November 1, 2018

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

Regarding:	Notice of Exempt Modification – Antenna Modification
Property Address:	14 Thompson Hill Road, Columbia, CT 06237
AT&T Site:	AT&T Mobility ("AT&T", Site# CT5861 / FA# 10070976)

Dear Ms. Bachman:

AT&T currently maintains a wireless telecommunications facility on an existing 180-foot monopole tower at the above-referenced address, latitude 41° 43' 3.44", longitude -72° 17' 59.09". Said monopole tower is owned by Crown Castle, and the ground is owned by Joshua Lanati.

AT&T desires to modify its existing telecommunications facility by installing three (3) additional panel antennas, six (6) remote radio units and accompanying feedlines as detailed in the enclosed plans. The centerline height of the existing antennas is and will remain at 140 feet.

Please accept this application as notification pursuant to R.C.S.A. §16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. §16-50j-72 (b)(2). In accordance with R.C.S.A. §16-50j-73, a copy of this letter is being sent to Steven M. Everett, First Selectman for the Town of Columbia, Paula Stahl, Town Planner, Crown Castle, the tower owner and Joshua Lanati, as the property owner

The planned modifications to AT&T's facility fall squarely within those activities explicitly provided for in R.C.S.A. §16-50j-72 (b)(2). Specifically:

1. The planned modification will not result in an increase in the height of the existing structure. The equipment to be added will be installed at the existing height of 140 feet on the 180-foot tower.

2. The proposed modifications will not involve any changes to ground-mounted equipment, and therefore will not require an extension of the site boundary.

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

4. The operation of the modified facility will not increase radio frequency (RF) emissions at the facility to a level at or above Federal Communications Commission (FCC) safety standard. An RF emissions calculation (enclosed) for AT&T's modified facility is herein provided.

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 AT&T's proposed modifications (please see enclosed structural analysis completed by AW Solutions, dated 10/1/2018).

For the foregoing reasons, AT&T respectfully requests that the proposed installation be allowed within the exempt modifications under R.C.S.A. §16-50j-72 (b)(2).

Sincerely,

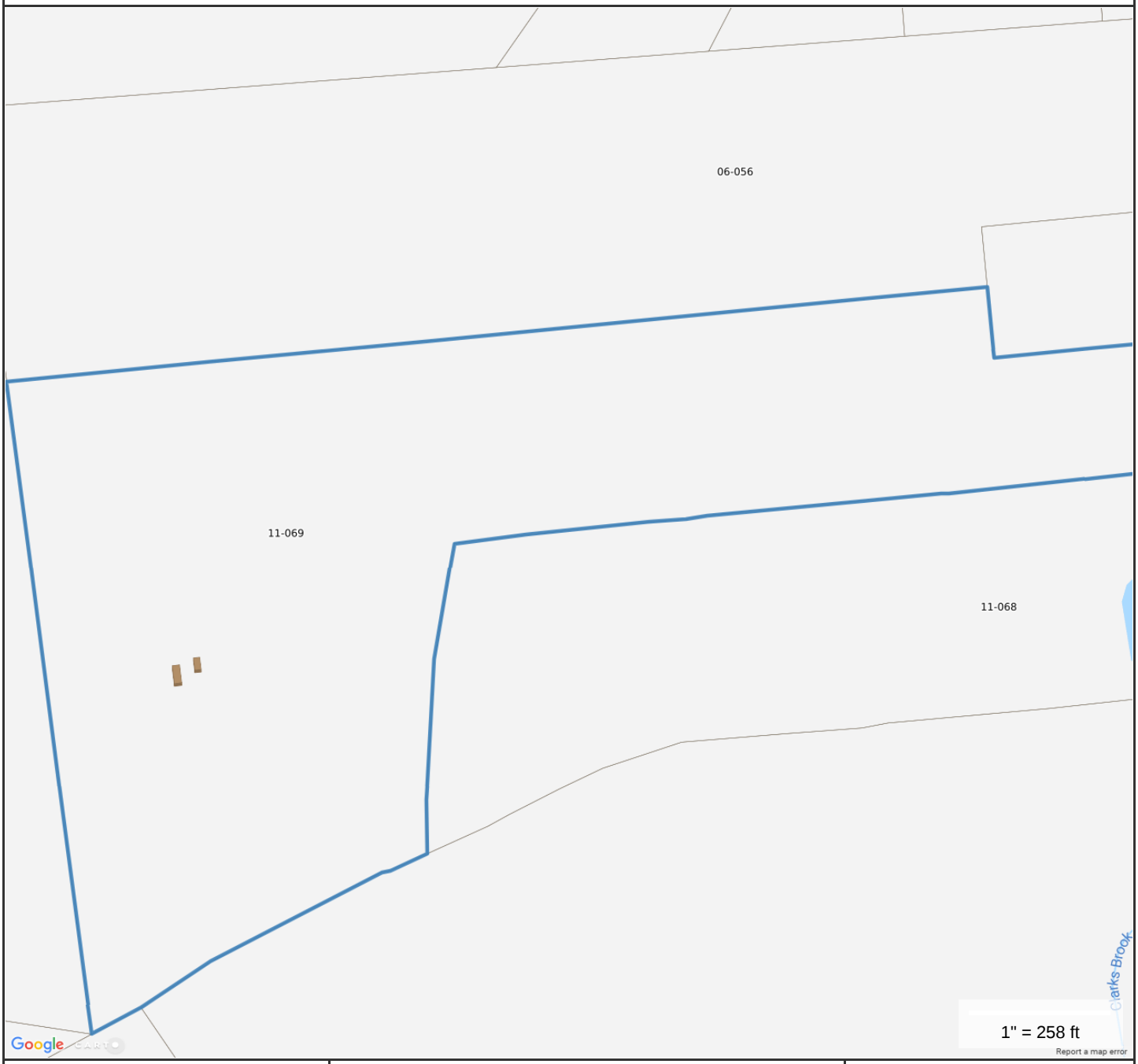
Nora Oliver

Nora Oliver
Site Acquisition Manager

Enclosures: Exhibit 1 – Property Card and GIS Map
Exhibit 2 – Construction Drawings
Exhibit 3 – Structural Analysis
Exhibit 4 – RF Emissions Analysis Report Evaluation

cc:
The Honorable Steven M. Everett, First Selectman for the Town of Columbia
Paula Stahl, Town Planner, Town of Columbia
Crown Castle, as the tower owner
Joshua Lanati, as the property owner.

14 Thompson Hill Rd



Property Information

Property ID	09013030-011-069
Location	14 THOMPSON HILL RD
Owner	CROWN CABLE TOWERS 09 LLC

CRCOG CAPITOL REGION COUNCIL OF GOVERNMENTS
Working together for a better region.

MAP FOR REFERENCE ONLY
NOT A LEGAL DOCUMENT

14 THOMPSON HILL RD

Location	14 THOMPSON HILL RD	**Mblu**	011/ / 069/ CELL/
Acct#	011069CEL	**Owner**	CROWN CABLE TOWERS 09 LLC
Assessment	$595,400	**Appraisal**	$850,600
PID	102279	**Building Count**	1

Current Value

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2016	$850,600	$0	$850,600
Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2016	$595,400	$0	$595,400

Owner of Record

Owner	CROWN CABLE TOWERS 09 LLC	**Sale Price**	$0
Co-Owner		**Certificate**	
Address	4017 WASHINGTON RD PNB 331 MCMURRAY, PA 15317	**Book & Page**	999
		Sale Date	09/30/2011

Ownership History

Ownership History				
Owner	**Sale Price**	**Certificate**	**Book & Page**	**Sale Date**
CROWN CABLE TOWERS 09 LLC	$0		999	09/30/2011

Building Information

Building 1 : Section 1

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

Building Photo

Building Attributes	
Field	**Description**
Style	Outbuildings
Model	

Grade:	
Stories:	
Occupancy	
Exterior Wall 1	
Exterior Wall 2	
Roof Structure:	
Roof Cover	
Interior Wall 1	
Interior Wall 2	
Interior Flr 1	
Interior Flr 2	
Heat Fuel	
Heat Type:	
AC Type:	
Total Bedrooms:	
Total Bthrms:	
Total Half Baths:	
Total Xtra Fixtrs:	
Total Rooms:	
Bath Style:	
Kitchen Style:	
Whirlpool	
Fireplace(s)	
Fndtn. Level	

(http://images.vgsi.com/photos2/ColumbiaCTPhotos//\00\00\83/48.jpg)

Building Layout

Building Layout

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	3900
Description	Dev Land
Zone	
Neighborhood	
Alt Land Appr	No
Category	

Land Line Valuation

Size (Acres)	0
Frontage	
Depth	
Assessed Value	$0
Appraised Value	$0

Outbuildings

Outbuildings						Legend
Code	**Description**	**Sub Code**	**Sub Description**	**Size**	**Value**	**Bldg #**
CELL	Cell Tower			4 UNITS	$800,000	1

FN3	Fence-6' Chain			200 L.F.	$2,000	1
CELS	Cell Shed			240 S.F.	$27,000	1
CELS	Cell Shed			192 S.F.	$21,600	1

Valuation History

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2015	$705,000	$0	$705,000
2014	$705,000	$0	$705,000
2013	$705,000	$0	$705,000

Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2015	$493,500	$0	$493,500
2014	$493,500	$0	$493,500
2013	$493,500	$0	$493,500

14 THOMPSON HILL RD

Location	14 THOMPSON HILL RD	**Mblu**	011/ / 069/ /
Acct#	00054300	**Owner**	LANATI JOSHUA & EILEEN
Assessment	$250,400	**Appraisal**	$502,300
PID	543	**Building Count**	1

Current Value

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2016	$127,400	$374,900	$502,300
Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2016	$89,200	$161,200	$250,400

Owner of Record

Owner	LANATI JOSHUA & EILEEN	**Sale Price**	$155,000
Co-Owner		**Certificate**	
Address	14 THOMPSON HILL RD COLUMBIA, CT 06237	**Book & Page**	0197/0163
		Sale Date	04/14/2011
		Instrument	28

Ownership History

Ownership History					
Owner	**Sale Price**	**Certificate**	**Book & Page**	**Instrument**	**Sale Date**
LANATI JOSHUA & EILEEN	$155,000		0197/0163	28	04/14/2011
DEOJAY THOMAS R ESTATE OF	$0		0122/0722	25	09/23/2010
DEOJAY THOMAS R	$0		0122/0722		10/25/1999
DEOJAY THOMAS R & WILLIE JO	$0		0059/0018		05/18/1982

Building Information

Building 1 : Section 1

Year Built:	1955
Living Area:	1,677
Replacement Cost:	$190,432
Building Percent Good:	66
Replacement Cost Less Depreciation:	$125,700

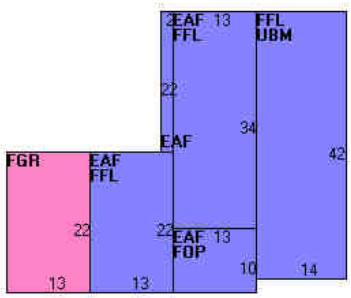
Building Attributes

Building Photo

Field	Description
Style	Conventional
Model	Residential
Grade:	Average +20
Stories:	1 1/2 Stories
Occupancy	1
Exterior Wall 1	Stucco/Masonry
Exterior Wall 2	Wood Shingle
Roof Structure:	Gable/Hip
Roof Cover	Asphalt
Interior Wall 1	Drywall/Sheet
Interior Wall 2	
Interior Flr 1	Pine/Soft Wood
Interior Flr 2	
Heat Fuel	Electric
Heat Type:	Electr Basebrd
AC Type:	None
Total Bedrooms:	3 Bedrooms
Total Bthrms:	2
Total Half Baths:	1
Total Xtra Fixtrs:	
Total Rooms:	8 Rooms
Bath Style:	Average
Kitchen Style:	Average
Whirlpool	
Fireplace(s)	1
Fndtn. Level	

(http://images.vgsi.com/photos2/ColumbiaCTPhotos//\00\00\75/76.jpg)

Building Layout



Building Sub-Areas (sq ft)			Legend
Code	Description	Gross Area	Living Area
FFL	First Floor Living	1,316	1,316
EAF	Attic, Expansion, Finished	902	361
FGR	Garage, Framed	286	0
FOP	Porch, Open, Finished	130	0
UBM	Basement, Unfinished	588	0
		3,222	1,677

Extra Features

Extra Features	Legend
No Data for Extra Features	

Land

Land Use

Use Code	1010
Description	Single Fam
Zone	RA
Neighborhood	12

Land Line Valuation

Size (Acres)	29.4
Frontage	0
Depth	0
Assessed Value	$161,200

Alt Land Appr Category No

Appraised Value $374,900

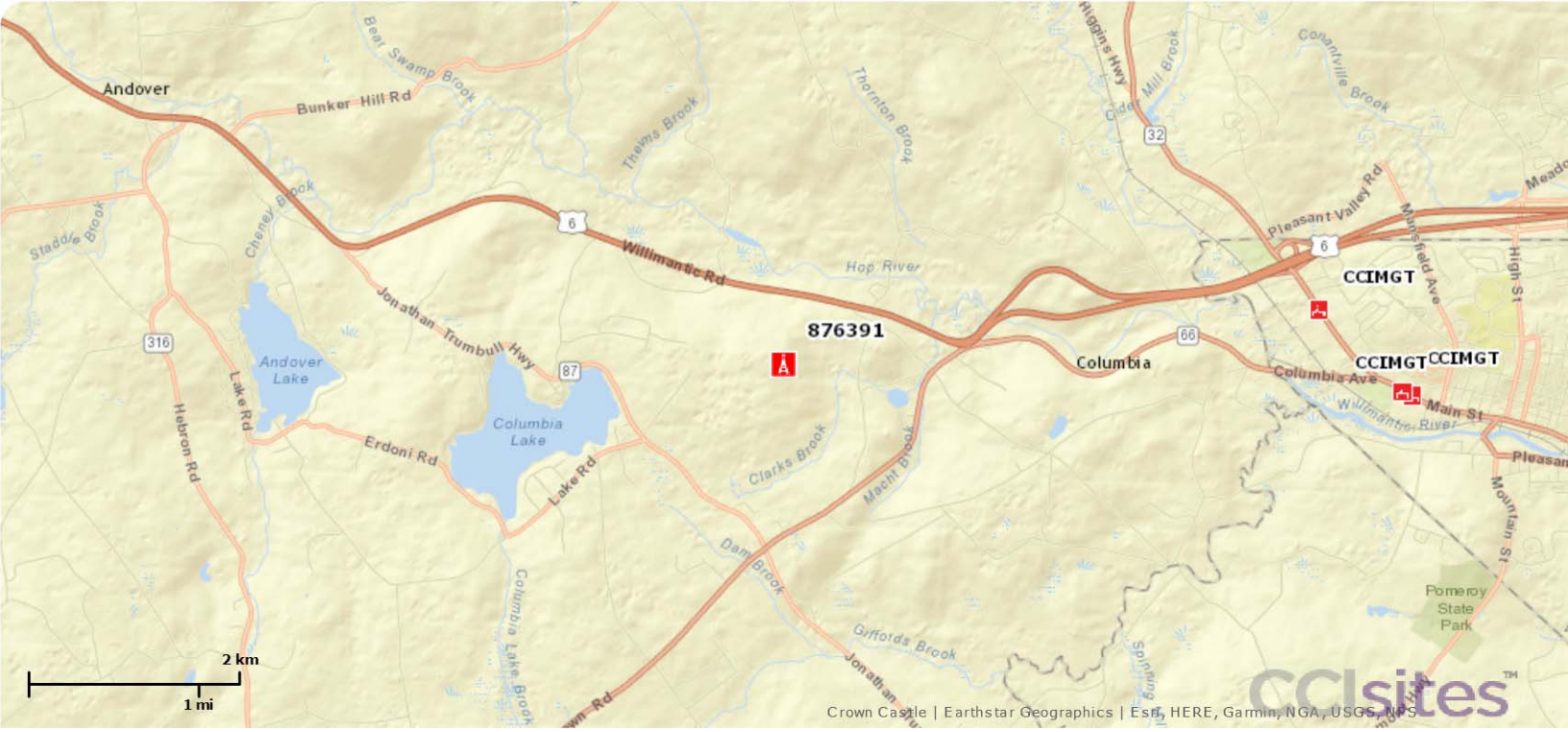
Outbuildings

Outbuildings						Legend
Code	**Description**	**Sub Code**	**Sub Description**	**Size**	**Value**	**Bldg #**
BRN3	Barn 1 St. w Loft			540 S.F.	$1,300	1
SHD1	Shed Frame			64 S.F.	$400	1

Valuation History

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2015	$123,000	$374,900	$497,900
2014	$123,000	$374,900	$497,900
2013	$123,000	$374,900	$497,900

Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2015	$86,100	$160,330	$246,430
2014	$86,100	$160,330	$246,430
2013	$86,100	$160,330	$246,430


Andover
Bunker Hill Rd
Bear Swamp Brook
Thelma Brook
Thornton Brook
Higgins Hwy
Cedar Mill Brook
Conantville Brook
32
Staddle Brook
Cheney Brook
6
Willimantic Rd
Hop River
Pleasant Valley Rd
Mansfield Ave
High St
CCIMGT
316
Jonathan Trumbull Hwy
87
876391
66
Columbia
CCIMGT
CCIMGT
Columbia Ave
Andover Lake
Lake Rd
Hebron Rd
Erdoni Rd
Columbia Lake
Clarks Brook
Macht Brook
Main St
Willimantic River
Pleasant
Mountain St
Dam Brook
Giffords Brook
Pomeroy State Park
Columbia Lake Brook
2 km
1 mi
Crown Castle | Earthstar Geographics | Esri, HERE, Garmin, NGA, USGS, NPS
CCIsites™

Radio Frequency Emissions Analysis Report

AT&T Existing Facility

Site ID: CT5861

FA#: 10070976

Columbia North
14 Thompson Hill Road
Columbia, CT 06237

June 6, 2018

Centerline Communications Project Number: 950006-123

Site Compliance Summary	
Compliance Status:	**COMPLIANT**
Site total MPE% of FCC general population allowable limit:	**8.48 %**

June 6, 2018

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

Emissions Analysis for Site: **CT5861 – Columbia North**

Centerline Communications, LLC ("Centerline") was directed to analyze the proposed AT&T facility located at **14 Thompson Hill Road, Columbia, CT**, for the purpose of determining whether the emissions from the Proposed AT&T Antenna Installation located on this property are within specified federal limits.

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

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

General population/uncontrolled exposure limits apply to situations in which the general 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.

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

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

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were performed for the proposed AT&T Wireless antenna facility located at **14 Thompson Hill Road, Columbia, CT**, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since AT&T is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was focused at the base of the tower. For this report the sample point is the top of a 6-foot person standing at the base of the tower.

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. All power values expressed and analyzed are maximum power levels expected to be used on all radios.

All emissions values for additional carriers were taken from the Connecticut Siting Council (CSC) active MPE database. Values in this database are provided by the individual carriers themselves

For each sector the following channel counts, frequency bands and power levels were utilized as shown in *Table 1*:

Technology	Frequency Band	Channel Count	Transmit Power per Channel (W)
UMTS	850 MHz	2	30
LTE	700 MHz	2	40
LTE	1900 MHz (PCS)	4	40
LTE	700 MHz (Band 14)	4	40
LTE	2300 MHz (WCS)	4	30

Table 1: Channel Data Table

The following antennas listed in *Table 2* were used in the modeling for transmission in the 700 MHz, 850 MHz, 1900 MHz (PCS) and 2300 MHz (WCS) frequency bands. This is based on feedback from the carrier with regards to anticipated antenna selection. Maximum gain values for all antennas are listed in the Inventory and Power Data table below. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

Sector	Antenna Number	Antenna Make / Model	Antenna Centerline (ft)
A	1	Powerwave 7770	140
A	2	CCI HPA-65R-BUU-H6	140
A	3	KMW EPBQ-654L8H6-L2	140
A	4	Powerwave 7770 (Dormant)	140
B	1	Powerwave 7770	140
B	2	CCI HPA-65R-BUU-H6	140
B	3	KMW EPBQ-654L8H6-L2	140
B	4	Powerwave 7770 (Dormant)	140
C	1	Powerwave 7770	140
C	2	CCI HPA-65R-BUU-H6	140
C	3	KMW EPBQ-654L8H6-L2	140
C	4	Powerwave 7770 (Dormant)	140

Table 2: Antenna Data

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

RESULTS

Per the calculations completed for the proposed AT&T configurations *Table 3* shows resulting emissions power levels and percentages of the FCC's allowable general population limit.

Antenna ID	Antenna Make / Model	Frequency Bands	Antenna Gain (dBd)	Channel Count	Total TX Power (W)	ERP (W)	MPE %
Antenna A1	Powerwave 7770	850 MHz	11.4	2	60	828.23	0.29
Antenna A2	CCI HPA-65R-BUU-H6	700 MHz / 1900 MHz (PCS)	11.95 / 14.75	6	240	6,030.01	1.49
Antenna A3	KMW EPBQ-654L8H6-L2	700 MHz / 2300 MHz (WCS)	12.35 / 15.35	8	280	6,861.87	2.00
Antenna A4	Powerwave 7770	UNUSED	NA	0	0	0.00	0.00
						Sector A Composite MPE%	**3.79**
Antenna B1	Powerwave 7770	850 MHz	11.4	2	60	828.23	0.29
Antenna B2	CCI HPA-65R-BUU-H6	700 MHz / 1900 MHz (PCS)	11.95 / 14.75	6	240	6,030.01	1.49
Antenna B3	KMW EPBQ-654L8H6-L2	700 MHz / 2300 MHz (WCS)	12.35 / 15.35	8	280	6,861.87	2.00
Antenna B4	Powerwave 7770	UNUSED	NA	0	0	0.00	0.00
						Sector B Composite MPE%	**3.79**
Antenna C1	Powerwave 7770	850 MHz	11.4	2	60	828.23	0.29
Antenna C2	CCI HPA-65R-BUU-H6	700 MHz / 1900 MHz (PCS)	11.95 / 14.75	6	240	6,030.01	1.49
Antenna C3	KMW EPBQ-654L8H6-L2	700 MHz / 2300 MHz (WCS)	12.35 / 15.35	8	280	6,861.87	2.00
Antenna C4	Powerwave 7770	UNUSED	NA	0	0	0.00	0.00
						Sector C Composite MPE%	**3.79**

Table 3: AT&T Emissions Levels

The Following table (*table 4*) shows all additional carriers on site and their MPE% as recorded in the CSC active MPE database for this facility along with the newly calculated maximum AT&T MPE contributions per this report. FCC OET 65 specifies that for carriers utilizing directional antennas that the highest recorded sector value be used for composite site MPE values due to their greatly reduced emissions contributions in the directions of the adjacent sectors. For this site, all three sectors have the same configuration yielding the same results on all three sectors. *Table 5* below shows a summary for each AT&T Sector as well as the composite MPE value for the site.

Site Composite MPE%	
Carrier	**MPE%**
AT&T – Max Sector Value (Per Sector)	**3.79 %**
Sprint	0.60 %
Verizon Wireless	2.61 %
T-Mobile	1.48 %
Site Total MPE %:	**8.48 %**

Table 4: All Carrier MPE Contributions

AT&T Sector A Total:	3.79 %
AT&T Sector B Total:	3.79 %
AT&T Sector C Total:	3.79 %
Site Total:	8.48 %

Table 5: Site MPE Summary

FCC OET 65 specifies that for carriers utilizing directional antennas that the highest recorded sector value be used for composite site MPE values due to their greatly reduced emissions contributions in the directions of the adjacent sectors. *Table 6* below details a breakdown by frequency band and technology for the MPE power values for the maximum calculated AT&T sector(s). For this site, all three sectors have the same configuration yielding the same results on all three sectors.

AT&T _ Frequency Band / Technology Max Power Values (Per Sector)	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ($\mu W/cm^2$)	Frequency (MHz)	Allowable MPE ($\mu W/cm^2$)	Calculated % MPE
AT&T 850 MHz UMTS- Antenna 1	2	414.12	140	1.66	850 MHz	567	0.29%
AT&T 700 MHz LTE- Antenna 2	2	626.70	140	2.51	700 MHz	467	0.54%
AT&T 1900 MHz (PCS) LTE- Antenna 23	4	1,194.15	140	9.56	1900 MHz (PCS)	1000	0.96%
AT&T 700 MHz LTE (Band 14) - Antenna 3	4	687.16	140	5.50	700 MHz	467	1.18%
AT&T 2300 MHz (WCS) LTE- Antenna 3	4	1,028.30	140	8.24	2300 MHz (WCS)	1000	0.82%
						Total:	**3.79%**

Table 6: AT&T Maximum Sector MPE Power Values

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 AT&T 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:

AT&T Sector	Power Density Value (%)
Sector A:	3.79 %
Sector B:	3.79 %
Sector C:	3.79 %
AT&T Maximum Total (per sector):	3.79 %
Site Total:	8.48 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **8.48 %** 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.

Scott Heffernan
RF Engineering Director
Centerline Communications, LLC
95 Ryan Drive, Suite 1
Raynham, MA 02767

WIRELESS COMMUNICATIONS FACILITY
CT5861 - LTE 3C WCS/4C & BWE
COLUMBIA NORTH
CROWN CASTLE SITE NO.: 876391
14 THOMPSON HILL ROAD
COLUMBIA, CT 06237

GENERAL NOTES

1. ALL WORK SHALL BE IN ACCORDANCE WITH THE 2012 INTERNATIONAL BUILDING CODE AS MODIFIED BY THE 2016 CONNECTICUT STATE BUILDING CODE, INCLUDING THE TIA-222 REVISION "G" STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWERS AND SUPPORTING STRUCTURES, 2016 CONNECTICUT FIRE SAFETY CODE AND, NATIONAL ELECTRICAL CODE AND LOCAL CODES.
2. THE COMPOUND, TOWER, PRIMARY GROUND RING, ELECTRICAL SERVICE TO THE METER BANK AND TELEPHONE SERVICE TO THE DEMARCATION POINT ARE PROVIDED BY SITE OWNER. AS BUILT FIELD CONDITIONS REGARDING THESE ITEMS SHALL BE CONFIRMED BY THE CONTRACTOR. SHOULD ANY FIELD CONDITIONS PRECLUDE COMPLIANCE WITH THE DRAWINGS, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER AND SHALL NOT PROCEED WITH ANY AFFECTED WORK.
3. CONTRACTOR SHALL REVIEW ALL DRAWINGS AND SPECIFICATIONS IN THE CONTRACT DOCUMENT SET. CONTRACTOR SHALL COORDINATE ALL WORK SHOWN IN THE SET OF DRAWINGS. THE CONTRACTOR SHALL PROVIDE A COMPLETE SET OF DRAWINGS TO ALL SUBCONTRACTORS AND ALL RELATED PARTIES. THE SUBCONTRACTORS SHALL EXAMINE ALL THE DRAWINGS AND SPECIFICATIONS FOR THE INFORMATION THAT AFFECTS THEIR WORK.
4. CONTRACTOR SHALL PROVIDE A COMPLETE BUILD-OUT WITH ALL FINISHES, STRUCTURAL, MECHANICAL, AND ELECTRICAL COMPONENTS AND PROVIDE ALL ITEMS AS SHOWN OR INDICATED ON THE DRAWINGS OR IN THE WRITTEN SPECIFICATIONS.
5. CONTRACTOR SHALL FURNISH ALL MATERIAL, LABOR AND EQUIPMENT TO COMPLETE THE WORK AND FURNISH A COMPLETED JOB ALL IN ACCORDANCE WITH LOCAL AND STATE GOVERNING AUTHORITIES AND OTHER AUTHORITIES HAVING LAWFUL JURISDICTION OVER THE WORK.
6. CONTRACTOR SHALL SECURE AND PAY FOR ALL PERMITS AND ALL INSPECTIONS REQUIRED AND SHALL ALSO PAY FEES REQUIRED FOR THE GENERAL CONSTRUCTION, PLUMBING, ELECTRICAL AND HVAC. PERMITS SHALL BE PAID FOR BY THE RESPECTIVE SUBCONTRACTORS.
7. CONTRACTOR SHALL MAINTAIN A CURRENT SET OF DRAWINGS AND SPECIFICATIONS ON SITE AT ALL TIMES AND INSURE DISTRIBUTION OF NEW DRAWINGS TO SUBCONTRACTORS AND OTHER RELEVANT PARTIES AS SOON AS THEY ARE MADE AVAILABLE. ALL OLD DRAWINGS SHALL BE MARKED VOID AND REMOVED FROM THE CONTRACT AREA. THE CONTRACTOR SHALL FURNISH AN 'AS-BUILT' SET OF DRAWINGS TO OWNER UPON COMPLETION OF PROJECT.
8. LOCATION OF EQUIPMENT, AND WORK SUPPLIED BY OTHERS THAT IS DIAGRAMMATICALLY INDICATED ON THE DRAWINGS SHALL BE DETERMINED BY THE CONTRACTOR. THE CONTRACTOR SHALL DETERMINE LOCATIONS AND DIMENSIONS SUBJECT TO STRUCTURAL CONDITIONS AND WORK OF THE SUBCONTRACTORS.
9. THE CONTRACTOR IS SOLELY RESPONSIBLE TO DETERMINE CONSTRUCTION PROCEDURE AND SEQUENCE, AND TO ENSURE THE SAFETY OF THE EXISTING STRUCTURES AND ITS COMPONENT PARTS DURING CONSTRUCTION. THIS INCLUDES THE ADDITION OF WHATEVER SHORING, BRACING, UNDERPINNING, ETC. THAT MAY BE NECESSARY. MAINTAIN EXISTING BUILDING'S/PROPERTY'S OPERATIONS, COORDINATE WORK WITH BUILDING/PROPERTY OWNER.
10. DRAWINGS INDICATE THE MINIMUM STANDARDS, BUT IF ANY WORK SHOULD BE INDICATED TO BE SUBSTANDARD TO ANY ORDINANCES, LAWS, CODES, RULES, OR REGULATIONS BEARING ON THE WORK, THE CONTRACTOR SHALL INCLUDE IN HIS WORK AND SHALL EXECUTE THE WORK CORRECTLY IN ACCORDANCE WITH SUCH ORDINANCES, LAWS, CODES, RULES OR REGULATIONS WITH NO INCREASE IN COSTS.
11. ALL UTILITY WORK SHALL BE IN ACCORDANCE WITH LOCAL UTILITY COMPANY REQUIREMENTS AND SPECIFICATIONS.
12. ALL EQUIPMENT AND PRODUCTS PURCHASED ARE TO BE REVIEWED BY CONTRACTOR AND ALL APPLICABLE SUBCONTRACTORS FOR ANY CONDITION PER MFR.'S RECOMMENDATIONS. CONTRACTOR TO SUPPLY THESE ITEMS AT NO COST TO OWNER OR CONSTRUCTION MANAGER.
13. ANY AND ALL ERRORS, DISCREPANCIES, AND 'MISSED" ITEMS ARE TO BE BROUGHT TO THE ATTENTION OF THE AT&T CONSTRUCTION MANAGER DURING THE BIDDING PROCESS BY THE CONTRACTOR. ALL THESE ITEMS ARE TO BE INCLUDED IN THE BID. NO 'EXTRA' WILL BE ALLOWED FOR MISSED ITEMS.
14. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL ON-SITE SAFETY FROM THE TIME THE JOB IS AWARDED UNTIL ALL WORK IS COMPLETE AND ACCEPTED BY THE OWNER.
15. CONTRACTOR TO REVIEW ALL SHOP DRAWINGS AND SUBMIT COPY TO ENGINEER FOR APPROVAL. DRAWINGS MUST BEAR THE CHECKER'S INITIALS BEFORE SUBMITTING TO THE CONSTRUCTION MANAGER FOR REVIEW.
16. THE CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS, ELEVATIONS, ANGLES, AND EXISTING CONDITIONS AT THE SITE, PRIOR TO FABRICATION AND/OR INSTALLATION OF ANY WORK IN THE CONTRACT AREA.
17. COORDINATION, LAYOUT, FURNISHING AND INSTALLATION OF CONDUIT AND ALL APPURTENANCES REQUIRED FOR PROPER INSTALLATION OF ELECTRICAL AND TELECOMMUNICATION SERVICE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
18. ALL EQUIPMENT AND PRODUCTS PURCHASED ARE TO BE REVIEWED BY CONTRACTOR AND ALL APPLICABLE SUB-CONTRACTORS FOR ANY CONDITION PER THE MANUFACTURER'S RECOMMENDATIONS. CONTRACTOR TO SUPPLY THESE ITEMS AT NO COST TO OWNER OR CONSTRUCTION MANAGER.
19. ALL DAMAGE CAUSED TO ANY EXISTING STRUCTURE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR WILL BE HELD LIABLE FOR ALL REPAIRS REQUIRED FOR EXISTING STRUCTURES IF DAMAGED DURING CONSTRUCTION ACTIVITIES.
20. THE CONTRACTOR SHALL CONTACT "CALL BEFORE YOU DIG" AT LEAST 48 HOURS PRIOR TO ANY EXCAVATIONS AT 1-800-922-4455. ALL UTILITIES SHALL BE IDENTIFIED AND CLEARLY MARKED PRIOR TO ANY EXCAVATION WORK. CONTRACTOR SHALL MAINTAIN AND PROTECT MARKED UTILITIES THROUGHOUT PROJECT COMPLETION.
21. CONTRACTOR SHALL COMPLY WITH OWNERS ENVIRONMENTAL ENGINEER ON ALL METHODS AND PROVISIONS FOR ALL EXCAVATION ACTIVITIES INCLUDING SOIL DISPOSAL. ALL BACKFILL MATERIALS TO BE PROVIDED BY THE CONTRACTOR.

