4 Davis Road West, Suite 5 – Old Lyme, CT 06371

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

Re: Notice of Exempt Modification Application
116 Newgate Road, East Granby 06026

August 07, 2018

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 6 panel antennae at the 80' level of the Tower. Sprint proposes to replace those panel antennas (2 per sector). Sprint also proposes relocating 3 existing remote radio units from their existing locations on the ground and adding 9 additional remote radio units, installing them at the 80' level on the tower. Sprint further proposes to add 4 hybrid cables while removing any existing cabling and strengthening the existing mounting apparatus.

There are no existing zoning or permitting documents, as the owner of this property is the Connecticut Airport Authority and does not require municipally generated zoning or building permits, nor does there appear to have been any previous Siting Council applications on the facility list that corresponds with this Sprint installation. Any documents enclosed reflect the reality of the current installation 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

4 Davis Road West, Suite 5 – Old Lyme, CT 06371

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

Re: Notice of Exempt Modification Application
116 New Gate Road East Granby, CT 06026

Latitude : N41.9601
Longitude: W72.7395

August 07, 2018

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 6 panel antennae at the 80' level of the Tower. Sprint proposes to replace those panel antennas (2 per sector) with 6 new antennas (2 per sector). Sprint also proposes to relocate 3 existing remote radio units and add 9 additional Remote Radio units also at the 80' level on the tower. Sprint further proposes to add 4 hybrid cable (while removing all other Sprint related cabling) and adding Antenna-RRH jumper cables. Lastly Sprint proposes strengthening the existing antenna mounts. No ground based modifications are being performed. 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 Sprint database does not have original zoning or building permits, nor are there submissions for Siting Council approval for this site on the Siting Council Database.

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 and to James Hayden, first selectman of East Granby as well as Gary Haynes, P&Z Director of the Town of East Granby, and to Paul Lavallee, the engineer with CT Airport Authority, the property Owner
.
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 Union Facility is located at 116 Newgate road, in the town of East Granby and is owned by the CT Airport Authority, the Site coordinates are: N41.9600, W72.7395

The existing facility consists of an 83' Monopole tower. Sprint currently operates wireless communications equipment on a platform on a concrete slab at the facility and has 6 antennas mounted at a centerline of 80'

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:

James M. Hayden, First Selectman, Town of East Granby	Via Fed Ex
Gary Haynes, P&Z Director, Town of East Granby	Via Fed Ex
Paul Lavallee, CT Airport Authority,	Via Fed Ex

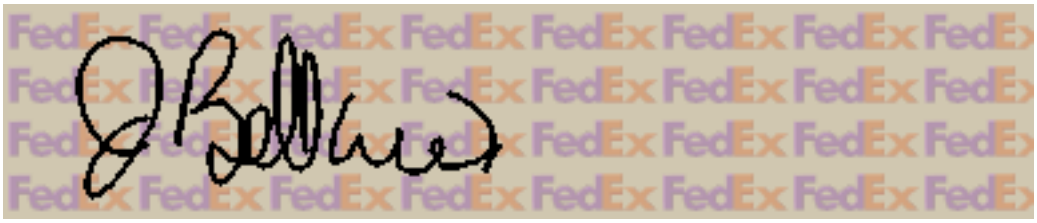
August 13,2018

Dear Customer:

The following is the proof-of-delivery for tracking number 772915799570.

Delivery Information:

Status:	Delivered	**Delivered to:**	Receptionist/Front Desk
Signed for by:	J.BELLUIES	**Delivery location:**	334 ELLA GRASSO TPKE 160 WINDSOR LOCKS, CT 06096
Service type:	FedEx Express Saver	**Delivery date:**	Aug 13, 2018 14:05
Special Handling:	Deliver Weekday Direct Signature Required		



Shipping Information:

Tracking number:	772915799570	**Ship date:**	Aug 8, 2018
		Weight:	0.5 lbs/0.2 kg

Recipient:
Paul Lavallee, PE
CT. Airport Authority
334 Ella Grasso Turnpike
Suite 160
WINDSOR LOCKS, CT 06096 US

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

Reference
CT03XC072 - CSC submission

Thank you for choosing FedEx.

August 13,2018

Dear Customer:

The following is the proof-of-delivery for tracking number 772915726770.

Delivery Information:

Status:	Delivered	**Delivered to:**	Receptionist/Front Desk
Signed for by:	A.NEWHALL	**Delivery location:**	9 CENTER ST EAST GRANBY, CT 06026
Service type:	FedEx Express Saver	**Delivery date:**	Aug 13, 2018 11:58
Special Handling:	Deliver Weekday Direct Signature Required		

Shipping Information:

Tracking number:	772915726770	**Ship date:**	Aug 7, 2018
		Weight:	0.5 lbs/0.2 kg

Recipient:
James. M. Hayden, First Selectman
Town of East Granby
9 Center Street
EAST GRANBY, CT 06026 US

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

Reference
CT03XC072 CSC Submission

Thank you for choosing FedEx.

August 13,2018

Dear Customer:

The following is the proof-of-delivery for tracking number 772915748937.

Delivery Information:

Status:	Delivered	**Delivered to:**	Receptionist/Front Desk
Signed for by:	A.NEWHALL	**Delivery location:**	9 CENTER ST EAST GRANBY, CT 06026
Service type:	FedEx Express Saver	**Delivery date:**	Aug 13, 2018 11:58
Special Handling:	Deliver Weekday Direct Signature Required		

Shipping Information:

Tracking number:	772915748937	**Ship date:**	Aug 7, 2018
		Weight:	0.5 lbs/0.2 kg

Recipient:
Gary Haynes, Planning Director
Town of East Granby
9 Center Street
EAST GRANBY, CT 06026 US

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

Reference
CT03XC072 CSC Submission

Thank you for choosing FedEx.


N
Sprint tower
Sprint tower
116 Newgate Rd
© 2018 Google
Google Earth
1992
41°57'48.31" N 72°44'31.79" W elev 578 ft eye alt 1245 ft

NEWGATE ROAD

Location	NEWGATE ROAD	**Mblu**	8/ 60/ / /
Acct#		**Owner**	CONNECTICUT AIRPORT AUTHORITY
Assessment	$6,000	**Appraisal**	$8,500
PID	2191	**Building Count**	1

Current Value

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2013	$0	$8,500	$8,500
Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2013	$0	$6,000	$6,000

Owner of Record

Owner	CONNECTICUT AIRPORT AUTHORITY	**Sale Price**	$0
Co-Owner		**Certificate**	
Address	BRADLEY INTERNATIONAL AIRPORT ADMIN OFFICE TERMINAL A WINDSOR LOCKS , CT 06096	**Book & Page**	0197/ 1024
		Sale Date	07/01/2013
		Instrument	

Ownership History

Ownership History					
Owner	**Sale Price**	**Certificate**	**Book & Page**	**Instrument**	**Sale Date**
CONNECTICUT AIRPORT AUTHORITY	$0		0197/ 1024		07/01/2013

Building Information

Building 1 : Section 1

Year Built:
Living Area: 0
Replacement Cost: $0
Building Percent Good:
Replacement Cost Less Depreciation: $0

Building Attributes

Field	Description
Style	Vacant Land
Model	
Grade:	
Stories:	
Occupancy	
Exterior Wall A	
Exterior Wall B	
Roof Structure:	
Roof Cover	
Interior Wall A	
Interior Wall B	
Interior Flr A	
Interior Flr B	
Heat Fuel	
Heat Type:	
AC Type:	
Total Bedrooms:	
Total Bthrms:	
Total Half Baths:	
Total Xtra Fixtrs:	
Total Rooms:	
Bath Style:	
Kitchen Style:	
Fin. Basement	
Fin. Bsmt. Qual.	
Bsmt. Garage	
Fireplaces	
Whirlpools	
Fin Rsd Bsm	

Building Photo

(http://images.vgsi.com/photos/EastGranbyCTPhotos//default.jp

Building Layout

(http://images.vgsi.com/photos/EastGranbyCTPhotos//Sketches/

Building Sub-Areas (sq ft)	Legend
No Data for Building Sub-Areas	

Extra Features

Extra Features	Legend
No Data for Extra Features	

Land

Land Use

Use Code 956

Land Line Valuation

Size (Acres) 1.7

Description	CAA AIRPORT VAC	**Frontage**	0
Zone	PRD	**Depth**	0
Neighborhood		**Assessed Value**	$6,000
Alt Land Appr	No	**Appraised Value**	$8,500
Category			

Outbuildings

Outbuildings	Legend
No Data for Outbuildings	

Valuation History

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2012	$0	$3,300	$3,300
2007	$0	$2,900	$2,900
2003	$0	$2,600	$2,600

Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2012	$0	$2,300	$2,300
2007	$0	$2,000	$2,000
2003	$0	$1,800	$1,800

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EBI Consulting
environmental | engineering | due diligence

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

SPRINT Existing Facility

Site ID: CT03XC072

Airport Tower
116 Newgate Road
East Granby, CT 06026

July 30, 2018

EBI Project Number: 6218005222

Site Compliance Summary	
Compliance Status:	**COMPLIANT**
Site total MPE% of FCC general population allowable limit:	**21.07 %**

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

EBI Consulting
environmental | engineering | due diligence

July 30, 2018

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

Emissions Analysis for Site: **CT03XC072 – Airport Tower**

EBI Consulting was directed to analyze the proposed SPRINT facility located at **116 Newgate Road, East Granby, 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.

General population 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 **116 Newgate Road, East Granby, 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 for directional panel antennas, 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 50 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 for directional panel antennas, 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 **Commscope NNVV-65B-R4 and the RFS APXVTM14-ALU-I20** 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 for directional panel antennas, 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 panel antennas are **80 feet** above ground level (AGL) for **Sector A**, **80 feet** above ground level (AGL) for **Sector B** and **80 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:	Commscope NNVV-65B-R4	Make / Model:	Commscope NNVV-65B-R4	Make / Model:	Commscope NNVV-65B-R4
Gain:	12.75 / 15.05 dBd	Gain:	12.75 / 15.05 dBd	Gain:	12.75 / 15.05 dBd
Height (AGL):	**80 feet**	Height (AGL):	**80 feet**	Height (AGL):	**80 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):	280 Watts	Total TX Power(W):	280 Watts	Total TX Power(W):	280 Watts
ERP (W):	7,378.61	ERP (W):	7,378.61	ERP (W):	7,378.61
Antenna A1 MPE%	**5.97 %**	Antenna B1 MPE%	**5.97 %**	Antenna C1 MPE%	**5.97 %**
Antenna #:	**2**	Antenna #:	**2**	Antenna #:	**2**
Make / Model:	RFS APXVTM14-ALU-I20	Make / Model:	RFS APXVTM14-ALU-I20	Make / Model:	RFS APXVTM14-ALU-I20
Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	**80 feet**	Height (AGL):	**80 feet**	Height (AGL):	**80 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):	6,224.72	ERP (W):	6,224.72	ERP (W):	6,224.72
Antenna A2 MPE%	**4.09 %**	Antenna B2 MPE%	**4.09 %**	Antenna C2 MPE%	**4.09 %**

Site Composite MPE%	
Carrier	**MPE%**
SPRINT – Max per sector	**10.06 %**
Verizon Wireless	11.00 %
Conn DOT	0.00 %
Site Total MPE %:	**21.07 %**

SPRINT Sector A Total:	10.06 %
SPRINT Sector B Total:	10.06 %
SPRINT Sector C Total:	10.06 %
Site Total:	21.07 %

SPRINT _ Frequency Band / Technology (All Sectors)	# 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	376.73	80	2.47	850 MHz	567	0.43%
Sprint 850 MHz LTE	2	941.82	80	12.37	850 MHz	567	2.18%
Sprint 1900 MHz (PCS) CDMA	5	511.82	80	16.80	1900 MHz (PCS)	1000	1.68%
Sprint 1900 MHz (PCS) LTE	2	1,279.56	80	16.80	1900 MHz (PCS)	1000	1.68%
Sprint 2500 MHz (BRS) LTE	8	778.09	80	40.87	2500 MHz (BRS)	1000	4.09%
						Total:	**10.06%**

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:	10.06 %
Sector B:	10.06 %
Sector C:	10.06 %
SPRINT Maximum MPE % (per sector):	10.06 %
Site Total:	21.07 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **21.07 %** 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.
100% EMPLOYEE-OWNED

June 26, 2018

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

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

SUBJECT: **STRUCTURAL ASSESSMENT**
75-FOOT MONOPOLE

CARRIER: **SPRINT**

SITE: **CT03XC072**
116 NEWGATE ROAD
EAST GRANBY, HARTFORD COUNTY, CONNECTICUT 06026
RAMAKER & ASSOCIATES PROJECT NUMBER: 22968

RESULTS:	**TOWER:**	**84.8%**	**PASS**
	FOUNDATION:		**NOT ANALYZED**

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.

Kali L. Phillips
Structural Designer

James R. Skowronski, P.E.
Supervising Engineer

STATE OF CONNECTICUT
JAMES R. SKOWRONSKI
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}	120 mph (3 sec. gust)
Nominal Design Wind Speed, V_{asd}	93 mph (3 sec. gust)
Design Wind Speed w/ Ice	50 mph (3 sec. gust)
Ice Thickness	1 inch
Exposure Category	B
Topographic Feature	Continuous Ridge

SUPPORTING DOCUMENTATION

- Tower mapping by TEP, job number 131595-155161, dated February 21, 2018
- Structural analysis by CHA LLP, job number 5950.41.72, dated December 20, 1996
- Construction drawings by RAMAKER, project number 22968
- 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
84	(1) Large Beacon	Top of Tower	(1) 1/2	--	Existing
80	**(6) Panel Antenna**	Profile Platform w/Handrail	(6) 1-1/4 **(4) 1-5/8**	Sprint	**Remove**
	(1) Yagi				Existing
	(3) Dipole				
	(3) RFS APXVTM14-ALU-I20				**Proposed**
	(3) Commscope NNVV-65B-R4				
	(3) ALU TD-RRH8x20-25				
	(6) ALU 800 MHz 2x50W RRH				
	(3) ALU 1900 MHz 4x45W RRH				**Relocate**
51.25	(1) GPS	(1) Standoff	(1) 1/2	--	Existing

TOWER RESULTS

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

Component Type	Percent Capacity	Pass/Fail
Section 1	59.8	Pass
Section 2	78.8	Pass
Section 3	84.8	Pass
Anchor Rod	61.2	Pass
Base Plate	75.1	Pass
RATING	**84.8**	**PASS**

Note: A rating of 105% or less is within engineering tolerances and considered acceptable.

Results of the analysis show that the existing tower will be stressed to a maximum of 84.8 percent of capacity. Therefore, the existing tower will pass the TIA-222-G analysis requirements under proposed loading conditions.

FOUNDATION REACTIONS

The maximum tower reactions correlated to maximum moment are as follows:

Load Type	Original Model	Proposed Model
Axial (k)	--	7.5
Shear (k)	--	10.2
Moment (k-ft)	--	574.7

The foundation was not analyzed due to insufficient foundation and geotechnical information.

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

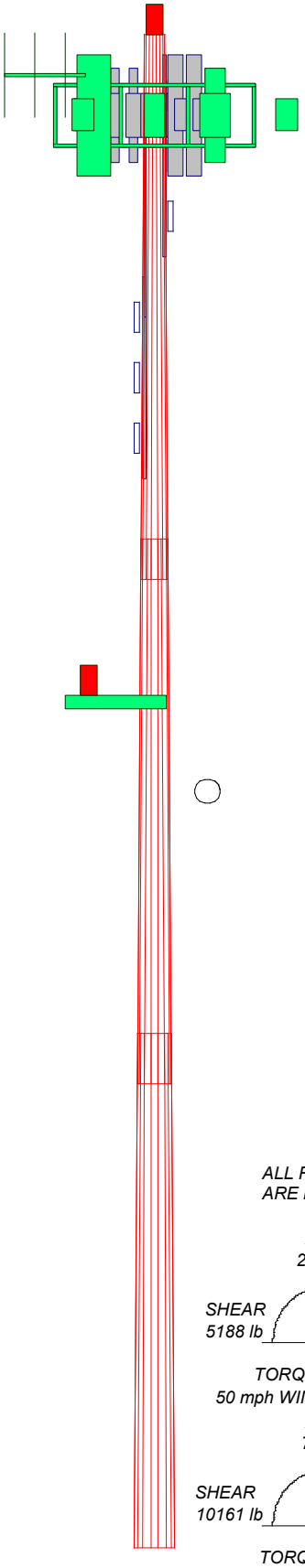
The tower owner is responsible for verifying that the existing loading on the structure is consistent with the loading applied to the structure within this report. If there is any information contrary to that contained herein, or if there are any defects arising from the original design, material, fabrication 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	Length (ft)	Number of Sides	Thickness (in)	Socket Length (ft)	Top Dia (in)	Bot Dia (in)	Grade	Weight (lb)
1	27.00	18	0.1875	2.00	12.0000	16.5000		768.9
2	27.00	18	0.2188	2.50	15.7917	20.7500	A572-65	1151.5
3	25.50	18	0.2500		19.8534	24.0000		1492.5
								3413.0



ALL REACTIONS ARE FACTORED

AXIAL 22052 lb

SHEAR 5188 lb

MOMENT 308698 lb-ft

TORQUE 1328 lb-ft

50 mph WIND - 1.0000 in ICE

AXIAL 7534 lb

SHEAR 10161 lb

MOMENT 574652 lb-ft

TORQUE 986 lb-ft

REACTIONS - 93 mph WIND

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Large Beacon	84	(2) 800MHz 2x50W RRH	80
3' Yagi	82	(2) 800MHz 2x50W RRH	80
APXVTM14-C-120	80	TD-RRH8x20-25	80
APXVTM14-C-120	80	TD-RRH8x20-25	80
APXVTM14-C-120	80	TD-RRH8x20-25	80
NNVV-65B-R4	80	6'-8" Platform	80
NNVV-65B-R4	80	DB408-B	78
NNVV-65B-R4	80	DB408-B	76.5
1900MHz 4x45W RRH	80	10'x4" Pipe Mount	75
1900MHz 4x45W RRH	80	DB408-B	67
1900MHz 4x45W RRH	80	GPS	51.25
(2) 800MHz 2x50W RRH	80	Side Arm Mount [SO 701-1]	51.25

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-65	65 ksi	80 ksi			

TOWER DESIGN NOTES

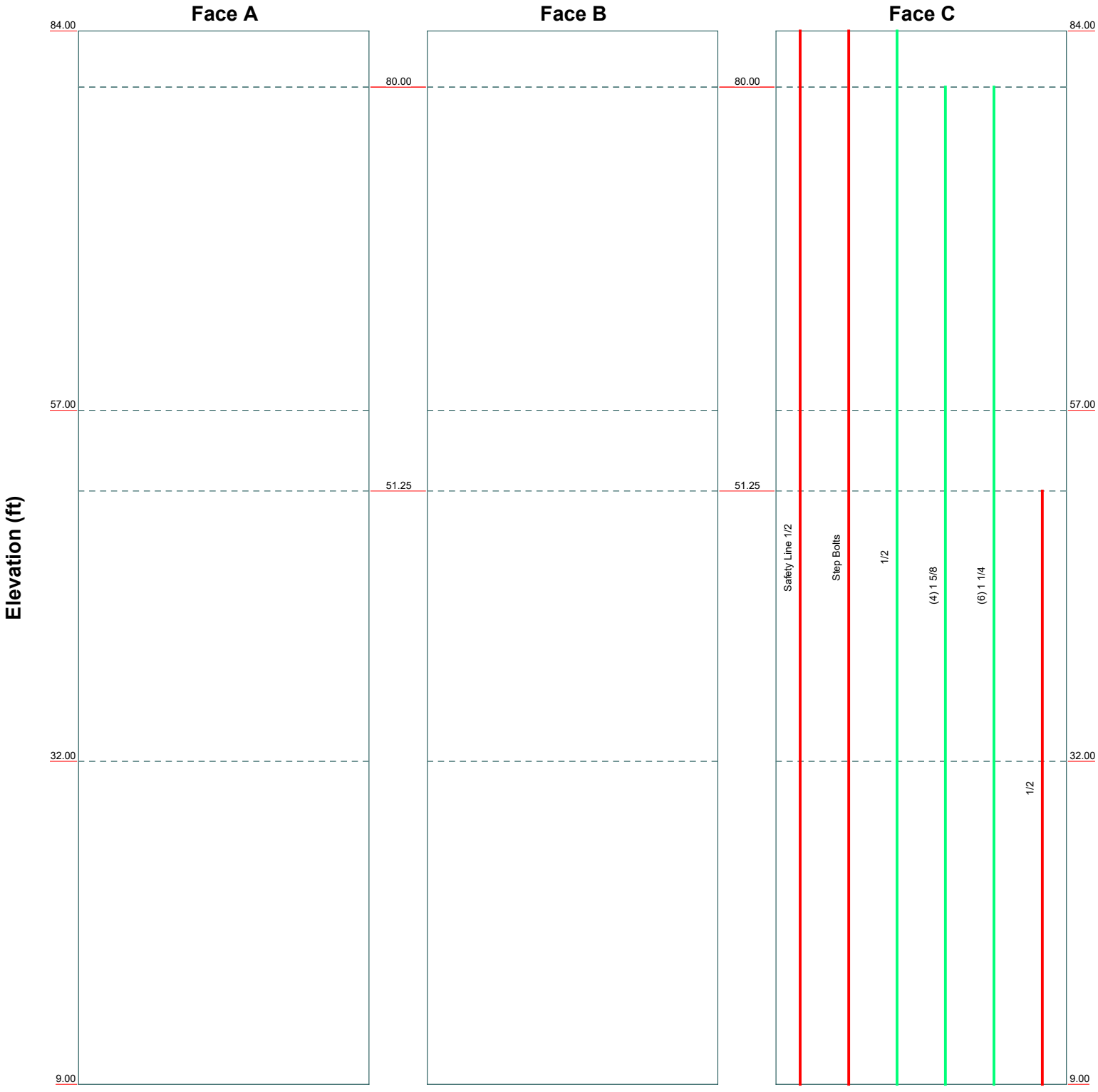
1. Tower is located in Hartford County, Connecticut.
2. Tower designed for Exposure B to the TIA-222-G Standard.
3. Tower designed for a 93 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 50 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Structure Class II.
7. Topographic Category 5 with Crest Height of 487.00 ft
8. TOWER RATING: 84.8%

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

Job: *CT03XC072*			
Project: *22968*			
Client: CCI/Sprint	Drawn by: kphillips	App'd:	
Code: TIA-222-G	Date: 06/18/18	Scale: NTS	
Path: I:\22900\22968\Structural\TNX\22968.eri		Dwg No. E-1	

Feed Line Distribution Chart
9' - 84'

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



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Job: ***CT03XC072***			
Project: ***22968***			
Client: CCI/Sprint	Drawn by: kphillips	App'd:	
Code: TIA-222-G	Date: 06/18/18	Scale: NTS	
Path: I:\22900\22968\Structural\TNX\22968.eri		Dwg No. E-7	

Tower Input Data

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

Tower is located in Hartford County, Connecticut.
ASCE 7-10 Wind Data is used (wind speeds converted to nominal values).
Basic wind speed of 93 mph.
Structure Class II.
Exposure Category B.
Topographic Category 5.
Crest Height 487.00 ft.
SEAW RSM-03 procedures for wind speed-up calculations are used.
Topographic Feature: Continuous Ridge.
Slope Distance L: 2692.00 ft.
Distance from Crest x: 0.00 ft.
Nominal ice thickness of 1.0000 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 pole design is 1.
Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

	Consider Moments - Legs		Distribute Leg Loads As Uniform		Use ASCE 10 X-Brace Ly Rules
	Consider Moments - Horizontals		Assume Legs Pinned		Calculate Redundant Bracing Forces
	Consider Moments - Diagonals	√	Assume Rigid Index Plate		Ignore Redundant Members in FEA
	Use Moment Magnification	√	Use Clear Spans For Wind Area		SR Leg Bolts Resist Compression
√	Use Code Stress Ratios	√	Use Clear Spans For KL/r	√	All Leg Panels Have Same Allowable
√	Use Code Safety Factors - Guys		Retension Guys To Initial Tension		Offset Girt At Foundation
	Escalate Ice	√	Bypass Mast Stability Checks	√	Consider Feed Line Torque
	Always Use Max Kz	√	Use Azimuth Dish Coefficients		Include Angle Block Shear Check
	Use Special Wind Profile	√	Project Wind Area of Appurt.		Use TIA-222-G Bracing Resist. Exemption
	Include Bolts In Member Capacity		Autocalc Torque Arm Areas		Use TIA-222-G Tension Splice Exemption
	Leg Bolts Are At Top Of Section		Add IBC .6D+W Combination		Poles
	Secondary Horizontal Braces Leg		Sort Capacity Reports By Component	√	Include Shear-Torsion Interaction
	Use Diamond Inner Bracing (4 Sided)		Triangulate Diamond Inner Bracing		Always Use Sub-Critical Flow
	SR Members Have Cut Ends		Treat Feed Line Bundles As Cylinder		Use Top Mounted Sockets
	SR Members Are Concentric				Pole Without Linear Attachments
					Pole With Shroud Or No Appurtenances
					Outside and Inside Corner Radii Are Known

Tapered Pole Section Geometry

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	84.00-57.00	27.00	2.00	18	12.0000	16.5000	0.1875	0.7500	A572-65 (65 ksi)
L2	57.00-32.00	27.00	2.50	18	15.7917	20.7500	0.2188	0.8750	A572-65 (65 ksi)
L3	32.00-9.00	25.50		18	19.8534	24.0000	0.2500	1.0000	A572-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	12.1562	7.0299	123.9285	4.1934	6.0960	20.3295	248.0200	3.5156	1.7820	9.504
	16.7256	9.7080	326.3677	5.7909	8.3820	38.9367	653.1649	4.8549	2.5740	13.728
L2	16.3745	10.8125	331.2854	5.5284	8.0222	41.2963	663.0068	5.4073	2.3943	10.946
	21.0364	14.2551	759.1692	7.2886	10.5410	72.0206	1519.3374	7.1289	3.2670	14.935
L3	20.5339	15.5553	755.2283	6.9592	10.0855	74.8824	1511.4503	7.7791	3.0542	12.217
	24.3317	18.8456	1342.9976	8.4313	12.1920	110.1540	2687.7623	9.4246	3.7840	15.136

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
L1 84.00-57.00				1	1	1			
L2 57.00-32.00				1	1	1			
L3 32.00-9.00				1	1	1			

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Sector	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight plf
**********									
Safety Line 1/2	C	Surface Ar (CaAa)	84.00 - 9.00	1	1	0.000 0.000	0.5000		0.35
Step Bolts	C	Surface Ar (CaAa)	84.00 - 9.00	1	1	0.000 0.000	0.4000		1.00
**********									
1/2	C	Surface Ar (CaAa)	51.25 - 9.00	1	1	0.000 0.000	0.5800		0.25

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
**********								
1/2	C	No	Inside Pole	84.00 - 9.00	1	No Ice	0.00	0.25

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
						1/2" Ice	0.00	0.25
						1" Ice	0.00	0.25
**********								
1 5/8	C	No	Inside Pole	80.00 - 9.00	4	No Ice	0.00	1.04
						1/2" Ice	0.00	1.04
						1" Ice	0.00	1.04
1 1/4	C	No	Inside Pole	80.00 - 9.00	6	No Ice	0.00	0.66
						1/2" Ice	0.00	0.66
						1" Ice	0.00	0.66

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
L1	84.00-57.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	2.430	0.000	229.96
L2	57.00-32.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	3.366	0.000	247.81
L3	32.00-9.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	3.404	0.000	229.31

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
L1	84.00-57.00	A	2.732	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	31.931	0.000	803.31
L2	57.00-32.00	A	2.639	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	41.199	0.000	991.43
L3	32.00-9.00	A	2.469	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	39.826	0.000	926.28

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	84.00-57.00	0.0000	0.7587	0.0000	2.7395
L2	57.00-32.00	0.0000	1.1219	0.0000	3.8698
L3	32.00-9.00	0.0000	1.2288	0.0000	4.3502

Note: For pole sections, center of pressure calculations do not consider feed line shielding.

