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January 29, 2015

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

Regarding:	Notice of Exempt Modification – Addition of 3 radio heads previously approved
Property Address:	699 Old Main Street, Rocky Hill, CT (the "Property")
Applicant:	AT&T Mobility ("AT&T")

Dear Ms. Bachman:

AT&T currently maintains a wireless telecommunications facility on an existing 148.5 monopole tower ("tower") location on the Property. AT&T's facility consists of nine (9) wireless telecommunications antenna at 105 feet. The tower is controlled by T-Mobile. The Council approved the previous application on September 7, 2012 reference number EM-AT&T-119-120820. This application (attached) granted AT&T the use of 6 radio heads at this location. The approval expired one year from the issue date. During that time AT&T made the changes to the site per the approval but only installed three (3) of the six (6) radio heads that they received approval. AT&T would now like to install the additional three(3) radio heads that were originally approved under EM-AT&T-119-120820.

Please accept this application as notification pursuant to R.C.S.A. § 16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72 (b)(2). In accordance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to the Mayor, Town Manager, and the Director of Planner for the Town of Rocky Hill. A copy of this letter is also being sent to AT&T Towers, the owner of the structure that AT&T is located.

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

1. The planned modifications will not result in an increase in the height of the existing structure. AT&T's additional, previously approved 3 radio heads will be installed at 105 foot level of the 148.5 foot monopole.
2. The proposed modifications will not involve any changes to ground-mounted equipment and, therefore will not require an extension of the site boundary.
3. The proposed modification will not increase the noise level at the facility by six decibel or more, or to levels that exceed state and local criteria.
4. The operation of the modified facility will not increase radio frequency (RF) emissions at the facility to a level at or above the Federal Communications Commission (FCC) safety

16 Esquire Road, Billerica, MA 01862 Mobile 617-639-4908 Email: Dcooper@empiretelecomm.com

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standard. An RF emissions calculation (attached) for AT&T's modified facility was provided in the application which led to the September 7, 2012 Decision.

5. The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site.
6. The tower and its foundation can support AT&T's proposed modifications. (Please see attached Structural analysis completed by Tower Engineering Professionals dated July 10, 2012).

For the foregoing reasons AT&T respectfully requests that the proposed addition of 3 radio heads previously approved be allowed within the exempt modifications under R.C.S.A. § 16-50j-72(b)(2).

Sincerely,

David P. Cooper

David P. Cooper
Director of Site Acquisition
Empire Telecom

CC: Henry Vasel, Mayor, Town of Rocky Hill
Guy Scaife, Town Manager, Town of Rocky Hill
Kimberly Ricci, Director of Planning, Town of Rocky Hill
American Tower Corporation

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CT 1039

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

September 7, 2012

Theresa Ranciato-Viele
Nexlink Global Services
55 Lynn Road
Ivoryton, CT 06442

RE: **EM-AT&T-119-120820** – AT&T Mobility notice of intent to modify an existing telecommunications facility located at 699 Old Main Street, Rocky Hill, Connecticut.

Dear Ms. Ranciato-Viele:

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

- Tower reinforcements identified in Appendix D – Structural Modification Drawings be implemented in accordance with the recommendations made in the Structural Modification Analysis Report prepared by Tower Engineering Professionals dated July 10, 2012 , and stamped by Andrew Haldane; and
- Prior to antenna installation, a signed letter from a Professional Engineer duly licensed in the State of Connecticut shall be submitted to the Council to certify that the recommended modifications have been completed and the tower and foundation will not exceed 100 percent of the post-construction structural rating; and
- AT&T shall submit to the Council a Radio Frequency Exposure Report with field measurements taken in the vicinity of this facility within three months after the installation described in this notice of exempt modification has been completed.
- Any deviation from the proposed modification as specified in this notice and supporting materials with Council shall render this acknowledgement invalid;
- Any material changes to this modification as proposed shall require the filing of a new notice with the Council;
- Not less than 45 days after completion of construction, the Council shall be notified in writing that construction has been completed;
- The validity of this action shall expire one year from the date of this letter; and
- The applicant may file a request for an extension of time beyond the one year deadline provided that such request is submitted to the Council not less than 60 days prior to the expiration;

The proposed modifications including the placement of all necessary equipment and shelters within the tower compound are to be implemented as specified here and in your notice dated August 20, 2012. The modifications are in compliance with the exception criteria in Section 16-50j-72 (b) of the Regulations of Connecticut State Agencies as changes to an existing facility site that would not increase tower height, extend the boundaries of the tower site, increase noise levels at the tower site boundary by six decibels, and increase the total radio frequencies

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

August 20, 2012

The Honorable Anthony P. LaRosa
Mayor
Town of Rocky Hill
P. O. Box 657
Rocky Hill, CT 06067

RE: **EM-AT&T-119-120820** – AT&T Mobility notice of intent to modify an existing telecommunications facility located at 699 Old Main Street, Rocky Hill, Connecticut.

Dear Mayor LaRosa:

The Connecticut Siting Council (Council) received this request to modify an existing telecommunications facility, pursuant to Regulations of Connecticut State Agencies Section 16-50j-72.

If you have any questions or comments regarding this proposal, please call me or inform the Council by September 3, 2012.

Thank you for your cooperation and consideration.

Very truly yours,

Linda Roberts
Executive Director

LR/cm

Enclosure: Notice of Intent

c: Barbara Gilbert, Town Manager, Town of Rocky Hill
Kimberly Ricci, Director of Planning, Town of Rocky Hill

EM-AT&T-119-120820

NEXLINK GLOBAL SERVICES

August 20, 2012

RECEIVED
AUG 20 2012
CONNECTICUT SITING COUNCIL

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

Re: AT&T Mobility – Notice of Exempt Modification
699 Old Main Street, Rocky Hill, CT 06067

Dear Ms. Roberts:

This letter and attachments are submitted on behalf of AT&T Mobility ("AT&T"). AT&T is enhancing the capabilities of its wireless system in Connecticut by implementing LTE Technology. In order to do so, AT&T will modify antenna and equipment configurations at a number of existing 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 attachment is being sent to the Mayor of Rocky Hill.

AT&T plans to modify the existing facility at 699 Old Main Street owned by T-Mobile (coordinates 41° 39′ 57.99" N. -72°38′ 15.99′′ W). Attached are drawings depicting the planned changes, and documentation of the structural sufficiency of the tower to accommodate the revised antenna configuration. Also, included are a power density calculation reflecting the modification to AT&T's operations at the site.

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

1. The height of the overall structure will be unaffected. Both AT&T's existing and proposed antennas will be located at an approximate center line of 105′ AGL on the approximately 150′ tower. The existing antennas will remain and be rotated to match new LTE azimuths (2/sector). AT&T will add three (3) new antennas and six (6) new RRH's. The existing and proposed equipment will be pipe mounted. Additionally, AT&T will install one (1) surge arrestor at 105′ AGL, and one (1) fiber cable and two (2) DC control cables. One (1) GPS LTE antenna will be mounted to existing shelter.

2. The proposed changes will not extend the site boundaries. AT&T will install one additional cabinet in the existing shelter. Thus, there will be no effect on the site compound.

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

4. The changes to the facility will not increase the calculated "worst case" power density for the combined operations at the site to a level at or above the applicable standard for uncontrolled environments as calculated for a mixed frequency site. As indicated in the attached power density calculations, AT&T's operations at the site will result in a power density of 3.97%; the combined site operations will result in a total power density of 76.72%.

Please feel free to call me with any questions or concerns regarding this matter. Thank you for your cooperation.

Respectfully submitted,
AT&T Mobility

By: _____

Theresa Ranciato-Viele
tviele@hotmail.com
(203) 606-5127

cc: Honorable Anthony LaRosa, Mayor, Town of Rocky Hill

Attachments

December 4, 2014

Mr. Timothy Howell
Crown Castle
3530 Toringdon Way Suite 300
Charlotte, NC 28277
(980) 209-8242

B+T Group
1717 S. Boulder, Suite 300
Tulsa, OK 74119
(918) 587-4630
ModDwgs@btgrp.com

Subject:	**Structural Modification Report**	
Carrier Designation:	***T-Mobile* Co-Locate**	
	Carrier Site Number:	CT11427A
	Carrier Site Name:	Rocky Hill/Rt 3/ Rt 160
Crown Castle Designation:	**Crown Castle BU Number:**	842872
	Crown Castle Site Name:	Rocky Hill
	Crown Castle JDE Job Number:	311750
	Crown Castle Work Order Number:	967052
	Crown Castle Application Number:	269932 Rev. 1
Engineering Firm Designation:	**B+T Group Project Number:**	95171.003.01
Site Data:	**52 New Britain Avenue, Rocky Hill, CT, Hartford County**	
	Latitude *41° 39' 36.89"*, Longitude *-72° 40' 50.58"*	
	182 Foot - Monopole	

Dear Mr. Howell,

B+T Group is pleased to submit this **"Structural Modification 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 729924, in accordance with application 269932, revision 1.

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:

LC4.7: TSA specified load case with proposed modifications **Sufficient Capacity**
Note: See Table 1 and Table 2 for the proposed and existing/reserved loading, respectively.

The analysis has been performed in accordance with the TIA/EIA-222-F standard and 2005 CT State Building Code based upon a wind speed of 80 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 *B+T Group* 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.

Respectfully submitted by:
B+T Engineering, Inc.

Braden Tabb, E.I.
Project Engineer

Chad E. Tuttle, P.E.
President

tnxTower Report - version 6.1.4.1

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1) INTRODUCTION

This tower is a 182 ft. Monopole designed by Engineered Endeavors, Inc. in September of 1999. The tower was originally designed for a wind speed of 85 mph per TIA/EIA-222-F. This tower has been modified by B+T Group in June and May of 2013 and 2014 and those modifications are incorporated in this analysis.

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 80 mph with no ice, 37.6 mph with 1 inch ice thickness and 50 mph under service loads.

Table 1 - Proposed Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
160.0	160.0	3	Commscope	LNX-6515DS-VTM	--	--	--
		3	Ericsson	RRUS 11 B12			

Table 2 - Existing and Reserved Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
180.0	191.0	1	Austin Antenna Company	APC-1362	7	7/8	1
		1	Austin Antenna Company	APC-2163			
		1	Austin Antenna Company	APC-301			
		1	Austin Antenna Company	APC-4065			
		2	RFS Celwave	PD458-3			
	180.0	1	--	Side Arm Mount [SO 702-3]			
	175.0	1	Telewave	ANT450D6-9			
	178.0	2	Radiowaves	HPD2-4.7	4	7/8	2
170.0	170.0	1	--	Platform Mount [LP 712-1]	12	1-5/8	1
	168.0	6	Ericsson	RRUS-11			
		3	KMW Comm.	AM-X-CD-16-65-00T-RET			
		3	Powerwave Tech.	7770.00			
		6	Powerwave Tech.	LGP21401			
		1	Raycap	DC6-48-60-18-8CF			
		3	**EMS Wireless**	**RR90-17-02DP**	--	--	**3**
160.0	160.0	3	Ericsson	ERICSSON AIR 21 B2A B4P	12	1-5/8	1
		3	Ericsson	ERICSSON AIR 21 B4A B2P	1	1-1/4	
		3	RFS Celwave	ATMAA1412D-1A20			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
		1	--	Platform Mount [LP 305-1]			
	144.0	2	Andrew	VHLP2.5-10W			
		2	Dragonwave	Horizon Compact			
		3	Kathrein	840 10054			
		3	Samsung Telecomm.	URAS-FLEXIBLE			
		3	Alcatel Lucent	1900MHz RRH	4	1/2	1
140.0	140.0	3	Alcatel Lucent	800 EXTERNAL NOTCH FILTER	3	1-1/4	
		3	Alcatel Lucent	800MHZ RRH			
		3	RFS Celwave	APXVSPP18-C-A20			
		1	--	Platform Mount [LP 1201-1]			
		3	Alcatel Lucent	TD-RRH8x20-25	1	1-1/4	2
		3	RFS Celwave	APXVTM14-C-120			
		3	Alcatel Lucent	RRH2X60-AWS			
		3	Alcatel Lucent	RRH2X60-PCS			
		6	Andrew	HBXX-6517DS-A2M	2	1-5/8	2
		3	Antel	BXA-70080-4BF-EDIN-0			
88.0	90.0	2	RFS Celwave	DB-T1-6Z-8AB-0Z			
		1	Andrew	LNX-6514DS-T6M			
		2	Antel	BXA-70063-6CF-EDIN-4	12	1-5/8	1
		6	RFS	FD9R6004/2C-3L			
	88.0	1	--	Platform Mount [LP 1201-1]			
		1	GPS	GPS_A			
75.0	75.0	1	--	Side Arm Mount [SO 701-1]	1	1/2	1

Notes:
1) Existing Equipment
2) Reserved Equipment
3) **Equipment To Be Removed**

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)
180	180	6	Cellwave	Omni ANT.	--	--
		1	Generic	T-Mounts		
170	170	12	Allgon	7184.15	--	--
		1	Generic	STD. Platform		
160	160	12	Allgon	7184.15	--	--
		1	Generic	STD. Platform		
150	150	12	Allgon	7184.15	--	--
		1	Generic	STD. Platform		

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
Online Application	T-Mobile Co-Locate Rev. 1	269932	CCIsites
Tower Manufacturer Drawing	EEI, Job No. 5554	4844402	CCIsites
Tower Modification Drawing	B+T Group, Project No. 84502.004.01	4904956	CCIsites
Post Modification inspection	B+T Group, Project No. 84502.007.01	4904967	CCIsites
Tower Modification Drawing	B+T Group, Project No. 84446.002	4740398	CCIsites
Foundation Mapping	TEP, Project No. 131650	4713252	CCIsites
Geotech Report	TEP, Project No. 131650.10	4713251	CCIsites
Antenna Configuration	Failing SA by B+T Group, Project No. 95171.002.01	5366165	CCIsites

3.1) Analysis Method

tnxTower (version 6.1.4.1), 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) Mount areas and weights are assumed based on photographs provided.

