EM-CING-059-130507

New Cingular Wireless PCS, LLC
154 General Patton Dr.
Naugatuck, CT 06770
Phone: (203)-217-6200
Christopher Bisson
Real Estate Consultant

May 2, 2013

Hand Delivered

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

RE: New Cingular Wireless PCS, LLC notice of intent to modify an existing telecommunications facility located at741 Flanders Road, Mystic, CT 06355, know to AT&T as site CT5225.

Dear Ms. Bachman:

In order to accommodate technological changes, implement Uniform Mobile Telecommunications System ("UMTS") and/or Long Term Evolution ("LTE") capabilities, and enhance system performance in the state of Connecticut, New Cingular Wireless PCS, LLC ("AT&T") plans to modify the equipment configurations at many of its existing cell sites. Please accept this letter and attachments as notification, pursuant to R.C.S.A. Section 16-50j-73, of construction which constitutes an exempt modification pursuant to R.C.S.A. Section 16-50j-72(b)(2). In compliance with R.C.S.A. Section 16-50j-73, a copy of this letter and its attachments is being sent to the chief elected official of the municipality in which affected cell site is located.

UMTS offers services to mobile computer and phone users anywhere in the world. Based on the Global System for Mobile ("GSM") communication standard, UMTS is the planned worldwide standard for mobile users. UMTS, fully implemented, gives computer and phone users high-speed access to the internet as they travel. They have the same capabilities even when they roam, through both terrestrial wireless and satellite transmissions.

LTE is a new high-performance air interface for cellular mobile communications. It is designed to increase the capacity and speed of mobile telephone networks.

Attached is a summary of the planned modifications, including power density calculations reflecting the change in AT&T's operations at the site. Also included is documentation of the structural sufficiency of the tower to accommodate the revised antenna configuration based on the supplied structural modification plan dated 4/26/2012 requiring the restacking of the existing coaxial cables.

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

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

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

Please feel free to call me at (203)-217-6200 or email CBisson@Transcendwireless.com with questions concerning this matter.
Thank you for your consideration.

Sincerely,

Christopher Bisson
Real Estate Consultant

C Squared Systems, LLC
65 Dartmouth Drive, Unit A3
Auburn, NH 03032
(603) 644-2800
support@csquaredsystems.com

Calculated Radio Frequency Emissions

CT5225

(Groton Central)

741 Flanders Road, Groton, CT 06355

May 2, 2013

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List of Tables

List of Figures

1. Introduction

The purpose of this report is to investigate compliance with applicable FCC regulations for the proposed modifications to the existing AT&T antenna arrays mounted on the guide wire tower located at 741 Flanders Road in Groton, CT. The coordinates of the tower are 41° 22' 11.5" N, 72° 00' 29.8" W.

AT&T is proposing the following modifications:

1) Install three multi-band (700/850/1900/2100 MHz) antennas for their LTE network (one per sector).

2. FCC Guidelines for Evaluating RF Radiation Exposure Limits

In 1985, the FCC established rules to regulate radio frequency (RF) exposure from FCC licensed antenna facilities. In 1996, the FCC updated these rules, which were further amended in August 1997 by OET Bulletin 65 Edition 97-01. These new rules include Maximum Permissible Exposure (MPE) limits for transmitters operating between 300 kHz and 100 GHz. The FCC MPE limits are based upon those recommended by the National Council on Radiation Protection and Measurements (NCRP), developed by the Institute of Electrical and Electronics Engineers, Inc., (IEEE) and adopted by the American National Standards Institute (ANSI).

The FCC general population/uncontrolled limits set the maximum exposure to which most people may be subjected. General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or cannot exercise control over their exposure.

Public exposure to radio frequencies is regulated and enforced in units of milliwatts per square centimeter (mW/cm^2). The general population exposure limits for the various frequency ranges are defined in the attached "FCC Limits for Maximum Permissible Exposure (MPE)" in Attachment B of this report.

Higher exposure limits are permitted under the occupational/controlled exposure category, but only for persons who are exposed as a consequence of their employment and who have been made fully aware of the potential for exposure, and they must be able to exercise control over their exposure. General population/uncontrolled limits are five times more stringent than the levels that are acceptable for occupational, or radio frequency trained individuals. Attachment B contains excerpts from OET Bulletin 65 and defines the Maximum Exposure Limit.

Finally, it should be noted that the MPE limits adopted by the FCC for both general population/uncontrolled exposure and for occupational/controlled exposure incorporate a substantial margin of safety and have been established to be well below levels generally accepted as having the potential to cause adverse health effects.

3. RF Exposure Prediction Methods

The emission field calculation results displayed in the following figures were generated using the following formula as outlined in FCC bulletin OET 65:

$$\text{Power Density} = \left(\frac{1.6^2 \times EIRP}{4\pi \times R^2} \right) \text{x Off Beam Loss}$$

Where:

EIRP = Effective Isotropic Radiated Power

R = Radial Distance = $\sqrt{(H^2 + V^2)}$

H = Horizontal Distance from antenna in meters

V = Vertical Distance from radiation center of antenna in meters

Ground reflection factor of 1.6

Off Beam Loss is determined by the selected antenna pattern

These calculations assume that the antennas are operating at 100 percent capacity and power, and that all channels are transmitting simultaneously. Obstructions (trees, buildings, etc.) that would normally attenuate the signal are not taken into account. The calculations assume even terrain in the area of study and do not take into account actual terrain elevations which could attenuate the signal. As a result, the predicted signal levels reported below are much higher than the actual signal levels will be from the finished modifications.

4. Calculation Results

Table 1 below outlines the power density information for the site. Because the proposed AT&T antennas are directional in nature, the majority of the RF power is focused out towards the horizon. As a result, there will be less RF power directed below the antennas relative to the horizon, and consequently lower power density levels around the base of the tower. Please refer to Attachment C for the vertical pattern of the proposed AT&T antennas. The calculated results for AT&T in Table 1 include a nominal 10 dB off-beam pattern loss to account for the lower relative gain below the antennas.

Carrier	Antenna Height (Feet)	Operating Frequency (MHz)	Number of Trans.	ERP Per Transmitter (Watts)	Power Density (mw/cm^2)	Limit	%MPE
Cingular UMTS	121	880	1	500	0.0123	0.5867	2.09%
Cingular GSM	121	1900	2	645	0.0317	1.0000	3.17%
T-Mobile GSM	131	1945	8	180	0.0302	1.0000	3.02%
T-Mobile UMTS	131	2100	2	674	0.0282	1.0000	2.82%
Verizon	110	869	9	372	0.0995	0.5793	17.17%
Verizon	110	1970	3	463	0.0413	1.0000	4.13%
Verizon	110	757	1	638	0.0190	0.5047	3.76%
AT&T UMTS	121	880	2	565	0.0028	0.5867	0.47%
AT&T UMTS	121	1900	2	875	0.0043	1.0000	0.43%
AT&T LTE	121	734	1	1771	0.0043	0.4893	0.89%
AT&T GSM	121	880	1	283	0.0007	0.5867	0.12%
AT&T GSM	121	1900	4	525	0.0052	1.0000	0.52%
						Total	33.32%

Table 1: Carrier Information[1] [2] [3]

[1] The existing CSC filing for Cingular should be removed and replaced with the updated AT&T technologies and values provided in Table 1. The power density information for carriers other than AT&T was taken directly from the CSC database dated 5/1/2013. Please note that %MPE values listed are rounded to two decimal points. The total %MPE listed is a summation of each unrounded contribution. Therefore, summing each rounded value may not reflect the total value listed in the table.

[2] In the case where antenna models are not uniform across all 3 sectors for the same frequency band, the antenna model with the highest gain was used for the calculations to present a worse-case scenario.

[3] Antenna height listed for AT&T is in reference to the Crown Castle Structural Analysis dated April 26, 2013.

5. Conclusion

The above analysis verifies that emissions from the existing site will be below the maximum power density levels as outlined by the FCC in the OET Bulletin 65 Ed. 97-01. Even when using conservative methods, the cumulative power density from the proposed transmit antennas at the existing facility is well below the limits for the general public. The highest expected percent of Maximum Permissible Exposure at ground level is **33.32% of the FCC limit.**

As noted previously, obstructions (trees, buildings, etc.) that would normally attenuate the signal are not taken into account. As a result, the predicted signal levels are more conservative (higher) than the actual signal levels will be from the finished modifications.

6. Statement of Certification

I certify to the best of my knowledge that the statements in this report are true and accurate. The calculations follow guidelines set forth in ANSI/IEEE Std. C95.3, ANSI/IEEE Std. C95.1 and FCC OET Bulletin 65 Edition 97-01.

Daniel L. Goulet
C Squared Systems, LLC

May 2, 2013
Date

Attachment A: References

OET Bulletin 65 - Edition 97-01 - August 1997 Federal Communications Commission Office of Engineering & Technology

ANSI C95.1-1982, American National Standard Safety Levels With Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 300 kHz to 100 GHz. IEEE-SA Standards Board

IEEE Std C95.3-1991 (Reaff 1997), IEEE Recommended Practice for the Measurement of Potentially Hazardous Electromagnetic Fields - RF and Microwave. IEEE-SA Standards Board

Attachment B: FCC Limits for Maximum Permissible Exposure (MPE)

(A) Limits for Occupational/Controlled Exposure[4]

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (E) (A/m)	Power Density (S) (mW/cm^2)	Averaging Time $\|E\|^2$, $\|H\|^2$ or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842/f	4.89/f	($900/f^2$)*	6
30-300	61.4	0.163	1.0	6
300-1500	-	-	f/300	6
1500-100,000	-	-	5	6

(B) Limits for General Population/Uncontrolled Exposure[5]

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (E) (A/m)	Power Density (S) (mW/cm^2)	Averaging Time $\|E\|^2$, $\|H\|^2$ or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	($180/f^2$)*	30
30-300	27.5	0.073	0.2	30
300-1500	-	-	f/1500	30
1500-100,000	-	-	1.0	30

f = frequency in MHz * Plane-wave equivalent power density

Table 2: FCC Limits for Maximum Permissible Exposure (MPE)

[4] Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure.

[5] General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or cannot exercise control over their exposure.

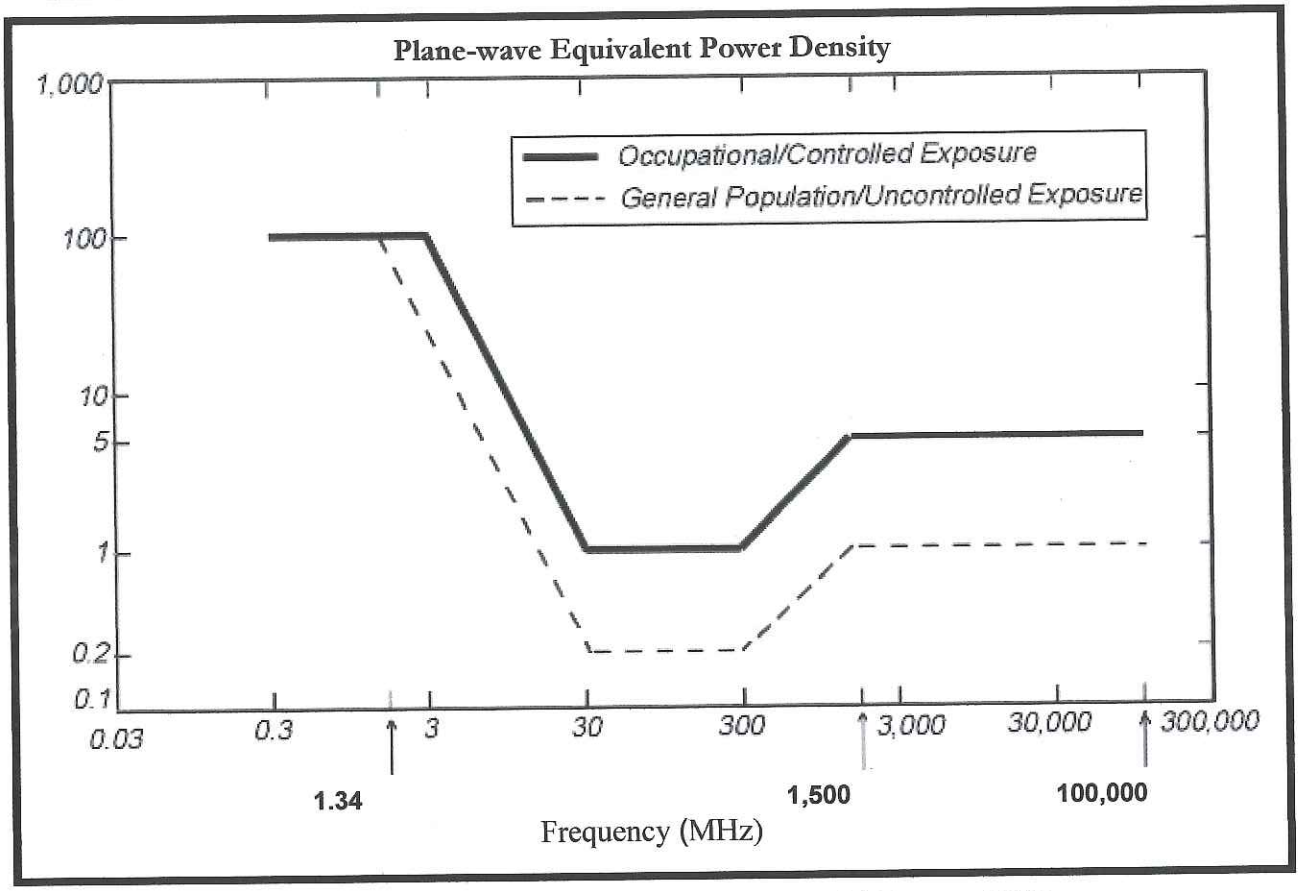
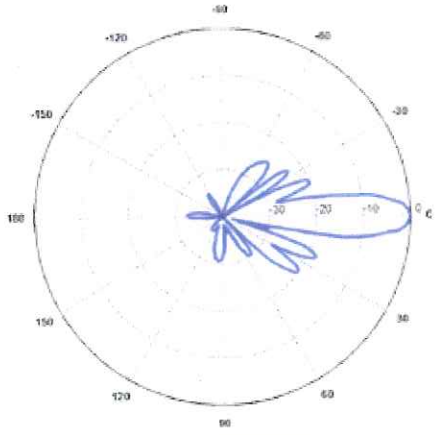


Figure 1: Graph of FCC Limits for Maximum Permissible Exposure (MPE)

Attachment C: AT&T Antenna Data Sheets and Electrical Patterns

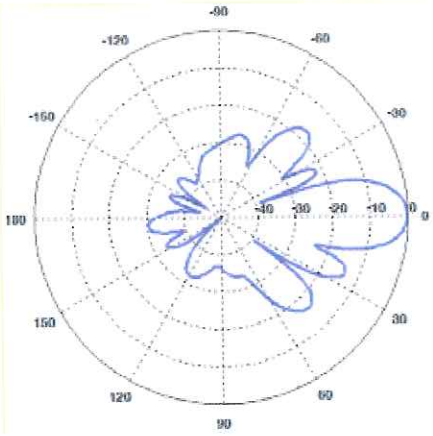
700 MHz

Manufacturer:	KMW Communications
Model #:	AM-X-CD-17-65-00T-RET
Frequency Band:	698-806 MHz
Gain:	14.7 dBd
Vertical Beamwidth:	10°
Horizontal Beamwidth:	66°
Polarization:	Dual Slant ± 45°
Size L x W x D:	96.0" x 11.8" x 6.0"



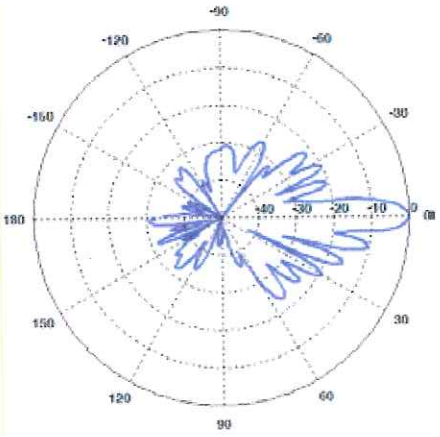
850 MHz

Manufacturer:	Powerwave
Model #:	7770
Frequency Band:	824-896 MHz
Gain:	11.5 dBd
Vertical Beamwidth:	15°
Horizontal Beamwidth:	82°
Polarization:	Dual Linear ± 45°
Size L x W x D:	55.0" x 11.0" x 5.0"



1900 MHz

Manufacturer:	Powerwave
Model #:	7770
Frequency Band:	1850-1990 MHz
Gain:	13.4 dBd
Vertical Beamwidth:	7°
Horizontal Beamwidth:	86°
Polarization:	Dual Linear ± 45°
Size L x W x D:	55.0" x 11.0" x 5.0"



Date: **April 26, 2013**

Cheryl Schultz
Crown Castle
3530 Toringdon Way, Suite 300
Charlotte, NC 28277

Crown Castle
2000 Corporate Dr.
Canonsburg, PA 15317
(724) 416-2000

Subject: **Structural Analysis Report**

Carrier Designation:	***AT&T Mobility* Co-Locate**	
	Carrier Site Number:	CT5225
Crown Castle Designation:	**Crown Castle BU Number:**	824359
	Crown Castle Site Name:	Groton/ I-95/ X89/ Noa_1
	Crown Castle JDE Job Number:	219382
	Crown Castle Work Order Number:	578478
	Crown Castle Application Number:	178897 Rev. 2
Engineering Firm Designation:	**Crown Castle Project Number:**	578478
Site Data:	**725 Flanders Rd, Groton, New London County, CT**	
	Latitude *41° 22' 11.74"*, Longitude *-72° 0' 29.77"*	
	130 Foot - Monopole Tower	

Dear Cheryl Schultz,

Crown Castle is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above mentioned tower. This analysis has been performed in accordance with the Crown Castle Structural 'Statement of Work' and the terms of Crown Castle Purchase Order Number 578478, in accordance with application 178897, revision 2.