SITE DIRECTIONS

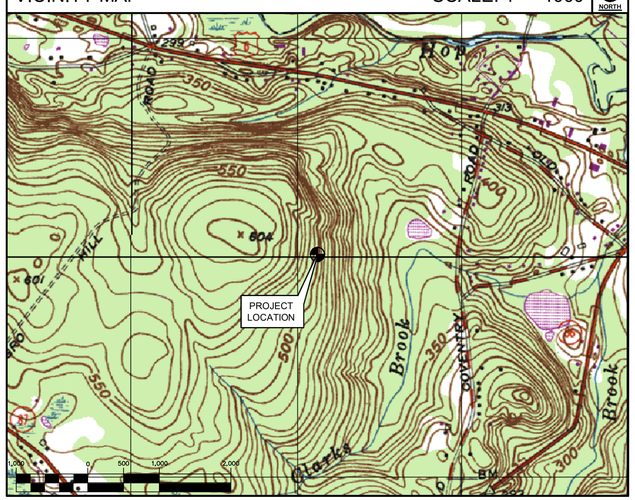
FROM: 500 ENTERPRISE DRIVE, ROCKY HILL, CONNECTICUT
TO: 14 THOMPSON HILL ROAD, COLUMBIA, CONNECTICUT

1.	HEAD NORTHEAST ON ENTERPRISE DR TOWARD CAPITAL BLVD	0.31 MI
2.	TURN LEFT ONTO CAPITAL BLVD	0.27 MI
3.	TURN LEFT ONTO WEST ST	0.16 MI
4.	TURN LEFT TO MERGE ONTO I-91 N TOWARD HARTFORD	7.79 MI
5.	MERGE ONTO CT-15 N/WILBUR CROSS HWY N EXIT 29 TOWARD I-84 E/E HARTFORD/BOSTON	2.14 MI
6.	CT-15 N/WILBUR CROSS HWY N BECOMES I-84 E/US-6 E/WILBUR CROSS HWY N.	1.50 MI
7.	KEEP RIGHT TO TAKE I-384 E EXIT 59 TOWARD PROVIDENCE	8.67 MI
8.	I-384 E BECOMES US-6 E/US-44 E/BOSTON TURNPIKE	0.22 MI
9.	TURN US-6 E TOWARD WILLIMANTIC/PROVIDENCE	10.12 MI
10.	TURN RIGHT ONO EDGARTON RD.	0.15 MI
11.	TAKE THE 1ST RIGHT ONTO THOMPSON HILL	0.18 MI

VICINITY MAP

SCALE: 1" = 1000'

NORTH



PROJECT SUMMARY

1. THE PROPOSED SCOPE OF WORK CONSISTS OF A MODIFICATION TO THE EXISTING UNMANNED TELECOMMUNICATIONS FACILITY INCLUDING THE FOLLOWING:
   - A. RELOCATE EXISTING LTE HEXPORT ANTENNA FROM POS.3 TO POSITION 2.
   - B. INSTALL (3) NEW TWELVE-PORT ANTENNA AT POS.3
   - C. REMOVE AND REPLACE (3) EXISTING RRUS-12+A2'S.
   - D. INSTALL (3) NEW RRUS-32 B2'S POS.2
   - E. INSTALL (3) NEW RRUS-32'S BEHIND PROPOSED POS.3 ANTENNA.
   - F. INSTALL (3) NEW B14 4478'S BEHIND PROPOSED POS.3 ANTENNA.
   - G. INSTALL (1) NEW SURGE ARRESTOR.
   - H. REMOVE AND REPLACE EXISTING DUL FOR A NEW 5216 UNIT WITHIN EXISTING PURCELL EQUIPMENT CABINET WITHIN EXISTING COMPOUND AREA.
   - I. DECOMMISSION AND REMOVE EXISTING GSM CABINET WITHIN EXISTING COMPOUND AREA.
   - J. DECOMMISSION AND REMOVE EXISTING UMTS CABINET WITHIN EXISTING COMPOUND AREA.
   - K. REMOVE AND REPLACE EXISTING 3-SIDED TOWER MOUNT FOR A NEW PLATFORM MOUNT TO ACCOMMODATE REQUIRED ANTENNA SEPARATIONS.

PROJECT INFORMATION

AT&T SITE NUMBER:	CT5861
AT&T SITE NAME:	COLUMBIA NORTH
SITE ADDRESS:	CROWN CASTLE SITE NO.: 876391 14 THOMPSON HILL ROAD COLUMBIA, CT 06237
LESSEE/APPLICANT:	AT&T MOBILITY 500 ENTERPRISE DRIVE, SUITE 3A ROCKY HILL, CT 06067
ENGINEER:	CENTEK ENGINEERING, INC. 63-2 NORTH BRANFORD RD. BRANFORD, CT 06405
PROJECT COORDINATES:	LATITUDE: 41°-43'-03.42" N LONGITUDE: 72°-17'-59.12" W GROUND ELEVATION: ±576' AMSL SITE COORDINATES AND GROUND ELEVATION REFERENCED FROM 1-A SURVEY PREPARED FOR AT&T MOBILITY BY EBI CONSULTING DATED SEPTEMBER 14, 2012.

SHEET INDEX

SHT. NO.	DESCRIPTION	REV.
T-1	TITLE SHEET	0
N-1	NOTES, SPECIFICATIONS AND ANTENNA SCHEDULE	0
C-1	PLANS AND ELEVATION	0
C-2	LTE 3C/4C ANTENNA LAYOUT PLANS	0
C-3	DETAILS	0
E-1	LTE SCHEMATIC DIAGRAM AND NOTES	0
E-2	LTE WIRING DIAGRAM	0
E-3	TYPICAL ELECTRICAL DETAILS	0

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	04/30/18	KAWJR	DMD	CONSTRUCTION DOCUMENTS - ISSUED FOR CONSTRUCTION

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WIRELESS COMMUNICATIONS FACILITY
COLUMBIA NORTH
CT5861 - LTE 3C WCS/4C & BWE
14 THOMPSON HILL ROAD
COLUMBIA, CT 06237

DATE: 10/04/17
SCALE: AS NOTED
JOB NO. 17004.57

TITLE SHEET

T-1

Sheet No. 1 of 8

NOTES AND SPECIFICATIONS

DESIGN BASIS:

GOVERNING CODE: 2012 INTERNATIONAL BUILDING (IBC) AS MODIFIED BY THE 2016 CT STATE BUILDING CODE AND AMENDMENTS.

1. DESIGN CRITERIA:

- WIND LOAD: PER EIA/TIA 222 G–05 (ANTENNA MOUNTS): 95–105 MPH (3 SECOND GUST)
- RISK CATEGORY: II (BASED ON IBC TABLE 1604.5)
- BASIC WIND SPEED (OTHER STRUCTURE): 101 MPH (NOMINAL DESIGN WIND SPEED) (EXPOSURE B/IMPORTANCE FACTOR 1.0 BASED ON ASCE 7–10) PER 2012 INTERNATIONAL BUILDING CODE (IBC) AS MODIFIED BY THE 2016 CONNECTICUT SUPPLEMENT AND AMENDMENTS.
- SEISMIC LOAD (DOES NOT CONTROL): PER ASCE 7–10 MINIMUM DESIGN LOADS FOR BUILDING AND OTHER STRUCTURES.

GENERAL NOTES:

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

STRUCTURAL STEEL

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

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

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

PAINT NOTES

PAINTING SCHEDULE:

1. ANTENNA PANELS:
   A. SHERWIN WILLIAMS POLANE–B
   B. COLOR TO BE MATCHED WITH EXISTING TOWER STRUCTURE.
2. COAXIAL CABLES:
   A. ONE COAT OF DTM BONDING PRIMER (2–5 MILS. DRY FINISH)
   B. TWO COATS OF DTM ACRYLIC PRIMER/FINISH (2.5–5 MILS. DRY FINISH)
   C. COLOR TO BE FIELD MATCHED WITH EXISTING STRUCTURE.

EXAMINATION AND PREPARATION:

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

CLEANING:

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

APPLICATION:

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

COMPLETED WORK:

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

ANTENNA SCHEDULE

SECTOR	EXISTING/PROPOSED	BAND	ANTENNA	SIZE (INCHES) (L x W x D)	ANTENNA ℄ HEIGHT	AZIMUTH	(E/P) TMA/DIPLEXER/TRIPLEXER (QTY)	(E/P) RRU (QTY)	FEEDER	(E/P) RAYCAP (QTY)
A1	EXISTING	UMTS 850	7770	55X11X5	±140'	80°	(E) POWERWAVE / LGP 21901 (2) | (E) POWERWAVE / LGP 17201 (FULL DUAL BAND) (2)		(2) 1–5/8"ø COAX	
A2	EXISTING	LTE 700/1900/1900	HPA–65R–BUU–H6	72.0X14.8X9.0	±140'	80°		(E) RRUS–11 (1), (P) RRUS–32 B2 (1)	FIBER AND DC POWER	(E) RAYCAP DC6–48–60–18–8C (1)
A3	PROPOSED	LTE 700/WCS	EPBQ–654L8H6–L2	73X21X6.3	±140'	80°		(P) RRUS–32 B2 (1), (P) B14 4478 (1)	FIBER AND DC POWER	(P) RAYCAP DC6–48–60–18–8C (1)
A4	EXISTING	GSM (DECOM)	7770	55X11X5	±140'	80°	(E) POWERWAVE / LGP 21901 (4)		FIBER AND DC POWER	
B1	EXISTING	UMTS 850	7770	55X11X5	±140'	140°	(E) POWERWAVE / LGP 21901 (2) | (E) POWERWAVE / LGP 17201 (FULL DUAL BAND) (2)		(2) 1–5/8"ø COAX	
B2	EXISTING	LTE 700/1900/1900	HPA–65R–BUU–H6	72.0X14.8X9.0	±140'	140°		(E) RRUS–11 (1), (P) RRUS–32 B2 (1)	FIBER AND DC POWER	
B3	PROPOSED	LTE 700/WCS	EPBQ–654L8H6–L2	73X21X6.3	±140'	140°		(P) RRUS–32 B2 (1), (P) B14 4478 (1)	FIBER AND DC POWER	
B4	EXISTING	GSM (DECOM)	7770	55X11X5	±140'	140°	(E) POWERWAVE / LGP 21901 (4)		FIBER AND DC POWER	
C1	EXISTING	UMTS 850	7770	55X11X5	±140'	310°	(E) POWERWAVE / LGP 21901 (2) | (E) POWERWAVE / LGP 17201 (FULL DUAL BAND) (2)		(2) 1–5/8"ø COAX	
C2	EXISTING	LTE 700/1900/1900	HPA–65R–BUU–H6	72.0X14.8X9.0	±140'	310°		(E) RRUS–11 (1), (P) RRUS–32 B2 (1)	FIBER AND DC POWER	
C3	PROPOSED	LTE 700/WCS	EPBQ–654L8H6–L2	73X21X6.3	±140'	310°		(P) RRUS–32 B2 (1), (P) B14 4478 (1)	FIBER AND DC POWER	
C4	EXISTING	GSM (DECOM)	7770	55X11X5	±140'	310°	(E) POWERWAVE / LGP 21901 (4)		FIBER AND DC POWER	

RRU	SIZE (INCHES) (L x W x D)
RRUS–11	19.7 x 17 x 7.2
RRUS–32 B2	27.2 x 12.1 x 7
RRUS–32	27.2 x 12.1 x 7
B14 4478	14.9 x 13.1 x 7.3

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	04/30/18	KAWJR	DMD	CONSTRUCTION DOCUMENTS – ISSUED FOR CONSTRUCTION

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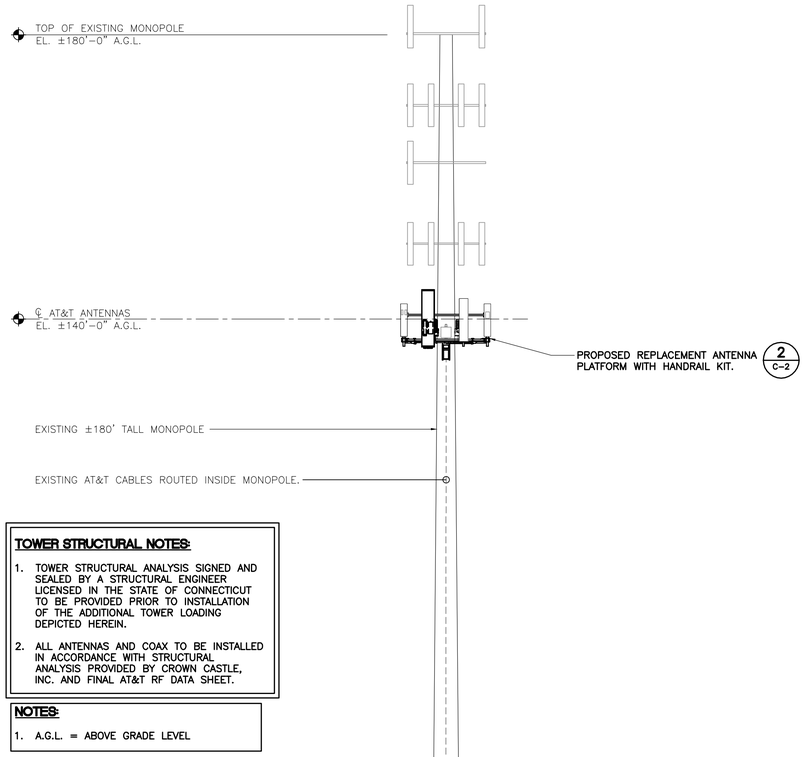
DATE: 10/04/17
SCALE: AS NOTED
JOB NO. 17004.57

NOTES, SPECIFICATIONS & ANTENNA SCHEDULE

N–1

Sheet No. 2 of 8

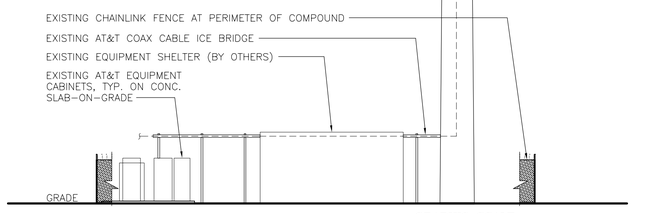


TOWER STRUCTURAL NOTES:

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

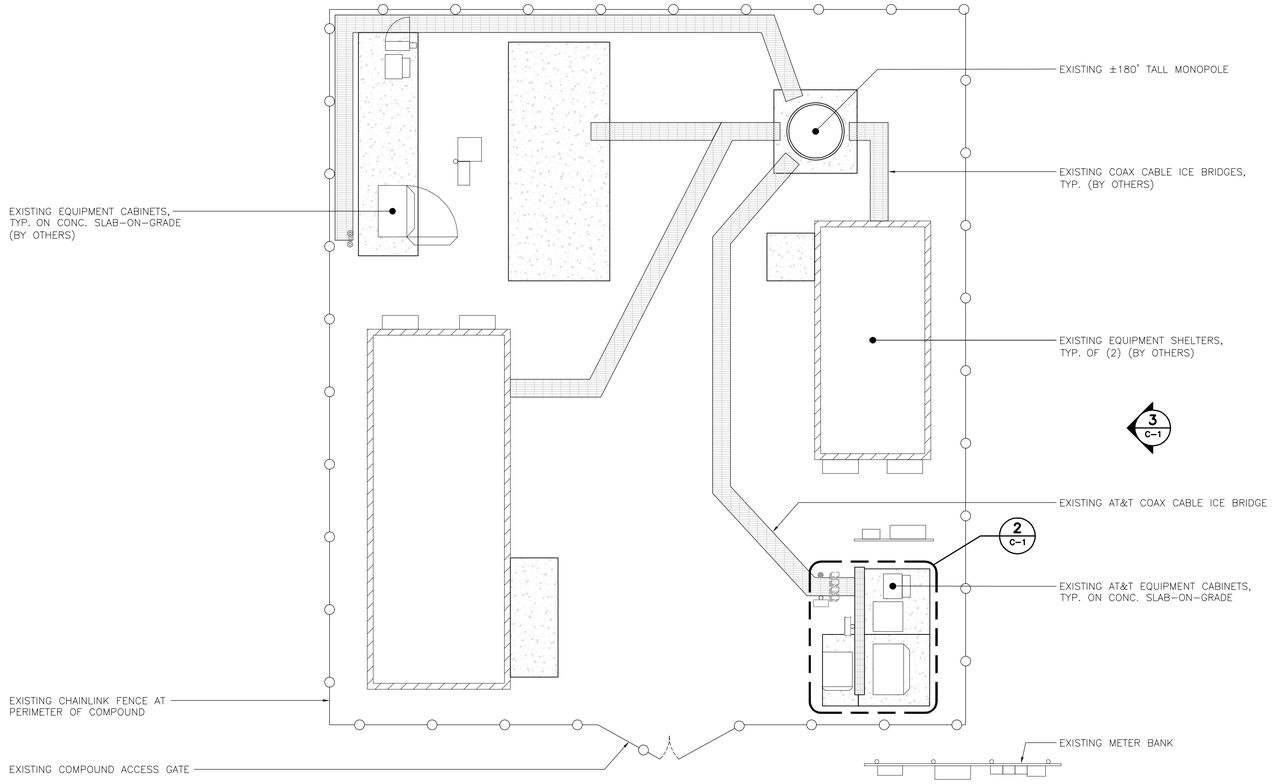
NOTES:

1. A.G.L. = ABOVE GRADE LEVEL



3 C-1 **EAST TOWER ELEVATION**
SCALE: 1" = 10'

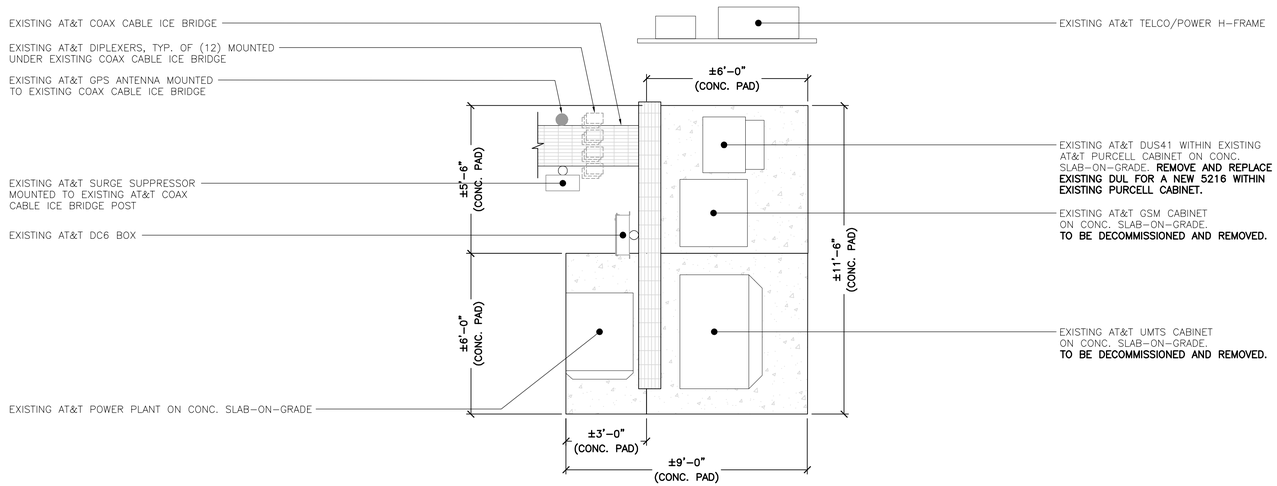
GRAPHIC SCALE
10 0 5 10 20 40
(IN FEET)
1 inch = 10 ft.



1 C-1 **COMPOUND PLAN**
SCALE: 1" = 6'

TRUE NORTH

GRAPHIC SCALE
6 0 3 6 12 24
(IN FEET)
1 inch = 6 ft.



2 C-1 **EQUIPMENT LAYOUT PLAN**
SCALE: 3/8" = 1'-0"

TRUE NORTH

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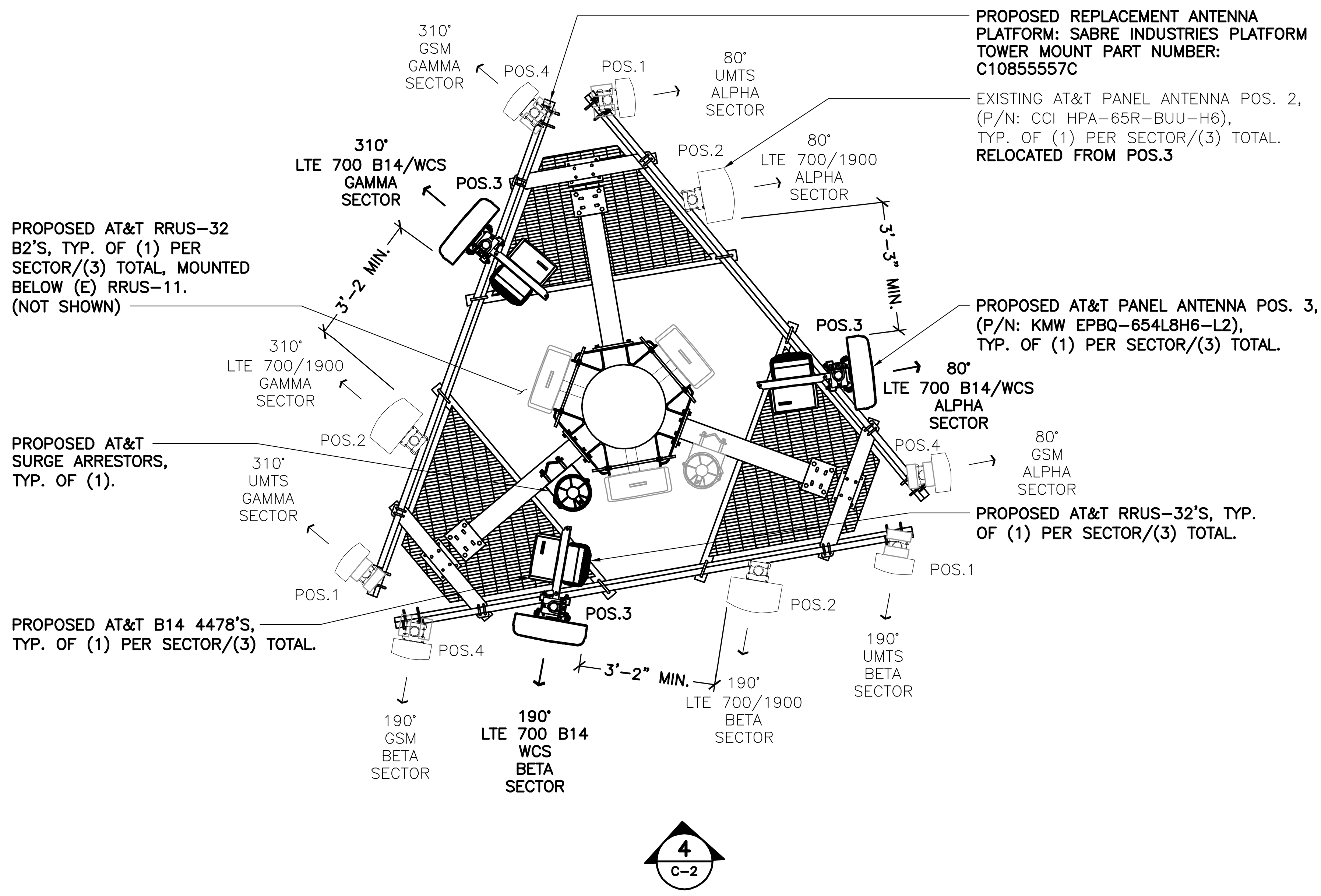
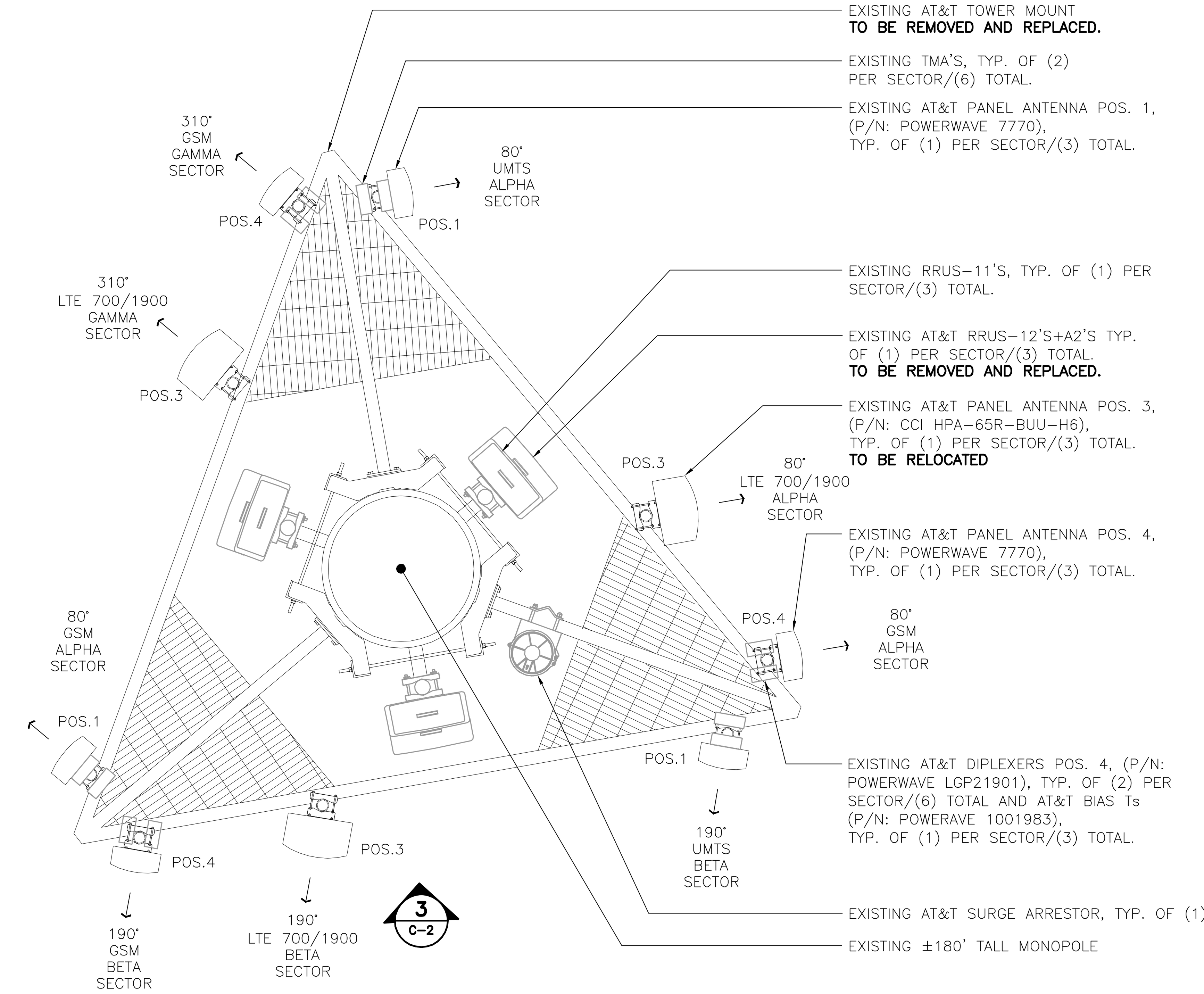
PLANS AND ELEVATION