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

4) ANALYSIS RESULTS

Table 5 - Section Capacity (Summary) - LC4.7

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	182 - 133.08	Pole	TP26.02x14.5x0.25	1	-9.677	--	80.5	Pass[1]
L2	133.08 - 87.46	Pole	TP36.15x24.616x0.375	2	-17.157	--	89.7	Pass[1]
L3	87.46 - 85	Pole	TP35.97x34.213x0.554	3	-22.750	--	82.8	Pass[1]
L4	85 - 74	Pole	TP38.529x35.97x0.704	4	-26.972	--	69.8	Pass[1]
L5	74 - 57.25	Pole	TP42.426x38.529x0.669	5	-33.444	--	77.0	Pass[1]
L6	57.25 - 42.88	Pole	TP45.77x42.426x0.709	6	-36.736	--	74.1	Pass[1]
L7	42.88 - 32.25	Pole	TP47.494x43.566x0.618	7	-44.924	--	87.7	Pass[1]
L8	32.25 - 0	Pole	TP55x47.494x0.567	8	-57.340	--	93.4	Pass[1]
							Summary	
						Pole (L8)	93.4	Pass[1]
						Rating =	93.4	Pass[1]

Table 6 - Tower Component Stresses vs. Capacity - LC4.7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	Base	89.6	Pass
1	Base Plate	Base	75.3	Pass
1	Base Foundation	Base	87.2	Pass

Structure Rating (max from all components) =	93.4%

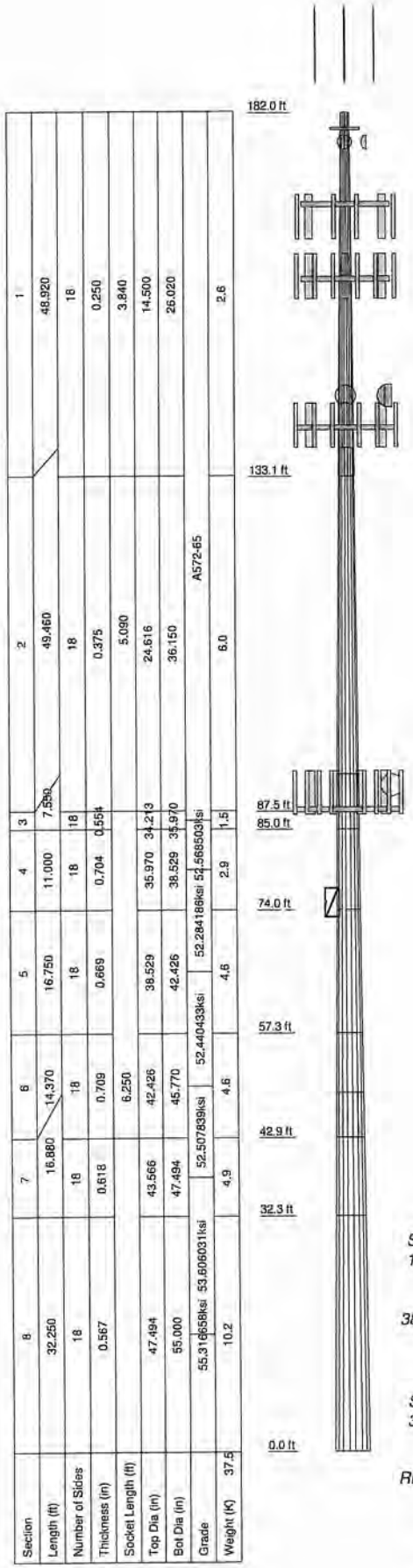
Notes:
1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity consumed.

4.1) Recommendations

1) All modifications proposed in this report shall be installed in accordance with the attached drawings (Appendix D) for the determined available structural capacity to be effective.

APPENDIX A

tnxTOWER OUTPUT



Section	8	7	6	5	4	3	2	1
Length (ft)	32.250	16.880	14.370	16.750	11.000	7.500	49.460	48.920
Number of Sides	18	18	18	18	18	18	18	18
Thickness (in)	0.567	0.618	0.709	0.669	0.704	0.554	0.375	0.250
Socket Length (ft)			6.250				5.090	3.840
Top Dia (in)	47.494	43.566	42.426	38.529	35.970	34.213	24.616	14.500
Bot Dia (in)	55.000	47.494	45.770	42.426	38.529	35.970	36.150	26.020
Grade	55.316658ksi	53.606031ksi	52.507839ksi	52.440433ksi	52.284186ksi	54.568503ksi	A572-65	
Weight (K)	10.2	4.9	4.6	4.6	2.9	1.5	6.0	2.6

Total Weight: 37.5

MATERIAL STRENGTH

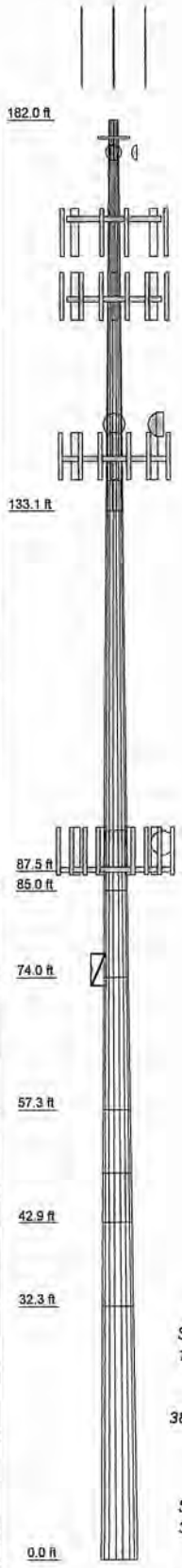
GRADE	Fy	Fu	GRADE	Fy	Fu
A572-65	65 ksi	80 ksi	52.507839ksi	53 ksi	68 ksi
52.568503ksi	53 ksi	68 ksi	53.606031ksi	54 ksi	69 ksi
52.284186ksi	52 ksi	67 ksi	55.316658ksi	55 ksi	70 ksi
52.440433ksi	52 ksi	67 ksi			

TOWER DESIGN NOTES

1. Tower is located in Hartford County, Connecticut.
2. Tower designed for a 80 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 38 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 93.4%

B+T Group
1717 S. Boulder, Suit 300
Tulsa, OK 74119
Phone: (918) 587-4630
FAX: (918) 295-0265
B+T GRP
Consulting Engineers

Job: 95171.003.01- Rocky Hill,CT (BU# 842872)			
Project:			
Client: Crown Castle	Drawn by: Nagabharana Nayak	App'd:	
Code: TIA/EIA-222-F	Date: 11/19/14	Scale: NTS	
Path:		Dwg No. E-1	



Section	8	7	6	5	4	3	2	1
Length (ft)	32.250	16.880	14.370	16.750	11.000	7.500	49.460	48.920
Number of Sides	18	18	18	18	18	18	18	18
Thickness (in)	0.567	0.618	0.709	0.869	0.704	0.554	0.375	0.250
Socket Length (ft)			6.250				5.090	3.840
Top Dia (in)	47.494	43.566	42.426	38.529	35.970	34.213	24.616	14.500
Bot Dia (in)	55.000	47.494	45.770	42.426	38.529	36.970	36.150	26.020
Grade	55.316658ksi	52.507839ksi	52.440433ksi	52.284186ksi	52.568503ksi	A572-65	A572-65	A572-65
Weight (K)	10.2	4.9	4.6	4.6	2.9	1.5	6.0	2.6

AXIAL
86 K

SHEAR
12 K

M
14

TORQUE 1 kip-ft
38 mph WIND - 1.000 in

AXIAL
57 K

SHEAR
38 K

M
44

TORQUE 3 kip-ft
REACTIONS - 80 mph W

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
PD458-3 (E)	180	800 EXTERNAL NOTCH FILTER (E)	140
PD458-3 (E)	180	800MHZ RRH (E)	140
APC-301 (E)	180	800MHZ RRH (E)	140
APC-2163 (E)	180	800MHZ RRH (E)	140
APC-1362 (E)	180	840 10054 w/ Mount Pipe (E-Clearwire)	140
APC-4065 (E)	180	840 10054 w/ Mount Pipe (E-Clearwire)	140
ANT450D6-9 (E)	180	840 10054 w/ Mount Pipe (E-Clearwire)	140
(2) 6' x 2" Mount Pipe (E)	180	Horizon Compact (E-Clearwire)	140
(2) 6' x 2" Mount Pipe (E)	180	Horizon Compact (E-Clearwire)	140
(2) 6' x 2" Mount Pipe (E)	180	URAS-FLEXIBLE (E-Clearwire)	140
Side Arm Mount [SO 702-3] (E)	180	URAS-FLEXIBLE (E-Clearwire)	140
HPD2-4.7 (R)	180	URAS-FLEXIBLE (E-Clearwire)	140
HPD2-4.7 (R)	180	APXVTM14-C-120 w/ Mount Pipe (R)	140
7770.00 w/ Mount Pipe (E)	170	APXVTM14-C-120 w/ Mount Pipe (R)	140
AM-X-CD-16-65-00T-RET w/ Mount Pipe (E)	170	APXVTM14-C-120 w/ Mount Pipe (R)	140
AM-X-CD-16-65-00T-RET w/ Mount Pipe (E)	170	TD-RRH8x20-25 (R)	140
AM-X-CD-16-65-00T-RET w/ Mount Pipe (E)	170	TD-RRH8x20-25 (R)	140
(2) LGP21401 (E)	170	TD-RRH8x20-25 (R)	140
(2) LGP21401 (E)	170	Platform Mount [LP 1201-1] (E)	140
(2) LGP21401 (E)	170	APXVSPP18-C-A20 w/ Mount Pipe (E)	140
(2) RRUS-11 (E)	170	APXVSPP18-C-A20 w/ Mount Pipe (E)	140
(2) RRUS-11 (E)	170	VHLP2.5-10W (E-Clerwire)	140
(2) RRUS-11 (E)	170	VHLP2.5-10W (E-Clerwire)	140
DC6-48-60-18-8CF (E)	170	(2) FD9R6004/2C-3L (E)	88
6' x 2" Mount Pipe (E)	170	(2) FD9R6004/2C-3L (E)	88
6' x 2" Mount Pipe (E)	170	BXA-70080-4BF-EDIN-0 w/ Mount Pipe (R)	88
6' x 2" Mount Pipe (E)	170	BXA-70080-4BF-EDIN-0 w/ Mount Pipe (R)	88
Platform Mount [LP 712-1] (E)	170	BXA-70080-4BF-EDIN-0 w/ Mount Pipe (R)	88
7770.00 w/ Mount Pipe (E)	170	(2) HBXX-6517DS-A2M w/ Mount Pipe (R)	88
7770.00 w/ Mount Pipe (E)	170	(2) HBXX-6517DS-A2M w/ Mount Pipe (R)	88
ERICSSON AIR 21 B4A B2P w/ Mount Pipe (E)	160	(2) HBXX-6517DS-A2M w/ Mount Pipe (R)	88
ERICSSON AIR 21 B2A B4P w/ Mount Pipe (E)	160	DB-T1-6Z-8AB-0Z (R)	88
ERICSSON AIR 21 B2A B4P w/ Mount Pipe (E)	160	DB-T1-6Z-8AB-0Z (R)	88
ERICSSON AIR 21 B2A B4P w/ Mount Pipe (E)	160	RRH2X60-AWS (R)	88
ATMAA1412D-1A20 (E)	160	RRH2X60-AWS (R)	88
ATMAA1412D-1A20 (E)	160	RRH2X60-AWS (R)	88
ATMAA1412D-1A20 (E)	160	RRH2X60-PCS (R)	88
LNX-6515DS-VTM w/ Mount Pipe (P)	160	RRH2X60-PCS (R)	88
LNX-6515DS-VTM w/ Mount Pipe (P)	160	RRH2X60-PCS (R)	88
LNX-6515DS-VTM w/ Mount Pipe (P)	160	Platform Mount [LP 1201-1] (E)	88
RRUS 11 B12 (P)	160	BXA-70063-6CF-EDIN-4 w/ Mount Pipe (E)	88
RRUS 11 B12 (P)	160	BXA-70063-6CF-EDIN-4 w/ Mount Pipe (E)	88
RRUS 11 B12 (P)	160	LNX-6514DS-T6M w/ Mount Pipe (E)	88
Platform Mount [LP 305-1] (E)	160	(2) FD9R6004/2C-3L (E)	88
ERICSSON AIR 21 B4A B2P w/ Mount Pipe (E)	160	GPS_A (E)	75
ERICSSON AIR 21 B4A B2P w/ Mount Pipe (E)	160	Side Arm Mount [SO 701-1] (E)	75
APXVSPP18-C-A20 w/ Mount Pipe (E)	140		
1900MHz RRH (E)	140		
1900MHz RRH (E)	140		
1900MHz RRH (E)	140		
800 EXTERNAL NOTCH FILTER (E)	140		
800 EXTERNAL NOTCH FILTER (E)	140		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-65	65 ksi	80 ksi	52.507839ksi	53 ksi	68 ksi
52.568503ksi	53 ksi	68 ksi	53.606031ksi	54 ksi	69 ksi
52.284186ksi	52 ksi	67 ksi	55.316658ksi	55 ksi	70 ksi
52.440433ksi	52 ksi	67 ksi			

TOWER DESIGN NOTES

1. Tower is located in Hartford County, Connecticut.
2. Tower designed for a 80 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 38 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based on a 50 mph wind.

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B+T Group
Consulting Engineers

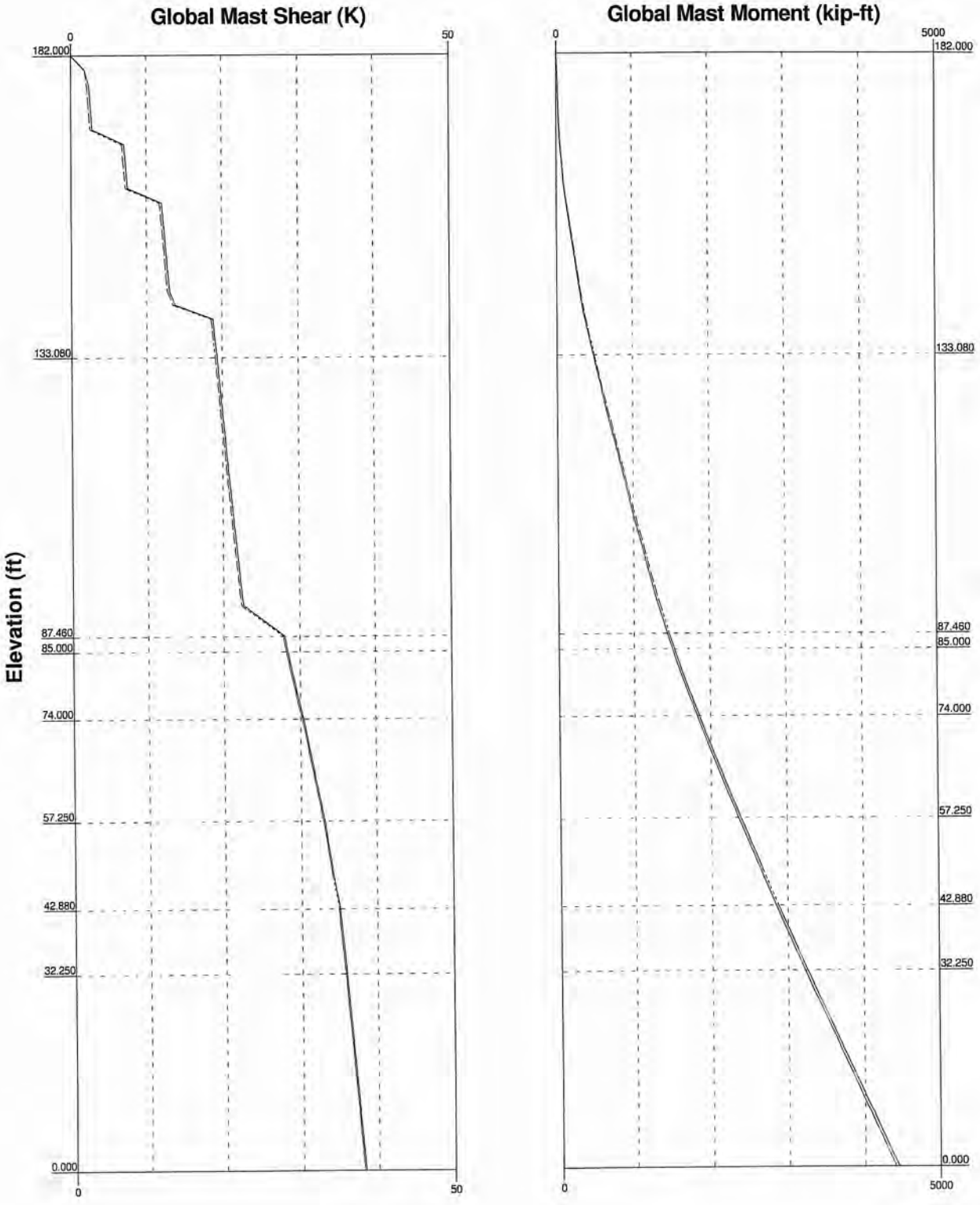
Job: 95171.003.01- Rocky Hill,CT (BU# 842872)			
Project:			
Client: Crown Castle	Drawn by: Nagabharana Nayak	App'd:	
Code: TIA/EIA-222-F	Date: 11/19/14	Scale: NTS	
Path:		Dwg No. E-1	