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

LC5: Existing + Proposed Equipment **Sufficient Capacity**
Note: See Table I and Table II for the proposed and existing loading, respectively.

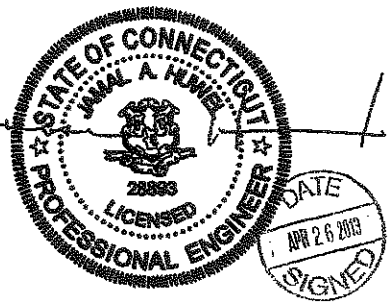
The analysis has been performed in accordance with the TIA/EIA-222-F standard and local code requirements based upon a wind speed of 85 mph fastest mile.

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

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

Structural analysis prepared by: Brad Gruszecki, Design Engineer / GS

Respectfully submitted by:



Jamal A. Huwel, P.E.
Manager Engineering

tnxTower Report - version 6.0.4.0

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1) INTRODUCTION

This tower is a 130 ft Monopole tower designed by Pirod Manufactures, Inc. in October of 2002. The tower was originally designed for a wind speed of 85 mph per TIA/EIA-222-F. The tower was modified with guyed wires by Structural Components, Inc. in February of 2013, but these modifications are ineffective. Therefore, these modifications were not included.

2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 85 mph with no ice, 37.6 mph with 0.75 inch ice thickness and 50 mph under service loads.

Table 1 - Proposed Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
121.0	121.0	2	andrew	SBNH-1D6565C w/ Mount Pipe	1	3/8	-
		6	ericsson	RRUS 11			
		6	powerwave technologies	LGP 17201			
		1	powerwave technologies	P65-17-XLH-RR w/ Mount Pipe			
		1	raycap	DC6-48-60-18-8F			

Table 2 - Existing Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
131.0	131.0	6	andrew	TMBXX-6516-R2M w/ Mount Pipe	24	1-5/8	1
		3	ems wireless	RR65-19-02DP w/ Mount Pipe			
		3	rfs celwave	APX16DWV-16DWVS-C-A20 w/ Mount Pipe			
		3	rfs celwave	ATMAA1412D-1A20			
		3	rfs celwave	ATMPP1412D-1CWA			
		1	tower mounts	Platform Mount [LP 405-1]			
121.0	121.0	2	nokia	MHA900	-	-	2
		6	powerwave technologies	7770.00 w/ Mount Pipe	12	1-5/8	1
		6	powerwave technologies	LGP13519			
		6	powerwave technologies	LGP21401			
		1	tower mounts	T-Arm Mount [TA 602-3]			
110.0	110.0	3	antel	BXA-70063/6CF w/ Mount Pipe	18	1-5/8	1
		6	antel	LPA-185063/8CF w/ Mount Pipe			
		6	antel	LPA-80063/6CF w/ Mount Pipe			
		1	tower mounts	Platform Mount [LP 303-1]			

Notes:
1) Existing Equipment
2) Equipment to be Removed, Not Considered in Analysis

Table 3 - Design Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
130	130	1	decibel	DB853	11	1-5/8
		9	ems wireless	RR90-17-00DP		
		1	rfs celwave	PD1610		
116	116	9	ems wireless	RR90-17-00DP	9	1-5/8

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	French & Parrello Associates, P.A.	3472178	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	FDH Engineering, Inc. (Mapping)	3804602	CCISITES
4-TOWER MANUFACTURER DRAWINGS	Pirod Manufacturers, Inc.	3472179	CCISITES

3.1) Analysis Method

tnxTower (version 6.0.4.0), 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 in accordance with the manufacturer's specifications.
2) The tower and structures have been maintained in accordance with the manufacturer's specification.
3) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
4) When applicable, transmission cables are considered as structural components for calculating wind loads as allowed by TIA/EIA-222-F.
5) Base and flange plate design methodology of the manufacturer has been reviewed and found to be an acceptable means of designing to resist the full capacity of the bolts and shaft.

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

4) ANALYSIS RESULTS

Table 5 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	130 - 120	Pole	P30x3/8	1	-5.68	1166.57	8.7	Pass
L2	120 - 100	Pole	P36x3/8	2	-11.06	1325.68	35.2	Pass
L3	100 - 80	Pole	P42x3/8	3	-15.43	1484.55	56.4	Pass
L4	80 - 60	Pole	P48x3/8	4	-21.12	1643.28	70.9	Pass
L5	60 - 40	Pole	P54x3/8	5	-26.52	1801.92	81.4	Pass
L6	40 - 20	Pole	P60x3/8	6	-32.43	1960.48	88.9	Pass
L7	20 - 0	Pole	P60x3/4	7	-43.03	4666.27	47.8	Pass
							Summary	
						Pole (L6)	88.9	Pass
						Rating =	88.9	Pass

Table 6 - Tower Component Stresses vs. Capacity – LC5

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1,2	Anchor Rods	0	47.8	Pass
1,2	Base Plate	0	47.8	Pass
1	Base Foundation Soil Interaction	0	92.9	Pass
1,2	Flange Plate & Bolts	20	88.9	Pass
1,2	Flange Plate & Bolts	40	81.4	Pass
1,2	Flange Plate & Bolts	60	70.9	Pass
1,2	Flange Plate & Bolts	80	56.4	Pass
1,2	Flange Plate & Bolts	100	35.2	Pass
1,2	Flange Plate & Bolts	120	8.7	Pass

Structure Rating (max from all components) =	92.9%

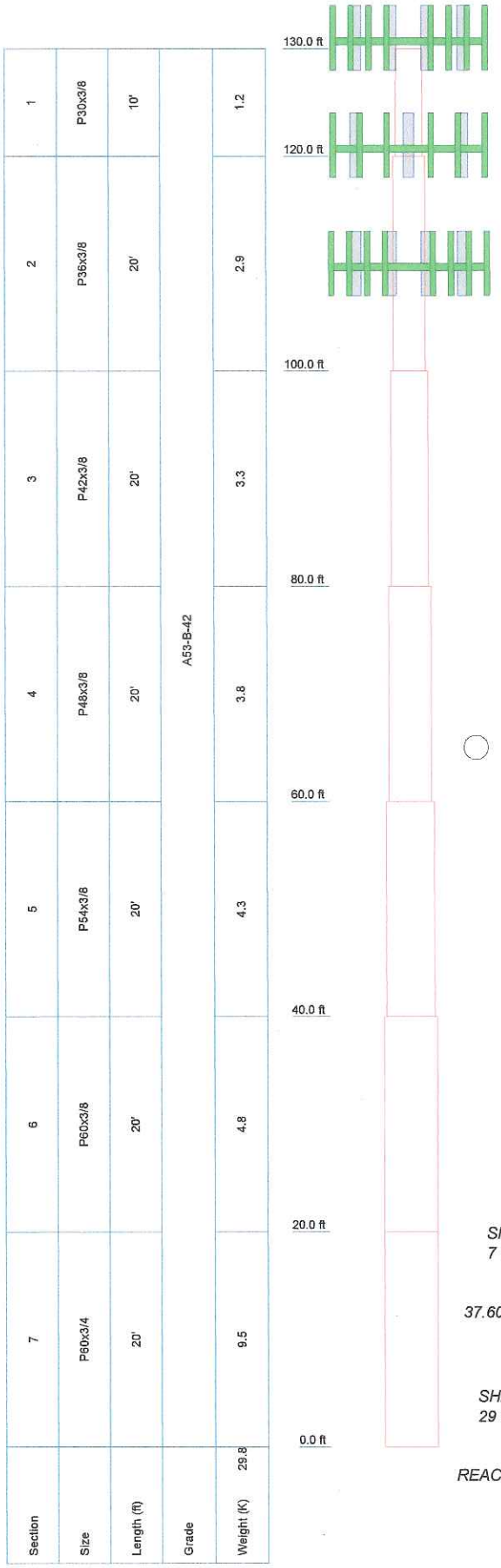
Notes:
1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity consumed.
2) Flange plates have the same capacity as their respective splice bolts or shaft.

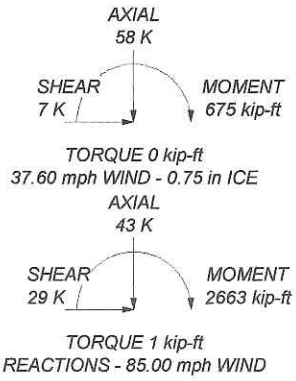
4.1) Recommendations

The tower and its base and anchor foundations have sufficient capacity to carry the existing and proposed loads. No modifications are required at this time.

APPENDIX A

TNXTOWER OUTPUT





DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
(2) TMBXX-6516-R2M w/ Mount Pipe	131	(2) LGP21401	121
(2) TMBXX-6516-R2M w/ Mount Pipe	131	(2) LGP21401	121
(2) TMBXX-6516-R2M w/ Mount Pipe	131	P65-17-XLH-RR w/ Mount Pipe	121
APX16DWV-16DWVS-C-A20 w/ Mount Pipe	131	SBNH-1D6565C w/ Mount Pipe	121
		SBNH-1D6565C w/ Mount Pipe	121
APX16DWV-16DWVS-C-A20 w/ Mount Pipe	131	(2) LGP 17201	121
		(2) LGP 17201	121
APX16DWV-16DWVS-C-A20 w/ Mount Pipe	131	(2) LGP 17201	121
		(2) RRUS 11	121
RR65-19-02DP w/ Mount Pipe	131	(2) RRUS 11	121
RR65-19-02DP w/ Mount Pipe	131	(2) RRUS 11	121
RR65-19-02DP w/ Mount Pipe	131	DC6-48-60-18-8F	121
ATMPP1412D-1CWA	131	T-Arm Mount [TA 602-3]	121
ATMPP1412D-1CWA	131	(2) LPA-185063/8CF w/ Mount Pipe	110
ATMPP1412D-1CWA	131	(2) LPA-185063/8CF w/ Mount Pipe	110
ATMAA1412D-1A20	131	(2) LPA-185063/8CF w/ Mount Pipe	110
ATMAA1412D-1A20	131	(2) LPA-80063/6CF w/ Mount Pipe	110
ATMAA1412D-1A20	131	(2) LPA-80063/6CF w/ Mount Pipe	110
Platform Mount [LP 405-1]	131	(2) LPA-80063/6CF w/ Mount Pipe	110
(2) 7770.00 w/ Mount Pipe	121	BXA-70063/6CF w/ Mount Pipe	110
(2) 7770.00 w/ Mount Pipe	121	BXA-70063/6CF w/ Mount Pipe	110
(2) 7770.00 w/ Mount Pipe	121	BXA-70063/6CF w/ Mount Pipe	110
(2) LGP13519	121	Platform Mount [LP 303-1]	110
(2) LGP13519	121	torque arm	68
(2) LGP13519	121	torque arm	68
(2) LGP21401	121	torque arm	68

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A53-B-42	42 ksi	63 ksi			

TOWER DESIGN NOTES

1. Tower is located in New London County, Connecticut.
2. Tower designed for a 85.00 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 37.60 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50.00 mph wind.
5. TOWER RATING: 88.9%

CROWN CASTLE
We Are Solutions
Crown Castle
2000 Corporate Dr.
Canonsburg, PA 15317
Phone: (724) 416-2000
FAX:

Job: BU# 824359			
Project:			
Client: Crown Castle	Drawn by: bgruszecki		App'd:
Code: TIA/EIA-222-F	Date: 04/26/13		Scale: NTS
Path: R:\SA Models - Letters\Work Area\BGruszecki\824359\824359.eri			Dwg No. E-1

Tower Input Data

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

1) Tower is located in New London County, Connecticut.
2) Basic wind speed of 85.00 mph.
3) Nominal ice thickness of 0.75 in.
4) Ice thickness is considered to increase with height.
5) Ice density of 56.00 pcf.
6) A wind speed of 37.60 mph is used in combination with ice.
7) Temperature drop of 50 °F.
8) Deflections calculated using a wind speed of 50.00 mph.
9) A non-linear (P-delta) analysis was used.
10) Pressures are calculated at each section.
11) Stress ratio used in pole design is 1.333.
12) Local bending stresses due to climbing loads, feedline supports, and appurtenance mounts are not considered.

Options

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

Pole Section Geometry

Section	*Elevation*	*Section Length*	*Pole Size*	*Pole Grade*	*Socket Length*
	ft	*ft*			*ft*
L1	130'-120'	10'	P30x3/8	A53-B-42 (42 ksi)	
L2	120'-100'	20'	P36x3/8	A53-B-42 (42 ksi)	
L3	100'-80'	20'	P42x3/8	A53-B-42 (42 ksi)	
L4	80'-60'	20'	P48x3/8	A53-B-42 (42 ksi)	
L5	60'-40'	20'	P54x3/8	A53-B-42 (42 ksi)	
L6	40'-20'	20'	P60x3/8	A53-B-42 (42 ksi)	
L7	20'-0'	20'	P60x3/4	A53-B-42 (42 ksi)	

Tower Elevation	Gusset Area (per face)	Gusset Thickness	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals	Double Angle Stitch Bolt Spacing Horizontals
ft	ft^2	in					in	in
L1 130'-120'				1	1	1		
L2 120'-100'				1	1	1		
L3 100'-80'				1	1	1		
L4 80'-60'				1	1	1		
L5 60'-40'				1	1	1		
L6 40'-20'				1	1	1		
L7 20'-0'				1	1	1		

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number	Number Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight klf
*										

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight klf
LDF7-50A(1-5/8")	C	No	Inside Pole	130' - 0'	24	No Ice	0.00	0.00
						1/2" Ice	0.00	0.00
						1" Ice	0.00	0.00
						2" Ice	0.00	0.00
						4" Ice	0.00	0.00
*								
LDF7-50A(1-5/8")	B	No	Inside Pole	121' - 0'	12	No Ice	0.00	0.00
						1/2" Ice	0.00	0.00
						1" Ice	0.00	0.00
						2" Ice	0.00	0.00
						4" Ice	0.00	0.00
WR-VG122ST-BRDA(3/8)	B	No	Inside Pole	121' - 0'	1	No Ice	0.00	0.00
						1/2" Ice	0.00	0.00
						1" Ice	0.00	0.00
						2" Ice	0.00	0.00
						4" Ice	0.00	0.00
*								
LDF7-50A(1-5/8")	A	No	CaAa (Out Of Face)	110' - 0'	2	No Ice	0.20	0.00
						1/2" Ice	0.30	0.00
						1" Ice	0.40	0.00
						2" Ice	0.60	0.01
						4" Ice	1.00	0.03
LDF7-50A(1-5/8")	A	No	CaAa (Out Of Face)	110' - 0'	4	No Ice	0.00	0.00
						1/2" Ice	0.00	0.00
						1" Ice	0.00	0.00
						2" Ice	0.00	0.01
						4" Ice	0.00	0.03
LDF7-50A(1-5/8")	A	No	Inside Pole	110' - 0'	12	No Ice	0.00	0.00
						1/2" Ice	0.00	0.00
						1" Ice	0.00	0.00
						2" Ice	0.00	0.00
						4" Ice	0.00	0.00
*								
Climbing Ladder (Round)	B	No	CaAa (Out Of Face)	130' - 0'	1	No Ice	0.23	0.01
						1/2" Ice	0.55	0.01
						1" Ice	0.86	0.01
						2" Ice	1.48	0.03
						4" Ice	2.73	0.09
*								

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	130'-120'	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	2.344	0.06
		C	0.000	0.000	0.000	0.000	0.20
L2	120'-100'	A	0.000	0.000	0.000	3.960	0.15
		B	0.000	0.000	0.000	4.688	0.31
		C	0.000	0.000	0.000	0.000	0.39
L3	100'-80'	A	0.000	0.000	0.000	7.920	0.30
		B	0.000	0.000	0.000	4.688	0.31
		C	0.000	0.000	0.000	0.000	0.39
L4	80'-60'	A	0.000	0.000	0.000	7.920	0.30
		B	0.000	0.000	0.000	4.688	0.31
		C	0.000	0.000	0.000	0.000	0.39
L5	60'-40'	A	0.000	0.000	0.000	7.920	0.30
		B	0.000	0.000	0.000	4.688	0.31
		C	0.000	0.000	0.000	0.000	0.39
L6	40'-20'	A	0.000	0.000	0.000	7.920	0.30
		B	0.000	0.000	0.000	4.688	0.31
		C	0.000	0.000	0.000	0.000	0.39
L7	20'-0'	A	0.000	0.000	0.000	7.920	0.30
		B	0.000	0.000	0.000	4.688	0.31
		C	0.000	0.000	0.000	0.000	0.39

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	130'-120'	A	0.880	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	7.844	0.13
		C		0.000	0.000	0.000	0.000	0.20
L2	120'-100'	A	0.867	0.000	0.000	0.000	7.426	0.33
		B		0.000	0.000	0.000	15.520	0.43
		C		0.000	0.000	0.000	0.000	0.39
L3	100'-80'	A	0.846	0.000	0.000	0.000	14.688	0.65
		B		0.000	0.000	0.000	15.262	0.43
		C		0.000	0.000	0.000	0.000	0.39
L4	80'-60'	A	0.821	0.000	0.000	0.000	14.487	0.64
		B		0.000	0.000	0.000	14.948	0.42
		C		0.000	0.000	0.000	0.000	0.39
L5	60'-40'	A	0.788	0.000	0.000	0.000	14.227	0.62
		B		0.000	0.000	0.000	14.542	0.41
		C		0.000	0.000	0.000	0.000	0.39
L6	40'-20'	A	0.750	0.000	0.000	0.000	13.920	0.60
		B		0.000	0.000	0.000	14.063	0.41
		C		0.000	0.000	0.000	0.000	0.39
L7	20'-0'	A	0.750	0.000	0.000	0.000	13.920	0.60
		B		0.000	0.000	0.000	14.063	0.41
		C		0.000	0.000	0.000	0.000	0.39