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L1	2	Safety Line 1/2	57.00 - 84.00	1.0000	1.0000
L1	3	Step Bolts	57.00 - 84.00	1.0000	1.0000
L1	11	1/2	57.00 - 51.25	1.0000	1.0000
L2	2	Safety Line 1/2	32.00 - 57.00	1.0000	1.0000
L2	3	Step Bolts	32.00 - 57.00	1.0000	1.0000
L2	11	1/2	32.00 - 51.25	1.0000	1.0000

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 lb
**********									
Large Beacon	C	None		0.0000	84.00	No Ice	1.56	1.56	28.00
						1/2" Ice	2.41	2.41	58.19
						1" Ice	2.64	2.64	91.58
**********									
3' Yagi	C	From Leg	0.00 6.00 0.00	0.0000	82.00	No Ice 1/2" Ice 1" Ice	1.82 4.75 7.70	1.82 4.75 7.70	20.00 40.11 78.26
APXVTM14-C-120	A	From Face	0.00 -3.00 0.00	0.0000	80.00	No Ice 1/2" Ice 1" Ice	5.85 6.22 6.59	3.34 3.69 4.04	52.90 89.15 130.32
APXVTM14-C-120	B	From Face	0.00 -3.00 0.00	0.0000	80.00	No Ice 1/2" Ice 1" Ice	5.85 6.22 6.59	3.34 3.69 4.04	52.90 89.15 130.32
APXVTM14-C-120	C	From Face	0.00 -3.00 0.00	0.0000	80.00	No Ice 1/2" Ice 1" Ice	5.85 6.22 6.59	3.34 3.69 4.04	52.90 89.15 130.32
NNVV-65B-R4	A	From Face	0.00 3.00 0.00	0.0000	80.00	No Ice 1/2" Ice 1" Ice	12.27 12.77 13.27	5.75 6.21 6.67	77.40 149.54 228.32
NNVV-65B-R4	B	From Face	0.00 3.00 0.00	0.0000	80.00	No Ice 1/2" Ice 1" Ice	12.27 12.77 13.27	5.75 6.21 6.67	77.40 149.54 228.32
NNVV-65B-R4	C	From Face	0.00 3.00 0.00	0.0000	80.00	No Ice 1/2" Ice 1" Ice	12.27 12.77 13.27	5.75 6.21 6.67	77.40 149.54 228.32
1900MHz 4x45W RRH	A	From Face	0.00 0.00 0.00	0.0000	80.00	No Ice 1/2" Ice 1" Ice	2.32 2.53 2.74	2.24 2.44 2.65	59.50 82.62 108.98
1900MHz 4x45W RRH	B	From Face	0.00	0.0000	80.00	No Ice	2.32	2.24	59.50

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			1/2" Ice	2.53	2.44	82.62
			0.00			1" Ice	2.74	2.65	108.98
1900MHz 4x45W RRH	C	From Face	0.00	0.0000	80.00	No Ice	2.32	2.24	59.50
			0.00			1/2" Ice	2.53	2.44	82.62
			0.00			1" Ice	2.74	2.65	108.98
(2) 800MHz 2x50W RRH	A	From Face	0.00	0.0000	80.00	No Ice	2.06	1.93	64.00
			-1.50			1/2" Ice	2.24	2.11	86.12
			0.00			1" Ice	2.43	2.29	111.30
(2) 800MHz 2x50W RRH	B	From Face	0.00	0.0000	80.00	No Ice	2.06	1.93	64.00
			-1.50			1/2" Ice	2.24	2.11	86.12
			0.00			1" Ice	2.43	2.29	111.30
(2) 800MHz 2x50W RRH	C	From Face	0.00	0.0000	80.00	No Ice	2.06	1.93	64.00
			-1.50			1/2" Ice	2.24	2.11	86.12
			0.00			1" Ice	2.43	2.29	111.30
TD-RRH8x20-25	A	From Face	0.00	0.0000	80.00	No Ice	4.05	1.53	70.00
			-3.00			1/2" Ice	4.30	1.71	97.14
			0.00			1" Ice	4.56	1.90	127.80
TD-RRH8x20-25	B	From Face	0.00	0.0000	80.00	No Ice	4.05	1.53	70.00
			-3.00			1/2" Ice	4.30	1.71	97.14
			0.00			1" Ice	4.56	1.90	127.80
TD-RRH8x20-25	C	From Face	0.00	0.0000	80.00	No Ice	4.05	1.53	70.00
			-3.00			1/2" Ice	4.30	1.71	97.14
			0.00			1" Ice	4.56	1.90	127.80
DB408-B	B	From Face	0.00	0.0000	78.00	No Ice	1.90	1.90	17.00
			0.00			1/2" Ice	3.42	3.42	22.10
			0.00			1" Ice	4.94	4.94	27.20
DB408-B	C	From Face	0.00	0.0000	76.50	No Ice	1.90	1.90	17.00
			0.00			1/2" Ice	3.42	3.42	22.10
			0.00			1" Ice	4.94	4.94	27.20
DB408-B	A	From Face	0.00	0.0000	67.00	No Ice	1.90	1.90	17.00
			0.00			1/2" Ice	3.42	3.42	22.10
			0.00			1" Ice	4.94	4.94	27.20
10'x4" Pipe Mount	A	From Face	0.00	0.0000	75.00	No Ice	3.14	3.14	108.00
			0.00			1/2" Ice	5.24	5.24	139.31
			0.00			1" Ice	5.85	5.85	177.35
6'-8" Platform	C	None		0.0000	80.00	No Ice	17.70	17.70	712.65
						1/2" Ice	25.64	25.64	1005.68
						1" Ice	33.59	33.59	1298.71
**********									
GPS	C	From Leg	3.00	0.0000	51.25	No Ice	1.00	1.00	10.00
			0.00			1/2" Ice	1.50	1.50	15.00
			0.00			1" Ice	2.00	2.00	20.00
Side Arm Mount [SO 701-1]	C	From Leg	1.50	0.0000	51.25	No Ice	0.85	1.67	65.00
			0.00			1/2" Ice	1.14	2.34	79.00
			0.00			1" Ice	1.43	3.01	93.00

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	3412.95					
Bracing Weight	0.00					
Total Member Self-Weight	3412.95			48.40	279.64	
Total Weight	6278.08			48.40	279.64	
Wind 0 deg - No Ice		-13.52	-6342.65	-346695.57	850.73	-574.33
Wind 30 deg - No Ice		3151.82	-5486.14	-299955.15	-172268.05	-634.14
Wind 60 deg - No Ice		5472.63	-3159.62	-172829.01	-299152.82	-524.05
Wind 90 deg - No Ice		6327.05	13.52	619.49	-345804.90	-273.53
Wind 120 deg - No Ice		5486.14	3183.03	173914.96	-299723.90	50.28
Wind 150 deg - No Ice		3175.23	5499.66	300623.03	-173257.20	360.62
Wind 180 deg - No Ice		13.52	6342.65	346792.37	-291.44	574.33
Wind 210 deg - No Ice		-3151.82	5486.14	300051.95	172827.34	634.14
Wind 240 deg - No Ice		-5472.63	3159.62	172925.82	299712.11	524.05
Wind 270 deg - No Ice		-6327.05	-13.52	-522.68	346364.19	273.53
Wind 300 deg - No Ice		-5486.14	-3183.03	-173818.16	300283.19	-50.28
Wind 330 deg - No Ice		-3175.23	-5499.66	-300526.23	173816.49	-360.62
Member Ice	4988.23					
Total Weight Ice	20471.55			-160.30	1944.43	
Wind 0 deg - Ice		-13.61	-4389.36	-240027.61	2519.52	-1057.77
Wind 30 deg - Ice		2175.03	-3794.49	-207603.94	-117159.16	-1408.65
Wind 60 deg - Ice		3780.88	-2182.89	-119595.92	-204924.13	-1382.08
Wind 90 deg - Ice		5187.65	13.61	414.79	-265908.62	-985.19
Wind 120 deg - Ice		3794.49	2206.47	120271.40	-205499.22	-324.31
Wind 150 deg - Ice		2198.61	3808.10	207858.44	-118155.24	423.46
Wind 180 deg - Ice		13.61	4389.36	239707.02	1369.34	1057.77
Wind 210 deg - Ice		-2175.03	3794.49	207283.35	121048.02	1408.65
Wind 240 deg - Ice		-3780.88	2182.89	119275.32	208812.99	1382.08
Wind 270 deg - Ice		-5187.65	-13.61	-735.38	269797.48	985.19
Wind 300 deg - Ice		-3794.49	-2206.47	-120591.99	209388.08	324.31
Wind 330 deg - Ice		-2198.61	-3808.10	-208179.03	122044.10	-423.46
Total Weight	6278.08			48.40	279.64	
Wind 0 deg - Service		-5.03	-2362.13	-129173.05	492.33	-213.89
Wind 30 deg - Service		1173.80	-2043.14	-111766.03	-63980.41	-236.17
Wind 60 deg - Service		2038.11	-1176.70	-64421.83	-111234.72	-195.16
Wind 90 deg - Service		2356.31	5.03	173.70	-128608.84	-101.87
Wind 120 deg - Service		2043.14	1185.42	64712.24	-111447.40	18.73
Wind 150 deg - Service		1182.52	2048.18	111900.74	-64348.79	134.30
Wind 180 deg - Service		5.03	2362.13	129095.09	66.96	213.89
Wind 210 deg - Service		-1173.80	2043.14	111688.06	64539.70	236.17
Wind 240 deg - Service		-2038.11	1176.70	64343.86	111794.01	195.16
Wind 270 deg - Service		-2356.31	-5.03	-251.67	129168.13	101.87
Wind 300 deg - Service		-2043.14	-1185.42	-64790.21	112006.69	-18.73
Wind 330 deg - Service		-1182.52	-2048.18	-111978.71	64908.08	-134.30

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.6 Wind 0 deg - No Ice
3	0.9 Dead+1.6 Wind 0 deg - No Ice
4	1.2 Dead+1.6 Wind 30 deg - No Ice
5	0.9 Dead+1.6 Wind 30 deg - No Ice
6	1.2 Dead+1.6 Wind 60 deg - No Ice
7	0.9 Dead+1.6 Wind 60 deg - No Ice
8	1.2 Dead+1.6 Wind 90 deg - No Ice

Comb. No.	Description
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
L1	84 - 57	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-12651.11	1866.42	1961.87
			Max. Mx	20	-2839.59	137284.68	95.78
			Max. My	2	-2839.44	151.38	137269.07
			Max. Vy	20	-7215.83	137284.68	95.78
			Max. Vx	2	-7215.88	151.38	137269.07
			Max. Torque	29			1302.42
L2	57 - 32	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-16957.29	2483.55	1218.99
			Max. Mx	20	-4829.03	332978.93	360.05
			Max. My	14	-4827.23	-38.61	-333078.21

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial lb	Major Axis Moment lb-ft	Minor Axis Moment lb-ft
L3	32 - 9	Pole	Max. Vy	20	-8709.90	332978.93	360.05
			Max. Vx	14	8735.08	-38.61	-333078.21
			Max. Torque	28			1330.53
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-22052.03	2541.74	475.17
			Max. Mx	20	-7520.64	573261.07	872.70
			Max. My	14	-7520.59	-592.40	-574046.57
			Max. Vy	20	-10132.98	573261.07	872.70
			Max. Vx	14	10157.97	-592.40	-574046.57
			Max. Torque	28			1328.55

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical lb	Horizontal, X lb	Horizontal, Z lb
Pole	Max. Vert	36	22052.03	5187.69	13.61
	Max. H_x	21	5650.28	10123.28	21.63
	Max. H_z	2	7533.70	21.63	10148.25
	Max. M_x	2	573930.79	21.63	10148.25
	Max. M_z	8	572562.54	-10123.28	-21.63
	Max. Torsion	28	1327.70	-2175.05	3794.53
	Min. Vert	19	5650.28	8756.20	-5055.39
	Min. H_x	9	5650.28	-10123.28	-21.63
	Min. H_z	14	7533.70	-21.63	-10148.25
	Min. M_x	14	-574046.57	-21.63	-10148.25
	Min. M_z	20	-573261.07	10123.28	21.63
	Min. Torsion	34	-1326.94	2175.04	-3794.50

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	6278.08	-0.00	-0.00	46.99	284.28	-0.01
1.2 Dead+1.6 Wind 0 deg - No Ice	7533.70	-21.63	-10148.25	-573930.79	1279.71	-890.36
0.9 Dead+1.6 Wind 0 deg - No Ice	5650.28	-21.63	-10148.25	-568563.83	1184.03	-893.45
1.2 Dead+1.6 Wind 30 deg - No Ice	7533.70	5042.91	-8777.83	-496562.48	-285302.69	-982.67
0.9 Dead+1.6 Wind 30 deg - No Ice	5650.28	5042.91	-8777.83	-491920.39	-282710.12	-985.77
1.2 Dead+1.6 Wind 60 deg - No Ice	7533.70	8756.20	-5055.39	-286121.98	-495344.60	-811.68
0.9 Dead+1.6 Wind 60 deg - No Ice	5650.28	8756.20	-5055.39	-283452.54	-490783.33	-813.94
1.2 Dead+1.6 Wind 90 deg - No Ice	7533.70	10123.28	21.63	999.92	-572562.54	-423.14
0.9 Dead+1.6 Wind 90 deg - No Ice	5650.28	10123.28	21.63	978.09	-567279.07	-423.99
1.2 Dead+1.6 Wind 120 deg - No Ice	7533.70	8777.83	5092.85	287864.90	-496270.34	78.79
0.9 Dead+1.6 Wind 120 deg - No Ice	5650.28	8777.83	5092.85	285154.33	-491704.54	79.59
1.2 Dead+1.6 Wind 150 deg - No Ice	7533.70	5080.37	8799.45	497611.93	-286916.14	559.52
0.9 Dead+1.6 Wind 150 deg - No Ice	5650.28	5080.37	8799.45	492934.80	-284314.45	561.77
1.2 Dead+1.6 Wind 180 deg - No Ice	7533.70	21.63	10148.25	574046.57	-592.75	890.37
0.9 Dead+1.6 Wind 180 deg - No Ice	5650.28	21.63	10148.25	568651.23	-676.23	893.44
1.2 Dead+1.6 Wind 210 deg - No Ice	7533.70	-5042.91	8777.83	496686.18	285987.54	982.64
0.9 Dead+1.6 Wind 210 deg - No Ice	5650.28	-5042.91	8777.83	492013.63	283216.39	985.73
1.2 Dead+1.6 Wind 240 deg - No Ice	7533.70	-8756.20	5055.39	286251.44	496035.19	811.59
0.9 Dead+1.6 Wind 240 deg - No Ice	5650.28	-8756.20	5055.39	283550.04	491293.91	813.88

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 270 deg - No Ice	7533.70	-10123.28	-21.63	-872.53	573261.07	423.09
0.9 Dead+1.6 Wind 270 deg - No Ice	5650.28	-10123.28	-21.63	-882.16	567795.75	423.95
1.2 Dead+1.6 Wind 300 deg - No Ice	7533.70	-8777.83	-5092.85	-287745.41	496971.02	-78.77
0.9 Dead+1.6 Wind 300 deg - No Ice	5650.28	-8777.83	-5092.85	-285064.24	492222.46	-79.56
1.2 Dead+1.6 Wind 330 deg - No Ice	7533.70	-5080.37	-8799.45	-497498.26	287611.00	-559.51
0.9 Dead+1.6 Wind 330 deg - No Ice	5650.28	-5080.37	-8799.45	-492848.96	284828.07	-561.76
1.2 Dead+1.0 Ice+1.0 Temp	22052.03	-0.03	-0.02	-475.17	2541.74	-0.52
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	22052.03	-13.61	-4389.40	-275562.66	3154.79	-1001.84
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	22052.03	2175.05	-3794.53	-238380.39	-134117.95	-1327.70
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	22052.03	3780.88	-2182.89	-137449.34	-234770.28	-1298.07
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	22052.03	5187.69	13.61	186.96	-303623.78	-915.23
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	22052.03	3794.52	2206.49	137636.15	-235380.37	-296.46
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	22052.03	2198.63	3808.14	238087.14	-135194.02	407.11
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	22052.03	13.61	4389.40	274629.43	1892.12	1001.38
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	22052.03	-2175.04	3794.50	237473.60	139157.63	1326.94
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	22052.03	-3780.91	2182.91	136556.75	239820.05	1296.71
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	22052.03	-5187.69	-13.61	-1075.17	308696.50	913.49
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	22052.03	-3794.50	-2206.47	-138555.23	240470.84	295.06
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	22052.03	-2198.61	-3808.11	-239027.30	140267.52	-407.91
Dead+Wind 0 deg - Service	6278.08	-5.03	-2362.13	-133117.93	510.37	-211.69
Dead+Wind 30 deg - Service	6278.08	1173.80	-2043.14	-115168.41	-65975.99	-233.98
Dead+Wind 60 deg - Service	6278.08	2038.11	-1176.70	-66346.89	-114705.46	-193.57
Dead+Wind 90 deg - Service	6278.08	2356.31	5.03	264.83	-132621.04	-101.30
Dead+Wind 120 deg - Service	6278.08	2043.14	1185.42	66818.16	-114922.43	18.12
Dead+Wind 150 deg - Service	6278.08	1182.52	2048.18	115480.34	-66352.05	132.67
Dead+Wind 180 deg - Service	6278.08	5.03	2362.13	133212.53	75.83	211.67
Dead+Wind 210 deg - Service	6278.08	-1173.80	2043.14	115263.37	66562.10	233.96
Dead+Wind 240 deg - Service	6278.08	-2038.11	1176.70	66442.11	115291.82	193.56
Dead+Wind 270 deg - Service	6278.08	-2356.31	-5.03	-169.70	133207.76	101.30
Dead+Wind 300 deg - Service	6278.08	-2043.14	-1185.42	-66723.39	115509.25	-18.11
Dead+Wind 330 deg - Service	6278.08	-1182.52	-2048.18	-115385.83	66938.60	-132.67

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX	PY	PZ	PX	PY	PZ	% Error
	lb	lb	lb	lb	lb	lb	
1	0.00	-6278.08	0.00	0.00	6278.08	0.00	0.000%
2	-21.63	-7533.70	-10148.25	21.63	7533.70	10148.25	0.000%
3	-21.63	-5650.28	-10148.25	21.63	5650.28	10148.25	0.000%
4	5042.91	-7533.70	-8777.83	-5042.91	7533.70	8777.83	0.000%
5	5042.91	-5650.28	-8777.83	-5042.91	5650.28	8777.83	0.000%
6	8756.20	-7533.70	-5055.39	-8756.20	7533.70	5055.39	0.000%
7	8756.20	-5650.28	-5055.39	-8756.20	5650.28	5055.39	0.000%
8	10123.28	-7533.70	21.63	-10123.28	7533.70	-21.63	0.000%
9	10123.28	-5650.28	21.63	-10123.28	5650.28	-21.63	0.000%
10	8777.83	-7533.70	5092.85	-8777.83	7533.70	-5092.85	0.000%
11	8777.83	-5650.28	5092.85	-8777.83	5650.28	-5092.85	0.000%
12	5080.37	-7533.70	8799.45	-5080.37	7533.70	-8799.45	0.000%
13	5080.37	-5650.28	8799.45	-5080.37	5650.28	-8799.45	0.000%
14	21.63	-7533.70	10148.25	-21.63	7533.70	-10148.25	0.000%
15	21.63	-5650.28	10148.25	-21.63	5650.28	-10148.25	0.000%
16	-5042.91	-7533.70	8777.83	5042.91	7533.70	-8777.83	0.000%
17	-5042.91	-5650.28	8777.83	5042.91	5650.28	-8777.83	0.000%
18	-8756.20	-7533.70	5055.39	8756.20	7533.70	-5055.39	0.000%
19	-8756.20	-5650.28	5055.39	8756.20	5650.28	-5055.39	0.000%
20	-10123.28	-7533.70	-21.63	10123.28	7533.70	21.63	0.000%
21	-10123.28	-5650.28	-21.63	10123.28	5650.28	21.63	0.000%

Load Comb.	Sum of Applied Forces PX lb	PY lb	PZ lb	Sum of Reactions PX lb	PY lb	PZ lb	% Error
22	-8777.83	-7533.70	-5092.85	8777.83	7533.70	5092.85	0.000%
23	-8777.83	-5650.28	-5092.85	8777.83	5650.28	5092.85	0.000%
24	-5080.37	-7533.70	-8799.45	5080.37	7533.70	8799.45	0.000%
25	-5080.37	-5650.28	-8799.45	5080.37	5650.28	8799.45	0.000%
26	0.00	-22052.03	0.00	0.03	22052.03	0.02	0.000%
27	-13.61	-22052.03	-4389.36	13.61	22052.03	4389.40	0.000%
28	2175.03	-22052.03	-3794.49	-2175.05	22052.03	3794.53	0.000%
29	3780.88	-22052.03	-2182.89	-3780.88	22052.03	2182.89	0.000%
30	5187.65	-22052.03	13.61	-5187.69	22052.03	-13.61	0.000%
31	3794.49	-22052.03	2206.47	-3794.52	22052.03	-2206.49	0.000%
32	2198.61	-22052.03	3808.10	-2198.63	22052.03	-3808.14	0.000%
33	13.61	-22052.03	4389.36	-13.61	22052.03	-4389.40	0.000%
34	-2175.03	-22052.03	3794.49	2175.04	22052.03	-3794.50	0.000%
35	-3780.88	-22052.03	2182.89	3780.91	22052.03	-2182.91	0.000%
36	-5187.65	-22052.03	-13.61	5187.69	22052.03	13.61	0.000%
37	-3794.49	-22052.03	-2206.47	3794.50	22052.03	2206.47	0.000%
38	-2198.61	-22052.03	-3808.10	2198.61	22052.03	3808.11	0.000%
39	-5.03	-6278.08	-2362.13	5.03	6278.08	2362.13	0.000%
40	1173.80	-6278.08	-2043.14	-1173.80	6278.08	2043.14	0.000%
41	2038.11	-6278.08	-1176.70	-2038.11	6278.08	1176.70	0.000%
42	2356.31	-6278.08	5.03	-2356.31	6278.08	-5.03	0.000%
43	2043.14	-6278.08	1185.42	-2043.14	6278.08	-1185.42	0.000%
44	1182.52	-6278.08	2048.18	-1182.52	6278.08	-2048.18	0.000%
45	5.03	-6278.08	2362.13	-5.03	6278.08	-2362.13	0.000%
46	-1173.80	-6278.08	2043.14	1173.80	6278.08	-2043.14	0.000%
47	-2038.11	-6278.08	1176.70	2038.11	6278.08	-1176.70	0.000%
48	-2356.31	-6278.08	-5.03	2356.31	6278.08	5.03	0.000%
49	-2043.14	-6278.08	-1185.42	2043.14	6278.08	1185.42	0.000%
50	-1182.52	-6278.08	-2048.18	1182.52	6278.08	2048.18	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	5	0.00000001	0.00010559
3	Yes	5	0.00000001	0.00004004
4	Yes	5	0.00000001	0.00091699
5	Yes	5	0.00000001	0.00030766
6	Yes	6	0.00000001	0.00003873
7	Yes	5	0.00000001	0.00037496
8	Yes	5	0.00000001	0.00006717
9	Yes	4	0.00000001	0.00097737
10	Yes	5	0.00000001	0.00098640
11	Yes	5	0.00000001	0.00033764
12	Yes	5	0.00000001	0.00095897
13	Yes	5	0.00000001	0.00032565
14	Yes	5	0.00000001	0.00009853
15	Yes	5	0.00000001	0.00003742
16	Yes	6	0.00000001	0.00003911
17	Yes	5	0.00000001	0.00037874
18	Yes	5	0.00000001	0.00092577
19	Yes	5	0.00000001	0.00031093
20	Yes	5	0.00000001	0.00007396
21	Yes	5	0.00000001	0.00002813
22	Yes	6	0.00000001	0.00003567

23	Yes	5	0.00000001	0.00034350
24	Yes	6	0.00000001	0.00003689
25	Yes	5	0.00000001	0.00035595
26	Yes	4	0.00000001	0.00020005
27	Yes	6	0.00000001	0.00044463
28	Yes	6	0.00000001	0.00088121
29	Yes	7	0.00000001	0.00020718
30	Yes	6	0.00000001	0.00047208
31	Yes	6	0.00000001	0.00089796
32	Yes	6	0.00000001	0.00090199
33	Yes	6	0.00000001	0.00043029
34	Yes	7	0.00000001	0.00020987
35	Yes	6	0.00000001	0.00090256
36	Yes	6	0.00000001	0.00049095
37	Yes	7	0.00000001	0.00018725
38	Yes	7	0.00000001	0.00018477
39	Yes	4	0.00000001	0.00027175
40	Yes	4	0.00000001	0.00064139
41	Yes	4	0.00000001	0.00091517
42	Yes	4	0.00000001	0.00018708
43	Yes	4	0.00000001	0.00072817
44	Yes	4	0.00000001	0.00068267
45	Yes	4	0.00000001	0.00026723
46	Yes	4	0.00000001	0.00094644
47	Yes	4	0.00000001	0.00065494
48	Yes	4	0.00000001	0.00019248
49	Yes	4	0.00000001	0.00076854
50	Yes	4	0.00000001	0.00083027

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	84 - 57	16.302	49	1.8045	0.0126
L2	59 - 32	7.491	49	1.4178	0.0058
L3	34.5 - 9	1.952	49	0.7031	0.0021

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
84.00	Large Beacon	49	16.302	1.8045	0.0126	10380
82.00	3' Yagi	49	15.550	1.7811	0.0120	10380
80.00	APXVTM14-C-120	49	14.799	1.7574	0.0114	10380
78.00	DB408-B	49	14.051	1.7331	0.0108	8650
76.50	DB408-B	49	13.494	1.7143	0.0104	6920
75.00	10'x4" Pipe Mount	49	12.941	1.6949	0.0100	5766
67.00	DB408-B	49	10.090	1.5762	0.0078	3052
51.25	GPS	49	5.313	1.2158	0.0043	1892

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	84 - 57	69.931	2	7.7511	0.0822
L2	59 - 32	32.199	24	6.0998	0.0337
L3	34.5 - 9	8.405	24	3.0284	0.0116

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
84.00	Large Beacon	2	69.931	7.7511	0.0824	2500
82.00	3' Yagi	2	66.708	7.6515	0.0780	2500
80.00	APXVTM14-C-120	2	63.492	7.5507	0.0736	2500
78.00	DB408-B	2	60.292	7.4474	0.0693	2083
76.50	DB408-B	2	57.907	7.3675	0.0661	1666
75.00	10'x4" Pipe Mount	2	55.539	7.2850	0.0629	1388
67.00	DB408-B	24	43.332	6.7779	0.0470	732
51.25	GPS	24	22.854	5.2327	0.0246	448

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
L1	84 - 82.6842	TP16.5x12x0.1875	27.00	0.00	0.0	7.1604	-401.55	531984.00	0.001
	82.6842 - 81.3684					7.2909	-939.57	541680.00	0.002
	81.3684 - 80.0526					7.4214	-1093.60	551376.00	0.002
	80.0526 - 78.7368					7.5519	-9500.94	561072.00	0.017
	78.7368 - 77.4211					7.6825	-1837.75	570769.00	0.003
	77.4211 - 76.1053					7.8130	-1891.08	580465.00	0.003
	76.1053 - 74.7895					7.9435	-2044.45	590161.00	0.003
	74.7895 - 73.4737					8.0740	-2099.11	599857.00	0.003
	73.4737 - 72.1579					8.2045	-2155.97	609554.00	0.004
	72.1579 - 70.8421					8.3350	-2214.96	619250.00	0.004
	70.8421 - 69.5263					8.4655	-2276.00	628946.00	0.004
	69.5263 - 68.2105					8.5960	-2339.02	638642.00	0.004
	68.2105 - 66.8947					8.7265	-2409.16	648338.00	0.004
	66.8947 - 65.5789					8.8570	-2476.26	658035.00	0.004
	65.5789 - 64.2632					8.9876	-2545.23	667731.00	0.004
	64.2632 - 62.9474					9.1181	-2616.00	677427.00	0.004
	62.9474 - 61.6316					9.2486	-2688.55	687123.00	0.004
	61.6316 - 60.3158					9.3791	-2762.83	696820.00	0.004
	60.3158 - 59					9.5096	-2838.80	706516.00	0.004
	59 - 57					9.7080	-1419.89	721254.00	0.002
L2	59 - 57	TP20.75x15.7917x0.2188	27.00	0.00	0.0	11.0675	-1612.11	822259.00	0.002
	57 - 55.75					11.2269	-3114.47	834100.00	0.004

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
	55.75 - 54.5					11.3862	-3199.98	845941.00	0.004
	54.5 - 53.25					11.5456	-3286.86	857782.00	0.004
	53.25 - 52					11.7050	-3375.10	869623.00	0.004
	52 - 50.75					11.8644	-3543.61	881465.00	0.004
	50.75 - 49.5					12.0238	-3631.84	893306.00	0.004
	49.5 - 48.25					12.1831	-3724.51	905147.00	0.004
	48.25 - 47					12.3425	-3818.48	916988.00	0.004
	47 - 45.75					12.5019	-3913.74	928830.00	0.004
	45.75 - 44.5					12.6613	-4010.26	940671.00	0.004
	44.5 - 43.25					12.8207	-4108.05	952512.00	0.004
	43.25 - 42					12.9801	-4205.94	964353.00	0.004
	42 - 40.75					13.1394	-4306.25	976194.00	0.004
	40.75 - 39.5					13.2988	-4407.78	988036.00	0.004
	39.5 - 38.25					13.4582	-4510.54	999877.00	0.005
	38.25 - 37					13.6176	-4614.50	1011720.00	0.005
	37 - 35.75					13.7770	-4719.67	1023560.00	0.005
	35.75 - 34.5					13.9363	-4826.04	1035400.00	0.005
	34.5 - 32					14.2551	-2452.93	1059080.00	0.002
L3	34.5 - 32	TP24x19.8534x0.25	25.50	0.00	0.0	15.8779	-2723.25	1179650.00	0.002
	32 - 30.7895					16.0341	-5290.35	1191250.00	0.004
	30.7895 - 29.5789					16.1903	-5404.84	1202860.00	0.004
	29.5789 - 28.3684					16.3465	-5520.46	1214460.00	0.005
	28.3684 - 27.1579					16.5027	-5637.20	1226070.00	0.005
	27.1579 - 25.9474					16.6589	-5755.05	1237670.00	0.005
	25.9474 - 24.7368					16.8151	-5874.02	1249270.00	0.005
	24.7368 - 23.5263					16.9713	-5994.10	1260880.00	0.005
	23.5263 - 22.3158					17.1275	-6115.28	1272480.00	0.005
	22.3158 - 21.1053					17.2837	-6237.57	1284090.00	0.005
	21.1053 - 19.8947					17.4398	-6360.96	1295690.00	0.005
	19.8947 - 18.6842					17.5960	-6485.44	1307300.00	0.005
	18.6842 - 17.4737					17.7522	-6611.02	1318900.00	0.005
	17.4737 - 16.2632					17.9084	-6737.69	1330510.00	0.005
	16.2632 - 15.0526					18.0646	-6865.46	1342110.00	0.005
	15.0526 - 13.8421					18.2208	-6994.31	1353720.00	0.005
	13.8421 - 12.6316					18.3770	-7124.25	1365320.00	0.005
	12.6316 - 11.4211					18.5332	-7255.27	1376930.00	0.005
	11.4211 - 10.2105					18.6894	-7387.37	1388530.00	0.005
	10.2105 - 9					18.8456	-7520.56	1400140.00	0.005