TIA/EIA-222-F - 80 mph/38 mph 1.000 in Ice

Vx ····· Vz

Maximum Values

Mx ····· Mz



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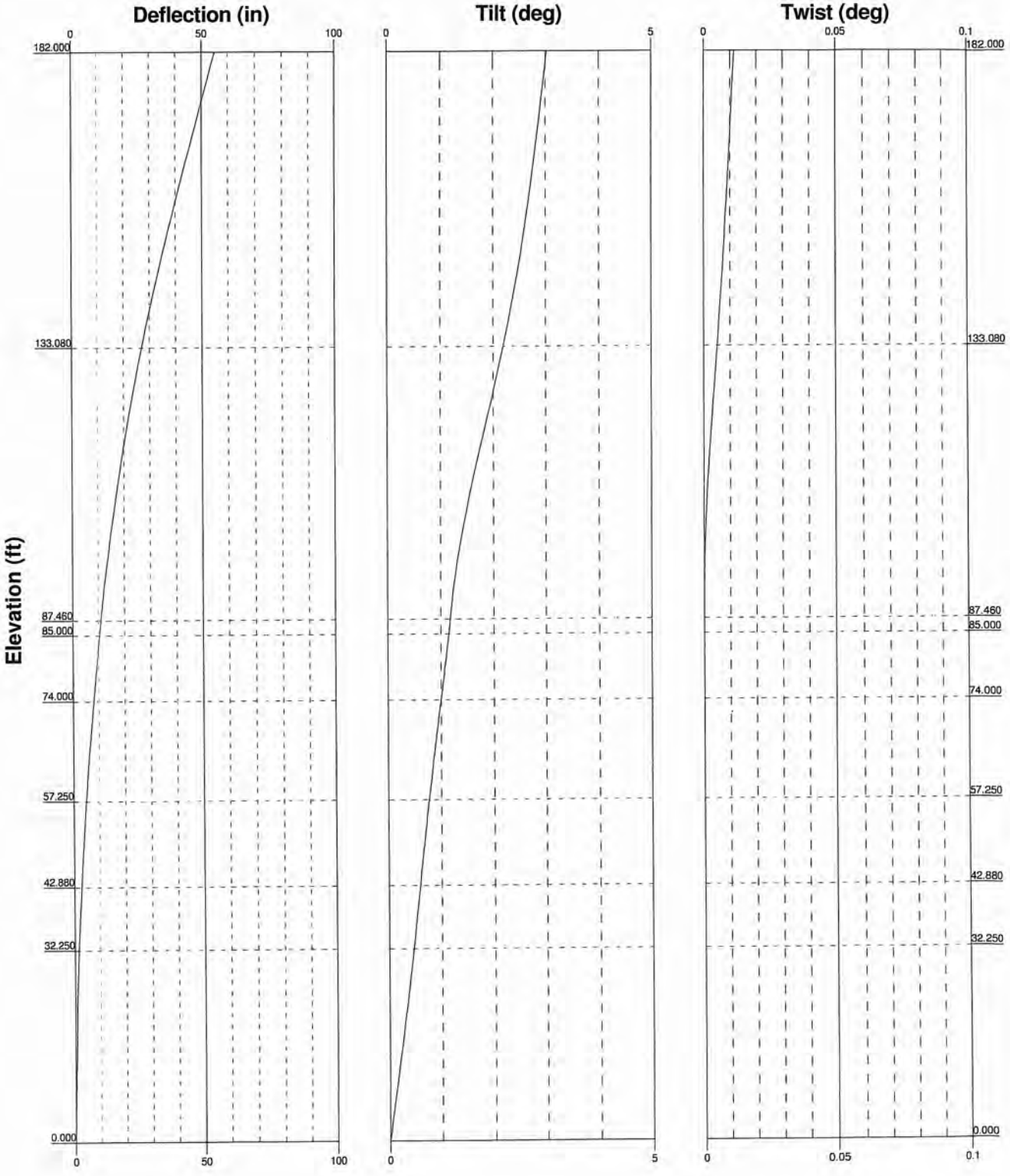
Job: *95171.003.01- Rocky Hill,CT (BU# 842872)*			
Project:			
Client: Crown Castle	Drawn by: Nagabharana Nayak	App'd:	
Code: TIA/EIA-222-F	Date: 11/19/14	Scale: NTS	
Path:		Dwg No. E-4	

TIA/EIA-222-F - Service - 50 mph

Maximum Values



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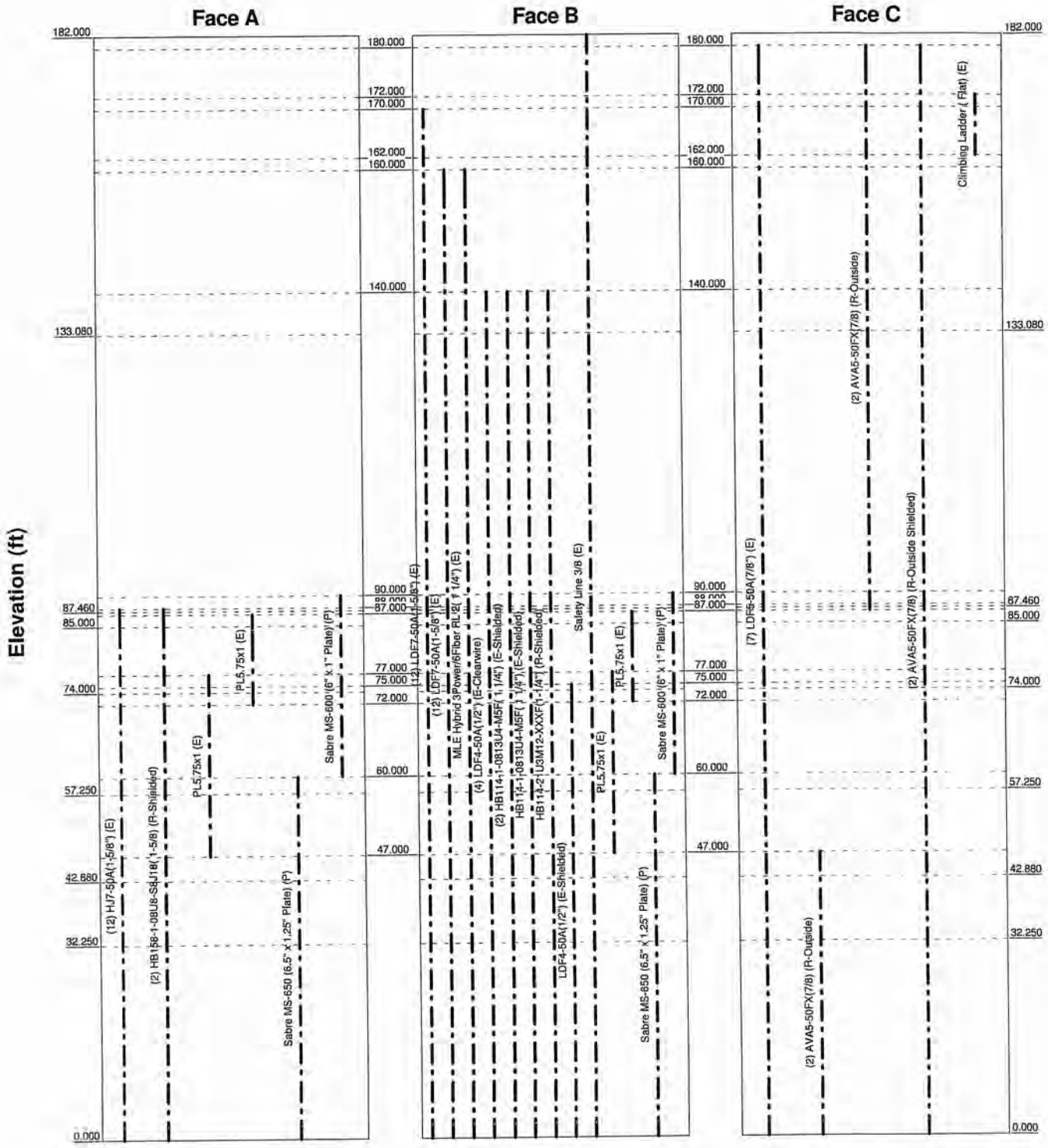
Job: *95171.003.01- Rocky Hill,CT (BU# 842872)*			
Project:			
Client: Crown Castle	Drawn by: Nagabharana Nayak	App'd:	
Code: TIA/EIA-222-F	Date: 11/19/14	Scale: NTS	
Path:		Dwg No. E-5	

Feed Line Distribution Chart

0' - 182'

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



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Job: *95171.003.01- Rocky Hill,CT (BU# 842872)*			
Project:			
Client: Crown Castle	Drawn by: Nagabharana Nayak	App'd:	
Code: TIA/EIA-222-F	Date: 11/19/14	Scale: NTS	
Path:		Dwg No. E-7	

Tower Input Data

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

Tower is located in Hartford County, Connecticut.
Basic wind speed of 80 mph.
Nominal ice thickness of 1.000 in.
Ice thickness is considered to increase with height.
Ice density of 56.000 pcf.
A wind speed of 38 mph is used in combination with ice.
Temperature drop of 50.000 °F.
Deflections calculated using a wind speed of 50 mph.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.333.
Local bending stresses due to climbing loads, feed line 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 Poles
Include Bolts In Member Capacity	Autocalc Torque Arm Areas	√ Include Shear-Torsion Interaction
Leg Bolts Are At Top Of Section	SR Members Have Cut Ends	Always Use Sub-Critical Flow
Secondary Horizontal Braces Leg	Sort Capacity Reports By Component	Use Top Mounted Sockets
Use Diamond Inner Bracing (4 Sided)	Triangulate Diamond Inner Bracing	
Add IBC .6D+W Combination	Use TIA-222-G Tension Splice Capacity Exemption	

Tapered Pole Section Geometry

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	182.000-133.080	48.920	3.840	18	14.500	26.020	0.250	1.000	A572-65 (65 ksi)
L2	133.080-87.460	49.460	5.090	18	24.616	36.150	0.375	1.500	A572-65 (65 ksi)
L3	87.460-85.000	7.550	0.000	18	34.213	35.970	0.554	2.218	52.568503ksi (53 ksi)
L4	85.000-74.000	11.000	0.000	18	35.970	38.529	0.704	2.816	52.284186ksi (52 ksi)
L5	74.000-57.250	16.750	0.000	18	38.529	42.426	0.669	2.676	52.440433ksi (52 ksi)
L6	57.250-42.880	14.370	6.250	18	42.426	45.770	0.709	2.835	52.507839ksi (53 ksi)
L7	42.880-32.250	16.880	0.000	18	43.566	47.494	0.618	2.474	53.606031ksi (54 ksi)

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L8	32.250-0.000	32.250		18	47.494	55.000	0.567	2.269	55.316658ksi (55 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	14.724	11.307	290.087	5.059	7.366	39.382	580.557	5.655	2.112	8.448
	26.421	20.448	1715.646	9.148	13.218	129.795	3433.549	10.226	4.140	16.558
L2	25.905	28.853	2141.967	8.605	12.505	171.292	4286.753	14.429	3.672	9.793
	36.708	42.581	6885.168	12.700	18.364	374.923	13779.397	21.295	5.702	15.206
L3	35.943	59.230	8477.535	11.949	17.380	487.770	16966.224	29.621	5.046	9.101
	36.525	62.321	9875.392	12.572	18.273	540.448	19763.778	31.167	5.355	9.659
L4	36.525	78.806	12382.258	12.519	18.273	677.641	24780.809	39.410	5.092	7.232
	39.124	84.525	15278.611	13.428	19.573	780.604	30577.326	42.271	5.542	7.872
L5	39.124	80.380	14556.360	13.440	19.573	743.704	29131.873	40.198	5.604	8.378
	43.081	88.654	19530.262	14.824	21.553	906.166	39086.222	44.336	6.290	9.403
L6	43.081	93.842	20633.581	14.810	21.553	957.358	41294.312	46.930	6.220	8.776
	46.476	101.363	26002.985	15.997	23.251	1118.352	52040.186	50.691	6.808	9.606
L7	45.715	84.295	19643.235	15.246	22.131	887.573	39312.316	42.156	6.579	10.639
	48.227	92.006	25541.869	16.641	24.127	1058.637	51117.346	46.012	7.271	11.757
L8	48.227	84.495	23507.895	16.659	24.127	974.335	47046.722	42.255	7.361	12.975
	55.848	98.009	36688.012	19.324	27.940	1313.100	73424.299	49.014	8.682	15.304

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
L1 182.000-133.080				1	1	1		
L2 133.080-87.460				1	1	1		
L3 87.460-85.000				1	1	0.969178		
L4 85.000-74.000				1	1	0.955006		
L5 74.000-57.250				1	1	0.962914		
L6 57.250-42.880				1	1	0.9583		
L7 42.880-32.250				1	1	0.975747		
L8 32.250-0.000				1	1	1.02245		

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
LDF5-50A(7/8") (E)	C	No	Inside Pole	180.000 - 0.000	7	No Ice	0.000	0.000
						1/2" Ice	0.000	0.000
						1" Ice	0.000	0.000
						2" Ice	0.000	0.000
						4" Ice	0.000	0.000