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	130'-120'	0.28	0.16	0.74	0.43
L2	120'-100'	0.27	-0.11	0.70	0.02
L3	100'-80'	0.26	-0.35	0.68	-0.36
L4	80'-60'	0.26	-0.36	0.69	-0.38

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
L5	60'-40'	0.27	-0.37	0.70	-0.39
L6	40'-20'	0.27	-0.37	0.70	-0.40
L7	20'-0'	0.27	-0.37	0.70	-0.40

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
(2) TMBXX-6516-R2M w/ Mount Pipe	A	From Leg	4.00 0' 0'	0.000	131'	No Ice	7.06	5.22	0.06
						1/2" Ice	7.61	6.08	0.11
						1" Ice	8.14	6.83	0.17
						2" Ice	9.24	8.38	0.32
						4" Ice	11.56	11.91	0.74
(2) TMBXX-6516-R2M w/ Mount Pipe	B	From Leg	4.00 0' 0'	0.000	131'	No Ice	7.06	5.22	0.06
						1/2" Ice	7.61	6.08	0.11
						1" Ice	8.14	6.83	0.17
						2" Ice	9.24	8.38	0.32
						4" Ice	11.56	11.91	0.74
(2) TMBXX-6516-R2M w/ Mount Pipe	C	From Leg	4.00 0' 0'	0.000	131'	No Ice	7.06	5.22	0.06
						1/2" Ice	7.61	6.08	0.11
						1" Ice	8.14	6.83	0.17
						2" Ice	9.24	8.38	0.32
						4" Ice	11.56	11.91	0.74
APX16DWV-16DWVS-C-A20 w/ Mount Pipe	A	From Leg	4.00 0' 0'	0.000	131'	No Ice	7.47	3.49	0.06
						1/2" Ice	7.99	4.26	0.11
						1" Ice	8.52	4.96	0.16
						2" Ice	9.59	6.40	0.30
						4" Ice	11.87	9.49	0.68
APX16DWV-16DWVS-C-A20 w/ Mount Pipe	B	From Leg	4.00 0' 0'	0.000	131'	No Ice	7.47	3.49	0.06
						1/2" Ice	7.99	4.26	0.11
						1" Ice	8.52	4.96	0.16
						2" Ice	9.59	6.40	0.30
						4" Ice	11.87	9.49	0.68
APX16DWV-16DWVS-C-A20 w/ Mount Pipe	C	From Leg	4.00 0' 0'	0.000	131'	No Ice	7.47	3.49	0.06
						1/2" Ice	7.99	4.26	0.11
						1" Ice	8.52	4.96	0.16
						2" Ice	9.59	6.40	0.30
						4" Ice	11.87	9.49	0.68
RR65-19-02DP w/ Mount Pipe	A	From Leg	4.00 0' 0'	0.000	131'	No Ice	6.10	4.41	0.04
						1/2" Ice	6.67	5.62	0.09
						1" Ice	7.19	6.50	0.14
						2" Ice	8.27	8.27	0.28
						4" Ice	10.82	12.03	0.69
RR65-19-02DP w/ Mount Pipe	B	From Leg	4.00 0' 0'	0.000	131'	No Ice	6.10	4.41	0.04
						1/2" Ice	6.67	5.62	0.09
						1" Ice	7.19	6.50	0.14
						2" Ice	8.27	8.27	0.28
						4" Ice	10.82	12.03	0.69
RR65-19-02DP w/ Mount Pipe	C	From Leg	4.00 0' 0'	0.000	131'	No Ice	6.10	4.41	0.04
						1/2" Ice	6.67	5.62	0.09
						1" Ice	7.19	6.50	0.14
						2" Ice	8.27	8.27	0.28
						4" Ice	10.82	12.03	0.69
ATMPP1412D-1CWA	A	From Leg	4.00 0' 0'	0.000	131'	No Ice	1.17	0.42	0.01
						1/2" Ice	1.32	0.53	0.02
						1" Ice	1.48	0.65	0.03
						2" Ice	1.82	0.92	0.05
						4" Ice	2.61	1.57	0.13
ATMPP1412D-1CWA	B	From Leg	4.00 0'	0.000	131'	No Ice	1.17	0.42	0.01
						1/2" Ice	1.32	0.53	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'			1" Ice	1.48	0.65	0.03
						2" Ice	1.82	0.92	0.05
						4" Ice	2.61	1.57	0.13
ATMPP1412D-1CWA	C	From Leg	4.00	0.000	131'	No Ice	1.17	0.42	0.01
			0'			1/2" Ice	1.32	0.53	0.02
			0'			1" Ice	1.48	0.65	0.03
						2" Ice	1.82	0.92	0.05
						4" Ice	2.61	1.57	0.13
ATMAA1412D-1A20	A	From Leg	4.00	0.000	131'	No Ice	0.47	1.17	0.01
			0'			1/2" Ice	0.57	1.31	0.02
			0'			1" Ice	0.69	1.47	0.03
						2" Ice	0.95	1.81	0.06
						4" Ice	1.57	2.58	0.14
ATMAA1412D-1A20	B	From Leg	4.00	0.000	131'	No Ice	0.47	1.17	0.01
			0'			1/2" Ice	0.57	1.31	0.02
			0'			1" Ice	0.69	1.47	0.03
						2" Ice	0.95	1.81	0.06
						4" Ice	1.57	2.58	0.14
ATMAA1412D-1A20	C	From Leg	4.00	0.000	131'	No Ice	0.47	1.17	0.01
			0'			1/2" Ice	0.57	1.31	0.02
			0'			1" Ice	0.69	1.47	0.03
						2" Ice	0.95	1.81	0.06
						4" Ice	1.57	2.58	0.14
Platform Mount [LP 405-1]	C	None		0.000	131'	No Ice	20.80	20.80	1.80
						1/2" Ice	28.10	28.10	2.07
						1" Ice	35.40	35.40	2.33
						2" Ice	50.00	50.00	2.86
						4" Ice	79.20	79.20	3.93
*									
(2) 7770.00 w/ Mount Pipe	A	From Leg	4.00	0.000	121'	No Ice	6.12	4.25	0.06
			0'			1/2" Ice	6.63	5.01	0.10
			0'			1" Ice	7.13	5.71	0.16
						2" Ice	8.16	7.16	0.29
						4" Ice	10.36	10.41	0.66
(2) 7770.00 w/ Mount Pipe	B	From Leg	4.00	0.000	121'	No Ice	6.12	4.25	0.06
			0'			1/2" Ice	6.63	5.01	0.10
			0'			1" Ice	7.13	5.71	0.16
						2" Ice	8.16	7.16	0.29
						4" Ice	10.36	10.41	0.66
(2) 7770.00 w/ Mount Pipe	C	From Leg	4.00	0.000	121'	No Ice	6.12	4.25	0.06
			0'			1/2" Ice	6.63	5.01	0.10
			0'			1" Ice	7.13	5.71	0.16
						2" Ice	8.16	7.16	0.29
						4" Ice	10.36	10.41	0.66
(2) LGP13519	A	From Leg	4.00	0.000	121'	No Ice	0.34	0.21	0.01
			0'			1/2" Ice	0.42	0.28	0.01
			0'			1" Ice	0.51	0.36	0.01
						2" Ice	0.73	0.55	0.02
						4" Ice	1.25	1.03	0.07
(2) LGP13519	B	From Leg	4.00	0.000	121'	No Ice	0.34	0.21	0.01
			0'			1/2" Ice	0.42	0.28	0.01
			0'			1" Ice	0.51	0.36	0.01
						2" Ice	0.73	0.55	0.02
						4" Ice	1.25	1.03	0.07
(2) LGP13519	C	From Leg	4.00	0.000	121'	No Ice	0.34	0.21	0.01
			0'			1/2" Ice	0.42	0.28	0.01
			0'			1" Ice	0.51	0.36	0.01
						2" Ice	0.73	0.55	0.02
						4" Ice	1.25	1.03	0.07
(2) LGP21401	A	From Leg	4.00	0.000	121'	No Ice	1.29	0.23	0.01
			0'			1/2" Ice	1.45	0.31	0.02
			0'			1" Ice	1.61	0.40	0.03
						2" Ice	1.97	0.61	0.05
						4" Ice	2.79	1.12	0.14
(2) LGP21401	B	From Leg	4.00	0.000	121'	No Ice	1.29	0.23	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
			0'			1/2" Ice	1.45	0.31	0.02
			0'			1" Ice	1.61	0.40	0.03
						2" Ice	1.97	0.61	0.05
						4" Ice	2.79	1.12	0.14
(2) LGP21401	C	From Leg	4.00	0.000	121'	No Ice	1.29	0.23	0.01
			0'			1/2" Ice	1.45	0.31	0.02
			0'			1" Ice	1.61	0.40	0.03
						2" Ice	1.97	0.61	0.05
						4" Ice	2.79	1.12	0.14
P65-17-XLH-RR w/ Mount Pipe	A	From Leg	4.00	0.000	121'	No Ice	11.70	8.94	0.09
			0'			1/2" Ice	12.42	10.45	0.17
			0'			1" Ice	13.15	11.99	0.27
						2" Ice	14.64	14.31	0.50
						4" Ice	17.91	19.14	1.13
SBNH-1D6565C w/ Mount Pipe	B	From Leg	4.00	0.000	121'	No Ice	11.68	9.84	0.09
			0'			1/2" Ice	12.40	11.37	0.18
			0'			1" Ice	13.14	12.91	0.28
						2" Ice	14.60	15.27	0.52
						4" Ice	17.87	20.14	1.16
SBNH-1D6565C w/ Mount Pipe	C	From Leg	4.00	0.000	121'	No Ice	11.68	9.84	0.09
			0'			1/2" Ice	12.40	11.37	0.18
			0'			1" Ice	13.14	12.91	0.28
						2" Ice	14.60	15.27	0.52
						4" Ice	17.87	20.14	1.16
(2) LGP 17201	A	From Leg	4.00	0.000	121'	No Ice	1.95	0.52	0.03
			0'			1/2" Ice	2.13	0.64	0.04
			0'			1" Ice	2.33	0.77	0.06
						2" Ice	2.75	1.06	0.09
						4" Ice	3.69	1.73	0.19
(2) LGP 17201	B	From Leg	4.00	0.000	121'	No Ice	1.95	0.52	0.03
			0'			1/2" Ice	2.13	0.64	0.04
			0'			1" Ice	2.33	0.77	0.06
						2" Ice	2.75	1.06	0.09
						4" Ice	3.69	1.73	0.19
(2) LGP 17201	C	From Leg	4.00	0.000	121'	No Ice	1.95	0.52	0.03
			0'			1/2" Ice	2.13	0.64	0.04
			0'			1" Ice	2.33	0.77	0.06
						2" Ice	2.75	1.06	0.09
						4" Ice	3.69	1.73	0.19
(2) RRUS 11	A	From Leg	4.00	0.000	121'	No Ice	3.25	1.37	0.05
			0'			1/2" Ice	3.49	1.55	0.07
			0'			1" Ice	3.74	1.74	0.09
						2" Ice	4.27	2.14	0.15
						4" Ice	5.43	3.04	0.31
(2) RRUS 11	B	From Leg	4.00	0.000	121'	No Ice	3.25	1.37	0.05
			0'			1/2" Ice	3.49	1.55	0.07
			0'			1" Ice	3.74	1.74	0.09
						2" Ice	4.27	2.14	0.15
						4" Ice	5.43	3.04	0.31
(2) RRUS 11	C	From Leg	4.00	0.000	121'	No Ice	3.25	1.37	0.05
			0'			1/2" Ice	3.49	1.55	0.07
			0'			1" Ice	3.74	1.74	0.09
						2" Ice	4.27	2.14	0.15
						4" Ice	5.43	3.04	0.31
DC6-48-60-18-8F	B	From Leg	4.00	0.000	121'	No Ice	1.27	1.27	0.02
			0'			1/2" Ice	1.46	1.46	0.04
			0'			1" Ice	1.66	1.66	0.05
						2" Ice	2.09	2.09	0.10
						4" Ice	3.10	3.10	0.21
T-Arm Mount [TA 602-3]	C	None		0.000	121'	No Ice	11.59	11.59	0.77
						1/2" Ice	15.44	15.44	0.99
						1" Ice	19.29	19.29	1.21
						2" Ice	26.99	26.99	1.64
						4" Ice	42.39	42.39	2.50

*

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
(2) LPA-185063/8CF w/ Mount Pipe	A	From Leg	4.00 0' 0'	0.000	110'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.21 3.60 4.02 4.90 6.79	3.92 4.52 5.16 6.54 9.58	0.03 0.06 0.10 0.20 0.51
(2) LPA-185063/8CF w/ Mount Pipe	B	From Leg	4.00 0' 0'	0.000	110'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.21 3.60 4.02 4.90 6.79	3.92 4.52 5.16 6.54 9.58	0.03 0.06 0.10 0.20 0.51
(2) LPA-185063/8CF w/ Mount Pipe	C	From Leg	4.00 0' 0'	0.000	110'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.21 3.60 4.02 4.90 6.79	3.92 4.52 5.16 6.54 9.58	0.03 0.06 0.10 0.20 0.51
(2) LPA-80063/6CF w/ Mount Pipe	A	From Leg	4.00 0' 0'	0.000	110'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	10.58 11.24 11.87 13.16 15.87	10.67 11.93 12.91 14.92 19.16	0.05 0.14 0.24 0.48 1.09
(2) LPA-80063/6CF w/ Mount Pipe	B	From Leg	4.00 0' 0'	0.000	110'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	10.58 11.24 11.87 13.16 15.87	10.67 11.93 12.91 14.92 19.16	0.05 0.14 0.24 0.48 1.09
(2) LPA-80063/6CF w/ Mount Pipe	C	From Leg	4.00 0' 0'	0.000	110'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	10.58 11.24 11.87 13.16 15.87	10.67 11.93 12.91 14.92 19.16	0.05 0.14 0.24 0.48 1.09
BXA-70063/6CF w/ Mount Pipe	A	From Leg	4.00 0' 0'	0.000	110'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.98 8.62 9.23 10.47 13.08	5.70 6.85 7.71 9.50 13.26	0.04 0.10 0.17 0.33 0.80
BXA-70063/6CF w/ Mount Pipe	B	From Leg	4.00 0' 0'	0.000	110'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.98 8.62 9.23 10.47 13.08	5.70 6.85 7.71 9.50 13.26	0.04 0.10 0.17 0.33 0.80
BXA-70063/6CF w/ Mount Pipe	C	From Leg	4.00 0' 0'	0.000	110'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.98 8.62 9.23 10.47 13.08	5.70 6.85 7.71 9.50 13.26	0.04 0.10 0.17 0.33 0.80
Platform Mount [LP 303-1]	C	None		0.000	110'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	14.66 18.87 23.08 31.50 48.34	14.66 18.87 23.08 31.50 48.34	1.25 1.48 1.71 2.18 3.10
* torque arm	A	From Leg	5.00 0' 0'	0.000	68'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.83 6.65 7.47 9.14 12.59	0.24 0.31 0.39 0.57 1.04	0.27 0.31 0.37 0.50 0.87
torque arm	B	From Leg	5.00 0' 0'	0.000	68'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.83 6.65 7.47 9.14 12.59	0.24 0.31 0.39 0.57 1.04	0.27 0.31 0.37 0.50 0.87
torque arm	C	From Leg	5.00 0' 0'	0.000	68'	No Ice 1/2" Ice 1" Ice 2" Ice	5.83 6.65 7.47 9.14	0.24 0.31 0.39 0.57	0.27 0.31 0.37 0.50

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						4" Ice	12.59	1.04	0.87

Load Combinations

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

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	130 - 120	Pole	Max Tension	14	0.00	0.00	0.00
			Max. Compression	14	-9.94	-0.34	-0.25
			Max. Mx	5	-5.68	-57.97	-0.08
			Max. My	8	-5.68	-0.14	-57.95
			Max. Vy	5	10.00	-57.97	-0.08
			Max. Vx	2	-10.04	-0.14	57.78