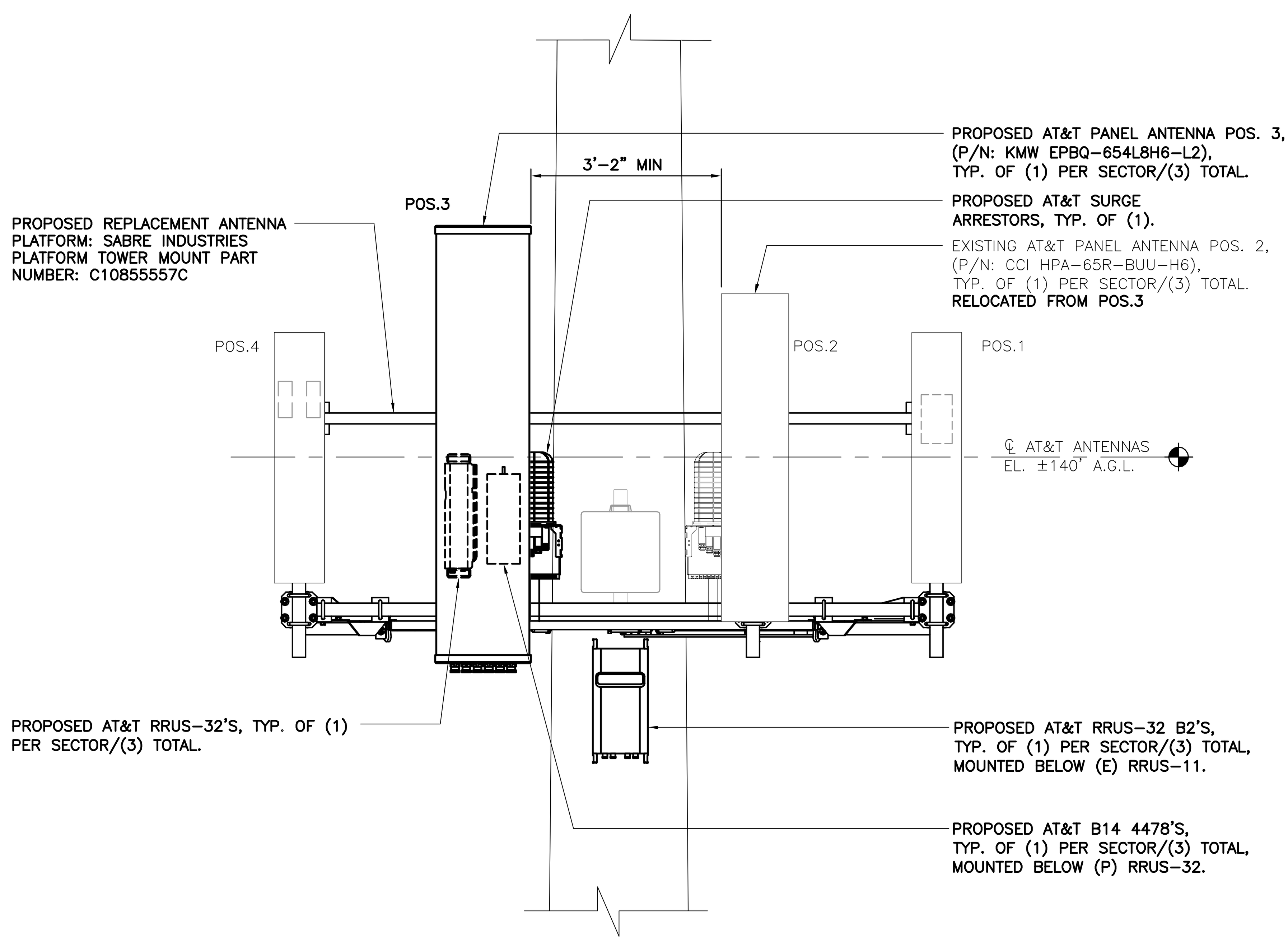
C-1



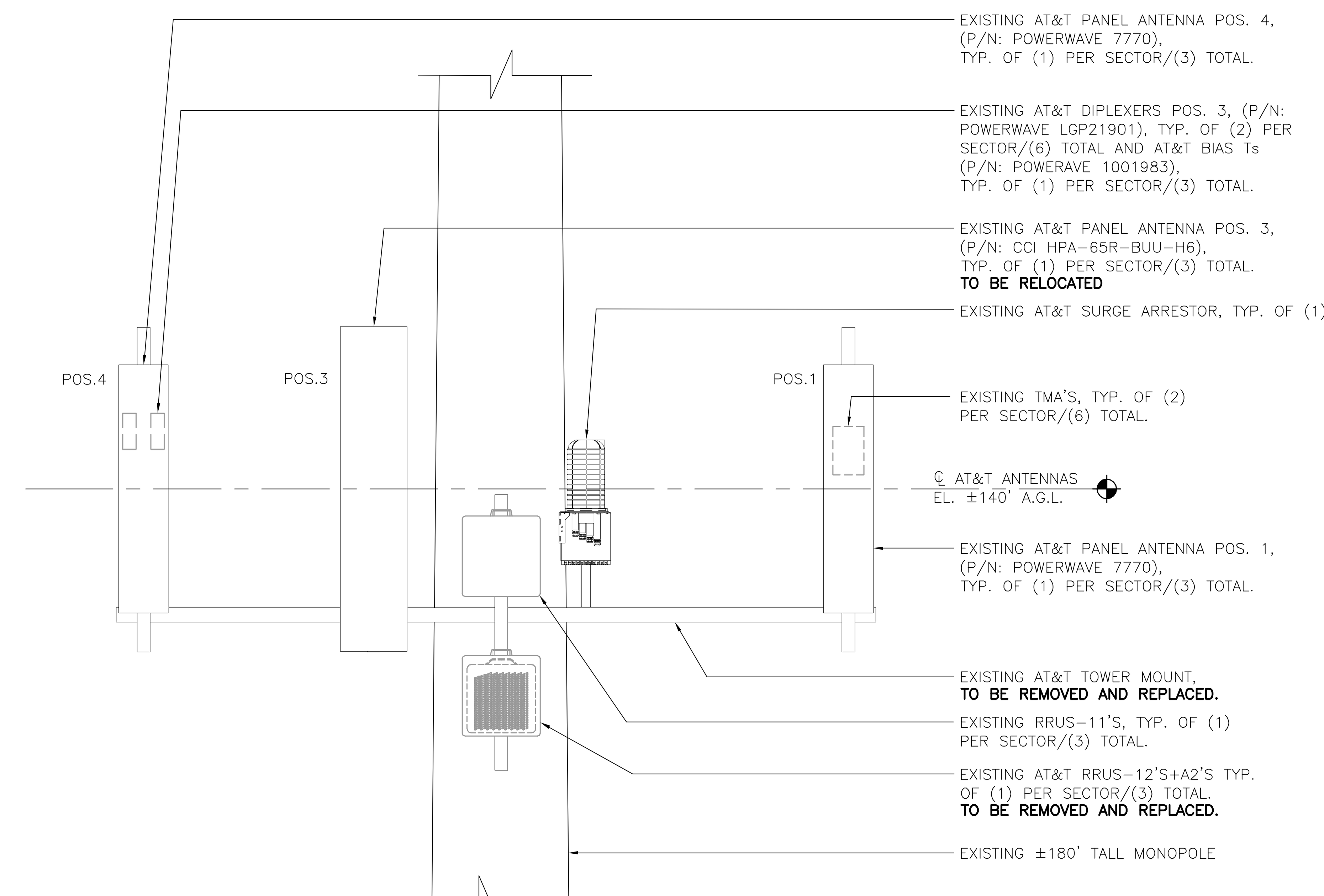
2 C-2 **PROPOSED ANTENNA PLAN** NORTH
SCALE: 3/8" = 1'-0"



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



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



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

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LTE 3C/4C ANTENNA LAYOUT PLANS

C-2

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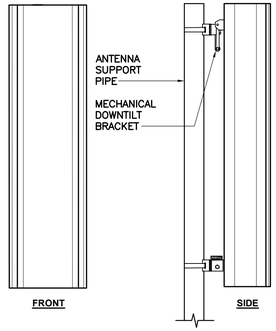
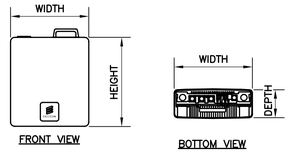


ALPHA/BETA/GAMMA ANTENNA		
EQUIPMENT	DIMENSIONS	WEIGHT
MAKE: KMW MODEL: EPBQ-654L8H8-L2	96"L x 21"W x 6.3"D	86 LBS.

1 C-3 PROPOSED ANTENNA DETAIL
SCALE: 1/2" = 1'-0"

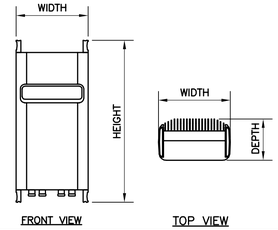


B14 4478

RRU (REMOTE RADIO UNIT)			
EQUIPMENT	DIMENSIONS	WEIGHT	CLEARANCES
MAKE: ERICSSON MODEL: B14 4478	14.9"L x 13.1"W x 7.3"D	60 LBS.	ABOVE: 16" MIN. BELOW: 12" MIN. FRONT: 36" MIN.

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

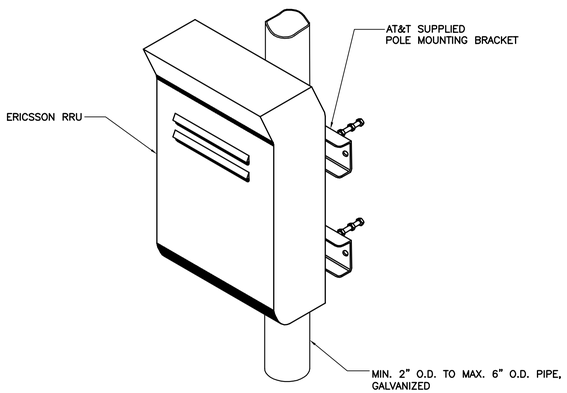
2 C-3 ERICSSON B14 4478 DETAIL
SCALE: 1" = 1'-0"



RRU (REMOTE RADIO UNIT)			
EQUIPMENT	DIMENSIONS	WEIGHT	CLEARANCES
MAKE: ERICSSON MODEL: RRUS-32 B2	27.17"H x 12.05"W x 7.01"D	52.91 LBS.	ABOVE: 16" MIN. BELOW: 12" MIN. FRONT: 36" MIN.
MAKE: ERICSSON MODEL: RRUS-32	27.17"H x 12.05"W x 7.01"D	52.91 LBS.	ABOVE: 16" MIN. BELOW: 12" MIN. FRONT: 36" MIN.

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

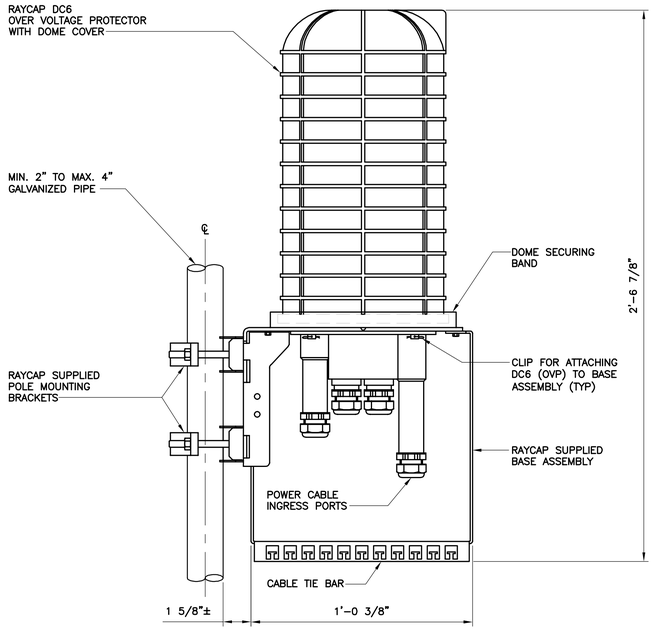
3 C-3 ERICSSON REMOTE RADIO UNITS
SCALE: 1" = 1'-0"



ISOMETRIC VIEW

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

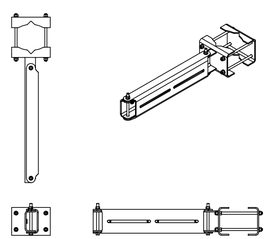
4 C-3 TYPICAL RRUS MOUNTING DETAILS
SCALE: NTS



ELEVATION

NOTES:
1. RAYCAP VIA AT&T SUPPLIES THE DC6 OVER VOLTAGE PROTECTOR AND PIPE MOUNTING BRACKETS. SUBCONTRACTOR SHALL SUPPLY THE PIPE.

5 C-3 RAYCAP DC6 MOUNTING DETAIL
SCALE: 3" = 1'-0"



RRU DUAL SWIVEL MOUNT			
EQUIPMENT		DIMENSIONS	WEIGHT
MAKE: PART NO.:	SITE PRO 1 RRUDSM	27.75"L x 6.5"W x 4.7"D	39.4 LBS.

6 C-3 RRH DUAL SWIVEL MOUNT DETAIL
NOT TO SCALE

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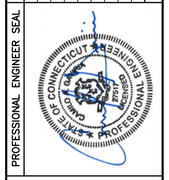

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DETAILS

C-3

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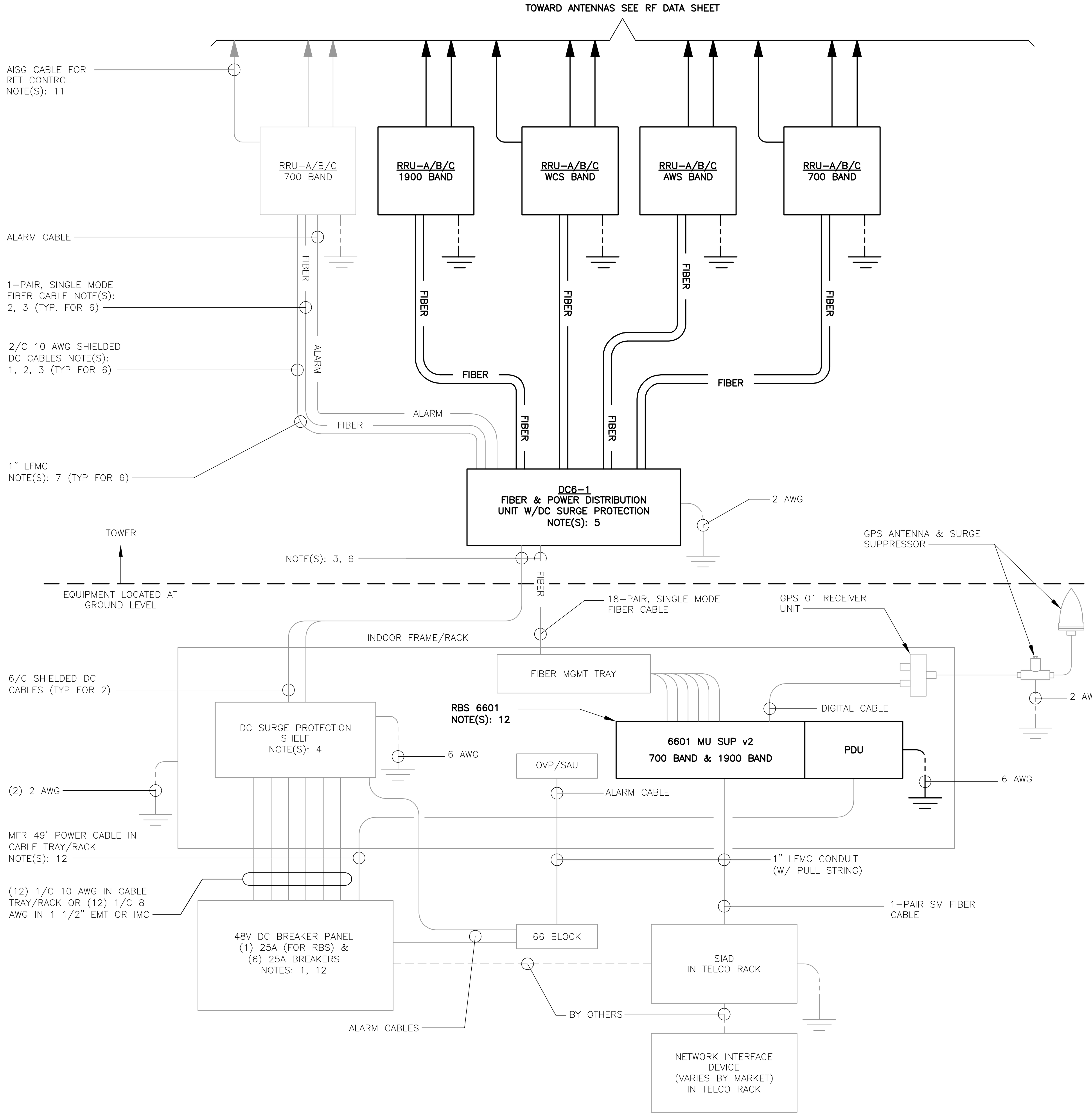

1 / E-1 LTE SCHEMATIC DIAGRAM

NOT TO SCALE

LTE SCHEMATIC DIAGRAM NOTES:

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

ELECTRICAL NOTES

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

TESTS BY INDEPENDENT ELECTRICAL TESTING FIRM

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

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

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

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

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

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

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

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TYPICAL ELECTRICAL DETAILS & NOTES

E-3

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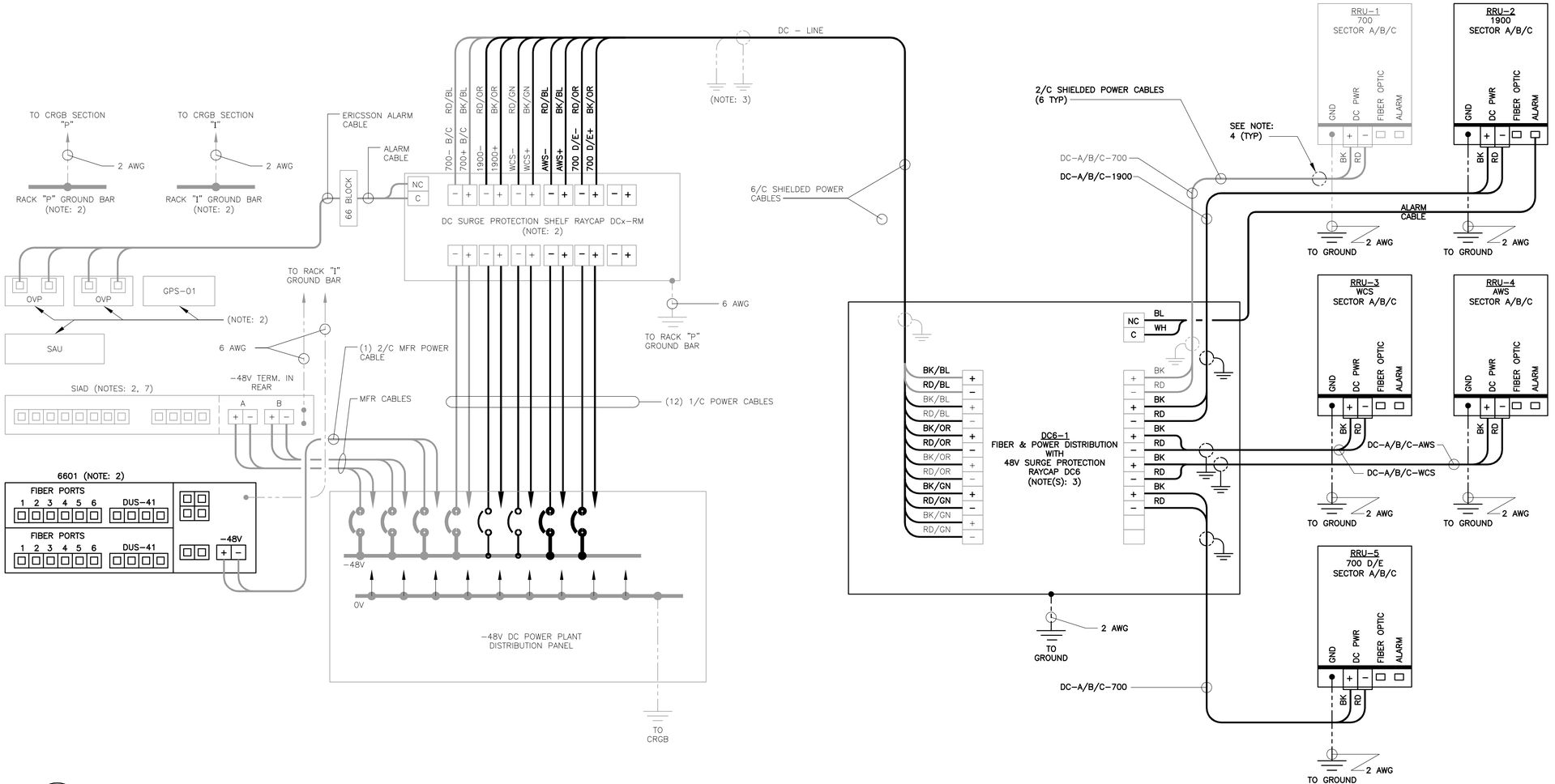

1 E-2 LTE WIRING DIAGRAM

NOT TO SCALE

LTE WIRING DIAGRAM NOTES:

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

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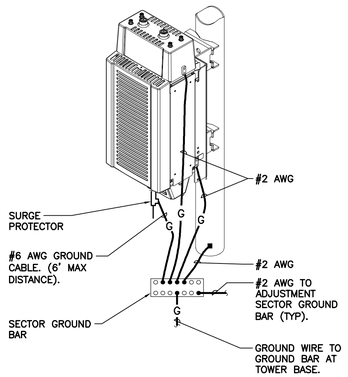
TYPICAL ELECTRICAL DETAILS & NOTES

E-3

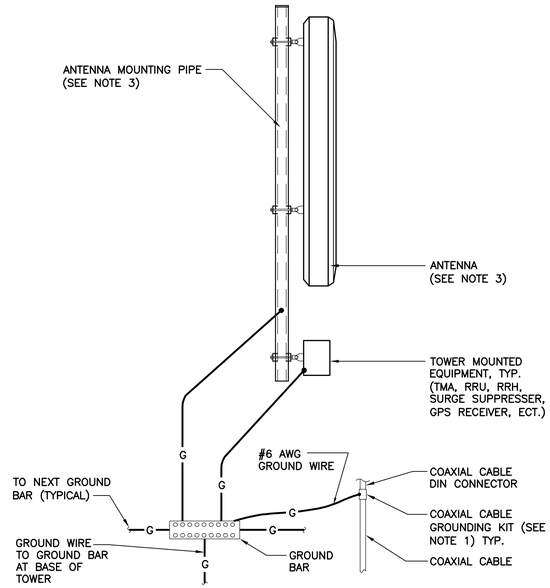
Sheet No. 7 of 8

EACH RRH CABINET SHALL BE GROUNDED IN THE FOLLOWING MANNER:

1. AT TOP OF THE CABINET
2. AT RIGHT SIDE OF THE CABINET.



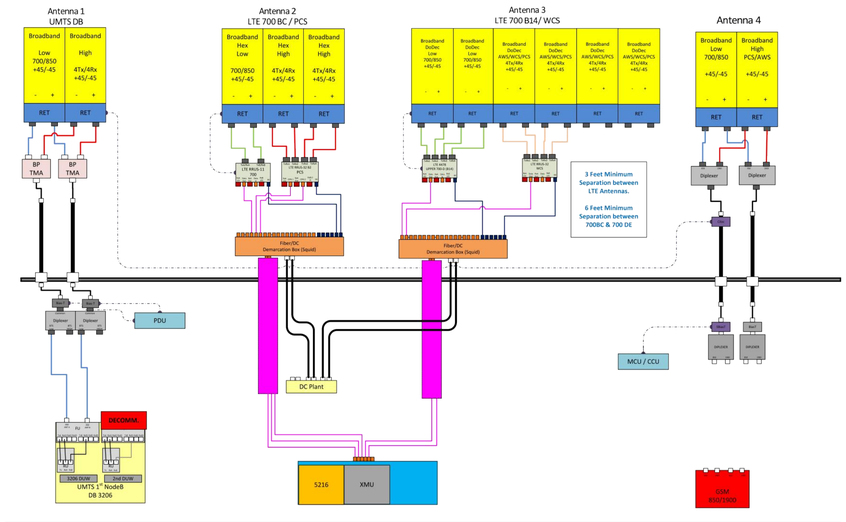
2 / E-3 **RRU POLE MOUNT GROUNDING**
NOT TO SCALE



NOTES:

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

1 / E-3 **TYPICAL ANTENNA GROUNDING DETAIL**
NOT TO SCALE



3 / E-3 **RF PLUMBING DIAGRAM**
NOT TO SCALE

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TYPICAL ELECTRICAL DETAILS

E-3
Sheet No. 8 of 8

Date: **October 01, 2018**

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	Carrier Site Name:	10070976
Crown Castle Designation:	**Crown Castle BU Number:**	876391
	Crown Castle Site Name:	COLUMBIA / DEOJAY
	Crown Castle JDE Job Number:	534005
	Crown Castle Work Order Number:	1637538
	Crown Castle Order Number:	460870 Rev. 0
Engineering Firm Designation:	**AW Solutions Project Number:**	876391
Site Data:	**14 Thompson Hill Rd, COLUMBIA, Tolland County, CT** **Latitude *41° 43' 3.44"*, Longitude *-72° 17' 59.09"*** **180 Foot - Monopole Tower**	

Ms. Haas,

AW Solutions is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above mentioned tower.

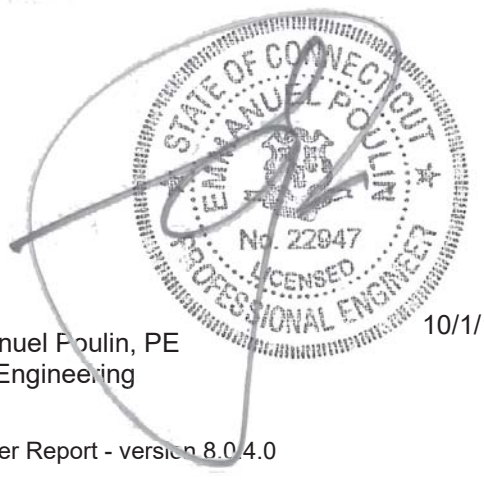
The purpose of the analysis is to determine acceptability of the tower stress level. Based on our analysis we have determined the tower stress level for the structure and foundation, under the following load case, to be:

LC7: Proposed Equipment Configuration **Sufficient Capacity**

The analysis has been performed in accordance with the TIA-222-G Standard. This analysis utilizes an ultimate 3-second gust wind speed of 130 mph (converted to an equivalent 101 mph nominal 3-second gust wind speed per Section 1609.3.1 for use with TIA-222-G) as required by the 2016 Connecticut State Building Code. Exposure Category C and Risk Category II were used in this analysis.

Structural analysis prepared by: Michael Brown, EI / EP

Respectfully submitted by:



10/1/18

Emmanuel Poulin, PE
VP of Engineering

tnxTower Report - version 8.0.4.0

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 180 ft Monopole tower designed by ENGINEERED ENDEAVORS, INC.

2) ANALYSIS CRITERIA

Building Code:	2016 Connecticut State Building Code
TIA-222 Revision:	TIA-222-G
Risk Category:	II
Wind Speed:	101 mph
Exposure Category:	C
Topographic Factor:	1
Ice Thickness:	0.75 in
Wind Speed with Ice:	50 mph
Service Wind Speed:	60 mph

Table 1 - Proposed Equipment Configuration

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
141.0	141.0	3	ericsson	RRUS 11	-	-
		1	tower mounts	Pipe Mount [PM 601-3]		
140.0	140.0	3	cci antennas	HPA-65R-BUU-H6	2 4 12 1	3/8 7/16 1-5/8 2
		3	ericsson	RRUS 32		
		3	ericsson	RRUS 32 B2		
		3	ericsson	RRUS 4478 B14		
		3	kmw communications	EPBQ-654L8H6-L2		
		3	powerwave technologies	1001983		
		12	powerwave technologies	7020.00		
		6	powerwave technologies	7770.00		
		6	powerwave technologies	LGP 17201		
		6	powerwave technologies	LGP21901		
		2	raycap	DC6-48-60-18-8F		
		1	sabre	C10855557C - Platform Mount		

Table 2 - Other Considered Equipment

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
180.0	181.0	3	alcatel lucent	PCS 1900MHZ 4X45W-65MHZ	4	1-1/4
		6	alcatel lucent	RRH2X50-800		
		3	alcatel lucent	TD-RRH8X20-25		
		3	commscope	NNVV-65B-R4		
		3	rfs celwave	APXVTM14-ALU-I20		
	180.0	1	tower mounts	Platform Mount [LP 301-1]		
161.0	161.0	3	ericsson	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	7	1-5/8
		3	ericsson	Ericsson Air 21 B4A B12P-B8P 4FT w/ Mount Pipe		
		3	ericsson	KRY 112 144/2		
		3	ericsson	RRUS 11 B12		
		1	tower mounts	Platform Mount [LP 305-1]		
147.0	150.0	3	alcatel lucent	RRH2X60-AWS	1 14	1/2 1-5/8
		3	alcatel lucent	RRH2X60-PCS		
		6	andrew	HBXX-6517DS-A2M w/ Mount Pipe		
		6	andrew	LNX-6514DS-A1M w/ Mount Pipe		
		1	lucent	KS24019-L112A		
		2	rfs celwave	DB-T1-6Z-8AB-0Z		
		6	rfs celwave	FD9R6004/1C-3L		
	147.0	1	tower mounts	Platform Mount [LP 712-1]		
83.0	84.0	2	kathrein	OG-860/1920/GPS-A	2 2	1/2 1-1/4
	83.0	2	tower mounts	Side Arm Mount [SO 701-1]		
78.0	79.0	1	kathrein	OG-860/1920/GPS-A	1	1/2
	78.0	1	tower mounts	Side Arm Mount [SO 701-1]		

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	Goodkind & O'Dea, Inc	1613526	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	EEI	1613632	CCISITES
4-TOWER MANUFACTURER DRAWINGS	EEI	1614546	CCISITES

3.1) Analysis Method

tnxTower (version 8.0.4.0), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A.

3.2) Assumptions

1) Tower and structures were built and maintained in accordance with the manufacturer's specifications.
2) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.

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

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary) (Monopole Tower)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	180 - 131.75	Pole	TP31.39x21x0.25	1	-14.42	1686.69	56.8	Pass
L2	131.75 - 86.71	Pole	TP40.46x29.921x0.375	2	-24.94	3408.11	75.8	Pass
L3	86.71 - 43.16	Pole	TP48.96x38.5229x0.4375	3	-39.70	4767.07	80.3	Pass
L4	43.16 - 0	Pole	TP57.25x46.668x0.5	4	-62.03	6465.70	78.0	Pass
							Summary	
						Pole (L3)	80.3	Pass
						Rating =	80.3	Pass

Table 5 - Tower Component Stresses vs. Capacity (Monopole Tower) - LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	84.1	Pass
1	Base Plate	0	91.9	Pass
1	Base Foundation Structural	0	95.7	Pass
1	Base Foundation Soil Interaction	0	93.8	Pass

Structure Rating (max from all components) =	95.7%

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

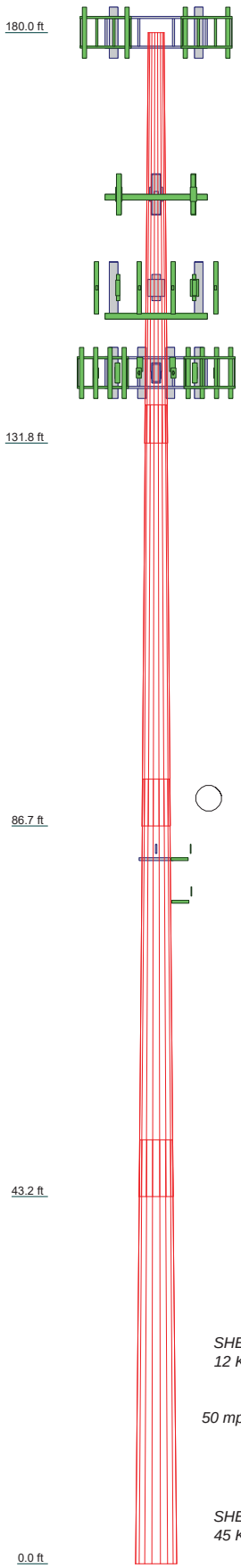
4.1) Recommendations

The tower and its foundation have sufficient capacity to carry the proposed load configuration. No modifications are required at this time.