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight klf
AVA5-50FX(7/8) (R-Outside)	C	No	CaAa (Out Of Face)	47.000 - 0.000	2	No Ice	0.110	0.000
						1/2" Ice	0.210	0.001
						1" Ice	0.310	0.003
						2" Ice	0.510	0.008
						4" Ice	0.910	0.025
AVA5-50FX(7/8) (R-Outside)	C	No	CaAa (Out Of Face)	180.000 - 87.000	2	No Ice	0.110	0.000
						1/2" Ice	0.210	0.001
						1" Ice	0.310	0.003
						2" Ice	0.510	0.008
						4" Ice	0.910	0.025
AVA5-50FX(7/8) (R-Outside Shielded)	C	No	CaAa (Out Of Face)	180.000 - 0.000	2	No Ice	0.000	0.000
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.003
						2" Ice	0.000	0.008
						4" Ice	0.000	0.025
### LDF7-50A(1-5/8") (E)	B	No	Inside Pole	170.000 - 0.000	12	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
						2" Ice	0.000	0.001
						4" Ice	0.000	0.001
Climbing Ladder (Flat) (E)	C	No	CaAa (Out Of Face)	172.000 - 162.000	1	No Ice	0.584	0.005
						1/2" Ice	1.030	0.007
						1" Ice	1.476	0.010
						2" Ice	2.368	0.020
						4" Ice	4.151	0.049
### LDF7-50A(1-5/8") (E)	B	No	Inside Pole	160.000 - 0.000	12	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
						2" Ice	0.000	0.001
						4" Ice	0.000	0.001
MLE Hybrid 3Power/6Fiber RL 2(1 1/4") (E)	B	No	Inside Pole	160.000 - 0.000	1	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
						2" Ice	0.000	0.001
						4" Ice	0.000	0.001
### LDF4-50A(1/2") (E-Clearwire)	B	No	CaAa (Out Of Face)	140.000 - 0.000	4	No Ice	0.063	0.000
						1/2" Ice	0.163	0.001
						1" Ice	0.263	0.002
						2" Ice	0.463	0.007
						4" Ice	0.863	0.023
HB114-1-0813U4-M5F(1 1/4") (E-Shielded)	B	No	CaAa (Out Of Face)	140.000 - 0.000	2	No Ice	0.000	0.001
						1/2" Ice	0.000	0.002
						1" Ice	0.000	0.004
						2" Ice	0.000	0.010
						4" Ice	0.000	0.028
HB114-1-0813U4-M5F(1 1/4") (E-Shielded)	B	No	CaAa (Out Of Face)	140.000 - 0.000	1	No Ice	0.000	0.001
						1/2" Ice	0.000	0.002
						1" Ice	0.000	0.004
						2" Ice	0.000	0.010
						4" Ice	0.000	0.028
HB114-21U3M12-XXX F(1-1/4") (R-Shielded)	B	No	CaAa (Out Of Face)	140.000 - 0.000	1	No Ice	0.000	0.001
						1/2" Ice	0.000	0.002
						1" Ice	0.000	0.004
						2" Ice	0.000	0.010
						4" Ice	0.000	0.028
### HJ7-50A(1-5/8") (E)	A	No	Inside Pole	88.000 - 0.000	12	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft²/ft	Weight klf
						2" Ice	0.000	0.001
						4" Ice	0.000	0.001
HB158-1-08U8-S8J18(1-5/8) (R-Shielded)	A	No	CaAa (Out Of Face)	88.000 - 0.000	2	No Ice	0.000	0.001
						1/2" Ice	0.000	0.003
						1" Ice	0.000	0.005
						2" Ice	0.000	0.011
						4" Ice	0.000	0.031
### LDF4-50A(1/2") (E-Shielded)	B	No	Inside Pole	75.000 - 0.000	1	No Ice	0.000	0.000
						1/2" Ice	0.000	0.000
						1" Ice	0.000	0.000
						2" Ice	0.000	0.000
						4" Ice	0.000	0.000
### Safety Line 3/8 (E)	B	No	CaAa (Out Of Face)	182.000 - 0.000	1	No Ice	0.037	0.000
						1/2" Ice	0.137	0.001
						1" Ice	0.238	0.001
						2" Ice	0.437	0.002
						4" Ice	0.838	0.004
### PL5.75x1 (E)	A	No	CaAa (Out Of Face)	77.000 - 47.000	1	No Ice	0.917	0.023
						1/2" Ice	1.028	0.026
						1" Ice	1.139	0.029
						2" Ice	1.361	0.035
						4" Ice	1.806	0.053
PL5.75x1 (E)	B	No	CaAa (Out Of Face)	77.000 - 47.000	1	No Ice	0.917	0.023
						1/2" Ice	1.028	0.026
						1" Ice	1.139	0.029
						2" Ice	1.361	0.035
						4" Ice	1.806	0.053
### PL5.75x1 (E)	A	No	CaAa (Out Of Face)	87.000 - 72.000	1	No Ice	0.917	0.023
						1/2" Ice	1.028	0.026
						1" Ice	1.139	0.029
						2" Ice	1.361	0.035
						4" Ice	1.806	0.053
PL5.75x1 (E)	B	No	CaAa (Out Of Face)	87.000 - 72.000	1	No Ice	0.917	0.023
						1/2" Ice	1.028	0.026
						1" Ice	1.139	0.029
						2" Ice	1.361	0.035
						4" Ice	1.806	0.053
### Sabre MS-650 (6.5" x 1.25" Plate) (P)	A	No	CaAa (Out Of Face)	60.000 - 0.000	1	No Ice	0.208	0.000
						1/2" Ice	0.292	0.000
						1" Ice	0.375	0.000
						2" Ice	0.542	0.000
						4" Ice	0.875	0.000
Sabre MS-650 (6.5" x 1.25" Plate) (P)	B	No	CaAa (Out Of Face)	60.000 - 0.000	1	No Ice	0.208	0.000
						1/2" Ice	0.292	0.000
						1" Ice	0.375	0.000
						2" Ice	0.542	0.000
						4" Ice	0.875	0.000
Sabre MS-600 (6" x 1" Plate) (P)	A	No	CaAa (Out Of Face)	90.000 - 60.000	1	No Ice	0.167	0.000
						1/2" Ice	0.250	0.000
						1" Ice	0.333	0.000
						2" Ice	0.500	0.000
						4" Ice	0.833	0.000
Sabre MS-600 (6" x 1" Plate) (P)	B	No	CaAa (Out Of Face)	90.000 - 60.000	1	No Ice	0.167	0.000
						1/2" Ice	0.250	0.000
						1" Ice	0.333	0.000
						2" Ice	0.500	0.000
						4" Ice	0.833	0.000

tnxTower	Job	Page
	95171.003.01- Rocky Hill,CT (BU# 842872)	5 of 30
B+T Group 1717 S. Boulder, Suit 300 Tulsa, OK 74119 Phone: (918) 587-4630 FAX: (918) 295-0265	Project	Date 13:43:56 11/19/14
	Client Crown Castle	Designed by Nagabharana Nayak

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	182.000-133.080	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	3.578	0.695
		C	0.000	0.000	0.000	16.185	0.215
L2	133.080-87.460	A	0.000	0.000	0.000	0.423	0.008
		B	0.000	0.000	0.000	13.630	1.186
		C	0.000	0.000	0.000	10.055	0.162
L3	87.460-85.000	A	0.000	0.000	0.000	2.243	0.084
		B	0.000	0.000	0.000	2.956	0.111
		C	0.000	0.000	0.000	0.101	0.007
L4	85.000-74.000	A	0.000	0.000	0.000	14.667	0.493
		B	0.000	0.000	0.000	17.851	0.614
		C	0.000	0.000	0.000	0.000	0.032
L5	74.000-57.250	A	0.000	0.000	0.000	20.094	0.691
		B	0.000	0.000	0.000	24.943	0.877
		C	0.000	0.000	0.000	0.000	0.049
L6	57.250-42.880	A	0.000	0.000	0.000	12.390	0.457
		B	0.000	0.000	0.000	16.550	0.616
		C	0.000	0.000	0.000	0.908	0.045
L7	42.880-32.250	A	0.000	0.000	0.000	2.215	0.160
		B	0.000	0.000	0.000	5.292	0.278
		C	0.000	0.000	0.000	2.343	0.038
L8	32.250-0.000	A	0.000	0.000	0.000	6.719	0.486
		B	0.000	0.000	0.000	16.055	0.843
		C	0.000	0.000	0.000	7.108	0.114

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	182.000-133.080	A	1.204	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	22.030	0.955
		C		0.000	0.000	0.000	49.529	0.963
L2	133.080-87.460	A	1.155	0.000	0.000	0.000	0.933	0.013
		B		0.000	0.000	0.000	69.086	2.546
		C		0.000	0.000	0.000	32.033	0.818
L3	87.460-85.000	A	1.122	0.000	0.000	0.000	3.230	0.119
		B		0.000	0.000	0.000	6.782	0.192
		C		0.000	0.000	0.000	0.314	0.027
L4	85.000-74.000	A	1.111	0.000	0.000	0.000	20.161	0.673
		B		0.000	0.000	0.000	35.568	0.984
		C		0.000	0.000	0.000	0.000	0.101
L5	74.000-57.250	A	1.086	0.000	0.000	0.000	27.649	0.941
		B		0.000	0.000	0.000	50.684	1.405
		C		0.000	0.000	0.000	0.000	0.149
L6	57.250-42.880	A	1.051	0.000	0.000	0.000	17.301	0.628
		B		0.000	0.000	0.000	36.565	1.011
		C		0.000	0.000	0.000	2.640	0.149
L7	42.880-32.250	A	1.016	0.000	0.000	0.000	4.077	0.244
		B		0.000	0.000	0.000	18.327	0.528
		C		0.000	0.000	0.000	6.812	0.158
L8	32.250-0.000	A	1.000	0.000	0.000	0.000	12.094	0.721
		B		0.000	0.000	0.000	53.680	1.535
		C		0.000	0.000	0.000	20.008	0.446

Feed Line Center of Pressure

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
L1	182.000-133.080	-0.250	0.243	-0.321	0.557
L2	133.080-87.460	0.086	0.310	0.544	0.836
L3	87.460-85.000	0.875	-0.253	1.381	0.078
L4	85.000-74.000	1.084	-0.403	1.564	-0.123
L5	74.000-57.250	1.073	-0.378	1.608	-0.083
L6	57.250-42.880	0.896	-0.240	1.440	0.118
L7	42.880-32.250	0.291	0.182	0.800	0.682
L8	32.250-0.000	0.296	0.186	0.816	0.693

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert	Azimuth Adjustment	Placement		C_AA_A Front	C_AA_A Side	Weight
			ft ft ft	°	ft		ft²	ft²	K
PD458-3 (E)	A	From Leg	4.000 0.000 11.000	0.000	180.000	No Ice	3.493	3.493	0.021
						1/2" Ice	4.794	4.794	0.047
						1" Ice	6.112	6.112	0.080
						2" Ice	8.499	8.499	0.173
						4" Ice	11.687	11.687	0.463
PD458-3 (E)	B	From Leg	4.000 0.000 11.000	0.000	180.000	No Ice	3.493	3.493	0.021
						1/2" Ice	4.794	4.794	0.047
						1" Ice	6.112	6.112	0.080
						2" Ice	8.499	8.499	0.173
						4" Ice	11.687	11.687	0.463
APC-301 (E)	C	From Leg	4.000 0.000 11.000	0.000	180.000	No Ice	3.000	3.000	0.013
						1/2" Ice	4.229	4.229	0.035
						1" Ice	5.475	5.475	0.065
						2" Ice	7.685	7.685	0.149
						4" Ice	10.708	10.708	0.417
APC-2163 (E)	A	From Leg	4.000 0.000 11.000	0.000	180.000	No Ice	3.375	3.375	0.014
						1/2" Ice	4.754	4.754	0.039
						1" Ice	6.150	6.150	0.073
						2" Ice	8.992	8.992	0.167
						4" Ice	12.448	12.448	0.465
APC-1362 (E)	B	From Leg	4.000 0.000 11.000	0.000	180.000	No Ice	3.500	3.500	0.015
						1/2" Ice	4.929	4.929	0.041
						1" Ice	6.375	6.375	0.076
						2" Ice	9.317	9.317	0.173
						4" Ice	13.051	13.051	0.482
APC-4065 (E)	C	From Leg	4.000 0.000 11.000	0.000	180.000	No Ice	3.125	3.125	0.013
						1/2" Ice	4.404	4.404	0.036
						1" Ice	5.700	5.700	0.067
						2" Ice	8.140	8.140	0.155
						4" Ice	11.277	11.277	0.433
ANT450D6-9 (E)	C	From Leg	4.000 0.000 -5.000	0.000	180.000	No Ice	2.862	2.862	0.176
						1/2" Ice	4.370	4.370	0.200
						1" Ice	5.878	5.878	0.224
						2" Ice	8.893	8.893	0.272
						4" Ice	14.923	14.923	0.368
(2) 6' x 2" Mount Pipe (E)	A	From Leg	4.000 0.000 0.000	0.000	180.000	No Ice	1.425	1.425	0.022
						1/2" Ice	1.925	1.925	0.033
						1" Ice	2.294	2.294	0.048
						2" Ice	3.060	3.060	0.090

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	4.702	4.702	0.231
(2) 6' x 2" Mount Pipe (E)	B	From Leg	4.000 0.000 0.000	0.000	180.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.425 1.925 2.294 3.060 4.702	1.425 1.925 2.294 3.060 4.702	0.022 0.033 0.048 0.090 0.231
(2) 6' x 2" Mount Pipe (E)	C	From Leg	4.000 0.000 0.000	0.000	180.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.425 1.925 2.294 3.060 4.702	1.425 1.925 2.294 3.060 4.702	0.022 0.033 0.048 0.090 0.231
Side Arm Mount [SO 702-3] (E)	C	None		0.000	180.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.220 4.150 5.080 6.940 10.660	3.220 4.150 5.080 6.940 10.660	0.081 0.114 0.147 0.213 0.345
### 7770.00 w/ Mount Pipe (E)	A	From Leg	4.000 0.000 -2.000	0.000	170.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.119 6.626 7.128 8.164 10.360	4.254 5.014 5.711 7.155 10.412	0.055 0.103 0.157 0.287 0.665
7770.00 w/ Mount Pipe (E)	B	From Leg	4.000 0.000 -2.000	0.000	170.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.119 6.626 7.128 8.164 10.360	4.254 5.014 5.711 7.155 10.412	0.055 0.103 0.157 0.287 0.665
7770.00 w/ Mount Pipe (E)	C	From Leg	4.000 0.000 -2.000	0.000	170.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.119 6.626 7.128 8.164 10.360	4.254 5.014 5.711 7.155 10.412	0.055 0.103 0.157 0.287 0.665
AM-X-CD-16-65-00T-RET w/ Mount Pipe (E)	A	From Leg	4.000 0.000 -2.000	0.000	170.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.498 9.149 9.767 11.031 13.679	6.304 7.479 8.368 10.179 14.024	0.074 0.139 0.212 0.385 0.874
AM-X-CD-16-65-00T-RET w/ Mount Pipe (E)	B	From Leg	4.000 0.000 -2.000	0.000	170.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.498 9.149 9.767 11.031 13.679	6.304 7.479 8.368 10.179 14.024	0.074 0.139 0.212 0.385 0.874
AM-X-CD-16-65-00T-RET w/ Mount Pipe (E)	C	From Leg	4.000 0.000 -2.000	0.000	170.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.498 9.149 9.767 11.031 13.679	6.304 7.479 8.368 10.179 14.024	0.074 0.139 0.212 0.385 0.874
(2) LGP21401 (E)	A	From Leg	4.000 0.000 -2.000	0.000	170.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.288 1.445 1.611 1.969 2.788	0.233 0.313 0.403 0.608 1.121	0.014 0.021 0.030 0.055 0.135
(2) LGP21401 (E)	B	From Leg	4.000 0.000 -2.000	0.000	170.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.288 1.445 1.611 1.969 2.788	0.233 0.313 0.403 0.608 1.121	0.014 0.021 0.030 0.055 0.135
(2) LGP21401	C	From Leg	4.000	0.000	170.000	No Ice	1.288	0.233	0.014