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Torque	4			-0.47
L2	120 - 100	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-18.67	-0.64	-0.07
			Max. Mx	5	-11.06	-331.88	-0.08
			Max. My	8	-11.06	-0.28	-332.57
			Max. Vy	5	17.37	-331.88	-0.08
			Max. Vx	2	-17.41	-0.28	332.39
			Max. Torque	4			-0.47
L3	100 - 80	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-24.36	-0.98	0.54
			Max. Mx	5	-15.43	-702.42	-0.01
			Max. My	8	-15.43	-0.45	-703.73
			Max. Vy	5	19.66	-702.42	-0.01
			Max. Vx	2	-19.70	-0.45	703.71
			Max. Torque	4			-0.47
L4	80 - 60	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-31.66	-1.37	1.20
			Max. Mx	5	-21.12	-1121.80	0.08
			Max. My	2	-21.12	-0.64	1123.85
			Max. Vy	5	22.32	-1121.80	0.08
			Max. Vx	2	-22.37	-0.64	1123.85
			Max. Torque	3			-0.48
L5	60 - 40	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-38.45	-1.78	1.92
			Max. Mx	5	-26.52	-1591.01	0.19
			Max. My	2	-26.52	-0.85	1593.80
			Max. Vy	5	24.56	-1591.01	0.19
			Max. Vx	2	-24.61	-0.85	1593.80
			Max. Torque	3			-0.49
L6	40 - 20	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-45.75	-2.23	2.68
			Max. Mx	5	-32.43	-2103.67	0.30
			Max. My	2	-32.43	-1.07	2107.20
			Max. Vy	5	26.67	-2103.67	0.30
			Max. Vx	2	-26.71	-1.07	2107.20
			Max. Torque	2			-0.53
L7	20 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-57.77	-2.68	3.45
			Max. Mx	5	-43.03	-2658.51	0.42
			Max. My	2	-43.03	-1.30	2662.77
			Max. Vy	5	28.78	-2658.51	0.42
			Max. Vx	2	-28.82	-1.30	2662.77
			Max. Torque	2			-0.58

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	14	57.77	0.00	0.00
	Max. H_x	11	43.04	28.78	0.00
	Max. H_z	2	43.04	0.00	28.82
	Max. M_x	2	2662.77	0.00	28.82
	Max. M_z	5	2658.51	-28.78	0.00
	Max. Torsion	8	0.58	0.00	-28.82
	Min. Vert	27	43.04	0.00	9.97
	Min. H_x	5	43.04	-28.78	0.00
	Min. H_z	8	43.04	0.00	-28.82
	Min. M_x	8	-2661.93	0.00	-28.82
	Min. M_z	11	-2655.91	28.78	0.00
	Min. Torsion	2	-0.58	0.00	28.82

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	43.04	0.00	0.00	-0.41	-1.29	0.00
Dead+Wind 0 deg - No Ice	43.04	0.00	-28.82	-2662.77	-1.30	0.58
Dead+Wind 30 deg - No Ice	43.04	14.39	-24.96	-2306.08	-1329.91	0.51
Dead+Wind 60 deg - No Ice	43.04	24.92	-14.41	-1331.59	-2302.51	0.30
Dead+Wind 90 deg - No Ice	43.04	28.78	0.00	-0.42	-2658.51	0.02
Dead+Wind 120 deg - No Ice	43.04	24.92	14.41	1330.76	-2302.52	-0.27
Dead+Wind 150 deg - No Ice	43.04	14.39	24.96	2305.25	-1329.91	-0.49
Dead+Wind 180 deg - No Ice	43.04	0.00	28.82	2661.93	-1.30	-0.58
Dead+Wind 210 deg - No Ice	43.04	-14.39	24.96	2305.25	1327.30	-0.51
Dead+Wind 240 deg - No Ice	43.04	-24.92	14.41	1330.76	2299.91	-0.30
Dead+Wind 270 deg - No Ice	43.04	-28.78	0.00	-0.42	2655.91	-0.02
Dead+Wind 300 deg - No Ice	43.04	-24.92	-14.41	-1331.59	2299.91	0.27
Dead+Wind 330 deg - No Ice	43.04	-14.39	-24.96	-2306.08	1327.30	0.49
Dead+Ice+Temp	57.77	0.00	0.00	-3.45	-2.68	0.00
Dead+Wind 0 deg+Ice+Temp	57.77	0.00	-7.19	-674.68	-2.73	0.27
Dead+Wind 30 deg+Ice+Temp	57.77	3.59	-6.23	-584.76	-337.81	0.24
Dead+Wind 60 deg+Ice+Temp	57.77	6.22	-3.60	-339.09	-583.10	0.14
Dead+Wind 90 deg+Ice+Temp	57.77	7.18	-0.00	-3.50	-672.88	-0.00
Dead+Wind 120 deg+Ice+Temp	57.77	6.22	3.60	332.09	-583.10	-0.14
Dead+Wind 150 deg+Ice+Temp	57.77	3.59	6.23	577.76	-337.81	-0.24
Dead+Wind 180 deg+Ice+Temp	57.77	0.00	7.19	667.68	-2.73	-0.27
Dead+Wind 210 deg+Ice+Temp	57.77	-3.59	6.23	577.76	332.34	-0.24
Dead+Wind 240 deg+Ice+Temp	57.77	-6.22	3.60	332.09	577.63	-0.14
Dead+Wind 270 deg+Ice+Temp	57.77	-7.18	-0.00	-3.50	667.41	0.00
Dead+Wind 300 deg+Ice+Temp	57.77	-6.22	-3.60	-339.09	577.63	0.14
Dead+Wind 330 deg+Ice+Temp	57.77	-3.59	-6.23	-584.76	332.34	0.24
Dead+Wind 0 deg - Service	43.04	0.00	-9.97	-921.75	-1.30	0.20
Dead+Wind 30 deg - Service	43.04	4.98	-8.64	-798.32	-461.08	0.18
Dead+Wind 60 deg - Service	43.04	8.62	-4.99	-461.09	-797.66	0.10
Dead+Wind 90 deg - Service	43.04	9.96	0.00	-0.42	-920.86	0.01
Dead+Wind 120 deg - Service	43.04	8.62	4.99	460.25	-797.66	-0.10
Dead+Wind 150 deg - Service	43.04	4.98	8.64	797.49	-461.08	-0.17
Dead+Wind 180 deg - Service	43.04	0.00	9.97	920.92	-1.30	-0.20
Dead+Wind 210 deg - Service	43.04	-4.98	8.64	797.49	458.48	-0.18
Dead+Wind 240 deg - Service	43.04	-8.62	4.99	460.25	795.06	-0.10
Dead+Wind 270 deg - Service	43.04	-9.96	0.00	-0.42	918.26	-0.01
Dead+Wind 300 deg - Service	43.04	-8.62	-4.99	-461.09	795.06	0.10
Dead+Wind 330 deg - Service	43.04	-4.98	-8.64	-798.32	458.48	0.17

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	-43.04	0.00	0.00	43.04	0.00	0.000%
2	0.00	-43.04	-28.82	0.00	43.04	28.82	0.000%
3	14.39	-43.04	-24.96	-14.39	43.04	24.96	0.000%
4	24.92	-43.04	-14.41	-24.92	43.04	14.41	0.000%
5	28.78	-43.04	0.00	-28.78	43.04	0.00	0.000%
6	24.92	-43.04	14.41	-24.92	43.04	-14.41	0.000%
7	14.39	-43.04	24.96	-14.39	43.04	-24.96	0.000%
8	0.00	-43.04	28.82	0.00	43.04	-28.82	0.000%
9	-14.39	-43.04	24.96	14.39	43.04	-24.96	0.000%
10	-24.92	-43.04	14.41	24.92	43.04	-14.41	0.000%
11	-28.78	-43.04	0.00	28.78	43.04	0.00	0.000%
12	-24.92	-43.04	-14.41	24.92	43.04	14.41	0.000%
13	-14.39	-43.04	-24.96	14.39	43.04	24.96	0.000%
14	0.00	-57.77	0.00	0.00	57.77	0.00	0.000%
15	0.00	-57.77	-7.19	-0.00	57.77	7.19	0.000%
16	3.59	-57.77	-6.23	-3.59	57.77	6.23	0.000%
17	6.22	-57.77	-3.60	-6.22	57.77	3.60	0.000%
18	7.18	-57.77	0.00	-7.18	57.77	0.00	0.000%
19	6.22	-57.77	3.60	-6.22	57.77	-3.60	0.000%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
20	3.59	-57.77	6.23	-3.59	57.77	-6.23	0.000%
21	0.00	-57.77	7.19	-0.00	57.77	-7.19	0.000%
22	-3.59	-57.77	6.23	3.59	57.77	-6.23	0.000%
23	-6.22	-57.77	3.60	6.22	57.77	-3.60	0.000%
24	-7.18	-57.77	0.00	7.18	57.77	0.00	0.000%
25	-6.22	-57.77	-3.60	6.22	57.77	3.60	0.000%
26	-3.59	-57.77	-6.23	3.59	57.77	6.23	0.000%
27	0.00	-43.04	-9.97	0.00	43.04	9.97	0.000%
28	4.98	-43.04	-8.64	-4.98	43.04	8.64	0.000%
29	8.62	-43.04	-4.99	-8.62	43.04	4.99	0.000%
30	9.96	-43.04	0.00	-9.96	43.04	0.00	0.000%
31	8.62	-43.04	4.99	-8.62	43.04	-4.99	0.000%
32	4.98	-43.04	8.64	-4.98	43.04	-8.64	0.000%
33	0.00	-43.04	9.97	0.00	43.04	-9.97	0.000%
34	-4.98	-43.04	8.64	4.98	43.04	-8.64	0.000%
35	-8.62	-43.04	4.99	8.62	43.04	-4.99	0.000%
36	-9.96	-43.04	0.00	9.96	43.04	0.00	0.000%
37	-8.62	-43.04	-4.99	8.62	43.04	4.99	0.000%
38	-4.98	-43.04	-8.64	4.98	43.04	8.64	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	4	0.00000001	0.00005550
3	Yes	4	0.00000001	0.00079200
4	Yes	4	0.00000001	0.00075300
5	Yes	4	0.00000001	0.00004614
6	Yes	4	0.00000001	0.00076939
7	Yes	4	0.00000001	0.00078104
8	Yes	4	0.00000001	0.00005549
9	Yes	4	0.00000001	0.00074865
10	Yes	4	0.00000001	0.00078614
11	Yes	4	0.00000001	0.00004609
12	Yes	4	0.00000001	0.00076842
13	Yes	4	0.00000001	0.00075825
14	Yes	4	0.00000001	0.00000001
15	Yes	4	0.00000001	0.00074793
16	Yes	4	0.00000001	0.00076946
17	Yes	4	0.00000001	0.00076865
18	Yes	4	0.00000001	0.00074694
19	Yes	4	0.00000001	0.00076484
20	Yes	4	0.00000001	0.00076348
21	Yes	4	0.00000001	0.00074141
22	Yes	4	0.00000001	0.00075898
23	Yes	4	0.00000001	0.00075849
24	Yes	4	0.00000001	0.00073975
25	Yes	4	0.00000001	0.00076227
26	Yes	4	0.00000001	0.00076492
27	Yes	4	0.00000001	0.00002001
28	Yes	4	0.00000001	0.00005842
29	Yes	4	0.00000001	0.00005363
30	Yes	4	0.00000001	0.00001939
31	Yes	4	0.00000001	0.00005544
32	Yes	4	0.00000001	0.00005691
33	Yes	4	0.00000001	0.00002000
34	Yes	4	0.00000001	0.00005302
35	Yes	4	0.00000001	0.00005754
36	Yes	4	0.00000001	0.00001932
37	Yes	4	0.00000001	0.00005525
38	Yes	4	0.00000001	0.00005402

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	130 - 120	8.88	28	0.579	0.000
L2	120 - 100	7.68	28	0.571	0.000
L3	100 - 80	5.36	28	0.519	0.000
L4	80 - 60	3.37	28	0.423	0.000
L5	60 - 40	1.81	28	0.311	0.000
L6	40 - 20	0.74	28	0.193	0.000
L7	20 - 0	0.17	28	0.077	0.000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
131'	(2) TMBXX-6516-R2M w/ Mount Pipe	28	8.88	0.579	0.000	103509
121'	(2) 7770.00 w/ Mount Pipe	28	7.80	0.573	0.000	56682
110'	(2) LPA-185063/8CF w/ Mount Pipe	28	6.49	0.552	0.000	22428
68'	torque arm	28	2.38	0.357	0.000	10063

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	130 - 120	25.65	2	1.671	0.001
L2	120 - 100	22.17	2	1.650	0.001
L3	100 - 80	15.49	2	1.498	0.001
L4	80 - 60	9.73	2	1.222	0.001
L5	60 - 40	5.23	2	0.897	0.000
L6	40 - 20	2.15	2	0.558	0.000
L7	20 - 0	0.48	2	0.221	0.000

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
131'	(2) TMBXX-6516-R2M w/ Mount Pipe	2	25.65	1.671	0.001	36056
121'	(2) 7770.00 w/ Mount Pipe	2	22.51	1.654	0.001	19737
110'	(2) LPA-185063/8CF w/ Mount Pipe	2	18.75	1.593	0.001	7788
68'	torque arm	2	6.87	1.030	0.000	3486

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
L1	130 - 120 (1)	P30x3/8	10'	0'	0.0	25.07	34.90	-5.68	875.15	0.006
L2	120 - 100 (2)	P36x3/8	20'	0'	0.0	23.70	41.97	-11.06	994.51	0.011
L3	100 - 80 (3)	P42x3/8	20'	0'	0.0	22.71	49.04	-15.43	1113.69	0.014
L4	80 - 60 (4)	P48x3/8	20'	0'	0.0	21.97	56.11	-21.12	1232.77	0.017
L5	60 - 40 (5)	P54x3/8	20'	0'	0.0	21.40	63.18	-26.52	1351.78	0.020
L6	40 - 20 (6)	P60x3/8	20'	0'	0.0	20.94	70.24	-32.43	1470.73	0.022
L7	20 - 0 (7)	P60x3/4	20'	0'	0.0	25.07	139.60	-43.03	3500.58	0.012

Pole Bending Design Data

Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
L1	130 - 120 (1)	P30x3/8	58.00	2.73	25.07	0.109	0.00	0.00	25.07	0.000
L2	120 - 100 (2)	P36x3/8	332.57	10.79	23.70	0.455	0.00	0.00	23.70	0.000
L3	100 - 80 (3)	P42x3/8	703.73	16.70	22.71	0.735	0.00	0.00	22.71	0.000
L4	80 - 60 (4)	P48x3/8	1123.85	20.35	21.97	0.926	0.00	0.00	21.97	0.000
L5	60 - 40 (5)	P54x3/8	1593.80	22.74	21.40	1.063	0.00	0.00	21.40	0.000
L6	40 - 20 (6)	P60x3/8	2107.20	24.30	20.94	1.161	0.00	0.00	20.94	0.000
L7	20 - 0 (7)	P60x3/4	2662.77	15.65	25.07	0.624	0.00	0.00	25.07	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V K	Actual f_v ksi	Allow. F_v ksi	Ratio $\frac{f_v}{F_v}$	Actual T kip-ft	Actual f_{vt} ksi	Allow. F_{vt} ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
L1	130 - 120 (1)	P30x3/8	10.01	0.57	16.80	0.034	0.19	0.00	15.64	0.000
L2	120 - 100 (2)	P36x3/8	17.41	0.83	16.80	0.049	0.32	0.01	12.03	0.000
L3	100 - 80 (3)	P42x3/8	19.70	0.80	16.80	0.048	0.37	0.00	10.72	0.000
L4	80 - 60 (4)	P48x3/8	22.37	0.80	16.80	0.047	0.42	0.00	9.70	0.000
L5	60 - 40 (5)	P54x3/8	24.61	0.78	16.80	0.046	0.47	0.00	8.88	0.000
L6	40 - 20 (6)	P60x3/8	26.71	0.76	16.80	0.045	0.53	0.00	8.20	0.000
L7	20 - 0 (7)	P60x3/4	28.82	0.41	16.80	0.025	0.58	0.00	16.80	0.000

Pole Interaction Design Data

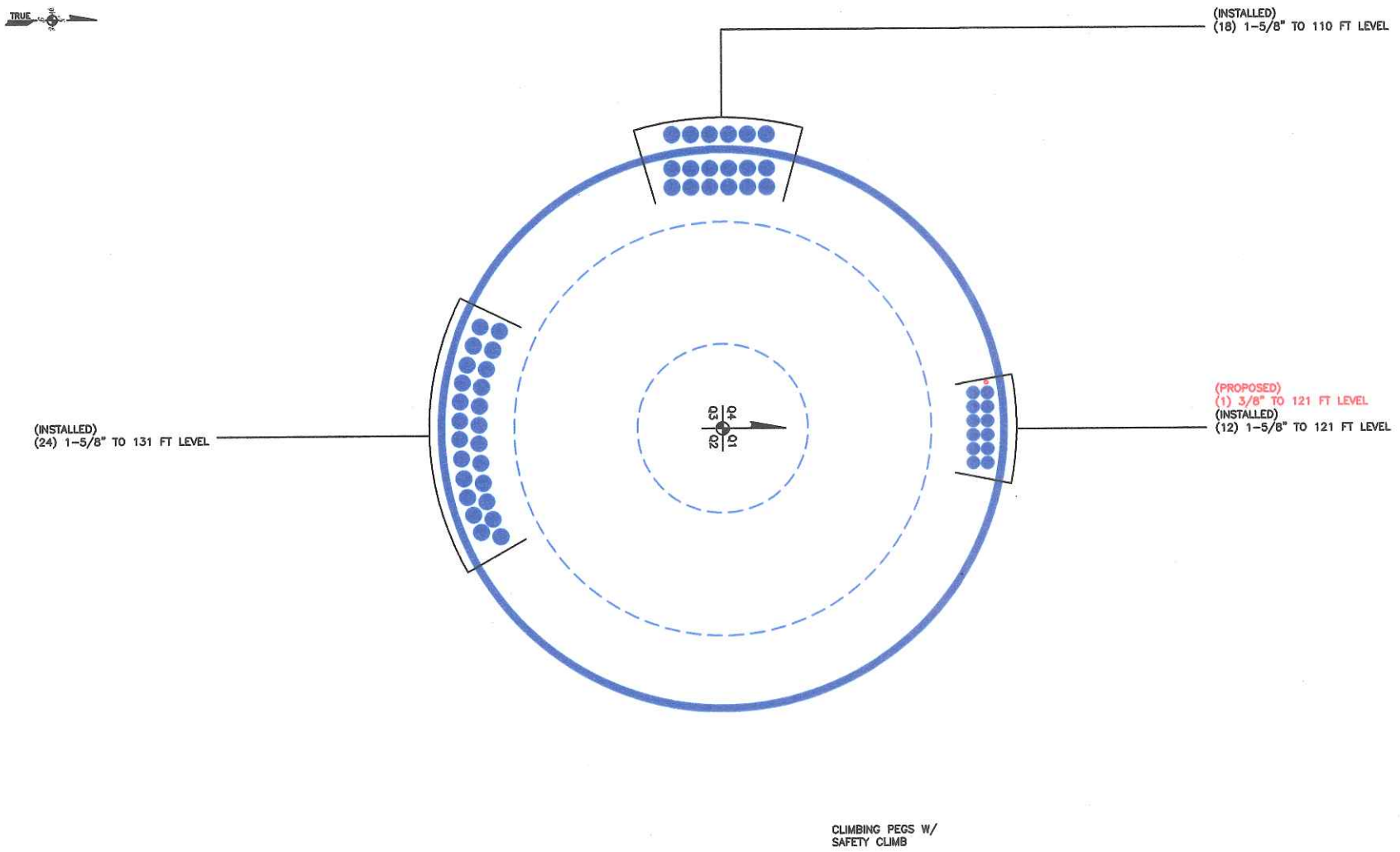
Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	130 - 120 (1)	0.006	0.109	0.000	0.034	0.000	0.116 ✔	1.333	H1-3+VT ✔
L2	120 - 100 (2)	0.011	0.455	0.000	0.049	0.000	0.469 ✔	1.333	H1-3+VT ✔
L3	100 - 80 (3)	0.014	0.735	0.000	0.048	0.000	0.751 ✔	1.333	H1-3+VT ✔
L4	80 - 60 (4)	0.017	0.926	0.000	0.047	0.000	0.945 ✔	1.333	H1-3+VT ✔
L5	60 - 40 (5)	0.020	1.063	0.000	0.046	0.000	1.084 ✔	1.333	H1-3+VT ✔
L6	40 - 20 (6)	0.022	1.161	0.000	0.045	0.000	1.185 ✔	1.333	H1-3+VT ✔
L7	20 - 0 (7)	0.012	0.624	0.000	0.025	0.000	0.637 ✔	1.333	H1-3+VT ✔