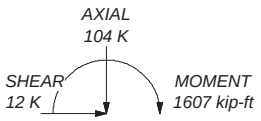
APPENDIX A

TNXTOWER OUTPUT

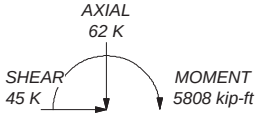
Section	Length (ft)	Number of Sides	Thickness (in)	Socket Length (ft)	Top Dia (in)	Bot Dia (in)	Grade	Weight (K)
1	48.2500	18	0.2500	4.5000	21.0000	31.3900	A572-65	3.4
2	49.5400	18	0.3750	5.5800	29.9210	40.4600		7.0
3	49.1300	18	0.4375	6.6700	38.5229	48.9600		10.1
4	49.8300	18	0.5000		46.6680	57.2500		13.8



ALL REACTIONS ARE FACTORED



TORQUE 0 kip-ft
50 mph WIND - 0.7500 in ICE



TORQUE 1 kip-ft
REACTIONS - 101 mph WIND

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
APXVTM14-ALU-I20	180	RRH2X60-AWS	147
APXVTM14-ALU-I20	180	DB-T1-6Z-8AB-0Z	147
APXVTM14-ALU-I20	180	DB-T1-6Z-8AB-0Z	147
NNVV-65B-R4	180	RRH2X60-PCS	147
NNVV-65B-R4	180	RRH2X60-PCS	147
NNVV-65B-R4	180	RRH2X60-PCS	147
PCS 1900MHZ 4X45W-65MHZ	180	Platform Mount [LP 712-1]	147
PCS 1900MHZ 4X45W-65MHZ	180	Pipe Mount [PM 601-3]	141
PCS 1900MHZ 4X45W-65MHZ	180	RRUS 11	141
(2) RRH2X50-800	180	RRUS 11	141
(2) RRH2X50-800	180	RRUS 11	141
(2) RRH2X50-800	180	(2) 7770.00	140
TD-RRH8X20-25	180	(2) 7770.00	140
TD-RRH8X20-25	180	(2) 7770.00	140
TD-RRH8X20-25	180	HPA-65R-BUU-H6	140
Platform Mount [LP 301-1]	180	HPA-65R-BUU-H6	140
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	161	HPA-65R-BUU-H6	140
		(2) LGP 17201	140
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	161	(2) LGP 17201	140
		(2) LGP 17201	140
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	161	RRUS 32 B2	140
		RRUS 32 B2	140
Ericsson Air 21 B4A B12P-B8P 4FT w/ Mount Pipe	161	1001983	140
		1001983	140
Ericsson Air 21 B4A B12P-B8P 4FT w/ Mount Pipe	161	1001983	140
		(2) LGP21901	140
Ericsson Air 21 B4A B12P-B8P 4FT w/ Mount Pipe	161	(2) LGP21901	140
KRY 112 144/2	161	(2) LGP21901	140
KRY 112 144/2	161	EPBQ-654L8H6-L2	140
KRY 112 144/2	161	EPBQ-654L8H6-L2	140
RRUS 11 B12	161	EPBQ-654L8H6-L2	140
RRUS 11 B12	161	(4) 7020.00	140
RRUS 11 B12	161	(4) 7020.00	140
Platform Mount [LP 305-1]	161	(4) 7020.00	140
6' x 2" Mount Pipe	161	RRUS 4478 B14	140
6' x 2" Mount Pipe	161	RRUS 4478 B14	140
6' x 2" Mount Pipe	161	RRUS 4478 B14	140
(2) LNX-6514DS-A1M w/ Mount Pipe	147	RRUS 32	140
(2) LNX-6514DS-A1M w/ Mount Pipe	147	RRUS 32	140
(2) LNX-6514DS-A1M w/ Mount Pipe	147	RRUS 32	140
(2) HBXX-6517DS-A2M w/ Mount Pipe	147	RRUS 32 B2	140
(2) HBXX-6517DS-A2M w/ Mount Pipe	147	(2) DC6-48-60-18-8F	140
(2) HBXX-6517DS-A2M w/ Mount Pipe	147	Platform Mount [LP 1301-1]	140
KS24019-L112A	147	OG-860/1920/GPS-A	83
(2) FD9R6004/1C-3L	147	OG-860/1920/GPS-A	83
(2) FD9R6004/1C-3L	147	Side Arm Mount [SO 701-1]	83
(2) FD9R6004/1C-3L	147	Side Arm Mount [SO 701-1]	83
RRH2X60-AWS	147	OG-860/1920/GPS-A	78
RRH2X60-AWS	147	Side Arm Mount [SO 701-1]	78

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower is located in Tolland County, Connecticut.
2. Tower designed for Exposure C to the TIA-222-G Standard.
3. Tower designed for a 101 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 50 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Structure Class II.
7. Topographic Category 1 with Crest Height of 0.0000 ft
8. TOWER RATING: 80.3%

AW Solutions
300 Crown Oak Centre Drive
Longwood, FL 32750
AW Solutions
Phone: (407) 260-0231
FAX: (407) 260-0749

Job: ***BU876391***			
Project: ***WO1605378***			
Client: Crown Castle	Drawn by: Michael Brown	App'd:	
Code: TIA-222-G	Date: 10/01/18	Scale: NTS	
Path: R:\Central_Data\CROWN CASTLE\CRC - STRUCTURAL\BU876391 - WO1637538\ENGINEERING\BU876391 - WO1637538.eti		Dwg No. E-1	

Tower Input Data

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

1) Tower is located in Tolland County, Connecticut.
2) Basic wind speed of 101 mph.
3) Structure Class II.
4) Exposure Category C.
5) Topographic Category 1.
6) Crest Height 0.0000 ft.
7) Nominal ice thickness of 0.7500 in.
8) Ice thickness is considered to increase with height.
9) Ice density of 56.00 pcf.
10) A wind speed of 50 mph is used in combination with ice.
11) Temperature drop of 50 °F.
12) Deflections calculated using a wind speed of 60 mph.
13) A non-linear (P-delta) analysis was used.
14) Pressures are calculated at each section.
15) Stress ratio used in pole design is 1.
16) 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	Ignore KL/ry For 60 Deg. Angle Legs	Pole Without Linear Attachments
		Pole With Shroud Or No Appurtenances
		Outside and Inside Corner Radii Are Known

Tapered Pole Section Geometry

Section	*Elevation*	*Section Length*	*Splice Length*	*Number of Sides*	*Top Diameter*	*Bottom Diameter*	*Wall Thickness*	*Bend Radius*	*Pole Grade*
	ft	*ft*	*ft*		*in*	*in*	*in*	*in*	
L1	180.0000-131.7500	48.2500	4.50	18	21.0000	31.3900	0.2500	1.0000	A572-65 (65 ksi)
L2	131.7500-86.7100	49.5400	5.58	18	29.9210	40.4600	0.3750	1.5000	A572-65 (65 ksi)
L3	86.7100-43.1600	49.1300	6.67	18	38.5229	48.9600	0.4375	1.7500	A572-65 (65 ksi)

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L4	43.1600-0.0000	49.8300		18	46.6680	57.2500	0.5000	2.0000	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	21.2854	16.4651	895.6507	7.3663	10.6680	83.9568	1792.4800	8.2341	3.2560	13.024
	31.8357	24.7096	3027.1937	11.0547	15.9461	189.8389	6058.3706	12.3571	5.0846	20.339
L2	31.2968	35.1671	3878.5647	10.4888	15.1999	255.1711	7762.2328	17.5869	4.6061	12.283
	41.0263	47.7112	9685.4835	14.2302	20.5537	471.2287	19383.7113	23.8601	6.4610	17.229
L3	40.2534	52.8864	9691.6750	13.5203	19.5696	495.2402	19396.1025	26.4482	6.0100	13.737
	49.6478	67.3796	20042.5020	17.2255	24.8717	805.8363	40111.3765	33.6962	7.8470	17.936
L4	48.7491	73.2687	19730.5260	16.3897	23.7074	832.2531	39487.0139	36.6413	7.3336	14.667
	58.0560	90.0622	36644.7678	20.1462	29.0830	1260.0065	73337.7538	45.0397	9.1960	18.392

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 180.0000-131.7500				1	1	1			
L2 131.7500-86.7100				1	1	1			
L3 86.7100-43.1600				1	1	1			
L4 43.1600-0.0000				1	1	1			

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Sector	Exclude From Torque Calculation	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight plf
LCF158-50J(1-5/8)	B	No	Surface Ar (CaAa)	161.0000 - 0.0000	6	6	-0.250 0.000	2.0100		0.92
HB158-1-08U8-S8J18(1-5/8) *83*	A	No	Surface Ar (CaAa)	147.0000 - 0.0000	2	2	0.000 0.100	1.9800		1.30
LDF4-50A(1/2)	C	No	Surface Ar (CaAa)	83.0000 - 0.0000	2	2	-0.500 -0.480	0.6250		0.15
LDF6-50A(1-1/4) *78*	C	No	Surface Ar (CaAa)	83.0000 - 0.0000	2	1	-0.480 -0.450	1.5500		0.60
LDF4-50A(1/2)	B	No	Surface Ar (CaAa)	78.0000 - 0.0000	1	1	-0.480 -0.480	0.6250		0.15

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
180									
HB114-1-0813U4-M5J(1-1/4)	A	No	No	Inside Pole	180.0000 - 0.0000	4	No Ice	0.0000	1.20
							1/2" Ice	0.0000	1.20
							1" Ice	0.0000	1.20
161									
MLE HYBRID 9POWER/18FIBER RL 2(1-5/8)	B	No	No	Inside Pole	161.0000 - 0.0000	1	No Ice	0.0000	1.07
							1/2" Ice	0.0000	1.07
							1" Ice	0.0000	1.07
147									
LDF4-50A(1/2)	A	No	No	Inside Pole	147.0000 - 0.0000	1	No Ice	0.0000	0.15
							1/2" Ice	0.0000	0.15
							1" Ice	0.0000	0.15
LDF7-50A(1-5/8)	A	No	No	Inside Pole	147.0000 - 0.0000	12	No Ice	0.0000	0.82
							1/2" Ice	0.0000	0.82
							1" Ice	0.0000	0.82
140									
2" Rigid Conduit	C	No	No	Inside Pole	140.0000 - 0.0000	1	No Ice	0.0000	2.80
							1/2" Ice	0.0000	2.80
							1" Ice	0.0000	2.80
FB-L98B-034-XXX(3/8)	C	No	No	Inside Pole	140.0000 - 0.0000	1	No Ice	0.0000	0.06
							1/2" Ice	0.0000	0.06
							1" Ice	0.0000	0.06
WR-VG122ST-BRDA(7/16)	C	No	No	Inside Pole	140.0000 - 0.0000	2	No Ice	0.0000	0.14
							1/2" Ice	0.0000	0.14
							1" Ice	0.0000	0.14
FB-L98B-034-XXX(3/8)	C	No	No	Inside Pole	140.0000 - 0.0000	1	No Ice	0.0000	0.06
							1/2" Ice	0.0000	0.06
							1" Ice	0.0000	0.06
WR-VG122ST-BRDA(7/16)	C	No	No	Inside Pole	140.0000 - 0.0000	2	No Ice	0.0000	0.14
							1/2" Ice	0.0000	0.14
							1" Ice	0.0000	0.14
LDF7-50A(1-5/8)	C	No	No	Inside Pole	140.0000 - 0.0000	12	No Ice	0.0000	0.82
							1/2" Ice	0.0000	0.82
							1" Ice	0.0000	0.82
ICE 200(2)	C	No	No	Inside Pole	140.0000 - 0.0000	1	No Ice	0.0000	0.23
							1/2" Ice	0.0000	0.23
							1" Ice	0.0000	0.23

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	180.0000-131.7500	A	0.000	0.000	6.039	0.000	0.42
		B	0.000	0.000	35.276	0.000	0.19
		C	0.000	0.000	0.000	0.000	0.11
L2	131.7500-86.7100	A	0.000	0.000	17.836	0.000	0.78
		B	0.000	0.000	54.318	0.000	0.30
		C	0.000	0.000	0.000	0.000	0.61
L3	86.7100-43.1600	A	0.000	0.000	17.246	0.000	0.76
		B	0.000	0.000	54.699	0.000	0.29
		C	0.000	0.000	11.155	0.000	0.65
L4	43.1600-0.0000	A	0.000	0.000	17.091	0.000	0.75
		B	0.000	0.000	54.748	0.000	0.29
		C	0.000	0.000	12.085	0.000	0.65

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	180.0000-131.7500	A	1.750	0.000	0.000	14.222	0.000	0.59
		B		0.000	0.000	56.894	0.000	0.88
		C		0.000	0.000	0.000	0.000	0.11
L2	131.7500-86.7100	A	1.690	0.000	0.000	42.004	0.000	1.28
		B		0.000	0.000	87.607	0.000	1.35
		C		0.000	0.000	0.000	0.000	0.61
L3	86.7100-43.1600	A	1.604	0.000	0.000	39.952	0.000	1.21
		B		0.000	0.000	97.997	0.000	1.44
		C		0.000	0.000	42.690	0.000	1.41
L4	43.1600-0.0000	A	1.439	0.000	0.000	38.673	0.000	1.17
		B		0.000	0.000	98.917	0.000	1.40
		C		0.000	0.000	44.589	0.000	1.41

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	180.0000-131.7500	2.7072	-3.9157	1.7262	-3.0034
L2	131.7500-86.7100	2.8182	-5.7425	1.4248	-4.4088
L3	86.7100-43.1600	4.0093	-5.3068	3.1467	-3.6330
L4	43.1600-0.0000	4.3524	-5.6196	3.5320	-3.9736

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	6	LCF158-50J(1-5/8)	131.75 - 161.00	1.0000	1.0000
L1	10	HB158-1-08U8-S8J18(1-5/8)	131.75 - 147.00	1.0000	1.0000
L2	6	LCF158-50J(1-5/8)	86.71 - 131.75	1.0000	1.0000
L2	10	HB158-1-08U8-S8J18(1-5/8)	86.71 - 131.75	1.0000	1.0000
L2	20	LDF4-50A(1/2)	86.71 - 83.00	1.0000	1.0000
L2	21	LDF6-50A(1-1/4)	86.71 - 83.00	1.0000	1.0000
L2	23	LDF4-50A(1/2)	86.71 - 78.00	1.0000	1.0000
L3	6	LCF158-50J(1-5/8)	43.16 - 86.71	1.0000	1.0000
L3	10	HB158-1-08U8-S8J18(1-5/8)	43.16 - 86.71	1.0000	1.0000
L3	20	LDF4-50A(1/2)	43.16 - 83.00	1.0000	1.0000
L3	21	LDF6-50A(1-1/4)	43.16 - 83.00	1.0000	1.0000
L3	23	LDF4-50A(1/2)	43.16 - 78.00	1.0000	1.0000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
180 *									
180 P									
APXVTM14-ALU-I20	A	From Leg	4.0000 0.00 1.00	0.00	180.0000	No Ice 1/2" Ice 1" Ice	6.3424 6.7164 7.0974	3.6074 3.9666 4.3332	0.06 0.10 0.14
APXVTM14-ALU-I20	B	From Leg	4.0000 0.00 1.00	0.00	180.0000	No Ice 1/2" Ice 1" Ice	6.3424 6.7164 7.0974	3.6074 3.9666 4.3332	0.06 0.10 0.14
APXVTM14-ALU-I20	C	From Leg	4.0000 0.00 1.00	0.00	180.0000	No Ice 1/2" Ice 1" Ice	6.3424 6.7164 7.0974	3.6074 3.9666 4.3332	0.06 0.10 0.14
NNVV-65B-R4	A	From Leg	4.0000 0.00 1.00	0.00	180.0000	No Ice 1/2" Ice 1" Ice	12.2711 12.7660 13.2679	5.7500 6.2069 6.6713	0.08 0.15 0.23
NNVV-65B-R4	B	From Leg	4.0000 0.00 1.00	0.00	180.0000	No Ice 1/2" Ice 1" Ice	12.2711 12.7660 13.2679	5.7500 6.2069 6.6713	0.08 0.15 0.23
NNVV-65B-R4	C	From Leg	4.0000 0.00 1.00	0.00	180.0000	No Ice 1/2" Ice 1" Ice	12.2711 12.7660 13.2679	5.7500 6.2069 6.6713	0.08 0.15 0.23
PCS 1900MHZ 4X45W-65MHZ	A	From Leg	4.0000 0.00 1.00	0.00	180.0000	No Ice 1/2" Ice 1" Ice	2.3218 2.5266 2.7388	2.2381 2.4407 2.6507	0.06 0.08 0.11
PCS 1900MHZ 4X45W-65MHZ	B	From Leg	4.0000 0.00 1.00	0.00	180.0000	No Ice 1/2" Ice 1" Ice	2.3218 2.5266 2.7388	2.2381 2.4407 2.6507	0.06 0.08 0.11
PCS 1900MHZ 4X45W-65MHZ	C	From Leg	4.0000 0.00 1.00	0.00	180.0000	No Ice 1/2" Ice 1" Ice	2.3218 2.5266 2.7388	2.2381 2.4407 2.6507	0.06 0.08 0.11
(2) RRH2X50-800	A	From Leg	4.0000 0.00 1.00	0.00	180.0000	No Ice 1/2" Ice 1" Ice	1.7008 1.8640 2.0345	1.2822 1.4275 1.5803	0.05 0.07 0.09
(2) RRH2X50-800	B	From Leg	4.0000 0.00 1.00	0.00	180.0000	No Ice 1/2" Ice 1" Ice	1.7008 1.8640 2.0345	1.2822 1.4275 1.5803	0.05 0.07 0.09
(2) RRH2X50-800	C	From Leg	4.0000 0.00 1.00	0.00	180.0000	No Ice 1/2" Ice 1" Ice	1.7008 1.8640 2.0345	1.2822 1.4275 1.5803	0.05 0.07 0.09
TD-RRH8X20-25	A	From Leg	4.0000 0.00 1.00	0.00	180.0000	No Ice 1/2" Ice 1" Ice	4.0455 4.2975 4.5570	1.5345 1.7142 1.9008	0.07 0.10 0.13
TD-RRH8X20-25	B	From Leg	4.0000 0.00 1.00	0.00	180.0000	No Ice 1/2" Ice	4.0455 4.2975 4.5570	1.5345 1.7142 1.9008	0.07 0.10 0.13

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						1" Ice			
TD-RRH8X20-25	C	From Leg	4.0000 0.00 1.00	0.00	180.0000	No Ice 1/2" Ice 1" Ice	4.0455 4.2975 4.5570	1.5345 1.7142 1.9008	0.07 0.10 0.13
*									
Platform Mount [LP 301-1]	C	None		0.00	180.0000	No Ice 1/2" Ice 1" Ice	30.1000 40.8000 51.5000	30.1000 40.8000 51.5000	1.59 2.03 2.47
161									
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	A	From Leg	4.0000 0.00 0.00	0.00	161.0000	No Ice 1/2" Ice 1" Ice	6.3292 6.7751 7.2137	5.6424 6.4259 7.1313	0.11 0.17 0.23
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	B	From Leg	4.0000 0.00 0.00	0.00	161.0000	No Ice 1/2" Ice 1" Ice	6.3292 6.7751 7.2137	5.6424 6.4259 7.1313	0.11 0.17 0.23
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	C	From Leg	4.0000 0.00 0.00	0.00	161.0000	No Ice 1/2" Ice 1" Ice	6.3292 6.7751 7.2137	5.6424 6.4259 7.1313	0.11 0.17 0.23
Ericsson Air 21 B4A B12P-B8P 4FT w/ Mount Pipe	A	From Leg	4.0000 0.00 0.00	0.00	161.0000	No Ice 1/2" Ice 1" Ice	7.8693 8.3424 8.8056	6.6765 7.5134 8.2518	0.15 0.21 0.29
Ericsson Air 21 B4A B12P-B8P 4FT w/ Mount Pipe	B	From Leg	4.0000 0.00 0.00	0.00	161.0000	No Ice 1/2" Ice 1" Ice	7.8693 8.3424 8.8056	6.6765 7.5134 8.2518	0.15 0.21 0.29
Ericsson Air 21 B4A B12P-B8P 4FT w/ Mount Pipe	C	From Leg	4.0000 0.00 0.00	0.00	161.0000	No Ice 1/2" Ice 1" Ice	7.8693 8.3424 8.8056	6.6765 7.5134 8.2518	0.15 0.21 0.29
KRY 112 144/2	A	From Leg	4.0000 0.00 0.00	0.00	161.0000	No Ice 1/2" Ice 1" Ice	0.4794 0.5681 0.6642	0.2317 0.2994 0.3763	0.01 0.01 0.02
KRY 112 144/2	B	From Leg	4.0000 0.00 0.00	0.00	161.0000	No Ice 1/2" Ice 1" Ice	0.4794 0.5681 0.6642	0.2317 0.2994 0.3763	0.01 0.01 0.02
KRY 112 144/2	C	From Leg	4.0000 0.00 0.00	0.00	161.0000	No Ice 1/2" Ice 1" Ice	0.4794 0.5681 0.6642	0.2317 0.2994 0.3763	0.01 0.01 0.02
RRUS 11 B12	A	From Leg	4.0000 0.00 0.00	0.00	161.0000	No Ice 1/2" Ice 1" Ice	2.8333 3.0426 3.2593	1.1821 1.3299 1.4848	0.05 0.07 0.10
RRUS 11 B12	B	From Leg	4.0000 0.00 0.00	0.00	161.0000	No Ice 1/2" Ice 1" Ice	2.8333 3.0426 3.2593	1.1821 1.3299 1.4848	0.05 0.07 0.10
RRUS 11 B12	C	From Leg	4.0000 0.00 0.00	0.00	161.0000	No Ice 1/2" Ice 1" Ice	2.8333 3.0426 3.2593	1.1821 1.3299 1.4848	0.05 0.07 0.10
*									
Platform Mount [LP 305-1]	C	None		0.00	161.0000	No Ice 1/2" Ice 1" Ice	18.0100 23.3300 28.6500	18.0100 23.3300 28.6500	1.12 1.35 1.58
6' x 2" Mount Pipe	A	From Leg	4.0000	0.00	161.0000	No Ice	1.4250	1.4250	0.02

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00 0.00			1/2" Ice 1" Ice	1.9250 2.2939	1.9250 2.2939	0.03 0.05
6' x 2" Mount Pipe	B	From Leg	4.0000 0.00 0.00	0.00	161.0000	No Ice 1/2" Ice 1" Ice	1.4250 1.9250 2.2939	1.4250 1.9250 2.2939	0.02 0.03 0.05
6' x 2" Mount Pipe	C	From Leg	4.0000 0.00 0.00	0.00	161.0000	No Ice 1/2" Ice 1" Ice	1.4250 1.9250 2.2939	1.4250 1.9250 2.2939	0.02 0.03 0.05
147 (2) LNX-6514DS-A1M w/ Mount Pipe	A	From Leg	4.0000 0.00 3.00	0.00	147.0000	No Ice 1/2" Ice 1" Ice	8.4106 8.9745 9.5048	7.0817 8.2729 9.1847	0.06 0.13 0.21
(2) LNX-6514DS-A1M w/ Mount Pipe	B	From Leg	4.0000 0.00 3.00	0.00	147.0000	No Ice 1/2" Ice 1" Ice	8.4106 8.9745 9.5048	7.0817 8.2729 9.1847	0.06 0.13 0.21
(2) LNX-6514DS-A1M w/ Mount Pipe	C	From Leg	4.0000 0.00 3.00	0.00	147.0000	No Ice 1/2" Ice 1" Ice	8.4106 8.9745 9.5048	7.0817 8.2729 9.1847	0.06 0.13 0.21
(2) HBXX-6517DS-A2M w/ Mount Pipe	A	From Leg	4.0000 0.00 3.00	0.00	147.0000	No Ice 1/2" Ice 1" Ice	8.7655 9.3417 9.8885	6.9629 8.1817 9.1436	0.07 0.14 0.21
(2) HBXX-6517DS-A2M w/ Mount Pipe	B	From Leg	4.0000 0.00 3.00	0.00	147.0000	No Ice 1/2" Ice 1" Ice	8.7655 9.3417 9.8885	6.9629 8.1817 9.1436	0.07 0.14 0.21
(2) HBXX-6517DS-A2M w/ Mount Pipe	C	From Leg	4.0000 0.00 3.00	0.00	147.0000	No Ice 1/2" Ice 1" Ice	8.7655 9.3417 9.8885	6.9629 8.1817 9.1436	0.07 0.14 0.21
KS24019-L112A	B	From Leg	4.0000 0.00 3.00	0.00	147.0000	No Ice 1/2" Ice 1" Ice	0.1407 0.1979 0.2621	0.1407 0.1979 0.2621	0.01 0.01 0.01
(2) FD9R6004/1C-3L	A	From Leg	4.0000 0.00 3.00	0.00	147.0000	No Ice 1/2" Ice 1" Ice	0.3142 0.3862 0.4656	0.0762 0.1189 0.1685	0.00 0.00 0.01
(2) FD9R6004/1C-3L	B	From Leg	4.0000 0.00 3.00	0.00	147.0000	No Ice 1/2" Ice 1" Ice	0.3142 0.3862 0.4656	0.0762 0.1189 0.1685	0.00 0.00 0.01
(2) FD9R6004/1C-3L	C	From Leg	4.0000 0.00 3.00	0.00	147.0000	No Ice 1/2" Ice 1" Ice	0.3142 0.3862 0.4656	0.0762 0.1189 0.1685	0.00 0.00 0.01
RRH2X60-AWS	A	From Leg	4.0000 0.00 3.00	0.00	147.0000	No Ice 1/2" Ice 1" Ice	3.5002 3.7609 4.0285	1.8157 2.0519 2.2894	0.06 0.08 0.11
RRH2X60-AWS	B	From Leg	4.0000 0.00 3.00	0.00	147.0000	No Ice 1/2" Ice 1" Ice	3.5002 3.7609 4.0285	1.8157 2.0519 2.2894	0.06 0.08 0.11
RRH2X60-AWS	C	From Leg	4.0000 0.00 3.00	0.00	147.0000	No Ice 1/2" Ice 1" Ice	3.5002 3.7609 4.0285	1.8157 2.0519 2.2894	0.06 0.08 0.11
DB-T1-6Z-8AB-0Z	A	From Leg	4.0000	0.00	147.0000	No Ice	4.8000	2.0000	0.04

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00 3.00			1/2" Ice 1" Ice	5.0704 5.3481	2.1926 2.3926	0.08 0.12
DB-T1-6Z-8AB-0Z	B	From Leg	4.0000 0.00 3.00	0.00	147.0000	No Ice 1/2" Ice 1" Ice	4.8000 5.0704 5.3481	2.0000 2.1926 2.3926	0.04 0.08 0.12
RRH2X60-PCS	A	From Leg	4.0000 0.00 3.00	0.00	147.0000	No Ice 1/2" Ice 1" Ice	2.2000 2.3926 2.5926	1.7233 1.9015 2.0870	0.06 0.08 0.10
RRH2X60-PCS	B	From Leg	4.0000 0.00 3.00	0.00	147.0000	No Ice 1/2" Ice 1" Ice	2.2000 2.3926 2.5926	1.7233 1.9015 2.0870	0.06 0.08 0.10
RRH2X60-PCS	C	From Leg	4.0000 0.00 3.00	0.00	147.0000	No Ice 1/2" Ice 1" Ice	2.2000 2.3926 2.5926	1.7233 1.9015 2.0870	0.06 0.08 0.10
* Platform Mount [LP 712-1]	C	None		0.00	147.0000	No Ice 1/2" Ice 1" Ice	24.5300 29.9400 35.3500	24.5300 29.9400 35.3500	1.34 1.65 1.96
141 * Pipe Mount [PM 601-3]	C	None		0.00	141.0000	No Ice 1/2" Ice 1" Ice	4.3900 5.4800 6.5700	4.3900 5.4800 6.5700	0.20 0.24 0.28
141 P RRUS 11	A	From Leg	1.0000 0.00 0.00	0.00	141.0000	No Ice 1/2" Ice 1" Ice	2.7845 2.9919 3.2066	1.1872 1.3342 1.4897	0.05 0.07 0.10
RRUS 11	B	From Leg	1.0000 0.00 0.00	0.00	141.0000	No Ice 1/2" Ice 1" Ice	2.7845 2.9919 3.2066	1.1872 1.3342 1.4897	0.05 0.07 0.10
RRUS 11	C	From Leg	1.0000 0.00 0.00	0.00	141.0000	No Ice 1/2" Ice 1" Ice	2.7845 2.9919 3.2066	1.1872 1.3342 1.4897	0.05 0.07 0.10
140 (2) 7770.00	A	From Leg	4.0000 0.00 0.00	0.00	140.0000	No Ice 1/2" Ice 1" Ice	5.5085 5.8673 6.2332	2.9282 3.2730 3.6252	0.04 0.07 0.11
(2) 7770.00	B	From Leg	4.0000 0.00 0.00	0.00	140.0000	No Ice 1/2" Ice 1" Ice	5.5085 5.8673 6.2332	2.9282 3.2730 3.6252	0.04 0.07 0.11
(2) 7770.00	C	From Leg	4.0000 0.00 0.00	0.00	140.0000	No Ice 1/2" Ice 1" Ice	5.5085 5.8673 6.2332	2.9282 3.2730 3.6252	0.04 0.07 0.11
HPA-65R-BUU-H6	A	From Leg	4.0000 0.00 0.00	0.00	140.0000	No Ice 1/2" Ice 1" Ice	9.6578 10.1285 10.6062	6.4500 6.9134 7.3843	0.05 0.11 0.18
HPA-65R-BUU-H6	B	From Leg	4.0000 0.00 0.00	0.00	140.0000	No Ice 1/2" Ice 1" Ice	9.6578 10.1285 10.6062	6.4500 6.9134 7.3843	0.05 0.11 0.18
HPA-65R-BUU-H6	C	From Leg	4.0000	0.00	140.0000	No Ice	9.6578	6.4500	0.05

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00			1/2"	10.1285	6.9134	0.11
			0.00			Ice	10.6062	7.3843	0.18
						1" Ice			
(2) LGP 17201	A	From Leg	4.0000	0.00	140.0000	No Ice	1.6680	0.4669	0.03
			0.00			1/2"	1.8289	0.5676	0.04
			0.00			Ice	1.9973	0.6752	0.06
						1" Ice			
(2) LGP 17201	B	From Leg	4.0000	0.00	140.0000	No Ice	1.6680	0.4669	0.03
			0.00			1/2"	1.8289	0.5676	0.04
			0.00			Ice	1.9973	0.6752	0.06
						1" Ice			
(2) LGP 17201	C	From Leg	4.0000	0.00	140.0000	No Ice	1.6680	0.4669	0.03
			0.00			1/2"	1.8289	0.5676	0.04
			0.00			Ice	1.9973	0.6752	0.06
						1" Ice			
RRUS 32 B2	B	From Leg	4.0000	0.00	140.0000	No Ice	2.7313	1.6681	0.05
			0.00			1/2"	2.9531	1.8552	0.07
			0.00			Ice	3.1823	2.0493	0.10
						1" Ice			
RRUS 32 B2	C	From Leg	4.0000	0.00	140.0000	No Ice	2.7313	1.6681	0.05
			0.00			1/2"	2.9531	1.8552	0.07
			0.00			Ice	3.1823	2.0493	0.10
						1" Ice			
1001983	A	From Leg	4.0000	0.00	140.0000	No Ice	0.0524	0.1757	0.00
			0.00			1/2"	0.0861	0.2317	0.01
			0.00			Ice	0.1272	0.2950	0.01
						1" Ice			
1001983	B	From Leg	4.0000	0.00	140.0000	No Ice	0.0524	0.1757	0.00
			0.00			1/2"	0.0861	0.2317	0.01
			0.00			Ice	0.1272	0.2950	0.01
						1" Ice			
1001983	C	From Leg	4.0000	0.00	140.0000	No Ice	0.0524	0.1757	0.00
			0.00			1/2"	0.0861	0.2317	0.01
			0.00			Ice	0.1272	0.2950	0.01
						1" Ice			
(2) LGP21901	A	From Leg	4.0000	0.00	140.0000	No Ice	0.2310	0.1575	0.01
			0.00			1/2"	0.2941	0.2129	0.01
			0.00			Ice	0.3647	0.2756	0.01
						1" Ice			
(2) LGP21901	B	From Leg	4.0000	0.00	140.0000	No Ice	0.2310	0.1575	0.01
			0.00			1/2"	0.2941	0.2129	0.01
			0.00			Ice	0.3647	0.2756	0.01
						1" Ice			
(2) LGP21901	C	From Leg	4.0000	0.00	140.0000	No Ice	0.2310	0.1575	0.01
			0.00			1/2"	0.2941	0.2129	0.01
			0.00			Ice	0.3647	0.2756	0.01
						1" Ice			
*									
140 P									
EPBQ-654L8H6-L2	A	From Leg	4.0000	0.00	140.0000	No Ice	13.2369	4.9596	0.08
			0.00			1/2"	13.7443	5.4142	0.16
			0.00			Ice	14.2587	5.8761	0.23
						1" Ice			
EPBQ-654L8H6-L2	B	From Leg	4.0000	0.00	140.0000	No Ice	13.2369	4.9596	0.08
			0.00			1/2"	13.7443	5.4142	0.16
			0.00			Ice	14.2587	5.8761	0.23
						1" Ice			
EPBQ-654L8H6-L2	C	From Leg	4.0000	0.00	140.0000	No Ice	13.2369	4.9596	0.08
			0.00			1/2"	13.7443	5.4142	0.16
			0.00			Ice	14.2587	5.8761	0.23
						1" Ice			
(4) 7020.00	A	From Leg	4.0000	0.00	140.0000	No Ice	0.1021	0.1750	0.00
			0.00			1/2"	0.1469	0.2393	0.01
			0.00			Ice	0.1991	0.3109	0.01
						1" Ice			