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
(E)			0.000 -2.000			1/2" Ice	1.445	0.313	0.021
						1" Ice	1.611	0.403	0.030
						2" Ice	1.969	0.608	0.055
						4" Ice	2.788	1.121	0.135
(2) RRUS-11 (E)	A	From Leg	4.000 0.000 -2.000	0.000	170.000	No Ice	3.249	1.373	0.048
						1/2" Ice	3.491	1.551	0.068
						1" Ice	3.741	1.738	0.092
						2" Ice	4.268	2.138	0.150
						4" Ice	5.426	3.042	0.310
(2) RRUS-11 (E)	B	From Leg	4.000 0.000 -2.000	0.000	170.000	No Ice	3.249	1.373	0.048
						1/2" Ice	3.491	1.551	0.068
						1" Ice	3.741	1.738	0.092
						2" Ice	4.268	2.138	0.150
						4" Ice	5.426	3.042	0.310
(2) RRUS-11 (E)	C	From Leg	4.000 0.000 -2.000	0.000	170.000	No Ice	3.249	1.373	0.048
						1/2" Ice	3.491	1.551	0.068
						1" Ice	3.741	1.738	0.092
						2" Ice	4.268	2.138	0.150
						4" Ice	5.426	3.042	0.310
DC6-48-60-18-8CF (E)	A	From Leg	4.000 0.000 -2.000	0.000	170.000	No Ice	3.342	3.342	0.034
						1/2" Ice	3.620	3.620	0.061
						1" Ice	3.907	3.907	0.093
						2" Ice	4.507	4.507	0.168
						4" Ice	5.809	5.809	0.370
6' x 2" Mount Pipe (E)	A	From Leg	4.000 0.000 0.000	0.000	170.000	No Ice	1.425	1.425	0.022
						1/2" Ice	1.925	1.925	0.033
						1" Ice	2.294	2.294	0.048
						2" Ice	3.060	3.060	0.090
						4" Ice	4.702	4.702	0.231
6' x 2" Mount Pipe (E)	B	From Leg	4.000 0.000 0.000	0.000	170.000	No Ice	1.425	1.425	0.022
						1/2" Ice	1.925	1.925	0.033
						1" Ice	2.294	2.294	0.048
						2" Ice	3.060	3.060	0.090
						4" Ice	4.702	4.702	0.231
6' x 2" Mount Pipe (E)	C	From Leg	4.000 0.000 0.000	0.000	170.000	No Ice	1.425	1.425	0.022
						1/2" Ice	1.925	1.925	0.033
						1" Ice	2.294	2.294	0.048
						2" Ice	3.060	3.060	0.090
						4" Ice	4.702	4.702	0.231
Platform Mount [LP 712-1] (E)	C	None		0.000	170.000	No Ice	24.530	24.530	1.335
						1/2" Ice	29.940	29.940	1.646
						1" Ice	35.350	35.350	1.956
						2" Ice	46.170	46.170	2.577
						4" Ice	67.810	67.810	3.820
### ERICSSON AIR 21 B4A B2P w/ Mount Pipe (E)	A	From Leg	4.000 0.000 0.000	0.000	160.000	No Ice	6.825	5.642	0.112
						1/2" Ice	7.347	6.480	0.169
						1" Ice	7.863	7.257	0.233
						2" Ice	8.926	8.864	0.383
						4" Ice	11.175	12.293	0.807
ERICSSON AIR 21 B4A B2P w/ Mount Pipe (E)	B	From Leg	4.000 0.000 0.000	0.000	160.000	No Ice	6.825	5.642	0.112
						1/2" Ice	7.347	6.480	0.169
						1" Ice	7.863	7.257	0.233
						2" Ice	8.926	8.864	0.383
						4" Ice	11.175	12.293	0.807
ERICSSON AIR 21 B4A B2P w/ Mount Pipe (E)	C	From Leg	4.000 0.000 0.000	0.000	160.000	No Ice	6.825	5.642	0.112
						1/2" Ice	7.347	6.480	0.169
						1" Ice	7.863	7.257	0.233

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" Ice	8.926	8.864	0.383
						4" Ice	11.175	12.293	0.807
ERICSSON AIR 21 B2A B4P w/ Mount Pipe (E)	A	From Leg	4.000 0.000 0.000	0.000	160.000	No Ice	6.825	5.642	0.112
						1/2" Ice	7.347	6.480	0.169
						1" Ice	7.863	7.257	0.233
						2" Ice	8.926	8.864	0.383
						4" Ice	11.175	12.293	0.807
ERICSSON AIR 21 B2A B4P w/ Mount Pipe (E)	B	From Leg	4.000 0.000 0.000	0.000	160.000	No Ice	6.825	5.642	0.112
						1/2" Ice	7.347	6.480	0.169
						1" Ice	7.863	7.257	0.233
						2" Ice	8.926	8.864	0.383
						4" Ice	11.175	12.293	0.807
ERICSSON AIR 21 B2A B4P w/ Mount Pipe (E)	C	From Leg	4.000 0.000 0.000	0.000	160.000	No Ice	6.825	5.642	0.112
						1/2" Ice	7.347	6.480	0.169
						1" Ice	7.863	7.257	0.233
						2" Ice	8.926	8.864	0.383
						4" Ice	11.175	12.293	0.807
ATMAA1412D-1A20 (E)	A	From Leg	4.000 0.000 0.000	0.000	160.000	No Ice	1.167	0.467	0.013
						1/2" Ice	1.314	0.575	0.021
						1" Ice	1.469	0.691	0.030
						2" Ice	1.806	0.951	0.056
						4" Ice	2.584	1.573	0.137
ATMAA1412D-1A20 (E)	B	From Leg	4.000 0.000 0.000	0.000	160.000	No Ice	1.167	0.467	0.013
						1/2" Ice	1.314	0.575	0.021
						1" Ice	1.469	0.691	0.030
						2" Ice	1.806	0.951	0.056
						4" Ice	2.584	1.573	0.137
ATMAA1412D-1A20 (E)	C	From Leg	4.000 0.000 0.000	0.000	160.000	No Ice	1.167	0.467	0.013
						1/2" Ice	1.314	0.575	0.021
						1" Ice	1.469	0.691	0.030
						2" Ice	1.806	0.951	0.056
						4" Ice	2.584	1.573	0.137
LNX-6515DS-VTM w/ Mount Pipe (P)	A	From Leg	4.000 0.000 0.000	0.000	160.000	No Ice	11.445	7.696	0.053
						1/2" Ice	12.064	8.289	0.119
						1" Ice	12.689	8.889	0.192
						2" Ice	14.030	10.111	0.363
						4" Ice	17.045	12.644	0.806
LNX-6515DS-VTM w/ Mount Pipe (P)	B	From Leg	4.000 0.000 0.000	0.000	160.000	No Ice	11.445	7.696	0.053
						1/2" Ice	12.064	8.289	0.119
						1" Ice	12.689	8.889	0.192
						2" Ice	14.030	10.111	0.363
						4" Ice	17.045	12.644	0.806
LNX-6515DS-VTM w/ Mount Pipe (P)	C	From Leg	4.000 0.000 0.000	0.000	160.000	No Ice	11.445	7.696	0.053
						1/2" Ice	12.064	8.289	0.119
						1" Ice	12.689	8.889	0.192
						2" Ice	14.030	10.111	0.363
						4" Ice	17.045	12.644	0.806
RRUS 11 B12 (P)	A	From Leg	4.000 0.000 0.000	0.000	160.000	No Ice	3.306	1.361	0.051
						1/2" Ice	3.550	1.540	0.072
						1" Ice	3.802	1.728	0.095
						2" Ice	4.334	2.130	0.153
						4" Ice	5.501	3.038	0.314
RRUS 11 B12 (P)	B	From Leg	4.000 0.000 0.000	0.000	160.000	No Ice	3.306	1.361	0.051
						1/2" Ice	3.550	1.540	0.072
						1" Ice	3.802	1.728	0.095
						2" Ice	4.334	2.130	0.153
						4" Ice	5.501	3.038	0.314
RRUS 11 B12	C	From Leg	4.000	0.000	160.000	No Ice	3.306	1.361	0.051

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
(P)			0.000 0.000			1/2" Ice	3.550	1.540	0.072
						1" Ice	3.802	1.728	0.095
						2" Ice	4.334	2.130	0.153
						4" Ice	5.501	3.038	0.314
Platform Mount [LP 305-1] (E)	C	None		0.000	160.000	No Ice	18.010	18.010	1.121
						1/2" Ice	23.330	23.330	1.352
						1" Ice	28.650	28.650	1.584
						2" Ice	39.290	39.290	2.046
						4" Ice	60.570	60.570	2.972
###									
APXVSPP18-C-A20 w/ Mount Pipe (E)	A	From Leg	4.000 0.000 0.000	0.000	140.000	No Ice	8.498	6.946	0.083
						1/2" Ice	9.149	8.127	0.151
						1" Ice	9.767	9.021	0.227
						2" Ice	11.031	10.844	0.406
						4" Ice	13.679	14.851	0.909
APXVSPP18-C-A20 w/ Mount Pipe (E)	B	From Leg	4.000 0.000 0.000	0.000	140.000	No Ice	8.498	6.946	0.083
						1/2" Ice	9.149	8.127	0.151
						1" Ice	9.767	9.021	0.227
						2" Ice	11.031	10.844	0.406
						4" Ice	13.679	14.851	0.909
APXVSPP18-C-A20 w/ Mount Pipe (E)	C	From Leg	4.000 0.000 0.000	0.000	140.000	No Ice	8.498	6.946	0.083
						1/2" Ice	9.149	8.127	0.151
						1" Ice	9.767	9.021	0.227
						2" Ice	11.031	10.844	0.406
						4" Ice	13.679	14.851	0.909
1900MHz RRH (E)	A	From Leg	4.000 0.000 0.000	0.000	140.000	No Ice	2.907	3.801	0.044
						1/2" Ice	3.145	4.065	0.075
						1" Ice	3.391	4.337	0.110
						2" Ice	3.909	4.908	0.192
						4" Ice	5.050	6.152	0.407
1900MHz RRH (E)	B	From Leg	4.000 0.000 0.000	0.000	140.000	No Ice	2.907	3.801	0.044
						1/2" Ice	3.145	4.065	0.075
						1" Ice	3.391	4.337	0.110
						2" Ice	3.909	4.908	0.192
						4" Ice	5.050	6.152	0.407
1900MHz RRH (E)	C	From Leg	4.000 0.000 0.000	0.000	140.000	No Ice	2.907	3.801	0.044
						1/2" Ice	3.145	4.065	0.075
						1" Ice	3.391	4.337	0.110
						2" Ice	3.909	4.908	0.192
						4" Ice	5.050	6.152	0.407
800 EXTERNAL NOTCH FILTER (E)	A	From Leg	4.000 0.000 0.000	0.000	140.000	No Ice	0.770	0.375	0.011
						1/2" Ice	0.890	0.465	0.017
						1" Ice	1.018	0.563	0.024
						2" Ice	1.301	0.787	0.045
						4" Ice	1.970	1.337	0.114
800 EXTERNAL NOTCH FILTER (E)	B	From Leg	4.000 0.000 0.000	0.000	140.000	No Ice	0.770	0.375	0.011
						1/2" Ice	0.890	0.465	0.017
						1" Ice	1.018	0.563	0.024
						2" Ice	1.301	0.787	0.045
						4" Ice	1.970	1.337	0.114
800 EXTERNAL NOTCH FILTER (E)	C	From Leg	4.000 0.000 0.000	0.000	140.000	No Ice	0.770	0.375	0.011
						1/2" Ice	0.890	0.465	0.017
						1" Ice	1.018	0.563	0.024
						2" Ice	1.301	0.787	0.045
						4" Ice	1.970	1.337	0.114
800MHZ RRH (E)	A	From Leg	4.000 0.000 0.000	0.000	140.000	No Ice	2.490	2.068	0.053
						1/2" Ice	2.706	2.271	0.074
						1" Ice	2.931	2.481	0.098

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" Ice	3.407	2.928	0.157
						4" Ice	4.462	3.927	0.318
800MHZ RRH (E)	B	From Leg	4.000 0.000 0.000	0.000	140.000	No Ice	2.490	2.068	0.053
						1/2" Ice	2.706	2.271	0.074
						1" Ice	2.931	2.481	0.098
						2" Ice	3.407	2.928	0.157
						4" Ice	4.462	3.927	0.318
800MHZ RRH (E)	C	From Leg	4.000 0.000 0.000	0.000	140.000	No Ice	2.490	2.068	0.053
						1/2" Ice	2.706	2.271	0.074
						1" Ice	2.931	2.481	0.098
						2" Ice	3.407	2.928	0.157
						4" Ice	4.462	3.927	0.318
840 10054 w/ Mount Pipe (E-Clearwire)	A	From Leg	4.000 0.000 0.000	0.000	140.000	No Ice	5.413	2.385	0.051
						1/2" Ice	5.833	2.917	0.088
						1" Ice	6.263	3.466	0.129
						2" Ice	7.156	4.614	0.230
						4" Ice	9.093	7.316	0.533
840 10054 w/ Mount Pipe (E-Clearwire)	B	From Leg	4.000 0.000 0.000	0.000	140.000	No Ice	5.413	2.385	0.051
						1/2" Ice	5.833	2.917	0.088
						1" Ice	6.263	3.466	0.129
						2" Ice	7.156	4.614	0.230
						4" Ice	9.093	7.316	0.533
840 10054 w/ Mount Pipe (E-Clearwire)	C	From Leg	4.000 0.000 0.000	0.000	140.000	No Ice	5.413	2.385	0.051
						1/2" Ice	5.833	2.917	0.088
						1" Ice	6.263	3.466	0.129
						2" Ice	7.156	4.614	0.230
						4" Ice	9.093	7.316	0.533
Horizon Compact (E-Clearwire)	A	From Leg	4.000 0.000 4.000	0.000	140.000	No Ice	0.841	0.429	0.012
						1/2" Ice	0.966	0.525	0.018
						1" Ice	1.099	0.629	0.026
						2" Ice	1.392	0.863	0.048
						4" Ice	2.082	1.435	0.122
Horizon Compact (E-Clearwire)	B	From Leg	4.000 0.000 4.000	0.000	140.000	No Ice	0.841	0.429	0.012
						1/2" Ice	0.966	0.525	0.018
						1" Ice	1.099	0.629	0.026
						2" Ice	1.392	0.863	0.048
						4" Ice	2.082	1.435	0.122
URAS-FLEXIBLE (E-Clearwire)	A	From Leg	4.000 0.000 0.000	0.000	140.000	No Ice	1.804	0.778	0.033
						1/2" Ice	1.988	0.918	0.045
						1" Ice	2.180	1.067	0.058
						2" Ice	2.589	1.391	0.094
						4" Ice	3.512	2.143	0.201
URAS-FLEXIBLE (E-Clearwire)	B	From Leg	4.000 0.000 0.000	0.000	140.000	No Ice	1.804	0.778	0.033
						1/2" Ice	1.988	0.918	0.045
						1" Ice	2.180	1.067	0.058
						2" Ice	2.589	1.391	0.094
						4" Ice	3.512	2.143	0.201
URAS-FLEXIBLE (E-Clearwire)	C	From Leg	4.000 0.000 0.000	0.000	140.000	No Ice	1.804	0.778	0.033
						1/2" Ice	1.988	0.918	0.045
						1" Ice	2.180	1.067	0.058
						2" Ice	2.589	1.391	0.094
						4" Ice	3.512	2.143	0.201
APXVTM14-C-120 w/ Mount Pipe (R)	A	From Leg	4.000 0.000 0.000	0.000	140.000	No Ice	7.134	4.959	0.077
						1/2" Ice	7.662	5.754	0.132
						1" Ice	8.183	6.472	0.193
						2" Ice	9.256	8.010	0.339
						4" Ice	11.526	11.412	0.753
APXVTM14-C-120 w/	B	From Leg	4.000	0.000	140.000	No Ice	7.134	4.959	0.077

