	8	
Weight of entire AISG cable. Lbs.	1.3	1.3	

Antenna Sector Information

	Sector 1	Sector 2	Sector 3
Antenna make/model	CommScope DT465B-2XR	CommScope DT465B-2XR	CommScope DT465B-2XR
Antenna qty	1	1	1
Antenna Dimensions. Inches	71.9" x 13.8" x 8.2"	71.9" x 13.8" x 8.2"	71.9" x 13.8" x 8.2"
Antenna Weight. Lbs	58	58	58
CL Height	170'-0"	170'-0"	170'-0"
Antenna Azimuth	90	175	260
Antenna Mechanical Downtilt	0	0	0
Antenna etilt	-2	-2	-2

*RFDS SHEET WAS GENERATED BY RAMAKER & ASSOCIATES FROM PLAN OF RECORD (POR) PROVIDED BY SPRINT. CONTRACTOR SHALL VERIFY AND OBTAIN FINAL RFDS FROM SPRINT CONSTRUCTION MANAGER PRIOR TO CONSTRUCTION.

NOTES:

1. GENERAL CONTRACTOR TO FIELD VERIFY AZIMUTH AND C/L HEIGHT AND MECHANICAL DOWNTILT. IF DIFFERENT THAN CALLED OUT BELOW, HALT ANTENNA WORK FOR ONE HOUR, CALL SPRINT RF ENGINEER (OR MANAGER IF RF ENGINEER DOES NOT ANSWER, BUT STILL LEAVE A MESSAGE TO RF ENGINEER) USING CONTACT INFORMATION ABOVE FOR FURTHER INSTRUCTIONS. IF SPRINT DOES NOT RESPOND WITHIN ONE HOUR, PLACE 2.5GHZ ANTENNA AT SAME C/L HEIGHT AS 1.9GHZ ANTENNA AND EMAIL CORRECT C/L HEIGHT AND AZIMUTH TO SPRINT RF ENGINEER. UPDATE AS-BUILD DRAWING WITH CORRECT C/L HEIGHT. ALSO EMAIL CORRECT 1.9GHZ AND 800MHZ ANTENNA C/L HEIGHT, AZIMUTH AND MECHANICAL DOWNTILT TO RF ENGINEER.
2. AISG TESTS TO VERIFY OPERATION IS TO BE PERFORMED AFTER FINAL INSTALLATION OF ANTENNAS AND AISG CABLES HAVE BEEN CONNECTED. VERIFY OPERATION OF ALL EXISTING SPRINT AISG EQUIPMENT INCLUDING 800MHZ, 1.9GHZ AND 2.5GHZ. TEST TO INCLUDE COMPLETE DOWNTILT, AZIMUTH (IF APPLICABLE) AND BEAMWIDTH SWINGS (IF APPLICABLE). DOCUMENT AISG TEST RESULTS IN COAX SWEEP TEST SPREADSHEET.
3. GENERAL CONTRACTOR MUST ENSURE THAT NO OBJECT IS LOCATED WITHIN 45 DEGREES OF LEFT AND RIGHT OF FRONT OF ANTENNA OR 7 DEGREES UP AND DOWN FROM CENTER OF ANTENNA. IF THIS IS NOT POSSIBLE, CONTACT RF ENGINEER FOR FURTHER INSTRUCTION. IN ADDITION, 2.5GHZ ANTENNA IS NOT TO BE PLACED IN FRONT OF ANY OTHER ANTENNA USING THE SAME 45 DEGREE RULE. THIS INCLUDES SPRINT AND NON-SPRINT ANTENNAS.
4. 2.5GHZ ANTENNA MUST BE AT LEAST 6" FROM 1.9GHZ ANTENNA, 30" FROM 800MHZ ANTENNA AND 30" FROM DUAL BAND 1.9GHZ AND 800MHZ ANTENNA.
5. GENERAL CONTRACT IS REQUIRED TO USE A DIGITAL ALIGNMENT TOOL TO SET AZIMUTH, ROLL AND DOWNTILT. AZIMUTH ACCURACY IS TO BE WITHIN 1 DEGREE. DOWNTILT AND ROLL (LEFT TO RIGHT TILT) IS TO BE WITHIN 0.1 DEGREES. IF FOR SOME REASON THIS ACCURACY CANNOT BE ACHIEVED, UPDATE AS-BUILT DRAWINGS AND EMAIL SPRINT RF ENGINEER WITH AS-BUILT SETTINGS. USE 3Z RF ALIGNMENT TOOL OR EQUIVALENT TOOL.

Sprint
6580 SPRINT PARKWAY
OVERLAND PARK, KANSAS 66251

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713 Clover Lane, Moscow, PA 18444
Phone: 570-840-5084 Fax: 570-842-5592

Certification & Seal:
I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Connecticut.

STATE OF CONNECTICUT · JAMES R. SKOWRONSKI · 26266 · LICENSED PROFESSIONAL ENGINEER

Signature: 11/02/2017 Date:

MARK	DATE	DESCRIPTION
.		

ISSUE PHASE: FINAL — DATE ISSUED: 11/02/2017

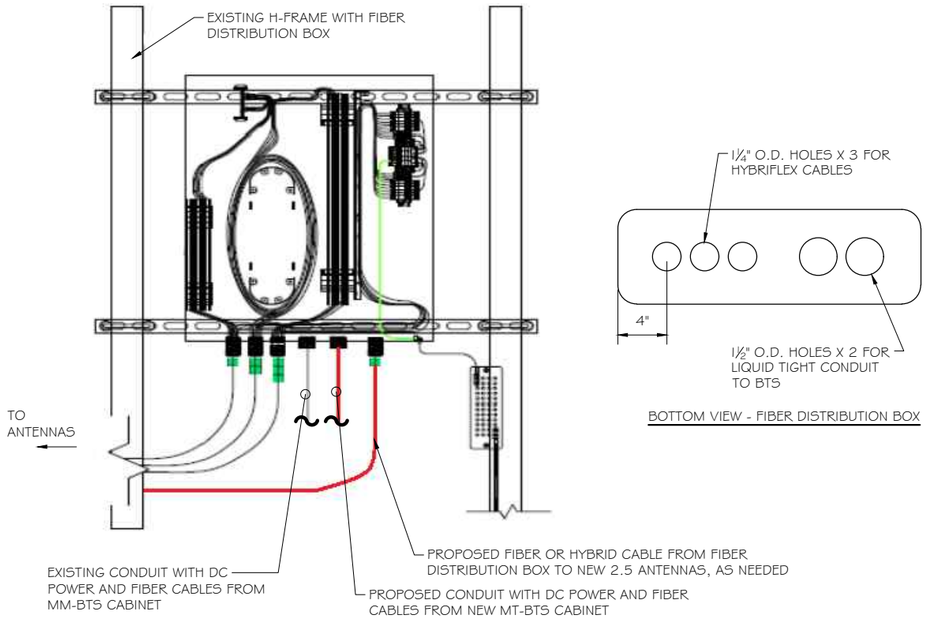
PROJECT TITLE:
CROMWELL - RT. 372
CT60XC931-A