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
(4) 7020.00	B	From Leg	4.0000 0.00 0.00	0.00	140.0000	No Ice 1/2" Ice 1" Ice	0.1021 0.1469 0.1991	0.1750 0.2393 0.3109	0.00 0.01 0.01
(4) 7020.00	C	From Leg	4.0000 0.00 0.00	0.00	140.0000	No Ice 1/2" Ice 1" Ice	0.1021 0.1469 0.1991	0.1750 0.2393 0.3109	0.00 0.01 0.01
RRUS 4478 B14	A	From Leg	4.0000 0.00 0.00	0.00	140.0000	No Ice 1/2" Ice 1" Ice	1.8425 2.0123 2.1895	1.0588 1.1969 1.3425	0.06 0.08 0.09
RRUS 4478 B14	B	From Leg	4.0000 0.00 0.00	0.00	140.0000	No Ice 1/2" Ice 1" Ice	1.8425 2.0123 2.1895	1.0588 1.1969 1.3425	0.06 0.08 0.09
RRUS 4478 B14	C	From Leg	4.0000 0.00 0.00	0.00	140.0000	No Ice 1/2" Ice 1" Ice	1.8425 2.0123 2.1895	1.0588 1.1969 1.3425	0.06 0.08 0.09
RRUS 32	A	From Leg	4.0000 0.00 0.00	0.00	140.0000	No Ice 1/2" Ice 1" Ice	2.8571 3.0830 3.3163	1.7766 1.9677 2.1658	0.06 0.08 0.10
RRUS 32	B	From Leg	4.0000 0.00 0.00	0.00	140.0000	No Ice 1/2" Ice 1" Ice	2.8571 3.0830 3.3163	1.7766 1.9677 2.1658	0.06 0.08 0.10
RRUS 32	C	From Leg	4.0000 0.00 0.00	0.00	140.0000	No Ice 1/2" Ice 1" Ice	2.8571 3.0830 3.3163	1.7766 1.9677 2.1658	0.06 0.08 0.10
RRUS 32 B2	A	From Leg	4.0000 0.00 0.00	0.00	140.0000	No Ice 1/2" Ice 1" Ice	2.7313 2.9531 3.1823	1.6681 1.8552 2.0493	0.05 0.07 0.10
(2) DC6-48-60-18-8F	A	From Leg	4.0000 0.00 0.00	0.00	140.0000	No Ice 1/2" Ice 1" Ice	0.7915 1.2743 1.4503	0.7915 1.2743 1.4503	0.02 0.04 0.05
Platform Mount [LP 1301-1]	C	None		0.00	140.0000	No Ice 1/2" Ice 1" Ice	51.7000 62.7000 73.7000	51.7000 62.7000 73.7000	2.26 2.94 3.61
83 OG-860/1920/GPS-A	A	From Leg	3.0000 0.00 1.00	0.00	83.0000	No Ice 1/2" Ice 1" Ice	0.3077 0.3952 0.4897	0.3667 0.4572 0.5548	0.00 0.01 0.01
OG-860/1920/GPS-A	B	From Leg	3.0000 0.00 1.00	0.00	83.0000	No Ice 1/2" Ice 1" Ice	0.3077 0.3952 0.4897	0.3667 0.4572 0.5548	0.00 0.01 0.01
* Side Arm Mount [SO 701-1]	A	From Leg	1.5000 0.00 0.00	0.00	83.0000	No Ice 1/2" Ice 1" Ice	0.8500 1.1400 1.4300	1.6700 2.3400 3.0100	0.07 0.08 0.09
Side Arm Mount [SO 701-1]	B	From Leg	1.5000 0.00 0.00	0.00	83.0000	No Ice 1/2" Ice 1" Ice	0.8500 1.1400 1.4300	1.6700 2.3400 3.0100	0.07 0.08 0.09
78 OG-860/1920/GPS-A	B	From Leg	3.0000 0.00	0.00	78.0000	No Ice 1/2"	0.3077 0.3952	0.3667 0.4572	0.00 0.01

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
*			1.00			Ice 1" Ice	0.4897	0.5548	0.01
Side Arm Mount [SO 701-1]	B	From Leg	1.5000 0.00 0.00	0.00	78.0000	No Ice 1/2" Ice 1" Ice	0.8500 1.1400 1.4300	1.6700 2.3400 3.0100	0.07 0.08 0.09

Load Combinations

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

Comb. No.	Description
48	Dead+Wind 270 deg - Service
49	Dead+Wind 300 deg - Service
50	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	180 - 131.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-40.47	-1.78	2.20
			Max. Mx	8	-14.44	-582.88	-0.40
			Max. My	2	-14.43	0.49	583.98
			Max. Vy	8	30.63	-582.88	-0.40
			Max. Vx	2	-30.70	0.49	583.98
			Max. Torque	11			0.76
L2	131.75 - 86.71	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-55.22	-3.03	3.96
			Max. Mx	8	-24.95	-2036.69	-2.72
			Max. My	2	-24.94	2.91	2041.02
			Max. Vy	8	35.48	-2036.69	-2.72
			Max. Vx	2	-35.55	2.91	2041.02
			Max. Torque	11			0.76
L3	86.71 - 43.16	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-75.45	-5.36	4.57
			Max. Mx	8	-39.70	-3653.84	-3.76
			Max. My	2	-39.70	3.56	3660.63
			Max. Vy	8	40.37	-3653.84	-3.76
			Max. Vx	2	-40.44	3.56	3660.63
			Max. Torque	13			1.25
L4	43.16 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-104.26	-7.23	4.93
			Max. Mx	8	-62.03	-5782.18	-4.36
			Max. My	2	-62.03	4.15	5792.39
			Max. Vy	8	44.65	-5782.18	-4.36
			Max. Vx	2	-44.72	4.15	5792.39
			Max. Torque	13			1.24

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	30	104.26	-11.84	0.01
	Max. H_x	21	46.56	44.59	0.02
	Max. H_z	3	46.56	0.02	44.66
	Max. M_x	2	5792.39	0.02	44.66
	Max. M_z	8	5782.18	-44.59	-0.02
	Max. Torsion	13	1.24	-22.31	-38.69
	Min. Vert	11	46.56	-38.63	-22.35
	Min. H_x	9	46.56	-44.59	-0.02
	Min. H_z	15	46.56	-0.02	-44.66
	Min. M_x	14	-5789.36	-0.02	-44.66
	Min. M_z	20	-5778.73	44.59	0.02
	Min. Torsion	25	-1.24	22.31	38.69

Tower Mast Reaction Summary

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
Dead Only	51.73	0.00	0.00	-1.20	-1.37	0.00
1.2 Dead+1.6 Wind 0 deg - No Ice	62.07	-0.02	-44.66	-5792.39	4.15	1.09
0.9 Dead+1.6 Wind 0 deg - No Ice	46.56	-0.02	-44.66	-5716.77	4.50	1.09
1.2 Dead+1.6 Wind 30 deg - No Ice	62.07	22.48	-39.02	-5033.20	-2898.13	0.65
0.9 Dead+1.6 Wind 30 deg - No Ice	46.56	22.48	-39.02	-4967.59	-2860.16	0.65
1.2 Dead+1.6 Wind 60 deg - No Ice	62.07	38.61	-22.31	-2891.92	-5004.83	0.03
0.9 Dead+1.6 Wind 60 deg - No Ice	46.56	38.61	-22.31	-2853.99	-4939.41	0.02
1.2 Dead+1.6 Wind 90 deg - No Ice	62.07	44.59	0.02	4.36	-5782.18	-0.60
0.9 Dead+1.6 Wind 90 deg - No Ice	46.56	44.59	0.02	4.66	-5706.64	-0.61
1.2 Dead+1.6 Wind 120 deg - No Ice	62.07	38.63	22.35	2899.02	-5010.64	-1.06
0.9 Dead+1.6 Wind 120 deg - No Ice	46.56	38.63	22.35	2861.72	-4945.12	-1.07
1.2 Dead+1.6 Wind 150 deg - No Ice	62.07	22.31	38.69	5016.45	-2897.00	-1.23
0.9 Dead+1.6 Wind 150 deg - No Ice	46.56	22.31	38.69	4951.66	-2858.92	-1.24
1.2 Dead+1.6 Wind 180 deg - No Ice	62.07	0.02	44.66	5789.36	-7.60	-1.07
0.9 Dead+1.6 Wind 180 deg - No Ice	46.56	0.02	44.66	5714.53	-7.05	-1.08
1.2 Dead+1.6 Wind 210 deg - No Ice	62.07	-22.48	39.02	5030.16	2894.68	-0.63
0.9 Dead+1.6 Wind 210 deg - No Ice	46.56	-22.48	39.02	4965.35	2857.61	-0.63
1.2 Dead+1.6 Wind 240 deg - No Ice	62.07	-38.61	22.31	2888.88	5001.38	-0.02
0.9 Dead+1.6 Wind 240 deg - No Ice	46.56	-38.61	22.31	2851.75	4936.86	-0.02
1.2 Dead+1.6 Wind 270 deg - No Ice	62.07	-44.59	-0.02	-7.40	5778.73	0.59
0.9 Dead+1.6 Wind 270 deg - No Ice	46.56	-44.59	-0.02	-6.90	5704.09	0.59
1.2 Dead+1.6 Wind 300 deg - No Ice	62.07	-38.63	-22.35	-2902.05	5007.18	1.05
0.9 Dead+1.6 Wind 300 deg - No Ice	46.56	-38.63	-22.35	-2863.96	4942.57	1.05
1.2 Dead+1.6 Wind 330 deg - No Ice	62.07	-22.31	-38.69	-5019.48	2893.55	1.23
0.9 Dead+1.6 Wind 330 deg - No Ice	46.56	-22.31	-38.69	-4953.89	2856.37	1.24
1.2 Dead+1.0 Ice+1.0 Temp	104.26	0.00	-0.00	-4.93	-7.23	0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	104.26	0.01	-11.85	-1576.17	-7.06	0.31
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	104.26	6.14	-10.64	-1390.51	-806.18	0.19
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	104.26	10.26	-5.93	-790.33	-1366.29	0.02
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	104.26	11.84	-0.01	-4.71	-1576.68	-0.16
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	104.26	10.25	5.92	780.80	-1366.66	-0.29
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	104.26	5.92	10.26	1355.75	-792.39	-0.35
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	104.26	-0.01	11.85	1566.01	-7.80	-0.31
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	104.26	-6.14	10.64	1380.36	791.32	-0.19
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	104.26	-10.26	5.93	780.17	1351.44	-0.02
1.2 Dead+1.0 Wind 270	104.26	-11.84	0.01	-5.45	1561.82	0.16

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
deg+1.0 Ice+1.0 Temp						
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	104.26	-10.25	-5.92	-790.96	1351.80	0.29
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	104.26	-5.92	-10.26	-1365.90	777.53	0.35
Dead+Wind 0 deg - Service	51.73	-0.00	-8.81	-1137.35	-0.29	0.22
Dead+Wind 30 deg - Service	51.73	4.44	-7.70	-988.41	-569.68	0.13
Dead+Wind 60 deg - Service	51.73	7.62	-4.40	-568.31	-982.96	0.00
Dead+Wind 90 deg - Service	51.73	8.80	0.00	-0.12	-1135.47	-0.12
Dead+Wind 120 deg - Service	51.73	7.62	4.41	567.77	-984.11	-0.21
Dead+Wind 150 deg - Service	51.73	4.40	7.63	983.19	-569.45	-0.25
Dead+Wind 180 deg - Service	51.73	0.00	8.81	1134.82	-2.59	-0.22
Dead+Wind 210 deg - Service	51.73	-4.44	7.70	985.88	566.80	-0.13
Dead+Wind 240 deg - Service	51.73	-7.62	4.40	565.78	980.08	-0.00
Dead+Wind 270 deg - Service	51.73	-8.80	-0.00	-2.42	1132.59	0.12
Dead+Wind 300 deg - Service	51.73	-7.62	-4.41	-570.31	981.23	0.21
Dead+Wind 330 deg - Service	51.73	-4.40	-7.63	-985.72	566.57	0.25

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX	PY	PZ	PX	PY	PZ	% Error
	K	K	K	K	K	K	
1	0.00	-51.73	0.00	0.00	51.73	0.00	0.000%
2	-0.02	-62.07	-44.66	0.02	62.07	44.66	0.000%
3	-0.02	-46.56	-44.66	0.02	46.56	44.66	0.000%
4	22.48	-62.07	-39.02	-22.48	62.07	39.02	0.000%
5	22.48	-46.56	-39.02	-22.48	46.56	39.02	0.000%
6	38.61	-62.07	-22.31	-38.61	62.07	22.31	0.000%
7	38.61	-46.56	-22.31	-38.61	46.56	22.31	0.000%
8	44.59	-62.07	0.02	-44.59	62.07	-0.02	0.000%
9	44.59	-46.56	0.02	-44.59	46.56	-0.02	0.000%
10	38.63	-62.07	22.35	-38.63	62.07	-22.35	0.000%
11	38.63	-46.56	22.35	-38.63	46.56	-22.35	0.000%
12	22.31	-62.07	38.69	-22.31	62.07	-38.69	0.000%
13	22.31	-46.56	38.69	-22.31	46.56	-38.69	0.000%
14	0.02	-62.07	44.66	-0.02	62.07	-44.66	0.000%
15	0.02	-46.56	44.66	-0.02	46.56	-44.66	0.000%
16	-22.48	-62.07	39.02	22.48	62.07	-39.02	0.000%
17	-22.48	-46.56	39.02	22.48	46.56	-39.02	0.000%
18	-38.61	-62.07	22.31	38.61	62.07	-22.31	0.000%
19	-38.61	-46.56	22.31	38.61	46.56	-22.31	0.000%
20	-44.59	-62.07	-0.02	44.59	62.07	0.02	0.000%
21	-44.59	-46.56	-0.02	44.59	46.56	0.02	0.000%
22	-38.63	-62.07	-22.35	38.63	62.07	22.35	0.000%
23	-38.63	-46.56	-22.35	38.63	46.56	22.35	0.000%
24	-22.31	-62.07	-38.69	22.31	62.07	38.69	0.000%
25	-22.31	-46.56	-38.69	22.31	46.56	38.69	0.000%
26	0.00	-104.26	0.00	-0.00	104.26	0.00	0.000%
27	0.01	-104.26	-11.85	-0.01	104.26	11.85	0.000%
28	6.14	-104.26	-10.64	-6.14	104.26	10.64	0.000%
29	10.26	-104.26	-5.93	-10.26	104.26	5.93	0.000%
30	11.84	-104.26	-0.01	-11.84	104.26	0.01	0.000%
31	10.25	-104.26	5.92	-10.25	104.26	-5.92	0.000%
32	5.92	-104.26	10.26	-5.92	104.26	-10.26	0.000%
33	-0.01	-104.26	11.85	0.01	104.26	-11.85	0.000%
34	-6.14	-104.26	10.64	6.14	104.26	-10.64	0.000%
35	-10.26	-104.26	5.93	10.26	104.26	-5.93	0.000%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
36	-11.84	-104.26	0.01	11.84	104.26	-0.01	0.000%
37	-10.25	-104.26	-5.92	10.25	104.26	5.92	0.000%
38	-5.92	-104.26	-10.26	5.92	104.26	10.26	0.000%
39	-0.00	-51.73	-8.81	0.00	51.73	8.81	0.000%
40	4.44	-51.73	-7.70	-4.44	51.73	7.70	0.000%
41	7.62	-51.73	-4.40	-7.62	51.73	4.40	0.000%
42	8.80	-51.73	0.00	-8.80	51.73	-0.00	0.000%
43	7.62	-51.73	4.41	-7.62	51.73	-4.41	0.000%
44	4.40	-51.73	7.63	-4.40	51.73	-7.63	0.000%
45	0.00	-51.73	8.81	-0.00	51.73	-8.81	0.000%
46	-4.44	-51.73	7.70	4.44	51.73	-7.70	0.000%
47	-7.62	-51.73	4.40	7.62	51.73	-4.40	0.000%
48	-8.80	-51.73	-0.00	8.80	51.73	0.00	0.000%
49	-7.62	-51.73	-4.41	7.62	51.73	4.41	0.000%
50	-4.40	-51.73	-7.63	4.40	51.73	7.63	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	0.00002850
3	Yes	4	0.00000001	0.00040709
4	Yes	6	0.00000001	0.00016030
5	Yes	6	0.00000001	0.00004488
6	Yes	6	0.00000001	0.00015982
7	Yes	6	0.00000001	0.00004477
8	Yes	5	0.00000001	0.00002233
9	Yes	4	0.00000001	0.00035867
10	Yes	6	0.00000001	0.00015878
11	Yes	6	0.00000001	0.00004432
12	Yes	6	0.00000001	0.00016145
13	Yes	6	0.00000001	0.00004523
14	Yes	5	0.00000001	0.00004626
15	Yes	4	0.00000001	0.00056218
16	Yes	6	0.00000001	0.00015904
17	Yes	6	0.00000001	0.00004449
18	Yes	6	0.00000001	0.00015925
19	Yes	6	0.00000001	0.00004462
20	Yes	5	0.00000001	0.00003935
21	Yes	4	0.00000001	0.00049730
22	Yes	6	0.00000001	0.00016130
23	Yes	6	0.00000001	0.00004519
24	Yes	6	0.00000001	0.00015870
25	Yes	6	0.00000001	0.00004428
26	Yes	4	0.00000001	0.00005055
27	Yes	5	0.00000001	0.00079384
28	Yes	6	0.00000001	0.00017275
29	Yes	6	0.00000001	0.00017034
30	Yes	5	0.00000001	0.00079290
31	Yes	6	0.00000001	0.00016743
32	Yes	6	0.00000001	0.00016919
33	Yes	5	0.00000001	0.00078534
34	Yes	6	0.00000001	0.00016722
35	Yes	6	0.00000001	0.00016524
36	Yes	5	0.00000001	0.00078410
37	Yes	6	0.00000001	0.00016899
38	Yes	6	0.00000001	0.00016735
39	Yes	4	0.00000001	0.00008080
40	Yes	4	0.00000001	0.00067597
41	Yes	4	0.00000001	0.00066865
42	Yes	4	0.00000001	0.00007834
43	Yes	4	0.00000001	0.00065207
44	Yes	4	0.00000001	0.00068580
45	Yes	4	0.00000001	0.00008186

46	Yes	4	0.00000001	0.00065414
47	Yes	4	0.00000001	0.00065520
48	Yes	4	0.00000001	0.00007915
49	Yes	4	0.00000001	0.00068388
50	Yes	4	0.00000001	0.00065150

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	180 - 131.75	33.62	40	1.65	0.00
L2	136.25 - 86.71	19.32	40	1.39	0.00
L3	92.29 - 43.16	8.53	40	0.91	0.00
L4	49.83 - 0	2.41	40	0.45	0.00

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
180.0000	APXVTM14-ALU-I20	40	33.62	1.65	0.00	48001
161.0000	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	40	27.17	1.56	0.00	12631
147.0000	(2) LNX-6514DS-A1M w/ Mount Pipe	40	22.61	1.48	0.00	7272
141.0000	Pipe Mount [PM 601-3]	40	20.75	1.43	0.00	6152
140.0000	(2) 7770.00	40	20.45	1.43	0.00	6000
83.0000	OG-860/1920/GPS-A	40	6.81	0.80	0.00	5013
78.0000	OG-860/1920/GPS-A	40	5.98	0.74	0.00	4960

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	180 - 131.75	170.90	2	8.40	0.00
L2	136.25 - 86.71	98.29	2	7.11	0.00
L3	92.29 - 43.16	43.40	4	4.62	0.00
L4	49.83 - 0	12.29	4	2.27	0.00

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
180.0000	APXVTM14-ALU-I20	2	170.90	8.40	0.00	9805
161.0000	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	2	138.12	7.95	0.00	2577
147.0000	(2) LNX-6514DS-A1M w/ Mount Pipe	2	114.99	7.53	0.00	1479
141.0000	Pipe Mount [PM 601-3]	2	105.53	7.31	0.00	1249
140.0000	(2) 7770.00	2	103.99	7.27	0.00	1218
83.0000	OG-860/1920/GPS-A	4	34.69	4.07	0.00	994
78.0000	OG-860/1920/GPS-A	4	30.43	3.78	0.00	982

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
L1	180 - 131.75 (1)	TP31.39x21x0.25	48.2500	0.0000	0.0	23.9407	-14.42	1686.69	0.009
L2	131.75 - 86.71 (2)	TP40.46x29.921x0.375	49.5400	0.0000	0.0	46.2983	-24.94	3408.11	0.007
L3	86.71 - 43.16 (3)	TP48.96x38.5229x0.4375	49.1300	0.0000	0.0	65.4119	-39.70	4767.07	0.008
L4	43.16 - 0 (4)	TP57.25x46.668x0.5	49.8300	0.0000	0.0	90.0622	-62.03	6465.70	0.010

Pole Bending Design Data

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L1	180 - 131.75 (1)	TP31.39x21x0.25	584.20	1046.01	0.559	0.00	1046.01	0.000
L2	131.75 - 86.71 (2)	TP40.46x29.921x0.375	2042.62	2721.23	0.751	0.00	2721.23	0.000
L3	86.71 - 43.16 (3)	TP48.96x38.5229x0.4375	3662.27	4611.06	0.794	0.00	4611.06	0.000
L4	43.16 - 0 (4)	TP57.25x46.668x0.5	5807.95	7538.14	0.770	0.00	7538.14	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	180 - 131.75 (1)	TP31.39x21x0.25	30.74	843.35	0.036	0.69	2097.19	0.000
L2	131.75 - 86.71 (2)	TP40.46x29.921x0.375	35.59	1704.05	0.021	0.68	5457.03	0.000
L3	86.71 - 43.16 (3)	TP48.96x38.5229x0.4375	40.44	2383.53	0.017	1.24	9246.33	0.000
L4	43.16 - 0 (4)	TP57.25x46.668x0.5	45.09	3232.85	0.014	0.65	15114.75	0.000

Pole Interaction Design Data

Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	180 - 131.75 (1)	0.009	0.559	0.000	0.036	0.000	0.568	1.000	4.8.2
L2	131.75 - 86.71 (2)	0.007	0.751	0.000	0.021	0.000	0.758	1.000	4.8.2

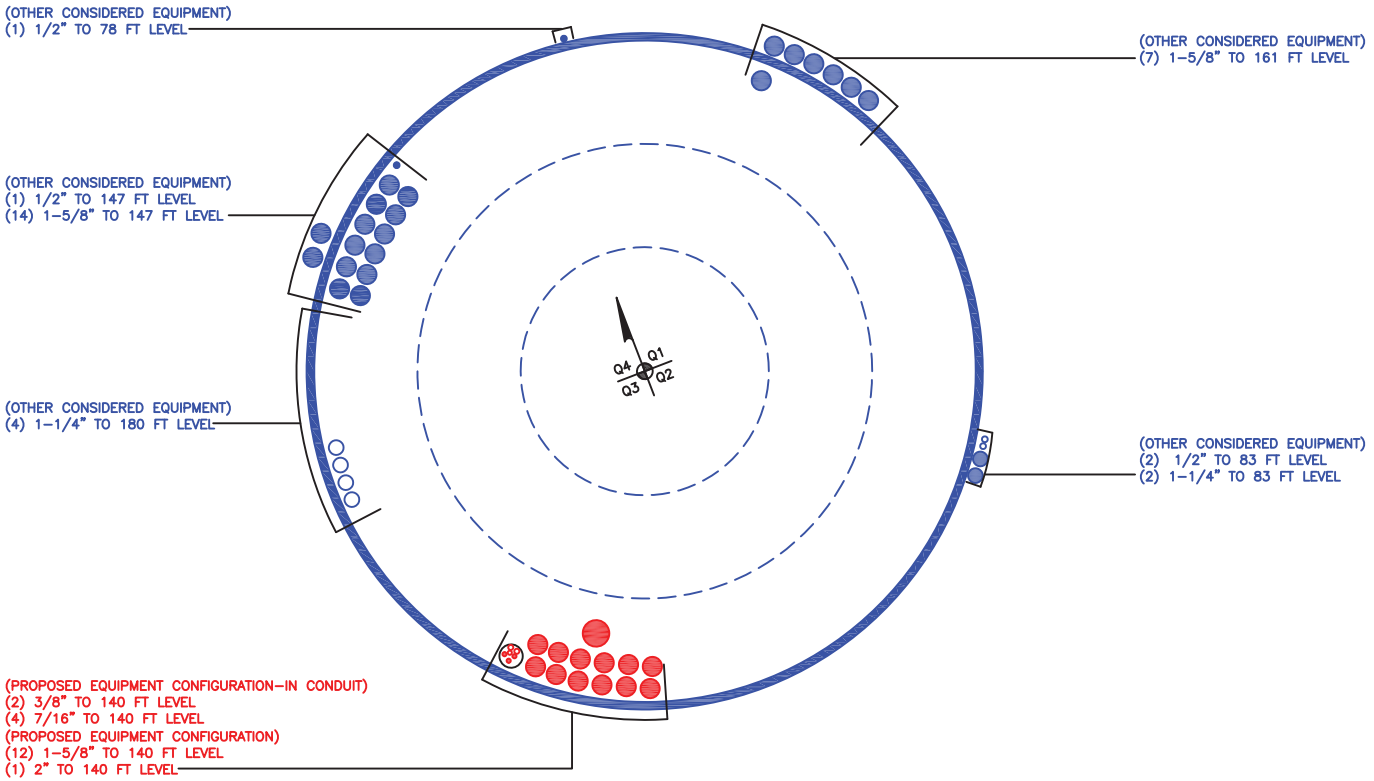
Section No.	Elevation ft	Ratio P_u / ϕP_n	Ratio M_{ux} / ϕM_{nx}	Ratio M_{uy} / ϕM_{ny}	Ratio V_u / ϕV_n	Ratio T_u / ϕT_n	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L3	86.71 - 43.16 (3)	0.008	0.794	0.000	0.017	0.000	0.803	1.000	4.8.2
L4	43.16 - 0 (4)	0.010	0.770	0.000	0.014	0.000	0.780	1.000	4.8.2

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L1	180 - 131.75	Pole	TP31.39x21x0.25	1	-14.42	1686.69	56.8	Pass
L2	131.75 - 86.71	Pole	TP40.46x29.921x0.375	2	-24.94	3408.11	75.8	Pass
L3	86.71 - 43.16	Pole	TP48.96x38.5229x0.4375	3	-39.70	4767.07	80.3	Pass
L4	43.16 - 0	Pole	TP57.25x46.668x0.5	4	-62.03	6465.70	78.0	Pass
							Summary	
							Pole (L3) 80.3	Pass
							RATING = **80.3**	**Pass**

APPENDIX B

BASE LEVEL DRAWING



BUSINESS UNIT: 876391 TOWER ID: C_BASELEVEL

APPENDIX C

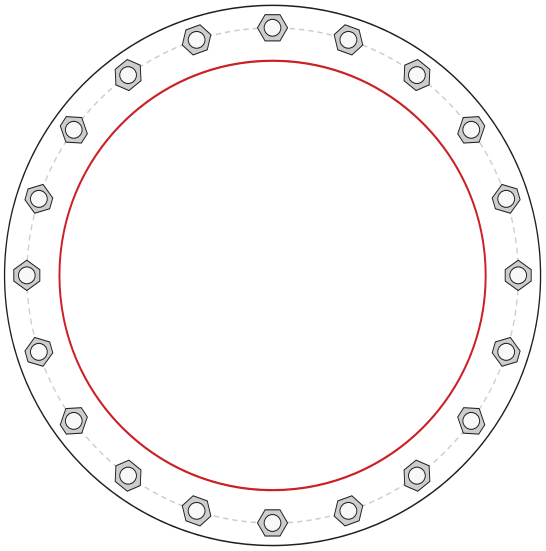
ADDITIONAL CALCULATIONS

Monopole Base Plate Connection

Site Info	
BU #	876391
Site Name	COLUMBIA / DEOJAY
Order #	460870 Rev. 0

Analysis Considerations	
TIA-222 Revision	G
Grout Considered:	No
l_{ar} (in)	0.5
Eta Factor, η	0.5

Applied Loads	
Moment (kip-ft)	5807.95
Axial Force (kips)	62.03
Shear Force (kips)	45.09



Connection Properties

Anchor Rod Data

(20) 2-1/4" ø bolts (A615-75 N; Fy=75 ksi, Fu=100 ksi) on 66" BC

Base Plate Data

72" OD x 2.25" Plate (A572-60; Fy=60 ksi, Fu=75 ksi)

Stiffener Data

N/A

Pole Data

57.25" x 0.5" 18-sided pole (A572-65; Fy=65 ksi, Fu=80 ksi)

Analysis Results

Anchor Rod Summary *(units of kips, kip-in)*

Pu = 214.2	ϕPn = 260	**Stress Rating**
Vu = 2.25	ϕVn = n/a	**84.1%**
Mu = n/a	ϕMn = n/a	**Pass**

Base Plate Summary

Max Stress (ksi):	49.62	(Flexural)
Allowable Stress (ksi):	54	
Stress Rating:	**91.9%**	**Pass**

Pier and Pad Foundation

BU # :	876391
Site Name:	COLUMBIA / DEO
App. Number:	460870 Rev. 0

TIA-222 Revision:	G
Tower Type:	Monopole

Block Foundation?: ☐

Superstructure Analysis Reactions

Compression, P_{comp}:	62	kips
Base Shear, Vu_comp:	45	kips
Moment, M_u:	5808	ft-kips
Tower Height, **H**:	180	ft
BP Dist. Above Fdn, bp_{dist}:	2.75	in

Pier Properties

Pier Shape:	Square	
Pier Diameter, **dpier**:	7	ft
Ext. Above Grade, **E**:	1	ft
Pier Rebar Size, **Sc**:	9	
Pier Rebar Quantity, **mc**:	39	
Pier Tie/Spiral Size, **St**:	4	
Pier Tie/Spiral Quantity, **mt**:	6	
Pier Reinforcement Type:	Tie	
Pier Clear Cover, cc_{pier}:	3	in