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
Mount Pipe (R)			0.000 0.000			1/2" Ice	7.662	5.754	0.132
						1" Ice	8.183	6.472	0.193
						2" Ice	9.256	8.010	0.339
						4" Ice	11.526	11.412	0.753
APXVTM14-C-120 w/ Mount Pipe (R)	C	From Leg	4.000 0.000 0.000	0.000	140.000	No Ice	7.134	4.959	0.077
						1/2" Ice	7.662	5.754	0.132
						1" Ice	8.183	6.472	0.193
						2" Ice	9.256	8.010	0.339
						4" Ice	11.526	11.412	0.753
TD-RRH8x20-25 (R)	A	From Leg	4.000 0.000 0.000	0.000	140.000	No Ice	4.720	1.703	0.070
						1/2" Ice	5.014	1.920	0.097
						1" Ice	5.316	2.145	0.128
						2" Ice	5.948	2.622	0.201
						4" Ice	7.314	3.680	0.397
TD-RRH8x20-25 (R)	B	From Leg	4.000 0.000 0.000	0.000	140.000	No Ice	4.720	1.703	0.070
						1/2" Ice	5.014	1.920	0.097
						1" Ice	5.316	2.145	0.128
						2" Ice	5.948	2.622	0.201
						4" Ice	7.314	3.680	0.397
TD-RRH8x20-25 (R)	C	From Leg	4.000 0.000 0.000	0.000	140.000	No Ice	4.720	1.703	0.070
						1/2" Ice	5.014	1.920	0.097
						1" Ice	5.316	2.145	0.128
						2" Ice	5.948	2.622	0.201
						4" Ice	7.314	3.680	0.397
Platform Mount [LP 1201-1] (E)	C	None		0.000	140.000	No Ice	23.100	23.100	2.100
						1/2" Ice	26.800	26.800	2.500
						1" Ice	30.500	30.500	2.900
						2" Ice	37.900	37.900	3.700
						4" Ice	52.700	52.700	5.300
*####									
BXA-70063-6CF-EDIN-4 w/ Mount Pipe (E)	A	From Leg	4.000 0.000 2.000	0.000	88.000	No Ice	7.969	5.398	0.042
						1/2" Ice	8.609	6.546	0.101
						1" Ice	9.216	7.409	0.168
						2" Ice	10.459	9.184	0.327
						4" Ice	13.066	12.933	0.787
BXA-70063-6CF-EDIN-4 w/ Mount Pipe (E)	B	From Leg	4.000 0.000 2.000	0.000	88.000	No Ice	7.969	5.398	0.042
						1/2" Ice	8.609	6.546	0.101
						1" Ice	9.216	7.409	0.168
						2" Ice	10.459	9.184	0.327
						4" Ice	13.066	12.933	0.787
LNX-6514DS-T6M w/ Mount Pipe (E)	C	From Leg	4.000 0.000 2.000	0.000	88.000	No Ice	8.568	7.004	0.058
						1/2" Ice	9.220	8.185	0.127
						1" Ice	9.838	9.081	0.203
						2" Ice	11.104	10.904	0.384
						4" Ice	13.754	14.926	0.889
(2) FD9R6004/2C-3L (E)	A	From Leg	4.000 0.000 2.000	0.000	88.000	No Ice	0.367	0.085	0.003
						1/2" Ice	0.451	0.136	0.005
						1" Ice	0.543	0.196	0.009
						2" Ice	0.755	0.343	0.020
						4" Ice	1.281	0.740	0.063
(2) FD9R6004/2C-3L (E)	B	From Leg	4.000 0.000 2.000	0.000	88.000	No Ice	0.367	0.085	0.003
						1/2" Ice	0.451	0.136	0.005
						1" Ice	0.543	0.196	0.009
						2" Ice	0.755	0.343	0.020
						4" Ice	1.281	0.740	0.063
(2) FD9R6004/2C-3L (E)	C	From Leg	4.000 0.000 2.000	0.000	88.000	No Ice	0.367	0.085	0.003
						1/2" Ice	0.451	0.136	0.005
						1" Ice	0.543	0.196	0.009

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" Ice	0.755	0.343	0.020
						4" Ice	1.281	0.740	0.063
BXA-70080-4BF-EDIN-0 w/ Mount Pipe (R)	A	From Leg	4.000 0.000 2.000	0.000	88.000	No Ice	3.932	3.970	0.030
						1/2" Ice	4.357	4.578	0.068
						1" Ice	4.792	5.222	0.112
						2" Ice	5.693	6.612	0.219
						4" Ice	7.633	9.661	0.540
BXA-70080-4BF-EDIN-0 w/ Mount Pipe (R)	B	From Leg	4.000 0.000 2.000	0.000	88.000	No Ice	3.932	3.970	0.030
						1/2" Ice	4.357	4.578	0.068
						1" Ice	4.792	5.222	0.112
						2" Ice	5.693	6.612	0.219
						4" Ice	7.633	9.661	0.540
BXA-70080-4BF-EDIN-0 w/ Mount Pipe (R)	C	From Leg	4.000 0.000 2.000	0.000	88.000	No Ice	3.932	3.970	0.030
						1/2" Ice	4.357	4.578	0.068
						1" Ice	4.792	5.222	0.112
						2" Ice	5.693	6.612	0.219
						4" Ice	7.633	9.661	0.540
(2) HBXX-6517DS-A2M w/ Mount Pipe (R)	A	From Leg	4.000 0.000 2.000	0.000	88.000	No Ice	8.976	6.963	0.067
						1/2" Ice	9.647	8.182	0.137
						1" Ice	10.291	9.144	0.215
						2" Ice	11.595	11.022	0.398
						4" Ice	14.321	15.027	0.914
(2) HBXX-6517DS-A2M w/ Mount Pipe (R)	B	From Leg	4.000 0.000 2.000	0.000	88.000	No Ice	8.976	6.963	0.067
						1/2" Ice	9.647	8.182	0.137
						1" Ice	10.291	9.144	0.215
						2" Ice	11.595	11.022	0.398
						4" Ice	14.321	15.027	0.914
(2) HBXX-6517DS-A2M w/ Mount Pipe (R)	C	From Leg	4.000 0.000 2.000	0.000	88.000	No Ice	8.976	6.963	0.067
						1/2" Ice	9.647	8.182	0.137
						1" Ice	10.291	9.144	0.215
						2" Ice	11.595	11.022	0.398
						4" Ice	14.321	15.027	0.914
DB-T1-6Z-8AB-0Z (R)	A	From Leg	4.000 0.000 2.000	0.000	88.000	No Ice	5.600	2.333	0.044
						1/2" Ice	5.915	2.558	0.080
						1" Ice	6.240	2.791	0.120
						2" Ice	6.914	3.284	0.213
						4" Ice	8.365	4.373	0.455
DB-T1-6Z-8AB-0Z (R)	C	From Leg	4.000 0.000 2.000	0.000	88.000	No Ice	5.600	2.333	0.044
						1/2" Ice	5.915	2.558	0.080
						1" Ice	6.240	2.791	0.120
						2" Ice	6.914	3.284	0.213
						4" Ice	8.365	4.373	0.455
RRH2X60-AWS (R)	A	From Leg	4.000 0.000 2.000	0.000	88.000	No Ice	3.957	1.816	0.060
						1/2" Ice	4.272	2.075	0.083
						1" Ice	4.596	2.360	0.109
						2" Ice	5.271	2.957	0.173
						4" Ice	6.722	4.253	0.354
RRH2X60-AWS (R)	B	From Leg	4.000 0.000 2.000	0.000	88.000	No Ice	3.957	1.816	0.060
						1/2" Ice	4.272	2.075	0.083
						1" Ice	4.596	2.360	0.109
						2" Ice	5.271	2.957	0.173
						4" Ice	6.722	4.253	0.354
RRH2X60-AWS (R)	C	From Leg	4.000 0.000 2.000	0.000	88.000	No Ice	3.957	1.816	0.060
						1/2" Ice	4.272	2.075	0.083
						1" Ice	4.596	2.360	0.109
						2" Ice	5.271	2.957	0.173
						4" Ice	6.722	4.253	0.354
RRH2X60-PCS	A	From Leg	4.000	0.000	88.000	No Ice	2.567	2.011	0.055

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
(R)			0.000 2.000			1/2" Ice	2.791	2.218	0.075
						1" Ice	3.025	2.435	0.099
						2" Ice	3.517	2.894	0.155
						4" Ice	4.606	3.915	0.313
RRH2X60-PCS (R)	B	From Leg	4.000 0.000 2.000	0.000	88.000	No Ice	2.567	2.011	0.055
						1/2" Ice	2.791	2.218	0.075
						1" Ice	3.025	2.435	0.099
						2" Ice	3.517	2.894	0.155
						4" Ice	4.606	3.915	0.313
RRH2X60-PCS (R)	C	From Leg	4.000 0.000 2.000	0.000	88.000	No Ice	2.567	2.011	0.055
						1/2" Ice	2.791	2.218	0.075
						1" Ice	3.025	2.435	0.099
						2" Ice	3.517	2.894	0.155
						4" Ice	4.606	3.915	0.313
Platform Mount [LP 1201-1] (E)	C	None		0.000	88.000	No Ice	23.100	23.100	2.100
						1/2" Ice	26.800	26.800	2.500
						1" Ice	30.500	30.500	2.900
						2" Ice	37.900	37.900	3.700
						4" Ice	52.700	52.700	5.300
### GPS_A (E)	C	From Leg	2.000 0.000 0.000	0.000	75.000	No Ice	0.297	0.297	0.001
						1/2" Ice	0.374	0.374	0.005
						1" Ice	0.459	0.459	0.010
						2" Ice	0.655	0.655	0.025
						4" Ice	1.151	1.151	0.079
Side Arm Mount [SO 701-1] (E)	C	From Leg	1.000 0.000 0.000	0.000	75.000	No Ice	0.850	1.670	0.065
						1/2" Ice	1.140	2.340	0.079
						1" Ice	1.430	3.010	0.093
						2" Ice	2.010	4.350	0.121
						4" Ice	3.170	7.030	0.177
###									

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
HPD2-4.7 (R)	A	Paraboloid w/o Radome	From Leg	2.000 0.000 -2.000	75.000		180.000	2.042	No Ice	3.270	0.027
									1/2" Ice	3.550	0.050
									1" Ice	3.820	0.060
									2" Ice	4.360	0.100
									4" Ice	5.460	0.170
HPD2-4.7 (R)	B	Paraboloid w/o Radome	From Leg	2.000 0.000 -2.000	-24.000		180.000	2.042	No Ice	3.270	0.027
									1/2" Ice	3.550	0.050
									1" Ice	3.820	0.060
									2" Ice	4.360	0.100
									4" Ice	5.460	0.170
### VHLP2.5-10W (E-Clerwire)	A	Paraboloid w/Shroud (HP)	From Leg	4.000 0.000 4.000	60.000		140.000	2.917	No Ice	6.680	0.050
									1/2" Ice	7.070	0.090
									1" Ice	7.460	0.120
									2" Ice	8.230	0.200
									4" Ice	9.780	0.340
VHLP2.5-10W	B	Paraboloid	From	4.000	60.000		140.000	2.917	No Ice	6.680	0.050

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft²	Weight K
(E-Clerwire)		w/Shroud (HP)	Leg	0.000 4.000					1/2" Ice 1" Ice 2" Ice 4" Ice	7.070 7.460 8.230 9.780	0.090 0.120 0.200 0.340
###											

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	182 - 179.627	TP26.02x14.5x0.25	48.920	0.000	0.0	39.000	11.751	-0.392	458.278	0.001
	179.627 - 177.255					39.000	12.194	-0.516	475.569	0.001
	177.255 - 174.882					39.000	12.637	-0.638	492.859	0.001
	174.882 - 172.509					39.000	13.081	-0.769	510.150	0.002
	172.509 - 170.137					39.000	13.524	-0.904	527.440	0.002
	170.137 - 167.764					39.000	13.967	-2.707	544.731	0.005
	167.764 - 165.392					39.000	14.411	-2.853	562.021	0.005
	165.392 - 163.019					39.000	14.854	-3.005	579.312	0.005
	163.019 - 160.646					39.000	15.297	-3.161	596.602	0.005
	160.646 - 158.274					39.000	15.741	-4.937	613.893	0.008
	158.274 - 155.901					39.000	16.184	-5.112	631.183	0.008
	155.901 - 153.528					39.000	16.628	-5.293	648.474	0.008
	153.528 - 151.156					39.000	17.071	-5.481	665.764	0.008
	151.156 - 148.783					39.000	17.514	-5.675	683.055	0.008
	148.783 - 146.411					39.000	17.958	-5.875	700.345	0.008
	146.411 - 144.038					39.000	18.401	-6.081	717.636	0.008
	144.038 - 141.665					39.000	18.844	-6.336	734.926	0.009
	141.665 - 139.293					39.000	19.288	-9.439	752.217	0.013
	139.293 - 136.92					39.000	19.731	-9.677	769.507	0.013
	136.92 - 133.08					39.000	20.448	-4.239	797.491	0.005
L2	136.92 - 133.08	TP36.15x24.616x0.375	49.460	0.000	0.0	39.000	29.918	-6.172	1166.820	0.005
	133.08 - 130.828					39.000	30.543	-10.736	1191.190	0.009
	130.828 - 128.577					39.000	31.168	-11.067	1215.570	0.009
	128.577 - 126.325					39.000	31.793	-11.404	1239.940	0.009
	126.325 - 124.073					39.000	32.418	-11.748	1264.320	0.009
	124.073 - 121.822					39.000	33.043	-12.098	1288.690	0.009
	121.822 - 119.57					39.000	33.668	-12.453	1313.070	0.009
	119.57 - 117.318					39.000	34.293	-12.815	1337.440	0.010
	117.318 -					39.000	34.918	-13.182	1361.820	0.010