Pole Bending Design Data

Section No.	Elevation ft	Size	M_{ux} lb-ft	ϕM_{nx} lb-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} lb-ft	ϕM_{ny} lb-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L1	84 - 82.6842	TP16.5x12x0.1875	121.35	130619.17	0.001	0.00	130619.17	0.000
	82.6842 - 81.3684		2792.03	135460.83	0.021	0.00	135460.83	0.000
	81.3684 - 80.0526		3305.83	140390.83	0.024	0.00	140390.83	0.000
	80.0526 - 78.7368		6709.87	145409.17	0.046	0.00	145409.17	0.000
	78.7368 - 77.4211		15615.00	150515.83	0.104	0.00	150515.83	0.000
	77.4211 - 76.1053		23266.92	155710.83	0.149	0.00	155710.83	0.000
	76.1053 - 74.7895		31242.50	160993.33	0.194	0.00	160993.33	0.000
	74.7895 - 73.4737		39491.92	166364.17	0.237	0.00	166364.17	0.000
	73.4737 - 72.1579		47831.50	171823.33	0.278	0.00	171823.33	0.000
	72.1579 - 70.8421		56261.92	177370.00	0.317	0.00	177370.00	0.000
	70.8421 - 69.5263		64783.83	183005.83	0.354	0.00	183005.83	0.000
	69.5263 - 68.2105		73397.92	188729.17	0.389	0.00	188729.17	0.000

Section No.	Elevation	Size	M_{ux}	ϕM_{nx}	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy}	ϕM_{ny}	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
	ft		lb-ft	lb-ft		lb-ft	lb-ft	
	68.2105 - 66.8947		82130.50	194540.83	0.422	0.00	194540.83	0.000
	66.8947 - 65.5789		91094.17	200440.00	0.454	0.00	200440.00	0.000
	65.5789 - 64.2632		100151.67	206428.33	0.485	0.00	206428.33	0.000
	64.2632 - 62.9474		109304.17	212504.17	0.514	0.00	212504.17	0.000
	62.9474 - 61.6316		118551.67	218668.33	0.542	0.00	218668.33	0.000
	61.6316 - 60.3158		127895.00	224920.83	0.569	0.00	224920.83	0.000
	60.3158 - 59		137335.83	231260.83	0.594	0.00	231260.83	0.000
	59 - 57		72879.00	241067.50	0.302	0.00	241067.50	0.000
L2	59 - 57	TP20.75x15.7917x0.2188	79008.50	267963.33	0.295	0.00	267963.33	0.000
	57 - 55.75		161103.33	275790.00	0.584	0.00	275790.00	0.000
	55.75 - 54.5		170400.00	283728.33	0.601	0.00	283728.33	0.000
	54.5 - 53.25		179778.33	291780.00	0.616	0.00	291780.00	0.000
	53.25 - 52		189239.17	299945.00	0.631	0.00	299945.00	0.000
	52 - 50.75		198988.33	308221.67	0.646	0.00	308221.67	0.000
	50.75 - 49.5		208793.33	316611.67	0.659	0.00	316611.67	0.000
	49.5 - 48.25		218700.00	325114.17	0.673	0.00	325114.17	0.000
	48.25 - 47		228691.67	333729.17	0.685	0.00	333729.17	0.000
	47 - 45.75		238767.50	342456.67	0.697	0.00	342456.67	0.000
	45.75 - 44.5		248929.17	351296.67	0.709	0.00	351296.67	0.000
	44.5 - 43.25		259176.67	360250.00	0.719	0.00	360250.00	0.000
	43.25 - 42		269505.00	369315.83	0.730	0.00	369315.83	0.000
	42 - 40.75		279940.83	378494.17	0.740	0.00	378494.17	0.000
	40.75 - 39.5		290464.17	387785.00	0.749	0.00	387785.00	0.000
	39.5 - 38.25		301075.83	397189.17	0.758	0.00	397189.17	0.000
	38.25 - 37		311776.67	406705.00	0.767	0.00	406705.00	0.000
	37 - 35.75		322565.83	416334.17	0.775	0.00	416334.17	0.000
	35.75 - 34.5		333445.00	426075.83	0.783	0.00	426075.83	0.000
	34.5 - 32		172491.67	445897.50	0.387	0.00	445897.50	0.000
L3	34.5 - 32	TP24x19.8534x0.25	183012.50	483167.50	0.379	0.00	483167.50	0.000
	32 - 30.7895		366326.67	492779.17	0.743	0.00	492779.17	0.000
	30.7895 - 29.5789		377226.67	502486.67	0.751	0.00	502486.67	0.000
	29.5789 - 28.3684		388204.17	512288.33	0.758	0.00	512288.33	0.000
	28.3684 - 27.1579		399260.83	522184.17	0.765	0.00	522184.17	0.000
	27.1579 - 25.9474		410395.00	532175.00	0.771	0.00	532175.00	0.000
	25.9474 - 24.7368		421608.33	542260.83	0.778	0.00	542260.83	0.000
	24.7368 - 23.5263		432900.83	552441.67	0.784	0.00	552441.67	0.000
	23.5263 - 22.3158		444272.50	562716.67	0.790	0.00	562716.67	0.000
	22.3158 - 21.1053		455724.17	573085.83	0.795	0.00	573085.83	0.000
	21.1053 - 19.8947		467255.00	583550.83	0.801	0.00	583550.83	0.000
	19.8947 - 18.6842		478865.83	594110.00	0.806	0.00	594110.00	0.000
	18.6842 - 17.4737		490556.67	604763.33	0.811	0.00	604763.33	0.000
	17.4737 - 16.2632		502327.50	615511.67	0.816	0.00	615511.67	0.000
	16.2632 - 15.0526		514179.17	626355.00	0.821	0.00	626355.00	0.000
	15.0526 - 13.8421		526111.67	637292.50	0.826	0.00	637292.50	0.000
	13.8421 - 12.6316		538124.17	648325.00	0.830	0.00	648325.00	0.000
	12.6316 - 11.4211		550219.17	659452.50	0.834	0.00	659452.50	0.000
	11.4211 - 10.2105		562394.17	670674.17	0.839	0.00	670674.17	0.000
	10.2105 - 9		574651.67	681990.83	0.843	0.00	681990.83	0.000

Pole Shear Design Data

Section No.	Elevation	Size	Actual V_u	ϕV_n	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u	ϕT_n	Ratio $\frac{T_u}{\phi T_n}$
	ft		lb	lb		lb-ft	lb-ft	
L1	84 - 82.6842	TP16.5x12x0.1875	96.69	265992.00	0.000	0.00	262168.33	0.000
	82.6842 - 81.3684		384.88	270840.00	0.001	107.36	271875.83	0.000

Section No.	Elevation ft	Size	Actual V_u lb	ϕV_n lb	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u lb-ft	ϕT_n lb-ft	Ratio $\frac{T_u}{\phi T_n}$
	81.3684 - 80.0526		422.66	275688.00	0.002	107.36	281759.17	0.000
	80.0526 - 78.7368		2711.79	280536.00	0.010	107.40	291820.00	0.000
	78.7368 - 77.4211		5752.24	285384.00	0.020	61.34	302056.67	0.000
	77.4211 - 76.1053		5947.03	290232.00	0.020	28.55	312470.00	0.000
	76.1053 - 74.7895		6237.06	295081.00	0.021	303.67	323060.00	0.001
	74.7895 - 73.4737		6305.62	299929.00	0.021	303.63	333826.67	0.001
	73.4737 - 72.1579		6374.66	304777.00	0.021	303.58	344769.17	0.001
	72.1579 - 70.8421		6444.20	309625.00	0.021	303.53	355888.33	0.001
	70.8421 - 69.5263		6514.24	314473.00	0.021	303.47	367184.17	0.001
	69.5263 - 68.2105		6584.78	319321.00	0.021	303.40	378656.67	0.001
	68.2105 - 66.8947		6779.79	324169.00	0.021	303.33	390305.83	0.001
	66.8947 - 65.5789		6851.31	329017.00	0.021	303.26	402130.83	0.001
	65.5789 - 64.2632		6923.32	333865.00	0.021	303.18	414132.50	0.001
	64.2632 - 62.9474		6995.81	338714.00	0.021	303.11	426310.83	0.001
	62.9474 - 61.6316		7068.78	343562.00	0.021	303.03	438665.83	0.001
	61.6316 - 60.3158		7142.22	348410.00	0.020	302.96	451196.67	0.001
	60.3158 - 59		7216.15	353258.00	0.020	302.88	463905.00	0.001
	59 - 57		3554.54	360627.00	0.010	145.28	483558.33	0.000
L2	59 - 57	TP20.75x15.7917x0.2188	3790.01	411129.00	0.009	157.54	537687.50	0.000
	57 - 55.75		7409.94	417050.00	0.018	302.77	553375.83	0.001
	55.75 - 54.5		7475.12	422970.00	0.018	302.72	569290.00	0.001
	54.5 - 53.25		7540.77	428891.00	0.018	302.67	585429.17	0.001
	53.25 - 52		7606.89	434812.00	0.017	302.63	601794.17	0.001
	52 - 50.75		7806.03	440732.00	0.018	647.28	618385.00	0.001
	50.75 - 49.5		7898.11	446653.00	0.018	79.35	635200.83	0.000
	49.5 - 48.25		7965.40	452574.00	0.018	79.33	652243.33	0.000
	48.25 - 47		8033.14	458494.00	0.018	79.30	669510.83	0.000
	47 - 45.75		8101.34	464415.00	0.017	79.27	687003.33	0.000
	45.75 - 44.5		8169.99	470335.00	0.017	79.24	704722.50	0.000
	44.5 - 43.25		8239.08	476256.00	0.017	79.21	722666.67	0.000
	43.25 - 42		8321.18	482177.00	0.017	562.63	740836.67	0.001
	42 - 40.75		8391.18	488097.00	0.017	562.41	759232.50	0.001
	40.75 - 39.5		8461.62	494018.00	0.017	562.19	777853.33	0.001
	39.5 - 38.25		8532.51	499938.00	0.017	561.98	796700.00	0.001
	38.25 - 37		8603.84	505859.00	0.017	561.77	815772.50	0.001
	37 - 35.75		8675.62	511780.00	0.017	561.57	835066.67	0.001
	35.75 - 34.5		8747.83	517700.00	0.017	561.39	854591.67	0.001
	34.5 - 32		4369.75	529541.00	0.008	272.27	894316.67	0.000
L3	34.5 - 32	TP24x19.8534x0.25	4546.99	589823.00	0.008	288.93	969333.33	0.000
	32 - 30.7895		8980.62	595626.00	0.015	561.04	988600.00	0.001
	30.7895 - 29.5789		9045.16	601428.00	0.015	560.89	1008058.33	0.001
	29.5789 - 28.3684		9109.90	607230.00	0.015	560.74	1027700.00	0.001
	28.3684 - 27.1579		9174.84	613033.00	0.015	560.60	1047533.33	0.001
	27.1579 - 25.9474		9239.96	618835.00	0.015	560.47	1067558.33	0.001
	25.9474 - 24.7368		9305.27	624637.00	0.015	560.34	1087775.00	0.001
	24.7368 - 23.5263		9370.77	630440.00	0.015	560.23	1108175.00	0.001
	23.5263 - 22.3158		9436.46	636242.00	0.015	560.12	1128775.00	0.000
	22.3158 - 21.1053		9502.32	642044.00	0.015	560.02	1149558.33	0.000
	21.1053 - 19.8947		9568.36	647847.00	0.015	559.93	1170525.00	0.000
	19.8947 - 18.6842		9634.58	653649.00	0.015	559.84	1191691.67	0.000
	18.6842 - 17.4737		9700.98	659451.00	0.015	559.77	1213041.67	0.000
	17.4737 - 16.2632		9767.55	665254.00	0.015	559.70	1234583.33	0.000
	16.2632 - 15.0526		9834.29	671056.00	0.015	559.65	1256316.67	0.000
	15.0526 - 13.8421		9901.19	676859.00	0.015	559.60	1278233.33	0.000
	13.8421 - 12.6316		9968.27	682661.00	0.015	559.56	1300350.00	0.000
	12.6316 - 11.4211		10035.50	688463.00	0.015	559.53	1322650.00	0.000
	11.4211 - 10.2105		10102.90	694266.00	0.015	559.52	1345133.33	0.000
	10.2105 - 9		10170.50	700068.00	0.015	559.51	1367816.67	0.000

Pole Interaction Design Data

Section No.	Elevation ft	Ratio $P_u/\phi P_n$	Ratio $M_{ux}/\phi M_{nx}$	Ratio $M_{uy}/\phi M_{ny}$	Ratio $V_u/\phi V_n$	Ratio $T_u/\phi T_n$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	84 - 82.6842	0.001	0.001	0.000	0.000	0.000	0.002 ✔	1.000	4.8.2 ✔
	82.6842 - 81.3684	0.002	0.021	0.000	0.001	0.000	0.022 ✔	1.000	4.8.2 ✔
	81.3684 - 80.0526	0.002	0.024	0.000	0.002	0.000	0.026 ✔	1.000	4.8.2 ✔
	80.0526 - 78.7368	0.017	0.046	0.000	0.010	0.000	0.063 ✔	1.000	4.8.2 ✔
	78.7368 - 77.4211	0.003	0.104	0.000	0.020	0.000	0.107 ✔	1.000	4.8.2 ✔
	77.4211 - 76.1053	0.003	0.149	0.000	0.020	0.000	0.153 ✔	1.000	4.8.2 ✔
	76.1053 - 74.7895	0.003	0.194	0.000	0.021	0.001	0.198 ✔	1.000	4.8.2 ✔
	74.7895 - 73.4737	0.003	0.237	0.000	0.021	0.001	0.241 ✔	1.000	4.8.2 ✔
	73.4737 - 72.1579	0.004	0.278	0.000	0.021	0.001	0.282 ✔	1.000	4.8.2 ✔
	72.1579 - 70.8421	0.004	0.317	0.000	0.021	0.001	0.321 ✔	1.000	4.8.2 ✔
	70.8421 - 69.5263	0.004	0.354	0.000	0.021	0.001	0.358 ✔	1.000	4.8.2 ✔
	69.5263 - 68.2105	0.004	0.389	0.000	0.021	0.001	0.393 ✔	1.000	4.8.2 ✔
	68.2105 - 66.8947	0.004	0.422	0.000	0.021	0.001	0.426 ✔	1.000	4.8.2 ✔
	66.8947 - 65.5789	0.004	0.454	0.000	0.021	0.001	0.459 ✔	1.000	4.8.2 ✔
	65.5789 - 64.2632	0.004	0.485	0.000	0.021	0.001	0.489 ✔	1.000	4.8.2 ✔
	64.2632 - 62.9474	0.004	0.514	0.000	0.021	0.001	0.519 ✔	1.000	4.8.2 ✔
	62.9474 - 61.6316	0.004	0.542	0.000	0.021	0.001	0.547 ✔	1.000	4.8.2 ✔
	61.6316 - 60.3158	0.004	0.569	0.000	0.020	0.001	0.573 ✔	1.000	4.8.2 ✔
	60.3158 - 59	0.004	0.594	0.000	0.020	0.001	0.598 ✔	1.000	4.8.2 ✔
	59 - 57	0.002	0.302	0.000	0.010	0.000	0.304 ✔	1.000	4.8.2 ✔
L2	59 - 57	0.002	0.295	0.000	0.009	0.000	0.297 ✔	1.000	4.8.2 ✔
	57 - 55.75	0.004	0.584	0.000	0.018	0.001	0.588 ✔	1.000	4.8.2 ✔
	55.75 - 54.5	0.004	0.601	0.000	0.018	0.001	0.605 ✔	1.000	4.8.2 ✔
	54.5 - 53.25	0.004	0.616	0.000	0.018	0.001	0.620 ✔	1.000	4.8.2 ✔
	53.25 - 52	0.004	0.631	0.000	0.017	0.001	0.635 ✔	1.000	4.8.2 ✔
	52 - 50.75	0.004	0.646	0.000	0.018	0.001	0.650 ✔	1.000	4.8.2 ✔
	50.75 - 49.5	0.004	0.659	0.000	0.018	0.000	0.664 ✔	1.000	4.8.2 ✔
	49.5 - 48.25	0.004	0.673	0.000	0.018	0.000	0.677 ✔	1.000	4.8.2 ✔
	48.25 - 47	0.004	0.685	0.000	0.018	0.000	0.690 ✔	1.000	4.8.2 ✔
	47 - 45.75	0.004	0.697	0.000	0.017	0.000	0.702 ✔	1.000	4.8.2 ✔
	45.75 - 44.5	0.004	0.709	0.000	0.017	0.000	0.713 ✔	1.000	4.8.2 ✔
	44.5 - 43.25	0.004	0.719	0.000	0.017	0.000	0.724 ✔	1.000	4.8.2 ✔
	43.25 - 42	0.004	0.730	0.000	0.017	0.001	0.734 ✔	1.000	4.8.2 ✔
	42 - 40.75	0.004	0.740	0.000	0.017	0.001	0.744 ✔	1.000	4.8.2 ✔
	40.75 - 39.5	0.004	0.749	0.000	0.017	0.001	0.754 ✔	1.000	4.8.2 ✔
	39.5 - 38.25	0.005	0.758	0.000	0.017	0.001	0.763 ✔	1.000	4.8.2 ✔

Section No.	Elevation ft	Ratio $P_u/\phi P_n$	Ratio $M_{ux}/\phi M_{nx}$	Ratio $M_{uy}/\phi M_{ny}$	Ratio $V_u/\phi V_n$	Ratio $T_u/\phi T_n$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
	38.25 - 37	0.005	0.767	0.000	0.017	0.001	0.771 ✔	1.000	4.8.2 ✔
	37 - 35.75	0.005	0.775	0.000	0.017	0.001	0.780 ✔	1.000	4.8.2 ✔
	35.75 - 34.5	0.005	0.783	0.000	0.017	0.001	0.788 ✔	1.000	4.8.2 ✔
	34.5 - 32	0.002	0.387	0.000	0.008	0.000	0.389 ✔	1.000	4.8.2 ✔
L3	34.5 - 32	0.002	0.379	0.000	0.008	0.000	0.381 ✔	1.000	4.8.2 ✔
	32 - 30.7895	0.004	0.743	0.000	0.015	0.001	0.748 ✔	1.000	4.8.2 ✔
	30.7895 - 29.5789	0.004	0.751	0.000	0.015	0.001	0.755 ✔	1.000	4.8.2 ✔
	29.5789 - 28.3684	0.005	0.758	0.000	0.015	0.001	0.763 ✔	1.000	4.8.2 ✔
	28.3684 - 27.1579	0.005	0.765	0.000	0.015	0.001	0.769 ✔	1.000	4.8.2 ✔
	27.1579 - 25.9474	0.005	0.771	0.000	0.015	0.001	0.776 ✔	1.000	4.8.2 ✔
	25.9474 - 24.7368	0.005	0.778	0.000	0.015	0.001	0.782 ✔	1.000	4.8.2 ✔
	24.7368 - 23.5263	0.005	0.784	0.000	0.015	0.001	0.789 ✔	1.000	4.8.2 ✔
	23.5263 - 22.3158	0.005	0.790	0.000	0.015	0.000	0.795 ✔	1.000	4.8.2 ✔
	22.3158 - 21.1053	0.005	0.795	0.000	0.015	0.000	0.800 ✔	1.000	4.8.2 ✔
	21.1053 - 19.8947	0.005	0.801	0.000	0.015	0.000	0.806 ✔	1.000	4.8.2 ✔
	19.8947 - 18.6842	0.005	0.806	0.000	0.015	0.000	0.811 ✔	1.000	4.8.2 ✔
	18.6842 - 17.4737	0.005	0.811	0.000	0.015	0.000	0.816 ✔	1.000	4.8.2 ✔
	17.4737 - 16.2632	0.005	0.816	0.000	0.015	0.000	0.821 ✔	1.000	4.8.2 ✔
	16.2632 - 15.0526	0.005	0.821	0.000	0.015	0.000	0.826 ✔	1.000	4.8.2 ✔
	15.0526 - 13.8421	0.005	0.826	0.000	0.015	0.000	0.831 ✔	1.000	4.8.2 ✔
	13.8421 - 12.6316	0.005	0.830	0.000	0.015	0.000	0.835 ✔	1.000	4.8.2 ✔
	12.6316 - 11.4211	0.005	0.834	0.000	0.015	0.000	0.840 ✔	1.000	4.8.2 ✔
	11.4211 - 10.2105	0.005	0.839	0.000	0.015	0.000	0.844 ✔	1.000	4.8.2 ✔
	10.2105 - 9	0.005	0.843	0.000	0.015	0.000	0.848 ✔	1.000	4.8.2 ✔

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	ϕP_{allow} lb	% Capacity	Pass Fail
L1	84 - 57	Pole	TP16.5x12x0.1875	1	-2838.80	706516.00	59.8	Pass
L2	57 - 32	Pole	TP20.75x15.7917x0.2188	2	-4826.04	1035400.00	78.8	Pass
L3	32 - 9	Pole	TP24x19.8534x0.25	3	-7520.56	1400140.00	84.8	Pass
							Summary	
						Pole (L3)	84.8	Pass
						RATING =	**84.8**	**Pass**

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

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

Site Data

Project #: *22968*
Site Name: *CT03XC072*

Pole Manufacturer:	*Other*

Reactions		
Mu:	574.7	ft-kips
Axial, Pu:	7.5	kips
Shear, Vu:	10.2	kips
Eta Factor, η	0.5	TIA G (Fig. 4-4)

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

Anchor Rod Data			
Qty:	8		
Diam:	2	in	
Rod Material:	A615-J		<- assumed
Strength (Fu):	100	ksi	
Yield (Fy):	75	ksi	
Bolt Circle:	29	in	

Anchor Rod Results

Max Rod (Cu+ Vu/ή):	122.4	Kips
Allowable Axial, Φ*Fu*Anet:	200.0	Kips
Anchor Rod Stress Ratio:	61.2%	**Pass**

Non-Rigid
AISC LRFD
φ*Tn

Plate Data			
Diam:	33	in	
Thick:	1.5	in	
Grade:	50	ksi	<- assumed
Single-Rod B-eff:	9.52	in	

Base Plate Results Flexural Check

Base Plate Stress:	33.8	ksi
Allowable Plate Stress:	45.0	ksi
Base Plate Stress Ratio:	75.1%	**Pass**

Non-Rigid
AISC LRFD
φ*Fy
Y.L. Length: 16.28

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

n/a

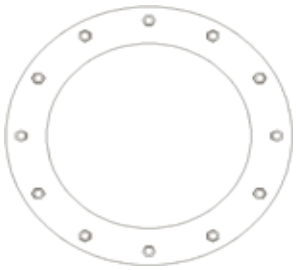
Stiffener Results

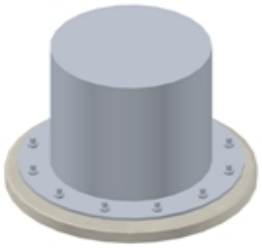
Horizontal Weld :	n/a
Vertical Weld:	n/a
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	n/a
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	n/a
Plate Comp. (AISC Bracket):	n/a

Pole Results

Pole Punching Shear Check: n/a

Pole Data		
Diam:	24	in
Thick:	0.25	in
Grade:	65	ksi
# of Sides:	18	"0" IF Round
Fu	80	ksi
Reinf. Fillet Weld	0	"0" if None





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

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

RAMAKER & ASSOCIATES, INC.
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June 27, 2018

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

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

SUBJECT: **MOUNT ASSESSMENT**

CARRIER: **SPRINT**

SITE: **CT03XC072**
116 NEWGATE ROAD
EAST GRANBY, HARTFORD COUNTY, CONNECTICUT 06026
RAMAKER & ASSOCIATES PROJECT NUMBER: 22968

RESULTS: **MOUNT:** **PASS WITH MODIFICATIONS**

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.

Tucker Schwab
Structural Designer

James R. Skowronski, P.E.
Supervising Engineer

STATE OF CONNECTICUT
JAMES R. SKOWRONSKI
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}	120 mph (3 sec. gust)
Nominal Design Wind Speed, V_{asd}	93 mph (3 sec. gust)
Design Wind Speed w/ Ice	50 mph (3 sec. gust)
Ice Thickness	1 inch
Exposure Category	B
Topographic Feature	Continuous Ridge

SUPPORTING DOCUMENTATION

- Mount mapping by Tower Engineering Professionals, site number CT03XC072, dated February 21, 2018
- Construction drawings by RAMAKER, project number 22968
- 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**
80	1	**(1) Decibel 980H90T2E-M**	Platform with Handrail	**Removed**
		(1) RFS APXVTM14-ALU-I20		**Proposed**
	2	**(1) ALU TD-RRH8x20-25**		**Proposed**
	3	(1) Commscope DB408-B		Existing
		(1) ALU 1900 MHz 4x45W RRH		**Relocated**
	4	**(2) ALU 800 MHz 2x50W RRH**		**Proposed**
	5	**(1) Decibel 980H90T2E-M**		**Removed**
		(1) Commscope NNVV-65B-R4		**Proposed**

Antenna Mount – Beta Sector				
Elevation	**Position**	**Appurtenance**	**Mount Type**	**Status**
80	1	**(1) Decibel 980H90T2E-M**	Platform with Handrail	**Removed**
		(1) RFS APXVTM14-ALU-I20		**Proposed**
	2	(1) 4 Bay Dipole		Existing
		(1) ALU TD-RRH8x20-25		**Proposed**
	3	**(1) ALU 1900 MHz 4x45W RRH**		**Relocated**
	4	**(2) ALU 800 MHz 2x50W RRH**		**Proposed**
	5	**(1) Decibel 980H90T2E-M**		**Removed**
		(1) Commscope NNVV-65B-R4		**Proposed**

Antenna Mount – Gamma Sector				
Elevation	**Position**	**Appurtenance**	**Mount Type**	**Status**
80	1	**(1) Decibel 980H90T2E-M**	Platform with Handrail	**Removed**
		(1) RFS APXVTM14-ALU-I20		**Proposed**
	2	**(1) ALU TD-RRH8x20-25**		**Proposed**
	3	**(1) ALU 1900 MHz 4x45W RRH**		**Relocated**
		(1) ALU 800 MHz 2x50W RRH		**Proposed**
	4	(1) Commscope DB408-B		Existing
		(1) ALU 800 MHz 2x50W RRH		**Proposed**
	5	**(1) Decibel 980H90T2E-M**		**Removed**
		(1) Commscope NNVV-65B-R4		**Proposed**
		(1) Yagi Antenna		Existing

MOUNT RESULTS

By engineering calculation and inspection, the ***modified*** 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), ***provided the proposed structural modifications are completed prior to antenna and equipment installation. See the associated construction drawings by RAMAKER for required modifications.***

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:

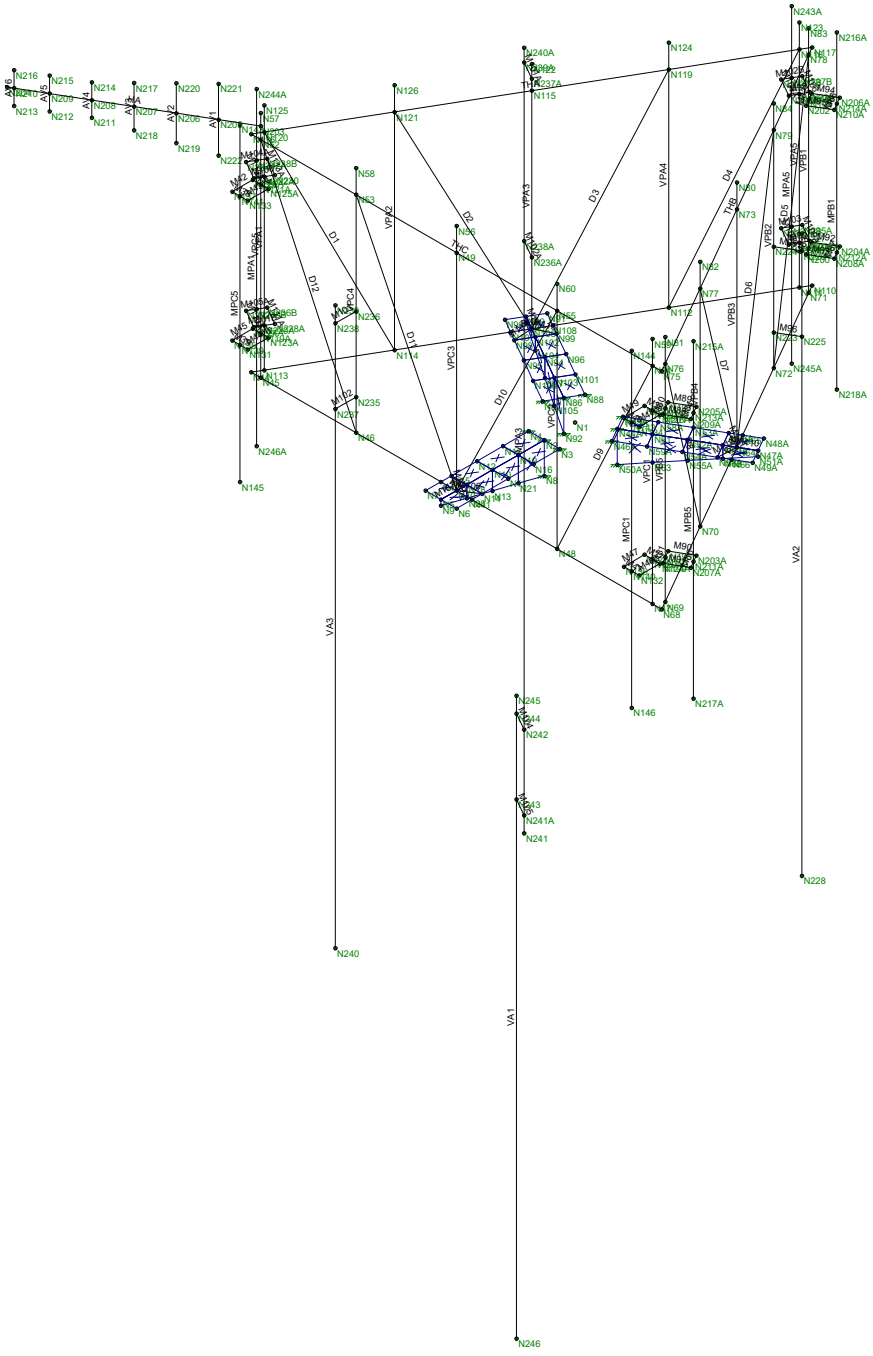
Assumed Steel Member Grades	
Angles/Plates/Channels/Solid Rods	ASTM A36, 36 ksi
Pipes	ASTM A53 Gr. B, 35 ksi

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.