PROJECT INFORMATION:
179 SHUNPIKE ROAD
CROMWELL, CT 06416
MIDDLESEX COUNTY

SHEET TITLE:
RF DATA SHEET

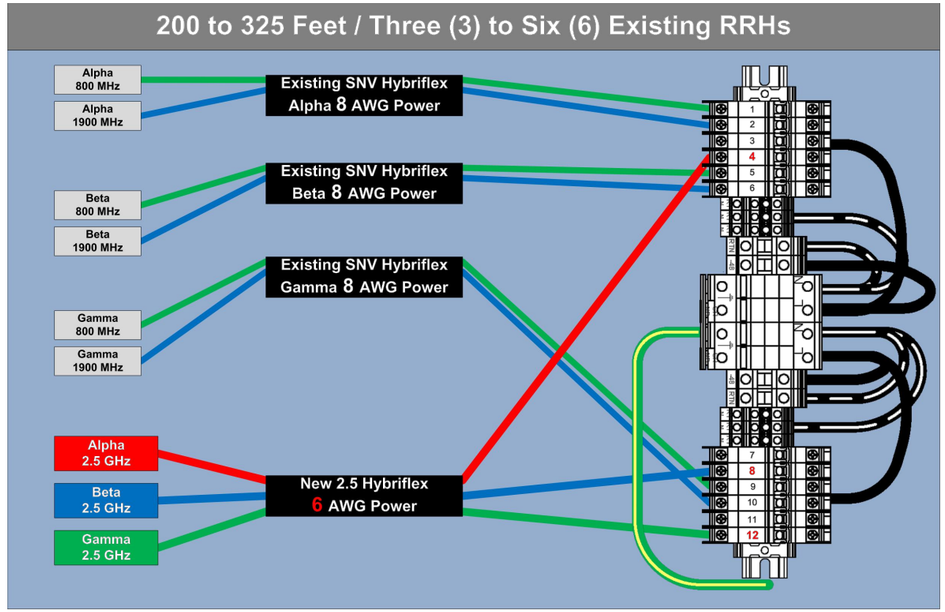
SCALE: NONE

PROJECT NUMBER: 29431
SHEET NUMBER: A-6

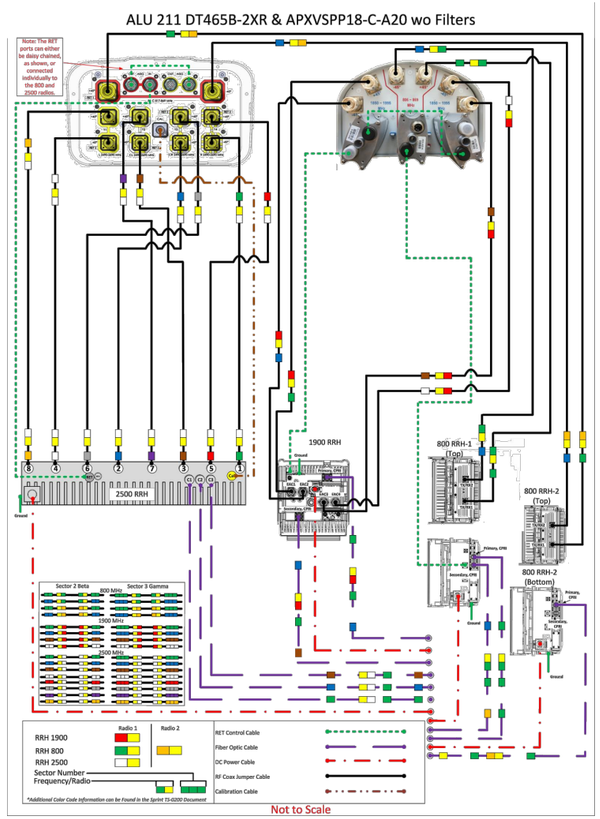


TYPICAL FIBER DISTRIBUTION BOX DETAIL (1)
SCALE: NTS

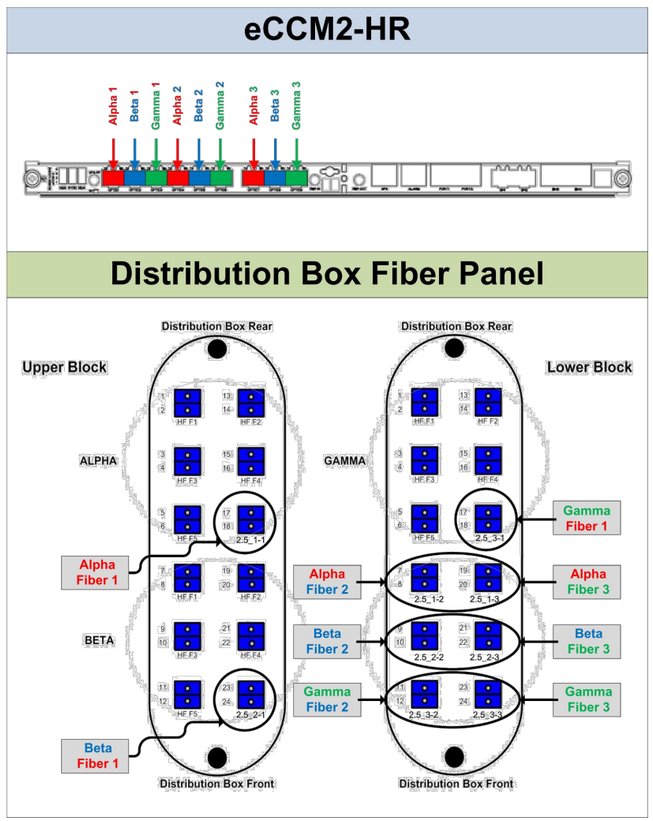
BOTTOM VIEW - FIBER DISTRIBUTION BOX



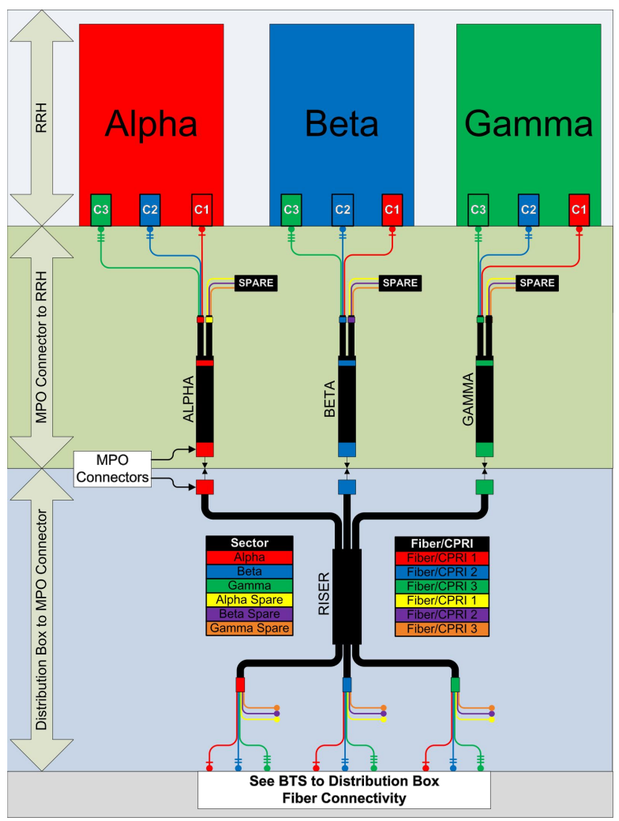
RRH TO DISTRIBUTION BOX POWER CONNECTIVITY DETAIL (2)
SCALE: NTS



8T8R DETAIL (3)
SCALE: NTS



BTS TO DISTRIBUTION BOX FIBER CONNECTIVITY DETAIL (4)
SCALE: NTS



RRH TO DISTRIBUTION BOX FIBER CONNECTIVITY DETAIL (5)
SCALE: NTS

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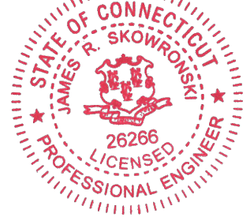