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 $\frac{P}{P_a}$
	115.067									
	115.067 - 112.815					39.000	35.543	-13.555	1386.190	0.010
	112.815 - 110.563					39.000	36.168	-13.933	1410.570	0.010
	110.563 - 108.312					39.000	36.793	-14.317	1434.940	0.010
	108.312 - 106.06					39.000	37.418	-14.707	1459.320	0.010
	106.06 - 103.808					39.000	38.043	-15.102	1483.690	0.010
	103.808 - 101.557					39.000	38.668	-15.502	1508.070	0.010
	101.557 - 99.305					39.000	39.293	-15.908	1532.440	0.010
	99.305 - 97.0533					39.000	39.918	-16.319	1556.820	0.010
	97.0533 - 94.8017					39.000	40.543	-16.735	1581.190	0.011
	94.8017 - 92.55					39.000	41.168	-17.157	1605.570	0.011
	92.55 - 87.46					39.000	42.581	-10.620	1660.670	0.006
L3	92.55 - 87.46	TP35.97x34.213x0.554	7.550	0.000	0.0	31.541	61.314	-11.374	1933.910	0.006
	87.46 - 86.23					31.541	61.818	-22.381	1949.790	0.011
	86.23 - 85					31.541	62.321	-22.750	1965.680	0.012
L4	85 - 84	TP38.529x35.97x0.704	11.000	0.000	0.0	31.371	79.326	-23.124	2488.490	0.009
	84 - 83					31.371	79.846	-23.490	2504.800	0.009
	83 - 82					31.371	80.366	-23.862	2521.110	0.009
	82 - 81					31.371	80.886	-24.237	2537.420	0.010
	81 - 80					31.371	81.406	-24.613	2553.740	0.010
	80 - 79					31.371	81.926	-24.991	2570.050	0.010
	79 - 78					31.371	82.446	-25.371	2586.360	0.010
	78 - 77					31.371	82.965	-25.752	2602.670	0.010
	77 - 76					31.371	83.485	-26.136	2618.980	0.010
	76 - 75					31.371	84.005	-26.521	2635.290	0.010
	75 - 74					31.371	84.525	-26.972	2651.600	0.010
L5	74 - 72.9531	TP42.426x38.529x0.669	16.750	0.000	0.0	31.464	80.897	-27.361	2545.370	0.011
	72.9531 - 71.9063					31.464	81.414	-27.754	2561.650	0.011
	71.9063 - 70.8594					31.464	81.932	-28.148	2577.920	0.011
	70.8594 - 69.8125					31.464	82.449	-28.544	2594.190	0.011
	69.8125 - 68.7656					31.464	82.966	-28.942	2610.460	0.011
	68.7656 - 67.7188					31.464	83.483	-29.341	2626.730	0.011
	67.7188 - 66.6719					31.464	84.000	-29.743	2643.000	0.011
	66.6719 - 65.625					31.464	84.517	-30.147	2659.270	0.011
	65.625 - 64.5781					31.464	85.034	-30.552	2675.550	0.011
	64.5781 - 63.5313					31.464	85.552	-30.960	2691.820	0.012
	63.5313 - 62.4844					31.464	86.069	-31.369	2708.090	0.012
	62.4844 - 61.4375					31.464	86.586	-31.780	2724.360	0.012
	61.4375 - 60.3906					31.464	87.103	-32.193	2740.630	0.012
	60.3906 - 59.3438					31.464	87.620	-32.608	2756.900	0.012

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 $\frac{P}{P_a}$
	59.3438 - 58.2969					31.464	88.137	-33.025	2773.180	0.012
	58.2969 - 57.25					31.464	88.654	-33.444	2789.450	0.012
L6	57.25 - 56.235	TP45.77x42.426x0.709	14.370	0.000	0.0	31.505	94.373	-33.850	2973.190	0.011
	56.235 - 55.22					31.505	94.904	-34.257	2989.930	0.011
	55.22 - 54.205					31.505	95.435	-34.665	3006.660	0.012
	54.205 - 53.19					31.505	95.967	-35.076	3023.400	0.012
	53.19 - 52.175					31.505	96.498	-35.488	3040.140	0.012
	52.175 - 51.16					31.505	97.029	-35.902	3056.870	0.012
	51.16 - 50.145					31.505	97.560	-36.318	3073.610	0.012
	50.145 - 49.13					31.505	98.092	-36.736	3090.350	0.012
	49.13 - 42.88					31.505	101.363	-22.171	3193.400	0.007
L7	49.13 - 42.88	TP47.494x43.566x0.618	16.880	0.000	0.0	32.164	87.150	-18.877	2803.060	0.007
	42.88 - 41.817					32.164	87.636	-41.446	2818.680	0.015
	41.817 - 40.754					32.164	88.121	-41.826	2834.300	0.015
	40.754 - 39.691					32.164	88.607	-42.207	2849.910	0.015
	39.691 - 38.628					32.164	89.092	-42.590	2865.530	0.015
	38.628 - 37.565					32.164	89.578	-42.974	2881.150	0.015
	37.565 - 36.502					32.164	90.063	-43.361	2896.770	0.015
	36.502 - 35.439					32.164	90.549	-43.749	2912.390	0.015
	35.439 - 34.376					32.164	91.035	-44.139	2928.000	0.015
	34.376 - 33.313					32.164	91.520	-44.531	2943.620	0.015
	33.313 - 32.25					32.164	92.006	-44.924	2959.240	0.015
L8	32.25 - 30.6375	TP55x47.494x0.567	32.250	0.000	0.0	33.190	85.171	-45.501	2826.810	0.016
	30.6375 - 29.025					33.190	85.846	-46.090	2849.240	0.016
	29.025 - 27.4125					33.190	86.522	-46.682	2871.660	0.016
	27.4125 - 25.8					33.190	87.198	-47.279	2894.090	0.016
	25.8 - 24.1875					33.190	87.873	-47.879	2916.520	0.016
	24.1875 - 22.575					33.190	88.549	-48.483	2938.940	0.016
	22.575 - 20.9625					33.190	89.225	-49.090	2961.370	0.017
	20.9625 - 19.35					33.190	89.900	-49.702	2983.800	0.017
	19.35 - 17.7375					33.190	90.576	-50.317	3006.230	0.017
	17.7375 - 16.125					33.190	91.252	-50.937	3028.650	0.017
	16.125 - 14.5125					33.190	91.928	-51.560	3051.080	0.017
	14.5125 - 12.9					33.190	92.603	-52.187	3073.510	0.017
	12.9 - 11.2875					33.190	93.279	-52.817	3095.930	0.017
	11.2875 - 9.675					33.190	93.955	-53.452	3118.360	0.017
	9.675 - 8.0625					33.190	94.631	-54.090	3140.790	0.017
	8.0625 - 6.45					33.190	95.306	-54.733	3163.220	0.017
	6.45 - 4.8375					33.190	95.982	-55.379	3185.640	0.017
	4.8375 - 3.225					33.190	96.658	-56.028	3208.070	0.017
	3.225 - 1.6125					33.190	97.334	-56.682	3230.500	0.018
	1.6125 - 0					33.190	98.009	-57.340	3252.920	0.018

Pole Bending Design Data

Section No.	Elevation ft	Size	Actual M_c 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	182 - 179.627	TP26.02x14.5x0.25	10.880	3.068	39.000	0.079	0.000	0.000	39.000	0.000
	179.627 - 177.255		15.444	4.041	39.000	0.104	0.000	0.000	39.000	0.000
	177.255 -		21.096	5.137	39.000	0.132	0.000	0.000	39.000	0.000

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 $\frac{f_{by}}{F_{by}}$
	174.882									
	174.882 - 172.509		27.153	6.168	39.000	0.158	0.000	0.000	39.000	0.000
	172.509 - 170.137		33.562	7.129	39.000	0.183	0.000	0.000	39.000	0.000
	170.137 - 167.764		44.373	8.832	39.000	0.226	0.000	0.000	39.000	0.000
	167.764 - 165.392		61.357	11.468	39.000	0.294	0.000	0.000	39.000	0.000
	165.392 - 163.019		78.714	13.841	39.000	0.355	0.000	0.000	39.000	0.000
	163.019 - 160.646		96.451	15.985	39.000	0.410	0.000	0.000	39.000	0.000
	160.646 - 158.274		122.001	19.090	39.000	0.489	0.000	0.000	39.000	0.000
	158.274 - 155.901		150.728	22.303	39.000	0.572	0.000	0.000	39.000	0.000
	155.901 - 153.528		179.848	25.203	39.000	0.646	0.000	0.000	39.000	0.000
	153.528 - 151.156		209.368	27.827	39.000	0.714	0.000	0.000	39.000	0.000
	151.156 - 148.783		239.290	30.206	39.000	0.775	0.000	0.000	39.000	0.000
	148.783 - 146.411		269.623	32.366	39.000	0.830	0.000	0.000	39.000	0.000
	146.411 - 144.038		300.372	34.331	39.000	0.880	0.000	0.000	39.000	0.000
	144.038 - 141.665		332.524	36.230	39.000	0.929	0.000	0.000	39.000	0.000
	141.665 - 139.293		368.962	38.364	39.000	0.984	0.000	0.000	39.000	0.000
	139.293 - 136.92		413.842	41.109	39.000	1.054	0.000	0.000	39.000	0.000
	136.92 - 133.08		203.950	18.856	39.000	0.483	0.000	0.000	39.000	0.000
L2	136.92 - 133.08	TP36.15x24.616x0.375	283.543	18.464	39.000	0.473	0.000	0.000	39.000	0.000
	133.08 - 130.828		531.263	33.183	39.000	0.851	0.000	0.000	39.000	0.000
	130.828 - 128.577		575.423	34.505	39.000	0.885	0.000	0.000	39.000	0.000
	128.577 - 126.325		619.975	35.719	39.000	0.916	0.000	0.000	39.000	0.000
	126.325 - 124.073		664.923	36.836	39.000	0.945	0.000	0.000	39.000	0.000
	124.073 - 121.822		710.268	37.864	39.000	0.971	0.000	0.000	39.000	0.000
	121.822 - 119.57		756.013	38.811	39.000	0.995	0.000	0.000	39.000	0.000
	119.57 - 117.318		802.160	39.683	39.000	1.018	0.000	0.000	39.000	0.000
	117.318 - 115.067		848.708	40.487	39.000	1.038	0.000	0.000	39.000	0.000
	115.067 - 112.815		895.667	41.228	39.000	1.057	0.000	0.000	39.000	0.000
	112.815 - 110.563		943.033	41.912	39.000	1.075	0.000	0.000	39.000	0.000
	110.563 - 108.312		990.808	42.544	39.000	1.091	0.000	0.000	39.000	0.000
	108.312 - 106.06		1039.000	43.126	39.000	1.106	0.000	0.000	39.000	0.000
	106.06 -		1087.60	43.664	39.000	1.120	0.000	0.000	39.000	0.000

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 $\frac{f_{by}}{F_{by}}$
	103.808		8							
	103.808 - 101.557		1136.64 2	44.161	39.000	1.132	0.000	0.000	39.000	0.000
	101.557 - 99.305		1186.08 3	44.620	39.000	1.144	0.000	0.000	39.000	0.000
	99.305 - 97.0533		1235.95 8	45.044	39.000	1.155	0.000	0.000	39.000	0.000
	97.0533 - 94.8017		1286.25 0	45.435	39.000	1.165	0.000	0.000	39.000	0.000
	94.8017 - 92.55		1336.97 5	45.796	39.000	1.174	0.000	0.000	39.000	0.000
	92.55 - 87.46		623.388	19.953	39.000	0.512	0.000	0.000	39.000	0.000
L3	92.55 - 87.46	TP35.97x34.213x0.554	840.750	19.291	31.541	0.612	0.000	0.000	31.541	0.000
	87.46 - 86.23		1498.70 0	33.826	31.541	1.072	0.000	0.000	31.541	0.000
	86.23 - 85		1533.48 3	34.049	31.541	1.080	0.000	0.000	31.541	0.000
L4	85 - 84	TP38.529x35.97x0.704	1561.92 5	27.294	31.371	0.870	0.000	0.000	31.371	0.000
	84 - 83		1590.59 2	27.431	31.371	0.874	0.000	0.000	31.371	0.000
	83 - 82		1619.45 0	27.565	31.371	0.879	0.000	0.000	31.371	0.000
	82 - 81		1648.47 5	27.696	31.371	0.883	0.000	0.000	31.371	0.000
	81 - 80		1677.68 3	27.825	31.371	0.887	0.000	0.000	31.371	0.000
	80 - 79		1707.07 5	27.951	31.371	0.891	0.000	0.000	31.371	0.000
	79 - 78		1736.64 2	28.074	31.371	0.895	0.000	0.000	31.371	0.000
	78 - 77		1766.39 2	28.195	31.371	0.899	0.000	0.000	31.371	0.000
	77 - 76		1796.32 5	28.313	31.371	0.903	0.000	0.000	31.371	0.000
	76 - 75		1826.43 3	28.429	31.371	0.906	0.000	0.000	31.371	0.000
	75 - 74		1856.94 2	28.546	31.371	0.910	0.000	0.000	31.371	0.000
L5	74 - 72.9531	TP42.426x38.529x0.669	1888.88 3	30.086	31.464	0.956	0.000	0.000	31.464	0.000
	72.9531 - 71.9063		1921.00 0	30.207	31.464	0.960	0.000	0.000	31.464	0.000
	71.9063 - 70.8594		1953.28 3	30.325	31.464	0.964	0.000	0.000	31.464	0.000
	70.8594 - 69.8125		1985.74 2	30.440	31.464	0.967	0.000	0.000	31.464	0.000
	69.8125 - 68.7656		2018.36 7	30.552	31.464	0.971	0.000	0.000	31.464	0.000
	68.7656 - 67.7188		2051.17 5	30.662	31.464	0.975	0.000	0.000	31.464	0.000
	67.7188 - 66.6719		2084.15 0	30.770	31.464	0.978	0.000	0.000	31.464	0.000
	66.6719 - 65.625		2117.30 8	30.875	31.464	0.981	0.000	0.000	31.464	0.000
	65.625 - 64.5781		2150.63 3	30.977	31.464	0.985	0.000	0.000	31.464	0.000
	64.5781 - 63.5313		2184.14 2	31.078	31.464	0.988	0.000	0.000	31.464	0.000
	63.5313 - 62.4844		2217.81 7	31.176	31.464	0.991	0.000	0.000	31.464	0.000
	62.4844 -		2251.68	31.272	31.464	0.994	0.000	0.000	31.464	0.000

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 $\frac{f_{by}}{F_{by}}$
	61.4375		3							
	61.4375 - 60.3906		2285.71 7	31.366	31.464	0.997	0.000	0.000	31.464	0.000
	60.3906 - 59.3438		2319.93 3	31.457	31.464	1.000	0.000	0.000	31.464	0.000
	59.3438 - 58.2969		2354.33 3	31.547	31.464	1.003	0.000	0.000	31.464	0.000
	58.2969 - 57.25		2388.90 8	31.635	31.464	1.005	0.000	0.000	31.464	0.000
L6	57.25 - 56.235	TP45.77x42.426x0.709	2422.60 0	30.022	31.505	0.953	0.000	0.000	31.505	0.000
	56.235 - 55.22		2456.41 7	30.099	31.505	0.955	0.000	0.000	31.505	0.000
	55.22 - 54.205		2490.37 5	30.173	31.505	0.958	0.000	0.000	31.505	0.000
	54.205 - 53.19		2524.46 7	30.246	31.505	0.960	0.000	0.000	31.505	0.000
	53.19 - 52.175		2558.68 3	30.317	31.505	0.962	0.000	0.000	31.505	0.000
	52.175 - 51.16		2593.04 2	30.385	31.505	0.964	0.000	0.000	31.505	0.000
	51.16 - 50.145		2627.53 3	30.453	31.505	0.967	0.000	0.000	31.505	0.000
	50.145 - 49.13		2662.15 0	30.518	31.505	0.969	0.000	0.000	31.505	0.000
	49.13 - 42.88		1569.65 8	16.843	31.505	0.535	0.000	0.000	31.505	0.000
L7	49.13 - 42.88	TP47.494x43.566x0.618	1309.03 3	16.550	32.164	0.515	0.000	0.000	32.164	0.000
	42.88 - 41.817		2916.10 8	36.458	32.164	1.133	0.000	0.000	32.164	0.000
	41.817 - 40.754		2953.60 0	36.518	32.164	1.135	0.000	0.000	32.164	0.000
	40.754 - 39.691		2991.18 3	36.575	32.164	1.137	0.000	0.000	32.164	0.000
	39.691 - 38.628		3028.85 0	36.631	32.164	1.139	0.000	0.000	32.164	0.000
	38.628 - 37.565		3066.61 7	36.684	32.164	1.141	0.000	0.000	32.164	0.000
	37.565 - 36.502		3104.46 7	36.735	32.164	1.142	0.000	0.000	32.164	0.000
	36.502 - 35.439		3142.40 8	36.783	32.164	1.144	0.000	0.000	32.164	0.000
	35.439 - 34.376		3180.43 3	36.830	32.164	1.145	0.000	0.000	32.164	0.000
	34.376 - 33.313		3218.55 0	36.874	32.164	1.146	0.000	0.000	32.164	0.000
	33.313 - 32.25		3256.76 7	36.916	32.164	1.148	0.000	0.000	32.164	0.000
L8	32.25 - 30.6375	TP55x47.494x0.567	3314.88 3	40.177	33.190	1.211	0.000	0.000	33.190	0.000
	30.6375 - 29.025		3373.19 2	40.239	33.190	1.212	0.000	0.000	33.190	0.000
	29.025 - 27.4125		3431.68 3	40.296	33.190	1.214	0.000	0.000	33.190	0.000
	27.4125 - 25.8		3490.36 7	40.349	33.190	1.216	0.000	0.000	33.190	0.000
	25.8 - 24.1875		3549.23 3	40.397	33.190	1.217	0.000	0.000	33.190	0.000
	24.1875 - 22.575		3608.29 2	40.442	33.190	1.218	0.000	0.000	33.190	0.000
	22.575 -		3667.53	40.482	33.190	1.220	0.000	0.000	33.190	0.000