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
L1	130 - 120	Pole	P30x3/8	1	-5.68	1166.57	8.7	Pass
L2	120 - 100	Pole	P36x3/8	2	-11.06	1325.68	35.2	Pass
L3	100 - 80	Pole	P42x3/8	3	-15.43	1484.55	56.4	Pass
L4	80 - 60	Pole	P48x3/8	4	-21.12	1643.28	70.9	Pass
L5	60 - 40	Pole	P54x3/8	5	-26.52	1801.92	81.4	Pass
L6	40 - 20	Pole	P60x3/8	6	-32.43	1960.48	88.9	Pass
L7	20 - 0	Pole	P60x3/4	7	-43.03	4666.27	47.8	Pass
							Summary	
						Pole (L6)	88.9	Pass
						RATING =	**88.9**	**Pass**

APPENDIX B

BASE LEVEL DRAWING



CLIMBING PEGS W/
SAFETY CLIMB

BUSINESS UNIT: 824359 TOWER ID: C_BASELEVEL

APPENDIX C

ADDITIONAL CALCULATIONS

Stiffened or Unstiffened, Exterior Flange Plate - Any Bolt Material TIA Rev F

Site Data

BU#: *824359*
Site Name: *Groton/ I-95/ X89/ Noa_1*
App #: *178897, Rev. 2*

Pole Manufacturer:	Rohn

Reactions		
Moment:	58	ft-kips
Axial:	5.68	kips
Shear:	10.01	kips
Elevation:	120	feet

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

Bolt Data			
Qty:	24		
Diameter (in.):	1	Bolt Fu:	150
Bolt Material:	A490	Bolt Fy:	130
N/A:		<-- Disregard	Bolt Fty: 54.00
N/A:		<-- Disregard	
Circle (in.):	33		

Plate Data		
Diam:	36	in
Thick, t:	1.25	in
Grade (Fy):	36	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	3.93	in

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

Pole Data		
Diam:	30	in
Thick:	0.375	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	63	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor		
ASIF:	1.333	

Flange Bolt Results

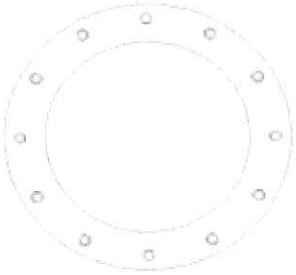
		Rigid
Bolt Tension Capacity, **B**:	56.53 kips	Service, ASD
Max Bolt directly applied T:	3.28 Kips	Fty*ASIF
Min. PL "tc" for **B** cap. **w/o** Pry:	1.549 in	
Min PL "treq" for actual **T w/ Pry**:	0.284 in	
Min PL "t1" for actual **T w/o Pry**:	0.373 in	
T allowable with Prying:	49.96 kips	0≤α'≤1 case
Prying Force, Q:	0.00 kips	
Total Bolt Tension=T+Q:	3.28 kips	
Prying Bolt Stress Ratio=(T+Q)/(B):	5.8% Pass	

Exterior Flange Plate Results Flexural Check

		Rigid
Compression Side Plate Stress:	Rohn/Pirod, OK	Service ASD
Allowable Plate Stress:	36.0 ksi	0.75*Fy*ASIF
Compression Plate Stress Ratio:	Rohn/Pirod, OK	Comp. Y.L. Length: 13.75
No Prying		
Tension Side Stress Ratio, (treq/t)^2:	5.2% Pass	

n/a

Stiffener Results	N/A for Rohn / Pirod
Horizontal Weld :	N/A
Vertical Weld:	N/A
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	N/A
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	N/A
Plate Comp. (AISC Bracket):	N/A
Pole Results	
Pole Punching Shear Check:	N/A



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

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

Stiffened or Unstiffened, Exterior Flange Plate - Any Bolt Material TIA Rev F

Site Data

BU#: *824359*
Site Name: *Groton/ I-95/ X89/ Noa_1*
App #: *178897, Rev. 2*

Pole Manufacturer:	Rohn

Reactions		
Moment:	332.57	ft-kips
Axial:	11.06	kips
Shear:	17.41	kips
Elevation:	100	feet

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

Bolt Data			
Qty:	28		
Diameter (in.):	1	Bolt Fu:	150
Bolt Material:	A490	Bolt Fy:	130
N/A:		<-- Disregard	Bolt Fty: 54.00
N/A:		<-- Disregard	
Circle (in.):	39		

Plate Data		
Diam:	42	in
Thick, t:	1.25	in
Grade (Fy):	36	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	4.04	in

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

Pole Data		
Diam:	36	in
Thick:	0.375	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	63	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor		
ASIF:	1.333	

Flange Bolt Results

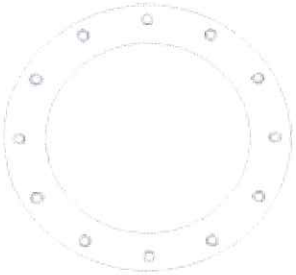
		Rigid
Bolt Tension Capacity, B:	56.53 kips	Service, ASD
Max Bolt directly applied T:	14.22 Kips	Fty*ASIF
Min. PL "tc" for B cap. w/o Pry:	1.528 in	
Min PL "treq" for actual T w/ Pry:	0.581 in	
Min PL "t1" for actual T w/o Pry:	0.766 in	
T allowable with Prying:	50.31 kips	0≤α'≤1 case
Prying Force, Q:	0.00 kips	
Total Bolt Tension=T+Q:	14.22 kips	
Prying Bolt Stress Ratio=(T+Q)/(B):	25.2% Pass	

Exterior Flange Plate Results Flexural Check

		Rigid
Compression Side Plate Stress:	Rohn/Pirod, OK	Service ASD
Allowable Plate Stress:	36.0 ksi	0.75*Fy*ASIF
Compression Plate Stress Ratio:	Rohn/Pirod, OK	Comp. Y.L. Length: 15.00
No Prying		
Tension Side Stress Ratio, (treq/t)^2:	21.6% Pass	

n/a

Stiffener Results	N/A for Rohn / Pirod
Horizontal Weld :	N/A
Vertical Weld:	N/A
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	N/A
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	N/A
Plate Comp. (AISC Bracket):	N/A
Pole Results	
Pole Punching Shear Check:	N/A



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

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

Stiffened or Unstiffened, Exterior Flange Plate - Any Bolt Material TIA Rev F

Site Data

BU#: *824359*
Site Name: *Groton/ I-95/ X89/ Noa_1*
App #: *178897, Rev. 2*

Pole Manufacturer:	Rohn

Reactions		
Moment:	703.73	ft-kips
Axial:	15.43	kips
Shear:	19.7	kips
Elevation:	80	feet

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

Bolt Data			
Qty:	32		
Diameter (in.):	1	Bolt Fu:	150
Bolt Material:	A490	Bolt Fy:	130
N/A:		<-- Disregard	Bolt Fty: 54.00
N/A:		<-- Disregard	
Circle (in.):	45		

Plate Data		
Diam:	48	in
Thick, t:	1.25	in
Grade (Fy):	36	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	4.12	in

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

Pole Data		
Diam:	42	in
Thick:	0.375	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	63	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor		
ASIF:	1.333	

Flange Bolt Results

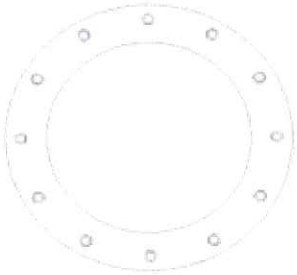
		Rigid
Bolt Tension Capacity, B:	56.53 kips	Service, ASD
Max Bolt directly applied T:	22.98 Kips	Fty*ASIF
Min. PL "tc" for B cap. w/o Pry:	1.512 in	
Min PL "treq" for actual T w/ Pry:	0.730 in	
Min PL "t1" for actual T w/o Pry:	0.964 in	
T allowable with Prying:	50.57 kips	0≤α'≤1 case
Prying Force, Q:	0.00 kips	
Total Bolt Tension=T+Q:	22.98 kips	
Prying Bolt Stress Ratio=(T+Q)/(B):	40.6% Pass	

Exterior Flange Plate Results — Flexural Check

		Rigid
Compression Side Plate Stress:	Rohn/Pirod, OK	Service ASD
Allowable Plate Stress:	36.0 ksi	0.75*Fy*ASIF
Compression Plate Stress Ratio:	Rohn/Pirod, OK	Comp. Y.L. Length: 16.16
No Prying		
Tension Side Stress Ratio, (treq/t)^2:	34.1% Pass	

n/a

Stiffener Results	N/A for Rohn / Pirod
Horizontal Weld :	N/A
Vertical Weld:	N/A
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	N/A
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	N/A
Plate Comp. (AISC Bracket):	N/A
Pole Results	
Pole Punching Shear Check:	N/A



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

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

Stiffened or Unstiffened, Exterior Flange Plate - Any Bolt Material TIA Rev F

Site Data

BU#: *824359*
Site Name: *Groton/ I-95/ X89/ Noa_1*
App #: *178897, Rev. 2*

Pole Manufacturer:	Rohn

Reactions		
Moment:	1123.85	ft-kips
Axial:	21.12	kips
Shear:	22.37	kips
Elevation:	60	feet

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

Bolt Data			
Qty:	36		
Diameter (in.):	1	Bolt Fu:	150
Bolt Material:	A490	Bolt Fy:	130
N/A:		<-- Disregard	Bolt Fty: 54.00
N/A:		<-- Disregard	
Circle (in.):	51		

Plate Data		
Diam:	54	in
Thick, t:	1.25	in
Grade (Fy):	36	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	4.19	in

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

Pole Data		
Diam:	48	in
Thick:	0.375	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	63	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor		
ASIF:	1.333	

Flange Bolt Results

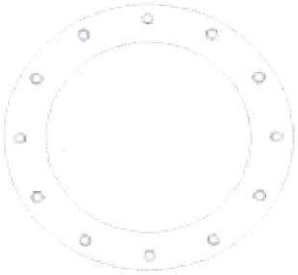
		Rigid
Bolt Tension Capacity, B:	56.53 kips	Service, ASD
Max Bolt directly applied T:	28.80 Kips	Fty*ASIF
Min. PL "tc" for B cap. w/o Pry:	1.500 in	
Min PL "treq" for actual T w/ Pry:	0.810 in	
Min PL "t1" for actual T w/o Pry:	1.071 in	
T allowable with Prying:	50.78 kips	0≤α'≤1 case
Prying Force, Q:	0.00 kips	
Total Bolt Tension=T+Q:	28.80 kips	
Prying Bolt Stress Ratio=(T+Q)/(B):	50.9% Pass	

Exterior Flange Plate Results — Flexural Check

		Rigid
Compression Side Plate Stress:	Rohn/Pirod, OK	Service ASD
Allowable Plate Stress:	36.0 ksi	0.75*Fy*ASIF
Compression Plate Stress Ratio:	Rohn/Pirod, OK	Comp. Y.L. Length: 17.23
No Prying		
Tension Side Stress Ratio, (treq/t)^2:	42.0% Pass	

n/a

Stiffener Results	N/A for Rohn / Pirod
Horizontal Weld :	N/A
Vertical Weld:	N/A
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	N/A
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	N/A
Plate Comp. (AISC Bracket):	N/A
Pole Results	
Pole Punching Shear Check:	N/A



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

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

Stiffened or Unstiffened, Exterior Flange Plate - Any Bolt Material TIA Rev F

Site Data

BU#: *824359*
Site Name: *Groton/ I-95/ X89/ Noa_1*
App #: *178897, Rev. 2*

Pole Manufacturer:	Rohn

Reactions		
Moment:	1593.8	ft-kips
Axial:	26.52	kips
Shear:	24.61	kips
Elevation:	40	feet

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

Bolt Data			
Qty:	45		
Diameter (in.):	1	Bolt Fu:	150
Bolt Material:	A490	Bolt Fy:	130
N/A:		<-- Disregard	Bolt Fty:
N/A:		<-- Disregard	54.00
Circle (in.):	57		

Plate Data		
Diam:	60	in
Thick, t:	1.25	in
Grade (Fy):	36	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	3.77	in

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

Pole Data		
Diam:	54	in
Thick:	0.375	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	63	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor		
ASIF:	1.333	

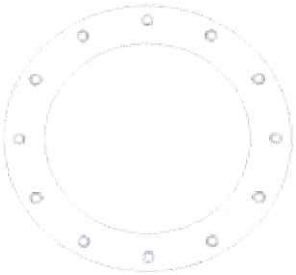
Flange Bolt Results

		Rigid
Bolt Tension Capacity, B:	56.53 kips	Service, ASD
Max Bolt directly applied T:	29.24 Kips	Fty*ASIF
Min. PL "tc" for B cap. w/o Pry:	1.581 in	
Min PL "treq" for actual T w/ Pry:	0.867 in	
Min PL "t1" for actual T w/o Pry:	1.137 in	
T allowable with Prying:	49.47 kips	0≤α'≤1 case
Prying Force, Q:	0.00 kips	
Total Bolt Tension=T+Q:	29.24 kips	
Prying Bolt Stress Ratio=(T+Q)/(B):	51.7% Pass	

Exterior Flange Plate Results	Flexural Check	Rigid
Compression Side Plate Stress:	Rohn/Pirod, OK	Service ASD
Allowable Plate Stress:	36.0 ksi	0.75*Fy*ASIF
Compression Plate Stress Ratio:	Rohn/Pirod, OK	Comp. Y.L. Length: 18.25
No Prying		
Tension Side Stress Ratio, (treq/t)^2:	48.2% Pass	

n/a

Stiffener Results	N/A for Rohn / Pirod
Horizontal Weld :	N/A
Vertical Weld:	N/A
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	N/A
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	N/A
Plate Comp. (AISC Bracket):	N/A
Pole Results	
Pole Punching Shear Check:	N/A



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

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

Stiffened or Unstiffened, Interior Flange Plate - Any Bolt Material TIA Rev F

Site Data

BU#: *824359*
Site Name: *Groton/ I-95/ X89/ Noa_1*
App #: *178897, Rev. 2*

Manufacturer:	Pirod

Reactions		
Moment:	2107.2	ft-kips
Axial:	32.43	kips
Shear:	26.71	kips
Exterior Flange Run, T+Q:	0	kips

Elevation: 20 feet

Bolt Data			
Qty:	64		
Diam:	1	Bolt Fu:	150
Bolt Material:	A490	Bolt Fy:	130
N/A:		<-- Disregard	Bolt Fty: 54.00
N/A:		<-- Disregard	
Circle:	50	in	

Interior Flange Bolt Results

Maximum Bolt Tension:	31.1	Kips, Ext. T=Interior T
Allowable Tension:	56.5	Kips
Bolt Stress Ratio:	55.0%	Pass

Plate Data		
Plate Outer Diam:	59.25	in
Plate Inner Diam:	12	in (Hole @ Ctr)
Thick:	1.25	in
Grade:	36	ksi
Effective Width:	2.91	in

Interior Flange Plate Results Flexural Check

Controlling Bolt Axial Force:	32.1	Kips, Ext. C= Interior C
Plate Stress:	Rohn/Pirod	OK
Allowable Plate Stress:	36.0	ksi
Plate Stress Ratio:	Rohn/Pirod	OK