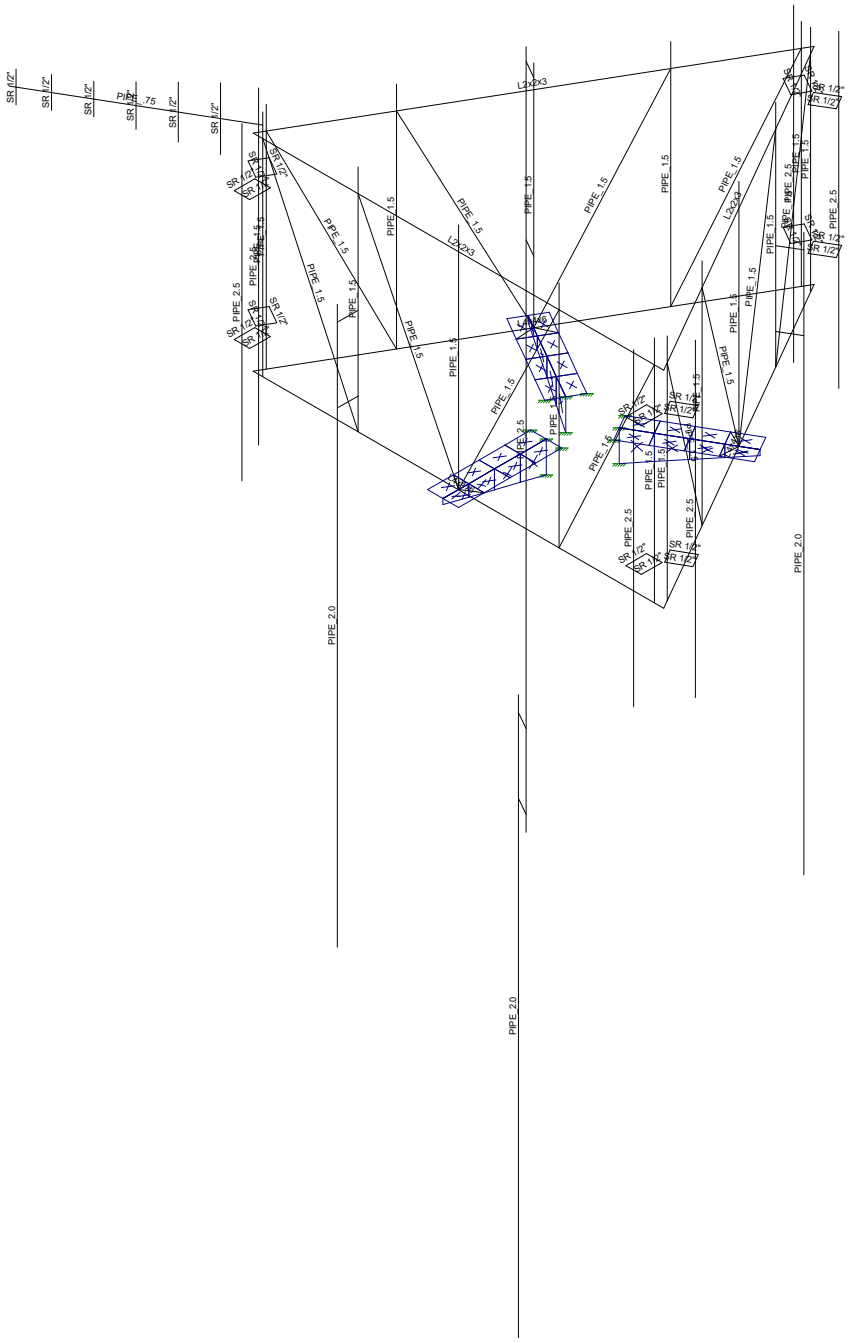
ATTACHMENTS

- Analysis Figures
- Analysis Calculations



Envelope Only Solution

Ramaker & Associates, Inc.	CT03XC072	SK - 1
TJS		June 21, 2018 at 1:09 PM
22968		22968 Platform.r3d



Envelope Only Solution

Ramaker & Associates, Inc.		SK - 2
TJS	CT03XC072	June 21, 2018 at 1:10 PM
22968		22968 Platform.r3d

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Job	CT03XC072
Project	22968
By	TJS
Date	6/27/18

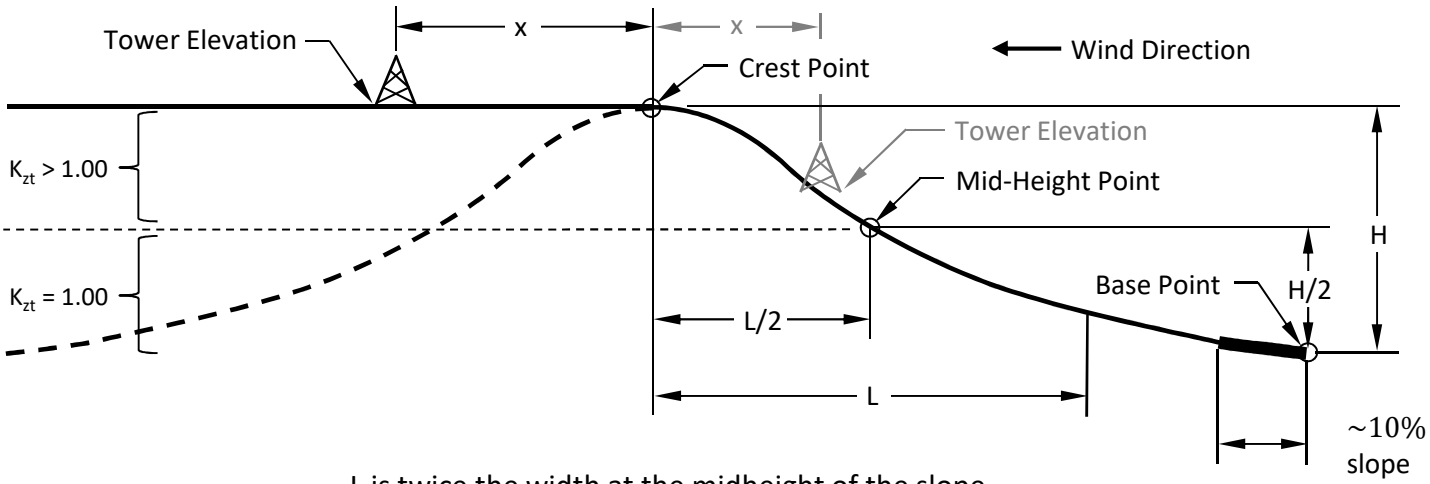
Topographical Multipliers

2.6.2 Topographic Factor KT

Elevations are Above Mean Sea Level

Method :	SEAW RSM-03
Topographic Feature :	Continuous Ridge

Exp :	B		Exposure Category	Override z Value	
Original Input z :	80	ft	Height of antennas above ground level		ft
CP Elev :	702	ft	Crest Point Elevation	Override Crest Ht	
BP Elev :	215	ft	Base Point Elevation		ft
MHP Elev :	458.5	ft	Mid-Height Point Elevation		
L/2 :	1346	ft	Crest to Mid-Height Distance		
TP Elev :	701	ft	Tower Point Elevation	Potential Tower Dist. x	
x :	0	ft	Tower Distance from Crest Line	5.5	ft
H :	487	ft	Crest Height		
L :	2692	ft	Slope Distance		
x :	0	ft	Distance from Crest Line		
KT :	1.94		Topographic Factor at z = 80.0 ft		



L is twice the width at the midheight of the slope

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Project	22968
By	TJS
Date	6/21/18

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 :	B		Exposure Category
V :	93	mph	Basic Wind Speed (Annex B)
z :	80	ft	Height above ground level to the center of the antenna
I :	1.00		Importance Factor (Table 2-3)
K_z :	0.93		Velocity Pressure Coefficient (2.6.5.2)
K_{zt} :	1.94		Topographic Factor (2.6.6.4)
K_d :	0.95		Wind Direction Probability Factor (Table 2-2)
q_z :	37.9	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_a	Force	Force
	in	*in*				*sq ft*	*lb*	*plf*
NNVV-65B-R4	72.0	19.6	3.7	Flat	1.252	9.80	464.8	
APXVTM14-ALU-I20	56.3	12.6	4.5	Flat	1.287	4.93	240.2	
1900MHz 4x45W RRH	25.1	11.1	2.3	Flat	1.200	1.93	87.9	
800MHz 2x50W RRH	19.0	13.0	1.5	Flat	1.200	1.72	78.0	
TD-RRH8x20	26.1	18.6	1.4	Flat	1.200	3.37	153.2	
L4X4X3/8 x 6.667 ft	80.0	4.0	20.0	Flat	1.833	2.22	154.3	23.1
L2X2X3/16 x 6.667 ft	80.0	2.0	40.0	Flat	2.000	1.11	84.2	12.6
Pipe1-1/2STD x 3.708 ft	44.5	1.9	23.4	Round	1.165	0.59	25.9	7.0
Pipe2-1/2STD x 5 ft	60.0	2.9	20.9	Round	1.108	1.20	50.3	10.1
Pipe2STD x 8 ft	96.0	2.4	40.4	Round	1.200	1.58	72.0	9.0
Pipe2-1/2STD x 11 ft	132.0	2.9	45.9	Round	1.200	2.64	119.8	10.9
Pipe3/4STD x 3 ft	36.0	1.1	34.3	Round	1.200	0.26	11.9	4.0
SR 1/2 x 1 ft	12.0	0.5	24.0	Round	1.178	0.04	1.9	1.9

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Job	CT03XC072
Project	22968
By	TJS
Date	6/21/18

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 :	B		Exposure Category
V :	93	mph	Basic Wind Speed (Annex B)
z :	80	ft	Height above ground level to the center of the antenna
I :	1.00		Importance Factor (Table 2-3)
K_z :	0.93		Velocity Pressure Coefficient (2.6.5.2)
K_{zt} :	1.94		Topographic Factor (2.6.6.4)
K_d :	0.95		Wind Direction Probability Factor (Table 2-2)
q_z :	37.9	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_a	Force	Force
	in	*in*				*sq ft*	*lb*	*plf*
NNVV-65B-R4	72.0	7.8	9.2	Flat	1.474	3.90	217.8	
APXVTM14-ALU-I20	56.3	6.3	8.9	Flat	1.465	2.46	136.6	
1900MHz 4x45W RRH	25.1	10.7	2.3	Flat	1.200	1.86	84.7	
800MHz 2x50W RRH	19.0	12.2	1.6	Flat	1.200	1.61	73.2	
TD-RRH8x20	26.1	6.7	3.9	Flat	1.262	1.21	58.0	
L4X4X3/8 x 6.667 ft	80.0	4.0	20.0	Flat	1.833	2.22	154.3	23.1
L2X2X3/16 x 6.667 ft	80.0	2.0	40.0	Flat	2.000	1.11	84.2	12.6
Pipe1-1/2STD x 3.708 ft	44.5	1.9	23.4	Round	1.165	0.59	25.9	7.0
Pipe2-1/2STD x 5 ft	60.0	2.9	20.9	Round	1.108	1.20	50.3	10.1
Pipe2STD x 8 ft	96.0	2.4	40.4	Round	1.200	1.58	72.0	9.0
Pipe2-1/2STD x 11 ft	132.0	2.9	45.9	Round	1.200	2.64	119.8	10.9
Pipe3/4STD x 3 ft	36.0	1.1	34.3	Round	1.200	0.26	11.9	4.0
SR 1/2 x 1 ft	12.0	0.5	24.0	Round	1.178	0.04	1.9	1.9

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Job	CT03XC072
Project	22968
By	TJS
Date	6/21/18

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 :	B		Exposure Category
V_i :	50	mph	Basic Wind Speed (Annex B)
z :	80	ft	Height above ground level to the center of the antenna
I :	1.00		Importance Factor (Table 2-3)
K_z :	0.93		Velocity Pressure Coefficient (2.6.5.2)
K_{zt} :	1.94		Topographic Factor (2.6.6.4)
K_d :	0.95		Wind Direction Probability Factor (Table 2-2)
q_z :	10.95	psf	Velocity Pressure at Height z
G_h :	1.00		Strength Design of Appurtenances and their Connections
t_{iz} :	2.76	in	Design Thickness of Radial Ice at Height z (2.6.8)

Mount & Antenna Ice Wind Loads

Appurtenance	Height	Width	h/D	Shape	C_a	A_a	Force	Force
	in	*in*				*sq ft*	*lb*	*plf*
NNVV-65B-R4	77.5	25.1	3.1	Flat	1.226	13.52	181.4	
APXVTM14-ALU-I20	61.8	18.1	3.4	Flat	1.241	7.78	105.6	
1900MHz 4x45W RRH	30.6	16.6	1.8	Flat	1.200	3.53	46.4	
800MHz 2x50W RRH	24.5	18.5	1.3	Flat	1.200	3.15	41.4	
TD-RRH8x20	31.6	24.1	1.3	Flat	1.200	5.29	69.5	
L4X4X3/8 x 6.667 ft	85.5	9.5	9.0	Flat	1.466	5.65	90.7	12.7
L2X2X3/16 x 6.667 ft	85.5	7.5	11.4	Flat	1.546	4.46	75.5	10.6
Pipe1-1/2STD x 3.708 ft	50.0	7.4	6.7	Round	0.794	2.57	22.4	5.4
Pipe2-1/2STD x 5 ft	65.5	8.4	7.8	Round	0.818	3.82	34.2	6.3
Pipe2STD x 8 ft	101.5	7.9	12.9	Round	0.930	5.56	56.6	6.7
Pipe2-1/2STD x 11 ft	137.5	8.4	16.4	Round	1.009	8.01	88.5	7.7
Pipe3/4STD x 3 ft	41.5	6.6	6.3	Round	0.785	1.89	16.3	4.7
SR 1/2 x 1 ft	17.5	6.0	2.9	Round	0.709	0.73	5.7	3.9

RAMAKER & ASSOCIATES, INC.
100% EMPLOYEE-OWNED

Job	CT03XC072
Project	22968
By	TJS
Date	6/21/18

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 :	B		Exposure Category
V_i :	50	mph	Basic Wind Speed (Annex B)
z :	80	ft	Height above ground level to the center of the antenna
I :	1.00		Importance Factor (Table 2-3)
K_z :	0.93		Velocity Pressure Coefficient (2.6.5.2)
K_{zt} :	1.94		Topographic Factor (2.6.6.4)
K_d :	0.95		Wind Direction Probability Factor (Table 2-2)
q_z :	10.95	psf	Velocity Pressure at Height z
G_h :	1.00		Strength Design of Appurtenances and their Connections
t_{iz} :	2.76	in	Design Thickness of Radial Ice at Height z (2.6.8)

Mount & Antenna Ice Wind Loads

Appurtenance	Height	Depth	h/D	Shape	C_a	A_a	Force	Force
	in	*in*				*sq ft*	*lb*	*plf*
NNVV-65B-R4	77.5	13.3	5.8	Flat	1.348	7.17	105.7	
APXVTM14-ALU-I20	61.8	11.8	5.2	Flat	1.321	5.07	73.4	
1900MHz 4x45W RRH	30.6	16.2	1.9	Flat	1.200	3.44	45.3	
800MHz 2x50W RRH	24.5	17.7	1.4	Flat	1.200	3.02	39.6	
TD-RRH8x20	31.6	12.2	2.6	Flat	1.204	2.68	35.3	
L4X4X3/8 x 6.667 ft	85.5	9.5	9.0	Flat	1.466	5.65	90.7	12.7
L2X2X3/16 x 6.667 ft	85.5	7.5	11.4	Flat	1.546	4.46	75.5	10.6
Pipe1-1/2STD x 3.708 ft	50.0	7.4	6.7	Round	0.794	2.57	22.4	5.4
Pipe2-1/2STD x 5 ft	65.5	8.4	7.8	Round	0.818	3.82	34.2	6.3
Pipe2STD x 8 ft	101.5	7.9	12.9	Round	0.930	5.56	56.6	6.7
Pipe2-1/2STD x 11 ft	137.5	8.4	16.4	Round	1.009	8.01	88.5	7.7
Pipe3/4STD x 3 ft	41.5	6.6	6.3	Round	0.785	1.89	16.3	4.7
SR 1/2 x 1 ft	17.5	6.0	2.9	Round	0.709	0.73	5.7	3.9

RAMAKER & ASSOCIATES, INC.
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Job	CT03XC072
Project	22968
By	TJS
Date	6/21/18

Ice Load on Antennas TIA-222-G

Ice Weight :	56	pcf	Ice Density
t_i :	1.00		Design Ice Thickness
Occupancy :	II		Classification of Structures (Table 2-1)
Exposure :	B		Exposure Category
V_i :	50	mph	Basic Wind Speed (Annex B)
z :	80	ft	Height above ground level to the center of the antenna
I :	1.00		Importance Factor (Table 2-3)
K_{iz} :	1.09		Height Escalation Factor for Ice Thickness
K_{zt} :	1.94		Topographic Factor (2.6.6.4)
t_{iz} :	2.76	in	Design Thickness of Radial Ice at Height z (2.6.8)

Platform Grating :	Bar	
Ice Load :	17.5	psf

Mount & Antenna Ice Wind Loads

Appurtenance	Height	Width	Depth	Diam.	Area	Perim.	Ice Weight	
	in	*in*	*in*	*in*	*sq in*	*in*	*lb*	*plf*
NNVV-65B-R4	77.5	25.1	13.3	21.10	206.56	65.83	482.0	
APXVTM14-ALU-I20	61.8	18.1	11.8	14.09	145.87	48.83	266.1	
1900MHz 4x45W RRH	30.6	16.6	16.2	15.41	157.33	54.61	128.0	
800MHz 2x50W RRH	24.5	18.5	17.7	17.83	178.26	61.43	109.8	
TD-RRH8x20	31.6	24.1	12.2	19.77	195.08	61.63	165.0	
L4X4X3/8 x 6.667 ft	85.5	9.5	9.5	5.66	72.86	27.03	188.9	28.3
L2X2X3/16 x 6.667 ft	85.5	7.5	7.5	2.83	48.37	19.03	125.4	18.8
Pipe1-1/2STD x 3.708 ft	50.0	7.4	7.4	1.90	40.33	14.63	58.2	15.7
Pipe2-1/2STD x 5 ft	65.5	8.4	8.4	2.88	48.77	17.69	94.8	19.0
Pipe2STD x 8 ft	101.5	7.9	7.9	2.38	44.44	16.12	138.3	17.3
Pipe2-1/2STD x 11 ft	137.5	8.4	8.4	2.88	48.77	17.69	208.6	19.0
Pipe3/4STD x 3 ft	41.5	6.6	6.6	1.05	32.97	11.96	38.5	12.8
SR 1/2 x 1 ft	17.5	6.0	6.0	0.50	28.20	10.23	11.0	11.0

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (\1E..	Density[k/ft...	Yield[ksi]	Ry	Fu[ksi]	Rt
1	A992	29000	11154	.3	.65	.49	50	1.1	65	1.1
2	A36 Gr.36	29000	11154	.3	.65	.49	36	1.5	58	1.2
3	A572 Gr.50	29000	11154	.3	.65	.49	50	1.1	65	1.1
4	A500 Gr.B RND	29000	11154	.3	.65	.527	42	1.4	58	1.3
5	A500 Gr.B Rect	29000	11154	.3	.65	.527	46	1.4	58	1.3
6	A53 Gr.B	29000	11154	.3	.65	.49	35	1.6	60	1.2
7	A1085	29000	11154	.3	.65	.49	50	1.4	65	1.3

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design Rules	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	PIPE_2.5	PIPE_2.5	Beam	Pipe	A53 Gr.B	Typical	1.61	1.45	1.45	2.89
2	PIPE_2	PIPE_2.0	Beam	Pipe	A53 Gr.B	Typical	1.02	.627	.627	1.25
3	PIPE_1.5	PIPE_1.5	Beam	Pipe	A53 Gr.B	Typical	.749	.293	.293	.586
4	PIPE_0.75	PIPE_.75	Beam	Pipe	A53 Gr.B	Typical	.312	.035	.035	.07
5	L4X4X6	L4x4x6	Beam	Single Angle	A36 Gr.36	Typical	2.86	4.32	4.32	.141
6	L2X2X3	L2x2x3	Beam	Single Angle	A36 Gr.36	Typical	.722	.271	.271	.009
7	SR1/2	SR 1/2"	Beam	BAR	A36 Gr.36	Typical	.196	.003	.003	.006

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rules
1	BHC	N44	N68		270	L4X4X6	Beam	Single Angle	A36 Gr.36	Typical
2	THC	N75	N116		90	L2X2X3	Beam	Single Angle	A36 Gr.36	Typical
3	D12	N52	N46			PIPE_1.5	Beam	Pipe	A53 Gr.B	Typical
4	D11	N53	N40			PIPE_1.5	Beam	Pipe	A53 Gr.B	Typical
5	D10	N55	N40			PIPE_1.5	Beam	Pipe	A53 Gr.B	Typical
6	D9	N54	N48			PIPE_1.5	Beam	Pipe	A53 Gr.B	Typical
7	VPC5	N45	N57			PIPE_1.5	Beam	Pipe	A53 Gr.B	Typical
8	VPC4	N46	N58			PIPE_1.5	Beam	Pipe	A53 Gr.B	Typical
9	VPC3	N40	N56			PIPE_1.5	Beam	Pipe	A53 Gr.B	Typical
10	VPC2	N48	N60			PIPE_1.5	Beam	Pipe	A53 Gr.B	Typical
11	VPC1	N47	N59			PIPE_1.5	Beam	Pipe	A53 Gr.B	Typical
12	BHB	N68	N110		270	L4X4X6	Beam	Single Angle	A36 Gr.36	Typical
13	THB	N117	N75		90	L2X2X3	Beam	Single Angle	A36 Gr.36	Typical
14	D8	N76	N70			PIPE_1.5	Beam	Pipe	A53 Gr.B	Typical
15	D7	N77	N64			PIPE_1.5	Beam	Pipe	A53 Gr.B	Typical
16	D6	N79	N64			PIPE_1.5	Beam	Pipe	A53 Gr.B	Typical
17	D5	N78	N72			PIPE_1.5	Beam	Pipe	A53 Gr.B	Typical
18	VPB5	N69	N81			PIPE_1.5	Beam	Pipe	A53 Gr.B	Typical
19	VPB4	N70	N82			PIPE_1.5	Beam	Pipe	A53 Gr.B	Typical
20	VPB3	N64	N80			PIPE_1.5	Beam	Pipe	A53 Gr.B	Typical
21	VPB2	N72	N84			PIPE_1.5	Beam	Pipe	A53 Gr.B	Typical
22	VPB1	N71	N83			PIPE_1.5	Beam	Pipe	A53 Gr.B	Typical
23	BHA	N110	N44		270	L4X4X6	Beam	Single Angle	A36 Gr.36	Typical
24	THA	N116	N117		90	L2X2X3	Beam	Single Angle	A36 Gr.36	Typical
25	D4	N118	N112			PIPE_1.5	Beam	Pipe	A53 Gr.B	Typical
26	D3	N119	N106			PIPE_1.5	Beam	Pipe	A53 Gr.B	Typical
27	D2	N121	N106			PIPE_1.5	Beam	Pipe	A53 Gr.B	Typical
28	D1	N120	N114			PIPE_1.5	Beam	Pipe	A53 Gr.B	Typical
29	VPA5	N111	N123			PIPE_1.5	Beam	Pipe	A53 Gr.B	Typical
30	VPA4	N112	N124			PIPE_1.5	Beam	Pipe	A53 Gr.B	Typical
31	VPA3	N106	N122			PIPE_1.5	Beam	Pipe	A53 Gr.B	Typical
32	VPA2	N114	N126			PIPE_1.5	Beam	Pipe	A53 Gr.B	Typical
33	VPA1	N113	N125			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
34	M34	N129	N125A			RIGID	None	None	RIGID	Typical
35	M35	N127	N123A			RIGID	None	None	RIGID	Typical
36	M36	N130	N126A			RIGID	None	None	RIGID	Typical
37	M37	N128	N124A			RIGID	None	None	RIGID	Typical
38	M38	N137	N133			RIGID	None	None	RIGID	Typical
39	M39	N135	N131			RIGID	None	None	RIGID	Typical
40	M40	N138	N134			RIGID	None	None	RIGID	Typical
41	M41	N136	N132			RIGID	None	None	RIGID	Typical
42	M42	N137	N129			SR1/2	Beam	BAR	A36 Gr.36	Typical
43	M43	N133	N125A			SR1/2	Beam	BAR	A36 Gr.36	Typical
44	M44	N131	N123A			SR1/2	Beam	BAR	A36 Gr.36	Typical
45	M45	N135	N127			SR1/2	Beam	BAR	A36 Gr.36	Typical
46	M46	N132	N124A			SR1/2	Beam	BAR	A36 Gr.36	Typical
47	M47	N136	N128			SR1/2	Beam	BAR	A36 Gr.36	Typical
48	M48	N134	N126A			SR1/2	Beam	BAR	A36 Gr.36	Typical
49	M49	N138	N130			SR1/2	Beam	BAR	A36 Gr.36	Typical
50	MPC5	N143	N145			PIPE_2.5	Beam	Pipe	A53 Gr.B	Typical
51	MPC1	N144	N146			PIPE_2.5	Beam	Pipe	A53 Gr.B	Typical
52	HA	N203	N204			PIPE_0.75	Beam	Pipe	A53 Gr.B	Typical
53	AV6	N213	N216			SR1/2	Beam	BAR	A36 Gr.36	Typical
54	AV5	N212	N215			SR1/2	Beam	BAR	A36 Gr.36	Typical
55	AV4	N211	N214			SR1/2	Beam	BAR	A36 Gr.36	Typical
56	AV3	N218	N217			SR1/2	Beam	BAR	A36 Gr.36	Typical
57	AV2	N219	N220			SR1/2	Beam	BAR	A36 Gr.36	Typical
58	AV1	N222	N221			SR1/2	Beam	BAR	A36 Gr.36	Typical
59	M95	N224	N226			RIGID	None	None	RIGID	Typical
60	M96	N223	N225			RIGID	None	None	RIGID	Typical
61	VA2	N227	N228			PIPE_2	Beam	Pipe	A53 Gr.B	Typical
62	M101	N236	N238			RIGID	None	None	RIGID	Typical
63	M102	N235	N237			RIGID	None	None	RIGID	Typical
64	VA3	N239	N240			PIPE_2	Beam	Pipe	A53 Gr.B	Typical
65	M101A	N237A	N239A			RIGID	None	None	RIGID	Typical
66	M102A	N236A	N238A			RIGID	None	None	RIGID	Typical
67	MPA3	N240A	N241			PIPE_2.5	Beam	Pipe	A53 Gr.B	Typical
68	M104	N242	N244			RIGID	None	None	RIGID	Typical
69	M105	N241A	N243			RIGID	None	None	RIGID	Typical
70	VA1	N245	N246			PIPE_2	Beam	Pipe	A53 Gr.B	Typical
71	M107	N40	N5			RIGID	None	None	RIGID	Typical
72	M108	N40	N14			RIGID	None	None	RIGID	Typical
73	M109	N40	N15			RIGID	None	None	RIGID	Typical
74	M110	N64	N47A			RIGID	None	None	RIGID	Typical
75	M111	N64	N56A			RIGID	None	None	RIGID	Typical
76	M112	N64	N57A			RIGID	None	None	RIGID	Typical
77	M113	N106	N89			RIGID	None	None	RIGID	Typical
78	M114	N106	N98			RIGID	None	None	RIGID	Typical
79	M115	N106	N99			RIGID	None	None	RIGID	Typical
80	M80	N201	N197			RIGID	None	None	RIGID	Typical
81	M81	N199	N195			RIGID	None	None	RIGID	Typical
82	M82	N202	N198			RIGID	None	None	RIGID	Typical
83	M83	N200	N196			RIGID	None	None	RIGID	Typical
84	M84	N209A	N205A			RIGID	None	None	RIGID	Typical
85	M85	N207A	N203A			RIGID	None	None	RIGID	Typical
86	M86	N210A	N206A			RIGID	None	None	RIGID	Typical
87	M87	N208A	N204A			RIGID	None	None	RIGID	Typical
88	M88	N209A	N201			SR1/2	Beam	BAR	A36 Gr.36	Typical
89	M89	N205A	N197			SR1/2	Beam	BAR	A36 Gr.36	Typical
90	M90	N203A	N195			SR1/2	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
91	M91	N207A	N199			SR1/2	Beam	BAR	A36 Gr.36	Typical
92	M92	N204A	N196			SR1/2	Beam	BAR	A36 Gr.36	Typical
93	M93	N208A	N200			SR1/2	Beam	BAR	A36 Gr.36	Typical
94	M94	N206A	N198			SR1/2	Beam	BAR	A36 Gr.36	Typical
95	M95A	N210A	N202			SR1/2	Beam	BAR	A36 Gr.36	Typical
96	MPB5	N215A	N217A			PIPE_2.5	Beam	Pipe	A53 Gr.B	Typical
97	MPB1	N216A	N218A			PIPE_2.5	Beam	Pipe	A53 Gr.B	Typical
98	M98	N229	N225A			RIGID	None	None	RIGID	Typical
99	M99	N227A	N223A			RIGID	None	None	RIGID	Typical
100	M100	N230	N226A			RIGID	None	None	RIGID	Typical
101	M101B	N228A	N224A			RIGID	None	None	RIGID	Typical
102	M102B	N237B	N233			RIGID	None	None	RIGID	Typical
103	M103	N235A	N231			RIGID	None	None	RIGID	Typical
104	M104A	N238B	N234			RIGID	None	None	RIGID	Typical
105	M105A	N236B	N232			RIGID	None	None	RIGID	Typical
106	M106	N237B	N229			SR1/2	Beam	BAR	A36 Gr.36	Typical
107	M107A	N233	N225A			SR1/2	Beam	BAR	A36 Gr.36	Typical
108	M108A	N231	N223A			SR1/2	Beam	BAR	A36 Gr.36	Typical
109	M109A	N235A	N227A			SR1/2	Beam	BAR	A36 Gr.36	Typical
110	M110A	N232	N224A			SR1/2	Beam	BAR	A36 Gr.36	Typical
111	M111A	N236B	N228A			SR1/2	Beam	BAR	A36 Gr.36	Typical
112	M112A	N234	N226A			SR1/2	Beam	BAR	A36 Gr.36	Typical
113	M113A	N238B	N230			SR1/2	Beam	BAR	A36 Gr.36	Typical
114	MPA5	N243A	N245A			PIPE_2.5	Beam	Pipe	A53 Gr.B	Typical
115	MPA1	N244A	N246A			PIPE_2.5	Beam	Pipe	A53 Gr.B	Typical