Pad Properties

Depth, **D**:	7	ft
Pad Width, **W**:	26	ft
Pad Thickness, **T**:	3	ft
Pad Rebar Size, **Sp**:	9	
Pad Rebar Quantity, **mp**:	35	
Pad Clear Cover, cc_{pad}:	3	in

Material Properties

Rebar Grade, **Fy**:	60000	psi
Concrete Compressive Strength, **F'c**:	4000	psi
Dry Concrete Density, δ**c**:	150	pcf

Soil Properties

Total Soil Unit Weight, γ:	100	pcf
Ultimate Gross Bearing, Qult:	12.000	ksf
Cohesion, **Cu**:		ksf
Friction Angle, φ:	30	degrees
SPT Blow Count, N_{blows}:	20	
Base Friction, μ:		
Neglected Depth, **N**:	3.50	ft
Foundation Bearing on Rock?	No	
Groundwater Depth, **gw**:	5	ft

<--Toggle between Gross and Net

Foundation Analysis Checks

	Capacity	Demand	Rating	Check
Lateral (Sliding) (kips)	229.53	45.00	**19.6%**	**Pass**
Bearing Pressure (ksf)	9.00	5.40	**60.0%**	**Pass**
*Overturning (kip*ft)*	6585.30	6178.31	**93.8%**	**Pass**
*Pier Flexure (Comp.) (kip*ft)*	6302.39	6033.00	**95.7%**	**Pass**
Pier Compression (kip)	31187.52	106.10	**0.3%**	**Pass**
*Pad Flexure (kip*ft)*	4775.11	3651.54	**76.5%**	**Pass**
Pad Shear - 1-way (kips)	926.68	410.80	**44.3%**	**Pass**
Pad Shear - 2-way (Comp) (ksi)	0.190	0.000	**0.0%**	**Pass**

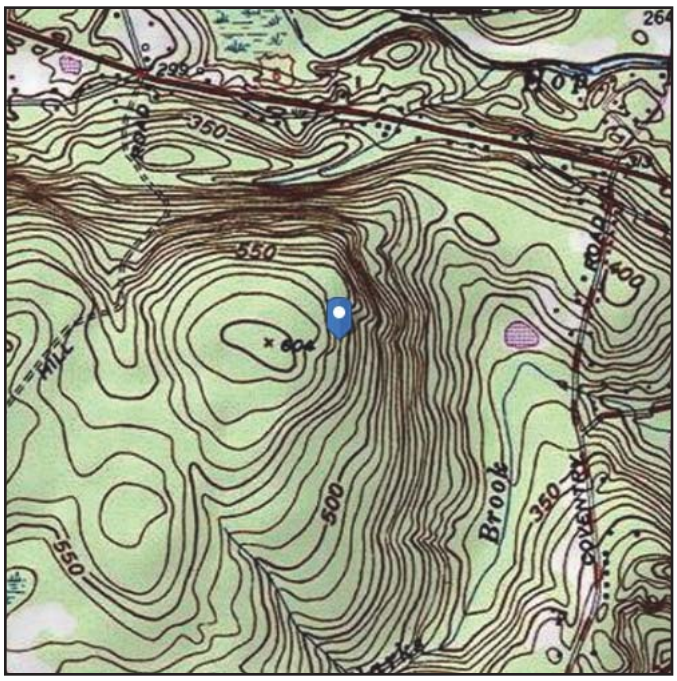
Soil Rating:	**93.8%**
Structural Rating:	**95.7%**

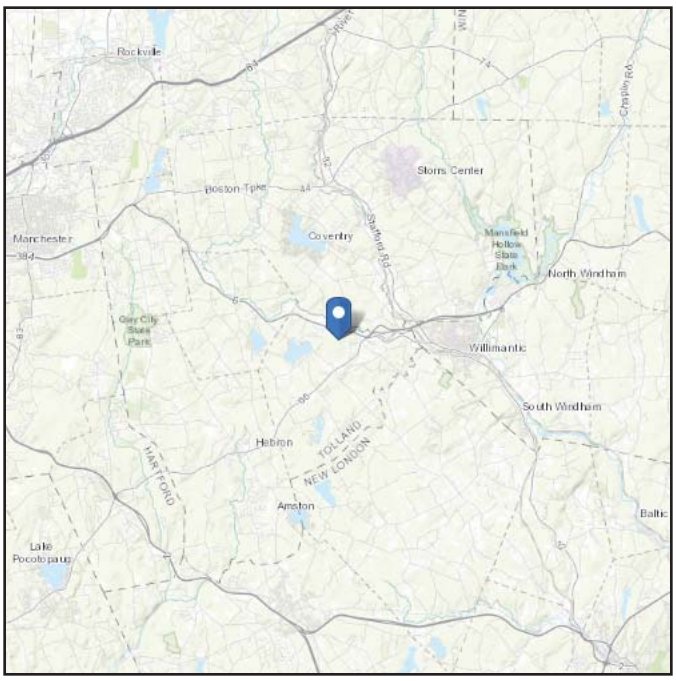
ASCE 7 Hazards Report

Address:
No Address at This Location

Standard: ASCE/SEI 7-10
Risk Category: II
Soil Class: D - Stiff Soil

Elevation: 560.51 ft (NAVD 88)
Latitude: 41.717622
Longitude: -72.299747





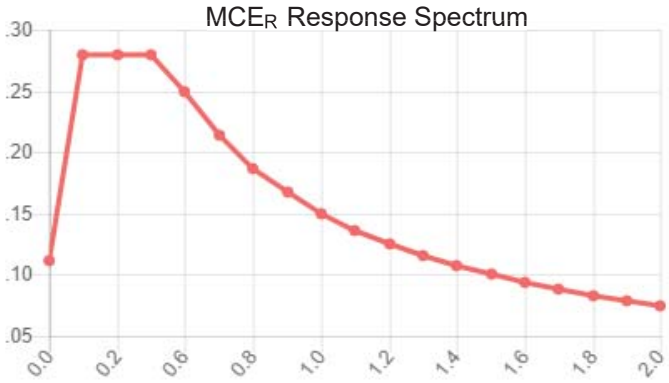
Seismic

Site Soil Class: D - Stiff Soil

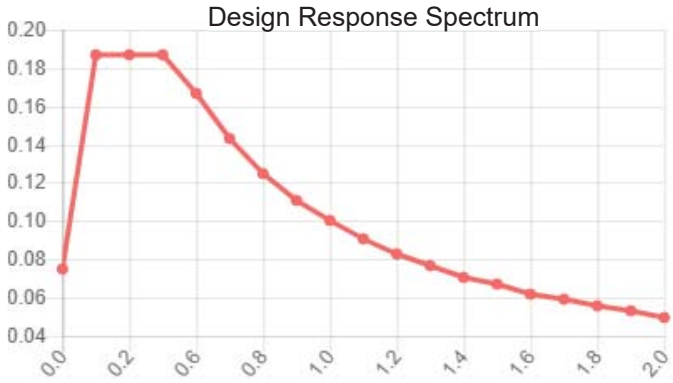
Results:

S_S :	0.175	S_{DS} :	0.187
S_1 :	0.062	S_{D1} :	0.100
F_a :	1.600	T_L :	6.000
F_v :	2.400	PGA :	0.088
S_{MS} :	0.280	PGA_M :	0.140
S_{M1} :	0.150	F_{PGA} :	1.600
		I_e :	1

Seismic Design Category B



S_a(g) vs T(s)



S_a(g) vs T(s)

Data Accessed: Tue Sep 25 2018

Date Source: USGS Seismic Design Maps based on ASCE/SEI 7-10, incorporating Supplement 1 and errata of March 31, 2013, and ASCE/SEI 7-10 Table 1.5-2. Additional data for site-specific ground motion procedures in accordance with ASCE/SEI 7-10 Ch. 21 are available from USGS.

Ice

Results:

Ice Thickness:	0.75 in.
Concurrent Temperature:	5 F
Gust Speed:	50 mph
Data Source:	Standard ASCE/SEI 7-10, Figs. 10-2 through 10-8
Date Accessed:	Tue Sep 25 2018

Ice thicknesses on structures in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

Values provided are equivalent radial ice thicknesses due to freezing rain with concurrent 3-second gust speeds, for a 50-year mean recurrence interval, and temperatures concurrent with ice thicknesses due to freezing rain. Thicknesses for ice accretions caused by other sources shall be obtained from local meteorological studies. Ice thicknesses in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

CENTEK engineering

Centered on Solutions℠

Structural Analysis Report

Antenna Mount Analysis

AT&T Site #: CT5861

AT&T Site Name: Columbia North

Project: LTE 3C/4C

PACE #: MRCTB025598/ MRCTB025553/ MRCTB025532

PT #: NA

FA #: 10070976

14 Thompson Hill Road
Columbia, CT

Centek Project No. 17004.57

Date: October 31, 2017

Max Stress Ratio = 97.8%

Prepared for:

AT&T Mobility
500 Enterprise Drive, Suite 3A
Rocky Hill, CT 06067

Table of Contents

CENTEK engineering

Centered on Solutions℠

October 31, 2017

Ms. Lauren Groppi
Site Acquisition Manager
Empire Telecom USA, LLC
16 Esquire Road
Billerica, MA 08162

Re: Structural Letter ~ Antenna Mount
AT&T – Site Ref: CT5861– Columbia North
14 Thompson Hill Road
Columbia, CT 06237

Centek Project No. 17004.57

Dear Ms. Groppi,

Centek Engineering, Inc. has reviewed the AT&T Mobility antenna installation at the above referenced site. The purpose of the review is to determine the structural adequacy of the existing mount, consisting of one (1) 13-ft low profile platform and one (1) collar mount to support the equipment configuration. The review considered the effects of wind load, dead load and ice load in accordance with the 2012 International Building Code as modified by the 2016 Connecticut State Building Code (CTBC) including ASCE 7-10 and ANSI/TIA-222-G *Structural Standards for Steel Antenna Towers and Supporting Structures*.

The AT&T Mobility loads considered in this analysis consist of the following:

- **AT&T Mobility:**
  Low Profile Platform: Six (6) Powerwave 7770 panel antennas, three (3) CCI HPA-65R-BUU-H6 panel antennas, three (3) KMW EPBQ-654L8H6-L2 panel antennas, six (6) Powerwave LGP17201 TMAs, six (6) Powerwave LGP21901 diplexers, three (3) Ericsson RRUS-32 remote radio heads, three (3) Ericsson B14 4478 remote radio heads and two (2) surge arrestors mounted on a low profile platform with a RAD center elevation of 140-ft +/- AGL.
  Collar Mount: Three (3) Ericsson RRUS-11 remote radio heads and three (3) Ericsson RRUS-32 B2 remote radio heads and mounted on collar mount with a RAD center elevation of 140-ft +/- AGL.

The antenna mount was analyzed per the requirements of the 2012 International Building Code as modified by the 2016 Connecticut State Building Code considering a nominal design wind speed of 101 mph for Columbia as required in Appendix N of the 2016 Connecticut State Building Code.

A structural analysis of tower and foundation needs to be completed prior to any work.

Based on our review of the installation, it is our opinion that the **subject antenna mount has sufficient capacity** to support the aforementioned antenna configuration. If there are any questions regarding this matter, please feel free to call.

Respectfully Submitted by:

Timothy J. Lynn, PE
Structural Engineer

STATE OF CONNECTICUT
TIMOTHY J. LYNN
No. 29336
LICENSED
PROFESSIONAL ENGINEER

Section 2 - Calculations

CENTEK engineering
Centered on Solutions℠ www.centekeng.com
63-2 North Branford Road P: (203) 488-0580
Branford, CT 06405 F: (203) 488-8587

Subject: TIA-222-G Loads

Location: Columbia, CT

Rev. 0: 10/30/17

Prepared by: T.J.L. Checked by: C.F.C.
Job No. 17004.57

Development of Design Heights, Exposure Coefficients, and Velocity Pressures Per TIA-222-G

Wind Speeds

Basic Wind Speed $V := 101$ mph (User Input - 2016 CSBC Appendix N)

Basic Wind Speed with Ice $V_i := 50$ mph (User Input per Annex B of TIA-222-G)

Input

Structure Type = $Structure\_Type := Pole$ (User Input)

Structure Category = $SC := II$ (User Input)

Exposure Category = $Exp := C$ (User Input)

Structure Height = $h := 180$ ft (User Input)

Height to Center of Antennas = $z_{AT\&T} := 140$ ft (User Input)

Radial Ice Thickness = $t_i := 0.75$ in (User Input per Annex B of TIA-222-G)

Radial Ice Density = $Id := 56.00$ pcf (User Input)

Topograpic Factor = $K_{zt} := 1.0$ (User Input)

$K_a := 1.0$ (User Input)

Gust Response Factor = $G_H := 1.1$ (User Input)

Output

Wind Direction Probability Factor =

$$K_d := \begin{cases} 0.95 & \text{if } Structure\_Type = Pole \\ 0.85 & \text{if } Structure\_Type = Lattice \end{cases} = 0.95$$

(Per Table 2-2 of TIA-222-G)

Importance Factors =

$$I_{Wind} := \begin{cases} 0.87 & \text{if } SC = 1 \\ 1.00 & \text{if } SC = 2 \\ 1.15 & \text{if } SC = 3 \end{cases} = 1$$

(Per Table 2-3 of TIA-222-G)

$$I_{Wind\_w\_Ice} := \begin{cases} 0 & \text{if } SC = 1 \\ 1.00 & \text{if } SC = 2 \\ 1.00 & \text{if } SC = 3 \end{cases} = 1$$

$$I_{ice} := \begin{cases} 0 & \text{if } SC = 1 \\ 1.00 & \text{if } SC = 2 \\ 1.25 & \text{if } SC = 3 \end{cases} = 1$$

$$K_{iz} := \left(\frac{z_{AT\&T}}{33}\right)^{0.1} = 1.155$$

$$t_{iz} := 2.0 \cdot t_i \cdot I_{ice} \cdot K_{iz} \cdot K_{zt}^{0.35} = 1.733$$

Velocity Pressure Coefficient Antennas =

$$Kz_{AT\&T} := 2.01\left(\left(\frac{z_{AT\&T}}{zg}\right)\right)^{\frac{2}{\alpha}} = 1.359$$

Velocity Pressure w/o Ice Antennas =

$$qz_{AT\&T} := 0.00256 \cdot K_d \cdot Kz_{AT\&T} \cdot V^2 \cdot I_{Wind} = 33.703$$

Velocity Pressure with Ice Antennas =

$$qz_{ice.AT\&T} := 0.00256 \cdot K_d \cdot Kz_{AT\&T} \cdot V_i^2 \cdot I_{Wind} = 8.26$$

CENTEK engineering
Centered on Solutions℠ www.centekeng.com
63-2 North Branford Road P: (203) 488-0580
Branford, CT 06405 F: (203) 488-8587

Subject: TIA-222-G Loads

Location: Columbia, CT

Rev. 0: 10/30/17

Prepared by: T.J.L. Checked by: C.F.C.
Job No. 17004.57

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	Powerwave 7770		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 55$	in	(User Input)
Antenna Width =	$W_{ant} := 11$	in	(User Input)
Antenna Thickness =	$T_{ant} := 5$	in	(User Input)
Antenna Weight =	$WT_{ant} := 35$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 1$		(User Input)
Antenna Aspect Ratio =	$Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 5.0$		
Antenna Force Coefficient =	$Ca_{ant} = 1.31$		

Wind Load (without ice)

Surface Area for One Antenna =	$SA_{antF} := \frac{L_{ant} \cdot W_{ant}}{144} = 4.2$	sf
Total Antenna Wind Force =	$F_{ant} := qz_{AT\&T} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antF} = 204$	lbs
Surface Area for One Antenna =	$SA_{antS} := \frac{L_{ant} \cdot T_{ant}}{144} = 1.9$	sf
Total Antenna Wind Force =	$F_{ant} := qz_{AT\&T} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antS} = 93$	lbs

Wind Load (with ice)

Surface Area for One Antenna w/ Ice =	$SA_{ICEantF} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (W_{ant} + 2 \cdot t_{iz})}{144} = 5.9$	sf
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := qz_{ice.AT\&T} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantF} = 70$	lbs
Surface Area for One Antenna w/ Ice =	$SA_{ICEantS} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz})}{144} = 3.4$	sf
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := qz_{ice.AT\&T} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantS} = 41$	lbs

Gravity Load (without ice)

Weight of All Antennas =	$WT_{ant} \cdot N_{ant} = 35$	lbs

Gravity Loads (ice only)

Volume of Each Antenna =	$V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 3025$	cu in
Volume of Ice on Each Antenna =	$V_{ice} := (L_{ant})(W_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz}) - V_{ant} = 3711$	cu in
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 120$	lbs
Weight of Ice on All Antennas =	$W_{ICEant} \cdot N_{ant} = 120$	lbs

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63-2 North Branford Road P: (203) 488-0580
Branford, CT 06405 F: (203) 488-8587

Subject: TIA-222-G Loads

Location: Columbia, CT

Rev. 0: 10/30/17

Prepared by: T.J.L. Checked by: C.F.C.
Job No. 17004.57

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	CCI HPA-65R-BUU-H6		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 72$	in	(User Input)
Antenna Width =	$W_{ant} := 14.8$	in	(User Input)
Antenna Thickness =	$T_{ant} := 9$	in	(User Input)
Antenna Weight =	$WT_{ant} := 51$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 1$		(User Input)
Antenna Aspect Ratio =	$Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 4.9$		
Antenna Force Coefficient =	$Ca_{ant} = 1.31$		

Wind Load (without ice)

Surface Area for One Antenna =	$SA_{antF} := \frac{L_{ant} \cdot W_{ant}}{144} = 7.4$	sf
Total Antenna Wind Force =	$F_{ant} := qz_{AT\&T} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antF} = 358$	lbs
Surface Area for One Antenna =	$SA_{antS} := \frac{L_{ant} \cdot T_{ant}}{144} = 4.5$	sf
Total Antenna Wind Force =	$F_{ant} := qz_{AT\&T} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antS} = 218$	lbs

Wind Load (with ice)

Surface Area for One Antenna w/ Ice =	$SA_{ICEantF} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (W_{ant} + 2 \cdot t_{iz})}{144} = 9.6$	sf
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := qz_{ice.AT\&T} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantF} = 114$	lbs
Surface Area for One Antenna w/ Ice =	$SA_{ICEantS} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz})}{144} = 6.5$	sf
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := qz_{ice.AT\&T} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantS} = 77$	lbs

Gravity Load (without ice)

Weight of All Antennas =	$WT_{ant} \cdot N_{ant} = 51$	lbs

Gravity Loads (ice only)

Volume of Each Antenna =	$V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 9590$	cu in
Volume of Ice on Each Antenna =	$V_{ice} := (L_{ant} + 2 \cdot t_{iz})(W_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz}) - V_{ant} = 7595$	cu in
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 246$	lbs
Weight of Ice on All Antennas =	$W_{ICEant} \cdot N_{ant} = 246$	lbs

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	KMW EPBQ-654L8H6-L2		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 73$	in	(User Input)
Antenna Width =	$W_{ant} := 21$	in	(User Input)
Antenna Thickness =	$T_{ant} := 6.3$	in	(User Input)
Antenna Weight =	$WT_{ant} := 73$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 1$		(User Input)
Antenna Aspect Ratio =	$Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 3.5$		
Antenna Force Coefficient =	$Ca_{ant} = 1.24$		

Wind Load (without ice)

Surface Area for One Antenna =	$SA_{antF} := \frac{L_{ant} \cdot W_{ant}}{144} = 10.6$	sf
Total Antenna Wind Force =	$F_{ant} := qz_{AT\&T} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antF} = 491$	lbs
Surface Area for One Antenna =	$SA_{antS} := \frac{L_{ant} \cdot T_{ant}}{144} = 3.2$	sf
Total Antenna Wind Force =	$F_{ant} := qz_{AT\&T} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antS} = 147$	lbs

Wind Load (with ice)

Surface Area for One Antenna w/ Ice =	$SA_{ICEantF} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (W_{ant} + 2 \cdot t_{iz})}{144} = 13$	sf
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := qz_{ice.AT\&T} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantF} = 147$	lbs
Surface Area for One Antenna w/ Ice =	$SA_{ICEantS} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz})}{144} = 5.2$	sf
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := qz_{ice.AT\&T} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantS} = 59$	lbs

Gravity Load (without ice)

Weight of All Antennas =	$WT_{ant} \cdot N_{ant} = 73$	lbs

Gravity Loads (ice only)

Volume of Each Antenna =	$V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 9658$	cu in
Volume of Ice on Each Antenna =	$V_{ice} := (L_{ant} + 2 \cdot t_{iz})(W_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz}) - V_{ant} = 8614$	cu in
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 279$	lbs
Weight of Ice on All Antennas =	$W_{ICEant} \cdot N_{ant} = 279$	lbs

Development of Wind & Ice Load on TMA's

TMA Data:

TMA Model =	Powerwave LGP17201 TMA		
TMA Shape =	Flat		(User Input)
TMA Height =	$L_{TMA} := 14.4$	in	(User Input)
TMA Width =	$W_{TMA} := 13.9$	in	(User Input)
TMA Thickness =	$T_{TMA} := 3.7$	in	(User Input)
TMA Weight =	$WT_{TMA} := 31$	lbs	(User Input)
Number of TMA's =	$N_{TMA} := 2$		(User Input)
TMA Aspect Ratio =	$Ar_{TMA} := \frac{L_{TMA}}{W_{TMA}} = 1$		
TMA Force Coefficient =	$Ca_{TMA} = 1.2$		

Wind Load (without ice)

Surface Area for One TMA =	$SA_{TMAF} := \frac{L_{TMA} \cdot W_{TMA}}{144} = 1.4$	sf
Total TMA Wind Force =	$F_{TMA} := qz_{AT\&T} \cdot G_H \cdot Ca_{TMA} \cdot K_a \cdot SA_{TMAF} = 62$	lbs
Surface Area for One TMA =	$SA_{TMAS} := \frac{L_{TMA} \cdot T_{TMA}}{144} = 0.4$	sf
Total TMA Wind Force =	$F_{TMA} := qz_{AT\&T} \cdot G_H \cdot Ca_{TMA} \cdot K_a \cdot SA_{TMAS} = 16$	lbs

Wind Load (with ice)

Surface Area for One TMA w/ Ice =	$SA_{ICETMAF} := \frac{(L_{TMA} + 2 \cdot t_{iz}) \cdot (W_{TMA} + 2 \cdot t_{iz})}{144} = 2.2$	sf
Total TMA Wind Force w/ Ice =	$Fi_{TMA} := qz_{ice.AT\&T} \cdot G_H \cdot Ca_{TMA} \cdot K_a \cdot SA_{ICETMAF} = 23$	lbs
Surface Area for One TMA w/ Ice =	$SA_{ICETMAS} := \frac{(L_{TMA} + 2 \cdot t_{iz}) \cdot (T_{TMA} + 2 \cdot t_{iz})}{144} = 0.9$	sf
Total TMA Wind Force w/ Ice =	$Fi_{TMA} := qz_{ice.AT\&T} \cdot G_H \cdot Ca_{TMA} \cdot K_a \cdot SA_{ICETMAS} = 10$	lbs

Gravity Load (without ice)

Weight of All TMAs =	$WT_{TMA} \cdot N_{TMA} = 62$	lbs

Gravity Loads (ice only)

Volume of Each TMA =	$V_{TMA} := L_{TMA} \cdot W_{TMA} \cdot T_{TMA} = 741$	cu in
Volume of Ice on Each TMA =	$V_{ice} := (L_{TMA} + 2 \cdot t_{iz})(W_{TMA} + 2 \cdot t_{iz}) \cdot (T_{TMA} + 2 \cdot t_{iz}) - V_{TMA} = 1483$	cu in
Weight of Ice on Each TMA =	$W_{ICETMA} := \frac{V_{ice}}{1728} \cdot Id = 48$	lbs
Weight of Ice on All TMAs =	$W_{ICETMA} \cdot N_{TMA} = 96$	lbs

Development of Wind & Ice Load on Diplexer's

Diplexer Data:

Diplexer Model = Powerwave LGP21901 Diplexer

Diplexer Shape = Flat (User Input)

Diplexer Height = $L_{Dpl} := 6$ in (User Input)

Diplexer Width = $W_{Dpl} := 4$ in (User Input)

Diplexer Thickness = $T_{Dpl} := 3$ in (User Input)

Diplexer Weight = $WT_{Dpl} := 6$ lbs (User Input)

Number of Diplexer's = $N_{Dpl} := 2$ (User Input)

Diplexer Aspect Ratio = $Ar_{Dpl} := \frac{L_{Dpl}}{W_{Dpl}} = 1.5$

Diplexer Force Coefficient = $Ca_{Dpl} = 1.2$

Wind Load (without ice)

Surface Area for One Diplexer = $SA_{DplF} := \frac{L_{Dpl} \cdot W_{Dpl}}{144} = 0.2$ sf

Total Diplexer Wind Force = $F_{Dpl} := qz_{AT\&T} \cdot G_H \cdot Ca_{Dpl} \cdot K_a \cdot SA_{DplF} = 7$ lbs

Surface Area for One Diplexer = $SA_{DplS} := \frac{L_{Dpl} \cdot T_{Dpl}}{144} = 0.1$ sf

Total Diplexer Wind Force = $F_{Dpl} := qz_{AT\&T} \cdot G_H \cdot Ca_{Dpl} \cdot K_a \cdot SA_{DplS} = 6$ lbs

Wind Load (with ice)

Surface Area for One Diplexer w/ Ice = $SA_{ICEDplF} := \frac{(L_{Dpl} + 2 \cdot t_{iz}) \cdot (W_{Dpl} + 2 \cdot t_{iz})}{144} = 0.5$ sf

Total Diplexer Wind Force w/ Ice = $Fi_{Dpl} := qz_{ice.AT\&T} \cdot G_H \cdot Ca_{Dpl} \cdot K_a \cdot SA_{ICEDplF} = 5$ lbs

Surface Area for One Diplexer w/ Ice = $SA_{ICEDplS} := \frac{(L_{Dpl} + 2 \cdot t_{iz}) \cdot (T_{Dpl} + 2 \cdot t_{iz})}{144} = 0.4$ sf

Total Diplexer Wind Force w/ Ice = $Fi_{Dpl} := qz_{ice.AT\&T} \cdot G_H \cdot Ca_{Dpl} \cdot K_a \cdot SA_{ICEDplS} = 5$ lbs

Gravity Load (without ice)

Weight of All Diplexers = $WT_{Dpl} \cdot N_{Dpl} = 12$ lbs

Gravity Loads (ice only)

Volume of Each Diplexer = $V_{Dpl} := L_{Dpl} \cdot W_{Dpl} \cdot T_{Dpl} = 72$ cu in

Volume of Ice on Each Diplexer = $V_{ice} := (L_{Dpl} + 2 \cdot t_{iz})(W_{Dpl} + 2 \cdot t_{iz}) \cdot (T_{Dpl} + 2 \cdot t_{iz}) - V_{Dpl} = 385$ cu in

Weight of Ice on Each Diplexer = $W_{ICEDpl} := \frac{V_{ice}}{1728} \cdot Id = 12$ lbs

Weight of Ice on All Diplexer = $W_{ICEDpl} \cdot N_{Dpl} = 25$ lbs

Development of Wind & Ice Load on RRUS's

RRUS Data:

RRUS Model =	RRUS-32		
RRUS Shape =	Flat		(User Input)
RRUS Height =	$L_{RRUS} := 26.7$	in	(User Input)
RRUS Width =	$W_{RRUS} := 12.1$	in	(User Input)
RRUS Thickness =	$T_{RRUS} := 6.7$	in	(User Input)
RRUS Weight =	$WT_{RRUS} := 60$	lbs	(User Input)
Number of RRUS's =	$N_{RRUS} := 1$		(User Input)
RRUS Aspect Ratio =	$Ar_{RRUS} := \frac{L_{RRUS}}{W_{RRUS}} = 2.2$		
RRUS Force Coefficient =	$Ca_{RRUS} = 1.2$		

Wind Load (without ice)

Surface Area for One RRUS =	$SA_{RRUSF} := \frac{L_{RRUS} \cdot W_{RRUS}}{144} = 2.2$	sf
Total RRUS Wind Force =	$F_{RRUS} := qz_{AT\&T} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{RRUSF} = 100$	lbs
Surface Area for One RRUS =	$SA_{RRUSS} := \frac{L_{RRUS} \cdot T_{RRUS}}{144} = 1.2$	sf
Total RRUS Wind Force =	$F_{RRUS} := qz_{AT\&T} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{RRUSS} = 55$	lbs

Wind Load (with ice)

Surface Area for One RRUS w/ Ice =	$SA_{ICERRUSF} := \frac{(L_{RRUS} + 2 \cdot t_{iz}) \cdot (W_{RRUS} + 2 \cdot t_{iz})}{144} = 3.3$	sf
Total RRUS Wind Force w/ Ice =	$Fi_{RRUS} := qz_{ice.AT\&T} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{ICERRUSF} = 36$	lbs
Surface Area for One RRUS w/ Ice =	$SA_{ICERRUSS} := \frac{(L_{RRUS} + 2 \cdot t_{iz}) \cdot (T_{RRUS} + 2 \cdot t_{iz})}{144} = 2.1$	sf
Total RRUS Wind Force w/ Ice =	$Fi_{RRUS} := qz_{ice.AT\&T} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{ICERRUSS} = 23$	lbs

Gravity Load (without ice)

Weight of All RRUSs =	$WT_{RRUS} \cdot N_{RRUS} = 60$	lbs

Gravity Loads (ice only)

Volume of Each RRUS =	$V_{RRUS} := L_{RRUS} \cdot W_{RRUS} \cdot T_{RRUS} = 2165$	cu in
Volume of Ice on Each RRUS =	$V_{ice} := (L_{RRUS} + 2 \cdot t_{iz})(W_{RRUS} + 2 \cdot t_{iz}) \cdot (T_{RRUS} + 2 \cdot t_{iz}) - V_{RRUS} = 2609$	
Weight of Ice on Each RRUS =	$W_{ICERRUS} := \frac{V_{ice}}{1728} \cdot Id = 85$	lbs
Weight of Ice on All RRUSs =	$W_{ICERRUS} \cdot N_{RRUS} = 85$	lbs

Development of Wind & Ice Load on RRUS's

RRUS Data:

RRUS Model = B14 4478

RRUS Shape = Flat (User Input)

RRUS Height = $L_{RRUS} := 14.9$ in (User Input)

RRUS Width = $W_{RRUS} := 13.1$ in (User Input)

RRUS Thickness = $T_{RRUS} := 7.3$ in (User Input)

RRUS Weight = $WT_{RRUS} := 60$ lbs (User Input)

Number of RRUS's = $N_{RRUS} := 1$ (User Input)

RRUS Aspect Ratio = $Ar_{RRUS} := \frac{L_{RRUS}}{W_{RRUS}} = 1.1$

RRUS Force Coefficient = $Ca_{RRUS} = 1.2$

Wind Load (without ice)

Surface Area for One RRUS = $SA_{RRUSF} := \frac{L_{RRUS} \cdot W_{RRUS}}{144} = 1.4$ sf

Total RRUS Wind Force = $F_{RRUS} := qz_{AT\&T} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{RRUSF} = 60$ lbs

Surface Area for One RRUS = $SA_{RRUSS} := \frac{L_{RRUS} \cdot T_{RRUS}}{144} = 0.8$ sf

Total RRUS Wind Force = $F_{RRUS} := qz_{AT\&T} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{RRUSS} = 34$ lbs

Wind Load (with ice)