Signature: Date: 11/02/2017

MARK	DATE	DESCRIPTION

ISSUE PHASE: FINAL
DATE ISSUED: 11/02/2017

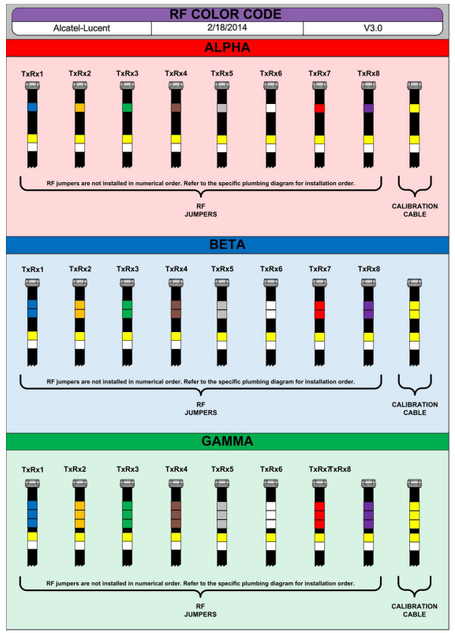
PROJECT TITLE:
CROMWELL - RT. 372
CT60XC931-A

PROJECT INFORMATION:
179 SHUNPIKE ROAD
CROMWELL, CT 06416
MIDDLESEX COUNTY

SHEET TITLE:
FIBER PLUMBING DIAGRAM

SCALE: NONE

PROJECT NUMBER: 29431
SHEET NUMBER: A-7



SECTOR COLOR CODING AND BANDING (1)
SCALE: NTS

2.5 Coaxial Cable Color Code (Radio#1)

Sector	Cable	Start at Connector Side	Wrap2	Wrap3	Wrap4	Wrap5
1 Alpha	1	Blue			Yellow	White
1	2	Orange			Yellow	White
1	3	Green			Yellow	White
1	4	Brown			Yellow	White
1	5	Slate			Yellow	White
1	6	White			Yellow	White
1	7	Red			Yellow	White
1	8	Violet			Yellow	White
1	Calibration Cable	Yellow			Yellow	White
2 Beta	1	Blue	Blue		Yellow	White
2	2	Orange	Orange		Yellow	White
2	3	Green	Green		Yellow	White
2	4	Brown	Brown		Yellow	White
2	5	Slate	Slate		Yellow	White
2	6	White	White		Yellow	White
2	7	Red	Red		Yellow	White
2	8	Violet	Violet		Yellow	White
2	Calibration Cable	Yellow	Yellow		Yellow	White
3 Gamma	1	Blue	Blue	Blue	Yellow	White
3	2	Orange	Orange	Orange	Yellow	White
3	3	Green	Green	Green	Yellow	White
3	4	Brown	Brown	Brown	Yellow	White
3	5	Slate	Slate	Slate	Yellow	White
3	6	White	White	White	Yellow	White
3	7	Red	Red	Red	Yellow	White
3	8	Violet	Violet	Violet	Yellow	White
3	Calibration Cable	Yellow	Yellow	Yellow	Yellow	White

2.5 Coaxial Cable Color Code (Radio#2)

Sector	Cable	Start at Connector Side	Wrap2	Wrap3	Wrap4	Wrap5
1 Alpha	1	Blue			Yellow	Violet
1	2	Orange			Yellow	Violet
1	3	Green			Yellow	Violet
1	4	Brown			Yellow	Violet
1	5	Slate			Yellow	Violet
1	6	White			Yellow	Violet
1	7	Red			Yellow	Violet
1	8	Violet			Yellow	Violet
1	Calibration Cable	Yellow			Yellow	Violet
2 Beta	1	Blue	Blue		Yellow	Violet
2	2	Orange	Orange		Yellow	Violet
2	3	Green	Green		Yellow	Violet
2	4	Brown	Brown		Yellow	Violet
2	5	Slate	Slate		Yellow	Violet
2	6	White	White		Yellow	Violet
2	7	Red	Red		Yellow	Violet
2	8	Violet	Violet		Yellow	Violet
2	Calibration Cable	Yellow	Yellow		Yellow	Violet
3 Gamma	1	Blue	Blue	Blue	Yellow	Violet
3	2	Orange	Orange	Orange	Yellow	Violet
3	3	Green	Green	Green	Yellow	Violet
3	4	Brown	Brown	Brown	Yellow	Violet
3	5	Slate	Slate	Slate	Yellow	Violet
3	6	White	White	White	Yellow	Violet
3	7	Red	Red	Red	Yellow	Violet
3	8	Violet	Violet	Violet	Yellow	Violet
3	Calibration Cable	Yellow	Yellow	Yellow	Yellow	Violet

2.5 COAXIAL CABLE COLOR CODE (2)
SCALE: NTS

CABLE MARKING NOTES

1. ALL CABLES SHALL BE MARKED WITH 2" WIDE, UV STABILIZED, UL APPROVED TAPE.
2. THE FIRST RING SHALL BE CLOSEST TO THE END OF THE CABLE AND SPACED APPROXIMATELY 2" FROM THE END CONNECTOR, WEATHERPROOFING, OR BREAKOUT UNIT. THERE SHALL BE 1" SPACE BETWEEN EACH RING.
3. A 2" GAP SHALL SEPARATE THE CABLE COLOR CODE FROM THE FREQUENCY COLOR CODE. THE 2" COLOR RINGS FOR THE FREQUENCY CODE SHALL BE PLACED NEXT TO EACH OTHER WITH NO SPACES.
4. THE 2" COLORED TAPE(S) SHALL BE WRAPPED A MINIMUM OF 3 TIMES AROUND THE INDIVIDUAL CABLES, AND THE TAPE SHALL BE KEPT IN THE SAME LOCATION AS MUCH AS POSSIBLE.
5. SITES WITH MORE THAN FOUR (4) SECTORS WILL REQUIRE ADDITIONAL RINGS FOR EACH SECTOR, FOLLOWING THE PATTERN. HIGH CAPACITY SITES WILL USE THE SECOND CABLE IDENTIFIED BY BLUE BANDS OF TAPE
6. HYBRID FIBER CABLE SHALL BE SECTOR IDENTIFIED INSIDE THE CABINET ON FREQUENCY BUNDLES, ON THE SEALTITE, ON THE MAIN LINE UPON EXIT OF SEALTITE, AND BEFORE AND AFTER THE BREAKOUT UNIT (MEDUSA), AS WELL AS BEFORE AND AFTER ANY ENTRANCE OR EXIT.
7. HFC "MAIN TRUNK" WILL NOT BE MARKED WITH THE FREQUENCY CODES, AS IT CONTAINS ALL FREQUENCIES.
8. INDIVIDUAL POWER PAIRS AND FIBER BUNDLES SHALL BE LABELED WITH BOTH THE CABLE AND FREQUENCY.

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STATE OF CONNECTICUT · JAMES R. SKOWRONSKI · 26266 · LICENSED PROFESSIONAL ENGINEER

Signature: Date: 11/02/2017

MARK	DATE	DESCRIPTION

ISSUE PHASE: FINAL
DATE ISSUED: 11/02/2017

PROJECT TITLE:
CROMWELL - RT. 372
CT60XC931-A

PROJECT INFORMATION:
179 SHUNPIKE ROAD
CROMWELL, CT 06416
MIDDLESEX COUNTY

SHEET TITLE:
CABLE COLOR CODING

SCALE: NONE

PROJECT NUMBER: 29431
SHEET NUMBER: A-8

HYBRID CABLE DC CONDUCTOR SIZE GUIDELINE
MANUF:RFS

CABLE	LENGTH	DC CONDUCTOR	CABLE DIAMETER
Fiber Only	Varies	Use NV Hybriflex	5/8"
Hybriflex	<200'	8 AWG	1-1/4"
Hybriflex	225-300'	6 AWG	1-1/4"
Hybriflex	325-375'	4 AWG	1-1/4"