Plate Primary Data

	Label	A Joint	B Joint	C Joint	D Joint	Material	Thickness[in]
1	P1	N4	N2	N19	N17	gen_Steel	.5
2	P2	N17	N19	N10	N12	gen_Steel	.5
3	P3	N12	N10	N18	N15	gen_Steel	.5
4	P4	N15	N18	N5	N7	gen_Steel	.5
5	P5	N2	N3	N16	N19	gen_Steel	.5
6	P6	N16	N11	N10	N19	gen_Steel	.5
7	P7	N11	N10	N18	N14	gen_Steel	.5
8	P8	N14	N18	N5	N6	gen_Steel	.5
9	P9	N2	N8	N21	N19	gen_Steel	.5
10	P10	N19	N21	N13	N10	gen_Steel	.5
11	P11	N10	N13	N20	N18	gen_Steel	.5
12	P12	N18	N20	N9	N5	gen_Steel	.5
13	P13	N46A	N44A	N61	N59A	gen_Steel	.5
14	P14	N59A	N61	N52A	N54A	gen_Steel	.5
15	P15	N54A	N52A	N60A	N57A	gen_Steel	.5
16	P16	N57A	N60A	N47A	N49A	gen_Steel	.5
17	P17	N44A	N45A	N58A	N61	gen_Steel	.5
18	P18	N58A	N53A	N52A	N61	gen_Steel	.5
19	P19	N53A	N52A	N60A	N56A	gen_Steel	.5
20	P20	N56A	N60A	N47A	N48A	gen_Steel	.5
21	P21	N44A	N50A	N63	N61	gen_Steel	.5
22	P22	N61	N63	N55A	N52A	gen_Steel	.5
23	P23	N52A	N55A	N62	N60A	gen_Steel	.5
24	P24	N60A	N62	N51A	N47A	gen_Steel	.5
25	P25	N88	N86	N103	N101	gen_Steel	.5
26	P26	N101	N103	N94	N96	gen_Steel	.5
27	P27	N96	N94	N102	N99	gen_Steel	.5

Plate Primary Data (Continued)

	Label	A Joint	B Joint	C Joint	D Joint	Material	Thickness[in]
28	P28	N99	N102	N89	N91	gen_Steel	.5
29	P29	N86	N87	N100	N103	gen_Steel	.5
30	P30	N100	N95	N94	N103	gen_Steel	.5
31	P31	N95	N94	N102	N98	gen_Steel	.5
32	P32	N98	N102	N89	N90	gen_Steel	.5
33	P33	N86	N92	N105	N103	gen_Steel	.5
34	P34	N103	N105	N97	N94	gen_Steel	.5
35	P35	N94	N97	N104	N102	gen_Steel	.5
36	P36	N102	N104	N93	N89	gen_Steel	.5

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distributed	Area(Me...	Surface(P...
1	Dead Load	None		-1			36		6	
2	Antenna Wind 0	None					72			
3	Antenna Wind 30	None					72			
4	Antenna Wind 45	None					72			
5	Antenna Wind 60	None					72			
6	Antenna Wind 90	None					72			
7	Antenna Wind 120	None					72			
8	Antenna Wind 135	None					72			
9	Antenna Wind 150	None					72			
10	Antenna Wind 180	None					72			
11	Antenna Wind 210	None					72			
12	Antenna Wind 225	None					72			
13	Antenna Wind 240	None					72			
14	Antenna Wind 270	None					72			
15	Antenna Wind 300	None					72			
16	Antenna Wind 315	None					72			
17	Antenna Wind 330	None					72			
18	Antenna Ice Dead Load	None					36		6	
19	Antenna Wind w/Ice 0	None					72			
20	Antenna Wind w/Ice 30	None					72			
21	Antenna Wind w/Ice 45	None					72			
22	Antenna Wind w/Ice 60	None					72			
23	Antenna Wind w/Ice 90	None					72			
24	Antenna Wind w/Ice 1...	None					72			
25	Antenna Wind w/Ice 1...	None					72			
26	Antenna Wind w/Ice 1...	None					72			
27	Antenna Wind w/Ice 1...	None					72			
28	Antenna Wind w/Ice 2...	None					72			
29	Antenna Wind w/Ice 2...	None					72			
30	'Antenna Wind w/Ice ...	None					72			
31	Antenna Wind w/Ice 2...	None					72			
32	Antenna Wind w/Ice 3...	None					72			
33	Antenna Wind w/Ice 3...	None					72			
34	Antenna Wind w/Ice 3...	None					72			
35	Member Wind 0	None						100		
36	Member Wind 30	None						100		
37	Member Wind 45	None						100		
38	Member Wind 60	None						100		
39	Member Wind 90	None						100		
40	Member Wind 120	None						100		
41	Member Wind 135	None						100		
42	Member Wind 150	None						100		
43	Member Wind 180	None						100		

Basic Load Cases (Continued)

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distributed	Area(Me...	Surface(P...
44	Member Wind 210	None						100		
45	Member Wind 225	None						100		
46	Member Wind 240	None						100		
47	Member Wind 270	None						100		
48	Member Wind 300	None						100		
49	Member Wind 315	None						100		
50	Member Wind 330	None						100		
51	Member Ice Dead Load	None						50		
52	Member Wind w/Ice 0	None						100		
53	Member Wind w/Ice 30	None						100		
54	Member Wind w/Ice 45	None						100		
55	Member Wind w/Ice 60	None						100		
56	Member Wind w/Ice 90	None						100		
57	Member Wind w/Ice 1...	None						100		
58	Member Wind w/Ice 1...	None						100		
59	Member Wind w/Ice 1...	None						100		
60	Member Wind w/Ice 1...	None						100		
61	Member Wind w/Ice 2...	None						100		
62	Member Wind w/Ice 2...	None						100		
63	Member Wind w/Ice 2...	None						100		
64	Member Wind w/Ice 2...	None						100		
65	Member Wind w/Ice 3...	None						100		
66	Member Wind w/Ice 3...	None						100		
67	Member Wind w/Ice 3...	None						100		
68	LV-1	None					1			
69	LV-2	None					1			
70	LV-3	None					1			
71	LV-4	None					1			
72	LV-5	None					1			
73	LV-6	None					1			
74	LV-7	None					1			
75	LV-8	None					1			
76	LV-9	None					1			
77	LV-10	None								
78	LV-11	None								
79	LV-12	None								
80	LV-13	None								
81	LV-14	None								
82	LV-15	None								
83	LM-1	None					1			
84	LM-2	None					1			
85	LM-3	None					1			
86	LM-4	None					1			
87	LM-5	None					1			
88	LM-6	None					1			
89	LM-7	None								
90	LM-8	None								
91	LM-9	None								
92	LM-10	None								
93	LM-11	None								
94	LM-12	None								
95	LM-13	None								
96	LM-14	None								
97	LM-15	None								
98	BLC 1 Transient Area...	None						95		
99	BLC 18 Transient Are...	None						95		

Load Combinations

	Description	S...	P...	S...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
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-Wind)	Yes	Y		1	.9	7	1.6	40	1.6														
8	0.9D + 1.6 (135-Wind)	Yes	Y		1	.9	8	1.6	41	1.6														
9	0.9D + 1.6 (150-Wind)	Yes	Y		1	.9	9	1.6	42	1.6														
10	0.9D + 1.6 (180-Wind)	Yes	Y		1	.9	10	1.6	43	1.6														
11	0.9D + 1.6 (210-Wind)	Yes	Y		1	.9	11	1.6	44	1.6														
12	0.9D + 1.6 (225-Wind)	Yes	Y		1	.9	12	1.6	45	1.6														
13	0.9D + 1.6 (240-Wind)	Yes	Y		1	.9	13	1.6	46	1.6														
14	0.9D + 1.6 (270-Wind)	Yes	Y		1	.9	14	1.6	47	1.6														
15	0.9D + 1.6 (300-Wind)	Yes	Y		1	.9	15	1.6	48	1.6														
16	0.9D + 1.6 (315-Wind)	Yes	Y		1	.9	16	1.6	49	1.6														
17	0.9D + 1.6 (330-Wind)	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-Wind)	Yes	Y		1	1.2	7	1.6	40	1.6														
24	1.2D + 1.6 (135-Wind)	Yes	Y		1	1.2	8	1.6	41	1.6														
25	1.2D + 1.6 (150-Wind)	Yes	Y		1	1.2	9	1.6	42	1.6														
26	1.2D + 1.6 (180-Wind)	Yes	Y		1	1.2	10	1.6	43	1.6														
27	1.2D + 1.6 (210-Wind)	Yes	Y		1	1.2	11	1.6	44	1.6														
28	1.2D + 1.6 (225-Wind)	Yes	Y		1	1.2	12	1.6	45	1.6														
29	1.2D + 1.6 (240-Wind)	Yes	Y		1	1.2	13	1.6	46	1.6														
30	1.2D + 1.6 (270-Wind)	Yes	Y		1	1.2	14	1.6	47	1.6														
31	1.2D + 1.6 (300-Wind)	Yes	Y		1	1.2	15	1.6	48	1.6														
32	1.2D + 1.6 (315-Wind)	Yes	Y		1	1.2	16	1.6	49	1.6														
33	1.2D + 1.6 (330-Wind)	Yes	Y		1	1.2	17	1.6	50	1.6														
34	1.2D + 1.0Di + 1.0 (0-Wind I...	Yes	Y		1	1.2	18	1	51	1	19	1	52	1										
35	1.2D + 1.0Di + 1.0 (30-Wind...	Yes	Y		1	1.2	18	1	51	1	20	1	53	1										
36	1.2D + 1.0Di + 1.0 (45-Wind...	Yes	Y		1	1.2	18	1	51	1	21	1	54	1										
37	1.2D + 1.0Di + 1.0 (60-Wind...	Yes	Y		1	1.2	18	1	51	1	22	1	55	1										
38	1.2D + 1.0Di + 1.0 (90-Wind...	Yes	Y		1	1.2	18	1	51	1	23	1	56	1										
39	1.2D + 1.0Di + 1.0 (120-Win...	Yes	Y		1	1.2	18	1	51	1	24	1	57	1										
40	1.2D + 1.0Di + 1.0 (135-Win...	Yes	Y		1	1.2	18	1	51	1	25	1	58	1										
41	1.2D + 1.0Di + 1.0 (150-Win...	Yes	Y		1	1.2	18	1	51	1	26	1	59	1										
42	1.2D + 1.0Di + 1.0 (180-Win...	Yes	Y		1	1.2	18	1	51	1	27	1	60	1										
43	1.2D + 1.0Di + 1.0 (210-Win...	Yes	Y		1	1.2	18	1	51	1	28	1	61	1										
44	1.2D + 1.0Di + 1.0 (225-Win...	Yes	Y		1	1.2	18	1	51	1	29	1	62	1										
45	1.2D + 1.0Di + 1.0 (240-Win...	Yes	Y		1	1.2	18	1	51	1	30	1	63	1										
46	1.2D + 1.0Di + 1.0 (270-Win...	Yes	Y		1	1.2	18	1	51	1	31	1	64	1										
47	1.2D + 1.0Di + 1.0 (300-Win...	Yes	Y		1	1.2	18	1	51	1	32	1	65	1										
48	1.2D + 1.0Di + 1.0 (315-Win...	Yes	Y		1	1.2	18	1	51	1	33	1	66	1										
49	1.2D + 1.0Di + 1.0 (330-Win...	Yes	Y		1	1.2	18	1	51	1	34	1	67	1										
50	1.2D + 1.5LV-1	Yes	Y		1	1.2	68	1.5																
51	1.2D + 1.5LV-2	Yes	Y		1	1.2	69	1.5																
52	1.2D + 1.5LV-3	Yes	Y		1	1.2	70	1.5																
53	1.2D + 1.5LV-4	Yes	Y		1	1.2	71	1.5																
54	1.2D + 1.5LV-5	Yes	Y		1	1.2	72	1.5																
55	1.2D + 1.5LV-6	Yes	Y		1	1.2	73	1.5																
56	1.2D + 1.5LV-7	Yes	Y		1	1.2	74	1.5																

Load Combinations (Continued)

	Description	S...	P...	S...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
57	1.2D + 1.5LV-8	Yes	Y		1	1.2	75	1.5																
58	1.2D + 1.5LV-9	Yes	Y		1	1.2	76	1.5																
59	1.2D + 1.5LV-10	Yes	Y		1	1.2	77	1.5																
60	1.2D + 1.5LV-11	Yes	Y		1	1.2	78	1.5																
61	1.2D + 1.5LV-12	Yes	Y		1	1.2	79	1.5																
62	1.2D + 1.5LV-13	Yes	Y		1	1.2	80	1.5																
63	1.2D + 1.5LV-14	Yes	Y		1	1.2	81	1.5																
64	1.2D + 1.5LV-15	Yes	Y		1	1.2	82	1.5																
65	1.2D + 1.5LM-1 + Maintena...	Yes	Y		1	1.2	83	1.5	2	.104	35	.104												
66	1.2D + 1.5LM-1 + Maintena...	Yes	Y		1	1.2	83	1.5	3	.104	36	.104												
67	1.2D + 1.5LM-1 + Maintena...	Yes	Y		1	1.2	83	1.5	4	.104	37	.104												
68	1.2D + 1.5LM-1 + Maintena...	Yes	Y		1	1.2	83	1.5	5	.104	38	.104												
69	1.2D + 1.5LM-1 + Maintena...	Yes	Y		1	1.2	83	1.5	6	.104	39	.104												
70	1.2D + 1.5LM-1 + Maintena...	Yes	Y		1	1.2	83	1.5	7	.104	40	.104												
71	1.2D + 1.5LM-1 + Maintena...	Yes	Y		1	1.2	83	1.5	8	.104	41	.104												
72	1.2D + 1.5LM-1 + Maintena...	Yes	Y		1	1.2	83	1.5	9	.104	42	.104												
73	1.2D + 1.5LM-1 + Maintena...	Yes	Y		1	1.2	83	1.5	10	.104	43	.104												
74	1.2D + 1.5LM-1 + Maintena...	Yes	Y		1	1.2	83	1.5	11	.104	44	.104												
75	1.2D + 1.5LM-1 + Maintena...	Yes	Y		1	1.2	83	1.5	12	.104	45	.104												
76	1.2D + 1.5LM-1 + Maintena...	Yes	Y		1	1.2	83	1.5	13	.104	46	.104												
77	1.2D + 1.5LM-1 + Maintena...	Yes	Y		1	1.2	83	1.5	14	.104	47	.104												
78	1.2D + 1.5LM-1 + Maintena...	Yes	Y		1	1.2	83	1.5	15	.104	48	.104												
79	1.2D + 1.5LM-1 + Maintena...	Yes	Y		1	1.2	83	1.5	16	.104	49	.104												
80	1.2D + 1.5LM-1 + Maintena...	Yes	Y		1	1.2	83	1.5	17	.104	50	.104												
81	1.2D + 1.5LM-2 + Maintena...	Yes	Y		1	1.2	84	1.5	2	.104	35	.104												
82	1.2D + 1.5LM-2 + Maintena...	Yes	Y		1	1.2	84	1.5	3	.104	36	.104												
83	1.2D + 1.5LM-2 + Maintena...	Yes	Y		1	1.2	84	1.5	4	.104	37	.104												
84	1.2D + 1.5LM-2 + Maintena...	Yes	Y		1	1.2	84	1.5	5	.104	38	.104												
85	1.2D + 1.5LM-2 + Maintena...	Yes	Y		1	1.2	84	1.5	6	.104	39	.104												
86	1.2D + 1.5LM-2 + Maintena...	Yes	Y		1	1.2	84	1.5	7	.104	40	.104												
87	1.2D + 1.5LM-2 + Maintena...	Yes	Y		1	1.2	84	1.5	8	.104	41	.104												
88	1.2D + 1.5LM-2 + Maintena...	Yes	Y		1	1.2	84	1.5	9	.104	42	.104												
89	1.2D + 1.5LM-2 + Maintena...	Yes	Y		1	1.2	84	1.5	10	.104	43	.104												
90	1.2D + 1.5LM-2 + Maintena...	Yes	Y		1	1.2	84	1.5	11	.104	44	.104												
91	1.2D + 1.5LM-2 + Maintena...	Yes	Y		1	1.2	84	1.5	12	.104	45	.104												
92	1.2D + 1.5LM-2 + Maintena...	Yes	Y		1	1.2	84	1.5	13	.104	46	.104												
93	1.2D + 1.5LM-2 + Maintena...	Yes	Y		1	1.2	84	1.5	14	.104	47	.104												
94	1.2D + 1.5LM-2 + Maintena...	Yes	Y		1	1.2	84	1.5	15	.104	48	.104												
95	1.2D + 1.5LM-2 + Maintena...	Yes	Y		1	1.2	84	1.5	16	.104	49	.104												
96	1.2D + 1.5LM-2 + Maintena...	Yes	Y		1	1.2	84	1.5	17	.104	50	.104												
97	1.2D + 1.5LM-3 + Maintena...	Yes	Y		1	1.2	85	1.5	2	.104	35	.104												
98	1.2D + 1.5LM-3 + Maintena...	Yes	Y		1	1.2	85	1.5	3	.104	36	.104												
99	1.2D + 1.5LM-3 + Maintena...	Yes	Y		1	1.2	85	1.5	4	.104	37	.104												
100	1.2D + 1.5LM-3 + Maintena...	Yes	Y		1	1.2	85	1.5	5	.104	38	.104												
101	1.2D + 1.5LM-3 + Maintena...	Yes	Y		1	1.2	85	1.5	6	.104	39	.104												
102	1.2D + 1.5LM-3 + Maintena...	Yes	Y		1	1.2	85	1.5	7	.104	40	.104												
103	1.2D + 1.5LM-3 + Maintena...	Yes	Y		1	1.2	85	1.5	8	.104	41	.104												
104	1.2D + 1.5LM-3 + Maintena...	Yes	Y		1	1.2	85	1.5	9	.104	42	.104												
105	1.2D + 1.5LM-3 + Maintena...	Yes	Y		1	1.2	85	1.5	10	.104	43	.104												
106	1.2D + 1.5LM-3 + Maintena...	Yes	Y		1	1.2	85	1.5	11	.104	44	.104												
107	1.2D + 1.5LM-3 + Maintena...	Yes	Y		1	1.2	85	1.5	12	.104	45	.104												
108	1.2D + 1.5LM-3 + Maintena...	Yes	Y		1	1.2	85	1.5	13	.104	46	.104												
109	1.2D + 1.5LM-3 + Maintena...	Yes	Y		1	1.2	85	1.5	14	.104	47	.104												
110	1.2D + 1.5LM-3 + Maintena...	Yes	Y		1	1.2	85	1.5	15	.104	48	.104												
111	1.2D + 1.5LM-3 + Maintena...	Yes	Y		1	1.2	85	1.5	16	.104	49	.104												
112	1.2D + 1.5LM-3 + Maintena...	Yes	Y		1	1.2	85	1.5	17	.104	50	.104												
113	1.2D + 1.5LM-4 + Maintena...	Yes	Y		1	1.2	86	1.5	2	.104	35	.104												

Load Combinations (Continued)

	Description	S...	P...	S...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
114	1.2D + 1.5LM-4 + Maintena...	Yes	Y		1	1.2	86	1.5	3	.104	36	.104												
115	1.2D + 1.5LM-4 + Maintena...	Yes	Y		1	1.2	86	1.5	4	.104	37	.104												
116	1.2D + 1.5LM-4 + Maintena...	Yes	Y		1	1.2	86	1.5	5	.104	38	.104												
117	1.2D + 1.5LM-4 + Maintena...	Yes	Y		1	1.2	86	1.5	6	.104	39	.104												
118	1.2D + 1.5LM-4 + Maintena...	Yes	Y		1	1.2	86	1.5	7	.104	40	.104												
119	1.2D + 1.5LM-4 + Maintena...	Yes	Y		1	1.2	86	1.5	8	.104	41	.104												
120	1.2D + 1.5LM-4 + Maintena...	Yes	Y		1	1.2	86	1.5	9	.104	42	.104												
121	1.2D + 1.5LM-4 + Maintena...	Yes	Y		1	1.2	86	1.5	10	.104	43	.104												
122	1.2D + 1.5LM-4 + Maintena...	Yes	Y		1	1.2	86	1.5	11	.104	44	.104												
123	1.2D + 1.5LM-4 + Maintena...	Yes	Y		1	1.2	86	1.5	12	.104	45	.104												
124	1.2D + 1.5LM-4 + Maintena...	Yes	Y		1	1.2	86	1.5	13	.104	46	.104												
125	1.2D + 1.5LM-4 + Maintena...	Yes	Y		1	1.2	86	1.5	14	.104	47	.104												
126	1.2D + 1.5LM-4 + Maintena...	Yes	Y		1	1.2	86	1.5	15	.104	48	.104												
127	1.2D + 1.5LM-4 + Maintena...	Yes	Y		1	1.2	86	1.5	16	.104	49	.104												
128	1.2D + 1.5LM-4 + Maintena...	Yes	Y		1	1.2	86	1.5	17	.104	50	.104												
129	1.2D + 1.5LM-5 + Maintena...	Yes	Y		1	1.2	87	1.5	2	.104	35	.104												
130	1.2D + 1.5LM-5 + Maintena...	Yes	Y		1	1.2	87	1.5	3	.104	36	.104												
131	1.2D + 1.5LM-5 + Maintena...	Yes	Y		1	1.2	87	1.5	4	.104	37	.104												
132	1.2D + 1.5LM-5 + Maintena...	Yes	Y		1	1.2	87	1.5	5	.104	38	.104												
133	1.2D + 1.5LM-5 + Maintena...	Yes	Y		1	1.2	87	1.5	6	.104	39	.104												
134	1.2D + 1.5LM-5 + Maintena...	Yes	Y		1	1.2	87	1.5	7	.104	40	.104												
135	1.2D + 1.5LM-5 + Maintena...	Yes	Y		1	1.2	87	1.5	8	.104	41	.104												
136	1.2D + 1.5LM-5 + Maintena...	Yes	Y		1	1.2	87	1.5	9	.104	42	.104												
137	1.2D + 1.5LM-5 + Maintena...	Yes	Y		1	1.2	87	1.5	10	.104	43	.104												
138	1.2D + 1.5LM-5 + Maintena...	Yes	Y		1	1.2	87	1.5	11	.104	44	.104												
139	1.2D + 1.5LM-5 + Maintena...	Yes	Y		1	1.2	87	1.5	12	.104	45	.104												
140	1.2D + 1.5LM-5 + Maintena...	Yes	Y		1	1.2	87	1.5	13	.104	46	.104												
141	1.2D + 1.5LM-5 + Maintena...	Yes	Y		1	1.2	87	1.5	14	.104	47	.104												
142	1.2D + 1.5LM-5 + Maintena...	Yes	Y		1	1.2	87	1.5	15	.104	48	.104												
143	1.2D + 1.5LM-5 + Maintena...	Yes	Y		1	1.2	87	1.5	16	.104	49	.104												
144	1.2D + 1.5LM-5 + Maintena...	Yes	Y		1	1.2	87	1.5	17	.104	50	.104												
145	1.2D + 1.5LM-6 + Maintena...	Yes	Y		1	1.2	88	1.5	2	.104	35	.104												
146	1.2D + 1.5LM-6 + Maintena...	Yes	Y		1	1.2	88	1.5	3	.104	36	.104												
147	1.2D + 1.5LM-6 + Maintena...	Yes	Y		1	1.2	88	1.5	4	.104	37	.104												
148	1.2D + 1.5LM-6 + Maintena...	Yes	Y		1	1.2	88	1.5	5	.104	38	.104												
149	1.2D + 1.5LM-6 + Maintena...	Yes	Y		1	1.2	88	1.5	6	.104	39	.104												
150	1.2D + 1.5LM-6 + Maintena...	Yes	Y		1	1.2	88	1.5	7	.104	40	.104												
151	1.2D + 1.5LM-6 + Maintena...	Yes	Y		1	1.2	88	1.5	8	.104	41	.104												
152	1.2D + 1.5LM-6 + Maintena...	Yes	Y		1	1.2	88	1.5	9	.104	42	.104												
153	1.2D + 1.5LM-6 + Maintena...	Yes	Y		1	1.2	88	1.5	10	.104	43	.104												
154	1.2D + 1.5LM-6 + Maintena...	Yes	Y		1	1.2	88	1.5	11	.104	44	.104												
155	1.2D + 1.5LM-6 + Maintena...	Yes	Y		1	1.2	88	1.5	12	.104	45	.104												
156	1.2D + 1.5LM-6 + Maintena...	Yes	Y		1	1.2	88	1.5	13	.104	46	.104												
157	1.2D + 1.5LM-6 + Maintena...	Yes	Y		1	1.2	88	1.5	14	.104	47	.104												
158	1.2D + 1.5LM-6 + Maintena...	Yes	Y		1	1.2	88	1.5	15	.104	48	.104												
159	1.2D + 1.5LM-6 + Maintena...	Yes	Y		1	1.2	88	1.5	16	.104	49	.104												
160	1.2D + 1.5LM-6 + Maintena...	Yes	Y		1	1.2	88	1.5	17	.104	50	.104												
161	1.2D + 1.5LM-7 + Maintena...	Yes	Y		1	1.2	89	1.5	2	.104	35	.104												
162	1.2D + 1.5LM-7 + Maintena...	Yes	Y		1	1.2	89	1.5	3	.104	36	.104												
163	1.2D + 1.5LM-7 + Maintena...	Yes	Y		1	1.2	89	1.5	4	.104	37	.104												
164	1.2D + 1.5LM-7 + Maintena...	Yes	Y		1	1.2	89	1.5	5	.104	38	.104												
165	1.2D + 1.5LM-7 + Maintena...	Yes	Y		1	1.2	89	1.5	6	.104	39	.104												
166	1.2D + 1.5LM-7 + Maintena...	Yes	Y		1	1.2	89	1.5	7	.104	40	.104												
167	1.2D + 1.5LM-7 + Maintena...	Yes	Y		1	1.2	89	1.5	8	.104	41	.104												
168	1.2D + 1.5LM-7 + Maintena...	Yes	Y		1	1.2	89	1.5	9	.104	42	.104												
169	1.2D + 1.5LM-7 + Maintena...	Yes	Y		1	1.2	89	1.5	10	.104	43	.104												
170	1.2D + 1.5LM-7 + Maintena...	Yes	Y		1	1.2	89	1.5	11	.104	44	.104												

Load Combinations (Continued)