Surface Area for One RRUS w/ Ice = $SA_{ICERRUSF} := \frac{(L_{RRUS} + 2 \cdot t_{iz}) \cdot (W_{RRUS} + 2 \cdot t_{iz})}{144} = 2.1$ sf

Total RRUS Wind Force w/ Ice = $Fi_{RRUS} := qz_{ice.AT\&T} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{ICERRUSF} = 23$ lbs

Surface Area for One RRUS w/ Ice = $SA_{ICERRUSS} := \frac{(L_{RRUS} + 2 \cdot t_{iz}) \cdot (T_{RRUS} + 2 \cdot t_{iz})}{144} = 1.4$ sf

Total RRUS Wind Force w/ Ice = $Fi_{RRUS} := qz_{ice.AT\&T} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{ICERRUSS} = 15$ lbs

Gravity Load (without ice)

Weight of All RRUSs = $WT_{RRUS} \cdot N_{RRUS} = 60$ lbs

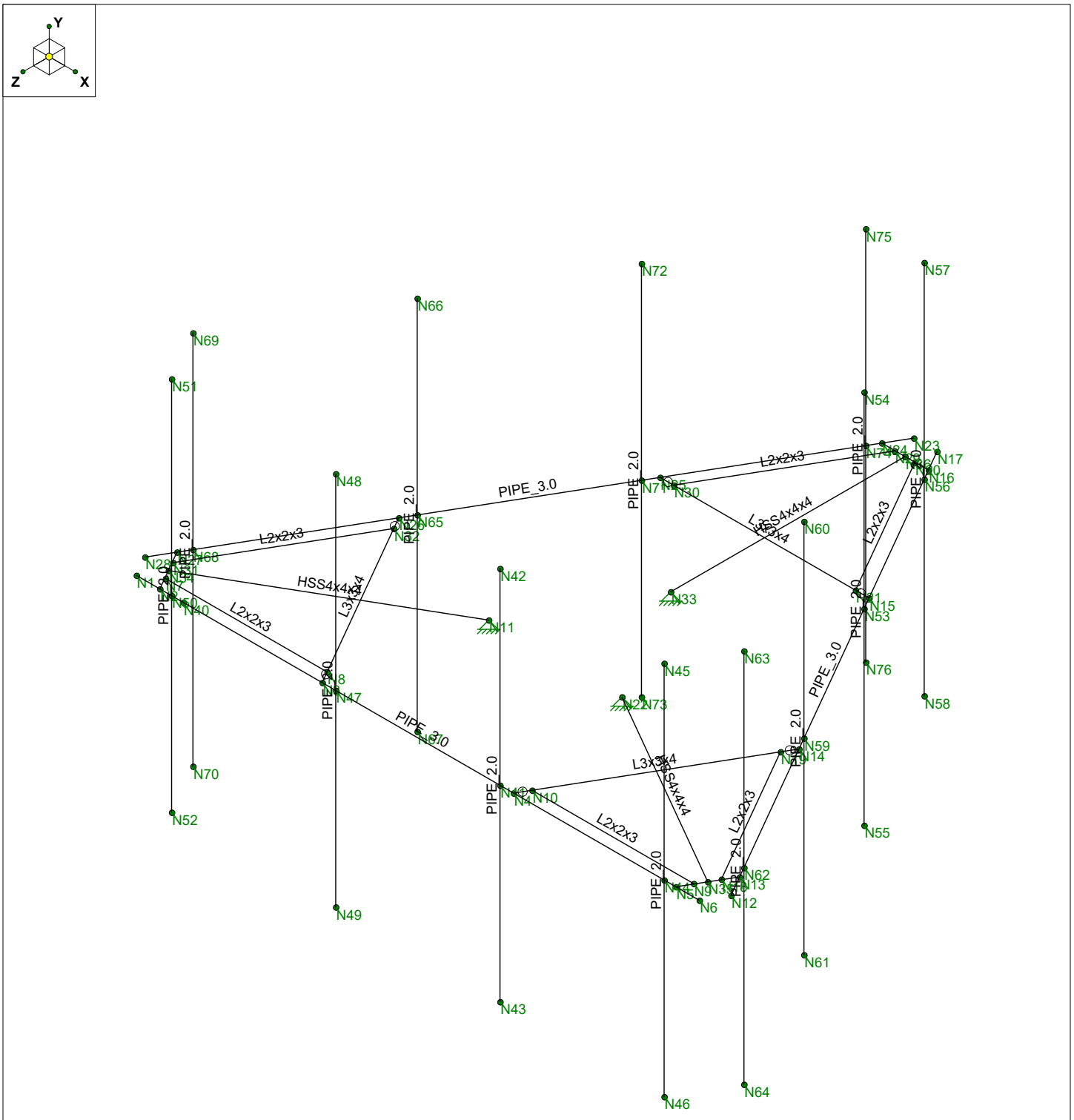
Gravity Loads (ice only)

Volume of Each RRUS = $V_{RRUS} := L_{RRUS} \cdot W_{RRUS} \cdot T_{RRUS} = 1425$ cu in

Volume of Ice on Each RRUS = $V_{ice} := (L_{RRUS} + 2 \cdot t_{iz})(W_{RRUS} + 2 \cdot t_{iz}) \cdot (T_{RRUS} + 2 \cdot t_{iz}) - V_{RRUS} = 1851$

Weight of Ice on Each RRUS = $W_{ICERRUS} := \frac{V_{ice}}{1728} \cdot Id = 60$ lbs

Weight of Ice on All RRUSs = $W_{ICERRUS} \cdot N_{RRUS} = 60$ lbs



Envelope Only Solution

Centek		
TJL	CT5861 - Mount	Oct 31, 2017 at 9:13 AM
17004.57	Member Shapes	Mount.r3d

(Global) Model Settings

Display Sections for Member Calcs	5
Max Internal Sections for Member Calcs	97
Include Shear Deformation?	Yes
Increase Nailing Capacity for Wind?	Yes
Include Warping?	Yes
Trans Load Btwn Intersecting Wood Wall?	Yes
Area Load Mesh (in^2)	144
Merge Tolerance (in)	.12
P-Delta Analysis Tolerance	0.50%
Include P-Delta for Walls?	Yes
Automatically Iterate Stiffness for Walls?	Yes
Max Iterations for Wall Stiffness	3
Gravity Acceleration (ft/sec^2)	32.2
Wall Mesh Size (in)	12
Eigensolution Convergence Tol. (1.E-)	4
Vertical Axis	Y
Global Member Orientation Plane	XZ
Static Solver	Sparse Accelerated
Dynamic Solver	Accelerated Solver

Hot Rolled Steel Code	AISC 14th(360-10): LRFD
Adjust Stiffness?	Yes(Iterative)
RISAConnection Code	AISC 14th(360-10): ASD
Cold Formed Steel Code	AISI S100-10: ASD
Wood Code	AWC NDS-12: ASD
Wood Temperature	< 100F
Concrete Code	ACI 318-11
Masonry Code	ACI 530-11: ASD
Aluminum Code	AA ADM1-10: ASD - Building

Number of Shear Regions	4
Region Spacing Increment (in)	4
Biaxial Column Method	Exact Integration
Parme Beta Factor (PCA)	.65
Concrete Stress Block	Rectangular
Use Cracked Sections?	Yes
Use Cracked Sections Slab?	No
Bad Framing Warnings?	No
Unused Force Warnings?	Yes
Min 1 Bar Diam. Spacing?	No
Concrete Rebar Set	REBAR_SET_ASTMA615
Min % Steel for Column	1
Max % Steel for Column	8

(Global) Model Settings, Continued

Seismic Code	ASCE 7-10
Seismic Base Elevation (ft)	Not Entered
Add Base Weight?	Yes
Ct X	.02
Ct Z	.02
T X (sec)	Not Entered
T Z (sec)	Not Entered
R X	3
R Z	3
Ct Exp. X	.75
Ct Exp. Z	.75
SD1	1
SDS	1
S1	1
TL (sec)	5
Risk Cat	I or II
Drift Cat	Other
Om Z	1
Om X	1
Cd Z	4
Cd X	4
Rho Z	1
Rho X	1
Footing Overturning Safety Factor	1
Optimize for OTM/Sliding	No
Check Concrete Bearing	No
Footing Concrete Weight (k/ft^3)	150.001
Footing Concrete f'c (ksi)	4
Footing Concrete Ec (ksi)	3644
Lambda	1
Footing Steel fy (ksi)	60
Minimum Steel	0.0018
Maximum Steel	0.0075
Footing Top Bar	#3
Footing Top Bar Cover (in)	2
Footing Bottom Bar	#3
Footing Bottom Bar Cover (in)	3.5
Pedestal Bar	#3
Pedestal Bar Cover (in)	1.5
Pedestal Ties	#3

Hot Rolled Steel Properties

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

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design R...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	Outrigger	HSS4x4x4	Beam	Tube	A500 Gr.46	Typical	3.37	7.8	7.8	12.8
2	Horz	PIPE_3.0	Beam	Pipe	A53 Grade B	Typical	2.07	2.85	2.85	5.69
3	Antenna Mast	PIPE_2.0	Beam	Pipe	A53 Grade B	Typical	1.02	.627	.627	1.25
4	Support	L3x3x4	Beam	Tube	A36 Gr.36	Typical	1.44	1.23	1.23	.031
5	Grating Supp...	L2x2x3	Beam	Tube	A36 Gr.36	Typical	.722	.271	.271	.009

Hot Rolled Steel Design Parameters

	Label	Shape	Length[ft]	Lbyy[ft]	Lbzz[ft]	Lcomp top[ft]	Lcomp bot[ft]	L-torq...	Kyy	Kzz	Cb	Function
1	M1	Horz	12	4	4	4	4	4				Lateral
2	M2	Horz	12	4	4	4	4	4				Lateral
3	M3	Horz	12	4	4	4	4	4				Lateral
4	M4	Support	4.455			Lbyy						Lateral
5	M5	Support	4.455			Lbyy						Lateral
6	M6	Support	4.455			Lbyy						Lateral
7	M7	Grating Sup...	3.446			Lbyy						Lateral
8	M8	Grating Sup...	3.446			Lbyy						Lateral
9	M12	Grating Sup...	3.446			Lbyy						Lateral
10	M13	Grating Sup...	3.446			Lbyy						Lateral
11	M14	Grating Sup...	3.446			Lbyy						Lateral
12	M15	Grating Sup...	3.446			Lbyy						Lateral
13	M16	Outrigger	4.998			Lbyy						Lateral
14	M17	Outrigger	4.998			Lbyy						Lateral
15	M18	Outrigger	4.998			Lbyy						Lateral
16	M19	Antenna Ma...	8			Lbyy						Lateral
17	M20	Antenna Ma...	8			Lbyy						Lateral
18	M21	Antenna Ma...	8			Lbyy						Lateral
19	M22	Antenna Ma...	8			Lbyy						Lateral
20	M23	Antenna Ma...	8			Lbyy						Lateral
21	M24	Antenna Ma...	8			Lbyy						Lateral
22	M25	Antenna Ma...	8			Lbyy						Lateral
23	M26	Antenna Ma...	8			Lbyy						Lateral
24	M27	Antenna Ma...	8			Lbyy						Lateral
25	M28	Antenna Ma...	8			Lbyy						Lateral
26	M29	Antenna Ma...	8			Lbyy						Lateral
27	M30	Antenna Ma...	8			Lbyy						Lateral

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(d...	Section/Shape	Type	Design List	Material	Design Ru...
1	M1	N1	N6			Horz	Beam	Pipe	A53 Gra...	Typical
2	M2	N12	N17			Horz	Beam	Pipe	A53 Gra...	Typical
3	M3	N23	N28			Horz	Beam	Pipe	A53 Gra...	Typical
4	M4	N3	N26		90	Support	Beam	Tube	A36 Gr.36	Typical
5	M5	N4	N14		180	Support	Beam	Tube	A36 Gr.36	Typical
6	M6	N15	N25		180	Support	Beam	Tube	A36 Gr.36	Typical
7	M7	N8	N7			Grating Support	Beam	Tube	A36 Gr.36	Typical
8	M8	N9	N10			Grating Support	Beam	Tube	A36 Gr.36	Typical
9	M9	N2	N27			RIGID	None	None	RIGID	Typical
10	M10	N5	N13			RIGID	None	None	RIGID	Typical
11	M11	N16	N24			RIGID	None	None	RIGID	Typical
12	M12	N31	N32			Grating Support	Beam	Tube	A36 Gr.36	Typical
13	M13	N19	N18			Grating Support	Beam	Tube	A36 Gr.36	Typical
14	M14	N20	N21			Grating Support	Beam	Tube	A36 Gr.36	Typical
15	M15	N30	N29			Grating Support	Beam	Tube	A36 Gr.36	Typical
16	M16	N34	N11			Outrigger	Beam	Tube	A500 Gr...	Typical

Member Primary Data (Continued)

	Label	I Joint	J Joint	K Joint	Rotate(d...	Section/Shape	Type	Design List	Material	Design Ru...
17	M17	N35	N22			Outrigger	Beam	Tube	A500 Gr...	Typical
18	M18	N36	N33			Outrigger	Beam	Tube	A500 Gr...	Typical
19	M19	N43	N42			Antenna Mast	Beam	Pipe	A53 Gra...	Typical
20	M20	N46	N45			Antenna Mast	Beam	Pipe	A53 Gra...	Typical
21	M21	N49	N48			Antenna Mast	Beam	Pipe	A53 Gra...	Typical
22	M22	N52	N51			Antenna Mast	Beam	Pipe	A53 Gra...	Typical
23	M23	N55	N54			Antenna Mast	Beam	Pipe	A53 Gra...	Typical
24	M24	N58	N57			Antenna Mast	Beam	Pipe	A53 Gra...	Typical
25	M25	N61	N60			Antenna Mast	Beam	Pipe	A53 Gra...	Typical
26	M26	N64	N63			Antenna Mast	Beam	Pipe	A53 Gra...	Typical
27	M27	N67	N66			Antenna Mast	Beam	Pipe	A53 Gra...	Typical
28	M28	N70	N69			Antenna Mast	Beam	Pipe	A53 Gra...	Typical
29	M29	N73	N72			Antenna Mast	Beam	Pipe	A53 Gra...	Typical
30	M30	N76	N75			Antenna Mast	Beam	Pipe	A53 Gra...	Typical

Joint Coordinates and Temperatures

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Diap...
1	N1	-6	0	3.75	0	
2	N2	-5.5	0	3.75	0	
3	N3	-2.04	0	3.75	0	
4	N4	2.04	0	3.75	0	
5	N5	5.5	0	3.75	0	
6	N6	6	0	3.75	0	
7	N7	-5.63	0	3.5	0	
8	N8	-2.184338	0	3.5	0	
9	N9	5.63	0	3.5	0	
10	N10	2.184338	0	3.5	0	
11	N11	-1.42	0	.82	0	
12	N12	6.247595	0	3.321152	0	
13	N13	5.997595	0	2.88814	0	
14	N14	4.267595	0	-0.108308	0	
15	N15	2.227595	0	-3.641692	0	
16	N16	0.497595	0	-6.63814	0	
17	N17	0.247595	0	-7.071152	0	
18	N18	5.846089	0	3.125723	0	
19	N19	4.123258	0	0.141692	0	
20	N20	0.216089	0	-6.625723	0	
21	N21	1.93892	0	-3.641692	0	
22	N22	1.420141	0	0.819756	0	
23	N23	-0.247595	0	-7.071152	0	
24	N24	-0.497595	0	-6.63814	0	
25	N25	-2.227595	0	-3.641692	0	
26	N26	-4.267595	0	-0.108308	0	
27	N27	-5.997595	0	2.88814	0	
28	N28	-6.247595	0	3.321152	0	
29	N29	-0.216089	0	-6.625723	0	
30	N30	-1.93892	0	-3.641692	0	
31	N31	-5.846089	0	3.125723	0	
32	N32	-4.123258	0	0.141692	0	
33	N33	-0.000141	0	-1.639756	0	
34	N34	-5.748798	0	3.31907	0	
35	N35	5.748798	0	3.31907	0	
36	N36	-0.	0	-6.63814	0	
37	N40	-5	0	3.75	0	
38	N41	1.75	0	3.75	0	

Joint Coordinates and Temperatures (Continued)

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Diap...
39	N42	1.75	4	3.75	0	
40	N43	1.75	-4	3.75	0	
41	N44	5.25	0	3.75	0	
42	N45	5.25	4	3.75	0	
43	N46	5.25	-4	3.75	0	
44	N47	-1.75	0	3.75	0	
45	N48	-1.75	4	3.75	0	
46	N49	-1.75	-4	3.75	0	
47	N50	-5.25	0	3.75	0	
48	N51	-5.25	4	3.75	0	
49	N52	-5.25	-4	3.75	0	
50	N53	2.372595	0	-3.390544	0	
51	N54	2.372595	4	-3.390544	0	
52	N55	2.372595	-4	-3.390544	0	
53	N56	0.622595	0	-6.421633	0	
54	N57	0.622595	4	-6.421633	0	
55	N58	0.622595	-4	-6.421633	0	
56	N59	4.122595	0	-0.359456	0	
57	N60	4.122595	4	-0.359456	0	
58	N61	4.122595	-4	-0.359456	0	
59	N62	5.872595	0	2.671633	0	
60	N63	5.872595	4	2.671633	0	
61	N64	5.872595	-4	2.671633	0	
62	N65	-4.122595	0	-0.359456	0	
63	N66	-4.122595	4	-0.359456	0	
64	N67	-4.122595	-4	-0.359456	0	
65	N68	-5.872595	0	2.671633	0	
66	N69	-5.872595	4	2.671633	0	
67	N70	-5.872595	-4	2.671633	0	
68	N71	-2.372595	0	-3.390544	0	
69	N72	-2.372595	4	-3.390544	0	
70	N73	-2.372595	-4	-3.390544	0	
71	N74	-0.622595	0	-6.421633	0	
72	N75	-0.622595	4	-6.421633	0	
73	N76	-0.622595	-4	-6.421633	0	

Joint Boundary Conditions

	Joint Label	X [k/in]	Y [k/in]	Z [k/in]	X Rot.[k-ft/rad]	Y Rot.[k-ft/rad]	Z Rot.[k-ft/rad]
1	N11	Reaction	Reaction	Reaction			
2	N33	Reaction	Reaction	Reaction			
3	N22	Reaction	Reaction	Reaction			

Member Point Loads (BLC 2 : Equipment Weight)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M20	Y	-.018	2.5
2	M21	Y	-.018	2.5
3	M24	Y	-.018	2.5
4	M25	Y	-.018	2.5
5	M28	Y	-.018	2.5
6	M29	Y	-.018	2.5
7	M20	Y	-.018	6.5
8	M21	Y	-.018	6.5
9	M24	Y	-.018	6.5
10	M25	Y	-.018	6.5

Member Point Loads (BLC 2 : Equipment Weight) (Continued)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
11	M28	Y	-.018	6.5
12	M29	Y	-.018	6.5
13	M19	Y	-.026	1.5
14	M23	Y	-.026	1.5
15	M27	Y	-.026	1.5
16	M19	Y	-.026	6.5
17	M23	Y	-.026	6.5
18	M27	Y	-.026	6.5
19	M22	Y	-.037	1.5
20	M26	Y	-.037	1.5
21	M30	Y	-.037	1.5
22	M22	Y	-.037	6.5
23	M26	Y	-.037	6.5
24	M30	Y	-.037	6.5
25	M20	Y	-.062	6
26	M24	Y	-.062	6
27	M28	Y	-.062	6
28	M21	Y	-.012	6
29	M25	Y	-.012	6
30	M29	Y	-.012	6
31	M22	Y	-.06	5
32	M26	Y	-.06	5
33	M30	Y	-.06	5
34	M19	Y	-.06	5
35	M23	Y	-.06	5
36	M27	Y	-.06	5

Member Point Loads (BLC 3 : Ice Weight)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M20	Y	-.06	2.5
2	M21	Y	-.06	2.5
3	M24	Y	-.06	2.5
4	M25	Y	-.06	2.5
5	M28	Y	-.06	2.5
6	M29	Y	-.06	2.5
7	M20	Y	-.06	6.5
8	M21	Y	-.06	6.5
9	M24	Y	-.06	6.5
10	M25	Y	-.06	6.5
11	M28	Y	-.06	6.5
12	M29	Y	-.06	6.5
13	M19	Y	-.123	1.5
14	M23	Y	-.123	1.5
15	M27	Y	-.123	1.5
16	M19	Y	-.123	6.5
17	M23	Y	-.123	6.5
18	M27	Y	-.123	6.5
19	M22	Y	-.14	1.5
20	M26	Y	-.14	1.5
21	M30	Y	-.14	1.5
22	M22	Y	-.14	6.5
23	M26	Y	-.14	6.5
24	M30	Y	-.14	6.5
25	M20	Y	-.096	6
26	M24	Y	-.096	6
27	M28	Y	-.096	6

Member Point Loads (BLC 3 : Ice Weight) (Continued)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
28	M21	Y	-.025	6
29	M25	Y	-.025	6
30	M29	Y	-.025	6
31	M22	Y	-.085	5
32	M26	Y	-.085	5
33	M30	Y	-.085	5
34	M19	Y	-.06	5
35	M23	Y	-.06	5
36	M27	Y	-.06	5

Member Point Loads (BLC 4 : Wind w/ Ice X)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M20	X	.021	2.5
2	M21	X	.021	2.5
3	M20	X	.021	6.5
4	M21	X	.021	6.5
5	M24	X	.035	2.5
6	M25	X	.035	2.5
7	M28	X	.035	2.5
8	M29	X	.035	2.5
9	M24	X	.035	6.5
10	M25	X	.035	6.5
11	M28	X	.035	6.5
12	M29	X	.035	6.5
13	M19	X	.039	1.5
14	M19	X	.039	6.5
15	M23	X	.057	1.5
16	M27	X	.057	1.5
17	M23	X	.057	6.5
18	M27	X	.057	6.5
19	M22	X	.03	1.5
20	M22	X	.03	6.5
21	M26	X	.074	1.5
22	M30	X	.074	1.5
23	M26	X	.074	6.5
24	M30	X	.074	6.5
25	M20	X	.01	6
26	M21	X	.005	6
27	M22	X	.023	5
28	M19	X	.015	5

Member Point Loads (BLC 5 : Wind X)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M20	X	.047	2.5
2	M21	X	.047	2.5
3	M20	X	.047	6.5
4	M21	X	.047	6.5
5	M24	X	.102	2.5
6	M25	X	.102	2.5
7	M28	X	.102	2.5
8	M29	X	.102	2.5
9	M24	X	.102	6.5
10	M25	X	.102	6.5
11	M28	X	.102	6.5
12	M29	X	.102	6.5
13	M19	X	.109	1.5

Member Point Loads (BLC 5 : Wind X) (Continued)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
14	M19	X	.109	6.5
15	M23	X	.179	1.5
16	M27	X	.179	1.5
17	M23	X	.179	6.5
18	M27	X	.179	6.5
19	M22	X	.074	1.5
20	M22	X	.074	6.5
21	M26	X	.246	1.5
22	M30	X	.246	1.5
23	M26	X	.246	6.5
24	M30	X	.246	6.5
25	M20	X	.016	6
26	M21	X	.006	6
27	M22	X	.055	5
28	M19	X	.034	5

Member Point Loads (BLC 6 : Wind w/ Ice Z)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M20	Z	.035	2.5
2	M21	Z	.035	2.5
3	M20	Z	.035	6.5
4	M21	Z	.035	6.5
5	M24	Z	.021	2.5
6	M25	Z	.021	2.5
7	M28	Z	.021	2.5
8	M29	Z	.021	2.5
9	M24	Z	.021	6.5
10	M25	Z	.021	6.5
11	M28	Z	.021	6.5
12	M29	Z	.021	6.5
13	M19	Z	.057	1.5
14	M19	Z	.057	6.5
15	M23	Z	.039	1.5
16	M27	Z	.039	1.5
17	M23	Z	.039	6.5
18	M27	Z	.039	6.5
19	M22	Z	.074	1.5
20	M22	Z	.074	6.5
21	M26	Z	.03	1.5
22	M30	Z	.03	1.5
23	M26	Z	.03	6.5
24	M30	Z	.03	6.5
25	M24	Z	.01	6
26	M28	Z	.01	6
27	M25	Z	.005	6
28	M29	Z	.005	6
29	M26	Z	.023	5
30	M30	Z	.023	5
31	M23	Z	.015	5
32	M27	Z	.015	5

Member Point Loads (BLC 7 : Wind Z)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M20	Z	.102	2.5
2	M21	Z	.102	2.5
3	M20	Z	.102	6.5

Member Point Loads (BLC 7 : Wind Z) (Continued)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
4	M21	Z	.102	6.5
5	M24	Z	.047	2.5
6	M25	Z	.047	2.5
7	M28	Z	.047	2.5
8	M29	Z	.047	2.5
9	M24	Z	.047	6.5
10	M25	Z	.047	6.5
11	M28	Z	.047	6.5
12	M29	Z	.047	6.5
13	M19	Z	.179	1.5
14	M19	Z	.179	6.5
15	M23	Z	.109	1.5
16	M27	Z	.109	1.5
17	M23	Z	.109	6.5
18	M27	Z	.109	6.5
19	M22	Z	.246	1.5
20	M22	Z	.246	6.5
21	M26	Z	.074	1.5
22	M30	Z	.074	1.5
23	M26	Z	.074	6.5
24	M30	Z	.074	6.5
25	M24	Z	.016	6
26	M28	Z	.016	6
27	M25	Z	.006	6
28	M29	Z	.006	6
29	M26	Z	.055	5
30	M30	Z	.055	5
31	M23	Z	.034	5
32	M27	Z	.034	5

Member Distributed Loads (BLC 4 : Wind w/ Ice X)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	M3	X	.003	.003	0	0
2	M22	X	.003	.003	0	0
3	M21	X	.003	.003	0	0
4	M19	X	.003	.003	0	0
5	M20	X	.003	.003	0	0

Member Distributed Loads (BLC 5 : Wind X)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	M3	X	.01	.01	0	0
2	M22	X	.01	.01	0	0
3	M21	X	.01	.01	0	0
4	M19	X	.01	.01	0	0
5	M20	X	.01	.01	0	0

Member Distributed Loads (BLC 6 : Wind w/ Ice Z)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	M3	Z	.003	.003	0	0
2	M2	Z	.003	.003	0	0
3	M24	Z	.003	.003	0	0
4	M30	Z	.003	.003	0	0
5	M29	Z	.003	.003	0	0
6	M23	Z	.003	.003	0	0

Member Distributed Loads (BLC 6 : Wind w/ Ice Z) (Continued)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
7	M27	Z	.003	.003	0	0
8	M25	Z	.003	.003	0	0
9	M28	Z	.003	.003	0	0
10	M26	Z	.003	.003	0	0

Member Distributed Loads (BLC 7 : Wind Z)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	M3	Z	.01	.01	0	0
2	M2	Z	.01	.01	0	0
3	M24	Z	.01	.01	0	0
4	M30	Z	.01	.01	0	0
5	M29	Z	.01	.01	0	0
6	M23	Z	.01	.01	0	0
7	M27	Z	.01	.01	0	0
8	M25	Z	.01	.01	0	0
9	M28	Z	.01	.01	0	0
10	M26	Z	.01	.01	0	0

Member Distributed Loads (BLC 8 : BLC 2 Transient Area Loads)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	M4	Y	-.002	-.002	0	2.228
2	M4	Y	-.002	-.002	2.228	4.455
3	M7	Y	-.002	-.002	.345	.965
4	M7	Y	-.002	-.002	.965	1.585
5	M7	Y	-.002	-.003	1.585	2.205
6	M7	Y	-.003	-.002	2.205	2.825
7	M7	Y	-.002	-.0002059	2.825	3.446
8	M12	Y	-.0002059	-.002	0	.62
9	M12	Y	-.002	-.003	.62	1.24
10	M12	Y	-.003	-.002	1.24	1.861
11	M12	Y	-.002	-.002	1.861	2.481
12	M12	Y	-.002	-.002	2.481	3.101
13	M16	Y	-.002	-.002	0	.6
14	M16	Y	-.002	-.004	.6	1.2
15	M16	Y	-.004	-.008	1.2	1.799
16	M16	Y	-.008	-.005	1.799	2.399
17	M16	Y	-.005	-3.719e-5	2.399	2.999
18	M6	Y	-.002	-.002	0	2.228
19	M6	Y	-.002	-.002	2.228	4.455
20	M14	Y	-.0002059	-.002	0	.62
21	M14	Y	-.002	-.003	.62	1.24
22	M14	Y	-.003	-.002	1.24	1.861
23	M14	Y	-.002	-.002	1.861	2.481
24	M14	Y	-.002	-.002	2.481	3.101
25	M15	Y	-.002	-.002	.345	.965
26	M15	Y	-.002	-.002	.965	1.585
27	M15	Y	-.002	-.003	1.585	2.205
28	M15	Y	-.003	-.002	2.205	2.825
29	M15	Y	-.002	-.0002059	2.825	3.446
30	M18	Y	-.002	-.002	0	.6
31	M18	Y	-.002	-.004	.6	1.2
32	M18	Y	-.004	-.008	1.2	1.799
33	M18	Y	-.008	-.005	1.799	2.399
34	M18	Y	-.005	-3.719e-5	2.399	2.999
35	M5	Y	-.002	-.002	0	2.228
36	M5	Y	-.002	-.002	2.228	4.455

Member Distributed Loads (BLC 8 : BLC 2 Transient Area Loads) (Continued)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
37	M8	Y	-.0002059	-.002	0	.62
38	M8	Y	-.002	-.003	.62	1.24
39	M8	Y	-.003	-.002	1.24	1.861
40	M8	Y	-.002	-.002	1.861	2.481
41	M8	Y	-.002	-.002	2.481	3.101
42	M13	Y	-.002	-.002	.345	.965
43	M13	Y	-.002	-.002	.965	1.585
44	M13	Y	-.002	-.003	1.585	2.205
45	M13	Y	-.003	-.002	2.205	2.825
46	M13	Y	-.002	-.0002059	2.825	3.446
47	M17	Y	-.002	-.002	0	.6
48	M17	Y	-.002	-.004	.6	1.2
49	M17	Y	-.004	-.008	1.2	1.799
50	M17	Y	-.008	-.005	1.799	2.399
51	M17	Y	-.005	-3.719e-5	2.399	2.999

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distribut...	Area(Me...	Surface(...
1	Self Weight	None		-1						
2	Equipment Weight	None					36		3	
3	Ice Weight	None					36			
4	Wind w/ Ice X	None					28	5		
5	Wind X	None					28	5		
6	Wind w/ Ice Z	None					32	10		
7	Wind Z	None					32	10		
8	BLC 2 Transient Area Loads	None						51		

Load Combinations

	Description	So...	P...	S...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...
1	1.2D + 1.6W (X-dire...	Yes	Y		1	1.2	2	1.2	5	1.6														
2	0.9D + 1.6W (X-dire...	Yes	Y		1	.9	2	.9	5	1.6														
3	1.2D + 1.0Di + 1.0W...	Yes	Y		1	1.2	2	1.2	3	1	4	1												
4	1.2D + 1.6W (Z-dire...	Yes	Y		1	1.2	2	1.2	7	1.6														
5	0.9D + 1.6W (Z-dire...	Yes	Y		1	.9	2	.9	7	1.6														
6	1.2D + 1.0Di + 1.0W...	Yes	Y		1	1.2	2	1.2	3	1	6	1												