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

n/a

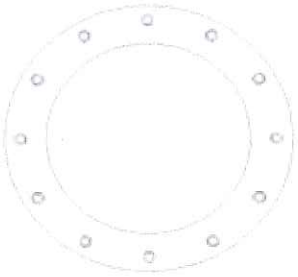
Stiffener Results N/A for Rohn / Pirod

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

Pole Results

Pole Punching Shear Check: N/A

Pole Data		
Pole OuterDiam:	60	in
Thick:	0.375	in
Pole Inner Diam:	59.25	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	63	ksi



Stress Increase Factor		
ASIF:	1.333	

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

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

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

TIA Rev F

Site Data

BU#: *824359*
Site Name: *Groton/ I-95/ X89/ Noa_1*
App #: *178897, Rev. 2*

Pole Manufacturer:	*Pirod*

Reactions		
Moment:	2663	ft-kips
Axial:	43	kips
Shear:	29	kips

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

Anchor Rod Data		
Qty:	52	
Diam:	1.25	in
Rod Material:	Other	
Strength (Fu):	150	ksi
Yield (Fy):	105	ksi
Bolt Circle:	67	in

Plate Data		
Diam:	70	in
Thick:	1	in
Grade:	36	ksi
Single-Rod B-eff:	3.62	in

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

Pole Data		
Diam:	60	in
Thick:	0.75	in
Grade:	35	ksi
# of Sides:	0	"0" IF Round
Fu	63	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor		
ASIF:	1.333	

Anchor Rod Results

Maximum Rod Tension:	35.9 Kips	Non-Rigid
Allowable Tension:	81.0 Kips	Service, ASD
Anchor Rod Stress Ratio:	44.3% Pass	Fty*ASIF

Base Plate Results

	Flexural Check	Non-Rigid
Base Plate Stress:	Rohn/Pirod, OK	Service ASD
Allowable Plate Stress:	36.0 ksi	0.75*Fy*ASIF
Base Plate Stress Ratio:	Rohn/Pirod, OK	Y.L. Length: 29.82

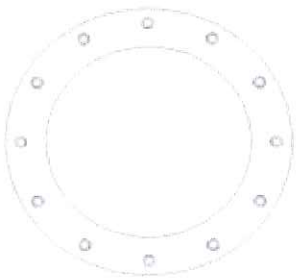
n/a

Stiffener Results N/A for Rohn / Pirod

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

Pole Results

Pole Punching Shear Check: N/A



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

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

Monopole Pier and Pad Foundation

BU # : 824359
Site Name: Groton/ I-95/ X89/ Noa_1
App. Number: 178897, Rev. 2

TIA-222 Revision: F

Design Reactions		
Shear, **S**:	29	kips
Moment, **M**:	2663	ft-kips
Tower Height, **H**:	130	ft
Tower Weight, **Wt**:	43	kips
Base Diameter, **BD**:	5	ft

Foundation Dimensions		
Depth, **D**:	6.5	ft
Pad Width, **W**:	20	ft
Neglected Depth, **N**:	3.33	ft
Thickness, **T**:	2.25	ft
Pier Diameter, **Pd**:	7.00	ft
Ext. Above Grade, **E**:	0.50	ft
BP Dist. Above Pier:	3	in.
Clear Cover, **Cc**:	3.0	in

Soil Properties		
Soil Unit Weight, **γ**:	0.130	kcf
Ult. Bearing Capacity, Bc:	32.0	ksf
Angle of Friction, **Φ**:	34	deg
Cohesion, **Co**:	0.000	ksf
Passive Pressure, **Pp**:	0.250	ksf
Base Friction, **μ**:	0.65	

Material Properties		
Rebar Yield Strength, **Fy**:	60000	psi
Concrete Strength, **F'c**:	3000	psi
Concrete Unit Weight, **δc**:	0.150	kcf
Seismic Zone, **z**:	1	

Rebar Properties		
Pier Rebar Size, **Sp**:	9	
Pier Rebar Quanity, **mp**:	40	28
Pad Rebar Size, **Spad**:	11	
Pad Rebar Quanity, **mpad**:	24	11
Pier Tie Size, **St**:	4	3
Tie Quanity, **mt**:	7	6

Design Checks	Capacity/ Availability	Demand/ Limits	Check
Req'd Pier Diam.(ft)	7	7	**OK**
Overturning (ft-kips)	2866.72	2663.00	**92.9%**
Shear Capacity (kips)	159.86	29.00	**18.1%**
Bearing (ksf)	24.00	6.22	**25.9%**
Pad Shear - 1-way (kips)	459.33	382.57	**83.3%**
Pad Shear - 2-way (kips)	1290.25	108.43	**8.4%**
Pad Moment Capacity (k-ft)	3615.53	1793.64	**49.6%**
Pier Moment Capacity (k-ft)	4863.47	2800.75	**57.6%**

PROJECT INFORMATION

SCOPE OF WORK:	TELECOMMUNICATIONS FACILITY UPGRADE (LTE): 1. INSTALL (3) NEW LTE ANTENNAS, (6) RRH'S, (1) SURGE ARRESTOR, (1) FIBER LINE, (2) DC POWER LINES & (1) GPS ANTENNA 2. INSTALL (1) LTE 6601 CABINET & (1) DC POWER PLANT
SITE ADDRESS:	741 FLANDERS ROAD GROTON, CT 06355
LATITUDE:	41.36987 N 41° 22' 11.5" N
LONGITUDE:	72.00828 W 72° 00' 29.8" W
CURRENT USE:	TELECOMMUNICATIONS FACILITY
PROPOSED USE:	TELECOMMUNICATIONS FACILITY

at&t

SITE NUMBER: CT5225
SITE NAME: GROTON CENTRAL

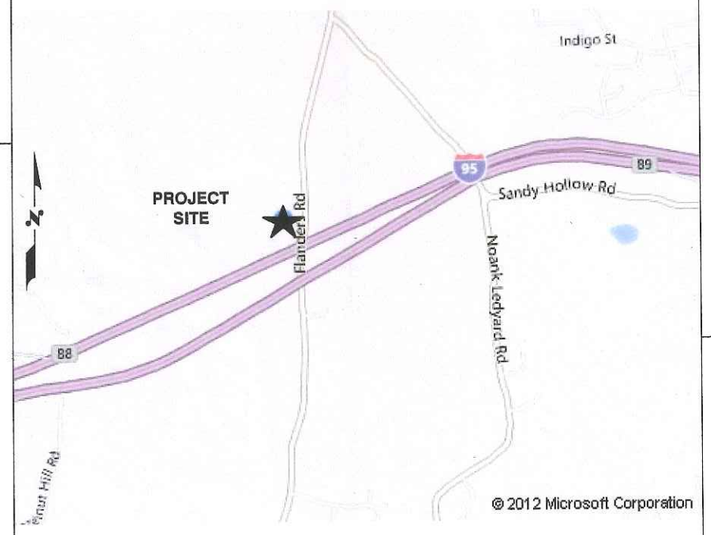
DRAWING INDEX

CROWN CASTLE SITE ID: 824359

VICINITY MAP

DIRECTIONS TO SITE:

DEPART ENTERPRISE DR TOWARD CAPITOL BLVD. 0.4 MI TURN LEFT ONTO CAPITOL BLVD. 0.2 MI TURN LEFT ONTO WEST ST. 0.3 MI TAKE RAMP LEFT FOR I-91 S. 1.4 MI AT EXIT 22S, TAKE RAMP LEFT FOR CT-9 SOUTH TOWARD OLD SAYBROOK / MIDDLETOWN. 5.5 MI KEEP STRAIGHT ONTO CT-9 S / CT-17 S. 0.8 MI KEEP STRAIGHT ONTO CT-9 S. 22.9 MI TAKE RAMP LEFT FOR US-1 NORTH / I-95 NORTH TOWARD NEW LONDON / PROVIDENCE. 17.3 MI AT EXIT 86, TAKE RAMP LEFT FOR CT-184 TOWARD U.S. SUB BASE / GALES FERRY. 0.5 MI KEEP STRAIGHT ONTO CT-184 / GOLD STAR HWY. 2.8 MI TURN RIGHT ONTO ROGERS RD. 0.7 MI TURN RIGHT ONTO FLANDERS RD. 0.8 MI ARRIVE AT 741 FLANDERS ROAD GROTON, CT 06355 ON THE RIGHT.



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2. THE FACILITY IS AN UNMANNED PRIVATE AND SECURED EQUIPMENT INSTALLATION. IT IS ONLY ACCESSED BY TRAINED TECHNICIANS FOR PERIODIC ROUTINE MAINTENANCE AND THEREFORE DOES NOT REQUIRE ANY WATER OR SANITARY SEWER SERVICE. THE FACILITY IS NOT GOVERNED BY REGULATIONS REQUIRING PUBLIC ACCESS PER ADA REQUIREMENTS.
3. CONTRACTOR SHALL VERIFY ALL PLANS AND EXISTING DIMENSIONS AND CONDITIONS ON THE JOB SITE AND SHALL IMMEDIATELY NOTIFY THE AT&T REPRESENTATIVE IN WRITING OF DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME.

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1600 OSGOOD STREET, BUILDING 20 NORTH, SUITE 3090, N. ANDOVER, MA 01845
TEL: (978) 557-5553 FAX: (978) 336-5586

Pinnacle Wireless
a UniTek GLOBAL SERVICES company
800 MARSHALL PHELPS ROAD UNIT# 2A
WINDSOR, CT 06095

SITE NUMBER: CT5225
SITE NAME: GROTON CENTRAL
CROWN CASTLE ID: 824359
741 FLANDERS ROAD
GROTON, CT 06355
NEW LONDON COUNTY

at&t
500 ENTERPRISE DRIVE, SUITE 3A
ROCKY HILL, CT 06067

NO.	DATE	REVISIONS	BY	CHK	APP'D
1	05/06/13	CONSTRUCTION REVISED	RS	DC	DPH
0	07/27/12	ISSUED FOR CONSTRUCTION	RS	DC	DPH

SCALE: AS SHOWN DESIGNED BY: DC DRAWN BY: RS

STATE OF CONNECTICUT DANIEL P. HAMM No. 24178 LICENSED PROFESSIONAL ENGINEER

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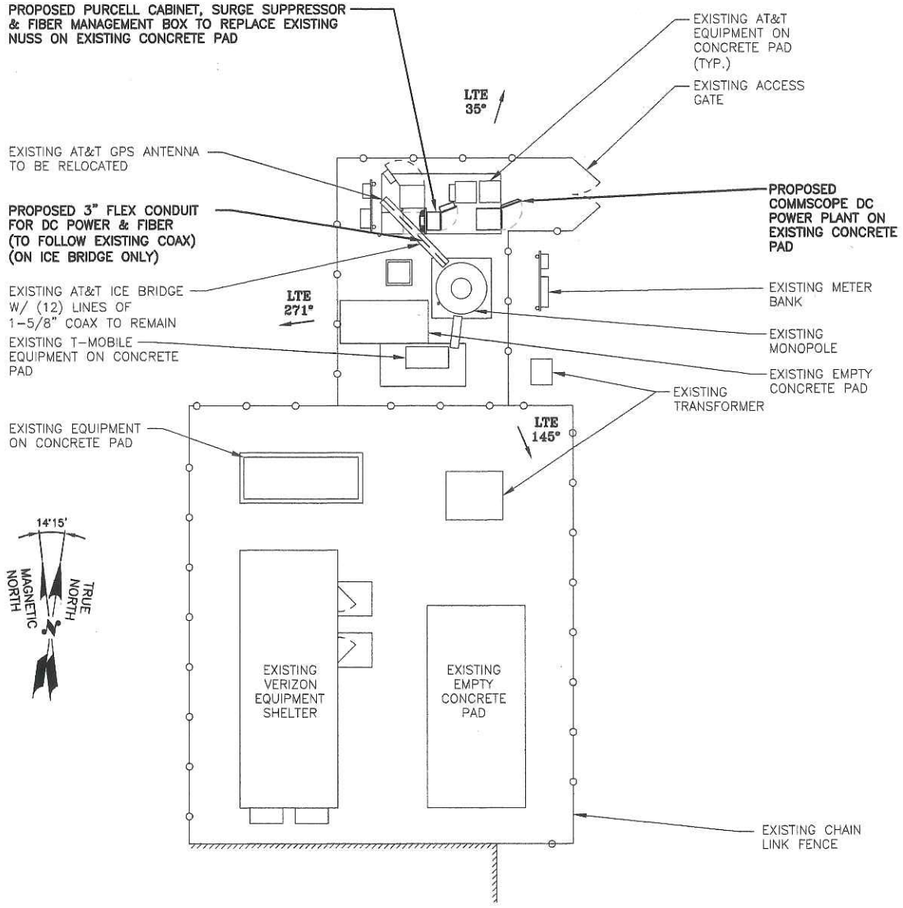
TITLE SHEET (LTE)

JOB NUMBER	DRAWING NUMBER	REV
5225.01	T-1	1



COMPOUND PLAN

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

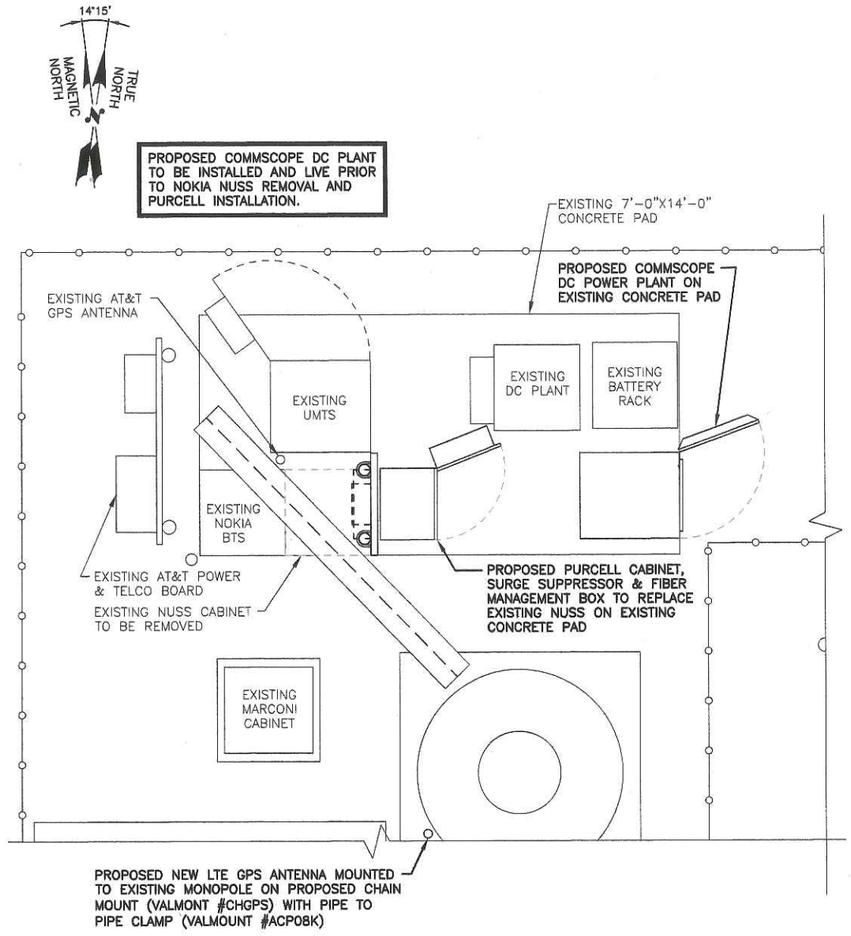
0 4'-0" 8'-0" 16'-0" 24'-0"

NOTE:

REFER TO THE FINAL RF DATA SHEET FOR FINAL ANTENNA SETTINGS.

NOTE:

REFER TO STRUCTURAL ANALYSIS BY: CROWN CASTLE DATED: APRIL 26, 2013, FOR THE CAPACITY OF THE EXISTING STRUCTURES TO SUPPORT THE PROPOSED EQUIPMENT.