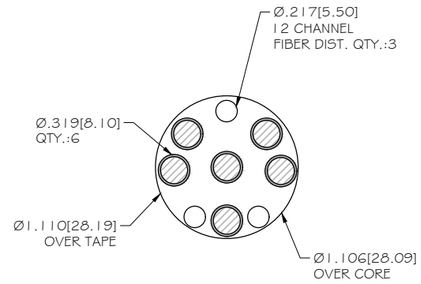
RFS HYBRIFLEX RISER CABLE SCHEDULE

FIBER ONLY (EXISTING DC POWER)	Hybrid cable MN:HB058-M12-050F 12x multi-mode fiber pairs, Top:Outdoor protected connectors, Bottom:LC Connectors, 5/8 cable, 50 ft	50 ft
	MN:HB058-M12-075F	75 ft
	MN:HB058-M12-100F	100 ft
	MN:HB058-M12-125F	125 ft
	MN:HB058-M12-150F	150 ft
	MN:HB058-M12-175F	175 ft
	MN:HB058-M12-200F	200 ft
8 AWG Power	Hybrid cable MN:HB114-08U3M12-050F 3x 8 AWG power pairs, 12x multi-mode fiber pairs, Outdoor rated connectors & LC connectors. 1 1/4 cable, 50 ft	50 ft
	MN:HB114-08U3M12-075F	75 ft
	MN:HB114-08U3M12-100F	100 ft
	MN:HB114-08U3M12-125F	125 ft
	MN:HB114-08U3M12-150F	150 ft
	MN:HB114-08U3M12-175F	175 ft
	MN:HB114-08U3M12-200F	200 ft
6 AWG Power	Hybrid cable MN:HB114-13U3M12-225F 3x 6 AWG power pairs, 12x multi-mode fiber pairs, Outdoor rated connectors & LC connectors. 1 1/4 cable, 225 ft	225 ft
	MN:HB114-13U3M12-250F	250 ft
	MN:HB114-13U3M12-275F	275 ft
	MN:HB114-13U3M12-300F	300 ft
4 AWG Power	Hybrid cable MN:HB114-21U3M12-325F 3x 4 AWG power pairs, 12x multi-mode fiber pairs, Outdoor rated connectors & LC connectors. 1 1/4 cable, 325 ft	325 ft
	MN:HB114-21U3M12-350F	350 ft
	MN:HB114-21U3M12-375F	375 ft

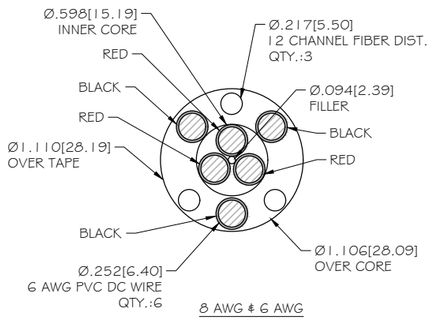
RFS HYBRIFLEX JUMPER CABLE SCHEDULE

FIBER ONLY	Hybrid Jumper cable MN:HBF012-M3-5F1 5 ft, 3x multi-mode fiber pairs, Outdoor & LC connectors, 1/2 cable	5 ft
	MN:HBF012-M3-10F1	10 ft
	MN:HBF012-M3-15F1	15 ft
	SPECIAL INSTALLATION NOTE: JUMPERS FROM 2.5 RRH TO 2.5 ANTENNA SHALL NOT EXCEED 15' NOTIFY SPRINT CM OF ANY DISCREPANCY	
8 AWG POWER	Hybrid Jumper cable MN:HBF058-08U1M3-5F1 5 ft, 1x 8 AWG power pair, 3x multi-mode fiber pairs, Outdoor & LC connectors, 5/8 cable	5 ft
	MN:HBF058-08U1M3-10F1	10 ft
	MN:HBF058-08U1M3-15F1	15 ft
	SPECIAL INSTALLATION NOTE: JUMPERS FROM 2.5 RRH TO 2.5 ANTENNA SHALL NOT EXCEED 15' NOTIFY SPRINT CM OF ANY DISCREPANCY	
6 AWG POWER	Hybrid Jumper cable MN:HBF058-13U1M3-5F1 5 ft, 1x 6 AWG power pair, 3x multi-mode fiber pairs, Outdoor & LC connectors, 5/8 cable	5 ft
	MN:HBF058-13U1M3-10F1	10 ft
	MN:HBF058-13U1M3-15F1	15 ft
	SPECIAL INSTALLATION NOTE: JUMPERS FROM 2.5 RRH TO 2.5 ANTENNA SHALL NOT EXCEED 15' NOTIFY SPRINT CM OF ANY DISCREPANCY	
4 AWG POWER	Hybrid Jumper cable MN:HBF078-21U1M3-5F1 5 ft, 1x 4 AWG power pair, 3x multi-mode fiber pairs, Outdoor & LC connectors, 7/8 cable	5 ft
	MN:HBF078-21U1M3-10F1	10 ft
	MN:HBF078-21U1M3-15F1	15 ft
	SPECIAL INSTALLATION NOTE: JUMPERS FROM 2.5 RRH TO 2.5 ANTENNA SHALL NOT EXCEED 15' NOTIFY SPRINT CM OF ANY DISCREPANCY	

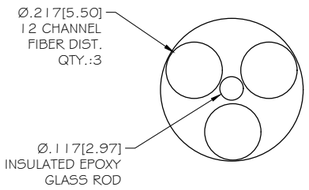
*NOTE: SPRINT CM TO CONFIRM HYBRID/FIBER RISER CABLE & HYBRID/FIBER JUMPER CABLE MODEL NUMBERS BEFORE PREPARING BOM.



4 AWG

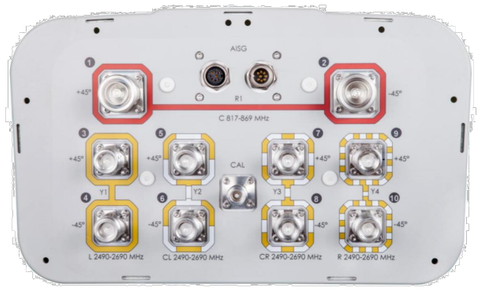


8 AWG & 6 AWG



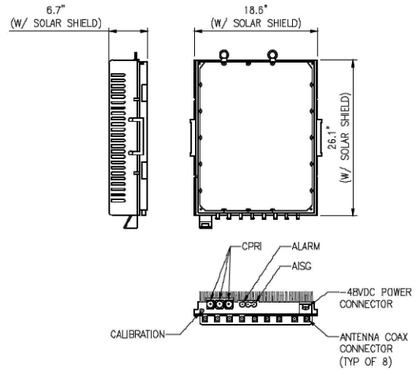
FIBER ONLY

HYBRID CABLE CROSS SECTION & DATA (1)
SCALE: NTS



MECHANICAL	
DIMENSION (HxWxD)	71.9" x 13.8" x 8.2"
WEIGHT	58 lbs

ANTENNA MODEL: COMMSCOPE #DT465B-2XR - ANTENNA SPECS



2500MHZ REMOTE RADIO HEAD
ALCATEL-LUCENTL #TD-RRH8x20
WEIGHT WITH SOLAR SHIELD: 70LBS

MECHANICAL	
DIMENSION (HxWxD)	26.1"x18.6"x6.7"
WEIGHT	70 lbs

RRH MODEL: ALU #TD-RRH8X20-25 - RADIO SPECS

800MHz 2X50W Remote Radio Head (RRH)

Simultaneous CDMA & LTE Multi technology RRH 862-869 MHz
- Any combination of CDMA and LTE carriers supported by 100W RF Power

2 CPRI-like Optical Connections for daisy chaining
Software Switchable External Filter for use before Public Safety is cleared

Dimensions:	w/o Filter	w/ Filter
Height:	480 mm (19")	480 mm (19")
Width:	330 mm (13")	330 mm (13")
Depth:	218 mm (8.6")	310 (12.2")
Weight:	24 kg (53 lbs)	29 kg (64 lbs)
49 liters, <29kg		

Power Supply: -48 VDC
Power Consumption: <400W Typical
Operating Temp range -40° C to +55° C
Option to mount on Ground at tower base

Front/Top View

Bottom View

Alcatel-Lucent's 800 RRH satisfies Sprint's requirements.