	Description	S...	P...	S...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
171	1.2D + 1.5LM-7 + Maintena...	Yes	Y		1	1.2	89	1.5	12	.104	45	.104												
172	1.2D + 1.5LM-7 + Maintena...	Yes	Y		1	1.2	89	1.5	13	.104	46	.104												
173	1.2D + 1.5LM-7 + Maintena...	Yes	Y		1	1.2	89	1.5	14	.104	47	.104												
174	1.2D + 1.5LM-7 + Maintena...	Yes	Y		1	1.2	89	1.5	15	.104	48	.104												
175	1.2D + 1.5LM-7 + Maintena...	Yes	Y		1	1.2	89	1.5	16	.104	49	.104												
176	1.2D + 1.5LM-7 + Maintena...	Yes	Y		1	1.2	89	1.5	17	.104	50	.104												
177	1.2D + 1.5LM-8 + Maintena...	Yes	Y		1	1.2	90	1.5	2	.104	35	.104												
178	1.2D + 1.5LM-8 + Maintena...	Yes	Y		1	1.2	90	1.5	3	.104	36	.104												
179	1.2D + 1.5LM-8 + Maintena...	Yes	Y		1	1.2	90	1.5	4	.104	37	.104												
180	1.2D + 1.5LM-8 + Maintena...	Yes	Y		1	1.2	90	1.5	5	.104	38	.104												
181	1.2D + 1.5LM-8 + Maintena...	Yes	Y		1	1.2	90	1.5	6	.104	39	.104												
182	1.2D + 1.5LM-8 + Maintena...	Yes	Y		1	1.2	90	1.5	7	.104	40	.104												
183	1.2D + 1.5LM-8 + Maintena...	Yes	Y		1	1.2	90	1.5	8	.104	41	.104												
184	1.2D + 1.5LM-8 + Maintena...	Yes	Y		1	1.2	90	1.5	9	.104	42	.104												
185	1.2D + 1.5LM-8 + Maintena...	Yes	Y		1	1.2	90	1.5	10	.104	43	.104												
186	1.2D + 1.5LM-8 + Maintena...	Yes	Y		1	1.2	90	1.5	11	.104	44	.104												
187	1.2D + 1.5LM-8 + Maintena...	Yes	Y		1	1.2	90	1.5	12	.104	45	.104												
188	1.2D + 1.5LM-8 + Maintena...	Yes	Y		1	1.2	90	1.5	13	.104	46	.104												
189	1.2D + 1.5LM-8 + Maintena...	Yes	Y		1	1.2	90	1.5	14	.104	47	.104												
190	1.2D + 1.5LM-8 + Maintena...	Yes	Y		1	1.2	90	1.5	15	.104	48	.104												
191	1.2D + 1.5LM-8 + Maintena...	Yes	Y		1	1.2	90	1.5	16	.104	49	.104												
192	1.2D + 1.5LM-8 + Maintena...	Yes	Y		1	1.2	90	1.5	17	.104	50	.104												
193	1.2D + 1.5LM-9 + Maintena...	Yes	Y		1	1.2	91	1.5	2	.104	35	.104												
194	1.2D + 1.5LM-9 + Maintena...	Yes	Y		1	1.2	91	1.5	3	.104	36	.104												
195	1.2D + 1.5LM-9 + Maintena...	Yes	Y		1	1.2	91	1.5	4	.104	37	.104												
196	1.2D + 1.5LM-9 + Maintena...	Yes	Y		1	1.2	91	1.5	5	.104	38	.104												
197	1.2D + 1.5LM-9 + Maintena...	Yes	Y		1	1.2	91	1.5	6	.104	39	.104												
198	1.2D + 1.5LM-9 + Maintena...	Yes	Y		1	1.2	91	1.5	7	.104	40	.104												
199	1.2D + 1.5LM-9 + Maintena...	Yes	Y		1	1.2	91	1.5	8	.104	41	.104												
200	1.2D + 1.5LM-9 + Maintena...	Yes	Y		1	1.2	91	1.5	9	.104	42	.104												
201	1.2D + 1.5LM-9 + Maintena...	Yes	Y		1	1.2	91	1.5	10	.104	43	.104												
202	1.2D + 1.5LM-9 + Maintena...	Yes	Y		1	1.2	91	1.5	11	.104	44	.104												
203	1.2D + 1.5LM-9 + Maintena...	Yes	Y		1	1.2	91	1.5	12	.104	45	.104												
204	1.2D + 1.5LM-9 + Maintena...	Yes	Y		1	1.2	91	1.5	13	.104	46	.104												
205	1.2D + 1.5LM-9 + Maintena...	Yes	Y		1	1.2	91	1.5	14	.104	47	.104												
206	1.2D + 1.5LM-9 + Maintena...	Yes	Y		1	1.2	91	1.5	15	.104	48	.104												
207	1.2D + 1.5LM-9 + Maintena...	Yes	Y		1	1.2	91	1.5	16	.104	49	.104												
208	1.2D + 1.5LM-9 + Maintena...	Yes	Y		1	1.2	91	1.5	17	.104	50	.104												
209	1.2D + 1.5LM-10 + Mainten...	Yes	Y		1	1.2	92	1.5	2	.104	35	.104												
210	1.2D + 1.5LM-10 + Mainten...	Yes	Y		1	1.2	92	1.5	3	.104	36	.104												
211	1.2D + 1.5LM-10 + Mainten...	Yes	Y		1	1.2	92	1.5	4	.104	37	.104												
212	1.2D + 1.5LM-10 + Mainten...	Yes	Y		1	1.2	92	1.5	5	.104	38	.104												
213	1.2D + 1.5LM-10 + Mainten...	Yes	Y		1	1.2	92	1.5	6	.104	39	.104												
214	1.2D + 1.5LM-10 + Mainten...	Yes	Y		1	1.2	92	1.5	7	.104	40	.104												
215	1.2D + 1.5LM-10 + Mainten...	Yes	Y		1	1.2	92	1.5	8	.104	41	.104												
216	1.2D + 1.5LM-10 + Mainten...	Yes	Y		1	1.2	92	1.5	9	.104	42	.104												
217	1.2D + 1.5LM-10 + Mainten...	Yes	Y		1	1.2	92	1.5	10	.104	43	.104												
218	1.2D + 1.5LM-10 + Mainten...	Yes	Y		1	1.2	92	1.5	11	.104	44	.104												
219	1.2D + 1.5LM-10 + Mainten...	Yes	Y		1	1.2	92	1.5	12	.104	45	.104												
220	1.2D + 1.5LM-10 + Mainten...	Yes	Y		1	1.2	92	1.5	13	.104	46	.104												
221	1.2D + 1.5LM-10 + Mainten...	Yes	Y		1	1.2	92	1.5	14	.104	47	.104												
222	1.2D + 1.5LM-10 + Mainten...	Yes	Y		1	1.2	92	1.5	15	.104	48	.104												
223	1.2D + 1.5LM-10 + Mainten...	Yes	Y		1	1.2	92	1.5	16	.104	49	.104												
224	1.2D + 1.5LM-10 + Mainten...	Yes	Y		1	1.2	92	1.5	17	.104	50	.104												
225	1.2D + 1.5LM-11 + Mainten...	Yes	Y		1	1.2	93	1.5	2	.104	35	.104												
226	1.2D + 1.5LM-11 + Mainten...	Yes	Y		1	1.2	93	1.5	3	.104	36	.104												
227	1.2D + 1.5LM-11 + Mainten...	Yes	Y		1	1.2	93	1.5	4	.104	37	.104												

Load Combinations (Continued)

	Description	S...	P...	S...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
228	1.2D + 1.5LM-11 + Mainten...	Yes	Y		1	1.2	93	1.5	5	.104	38	.104												
229	1.2D + 1.5LM-11 + Mainten...	Yes	Y		1	1.2	93	1.5	6	.104	39	.104												
230	1.2D + 1.5LM-11 + Mainten...	Yes	Y		1	1.2	93	1.5	7	.104	40	.104												
231	1.2D + 1.5LM-11 + Mainten...	Yes	Y		1	1.2	93	1.5	8	.104	41	.104												
232	1.2D + 1.5LM-11 + Mainten...	Yes	Y		1	1.2	93	1.5	9	.104	42	.104												
233	1.2D + 1.5LM-11 + Mainten...	Yes	Y		1	1.2	93	1.5	10	.104	43	.104												
234	1.2D + 1.5LM-11 + Mainten...	Yes	Y		1	1.2	93	1.5	11	.104	44	.104												
235	1.2D + 1.5LM-11 + Mainten...	Yes	Y		1	1.2	93	1.5	12	.104	45	.104												
236	1.2D + 1.5LM-11 + Mainten...	Yes	Y		1	1.2	93	1.5	13	.104	46	.104												
237	1.2D + 1.5LM-11 + Mainten...	Yes	Y		1	1.2	93	1.5	14	.104	47	.104												
238	1.2D + 1.5LM-11 + Mainten...	Yes	Y		1	1.2	93	1.5	15	.104	48	.104												
239	1.2D + 1.5LM-11 + Mainten...	Yes	Y		1	1.2	93	1.5	16	.104	49	.104												
240	1.2D + 1.5LM-11 + Mainten...	Yes	Y		1	1.2	93	1.5	17	.104	50	.104												
241	1.2D + 1.5LM-12 + Mainten...	Yes	Y		1	1.2	94	1.5	2	.104	35	.104												
242	1.2D + 1.5LM-12 + Mainten...	Yes	Y		1	1.2	94	1.5	3	.104	36	.104												
243	1.2D + 1.5LM-12 + Mainten...	Yes	Y		1	1.2	94	1.5	4	.104	37	.104												
244	1.2D + 1.5LM-12 + Mainten...	Yes	Y		1	1.2	94	1.5	5	.104	38	.104												
245	1.2D + 1.5LM-12 + Mainten...	Yes	Y		1	1.2	94	1.5	6	.104	39	.104												
246	1.2D + 1.5LM-12 + Mainten...	Yes	Y		1	1.2	94	1.5	7	.104	40	.104												
247	1.2D + 1.5LM-12 + Mainten...	Yes	Y		1	1.2	94	1.5	8	.104	41	.104												
248	1.2D + 1.5LM-12 + Mainten...	Yes	Y		1	1.2	94	1.5	9	.104	42	.104												
249	1.2D + 1.5LM-12 + Mainten...	Yes	Y		1	1.2	94	1.5	10	.104	43	.104												
250	1.2D + 1.5LM-12 + Mainten...	Yes	Y		1	1.2	94	1.5	11	.104	44	.104												
251	1.2D + 1.5LM-12 + Mainten...	Yes	Y		1	1.2	94	1.5	12	.104	45	.104												
252	1.2D + 1.5LM-12 + Mainten...	Yes	Y		1	1.2	94	1.5	13	.104	46	.104												
253	1.2D + 1.5LM-12 + Mainten...	Yes	Y		1	1.2	94	1.5	14	.104	47	.104												
254	1.2D + 1.5LM-12 + Mainten...	Yes	Y		1	1.2	94	1.5	15	.104	48	.104												
255	1.2D + 1.5LM-12 + Mainten...	Yes	Y		1	1.2	94	1.5	16	.104	49	.104												
256	1.2D + 1.5LM-12 + Mainten...	Yes	Y		1	1.2	94	1.5	17	.104	50	.104												
257	1.2D + 1.5LM-13 + Mainten...	Yes	Y		1	1.2	95	1.5	2	.104	35	.104												
258	1.2D + 1.5LM-13 + Mainten...	Yes	Y		1	1.2	95	1.5	3	.104	36	.104												
259	1.2D + 1.5LM-13 + Mainten...	Yes	Y		1	1.2	95	1.5	4	.104	37	.104												
260	1.2D + 1.5LM-13 + Mainten...	Yes	Y		1	1.2	95	1.5	5	.104	38	.104												
261	1.2D + 1.5LM-13 + Mainten...	Yes	Y		1	1.2	95	1.5	6	.104	39	.104												
262	1.2D + 1.5LM-13 + Mainten...	Yes	Y		1	1.2	95	1.5	7	.104	40	.104												
263	1.2D + 1.5LM-13 + Mainten...	Yes	Y		1	1.2	95	1.5	8	.104	41	.104												
264	1.2D + 1.5LM-13 + Mainten...	Yes	Y		1	1.2	95	1.5	9	.104	42	.104												
265	1.2D + 1.5LM-13 + Mainten...	Yes	Y		1	1.2	95	1.5	10	.104	43	.104												
266	1.2D + 1.5LM-13 + Mainten...	Yes	Y		1	1.2	95	1.5	11	.104	44	.104												
267	1.2D + 1.5LM-13 + Mainten...	Yes	Y		1	1.2	95	1.5	12	.104	45	.104												
268	1.2D + 1.5LM-13 + Mainten...	Yes	Y		1	1.2	95	1.5	13	.104	46	.104												
269	1.2D + 1.5LM-13 + Mainten...	Yes	Y		1	1.2	95	1.5	14	.104	47	.104												
270	1.2D + 1.5LM-13 + Mainten...	Yes	Y		1	1.2	95	1.5	15	.104	48	.104												
271	1.2D + 1.5LM-13 + Mainten...	Yes	Y		1	1.2	95	1.5	16	.104	49	.104												
272	1.2D + 1.5LM-13 + Mainten...	Yes	Y		1	1.2	95	1.5	17	.104	50	.104												
273	1.2D + 1.5LM-14 + Mainten...	Yes	Y		1	1.2	96	1.5	2	.104	35	.104												
274	1.2D + 1.5LM-14 + Mainten...	Yes	Y		1	1.2	96	1.5	3	.104	36	.104												
275	1.2D + 1.5LM-14 + Mainten...	Yes	Y		1	1.2	96	1.5	4	.104	37	.104												
276	1.2D + 1.5LM-14 + Mainten...	Yes	Y		1	1.2	96	1.5	5	.104	38	.104												
277	1.2D + 1.5LM-14 + Mainten...	Yes	Y		1	1.2	96	1.5	6	.104	39	.104												
278	1.2D + 1.5LM-14 + Mainten...	Yes	Y		1	1.2	96	1.5	7	.104	40	.104												
279	1.2D + 1.5LM-14 + Mainten...	Yes	Y		1	1.2	96	1.5	8	.104	41	.104												
280	1.2D + 1.5LM-14 + Mainten...	Yes	Y		1	1.2	96	1.5	9	.104	42	.104												
281	1.2D + 1.5LM-14 + Mainten...	Yes	Y		1	1.2	96	1.5	10	.104	43	.104												
282	1.2D + 1.5LM-14 + Mainten...	Yes	Y		1	1.2	96	1.5	11	.104	44	.104												
283	1.2D + 1.5LM-14 + Mainten...	Yes	Y		1	1.2	96	1.5	12	.104	45	.104												
284	1.2D + 1.5LM-14 + Mainten...	Yes	Y		1	1.2	96	1.5	13	.104	46	.104												

Load Combinations (Continued)

	Description	S...	P...	S...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
285	1.2D + 1.5LM-14 + Mainten...	Yes	Y		1	1.2	96	1.5	14	.104	47	.104												
286	1.2D + 1.5LM-14 + Mainten...	Yes	Y		1	1.2	96	1.5	15	.104	48	.104												
287	1.2D + 1.5LM-14 + Mainten...	Yes	Y		1	1.2	96	1.5	16	.104	49	.104												
288	1.2D + 1.5LM-14 + Mainten...	Yes	Y		1	1.2	96	1.5	17	.104	50	.104												
289	1.2D + 1.5LM-15 + Mainten...	Yes	Y		1	1.2	97	1.5	2	.104	35	.104												
290	1.2D + 1.5LM-15 + Mainten...	Yes	Y		1	1.2	97	1.5	3	.104	36	.104												
291	1.2D + 1.5LM-15 + Mainten...	Yes	Y		1	1.2	97	1.5	4	.104	37	.104												
292	1.2D + 1.5LM-15 + Mainten...	Yes	Y		1	1.2	97	1.5	5	.104	38	.104												
293	1.2D + 1.5LM-15 + Mainten...	Yes	Y		1	1.2	97	1.5	6	.104	39	.104												
294	1.2D + 1.5LM-15 + Mainten...	Yes	Y		1	1.2	97	1.5	7	.104	40	.104												
295	1.2D + 1.5LM-15 + Mainten...	Yes	Y		1	1.2	97	1.5	8	.104	41	.104												
296	1.2D + 1.5LM-15 + Mainten...	Yes	Y		1	1.2	97	1.5	9	.104	42	.104												
297	1.2D + 1.5LM-15 + Mainten...	Yes	Y		1	1.2	97	1.5	10	.104	43	.104												
298	1.2D + 1.5LM-15 + Mainten...	Yes	Y		1	1.2	97	1.5	11	.104	44	.104												
299	1.2D + 1.5LM-15 + Mainten...	Yes	Y		1	1.2	97	1.5	12	.104	45	.104												
300	1.2D + 1.5LM-15 + Mainten...	Yes	Y		1	1.2	97	1.5	13	.104	46	.104												
301	1.2D + 1.5LM-15 + Mainten...	Yes	Y		1	1.2	97	1.5	14	.104	47	.104												
302	1.2D + 1.5LM-15 + Mainten...	Yes	Y		1	1.2	97	1.5	15	.104	48	.104												
303	1.2D + 1.5LM-15 + Mainten...	Yes	Y		1	1.2	97	1.5	16	.104	49	.104												
304	1.2D + 1.5LM-15 + Mainten...	Yes	Y		1	1.2	97	1.5	17	.104	50	.104												

Envelope Joint Reactions

	Joint		X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [lb-ft]	LC	MY [lb-ft]	LC	MZ [lb-ft]	LC
1	N2	max	479.898	7	1324.192	42	2913.646	2	9.195	10	17.201	13	1.522	117
2		min	-481.711	31	-337.295	2	-5362.487	42	-19.128	34	-17.252	21	-1.627	77
3	N3	max	2272.871	29	13.354	5	6587.887	5	3.131	16	0	1	1.272	35
4		min	-1894.941	5	-23.594	45	-7610.623	29	-5.433	40	0	1	-.766	11
5	N4	max	1825.721	16	15.427	15	6291.664	16	2.886	4	0	1	.718	10
6		min	-2194.976	24	-19.999	23	-7283.113	24	-6.529	44	0	1	-1.372	34
7	N8	max	11.996	6	2791.792	42	11385.928	42	0	1	4.281	12	1.462	5
8		min	-12.557	30	-1102.172	2	-4942.44	2	0	1	-4.427	20	-1.465	29
9	N44A	max	2462.672	13	1278.291	37	2599.824	38	9.415	45	17.171	24	15.651	45
10		min	-4469.313	37	-349.598	13	-1522.598	14	-3.726	5	-17.148	16	-6.413	5
11	N45A	max	6681.587	15	15.042	16	1850.307	23	3.826	34	0	1	4.847	35
12		min	-7749.466	23	-19.75	24	-1670.898	15	-1.144	10	0	1	-2.732	11
13	N46A	max	4427.298	10	13.651	10	5456.061	18	2.609	22	0	1	5.14	39
14		min	-5145.152	18	-21.578	34	-4593.686	10	-1.968	14	0	1	-2.445	15
15	N50A	max	9482.842	37	2686.208	37	2420.806	13	1.286	31	4.443	23	.739	8
16		min	-4194.094	13	-1085.659	13	-5476.842	37	-1.28	8	-4.317	15	-.742	31
17	N86	max	5332.714	47	1539.161	47	3114.534	46	8.329	39	19.157	2	.793	15
18		min	-2603.016	8	-417.056	7	-1615.703	6	-.407	15	-19.207	26	-14.702	39
19	N87	max	6116.331	18	15.636	10	6445.127	18	2.563	46	0	1	2.751	5
20		min	-5333.893	10	-22.486	34	-5501.121	10	-1.696	6	0	1	-6.646	45
21	N88	max	8265.883	29	16.751	4	1980.252	29	4.293	34	0	1	2.657	9
22		min	-7058.678	5	-24.757	44	-1774.359	5	-1.533	10	0	1	-5.197	49
23	N92	max	3888.745	7	3159.081	47	2244.985	7	1.452	19	4.909	2	.838	19
24		min	-11133.216	47	-1013.787	7	-6426.599	47	-1.451	27	-5.002	26	-.838	27
25	Totals:	max	6922.138	14	10552.684	49	6922.188	2						
26		min	-6922.141	22	1957.429	9	-6922.188	10						

Envelope AISC 14th(360-10): LRFD Steel Code Checks

	Member	Shape	Code C...	Loc[ft]	LC	Shear ...	Loc[ft]	Dir	LC	phi*Pnc [lb]	phi*Pnt [lb]	phi*Mn y-...	phi*Mn z-...	Cb	Eqn
1	BHC	L4x4x6	.214	3.32	28	.247	0	z	18	53414.875	92664	4398.479	9676.014	1....	H2-1
2	THC	L2x2x3	.348	.138	13	.096	6.641	y	26	3886.765	23392.8	557.717	982.217	1....	H2-1
3	D12	PIPE_1.5	.112	0	26	.016	3.672		16	18299.835	23593.5	1105.125	1105.125	2....	H1-1b
4	D11	PIPE_1.5	.105	3.708	38	.033	3.708		18	18209.893	23593.5	1105.125	1105.125	1....	H1-1b
5	D10	PIPE_1.5	.130	3.708	18	.032	3.708		18	18209.893	23593.5	1105.125	1105.125	2....	H1-1b
6	D9	PIPE_1.5	.103	1.377	26	.020	3.672		20	18299.835	23593.5	1105.125	1105.125	2....	H1-1b
7	VPC5	PIPE_1.5	.187	0	17	.181	0		20	18209.199	23593.5	1105.125	1105.125	2....	H1-1b
8	VPC4	PIPE_1.5	.175	.464	33	.105	0		28	18209.199	23593.5	1105.125	1105.125	2....	H1-1b
9	VPC3	PIPE_1.5	.204	0	18	.047	0		33	18209.199	23593.5	1105.125	1105.125	1....	H1-1b
10	VPC2	PIPE_1.5	.092	3.322	2	.049	3.322		26	18209.199	23593.5	1105.125	1105.125	2....	H1-1b
11	VPC1	PIPE_1.5	.128	0	4	.124	0		33	18209.199	23593.5	1105.125	1105.125	2....	H1-1b
12	BHB	L4x4x6	.204	3.32	19	.261	0	z	29	53414.875	92664	4398.479	9668.654	1....	H2-1
13	THB	L2x2x3	.356	6.502	2	.101	6.641	y	21	3886.765	23392.8	557.717	1040.325	1....	H2-1
14	D8	PIPE_1.5	.127	.115	20	.015	3.672		26	18299.835	23593.5	1105.125	1105.125	2....	H1-1b
15	D7	PIPE_1.5	.133	3.708	29	.031	3.708		28	18209.893	23593.5	1105.125	1105.125	2....	H1-1b
16	D6	PIPE_1.5	.099	3.708	43	.033	3.708		29	18209.893	23593.5	1105.125	1105.125	2....	H1-1b
17	D5	PIPE_1.5	.085	.842	21	.013	3.672		27	18299.835	23593.5	1105.125	1105.125	1....	H1-1b
18	VPB5	PIPE_1.5	.190	0	27	.186	0		30	18209.199	23593.5	1105.125	1105.125	1....	H1-1b
19	VPB4	PIPE_1.5	.121	0	18	.051	0		21	18209.199	23593.5	1105.125	1105.125	1....	H1-1b
20	VPB3	PIPE_1.5	.147	0	29	.032	0		30	18209.199	23593.5	1105.125	1105.125	3....	H1-1b
21	VPB2	PIPE_1.5	.175	.464	32	.106	0		19	18209.199	23593.5	1105.125	1105.125	2....	H1-1b
22	VPB1	PIPE_1.5	.125	0	15	.116	0		27	18209.199	23593.5	1105.125	1105.125	1....	H1-1b
23	BHA	L4x4x6	.195	3.32	18	.257	0	z	23	53414.875	92664	4398.479	9482.076	1....	H2-1
24	THA	L2x2x3	.591	3.32	8	.100	6.641	z	23	3886.765	23392.8	557.717	1087.045	1....	H2-1
25	D4	PIPE_1.5	.105	0	31	.027	3.672		23	18299.835	23593.5	1105.125	1105.125	2....	H1-1b
26	D3	PIPE_1.5	.106	3.708	46	.051	0		24	18209.893	23593.5	1105.125	1105.125	3....	H1-1b
27	D2	PIPE_1.5	.108	3.708	49	.050	0		22	18209.893	23593.5	1105.125	1105.125	3....	H1-1b
28	D1	PIPE_1.5	.084	0	33	.022	3.672		23	18299.835	23593.5	1105.125	1105.125	2....	H1-1b
29	VPA5	PIPE_1.5	.197	0	22	.160	0		22	18209.199	23593.5	1105.125	1105.125	1....	H1-1b
30	VPA4	PIPE_1.5	.136	2.009	31	.056	0		23	18209.199	23593.5	1105.125	1105.125	1....	H1-1b
31	VPA3	PIPE_1.5	.613	.966	15	.244	0		11	18209.199	23593.5	1105.125	1105.125	2....	H1-1b
32	VPA2	PIPE_1.5	.102	2.549	32	.052	0		23	18209.199	23593.5	1105.125	1105.125	1....	H1-1b
33	VPA1	PIPE_1.5	.133	0	9	.106	0		25	18209.199	23593.5	1105.125	1105.125	1....	H1-1b
34	M42	SR 1/2"	.709	.333	154	.081	.333		156	6027.745	6361.74	53.015	53.015	2....	H1-1b
35	M43	SR 1/2"	.706	.333	152	.083	.333		39	6027.745	6361.74	53.015	53.015	2....	H1-1b
36	M44	SR 1/2"	.707	.333	160	.135	.333		31	6027.745	6361.74	53.015	53.015	2....	H1-1b
37	M45	SR 1/2"	.701	.333	146	.131	.333		21	6027.745	6361.74	53.015	53.015	2....	H1-1b
38	M46	SR 1/2"	.672	.333	144	.085	.333		30	6027.745	6361.74	53.015	53.015	2....	H1-1b
39	M47	SR 1/2"	.679	.333	130	.088	.333		21	6027.745	6361.74	53.015	53.015	2....	H1-1b
40	M48	SR 1/2"	.689	.333	136	.078	.333		134	6027.745	6361.74	53.015	53.015	2....	H1-1b
41	M49	SR 1/2"	.682	.333	138	.077	.333		134	6027.745	6361.74	53.015	53.015	2....	H1-1b
42	MPC5	PIPE_2.5	.205	3.073	18	.026	3.125		10	41331.898	50715	3596.25	3596.25	2....	H1-1b
43	MPC1	PIPE_2.5	.099	3.073	18	.023	3.073		19	41331.898	50715	3596.25	3596.25	2....	H1-1b
44	MPA3	PIPE_2.5	.563	2.75	23	.085	2.635		3	18800.092	50715	3596.25	3596.25	1....	H1-1b
45	M88	SR 1/2"	.714	.333	117	.083	.333		39	6027.745	6361.74	53.015	53.015	2....	H1-1b
46	M89	SR 1/2"	.707	.333	114	.080	.333		118	6027.745	6361.74	53.015	53.015	2....	H1-1b
47	M90	SR 1/2"	.706	.333	122	.138	.333		26	6027.745	6361.74	53.015	53.015	2....	H1-1b
48	M91	SR 1/2"	.699	.333	125	.135	.333		18	6027.745	6361.74	53.015	53.015	2....	H1-1b
49	M92	SR 1/2"	.672	.333	106	.082	.333		25	6027.745	6361.74	53.015	53.015	2....	H1-1b
50	M93	SR 1/2"	.679	.333	109	.085	.333		32	6027.745	6361.74	53.015	53.015	2....	H1-1b
51	M94	SR 1/2"	.689	.333	99	.079	.333		97	6027.745	6361.74	53.015	53.015	2....	H1-1b
52	M95A	SR 1/2"	.683	.333	101	.077	.333		97	6027.745	6361.74	53.015	53.015	2....	H1-1b
53	MPB5	PIPE_2.5	.205	3.073	29	.029	3.073		27	41331.898	50715	3596.25	3596.25	1....	H1-1b
54	MPB1	PIPE_2.5	.099	3.073	29	.015	3.125		5	41331.898	50715	3596.25	3596.25	1....	H1-1b
55	M106	SR 1/2"	.713	.333	95	.084	.333		37	6027.745	6361.74	53.015	53.015	2....	H1-1b
56	M107A	SR 1/2"	.708	.333	93	.081	.333		29	6027.745	6361.74	53.015	53.015	2....	H1-1b
57	M108A	SR 1/2"	.705	.333	85	.137	.333		21	6027.745	6361.74	53.015	53.015	2....	H1-1b

Envelope AISC 14th(360-10): LRFD Steel Code Checks (Continued)

	Member	Shape	Code C...	Loc[ft]	LC	Shear ...	Loc[ft]	Dir	LC	phi*Pnc [lb]	phi*Pnt [lb]	phi*Mn y-...	phi*Mn z-...	Cb	Eqn
58	M109A	SR 1/2"	.702	.333	88	.135	.333		26	6027.745	6361.74	53.015	53.015	2....	H1-1b
59	M110A	SR 1/2"	.675	.333	69	.085	.333		20	6027.745	6361.74	53.015	53.015	2....	H1-1b
60	M111A	SR 1/2"	.678	.333	72	.086	.333		26	6027.745	6361.74	53.015	53.015	2....	H1-1b
61	M112A	SR 1/2"	.688	.333	77	.079	.333		73	6027.745	6361.74	53.015	53.015	2....	H1-1b
62	M113A	SR 1/2"	.685	.333	79	.077	.333		73	6027.745	6361.74	53.015	53.015	2....	H1-1b
63	MPA5	PIPE_2.5	.206	3.073	23	.026	3.125		15	41331.898	50715	3596.25	3596.25	1....	H1-1b
64	MPA1	PIPE_2.5	.099	3.073	23	.016	3.073		21	41331.898	50715	3596.25	3596.25	1....	H1-1b

Envelope Plate/Shell Principal Stresses

	Plate		Surf...	Sigma1 [ksi]	LC	Sigma2 [ksi]	LC	Tau Max [ksi]	LC	Angle [rad]	LC	Von Mises [ksi]	LC
1	P1	max	T	6.522	24	.663	25	2.956	24	2.166	3	6.24	24
2		min		-.496	17	-4.996	16	.03	82	-.78	98	.053	82
3		max	B	5.474	24	.62	24	2.427	24	2.194	82	5.191	24
4		min		-.459	16	-4.55	16	.041	98	-.024	81	.083	106
5	P2	max	T	4.67	25	.165	34	2.548	24	2.34	100	4.892	25
6		min		.045	82	-3.365	17	.043	83	-.779	84	.076	83
7		max	B	3.372	24	-.007	10	1.811	24	2.315	83	3.504	24
8		min		-.122	18	-2.792	16	.01	90	-.673	82	.038	90
9	P3	max	T	3.551	26	.548	43	1.64	25	2.309	87	3.346	26
10		min		-.291	2	-2.777	2	.028	89	-.753	102	.075	89
11		max	B	1.077	25	-.009	90	.93	24	2.352	20	1.615	24
12		min		-.071	18	-1.098	21	0	81	-.773	4	.019	81
13	P4	max	T	.142	31	-.006	106	.168	49	2.251	3	.293	49
14		min		-.038	23	-.228	38	.005	104	-.779	19	.009	104
15		max	B	.13	13	.026	17	.083	20	2.308	169	.155	21
16		min		-.034	25	-.148	21	0	49	-.775	121	.002	49
17	P5	max	T	6.669	28	.663	27	3.018	28	2.275	104	6.377	28
18		min		-.498	3	-5.127	4	.021	88	-.71	24	.037	88
19		max	B	5.6	28	.61	28	2.495	28	1.902	37	5.322	28
20		min		-.442	4	-4.653	4	.044	104	-.549	25	.081	88
21	P6	max	T	4.652	28	.141	35	2.602	28	2.283	33	4.952	28
22		min		.042	81	-3.359	4	.035	88	-.75	94	.074	88
23		max	B	3.468	28	.005	10	1.846	28	2.31	96	3.585	28
24		min		-.127	18	-2.883	4	.01	104	-.67	111	.039	104
25	P7	max	T	1.001	28	-.014	89	.958	29	2.345	15	1.66	29
26		min		-.065	18	-1.036	30	.007	97	-.783	17	.019	97
27		max	B	3.341	26	.533	41	1.641	27	2.329	92	3.303	27
28		min		-.284	2	-2.559	2	.02	88	-.766	108	.052	88
29	P8	max	T	.117	7	.029	4	.076	32	2.35	115	.144	32
30		min		-.035	28	-.137	31	0	36	-.758	73	.001	36
31		max	B	.157	21	-.006	105	.173	38	2.164	33	.302	38
32		min		-.031	29	-.221	34	.004	92	-.446	93	.007	92
33	P9	max	T	2.083	17	.195	17	2.275	41	2.212	5	4.669	41
34		min		-.253	25	-4.779	41	.003	93	-.536	101	.012	93
35		max	B	2.068	3	.204	3	2.273	43	2.037	85	4.646	43
36		min		-.257	27	-4.74	43	.007	101	-.588	93	.017	101
37	P10	max	T	2.284	2	.012	93	2.772	42	2.342	101	5.313	42
38		min		.019	92	-5.046	42	.013	93	-.747	85	.033	93
39		max	B	2.222	2	.006	100	2.817	42	2.342	93	5.396	42
40		min		.024	102	-5.12	42	.018	101	-.756	109	.038	101
41	P11	max	T	2.799	2	.004	93	2.985	42	2.344	108	5.598	42
42		min		.034	92	-5.131	42	.038	93	-.762	92	.072	92
43		max	B	2.758	2	-.006	101	3.046	42	2.345	108	5.718	42
44		min		.042	103	-5.25	42	.046	101	-.735	87	.09	101
45	P12	max	T	2.624	2	-.012	91	2.081	26	2.345	22	3.849	26