EQUIPMENT PLAN

SCALE: 1/2"=1'-0"

0 1'-0" 2'-0" 4'-0" 6'-0"

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SCALE: AS SHOWN | DESIGNED BY: DC | DRAWN BY: RS

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COMPOUND PLAN & EQUIPMENT PLAN (LTE)

JOB NUMBER	DRAWING NUMBER	REV
5225.01	A-1	1

NOTE:

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NOTE:

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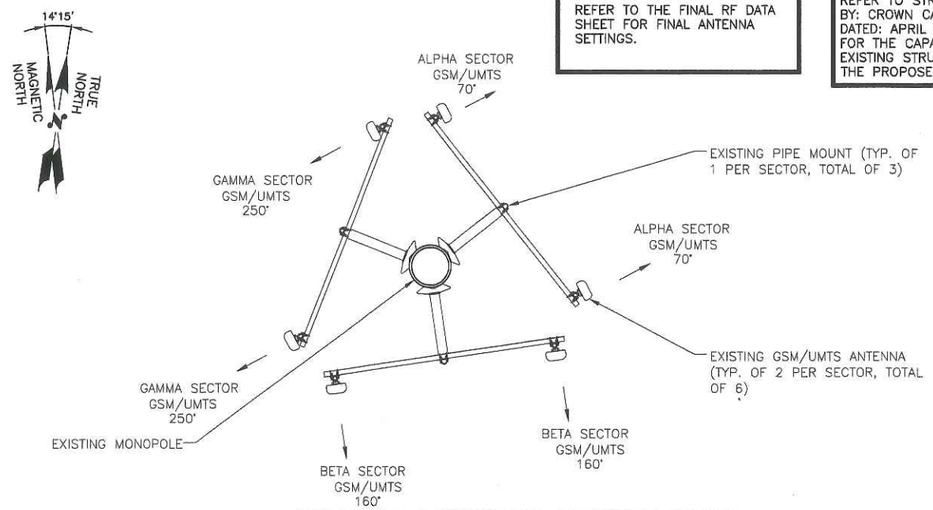
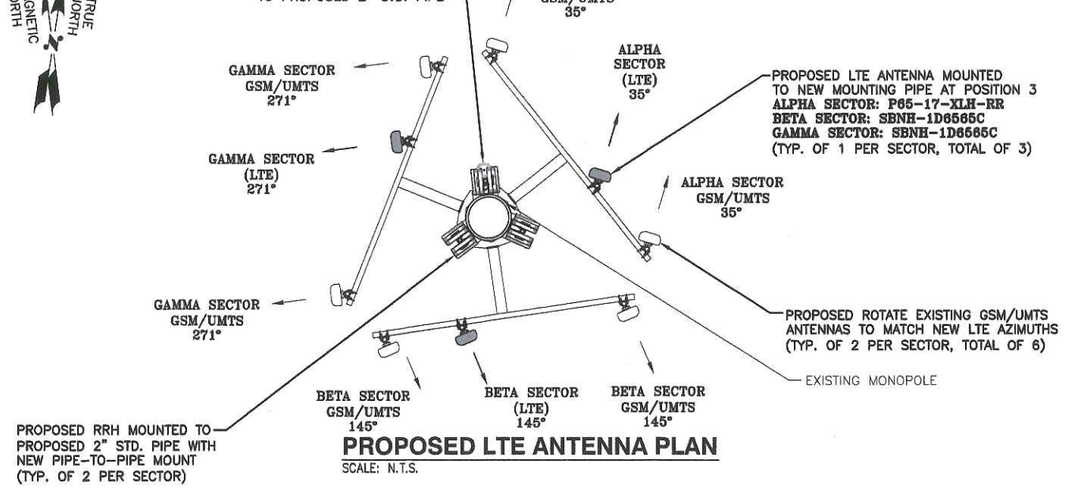


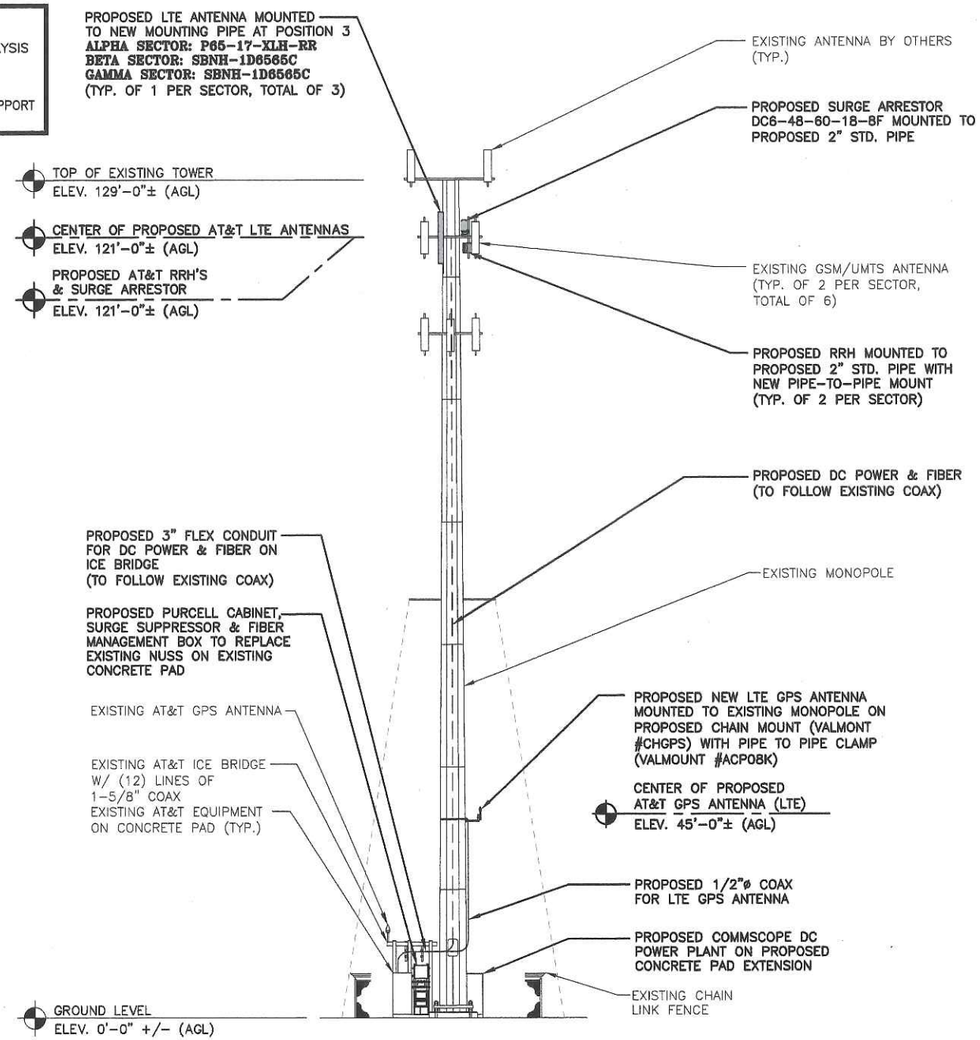
EXISTING GSM/UMTS ANTENNA PLAN

SCALE: N.T.S.



PROPOSED LTE ANTENNA PLAN

SCALE: N.T.S.



WEST ELEVATION

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

0 5'-4" 10'-8" 21'-4" 32'-0"

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STATE OF CONNECTICUT — DANIEL P. HAMM — No. 24178 — LICENSED PROFESSIONAL ENGINEER

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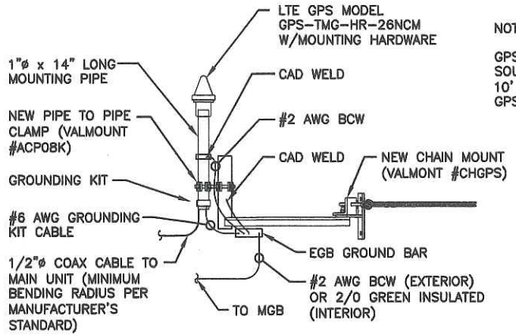
ANTENNA PLAN & ELEVATION (LTE)

JOB NUMBER	DRAWING NUMBER	REV
5225.01	A-2	1

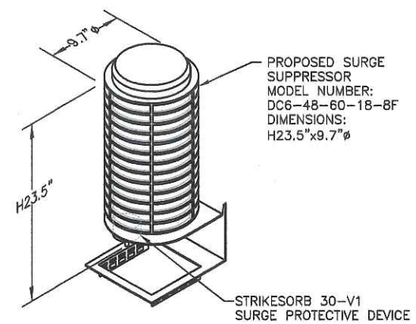


NOTE:

GPS TO BE MOUNTED WITH SOUTHWESTERN EXPOSURE, 10' (MIN.) FROM EXISTING GPS ANTENNA.

GPS MOUNTING DETAIL

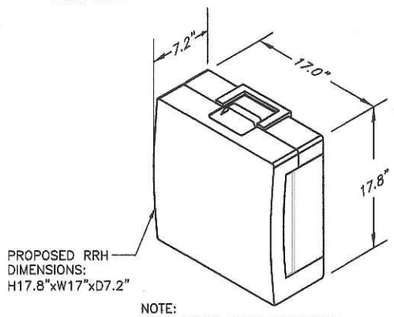
SCALE: N.T.S.



NOTE:
MOUNT PER MANUFACTURER'S SPECIFICATIONS.

DC SURGE SUPPRESSOR DETAIL

SCALE: N.T.S.



NOTE:
MOUNT PER MANUFACTURER'S SPECIFICATIONS.

RRH DETAIL

SCALE: N.T.S.

NOTE:

REFER TO THE FINAL RF DATA SHEET FOR FINAL ANTENNA SETTINGS.

NOTE:

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DATED: APRIL 26, 2013,
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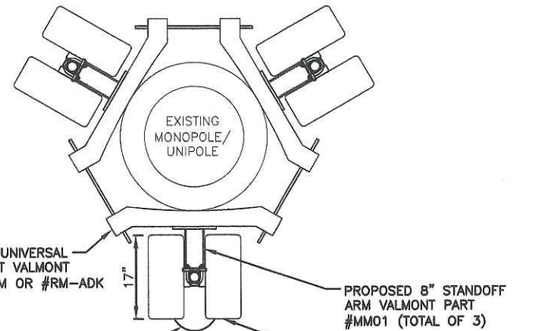
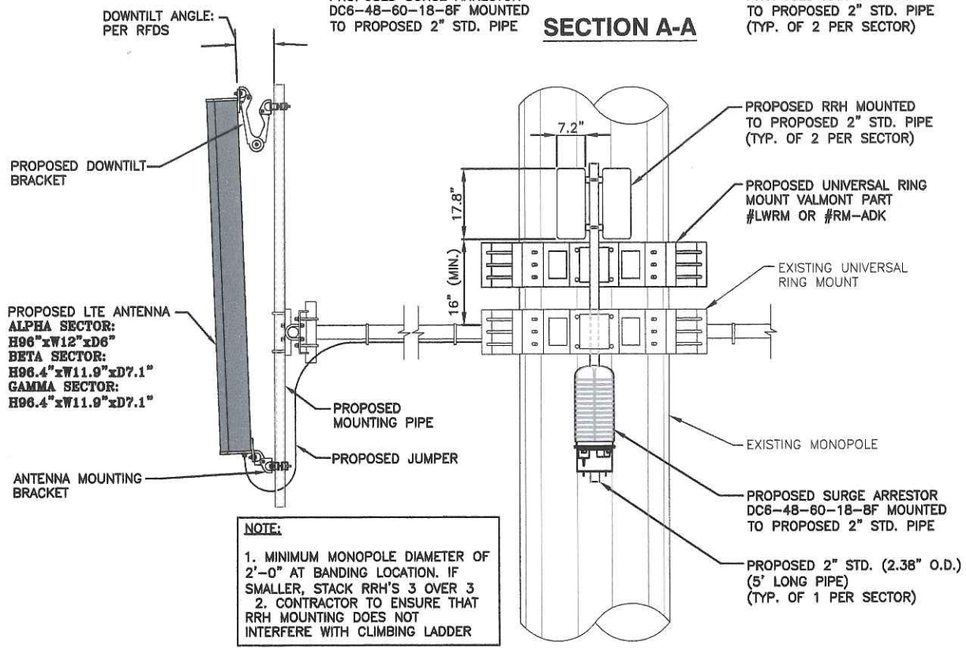


SECTION A-A



NOTE:

1. MINIMUM MONOPOLE DIAMETER OF 2'-0" AT BANDING LOCATION. IF SMALLER, STACK RRH'S 3 OVER 3
2. CONTRACTOR TO ENSURE THAT RRH MOUNTING DOES NOT INTERFERE WITH CLIMBING LADDER

PART #	VMI PART #	SIZE RANGE
LWRM	801068	12"-45"
RM-ADK	157286	36"-60" ADAPTER KIT

NOTES:
1. REFER TO RFDS & SECTOR SCHEMATICS FOR ANTENNA MODEL, TYPE & QUANTITY REQUIRED PER SECTOR

PROPOSED RRH & SURGE ARRESTOR MOUNTING DETAIL

SCALE: N.T.S.

Hudson Design Group LLC
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0	07/27/12	ISSUED FOR CONSTRUCTION	RS	DC	DPH

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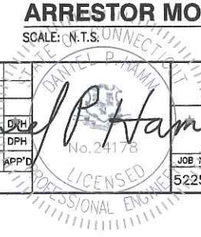

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DETAILS
(LTE)

JOB NUMBER	DRAWING NUMBER	REV
5225.01	A-4	1

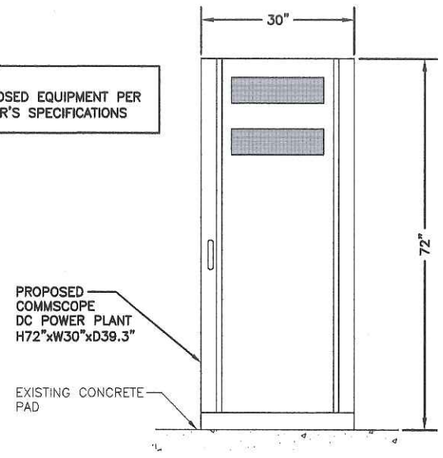
NOTE:

REFER TO THE FINAL RF DATA SHEET FOR FINAL ANTENNA SETTINGS.

NOTE:

REFER TO STRUCTURAL ANALYSIS BY: CROWN CASTLE DATED: APRIL 26, 2013, FOR THE CAPACITY OF THE EXISTING STRUCTURES TO SUPPORT THE PROPOSED EQUIPMENT.

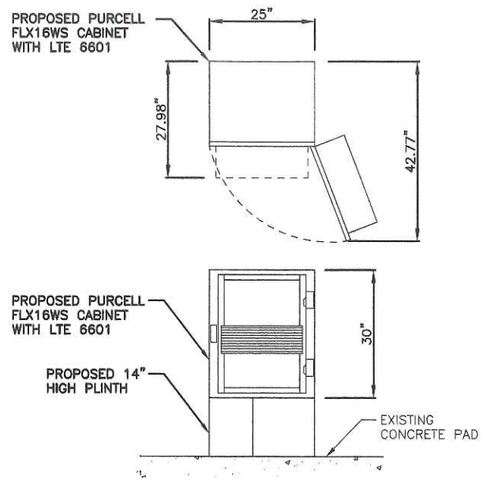
NOTE:
MOUNT PROPOSED EQUIPMENT PER MANUFACTURER'S SPECIFICATIONS



PROPOSED DC POWER PLANT DETAIL

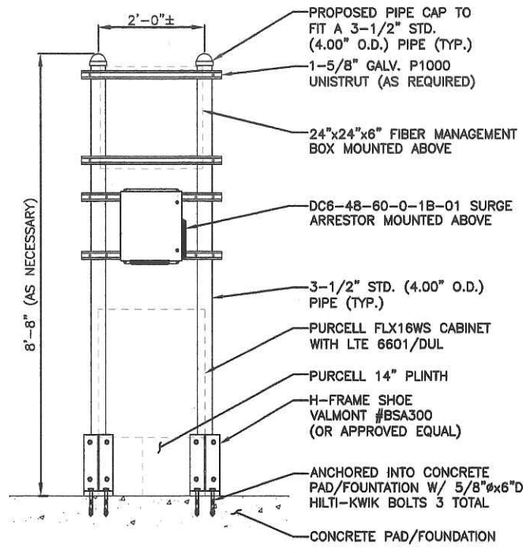
SCALE: N.T.S.

NOTE:
1. MOUNT PROPOSED EQUIPMENT PER MANUFACTURER'S SPECIFICATIONS
2. CONTRACTOR TO PROVIDE MOUNTING HARDWARE.



PROPOSED EQUIPMENT MOUNTING DETAIL

SCALE: N.T.S.



PROPOSED EQUIPMENT MOUNTING DETAIL

SCALE: N.T.S.

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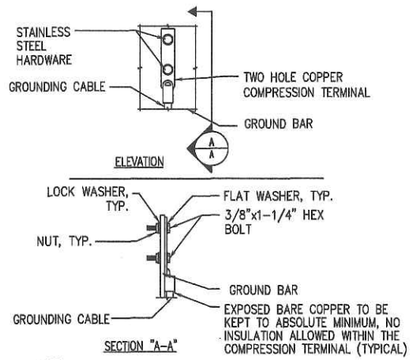
STATE OF CONNECTICUT · DANIEL P. HAMM · No. 24178 · LICENSED PROFESSIONAL ENGINEER

AT&T

DETAILS (LTE)

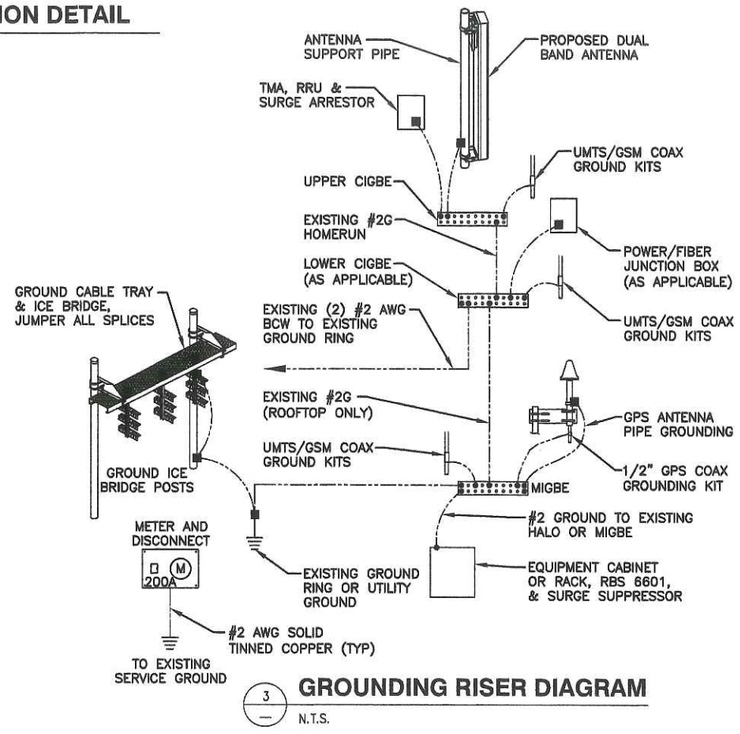
JOB NUMBER	DRAWING NUMBER	REV
5225.01	A-4	1



NOTE:
1. "DOUBLING UP" OR "STACKING " OF CONNECTION IS NOT PERMITTED.
2. OXIDE INHIBITING COMPOUND TO BE USED AT ALL LOCATIONS.
3. CADWELD DOWNLEADS FROM UPPER EGB, LOWER EGB, AND MGB.