MECHANICAL	
DIMENSION (HxWxD)	19" x 13" x 12.2"
WEIGHT	64 lbs

RRH MODEL: ALU #800 MHz 2x50W - RADIO SPECS

ANTENNA & RRH SPECIFICATIONS (2)
SCALE: NTS

Sprint
6580 SPRINT PARKWAY
OVERLAND PARK, KANSAS 66251

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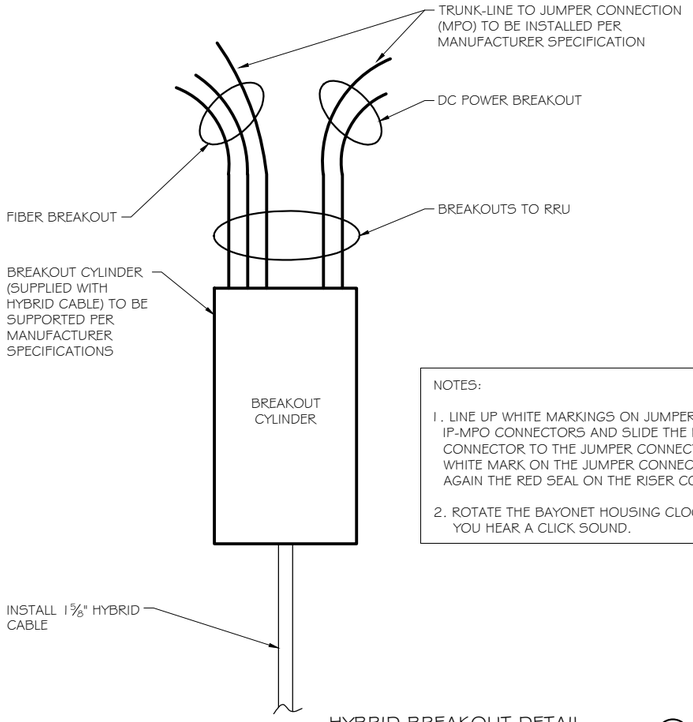
PROJECT TITLE:
CROMWELL - RT. 372
CT60XC931-A

PROJECT INFORMATION:
179 SHUNPIKE ROAD
CROMWELL, CT 06416
MIDDLESEX COUNTY

SHEET TITLE:
ANTENNA & HYBRID CABLE DETAILS

SCALE: NONE

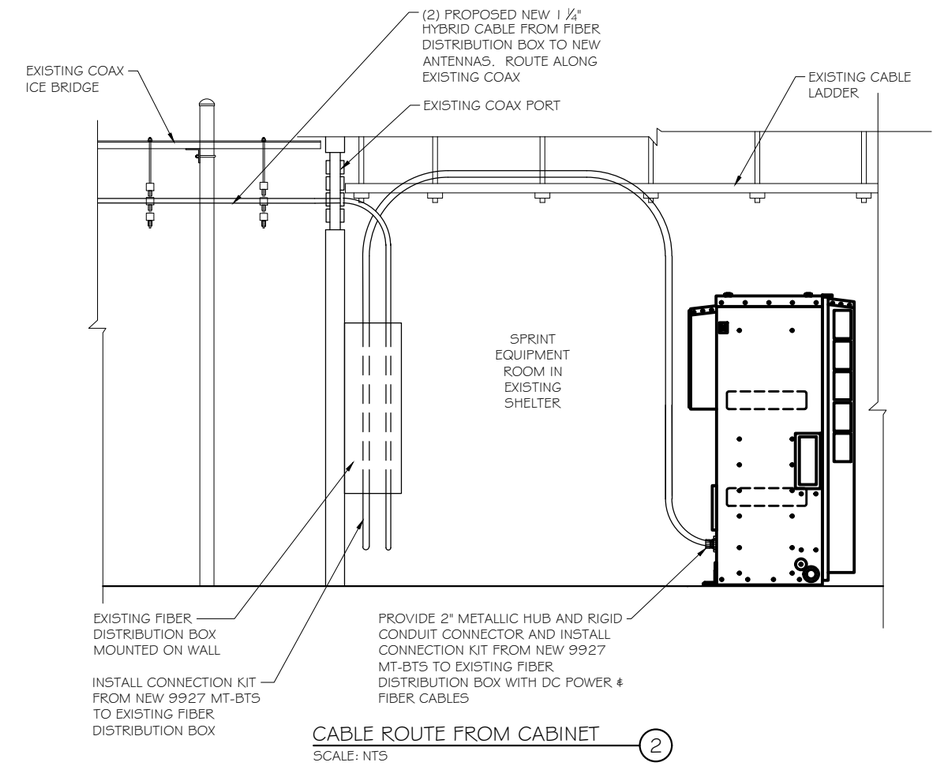
PROJECT NUMBER: 29431
SHEET NUMBER: A-9



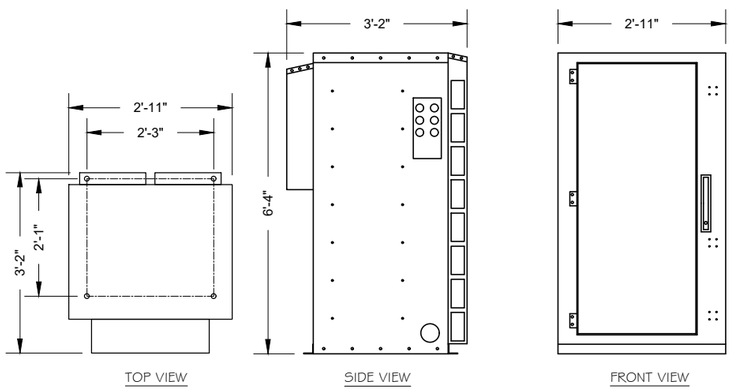
NOTES:

1. LINE UP WHITE MARKINGS ON JUMPER AND RISER IP-MPO CONNECTORS AND SLIDE THE RISER CONNECTOR TO THE JUMPER CONNECTOR. PUSH THE WHITE MARK ON THE JUMPER CONNECTOR FLUSH AGAIN THE RED SEAL ON THE RISER CONNECTOR.
2. ROTATE THE BAYONET HOUSING CLOCKWISE UNTIL YOU HEAR A CLICK SOUND.

HYBRID BREAKOUT DETAIL (1)
SCALE: NTS



CABLE ROUTE FROM CABINET (2)
SCALE: NTS



TOP VIEW SIDE VIEW FRONT VIEW

Cabinets	Configuration	Shipped Weight including pallet (estimate)	Maximum Installed Weight (estimate)	Reference Dimensions (Width x Depth x Height)
9927 Distributed Base Station Outdoor Cabinet with Integrated Power	Half loaded • CDMA • One BBU • One 7210 • One SAR 8 • Three DC-DC convertors	470 kg (1033 lbs)	430 kg (945 lbs)	900 mm x 960 mm x 1925 mm (35.4 inches x 37.8 inches x 75.8 inches)
	Fully loaded • CDMA • Four BBUs • Two 7210s • One SAR 8 • Six DC-DC convertors • 8 Injectors	529 kg (1162 lbs)	489 kg (1074 lbs)	

9927 DISTRIBUTED BASE STATION OUTDOOR CABINET DETAIL (3)
SCALE: NTS

FRONT VIEW
6OECv2 BATTERY CABINET
(FRONT DOOR REMOVED)

REAR VIEW
6OECv2 BATTERY CABINET
(REAR PANEL REMOVED)

General Specifications

Cabinet Dimensions:	Height: 60 in. (152.4 cm) Width: 31 in. (78.7 cm) Depth: 30 in. (76.2 cm)
Approximate Weight:	425 lbs., (Empty)
Cabinet Operating Temperature Range:	-40°C to 46°C

ALU 6OECv2 BATTERY CABINET DETAIL (4)
SCALE: NTS

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www.Ramaker.com

Charles Cherundolo Consulting, Inc.
713 Clover Lane, Moscow, PA 18444
Phone: 570-840-5084 Fax: 570-842-5592

Certification & Seal:
I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Connecticut.