Envelope Plate/Shell Principal Stresses (Continued)

	Plate		Surf...	Sigma1 [ksi]	LC	Sigma2 [ksi]	LC	Tau Max [ksi]	LC	Angle [rad]	LC	Von Mises [ksi]	LC
46		min		-.022	34	-3.432	26	.004	107	-.643	89	.012	107
47		max	B	2.624	2	-.012	107	2.08	26	1.57	91	3.849	26
48		min		-.033	34	-3.433	26	.007	91	-.77	106	.015	107
49	P13	max	T	6.247	19	.646	19	2.801	19	2.191	77	5.951	19
50		min		-.476	11	-4.655	11	.025	69	-.042	76	.045	69
51		max	B	5.29	18	.581	18	2.355	18	2.003	157	5.025	18
52		min		-.406	10	-4.317	10	.039	149	-.009	156	.074	69
53	P14	max	T	4.551	19	.146	44	2.485	19	2.24	78	4.775	19
54		min		.041	76	-3.192	11	.042	69	-.727	30	.08	157
55		max	B	3.241	19	-.025	5	1.714	19	2.349	157	3.339	19
56		min		-.106	29	-2.635	11	.004	149	-.189	156	.032	149
57	P15	max	T	3.35	20	.516	38	1.593	19	2.325	16	3.219	20
58		min		-.274	13	-2.511	12	.022	69	-.785	145	.061	69
59		max	B	1.007	8	-.014	149	.897	18	2.342	30	1.554	18
60		min		-.033	29	-1.04	32	.007	156	-.776	14	.018	156
61	P16	max	T	.154	24	-.008	148	.165	40	2.265	20	.288	40
62		min		-.034	18	-.212	46	.005	66	-.443	79	.01	66
63		max	B	.125	7	.024	11	.074	31	2.356	84	.146	31
64		min		-.031	19	-.144	31	.002	149	-.784	122	.004	149
65	P17	max	T	6.403	23	.66	22	2.937	23	2.205	66	6.156	23
66		min		-.49	14	-4.851	15	.032	74	-.552	18	.055	74
67		max	B	5.603	23	.621	23	2.491	23	2.034	67	5.319	23
68		min		-.454	15	-4.661	15	.008	67	-.603	19	.016	67
69	P18	max	T	4.683	22	.154	45	2.543	22	2.238	27	4.898	22
70		min		.044	156	-3.35	14	.045	73	-.73	153	.081	74
71		max	B	3.35	22	-.019	4	1.784	23	2.277	154	3.461	22
72		min		-.107	29	-2.761	14	.012	66	-.689	11	.037	146
73	P19	max	T	1.09	22	.064	4	.98	23	2.342	26	1.697	23
74		min		-.085	29	-1.042	25	.004	76	-.784	10	.019	76
75		max	B	3.393	21	.525	35	1.618	22	2.251	9	3.256	22
76		min		-.288	13	-2.602	13	.027	68	-.785	150	.072	146
77	P20	max	T	.121	15	.025	14	.073	26	2.332	93	.141	26
78		min		-.032	22	-.142	23	.001	46	-.772	132	.002	46
79		max	B	.151	31	-.007	158	.16	46	2.269	27	.28	46
80		min		-.04	23	-.218	40	.007	153	-.637	12	.013	153
81	P21	max	T	2.103	12	.193	11	2.202	36	2.3	72	4.501	36
82		min		-.248	19	-4.593	36	.005	15	-.775	158	.016	158
83		max	B	2.059	14	.193	14	2.187	38	2.326	160	4.485	38
84		min		-.253	22	-4.587	38	.005	73	-.628	73	.009	73
85	P22	max	T	2.245	12	.007	153	2.714	36	2.258	159	5.196	36
86		min		.025	151	-4.929	36	.018	152	-.733	80	.034	152
87		max	B	2.205	13	.011	79	2.674	37	2.228	160	5.124	37
88		min		.019	80	-4.864	37	.005	80	-.72	152	.017	80
89	P23	max	T	2.654	13	-.006	153	2.915	37	2.349	70	5.468	37
90		min		.045	150	-5.016	37	.041	152	-.784	65	.076	152
91		max	B	2.693	13	.002	79	2.88	37	2.35	150	5.401	37
92		min		.034	32	-4.95	37	.03	32	-.77	70	.053	32
93	P24	max	T	2.461	13	-.019	145	1.994	21	1.463	32	3.692	21
94		min		-.035	45	-3.299	21	.013	149	-.75	66	.03	149
95		max	B	2.469	13	-.021	65	1.995	21	2.327	9	3.695	21
96		min		-.028	45	-3.303	21	.013	149	-.756	25	.027	69
97	P25	max	T	6.809	29	.664	30	3.131	29	2.11	135	6.553	29
98		min		-.468	6	-5.068	5	.027	119	-.515	24	.05	119
99		max	B	6.004	29	.686	29	2.659	29	2.284	8	5.692	29
100		min		-.499	5	-4.94	5	.026	134	-.096	118	.049	128
101	P26	max	T	5.195	46	.103	38	2.676	30	2.356	25	5.22	46
102		min		.036	134	-3.491	6	.022	119	-.721	9	.041	119

Envelope Plate/Shell Principal Stresses (Continued)

	Plate		Surf...	Sigma1 [ksi]	LC	Sigma2 [ksi]	LC	Tau Max [ksi]	LC	Angle [rad]	LC	Von Mises [ksi]	LC
103		max	B	3.507	30	-.034	143	1.906	29	2.198	120	3.664	30
104		min		-.037	23	-2.827	6	.02	144	-.73	135	.038	144
105	P27	max	T	3.264	46	.618	49	1.613	30	2.318	123	3.232	30
106		min		-.288	7	-2.304	6	.041	144	-.779	138	.098	129
107		max	B	1.25	30	.044	16	1.023	29	2.339	10	1.773	29
108		min		-.072	23	-1.188	26	.004	134	-.724	25	.023	134
109	P28	max	T	.174	18	-.012	116	.193	34	2.137	30	.337	34
110		min		-.041	28	-.255	44	.009	137	-.771	8	.017	137
111		max	B	.138	3	.009	2	.074	28	2.354	86	.153	28
112		min		-.024	42	-.159	27	.002	132	-.785	159	.003	132
113	P29	max	T	7.056	18	.663	33	3.246	18	2.152	14	6.792	18
114		min		-.47	9	-5.317	10	.027	134	-.697	140	.064	134
115		max	B	6.252	18	.703	18	2.774	18	1.907	42	5.932	18
116		min		-.513	10	-5.187	10	.02	118	-.754	125	.038	118
117	P30	max	T	5.199	49	.115	40	2.71	18	2.3	6	5.218	49
118		min		.036	118	-3.483	9	.042	133	-.776	22	.085	133
119		max	B	3.608	18	-.036	126	1.987	18	1.934	134	3.804	18
120		min		-.041	23	-2.936	10	.017	141	-.607	133	.037	141
121	P31	max	T	1.215	33	-.014	141	1.079	18	2.343	5	1.869	18
122		min		-.076	23	-1.119	20	.005	118	-.738	22	.025	118
123		max	B	3.248	48	.616	46	1.638	18	2.295	4	3.215	33
124		min		-.287	7	-2.283	8	.036	125	-.784	114	.086	124
125	P32	max	T	.142	10	.009	13	.077	18	2.351	39	.158	18
126		min		-.024	37	-.162	18	.002	121	-.777	167	.003	121
127		max	B	.171	27	-.012	137	.194	44	2.236	16	.338	44
128		min		-.041	18	-.255	34	.009	116	-.725	32	.017	116
129	P33	max	T	1.913	6	.163	6	2.579	46	2.023	134	5.272	46
130		min		-.23	30	-5.379	46	.003	118	-.78	135	.009	118
131		max	B	1.937	8	.168	9	2.588	48	2.054	118	5.294	48
132		min		-.235	49	-5.404	48	.006	134	-.709	121	.013	134
133	P34	max	T	1.946	7	.008	117	3.163	46	2.294	120	6.046	47
134		min		.022	116	-5.722	47	.019	116	-.761	132	.034	116
135		max	B	2.016	8	.002	136	3.164	48	2.271	117	6.05	48
136		min		.026	137	-5.725	48	.024	136	-.781	121	.044	137
137	P35	max	T	2.251	7	-.003	118	3.39	47	2.355	138	6.345	47
138		min		.03	20	-5.793	47	.036	116	-.772	130	.066	116
139		max	B	2.239	7	-.006	134	3.367	47	2.351	114	6.298	47
140		min		.05	138	-5.745	47	.041	137	-.781	122	.073	137
141	P36	max	T	1.812	7	-.017	113	1.804	47	2.074	140	3.407	47
142		min		-.017	129	-3.164	47	.003	113	-.757	11	.015	113
143		max	B	1.812	7	-.017	140	1.803	47	2.113	113	3.403	47
144		min		-.018	124	-3.154	47	.002	140	-.75	3	.015	140

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PROJECT INFORMATION:

TOWER INFORMATION

LAT: 41.96009444°

LONG: -72.73953056°

SITE TYPE: 83' MONOPOLE

COUNTY: HARTFORD

LANDLORD

STATE OF CONNECTICUT
2800 BERLIN TURNPIKE
NEWINGTON, CT 06131

APPLICANT

SPRINT
1 INTERNATIONAL BLVD., SUITE 800
MAHWAH, NJ 07495
CONTACT: TBD
PHONE: TBD
EMAIL: TBD

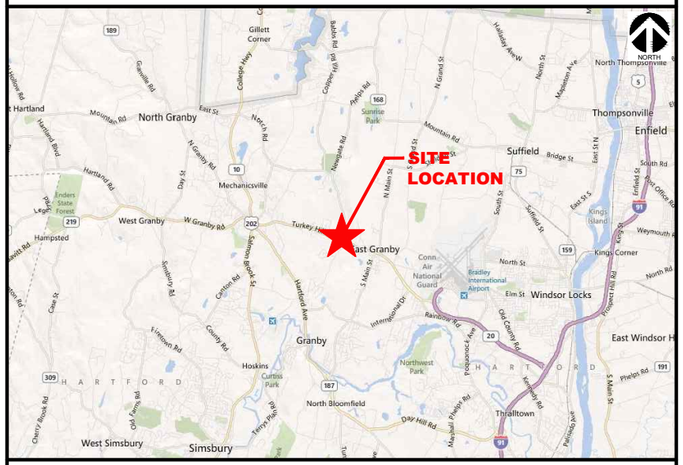
A&E FIRM

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

SCOPE OF WORK:

- REPLACE (6) EXISTING ANTENNAS WITH (3) NEW 2500 PANEL ANTENNAS AND (3) NEW 800/1900 PANEL ANTENNAS ON EXISTING MOUNTS
- REPLACE EXISTING COAX WITH (4) HYBRIFLEX CABLES
- ADD (3) NEW 2500 RRHS
- ADD (6) NEW 800 RRHS
- RELOCATE (3) EXISTING 1900 RRHS FROM GROUND TO TOWER

VICINITY MAP:



AERIAL MAP:

SHEET INDEX:

SHEET #	SHEET DESCRIPTION	REVISION
T-1	COVER SHEET & SITE PLAN	B
A-1	PROPOSED ANTENNA LAYOUT & EQUIPMENT LAYOUT	B
A-2	TOWER ELEVATION	B
A-3	ANTENNA SPECIFICATIONS	B
A-4	REMOTE RADIO HEAD SPECIFICATIONS	B
A-5	ANTENNA SCHEDULE & DETAILS	B
A-6	FIBER PLUMBING DIAGRAM	B
A-7	CABLE COLOR CODING	B
E-1	DC POWER & FIBER DISTRIBUTION DETAIL	B

CODE COMPLIANCE:

ALL WORK SHALL BE PERFORMED AND MATERIALS INSTALLED IN ACCORDANCE WITH THE CURRENT EDITIONS OF 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.

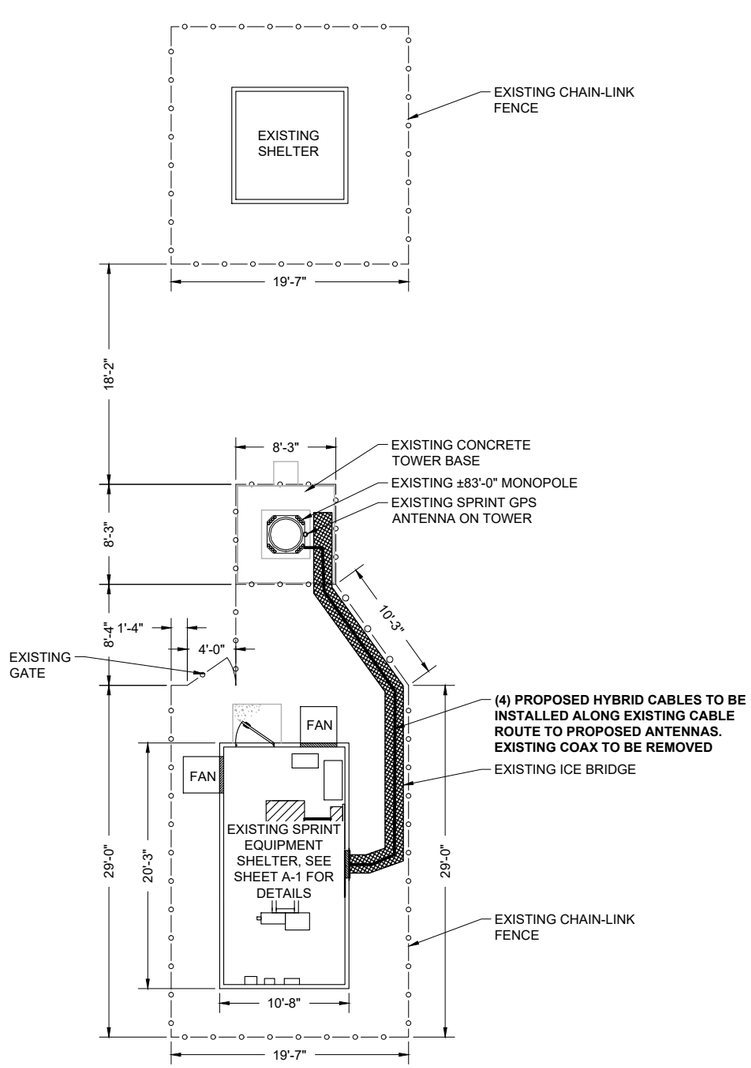
1. INTERNATIONAL BUILDING CODE
2. ANSI/TIA-222 STRUCTURAL STANDARD FOR ANTENNA STRUCTURES
3. NFPA 780 - LIGHTNING PROTECTION CODE
4. NATIONAL ELECTRIC CODE

811 Know what's below. Call before you dig. www.call811.com

DO MACRO UPGRADE

SITE CASCADE:

CT03XC072



OVERALL SITE PLAN (1)
SCALE: 1" = 12.5'

Sprint
1 INTERNATIONAL BLVD, SUITE 800
MAHWAH, NJ 07495

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Woodcliff Lake, NJ • Bayamon, PR

Charles Cherundolo Consulting, Inc.
1280 RT. 46 WEST
PARSIPPANY, NJ 07054
Phone: 973-794-3633 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: James R Skowronski Date: 6/28/2018

MARK	DATE	DESCRIPTION
B	06/28/18	FINAL CDs ISSUED
A	06/11/18	REVISED RF CONFIGURATION

ISSUE PHASE: FINAL
DATE ISSUED: 10/10/2017

PROJECT TITLE:
CT03XC072

PROJECT INFORMATION:
116 NEWGATE ROAD
EAST GRANBY, CT 06026
HARTFORD COUNTY

SHEET TITLE:
COVER SHEET & SITE PLAN

0 6.25' 12.5' 25'
11" x 17" - 1" = 12.5'
22" x 34" - 1" = 6.25'

PROJECT NUMBER: 22968
SHEET NUMBER: T-1

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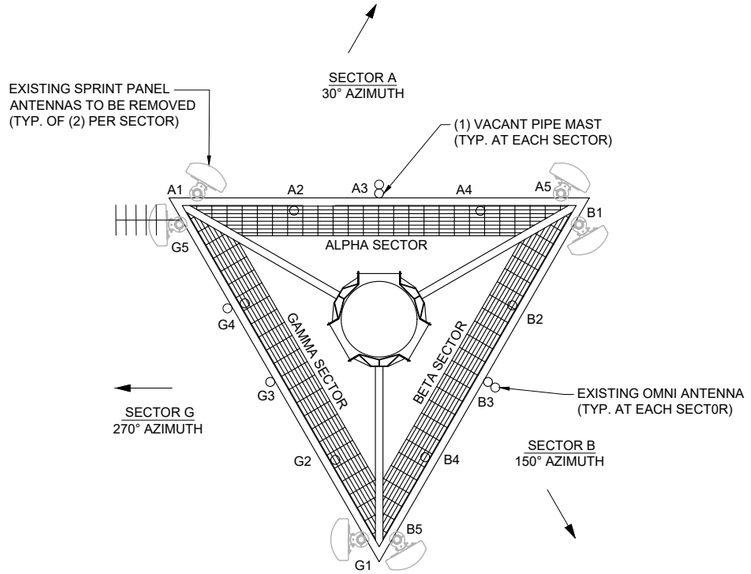
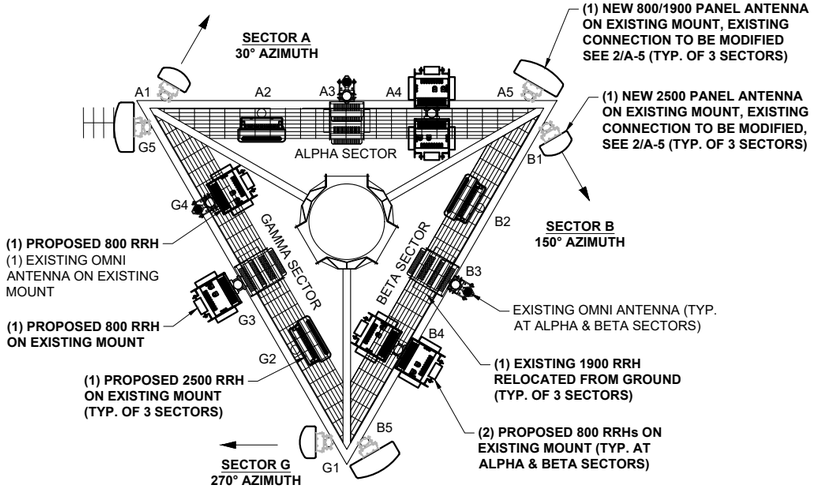


EXISTING ANTENNA PLAN

SCALE: NTS

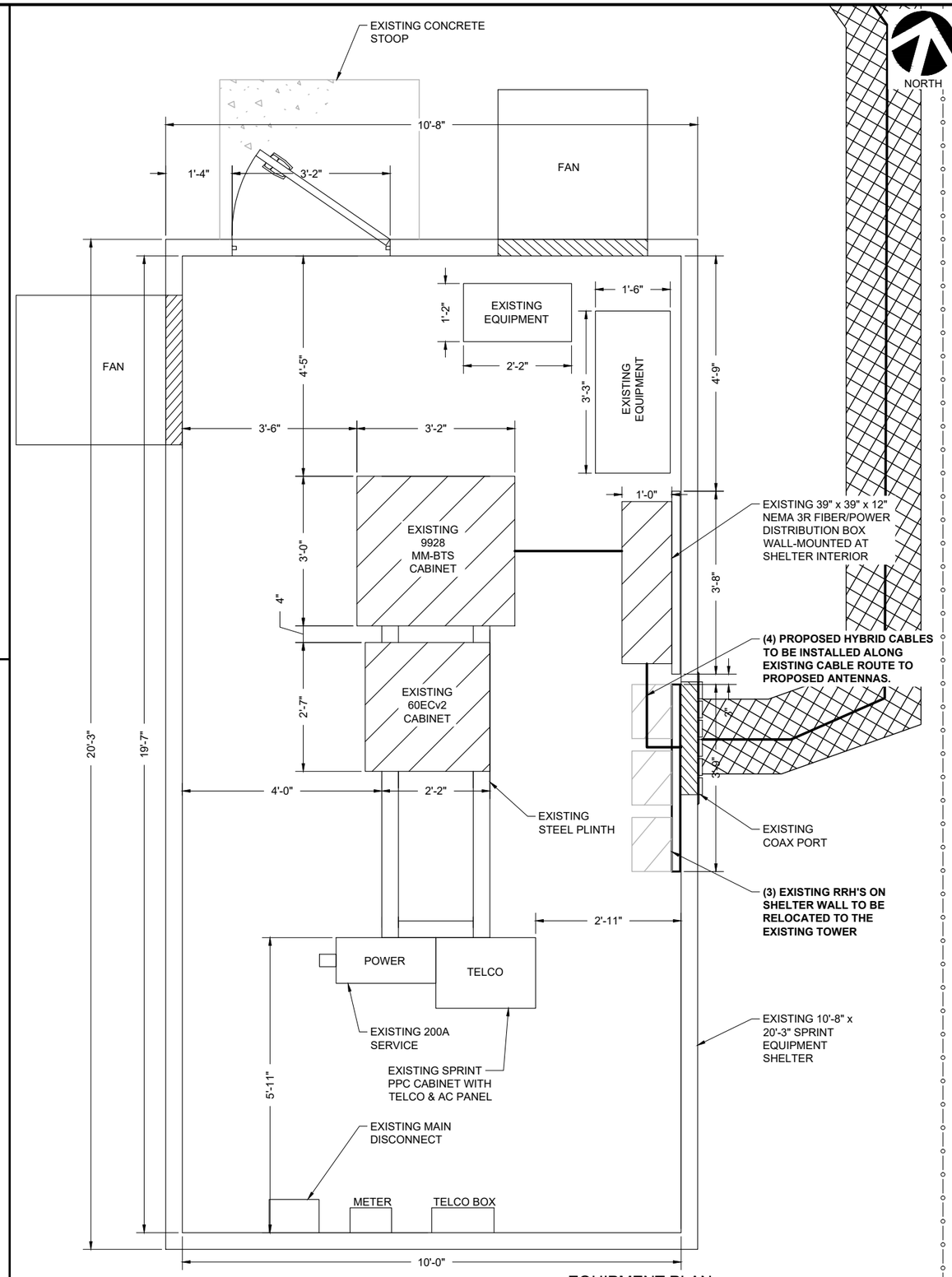
1



PROPOSED ANTENNA PLAN

SCALE: NTS

2



EQUIPMENT PLAN

SCALE: 1" = 2.5'

3

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Charles Cherundolo Consulting, Inc.
1280 RT. 46 WEST
PARSIPPANY, NJ 07054
Phone: 973-794-3633 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: 6/28/2018 Date:

MARK	DATE	DESCRIPTION
B	06/28/18	FINAL CDs ISSUED
A	06/11/18	REVISED RF CONFIGURATION

ISSUE PHASE: FINAL
DATE ISSUED: 10/10/2017

PROJECT TITLE:

CT03XC072

PROJECT INFORMATION:
116 NEWGATE ROAD
EAST GRANBY, CT 06026
HARTFORD COUNTY

SHEET TITLE:

ANTENNA LAYOUTS & EQUIPMENT LAYOUT

0 1.25' 2.5' 5'

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

PROJECT NUMBER: 22968

SHEET NUMBER: A-1

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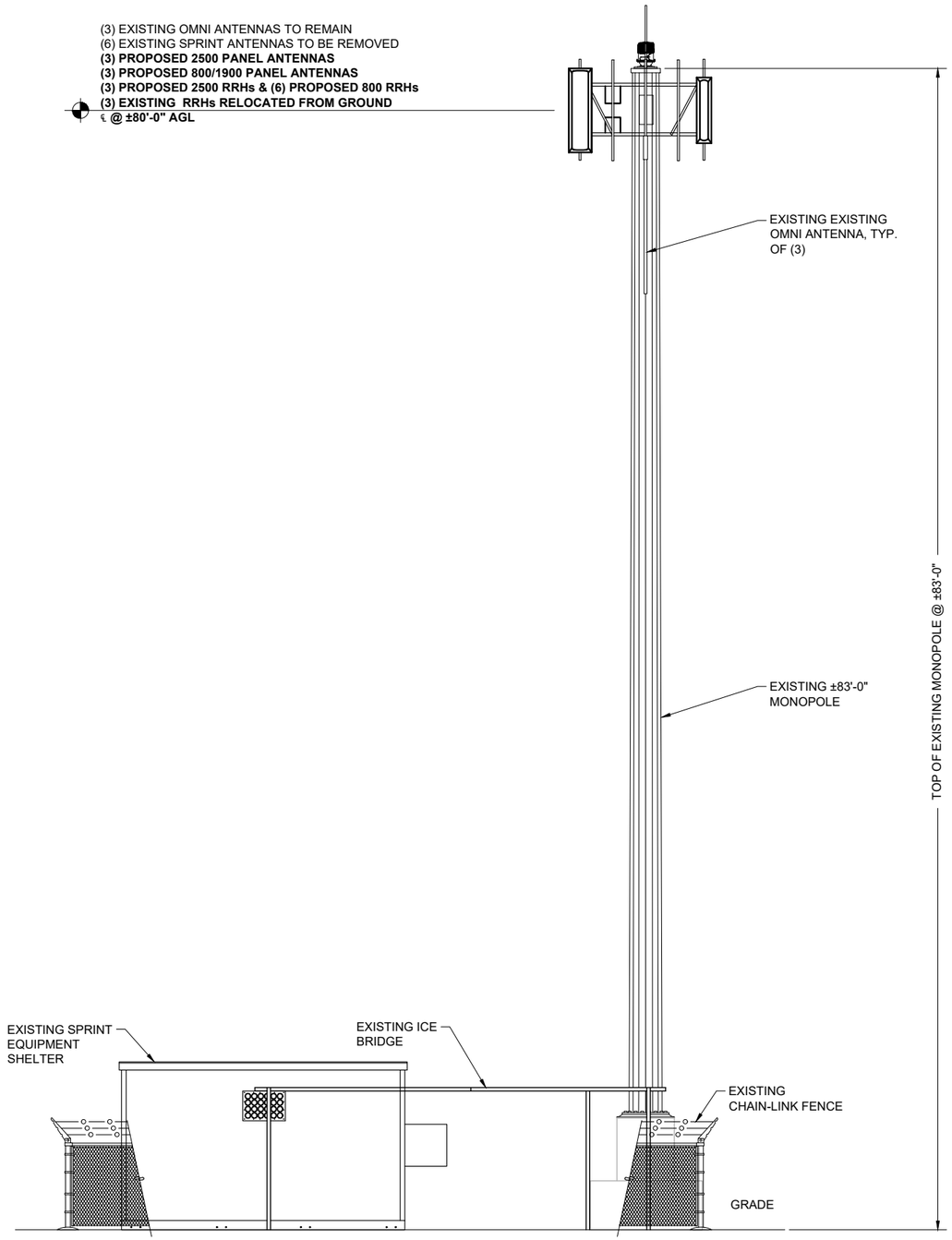
(3) EXISTING OMNI ANTENNAS TO REMAIN
(6) EXISTING SPRINT ANTENNAS TO BE REMOVED
(3) PROPOSED 2500 PANEL ANTENNAS
(3) PROPOSED 800/1900 PANEL ANTENNAS
(3) PROPOSED 2500 RRHs & (6) PROPOSED 800 RRHs
(3) EXISTING RRHs RELOCATED FROM GROUND
℄ @ ±80'-0" AGL



TOWER ELEVATION (EAST) 1
SCALE: 1" = 10'

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A	06/11/18	REVISED RF CONFIGURATION

ISSUE PHASE: FINAL
DATE ISSUED: 10/10/2017

PROJECT TITLE:
CT03XC072

PROJECT INFORMATION:
116 NEWGATE ROAD
EAST GRANBY, CT 06026
HARTFORD COUNTY

SHEET TITLE:
TOWER ELEVATION

0 5' 10' 20'
11" x 17" - 1" = 10'
22" x 34" - 1" = 5'

PROJECT NUMBER: 22968
SHEET NUMBER: A-2

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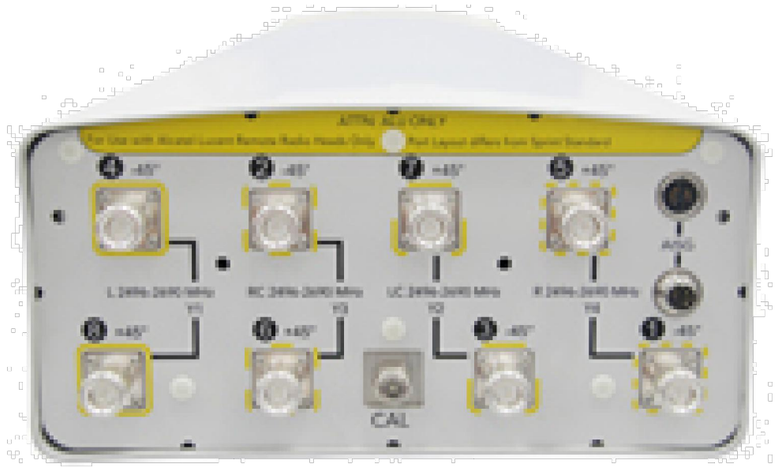

MECHANICAL	
DIMENSION (HxWxD)	56.3"x12.6"x6.3"
WEIGHT	56.2 lbs

ANTENNA MODEL: RFS #APXVTM14-ALU-I20 - ANTENNA SPECS

MECHANICAL	
DIMENSION (HxWxD)	72.0" x 19.6" x 7.8"
WEIGHT	77.4 lbs

ANTENNA MODEL: COMMSCOPE #NNVV-65B-R4 - ANTENNA SPECS

Sprint

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

Signature: 6/28/2018 Date:

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PROJECT TITLE:
CT03XC072

PROJECT INFORMATION:
116 NEWGATE ROAD
EAST GRANBY, CT 06026
HARTFORD COUNTY

SHEET TITLE:
ANTENNA SPECIFICATIONS

SCALE: NONE

PROJECT NUMBER: 22968
SHEET NUMBER: A-3

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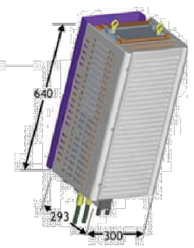
1900MHz Remote Radio Head (RRH)



Capacity & Features

CDMA / LTE Multi technology RRH 65MHz bandwidth (PCS A-G Band)

- Sprint is free to deploy any combination of CDMA (1XRTT or EVDO) and LTE carriers in Sprint's spectrum up to 160 Watts of RF power.
- E.g. "A block" and "G block" both with 4 branch MIMO (4Tx & 4Rx)

2 CPRI Optical Connections for multi-carrier LTE and CDMA (1X & DO)

Power Supply: -48 VDC

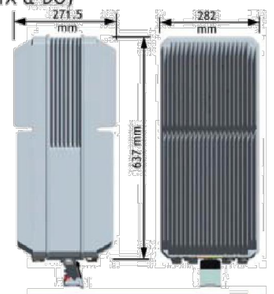
Power Consumption: 700W Typical

Dimensions:

- Size: 282 x 271.5 x 637mm (11.1" x 10.69" x 25.1")
- Volume: 49 Liter
  56 liters with solar shield & mounting OD

Weight: 27 kg (59.5 lbs)

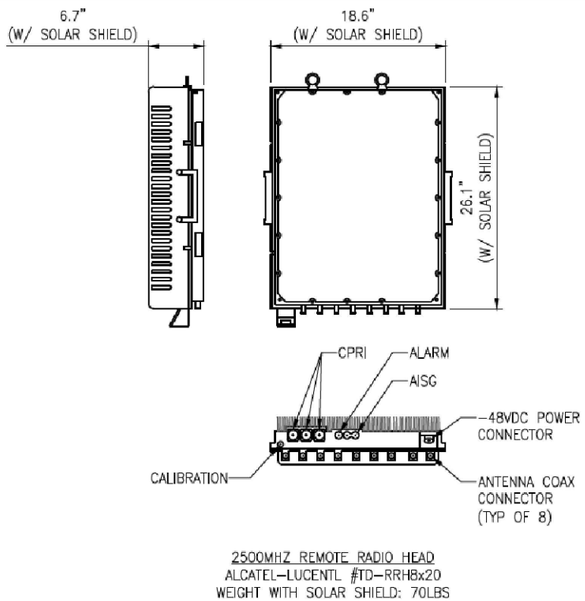
Operating Temp range -40°C/+55°C



Alcatel-Lucent's 65MHz RRH satisfies Sprint's requirements.