Envelope Joint Reactions

	Joint		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	N11	max	1.19	4	1.919	3	1.641	2	0	1	0	1	0	1
2		min	-2.546	1	.45	2	-1.431	4	0	1	0	1	0	1
3	N33	max	.269	5	1.906	6	.142	1	0	1	0	1	0	1
4		min	-.759	2	.384	5	-3.36	4	0	1	0	1	0	1
5	N22	max	-.315	6	1.884	6	-.191	6	0	1	0	1	0	1
6		min	-2.489	1	.782	5	-1.783	2	0	1	0	1	0	1
7	Totals:	max	0	4	5.673	3	0	3						
8		min	-5.794	2	1.933	2	-5.549	5						

Envelope Joint Displacements

	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation ...	LC	Y Rotation ...	LC	Z Rotation [...	LC
1	N1	max	.72	4	-.503	2	1.148	4	3.021e-02	3	1.704e-02	4	5.653e-02	3
2		min	-.907	2	-4.946	3	-1.429	2	6.509e-03	2	-2.455e-02	2	1.684e-03	2
3	N2	max	.72	4	-.492	2	1.046	4	3.021e-02	3	1.704e-02	4	5.653e-02	3
4		min	-.907	2	-4.607	3	-1.282	2	6.509e-03	2	-2.455e-02	2	1.684e-03	2
5	N3	max	.718	4	-.579	2	.429	4	2.986e-02	3	1.342e-02	4	2.151e-02	3
6		min	-.906	2	-3.025	3	-.384	2	7.071e-03	2	-1.784e-02	2	-5.765e-03	2
7	N4	max	.717	4	-1.087	2	.394	2	2.93e-02	3	1.575e-02	4	-6.61e-03	5
8		min	-.906	2	-2.793	3	-.257	4	7.646e-03	2	-1.757e-02	2	-1.643e-02	6
9	N5	max	.715	4	-1.987	2	1.281	2	2.866e-02	3	2.009e-02	4	-1.792e-02	5
10		min	-.906	2	-4.078	6	-.997	4	8.049e-03	2	-2.458e-02	2	-4.992e-02	6
11	N6	max	.715	4	-2.161	2	1.428	2	2.866e-02	3	2.009e-02	4	-1.792e-02	5
12		min	-.906	2	-4.378	6	-1.117	4	8.049e-03	2	-2.458e-02	2	-4.992e-02	6
13	N7	max	.673	4	-.541	2	1.097	4	2.148e-02	5	1.571e-02	4	3.425e-02	3
14		min	-.838	2	-4.439	3	-1.34	2	3.675e-03	2	-2.204e-02	2	-4.002e-04	2
15	N8	max	.673	4	-.566	2	.455	5	2.148e-02	5	1.51e-02	5	3.309e-02	3
16		min	-.838	2	-3.035	3	-.423	1	3.675e-03	2	-2.264e-02	1	-1.273e-03	2
17	N9	max	.661	5	-1.996	2	1.355	1	2.19e-02	5	1.805e-02	5	-1.307e-02	5
18		min	-.84	1	-3.941	6	-1.041	5	3.535e-03	2	-2.25e-02	1	-2.893e-02	6
19	N10	max	.661	5	-1.112	2	.432	2	2.19e-02	5	1.865e-02	4	-1.22e-02	5
20		min	-.84	1	-2.786	3	-.289	4	3.535e-03	2	-2.189e-02	2	-2.777e-02	6
21	N11	max	0	1	0	2	0	4	3.987e-02	3	2.308e-02	4	7.325e-02	3
22		min	0	4	0	3	0	2	8.768e-03	2	-2.681e-02	2	5.597e-03	2
23	N12	max	.612	4	-2.133	5	1.502	2	2.866e-02	3	2.009e-02	4	-1.792e-02	5
24		min	-.78	2	-4.394	6	-1.177	4	8.049e-03	2	-2.458e-02	2	-4.992e-02	6
25	N13	max	.508	4	-1.938	5	1.428	2	2.866e-02	3	2.009e-02	4	-1.792e-02	5
26		min	-.652	2	-4.112	6	-1.117	4	8.049e-03	2	-2.458e-02	2	-4.992e-02	6
27	N14	max	.119	2	-.906	5	.984	2	1.561e-02	5	1.469e-02	4	-1.014e-02	5
28		min	-.132	5	-2.895	6	-.748	4	-4.092e-03	6	-1.983e-02	2	-3.334e-02	6
29	N15	max	.927	2	-.258	5	.52	2	7.525e-03	5	1.327e-02	4	-4.5e-03	5
30		min	-.667	4	-3.075	6	-.439	4	-3.324e-02	6	-1.786e-02	2	-1.772e-02	2
31	N16	max	1.605	2	-.03	5	.13	2	1.996e-03	5	1.848e-02	4	4.22e-03	3
32		min	-1.244	4	-4.588	6	-.108	4	-6.354e-02	6	-2.171e-02	2	-1.241e-02	2
33	N17	max	1.718	2	-.018	5	.064	2	1.996e-03	5	1.848e-02	4	4.22e-03	3
34		min	-1.34	4	-4.918	6	-.052	4	-6.354e-02	6	-2.171e-02	2	-1.241e-02	2
35	N18	max	.586	4	-1.945	5	1.4	2	2.211e-02	5	1.871e-02	4	-1.009e-02	5
36		min	-.734	2	-3.946	6	-1.1	4	5.681e-03	2	-2.185e-02	2	-2.759e-02	6
37	N19	max	.052	2	-.953	5	.946	2	2.135e-02	5	1.81e-02	5	-9.657e-03	5
38		min	-.078	4	-2.887	6	-.716	4	4.925e-03	2	-2.245e-02	1	-2.701e-02	6
39	N20	max	1.631	1	-.09	5	.048	2	4.508e-03	5	1.633e-02	5	5.314e-03	3
40		min	-1.256	5	-4.417	6	-.041	4	-3.726e-02	6	-1.983e-02	1	-1.044e-02	2
41	N21	max	.927	2	-.257	5	.454	1	5.263e-03	5	1.693e-02	4	4.733e-03	3
42		min	-.667	4	-3.076	6	-.381	5	-3.625e-02	6	-1.921e-02	2	-1.087e-02	2
43	N22	max	0	1	0	5	0	2	3.76e-02	3	2.048e-02	4	-2.402e-02	5
44		min	0	6	0	6	0	6	1.161e-02	2	-2.677e-02	2	-6.57e-02	6
45	N23	max	1.718	2	-.014	5	.057	4	1.996e-03	5	1.848e-02	4	4.22e-03	3
46		min	-1.34	4	-4.916	6	-.065	2	-6.354e-02	6	-2.171e-02	2	-1.241e-02	2
47	N24	max	1.605	2	-.022	5	.113	4	1.996e-03	5	1.848e-02	4	4.22e-03	3
48		min	-1.244	4	-4.586	6	-.13	2	-6.354e-02	6	-2.171e-02	2	-1.241e-02	2
49	N25	max	.927	2	-.221	5	.449	4	7.646e-03	5	1.568e-02	4	2.163e-02	3
50		min	-.665	4	-3.061	6	-.52	2	-3.309e-02	6	-1.774e-02	2	-7.326e-03	2
51	N26	max	.128	2	-.353	2	.838	4	1.528e-02	5	1.477e-02	4	3.881e-02	3
52		min	.005	6	-3.146	3	-.98	2	-4.135e-03	6	-2.e-02	2	-2.527e-03	2
53	N27	max	.543	4	-.435	2	1.148	4	3.021e-02	3	1.704e-02	4	5.653e-02	3
54		min	-.653	2	-4.632	3	-1.429	2	6.509e-03	2	-2.455e-02	2	1.684e-03	2
55	N28	max	.632	4	-.474	2	1.199	4	3.021e-02	3	1.704e-02	4	5.653e-02	3
56		min	-.78	2	-4.959	3	-1.502	2	6.509e-03	2	-2.455e-02	2	1.684e-03	2
57	N29	max	1.618	2	-.083	5	.045	5	4.613e-03	5	1.698e-02	4	3.082e-03	3

Envelope Joint Displacements (Continued)

	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation ...	LC	Y Rotation ...	LC	Z Rotation [...	LC
58		min	-1.267	4	-4.411	6	-.054	1	-3.714e-02	6	-1.917e-02	2	-1.211e-02	2
59	N30	max	.927	2	-.225	5	.392	4	5.368e-03	5	1.637e-02	5	3.663e-03	3
60		min	-.665	4	-3.064	6	-.452	2	-3.613e-02	6	-1.977e-02	1	-1.168e-02	2
61	N31	max	.598	5	-.482	2	1.125	5	2.172e-02	5	1.506e-02	5	3.32e-02	3
62		min	-.744	1	-4.454	3	-1.407	1	4.612e-03	2	-2.269e-02	1	-2.136e-03	2
63	N32	max	.062	1	-.369	2	.811	5	2.097e-02	5	1.566e-02	4	3.261e-02	3
64		min	.012	3	-3.14	3	-.942	1	3.857e-03	2	-2.208e-02	2	-2.572e-03	2
65	N33	max	0	2	0	5	0	4	-1.648e-03	5	2.184e-02	4	4.22e-03	3
66		min	0	5	0	6	0	1	-8.281e-02	6	-2.921e-02	2	-1.241e-02	2
67	N34	max	.632	4	-.464	2	1.097	4	3.021e-02	3	1.704e-02	4	5.653e-02	3
68		min	-.78	2	-4.62	3	-1.355	2	6.509e-03	2	-2.455e-02	2	1.684e-03	2
69	N35	max	.612	4	-2.025	5	1.354	2	2.866e-02	3	2.009e-02	4	-1.792e-02	5
70		min	-.779	2	-4.095	6	-1.057	4	8.049e-03	2	-2.458e-02	2	-4.992e-02	6
71	N36	max	1.605	2	-.026	5	.003	4	1.996e-03	5	1.848e-02	4	4.22e-03	3
72		min	-1.244	4	-4.587	6	0	1	-6.354e-02	6	-2.171e-02	2	-1.241e-02	2
73	N40	max	.719	4	-.486	2	.946	4	3.017e-02	3	1.623e-02	4	5.079e-02	3
74		min	-.907	2	-4.286	3	-1.137	2	6.59e-03	2	-2.389e-02	2	5.41e-04	2
75	N41	max	.717	4	-1.034	2	.334	2	2.935e-02	3	1.54e-02	4	-5.809e-03	5
76		min	-.906	2	-2.757	3	-.202	4	7.606e-03	2	-1.689e-02	2	-1.479e-02	2
77	N42	max	1.063	4	-1.034	2	1.456	5	3.641e-02	5	1.54e-02	4	-5.83e-03	5
78		min	-.147	1	-2.758	3	.7	2	7.633e-03	2	-1.689e-02	2	-2.222e-02	2
79	N43	max	.438	5	-1.034	2	-.031	2	2.915e-02	3	1.54e-02	4	-2.842e-03	1
80		min	-1.348	2	-2.758	3	-1.375	3	7.595e-03	2	-1.689e-02	2	-1.406e-02	6
81	N44	max	.716	4	-1.902	2	1.208	2	2.872e-02	3	1.975e-02	4	-1.698e-02	5
82		min	-.906	2	-3.933	6	-.937	4	8.02e-03	2	-2.419e-02	2	-4.707e-02	6
83	N45	max	2.386	6	-1.902	2	1.783	1	3.231e-02	5	1.975e-02	4	-1.703e-02	5
84		min	.508	1	-3.933	6	.355	4	8.047e-03	2	-2.419e-02	2	-4.758e-02	6
85	N46	max	-.099	5	-1.902	2	.823	2	2.86e-02	3	1.975e-02	4	-1.696e-02	5
86		min	-2.144	2	-3.933	6	-2.163	5	8.011e-03	2	-2.419e-02	2	-4.689e-02	6
87	N47	max	.718	4	-.6	2	.382	4	2.983e-02	3	1.333e-02	4	1.902e-02	3
88		min	-.906	2	-2.955	3	-.324	2	7.112e-03	2	-1.712e-02	2	-6.394e-03	2
89	N48	max	.531	5	-.6	2	1.901	5	3.269e-02	5	1.333e-02	4	1.805e-02	3
90		min	-.96	3	-2.955	3	.018	2	7.123e-03	2	-1.712e-02	2	-1.061e-02	2
91	N49	max	.97	4	-.6	2	-.657	4	2.971e-02	3	1.333e-02	4	1.95e-02	3
92		min	-1.116	2	-2.955	3	-1.452	3	7.104e-03	2	-1.712e-02	2	-3.862e-03	2
93	N50	max	.72	4	-.488	2	.996	4	3.019e-02	3	1.66e-02	4	5.361e-02	3
94		min	-.907	2	-4.442	3	-1.209	2	6.549e-03	2	-2.423e-02	2	1.082e-03	2
95	N51	max	-.008	5	-.488	2	2.732	5	3.871e-02	5	1.66e-02	4	5.3e-02	3
96		min	-2.629	3	-4.443	3	-.894	2	6.575e-03	2	-2.423e-02	2	-4.72e-03	2
97	N52	max	2.522	3	-.488	2	.404	4	2.995e-02	3	1.66e-02	4	5.442e-02	3
98		min	-.654	2	-4.443	3	-1.795	1	6.538e-03	2	-2.423e-02	2	6.424e-03	2
99	N53	max	.873	2	-.29	5	.551	2	7.985e-03	5	1.282e-02	4	-4.812e-03	5
100		min	-.628	4	-3.009	6	-.462	4	-3.118e-02	6	-1.803e-02	2	-1.833e-02	6
101	N54	max	2.083	2	-.29	5	.202	5	1.539e-02	5	1.282e-02	4	-4.829e-03	5
102		min	-.396	5	-3.01	6	-1.519	6	-2.995e-02	6	-1.803e-02	2	-2.706e-02	2
103	N55	max	.554	1	-.29	5	1.476	6	8.966e-04	5	1.282e-02	4	-4.805e-03	5
104		min	-.979	4	-3.009	6	-.578	5	-3.249e-02	6	-1.803e-02	2	-1.821e-02	6
105	N56	max	1.549	2	-.038	5	.161	2	2.481e-03	5	1.815e-02	4	2.762e-03	3
106		min	-1.196	4	-4.428	6	-.135	4	-6.094e-02	6	-2.105e-02	2	-1.292e-02	2
107	N57	max	2.364	2	-.038	5	.155	5	7.024e-03	5	1.815e-02	4	1.7e-03	3
108		min	-1.149	5	-4.428	6	-2.922	6	-6.042e-02	6	-2.105e-02	2	-1.803e-02	2
109	N58	max	1.301	1	-.038	5	2.918	6	-4.612e-05	5	1.815e-02	4	3.14e-03	3
110		min	-1.255	4	-4.428	6	-.158	5	-6.125e-02	6	-2.105e-02	2	-1.109e-02	2
111	N59	max	.179	2	-.843	5	.95	2	1.492e-02	5	1.408e-02	4	-9.637e-03	5
112		min	-.175	5	-2.853	6	-.723	4	-6.226e-03	6	-1.979e-02	2	-3.215e-02	6
113	N60	max	1.518	6	-.843	5	.816	1	1.915e-02	5	1.408e-02	4	-9.652e-03	5
114		min	.288	5	-2.854	6	-.369	6	-5.19e-03	6	-1.979e-02	2	-3.233e-02	6

Envelope Joint Displacements (Continued)

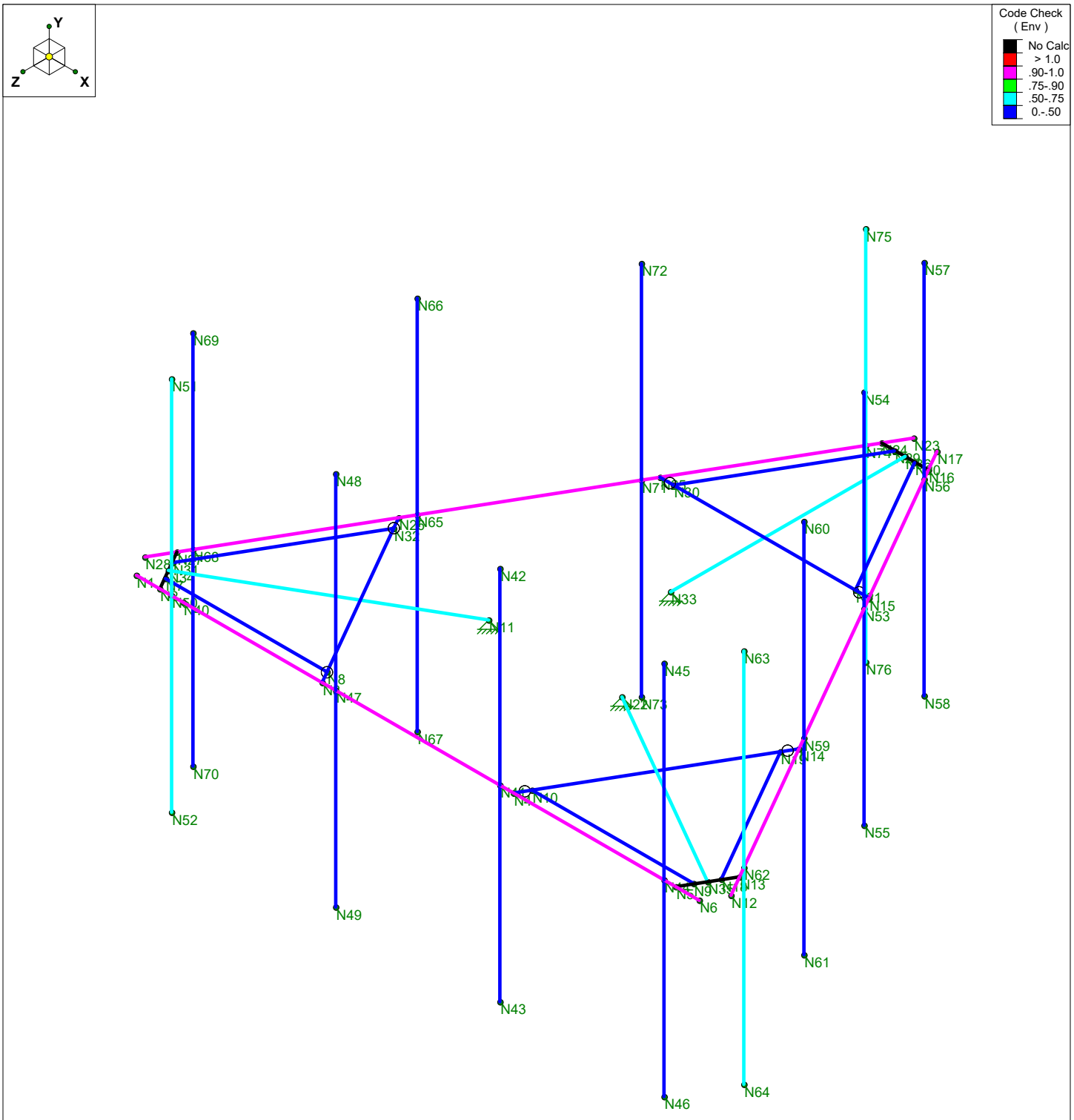
	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation ...	LC	Y Rotation ...	LC	Z Rotation [...	LC
115	N61	max	-.637	5	-.843	5	1.129	2	1.238e-02	5	1.408e-02	4	-9.626e-03	5
116		min	-1.57	6	-2.853	6	-1.342	5	-6.75e-03	6	-1.979e-02	2	-3.203e-02	6
117	N62	max	.456	4	-1.843	5	1.391	2	2.626e-02	3	1.986e-02	4	-1.723e-02	5
118		min	-.589	2	-3.975	6	-1.087	4	7.12e-03	2	-2.397e-02	2	-4.855e-02	6
119	N63	max	2.422	6	-1.843	5	1.911	1	3.195e-02	5	1.986e-02	4	-1.73e-02	5
120		min	1.161	1	-3.975	6	.169	4	7.148e-03	2	-2.397e-02	2	-4.924e-02	6
121	N64	max	-.37	5	-1.843	5	1.05	2	2.606e-02	3	1.986e-02	4	-1.442e-02	1
122		min	-2.249	6	-3.975	6	-2.135	5	7.107e-03	2	-2.397e-02	2	-4.816e-02	6
123	N65	max	.188	2	-.362	2	.812	4	1.464e-02	5	1.506e-02	4	3.76e-02	3
124		min	-.037	4	-3.082	3	-.945	2	-6.144e-03	6	-1.986e-02	2	-2.83e-03	2
125	N66	max	.664	2	-.362	2	1.796	5	2.207e-02	5	1.506e-02	4	3.628e-02	3
126		min	-1.728	3	-3.082	3	-1.015	2	-4.605e-03	6	-1.986e-02	2	-1.173e-02	2
127	N67	max	1.888	3	-.362	2	.743	4	7.547e-03	5	1.506e-02	4	3.91e-02	3
128		min	.351	5	-3.082	3	-.922	1	-7.618e-03	6	-1.986e-02	2	6.024e-03	2
129	N68	max	.5	4	-.417	2	1.122	4	2.764e-02	3	1.647e-02	4	5.5e-02	3
130		min	-.59	2	-4.474	3	-1.392	2	5.893e-03	2	-2.402e-02	2	1.248e-03	2
131	N69	max	-.239	5	-.417	2	2.512	5	2.996e-02	5	1.647e-02	4	5.45e-02	3
132		min	-2.67	3	-4.474	3	-1.109	2	5.913e-03	2	-2.402e-02	2	-3.81e-03	2
133	N70	max	2.597	3	-.417	2	.224	4	2.753e-02	3	1.647e-02	4	5.518e-02	3
134		min	-.453	2	-4.474	3	-1.93	1	5.887e-03	2	-2.402e-02	2	3.062e-03	2
135	N71	max	.873	2	-.251	5	.476	4	8.132e-03	5	1.589e-02	4	2.288e-02	3
136		min	-.618	4	-2.995	6	-.551	2	-3.092e-02	6	-1.785e-02	2	-7.025e-03	2
137	N72	max	1.404	2	-.251	5	1.025	5	1.236e-02	5	1.589e-02	4	2.191e-02	3
138		min	-.974	6	-2.995	6	-1.375	6	-3.002e-02	6	-1.785e-02	2	-1.209e-02	2
139	N73	max	1.203	3	-.251	5	1.576	6	5.598e-03	5	1.589e-02	4	2.318e-02	3
140		min	-.454	5	-2.995	6	-.125	2	-3.135e-02	6	-1.785e-02	2	-5.201e-03	2
141	N74	max	1.549	2	-.027	5	.14	4	2.461e-03	5	1.791e-02	4	5.657e-03	3
142		min	-1.197	4	-4.425	6	-.162	2	-6.101e-02	6	-2.104e-02	2	-1.194e-02	2
143	N75	max	2.59	2	-.027	5	.479	5	8.277e-03	5	1.791e-02	4	3.423e-03	3
144		min	-1.186	4	-4.425	6	-2.882	6	-6.051e-02	6	-2.104e-02	2	-2.42e-02	2
145	N76	max	1.752	1	-.027	5	2.981	6	-2.888e-03	5	1.791e-02	4	7.887e-03	3
146		min	-1.217	5	-4.425	6	.223	5	-6.176e-02	6	-2.104e-02	2	-4.224e-04	5

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

	Member	Shape	Code Check	Loc...	LC	Shea...	Loc...	...	...	phi*Pn...	phi*Pn...	phi*Mn...	phi*Mn...	...	Eqn
1	M1	PIPE_3.0	.956	.5	3	.083	.5		4	59.853	65.205	5.749	5.749	1	H1-1b
2	M2	PIPE_3.0	.974	11.5	6	.076	11.5		2	59.853	65.205	5.749	5.749	1	H1-1b
3	M3	PIPE_3.0	.978	11.5	3	.087	.5		2	59.853	65.205	5.749	5.749	1	H1-1b
4	M4	L3x3x4	.055	2.228	1	.112	4.455	z	4	30.058	46.656	1.688	3.423	...	H2-1
5	M5	L3x3x4	.042	2.228	1	.112	4.455	y	4	30.058	46.656	1.688	3.424	...	H2-1
6	M6	L3x3x4	.057	2.228	4	.112	4.455	y	1	30.058	46.656	1.688	3.423	...	H2-1
7	M7	L2x2x3	.054	0	1	.002	0	y	3	12.905	23.393	.558	1.239	...	H2-1
8	M8	L2x2x3	.054	3.446	4	.002	3.446	y	3	12.905	23.393	.558	1.239	...	H2-1
9	M12	L2x2x3	.054	3.446	1	.002	3.446	y	6	12.905	23.393	.558	1.239	...	H2-1
10	M13	L2x2x3	.054	0	1	.002	0	y	1	12.905	23.393	.558	1.239	...	H2-1
11	M14	L2x2x3	.054	3.446	4	.002	3.446	y	3	12.905	23.393	.558	1.239	...	H2-1
12	M15	L2x2x3	.054	0	1	.002	0	y	3	12.905	23.393	.558	1.239	...	H2-1
13	M16	HSS4x4x4	.599	0	3	.051	4.998	y	3	125.667	139.518	16.181	16.181	...	H1-1b
14	M17	HSS4x4x4	.566	0	6	.049	4.998	y	6	125.667	139.518	16.181	16.181	...	H1-1b
15	M18	HSS4x4x4	.613	0	6	.051	4.998	y	6	125.667	139.518	16.181	16.181	...	H1-1b
16	M19	PIPE_2.0	.390	4	4	.030	4		1	14.916	32.13	1.872	1.872	...	H1-1b
17	M20	PIPE_2.0	.225	4	4	.017	4		1	14.916	32.13	1.872	1.872	...	H1-1b
18	M21	PIPE_2.0	.221	4	4	.017	4		4	14.916	32.13	1.872	1.872	...	H1-1b
19	M22	PIPE_2.0	.535	4	4	.041	4		4	14.916	32.13	1.872	1.872	...	H1-1b
20	M23	PIPE_2.0	.389	4	1	.030	4		5	14.916	32.13	1.872	1.872	...	H1-1b

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

	Member	Shape	Code Check	Loc...	LC	Shea...	Loc...	...	...	phi*Pn...	phi*Pn...	phi*Mn...	phi*Mn...	...	Eqn
21	M24	PIPE_2.0	.223	4	1	.017	4		5	14.916	32.13	1.872	1.872	...	H1-1b
22	M25	PIPE_2.0	.221	4	1	.017	4		1	14.916	32.13	1.872	1.872	...	H1-1b
23	M26	PIPE_2.0	.535	4	1	.041	4		1	14.916	32.13	1.872	1.872	...	H1-1b
24	M27	PIPE_2.0	.387	4	2	.030	4		5	14.916	32.13	1.872	1.872	...	H1-1b
25	M28	PIPE_2.0	.221	4	2	.017	4		4	14.916	32.13	1.872	1.872	...	H1-1b
26	M29	PIPE_2.0	.220	4	1	.017	4		2	14.916	32.13	1.872	1.872	...	H1-1b
27	M30	PIPE_2.0	.532	4	1	.041	4		2	14.916	32.13	1.872	1.872	...	H1-1b



Envelope Only Solution

Centek		
TJL	CT5861 - Mount	Oct 31, 2017 at 9:12 AM
17004.57	Unity Check	Mount.r3d

USPS Tracking® FAQs > (https://www.usps.com/faqs/uspstracking-faqs.htm)

Track Another Package +

Tracking Number: 9510812444778306192562

Remove ×

Expected Delivery on

MONDAY
5 NOVEMBER 2018 ⓘ

between
1:15pm and 3:15pm ⓘ

Feedback

Delivered

November 5, 2018 at 2:27 pm
Delivered
COLUMBIA, CT 06237

Get Updates ∨

Text & Email Updates ∨

Proof of Delivery ∨

Tracking History ∨

Product Information ∧

Features: Signed for By: J LAVOIE // COLUMBIA, CT

Postal Product: Priority Mail®	Insured Signature Confirmation™	06237 // 2:27 pm

See Less ^

Can’t find what you’re looking for?

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FAQs (https://www.usps.com/faqs/uspstracking-faqs.htm)

Feedback

The easiest tracking number is the one you don't have to know.

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- See images* of incoming mail.
- Automatically track the packages you're expecting.

- Set up email and text alerts so you don't need to enter tracking numbers.
- Enter USPS Delivery Instructions™ for your mail carrier.

Sign Up

(https://reg.usps.com/entreg/RegistrationAction_input?app=UspsTools&appURL=https%

*NOTE: Black and white (grayscale) images show the outside, front of letter-sized envelopes and mailpieces that are processed through USPS automated equipment.

Feedback

USPS Tracking® FAQs > (https://www.usps.com/faqs/uspstracking-faqs.htm)

Track Another Package +

Tracking Number: 9510812444778306192579

Remove ×

Expected Delivery on

MONDAY
5 NOVEMBER 2018 ⓘ

between
1:15pm and 3:15pm ⓘ

Feedback

Delivered

November 5, 2018 at 2:27 pm
Delivered
COLUMBIA, CT 06237

Get Updates ∨

Text & Email Updates ∨

Proof of Delivery ∨

Tracking History ∨

Product Information ∧

Features: Signed for By: J LAVOIE // COLUMBIA, CT

Postal Product: Priority Mail®	Insured Signature Confirmation™	06237 // 2:27 pm

See Less ^

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Track Another Package +

Tracking Number: 9510812444778306192586

Remove ×

Expected Delivery on

MONDAY
5 NOVEMBER 2018 ⓘ

between
2:50pm and 4:50pm ⓘ

Feedback

Delivered

November 5, 2018 at 3:57 pm
Delivered
COLUMBIA, CT 06237

Get Updates ∨

Text & Email Updates ∨

Proof of Delivery ∨

Tracking History ∨

Product Information ∧

Features: Signed for By: E LANATI // COLUMBIA, CT

Postal Product: Priority Mail®	Insured Signature Confirmation™	06237 // 3:57 pm

See Less ^

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FAQs (https://www.usps.com/faqs/uspstracking-faqs.htm)

Feedback

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Feedback

USPS Tracking® FAQs > (https://www.usps.com/faqs/uspstracking-faqs.htm)

Track Another Package +

Tracking Number: 9510812444778306192593 Remove ×

On Time

Expected Delivery on

MONDAY
5 NOVEMBER 2018

See Product Information

Feedback

Delivered

November 5, 2018 at 1:28 pm
Delivered
CLIFTON PARK, NY 12065

Get Updates

Text & Email Updates

Proof of Delivery

Tracking History

Product Information

Postal Product:	Features:	
Priority Mail®	Insured Signature Confirmation™	Signed for By: A RHOADES // CLIFTON PARK, NY 12065 // 1:28 pm

See Less ^

Can’t find what you’re looking for?

Go to our FAQs section to find answers to your tracking questions.

FAQs (https://www.usps.com/faqs/uspstracking-faqs.htm)

Feedback

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- Automatically track the packages you're expecting.
- Set up email and text alerts so you don't need to enter tracking numbers.
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Feedback

USPS Tracking® FAQs > (https://www.usps.com/faqs/uspstracking-faqs.htm)

Track Another Package +

Tracking Number: 9505512444778306192552

Remove ×

Expected Delivery on

MONDAY
5 NOVEMBER 2018 ⓘ

between
1:15pm and 3:15pm ⓘ

Feedback

Delivered

November 5, 2018 at 2:27 pm
Delivered, Front Desk/Reception/Mail Room
COLUMBIA, CT 06237

Get Updates ⌄

Text & Email Updates ⌄

Tracking History ⌄

Product Information ⌃

Postal Product:
Priority Mail®

Features:
Insured
USPS Tracking®

See Less ^

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app=UspsTools&appURL=https%

Feedback