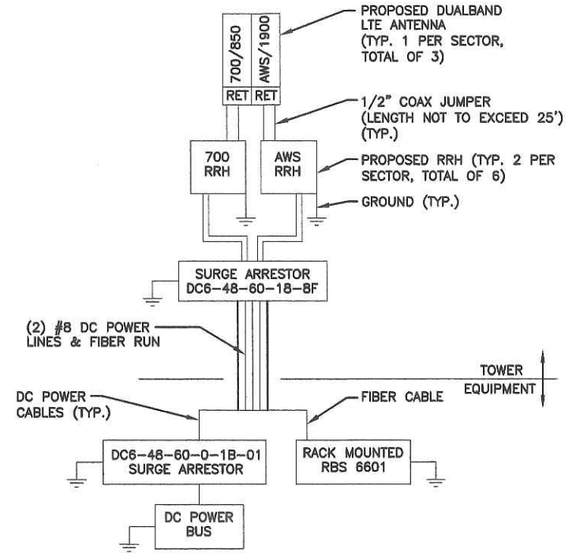
TYPICAL GROUND BAR CONNECTION DETAIL

1 — N.T.S.



GROUNDING RISER DIAGRAM

3 — N.T.S.



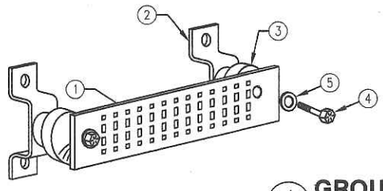
NOTE:

CONTRACTOR TO CONFIRM ALL PARTS & INSTALL ALL EQUIPMENT TO MANUFACTURER'S RECOMMENDATIONS.

LTE PLUMBING DIAGRAM

2 — N.T.S.

WIRELESS SOLUTIONS INC.			
NO.	REQ.	PART NO.	DESCRIPTION
1	1	HLGB-0420-IS	SOLID GND. BAR (20"x4"x1/4")
2	2	———	WALL MTG. BRKT.
3	2	———	INSULATORS
4	4	———	5/8"-11x1" H.H.C.S.
5	4	———	5/8 LOCKWASHER



EACH GROUND CONDUCTOR TERMINATING ON ANY GROUND BAR SHALL HAVE AN IDENTIFICATION TAG ATTACHED AT EACH END THAT WILL IDENTIFY ITS ORIGIN AND DESTINATION.

SECTION "P" - SURGE PRODUCERS

CABLE ENTRY PORTS (HATCH PLATES) (#2)
GENERATOR FRAMEWORK (IF AVAILABLE) (#2)
TELCO GROUND BAR
COMMERCIAL POWER COMMON NEUTRAL/GROUND BOND (#2)
+24V POWER SUPPLY RETURN BAR (#2)
-48V POWER SUPPLY RETURN BAR (#2)
RECTIFIER FRAMES.

SECTION "A" - SURGE ABSORBERS

INTERIOR GROUND RING (#2)
EXTERNAL EARTH GROUND FIELD (BURIED GROUND RING) (#2)
METALLIC COLD WATER PIPE (IF AVAILABLE) (#2)
BUILDING STEEL (IF AVAILABLE) (#2)

GROUND BAR DETAIL

4 — N.T.S.

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1600 OSGOOD STREET
BUILDING 20 NORTH, SUITE 3090
N. ANDOVER, MA 01845
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FAX: (978) 336-5586

Pinnacle Wireless
a UniTek GLOBAL SERVICES company
800 MARSHALL PHELPS ROAD UNIT# 2A
WINDSOR, CT 06095

SITE NUMBER: CT5225
SITE NAME: GROTON CENTRAL
CROWN CASTLE ID: 824359
741 FLANDERS ROAD
GROTON, CT 06355
NEW LONDON COUNTY

at&t
500 ENTERPRISE DRIVE, SUITE 3A
ROCKY HILL, CT 06067

NO.	DATE	REVISIONS	BY	CHK	APP'D
1	05/06/13	CONSTRUCTION REVISED	RS	DC	DPH
0	07/27/12	ISSUED FOR CONSTRUCTION	RS	DC	DPH

SCALE: AS SHOWN | DESIGNED BY: DC | DRAWN BY: RS

STATE OF CONNECTICUT — DANIEL P. HAMM — No. 21178 — LICENSED PROFESSIONAL ENGINEER

AT&T

GROUNDING DIAGRAM & GROUNDING DETAILS (LTE)

JOB NUMBER	DRAWING NUMBER	REV
5225.01	G-1	1

GROUNDING NOTES

1. THE SUBCONTRACTOR SHALL REVIEW AND INSPECT THE EXISTING FACILITY GROUNDING SYSTEM AND LIGHTNING PROTECTION SYSTEM (AS DESIGNED AND INSTALLED) FOR STRICT COMPLIANCE WITH THE NEC (AS ADOPTED BY THE AHJ), THE SITE-SPECIFIC (UL, LPI, OR NFPA) LIGHTING PROTECTION CODE, AND GENERAL COMPLIANCE WITH TELCORDIA AND TIA GROUNDING STANDARDS. THE SUBCONTRACTOR SHALL REPORT ANY VIOLATIONS OR ADVERSE FINDINGS TO THE CONTRACTOR FOR RESOLUTION.

2. ALL GROUND ELECTRODE SYSTEMS (INCLUDING TELECOMMUNICATION, RADIO, LIGHTNING PROTECTION, AND AC POWER GES'S) SHALL BE BONDED TOGETHER, AT OR BELOW GRADE, BY TWO OR MORE COPPER BONDING CONDUCTORS IN ACCORDANCE WITH THE NEC.

3. THE SUBCONTRACTOR SHALL PERFORM IEEE FALL-OF-POTENTIAL RESISTANCE TO EARTH TESTING (PER IEEE 1100 AND 81) FOR NEW GROUND ELECTRODE SYSTEMS. THE SUBCONTRACTOR SHALL FURNISH AND INSTALL SUPPLEMENTAL GROUND ELECTRODES AS NEEDED TO ACHIEVE A TEST RESULT OF 5 OHMS OR LESS.

4. METAL RACEWAY SHALL NOT BE USED AS THE NEC REQUIRED EQUIPMENT GROUND CONDUCTOR. STRANDED COPPER CONDUCTORS WITH GREEN INSULATION, SIZED IN ACCORDANCE WITH THE NEC, SHALL BE FURNISHED AND INSTALLED WITH THE POWER CIRCUITS TO BTS EQUIPMENT.

5. EACH BTS CABINET FRAME SHALL BE DIRECTLY CONNECTED TO THE MASTER GROUND BAR WITH GREEN INSULATED SUPPLEMENTAL EQUIPMENT GROUND WIRES, 6 AWG STRANDED COPPER OR LARGER FOR INDOOR BTS 2 AWG STRANDED COPPER FOR OUTDOOR BTS.

6. EXOTHERMIC WELDS SHALL BE USED FOR ALL GROUNDING CONNECTIONS BELOW GRADE.

7. APPROVED ANTIOXIDANT COATINGS (I.E., CONDUCTIVE GEL OR PASTE) SHALL BE USED ON ALL COMPRESSION AND BOLTED GROUND CONNECTIONS.

8. ICE BRIDGE BONDING CONDUCTORS SHALL BE EXOTHERMICALLY BONDED OR BOLTED TO THE BRIDGE AND THE TOWER GROUND BAR.

9. ALUMINUM CONDUCTOR OR COPPER CLAD STEEL CONDUCTOR SHALL NOT BE USED FOR GROUNDING CONNECTIONS.

10. MISCELLANEOUS ELECTRICAL AND NON-ELECTRICAL METAL BOXES, FRAMES AND SUPPORTS SHALL BE BONDED TO THE GROUND RING, IN ACCORDANCE WITH THE NEC.

11. METAL CONDUIT SHALL BE MADE ELECTRICALLY CONTINUOUS WITH LISTED BONDING FITTINGS OR BY BONDING ACROSS THE DISCONTINUITY WITH 6 AWS COPPER WIRE UL APPROVED GROUNDING TYPE CONDUIT CLAMPS.

12. ALL NEW STRUCTURES WITH A FOUNDATION AND/OR FOOTING HAVING 20 FT. OR MORE OF 1/2 IN. OR GREATER ELECTRICALLY CONDUCTIVE REINFORCING STEEL MUST HAVE IT BONDED TO THE GROUND RING USING AN EXOTHERMIC WELD CONNECTION USING #2 AWG SOLID BARE TINNED COPPER GROUND WIRE, PER NEC 250.50

GENERAL NOTES

1. FOR THE PURPOSE OF CONSTRUCTION DRAWING, THE FOLLOWING DEFINITIONS SHALL APPLY:
CONTRACTOR – PINNACLE WIRELESS
SUBCONTRACTOR – GENERAL CONTRACTOR (CONSTRUCTION)
OWNER – AT&T MOBILITY

2. PRIOR TO THE SUBMISSION OF BIDS, THE BIDDING SUBCONTRACTOR SHALL VISIT THE CELL SITE TO FAMILIARIZE WITH THE EXISTING CONDITIONS AND TO CONFIRM THAT THE WORK CAN BE ACCOMPLISHED AS SHOWN ON THE CONSTRUCTION DRAWINGS. ANY DISCREPANCY FOUND SHALL BE BROUGHT TO THE ATTENTION OF CONTRACTOR.

3. ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS, AND ORDINANCES. SUBCONTRACTOR SHALL ISSUE ALL APPROPRIATE NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS, AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY REGARDING THE PERFORMANCE OF THE WORK. ALL WORK CARRIED OUT SHALL COMPLY WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS AND LOCAL JURISDICTIONAL CODES, ORDINANCES AND APPLICABLE REGULATIONS.

4. DRAWINGS PROVIDED HERE ARE NOT TO BE SCALED AND ARE INTENDED TO SHOW OUTLINE ONLY.

5. UNLESS NOTED OTHERWISE, THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT, APPURTENANCES, AND LABOR NECESSARY TO COMPLETE ALL INSTALLATIONS AS INDICATED ON THE DRAWINGS.

6. "KITTING LIST" SUPPLIED WITH THE BID PACKAGE IDENTIFIES ITEMS THAT WILL BE SUPPLIED BY CONTRACTOR. ITEMS NOT INCLUDED IN THE BILL OF MATERIALS AND KITTING LIST SHALL BE SUPPLIED BY THE SUBCONTRACTOR.

7. THE SUBCONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.

8. IF THE SPECIFIED EQUIPMENT CANNOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE SUBCONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION SPACE FOR APPROVAL BY THE CONTRACTOR.

9. SUBCONTRACTOR SHALL DETERMINE ACTUAL ROUTING OF CONDUIT, POWER AND T1 CABLES, GROUNDING CABLES AS SHOWN ON THE POWER, GROUNDING AND TELCO PLAN DRAWING. SUBCONTRACTOR SHALL UTILIZE EXISTING TRAYS AND/OR SHALL ADD NEW TRAYS AS NECESSARY. SUBCONTRACTOR SHALL CONFIRM THE ACTUAL ROUTING WITH THE CONTRACTOR.

10. THE SUBCONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CURBS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT SUBCONTRACTOR'S EXPENSE TO THE SATISFACTION OF OWNER.

11. SUBCONTRACTOR SHALL LEGALLY AND PROPERLY DISPOSE OF ALL SCRAP MATERIALS SUCH AS COAXIAL CABLES AND OTHER ITEMS REMOVED FROM THE EXISTING FACILITY. ANTENNAS REMOVED SHALL BE RETURNED TO THE OWNER'S DESIGNATED LOCATION.

12. SUBCONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION.

13. ALL CONCRETE REPAIR WORK SHALL BE DONE IN ACCORDANCE WITH AMERICAN CONCRETE INSTITUTE (ACI) 301.

14. ANY NEW CONCRETE NEEDED FOR THE CONSTRUCTION SHALL BE AIR-ENTRAINED AND SHALL HAVE 4000 PSI STRENGTH AT 28 DAYS. ALL CONCRETE WORK SHALL BE DONE IN ACCORDANCE WITH ACI 318 CODE REQUIREMENTS.

15. ALL STRUCTURAL STEEL WORK SHALL BE DETAILED, FABRICATED AND ERECTED IN ACCORDANCE WITH AISC SPECIFICATIONS. ALL STRUCTURAL STEEL SHALL BE ASTM A36 (Fy = 36 ksi) UNLESS OTHERWISE NOTED. PIPES SHALL BE ASTM A53 TYPE E (Fy = 36 ksi). ALL STEEL EXPOSED TO WEATHER SHALL BE HOT DIPPED GALVANIZED. TOUCHUP ALL SCRATCHES AND OTHER MARKS IN THE FIELD AFTER STEEL IS ERECTED USING A COMPATIBLE ZINC RICH PAINT.

16. CONSTRUCTION SHALL COMPLY WITH UMTS SPECIFICATIONS AND "GENERAL CONSTRUCTION SERVICES FOR CONSTRUCTION OF AT&T MOBILITY SITES."

17. SUBCONTRACTOR SHALL VERIFY ALL EXISTING DIMENSIONS AND CONDITIONS PRIOR TO COMMENCING ANY WORK. ALL DIMENSIONS OF EXISTING CONSTRUCTION SHOWN ON THE DRAWINGS MUST BE VERIFIED. SUBCONTRACTOR SHALL NOTIFY THE CONTRACTOR OF ANY DISCREPANCIES PRIOR TO ORDERING MATERIAL OR PROCEEDING WITH CONSTRUCTION.

18. THE EXISTING CELL SITE IS IN FULL COMMERCIAL OPERATION. ANY CONSTRUCTION WORK BY SUBCONTRACTOR SHALL NOT DISRUPT THE EXISTING NORMAL OPERATION. ANY WORK ON EXISTING EQUIPMENT MUST BE COORDINATED WITH CONTRACTOR. ALSO, WORK SHOULD BE SCHEDULED FOR AN APPROPRIATE MAINTENANCE WINDOW USUALLY IN LOW TRAFFIC PERIODS AFTER MIDNIGHT.

19. SINCE THE CELL SITE IS ACTIVE, ALL SAFETY PRECAUTIONS MUST BE TAKEN WHEN WORKING AROUND HIGH LEVELS OF ELECTROMAGNETIC RADIATION. EQUIPMENT SHOULD BE SHUTDOWN PRIOR TO PERFORMING ANY WORK THAT COULD EXPOSE THE WORKERS TO DANGER. PERSONAL RF EXPOSURE MONITORS ARE ADVISED TO BE WORN TO ALERT OF ANY DANGEROUS EXPOSURE LEVELS.

20. APPLICABLE BUILDING CODES:
SUBCONTRACTOR'S WORK SHALL COMPLY WITH ALL APPLICABLE NATIONAL, STATE, AND LOCAL CODES AS ADOPTED BY THE LOCAL AUTHORITY HAVING JURISDICTION (AHJ) FOR THE LOCATION. THE EDITION OF THE AHJ ADOPTED CODES AND STANDARDS IN EFFECT ON THE DATE OF CONTRACT AWARD SHALL GOVERN THE DESIGN.
BUILDING CODE: 2003 IBC WITH 2005 CT SUPPLEMENT & 2009 CT AMENDMENTS
ELECTRICAL CODE: REFER TO ELECTRICAL DRAWINGS
LIGHTENING CODE: REFER TO ELECTRICAL DRAWINGS

SUBCONTRACTOR'S WORK SHALL COMPLY WITH THE LATEST EDITION OF THE FOLLOWING STANDARDS:

AMERICAN CONCRETE INSTITUTE (ACI) 318; BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE;

AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC)

MANUAL OF STEEL CONSTRUCTION, ASD, NINTH EDITION;

TELECOMMUNICATIONS INDUSTRY ASSOCIATION (TIA) 222-F, STRUCTURAL STANDARDS FOR STEEL

ANTENNA TOWER AND ANTENNA SUPPORTING STRUCTURES; REFER TO ELECTRICAL DRAWINGS FOR SPECIFIC ELECTRICAL STANDARDS.

FOR ANY CONFLICTS BETWEEN SECTIONS OF LISTED CODES AND STANDARDS REGARDING MATERIAL, METHODS OF CONSTRUCTION, OR OTHER REQUIREMENTS, THE MOST RESTRICTIVE REQUIREMENT SHALL GOVERN. WHERE THERE IS CONFLICT BETWEEN A GENERAL REQUIREMENT AND A SPECIFIC REQUIREMENT, THE SPECIFIC REQUIREMENT SHALL GOVERN.

ABBREVIATIONS

AGL	ABOVE GRADE LEVEL	G.C.	GENERAL CONTRACTOR	RF	RADIO FREQUENCY
AWG	AMERICAN WIRE GAUGE	MGB	MASTER GROUND BUS		
BCW	BARE COPPER WIRE	MIN	MINIMUM	TBD	TO BE DETERMINED
BTS	BASE TRANSCEIVER STATION	PROPOSED	NEW	TBR	TO BE REMOVED
EXISTING	EXISTING	N.T.S.	NOT TO SCALE	TBRR	TO BE REMOVED AND REPLACED
EG	EQUIPMENT GROUND	REF	REFERENCE		
EGR	EQUIPMENT GROUND RING	REQ	REQUIRED	TYP	TYPICAL

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GENERAL NOTES (LTE)

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