MECHANICAL	
DIMENSION (HxWxD)	25.2"x11.8"x11.5"
WEIGHT	59.5 lbs

RRH MODEL: ALU #1900 MHZ 4X45W - RADIO 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

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

Signature: 6/28/2018 Date:

MARK	DATE	DESCRIPTION
B	06/28/18	FINAL CDs ISSUED
A	06/11/18	REVISED RF CONFIGURATION

ISSUE PHASE: FINAL
DATE ISSUED: 10/10/2017

PROJECT TITLE:
CT03XC072

PROJECT INFORMATION:
116 NEWGATE ROAD
EAST GRANBY, CT 06026
HARTFORD COUNTY

SHEET TITLE:
REMOTE RADIO HEAD SPECIFICATIONS

SCALE: NONE

PROJECT NUMBER: 22968
SHEET NUMBER: A-4

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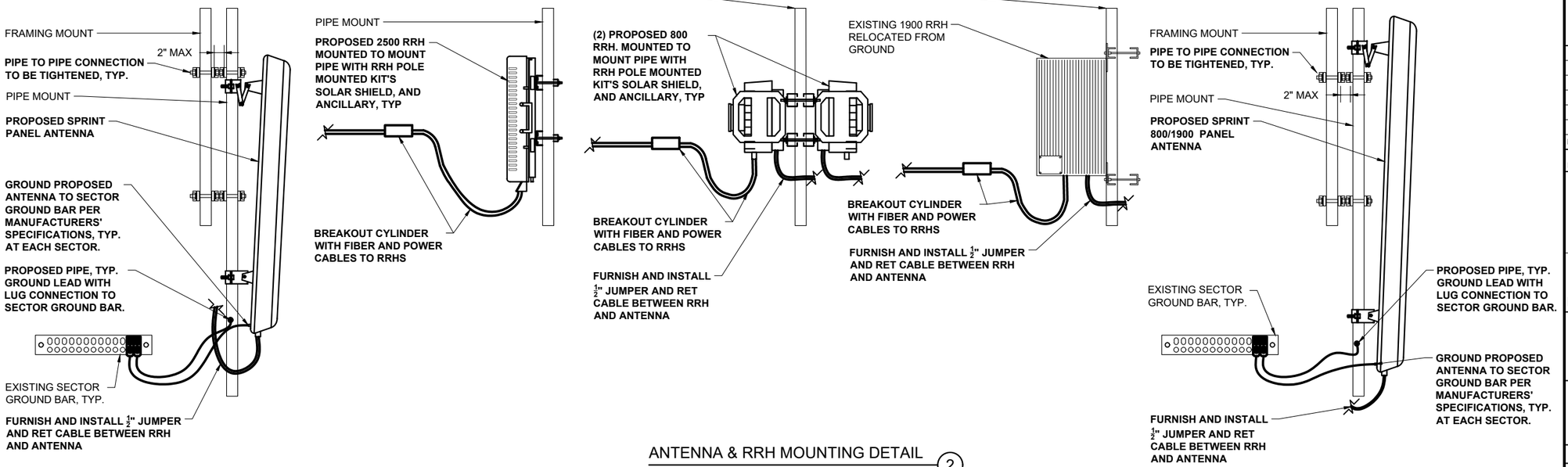
800/1900/2500 EQUIPMENT SCHEDULE

SECTOR	POSITION	ANTENNA MAKE/MODEL	AZIMUTH	CENTERLINE	RRH	CABLE TYPE	CABLE LENGTH	JUMPER TYPE
ALPHA	1	(1) PROPOSED 2500 PANEL ANTENNA (RFS APXVTM14-ALU-I20) (EXISTING ANTENNA TO BE REMOVED)	30°	80'	(1) PROPOSED 2500 RRH (ALU TD-RRH8x20-25)	(1) PROPOSED HYBRIFLEX	115'	8' HYBRID
	2	VACANT	-	-	-	-	-	-
	3	EXISTING OMNI ANTENNA	-	-	-	-	-	-
	4	VACANT	-	-	-	-	-	-
	5	(1) PROPOSED 800/1900 PANEL ANTENNA (COMMSCOPE NNVV-65B-R4) (EXISTING ANTENNA TO BE REMOVED)	30°	80'	(1) EXISTING 1900 RRH (ALU RRH-4x45-1900) (RELOCATED FROM THE GROUND) (2) PROPOSED 800 RRHs (ALU RRH-2x50-800)	(1) PROPOSED HYBRIFLEX	115'	8' HYBRID
BETA	1	(1) PROPOSED 2500 PANEL ANTENNA (RFS APXVTM14-ALU-I20) (EXISTING ANTENNA TO BE REMOVED)	150°	80'	(1) PROPOSED 2500 RRH (ALU TD-RRH8x20-25)	(1) PROPOSED HYBRIFLEX	115'	8' HYBRID
	2	VACANT	-	-	-	-	-	-
	3	EXISTING OMNI ANTENNA	-	-	-			
	4	VACANT	-	-	-	-	-	-
	5	(1) PROPOSED 800/1900 PANEL ANTENNA (COMMSCOPE NNVV-65B-R4) (EXISTING ANTENNA TO BE REMOVED)	150°	80'	(1) EXISTING 1900 RRH (ALU RRH-4x45-1900) (RELOCATED FROM THE GROUND) (2) PROPOSED 800 RRHs (ALU RRH-2x50-800)	SHARED W/ ALPHA	115'	8' HYBRID
GAMMA	1	(1) PROPOSED 2500 PANEL ANTENNA (RFS APXVTM14-ALU-I20) (EXISTING ANTENNA TO BE REMOVED)	270°	80'	(1) PROPOSED 2500 RRH (ALU TD-RRH8x20-25)	(1) PROPOSED HYBRIFLEX	115'	8' HYBRID
	2	VACANT	-	-	-	-	-	-
	3	VACANT	-	-	-			
	4	EXISTING OMNI ANTENNA	-	-	-	-	-	-
	5	(1) PROPOSED 800/1900 PANEL ANTENNA (COMMSCOPE NNVV-65B-R4) (EXISTING ANTENNA TO BE REMOVED)	270°	80'	(1) EXISTING 1900 RRH (ALU RRH-4x45-1900) (RELOCATED FROM THE GROUND) (2) PROPOSED 800 RRHs (ALU RRH-2x50-800)	SHARED W/ ALPHA	115'	8' HYBRID

EQUIPMENT & CABLE SCHEDULE (1)
SCALE: NTS



ANTENNA & RRH MOUNTING DETAIL (2)
SCALE: NTS

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PROJECT TITLE:
CT03XC072

PROJECT INFORMATION:
116 NEWGATE ROAD
EAST GRANBY, CT 06026
HARTFORD COUNTY

SHEET TITLE:
ANTENNA SCHEDULE & DETAIL

SCALE: NONE

PROJECT NUMBER: 22968
SHEET NUMBER: A-5

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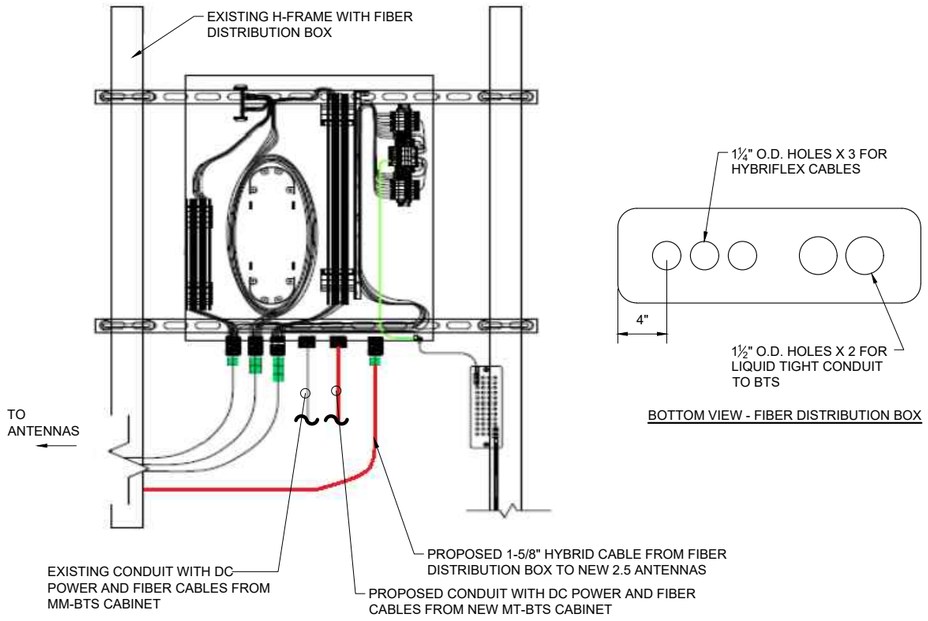
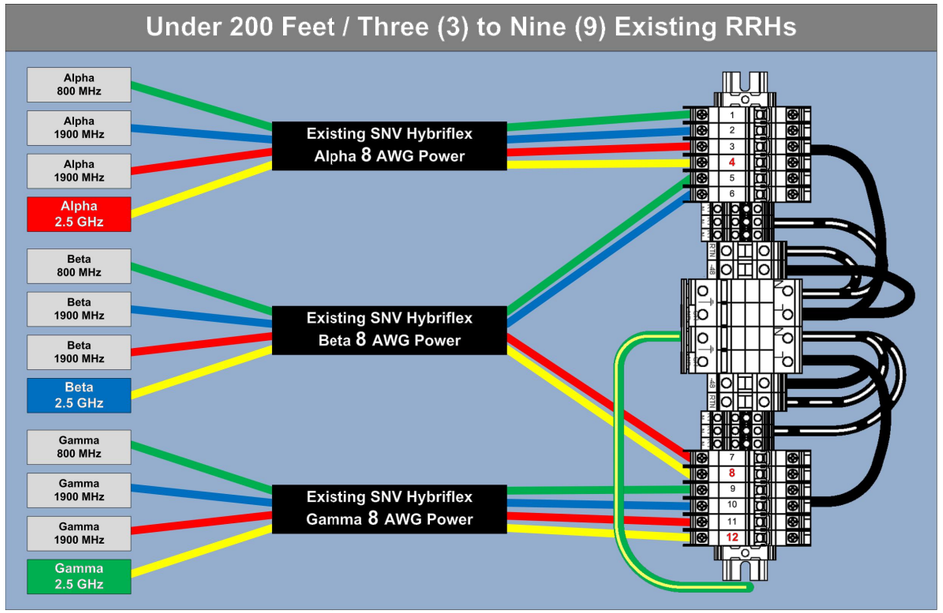
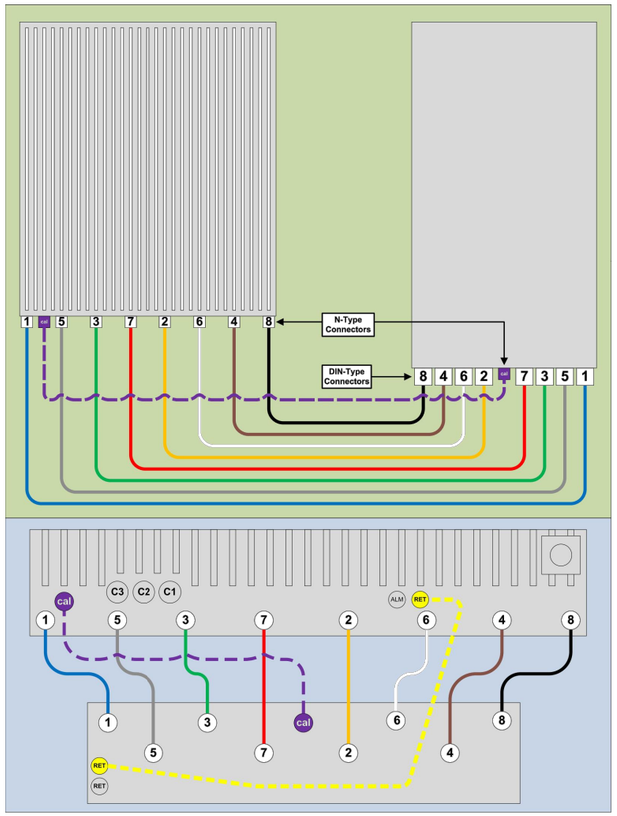


TYPICAL FIBER DISTRIBUTION BOX DETAIL (1)
SCALE: NTS

BOTTOM VIEW - FIBER DISTRIBUTION BOX

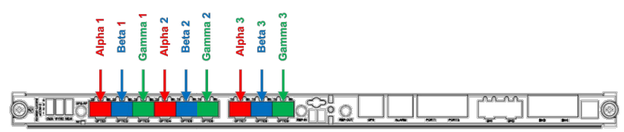


RRH TO DISTRIBUTION BOX POWER CONNECTIVITY DETAIL (2)
SCALE: NTS

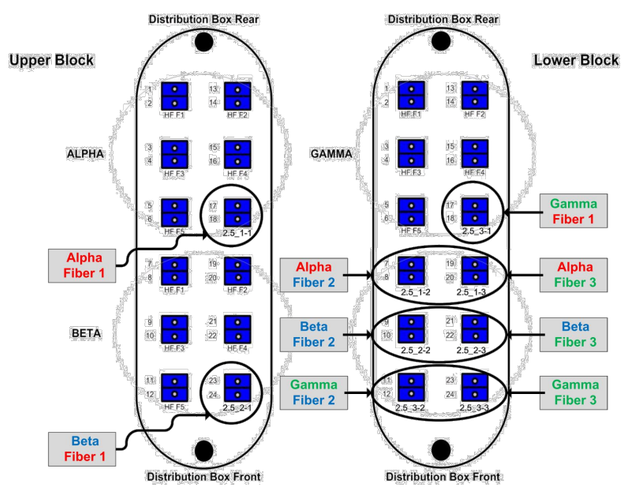


8T8R DETAIL (3)
SCALE: NTS

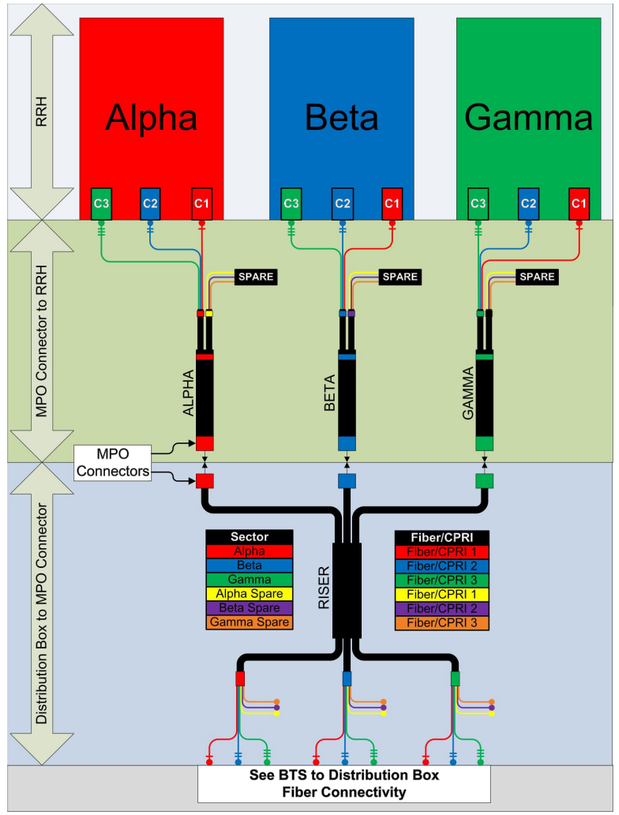
eCCM2-HR



Distribution Box Fiber Panel



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



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

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CT03XC072

PROJECT INFORMATION:
116 NEWGATE ROAD
EAST GRANBY, CT 06026
HARTFORD COUNTY

SHEET TITLE:
FIBER PLUMBING DIAGRAM

SCALE: NONE

PROJECT NUMBER: 22968
SHEET NUMBER: A-6

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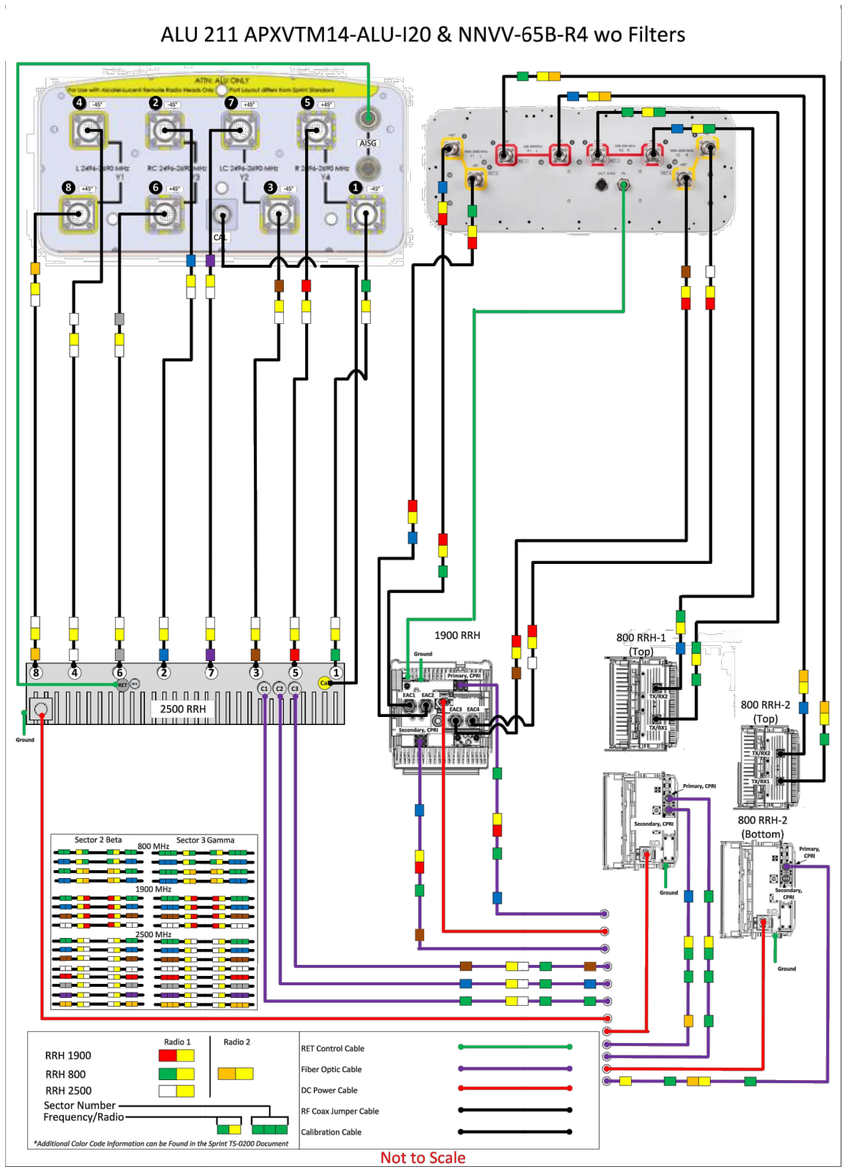
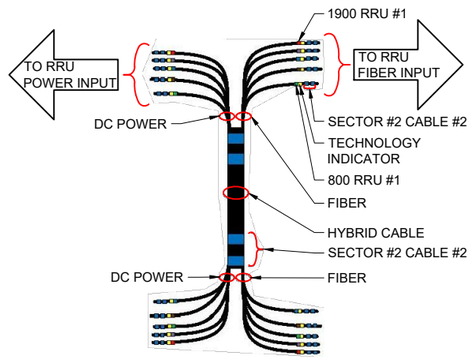
ALU 211 APXVTM14-ALU-I20 & NNVV-65B-R4 wo Filters

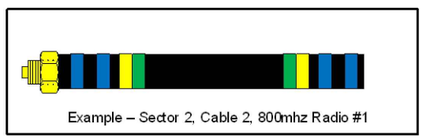


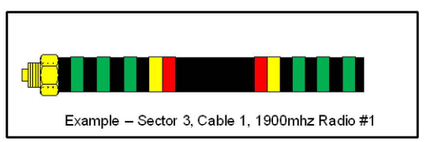
Not to Scale

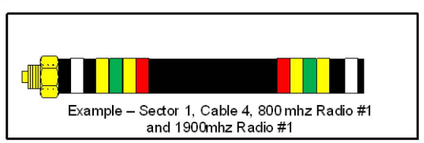
ANTENNA COLOR CODING CHART (1)
SCALE: NTS

Sector	Cable	First Ring	Second Ring	Third Ring
1 Alpha	1	Green	No Tape	No Tape
1	2	Blue	No Tape	No Tape
1	3	Brown	No Tape	No Tape
1	4	White	No Tape	No Tape
1	5	Red	No Tape	No Tape
1	6	Grey	No Tape	No Tape
1	7	Purple	No Tape	No Tape
1	8	Orange	No Tape	No Tape
2 Beta	1	Green	Green	No Tape
2	2	Blue	Blue	No Tape
2	3	Brown	Brown	No Tape
2	4	White	White	No Tape
2	5	Red	Red	No Tape
2	6	Grey	Grey	No Tape
2	7	Purple	Purple	No Tape
2	8	Orange	Orange	No Tape
3 Gamma	1	Green	Green	Green
3	2	Blue	Blue	Blue
3	3	Brown	Brown	Brown
3	4	White	White	White
3	5	Red	Red	Red
3	6	Grey	Grey	Grey
3	7	Purple	Purple	Purple
3	8	Orange	Orange	Orange




Example – Sector 2, Cable 2, 800mhz Radio #1


Example – Sector 3, Cable 1, 1900mhz Radio #1


Example – Sector 1, Cable 4, 800 mhz Radio #1 and 1900mhz Radio #1

COLOR CODING CHARTS (2)
SCALE: NTS

2.5 FREQUENCY	INDICATOR		ID
2500 -1	YEL	WHT	GRN
2500 -2	YEL	WHT	RED
2500 -3	YEL	WHT	BRN
2500 -4	YEL	WHT	BLU
2500 -5	YEL	WHT	SLT
2500 -6	YEL	WHT	ORG
2500 -7	YEL	WHT	WHT
2500 -8	YEL	WHT	PPL

NV FREQUENCY	INDICATOR	ID
800-1	YEL	GRN
1900-1	YEL	RED
1900-2	YEL	BRN
1900-3	YEL	BLU
1900-4	YEL	SLT
800-1	YEL	ORG
RESERVED	YEL	WHT
RESERVED	YEL	PPL

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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PROJECT TITLE:
CT03XC072

PROJECT INFORMATION:
116 NEWGATE ROAD
EAST GRANBY, CT 06026
HARTFORD COUNTY

SHEET TITLE:
CABLE COLOR CODING

SCALE: NONE

PROJECT NUMBER: 22968
SHEET NUMBER: A-7

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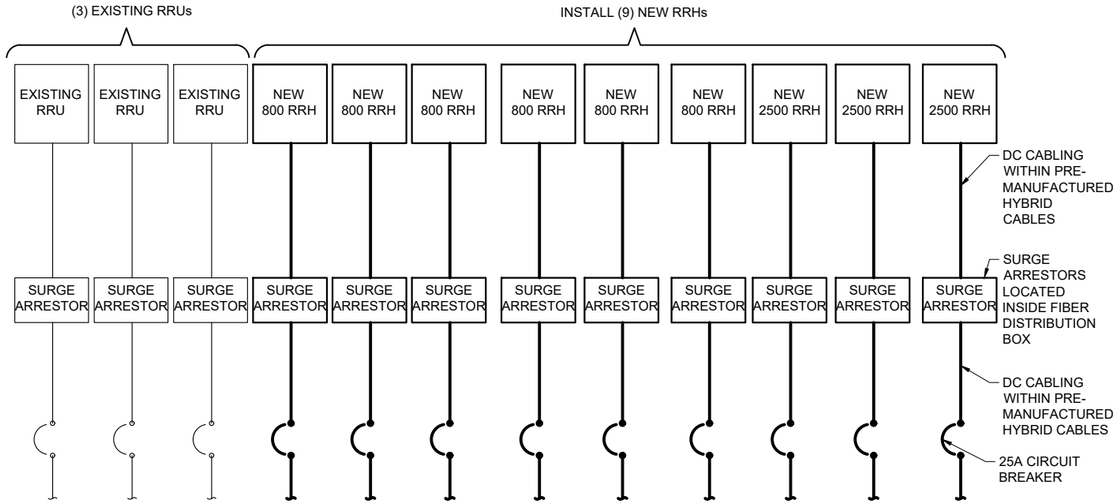
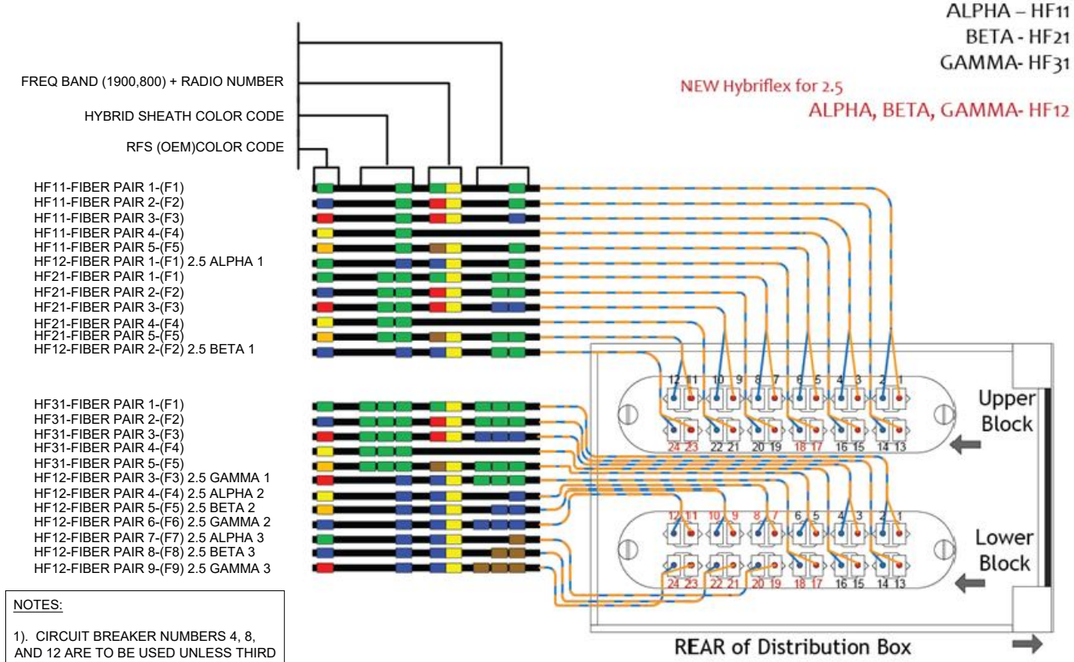


DC ONE-LINE DIAGRAM (1)
SCALE: NTS

Each sector has separate Hybriflex cable .
Hybriflex cable naming as follows:

ALPHA – HF11
BETA - HF21
GAMMA- HF31

NEW Hybriflex for 2.5
ALPHA, BETA, GAMMA- HF12



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 (2)
SCALE: NTS

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116 NEWGATE ROAD
EAST GRANBY, CT 06026
HARTFORD COUNTY

SHEET TITLE:
DC POWER & FIBER DISTRIBUTION DETAIL

SCALE: NONE

PROJECT NUMBER: 22968
SHEET NUMBER: E-1

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