STATE OF CONNECTICUT · JAMES R. SKOWRONSKI · 26266 · LICENSED PROFESSIONAL ENGINEER

Signature: Date: 11/02/2017

MARK	DATE	DESCRIPTION

ISSUE PHASE: FINAL DATE ISSUED: 11/02/2017

PROJECT TITLE:
CROMWELL - RT. 372
CT60XC931-A

PROJECT INFORMATION:
179 SHUNPIKE ROAD
CROMWELL, CT 06416
MIDDLESEX COUNTY

SHEET TITLE:
EQUIPMENT DETAILS

SCALE: NONE

PROJECT NUMBER: 29431
SHEET NUMBER: A-10

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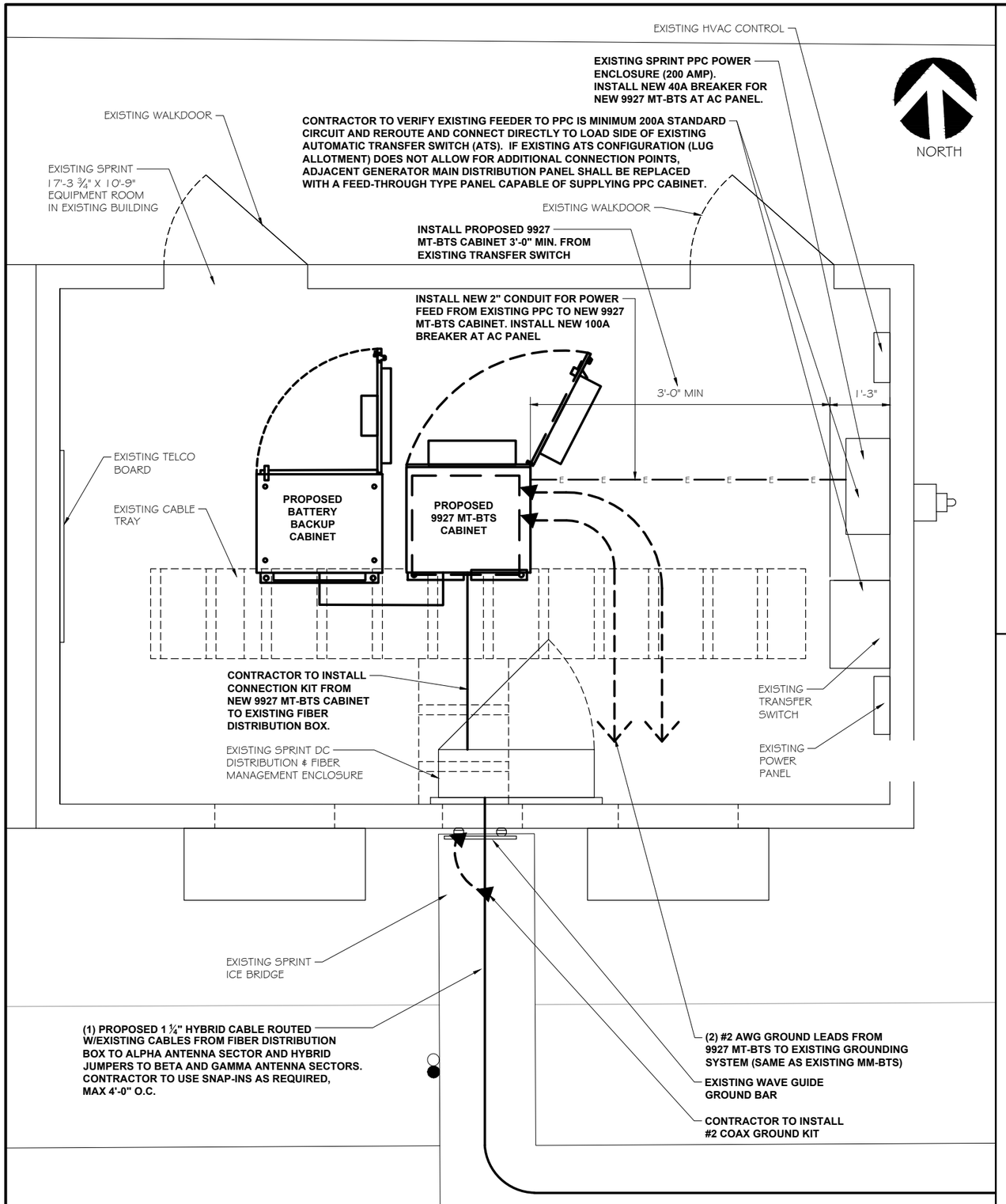
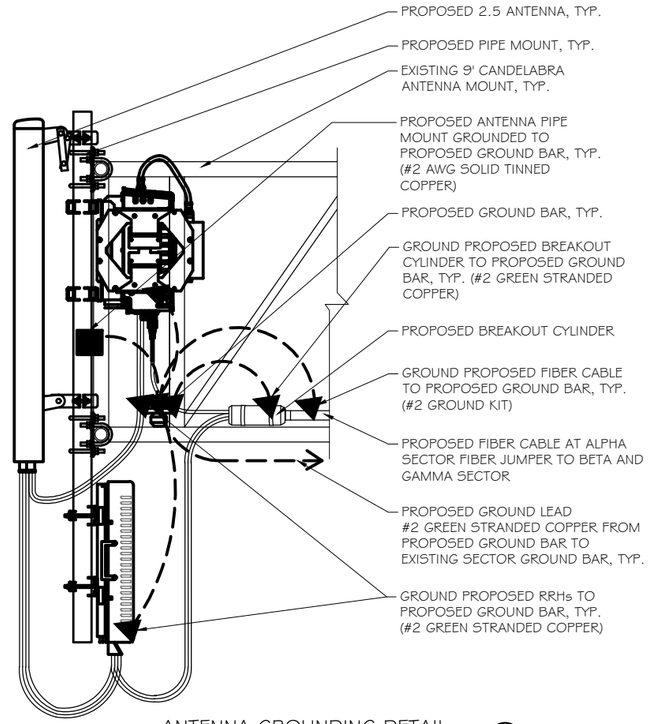


EQUIPMENT UTILITY & GROUNDING PLAN (1)
SCALE: NTS



ANTENNA GROUNDING DETAIL (2)
SCALE: NTS

GROUNDING NOTES:

1. CONTRACTOR TO ENSURE PROPER SEQUENCING OF GROUNDING AND UNDERGROUND CONDUIT INSTALLATION TO PREVENT ANY LOSS OF CONTINUITY IN THE GROUNDING SYSTEM AND/OR DAMAGE TO THE CONDUIT.
2. ALL EXTERIOR GROUND CONDUCTORS SHALL BE #2 AWG SOLID TINNED COPPER UNLESS NOTED OTHERWISE.
3. ALL GROUND CONNECTIONS BELOW GRADE SHALL BE EXOTHERMIC (CADWELD).
4. ALL GROUND CONNECTIONS ABOVE GRADE AND/OR INTERIOR SHALL BE COMPRESSION TYPE, TWO-HOLE LUGS OR DOUBLE-CRIMP "C" TAPS.
5. CONTACT AREAS WHERE CONNECTIONS ARE MADE SHALL BE PREPARED TO A BARE BRIGHT FINISH AND COATED WITH AN ANTI-OXIDATION MATERIAL BEFORE CONNECTIONS ARE MADE.
6. MAXIMUM RESISTANCE OF THE COMPLETED GROUND SYSTEM SHALL NOT EXCEED 5 OHMS.
7. WHERE GROUNDING CONNECTIONS ARE MADE TO PAINTED METAL SURFACES, PAINT SHALL BE REMOVED TO BEAR METAL TO ENSURE PROPER CONTACT AND RESTORED/PAINTED TO ORIGINAL FINISH.
8. GROUND DEPTH SHALL BE 30" MINIMUM BELOW FINISHED GRADE, OR 6" BELOW FROST LINE, WHICHEVER IS GREATER.

LEGEND:	
- - - - - - - - - - - - -	EXISTING GROUND CABLE
▬▬▬▬▬▬▬▬▬▬▬	PROPOSED GROUND CABLE
▲	MECHANICAL CONNECTION
■	EXOTHERMIC CONNECTION
—E—E—E—E—	PROPOSED ELECTRIC

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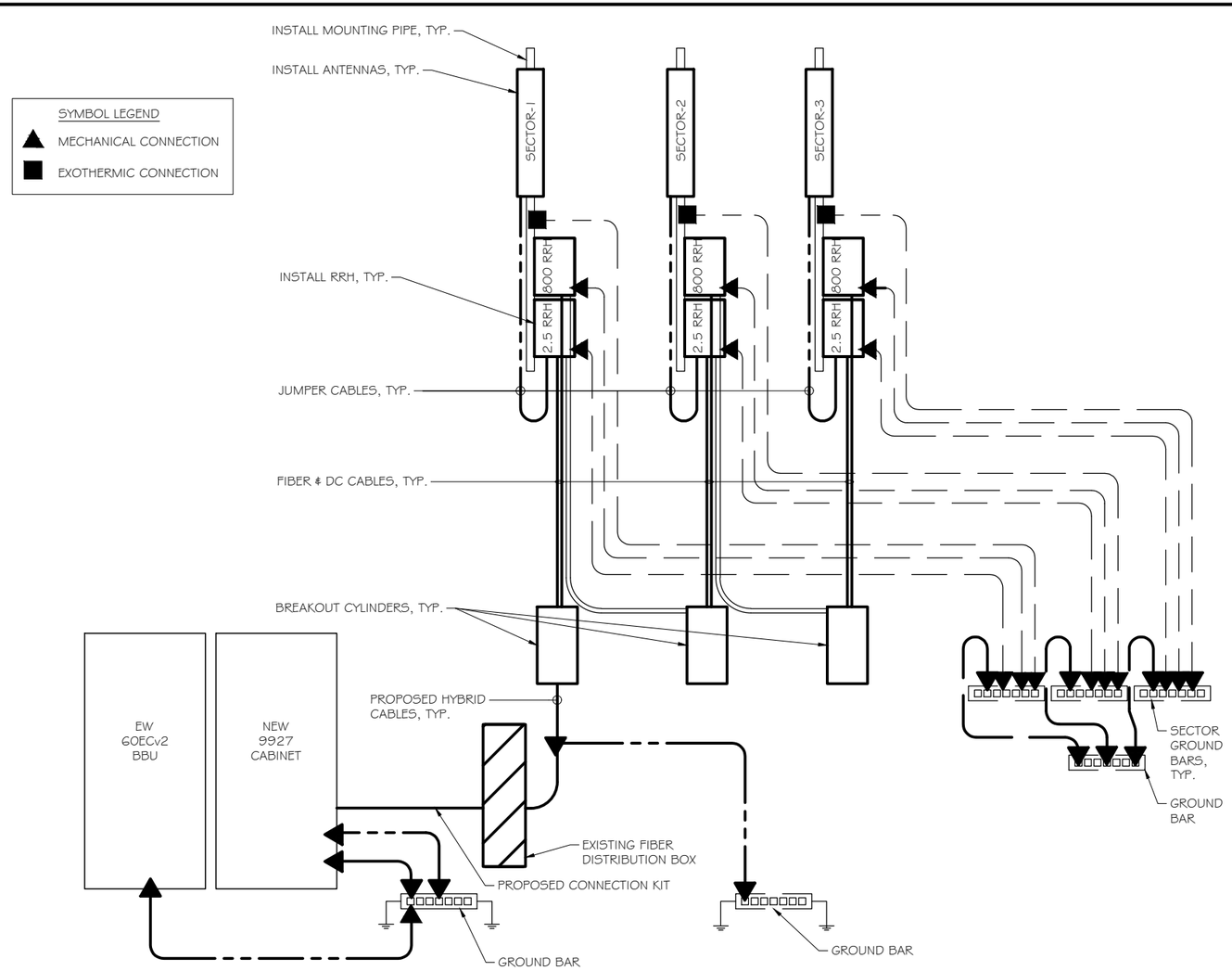
CT60XC931-A

PROJECT INFORMATION:
179 SHUNPIKE ROAD
CROMWELL, CT 06416
MIDDLESEX COUNTY

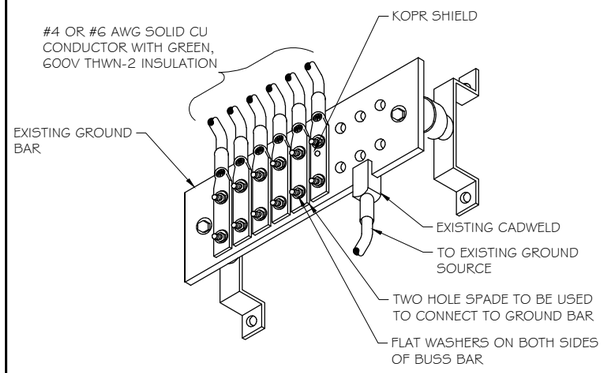
SHEET TITLE:
EQUIPMENT UTILITY & GROUNDING PLAN

SCALE: NONE

PROJECT NUMBER: 29431
SHEET NUMBER: E-1



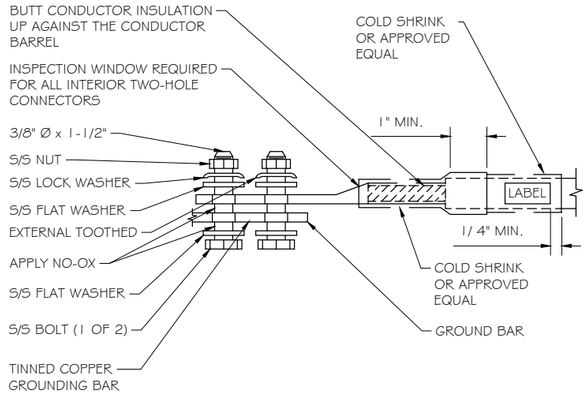
GROUNDING RISER DIAGRAM (1)
SCALE: NTS



NOTES:
1. APPLY NO-OX TO LUG AND GROUND BAR CONTACT SURFACE. DO NOT COAT INLINE LUG.

2. IF STOLEN GROUND BARS ARE ENCOUNTERED, CONTACT SPRINT CM FOR REPLACEMENT THREADED ROD KIT.

GROUNDING CONDUCTOR INSTALLATION (2)
SCALE: NTS



TWO-HOLE LUG (3)
SCALE: NTS

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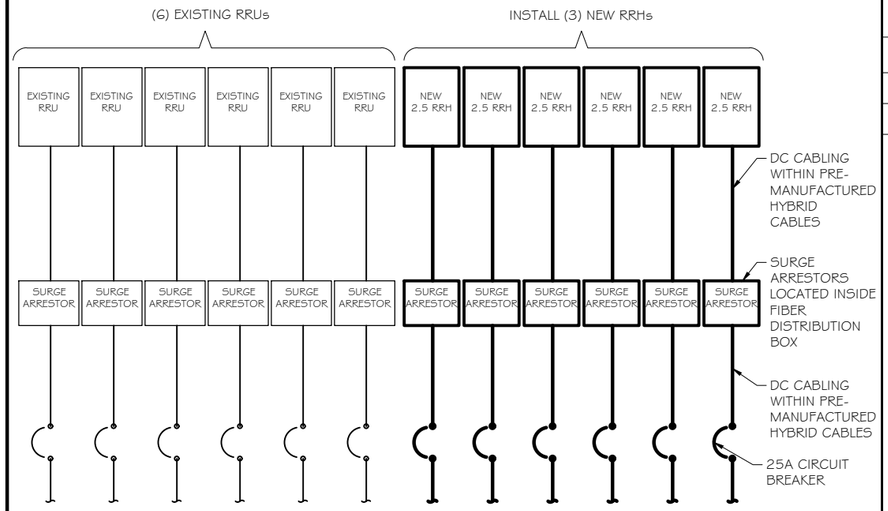
179 SHUNPIKE ROAD
CROMWELL, CT 06416
MIDDLESEX COUNTY

SHEET TITLE:
GROUNDING DETAILS

SCALE: NONE

PROJECT NUMBER: 29431
SHEET NUMBER: E-2



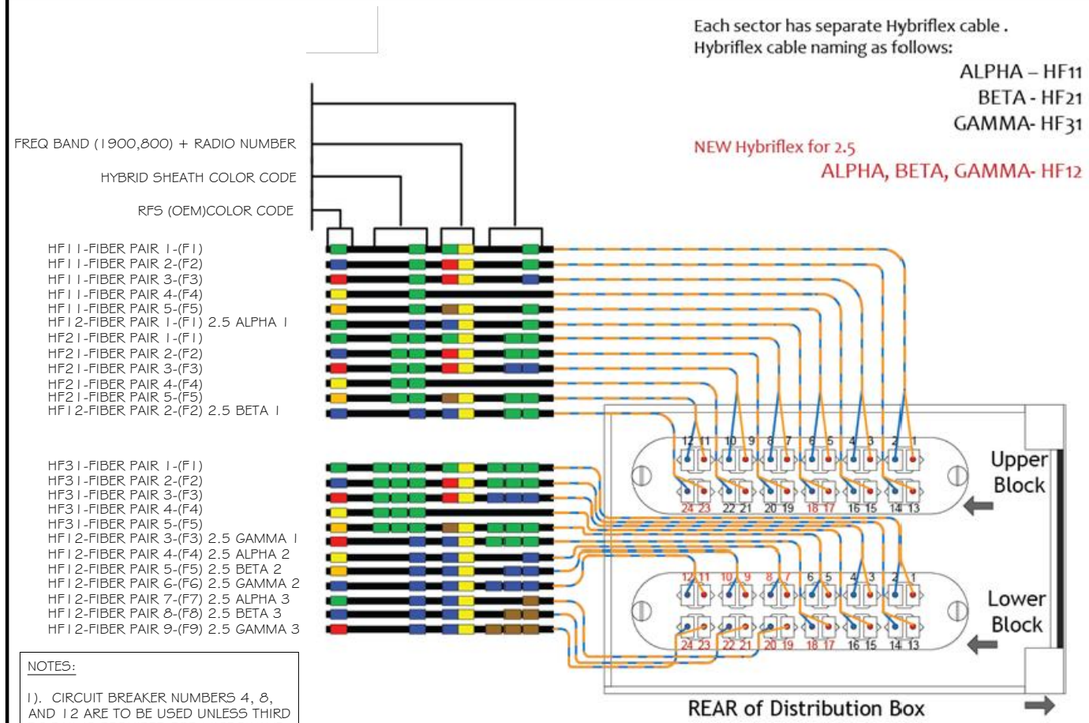
DC ONE-LINE DIAGRAM (1)
SCALE: NTS

A/C PANEL SCHEDULE

VOLTAGE:	240V/120		PANEL STATUS:	EXISTING		N TO GROUND BOND:	YES
MAIN BREAKER:	200 AMP		MODEL NUMBER:	TBD		INTERNAL TVSS:	YES
MOUNT:	SHELTER		PHASE:	1		WIRE:	3
ENCLOSURE TYPE:	NEMA 3R		BUSS RATING:	200 AMP		GROUND BAR:	YES
			NEUTRAL BAR:	YES			

CKT	DESCRIPTION	BREAKER AMPS	BREAKER POLES	BREAKER STATUS	PHASE A VA	PHASE B VA	BREAKER STATUS	BREAKER POLES	BREAKER AMPS	DESCRIPTION	CKT
1	SURGE	60	2	ON			OFF	1	10	SPARE	13
2							ON	1	15	GFI	14
3	**NEW 9927 CABINET**	**40**	**2**	**ON**			ON	2	60	HVAC 1	15
4											16
5	RADIO 2	80	2	ON			ON	2	60	HVAC 2	17
6											18
7	BLANK (UNUSED)	-	-	-			OFF	2	30	SPARE	19
8	BLANK (UNUSED)	-	-	-							20
9	BLANK (UNUSED)	-	-	-			-	-	-	BLANK (UNUSED)	21
10	BLANK (UNUSED)	-	-	-			-	-	-	BLANK (UNUSED)	22
11	BLANK (UNUSED)	-	-	-			-	-	-	BLANK (UNUSED)	23
12	BLANK (UNUSED)	-	-	-			-	-	-	BLANK (UNUSED)	24

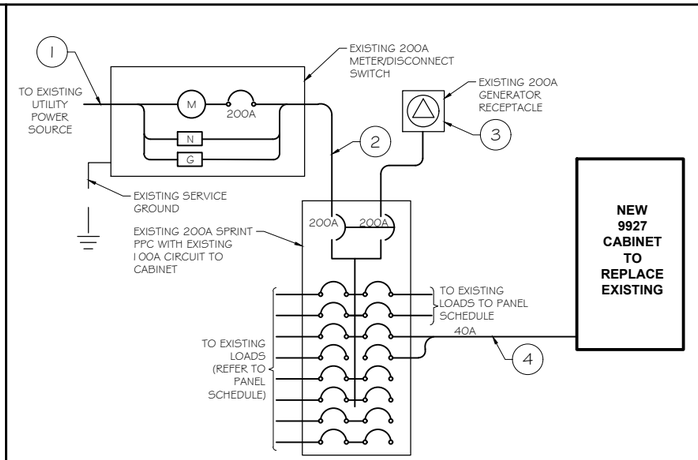
AC PANEL SCHEDULE (2)
SCALE: NTS



NOTES:

1). CIRCUIT BREAKER NUMBERS 4, 8, AND 12 ARE TO BE USED UNLESS THIRD DC RAIL IS REQUIRED FOR MICROWAVE.
2). USE DC POWER LOOP.
3). ALL UNUSED DC FEEDERS TO BE TERMINATED WITH WIRE NUTS AND TAPED.
4). REMOVE ALL DEBRIS FROM INTERIOR OF FIBER DISTRIBUTION BOX WHEN COMPLETE.

TYPICAL FIBER DISTRIBUTION (3)
SCALE: NTS



CIRCUIT SCHEDULE			
NO.	FROM	TO	CONFIGURATION
1	UTILITY SOURCE	METER/ DISCONNECT	EXISTING
2	METER/ DISCONNECT	TRANSFER & LOAD CENTER	EXISTING
3	TRANSFER & LOAD CENTER	GENERATOR RECEPTACLE	EXISTING
4	TRANSFER & LOAD CENTER	**NEW 9927 CABINET**	(3) #2 AWG, (1) #8 GND IN 1½" CONDUIT

ELECTRICAL ONE-LINE DIAGRAM (4)
SCALE: NTS

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MIDDLESEX COUNTY

SHEET TITLE:
DC POWER DETAILS & PANEL SCHEDULES

SCALE: NONE

PROJECT NUMBER: 29431
SHEET NUMBER: E-3