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 $\frac{f_{by}}{F_{by}}$
	20.9625		3							
	20.9625 - 19.35		3726.96 7	40.518	33.190	1.221	0.000	0.000	33.190	0.000
	19.35 - 17.7375		3786.58 3	40.551	33.190	1.222	0.000	0.000	33.190	0.000
	17.7375 - 16.125		3846.40 0	40.581	33.190	1.223	0.000	0.000	33.190	0.000
	16.125 - 14.5125		3906.40 0	40.607	33.190	1.223	0.000	0.000	33.190	0.000
	14.5125 - 12.9		3966.59 2	40.630	33.190	1.224	0.000	0.000	33.190	0.000
	12.9 - 11.2875		4026.98 3	40.649	33.190	1.225	0.000	0.000	33.190	0.000
	11.2875 - 9.675		4087.55 8	40.666	33.190	1.225	0.000	0.000	33.190	0.000
	9.675 - 8.0625		4148.32 5	40.681	33.190	1.226	0.000	0.000	33.190	0.000
	8.0625 - 6.45		4209.29 2	40.692	33.190	1.226	0.000	0.000	33.190	0.000
	6.45 - 4.8375		4270.45 0	40.701	33.190	1.226	0.000	0.000	33.190	0.000
	4.8375 - 3.225		4331.80 0	40.708	33.190	1.227	0.000	0.000	33.190	0.000
	3.225 - 1.6125		4393.35 0	40.712	33.190	1.227	0.000	0.000	33.190	0.000
	1.6125 - 0		4455.09 2	40.714	33.190	1.227	0.000	0.000	33.190	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	182 - 179.627	TP26.02x14.5x0.25	1.755	0.149	26.000	0.011	0.028	0.004	26.000	0.000
	179.627 - 177.255		2.309	0.189	26.000	0.015	0.334	0.042	26.000	0.002
	177.255 - 174.882		2.480	0.196	26.000	0.015	0.089	0.010	26.000	0.000
	174.882 - 172.509		2.626	0.201	26.000	0.015	0.086	0.009	26.000	0.000
	172.509 - 170.137		2.776	0.205	26.000	0.016	0.083	0.009	26.000	0.000
	170.137 - 167.764		7.081	0.507	26.000	0.039	0.778	0.075	26.000	0.003
	167.764 - 165.392		7.237	0.502	26.000	0.039	0.778	0.070	26.000	0.003
	165.392 - 163.019		7.397	0.498	26.000	0.038	0.775	0.066	26.000	0.003
	163.019 - 160.646		7.559	0.494	26.000	0.038	0.772	0.062	26.000	0.002
	160.646 - 158.274		12.030	0.764	26.000	0.059	0.768	0.058	26.000	0.002
	158.274 - 155.901		12.195	0.754	26.000	0.058	0.764	0.055	26.000	0.002
	155.901 - 153.528		12.362	0.743	26.000	0.057	0.761	0.052	26.000	0.002
	153.528 - 151.156		12.532	0.734	26.000	0.056	0.758	0.049	26.000	0.002
	151.156 -		12.704	0.725	26.000	0.056	0.754	0.046	26.000	0.002

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 $\frac{f_{vt}}{F_{vt}}$
	148.783									
	148.783 - 146.411		12.879	0.717	26.000	0.055	0.750	0.044	26.000	0.002
	146.411 - 144.038		13.056	0.710	26.000	0.055	0.746	0.042	26.000	0.002
	144.038 - 141.665		13.749	0.730	26.000	0.056	1.686	0.089	26.000	0.003
	141.665 - 139.293		18.843	0.977	26.000	0.075	1.727	0.087	26.000	0.003
	139.293 - 136.92		19.018	0.964	26.000	0.074	1.726	0.083	26.000	0.003
	136.92 - 133.08		8.191	0.401	26.000	0.031	0.722	0.033	26.000	0.001
L2	136.92 - 133.08	TP36.15x24.616x0.375	11.177	0.374	26.000	0.029	1.000	0.032	26.000	0.001
	133.08 - 130.828		19.543	0.640	26.000	0.049	1.715	0.052	26.000	0.002
	130.828 - 128.577		19.717	0.633	26.000	0.049	1.710	0.050	26.000	0.002
	128.577 - 126.325		19.893	0.626	26.000	0.048	1.705	0.048	26.000	0.002
	126.325 - 124.073		20.069	0.619	26.000	0.048	1.700	0.046	26.000	0.002
	124.073 - 121.822		20.247	0.613	26.000	0.047	1.695	0.044	26.000	0.002
	121.822 - 119.57		20.426	0.607	26.000	0.047	1.690	0.042	26.000	0.002
	119.57 - 117.318		20.605	0.601	26.000	0.046	1.685	0.040	26.000	0.002
	117.318 - 115.067		20.786	0.595	26.000	0.046	1.679	0.039	26.000	0.001
	115.067 - 112.815		20.967	0.590	26.000	0.045	1.674	0.037	26.000	0.001
	112.815 - 110.563		21.150	0.585	26.000	0.045	1.669	0.036	26.000	0.001
	110.563 - 108.312		21.333	0.580	26.000	0.045	1.663	0.035	26.000	0.001
	108.312 - 106.06		21.518	0.575	26.000	0.044	1.658	0.033	26.000	0.001
	106.06 - 103.808		21.704	0.571	26.000	0.044	1.652	0.032	26.000	0.001
	103.808 - 101.557		21.891	0.566	26.000	0.044	1.647	0.031	26.000	0.001
	101.557 - 99.305		22.079	0.562	26.000	0.043	1.641	0.030	26.000	0.001
	99.305 - 97.0533		22.268	0.558	26.000	0.043	1.635	0.029	26.000	0.001
	97.0533 - 94.8017		22.458	0.554	26.000	0.043	1.629	0.028	26.000	0.001
	94.8017 - 92.55		22.649	0.550	26.000	0.042	1.624	0.027	26.000	0.001
	92.55 - 87.46		14.215	0.334	26.000	0.026	0.746	0.012	26.000	0.000
L3	92.55 - 87.46	TP35.97x34.213x0.554	13.850	0.226	21.027	0.021	0.934	0.010	21.027	0.000
	87.46 - 86.23		28.230	0.457	21.027	0.043	1.684	0.018	21.027	0.001
	86.23 - 85		28.411	0.456	21.027	0.043	1.688	0.018	21.027	0.001
L4	85 - 84	TP38.529x35.97x0.704	28.583	0.360	20.914	0.034	1.693	0.014	20.914	0.001
	84 - 83		28.825	0.361	20.914	0.035	1.496	0.012	20.914	0.001
	83 - 82		29.002	0.361	20.914	0.035	1.493	0.012	20.914	0.001
	82 - 81		29.180	0.361	20.914	0.034	1.490	0.012	20.914	0.001
	81 - 80		29.358	0.361	20.914	0.034	1.487	0.012	20.914	0.001
	80 - 79		29.538	0.361	20.914	0.034	1.484	0.012	20.914	0.001
	79 - 78		29.718	0.360	20.914	0.034	1.481	0.012	20.914	0.001

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 $\frac{f_{vt}}{F_{vt}}$
	78 - 77		29.899	0.360	20.914	0.034	1.478	0.011	20.914	0.001
	77 - 76		30.081	0.360	20.914	0.034	1.475	0.011	20.914	0.001
	76 - 75		30.263	0.360	20.914	0.034	1.472	0.011	20.914	0.001
	75 - 74		30.490	0.361	20.914	0.034	1.469	0.011	20.914	0.001
L5	74 - 72.9531	TP42.426x38.529x0.669	30.653	0.379	20.976	0.036	1.466	0.011	20.976	0.001
	72.9531 - 71.9063		30.817	0.379	20.976	0.036	1.463	0.011	20.976	0.001
	71.9063 - 70.8594		30.981	0.378	20.976	0.036	1.460	0.011	20.976	0.001
	70.8594 - 69.8125		31.146	0.378	20.976	0.036	1.458	0.011	20.976	0.001
	69.8125 - 68.7656		31.312	0.377	20.976	0.036	1.455	0.011	20.976	0.001
	68.7656 - 67.7188		31.478	0.377	20.976	0.036	1.452	0.010	20.976	0.001
	67.7188 - 66.6719		31.645	0.377	20.976	0.036	1.448	0.010	20.976	0.000
	66.6719 - 65.625		31.812	0.376	20.976	0.036	1.445	0.010	20.976	0.000
	65.625 - 64.5781		31.981	0.376	20.976	0.036	1.442	0.010	20.976	0.000
	64.5781 - 63.5313		32.149	0.376	20.976	0.036	1.439	0.010	20.976	0.000
	63.5313 - 62.4844		32.319	0.376	20.976	0.036	1.436	0.010	20.976	0.000
	62.4844 - 61.4375		32.489	0.375	20.976	0.036	1.433	0.010	20.976	0.000
	61.4375 - 60.3906		32.660	0.375	20.976	0.036	1.430	0.009	20.976	0.000
	60.3906 - 59.3438		32.831	0.375	20.976	0.036	1.427	0.009	20.976	0.000
	59.3438 - 58.2969		33.003	0.374	20.976	0.036	1.424	0.009	20.976	0.000
	58.2969 - 57.25		33.176	0.374	20.976	0.036	1.421	0.009	20.976	0.000
L6	57.25 - 56.235	TP45.77x42.426x0.709	33.305	0.353	21.003	0.034	1.417	0.008	21.003	0.000
	56.235 - 55.22		33.435	0.352	21.003	0.034	1.415	0.008	21.003	0.000
	55.22 - 54.205		33.566	0.352	21.003	0.033	1.412	0.008	21.003	0.000
	54.205 - 53.19		33.697	0.351	21.003	0.033	1.409	0.008	21.003	0.000
	53.19 - 52.175		33.828	0.351	21.003	0.033	1.406	0.008	21.003	0.000
	52.175 - 51.16		33.961	0.350	21.003	0.033	1.403	0.008	21.003	0.000
	51.16 - 50.145		34.093	0.349	21.003	0.033	1.400	0.008	21.003	0.000
	50.145 - 49.13		34.226	0.349	21.003	0.033	1.398	0.008	21.003	0.000
	49.13 - 42.88		19.409	0.191	21.003	0.018	0.764	0.004	21.003	0.000
L7	49.13 - 42.88	TP47.494x43.566x0.618	15.783	0.181	21.442	0.017	0.630	0.004	21.442	0.000
	42.88 - 41.817		35.251	0.402	21.442	0.038	1.377	0.008	21.442	0.000
	41.817 - 40.754		35.334	0.401	21.442	0.037	1.374	0.008	21.442	0.000
	40.754 - 39.691		35.418	0.400	21.442	0.037	1.371	0.008	21.442	0.000
	39.691 - 38.628		35.502	0.398	21.442	0.037	1.369	0.008	21.442	0.000
	38.628 - 37.565		35.586	0.397	21.442	0.037	1.366	0.008	21.442	0.000
	37.565 - 36.502		35.670	0.396	21.442	0.037	1.363	0.008	21.442	0.000
	36.502 - 35.439		35.754	0.395	21.442	0.037	1.361	0.008	21.442	0.000
	35.439 - 34.376		35.839	0.394	21.442	0.037	1.358	0.008	21.442	0.000
	34.376 - 33.313		35.924	0.393	21.442	0.037	1.355	0.008	21.442	0.000

Section No.	Elevation ft	Size	Actual V K	Actual f_v ksi	Allow. F_v ksi	Ratio $\frac{f_v}{F_v}$	Actual T kip-ft	Actual f_{vt} ksi	Allow. F_{vt} ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
	33.313 - 32.25		36.009	0.391	21.442	0.036	1.353	0.007	21.442	0.000
L8	32.25 - 30.6375	TP55x47.494x0.567	36.134	0.424	22.127	0.038	1.350	0.008	22.127	0.000
	30.6375 - 29.025		36.249	0.422	22.127	0.038	1.346	0.008	22.127	0.000
	29.025 - 27.4125		36.365	0.420	22.127	0.038	1.342	0.008	22.127	0.000
	27.4125 - 25.8		36.481	0.418	22.127	0.038	1.338	0.008	22.127	0.000
	25.8 - 24.1875		36.597	0.416	22.127	0.038	1.334	0.007	22.127	0.000
	24.1875 - 22.575		36.714	0.415	22.127	0.037	1.329	0.007	22.127	0.000
	22.575 - 20.9625		36.831	0.413	22.127	0.037	1.325	0.007	22.127	0.000
	20.9625 - 19.35		36.949	0.411	22.127	0.037	1.321	0.007	22.127	0.000
	19.35 - 17.7375		37.066	0.409	22.127	0.037	1.317	0.007	22.127	0.000
	17.7375 - 16.125		37.185	0.407	22.127	0.037	1.313	0.007	22.127	0.000
	16.125 - 14.5125		37.303	0.406	22.127	0.037	1.308	0.007	22.127	0.000
	14.5125 - 12.9		37.422	0.404	22.127	0.037	1.304	0.006	22.127	0.000
	12.9 - 11.2875		37.541	0.402	22.127	0.036	1.300	0.006	22.127	0.000
	11.2875 - 9.675		37.660	0.401	22.127	0.036	1.295	0.006	22.127	0.000
	9.675 - 8.0625		37.780	0.399	22.127	0.036	1.291	0.006	22.127	0.000
	8.0625 - 6.45		37.901	0.398	22.127	0.036	1.287	0.006	22.127	0.000
	6.45 - 4.8375		38.021	0.396	22.127	0.036	1.282	0.006	22.127	0.000
	4.8375 - 3.225		38.142	0.395	22.127	0.036	1.278	0.006	22.127	0.000
	3.225 - 1.6125		38.263	0.393	22.127	0.036	1.273	0.006	22.127	0.000
	1.6125 - 0		38.385	0.392	22.127	0.035	1.269	0.006	22.127	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	182 - 179.627	0.001	0.079	0.000	0.011	0.000	0.080 ✓	1.333	H1-3+VT ✓
	179.627 - 177.255	0.001	0.104	0.000	0.015	0.002	0.105 ✓	1.333	H1-3+VT ✓
	177.255 - 174.882	0.001	0.132	0.000	0.015	0.000	0.133 ✓	1.333	H1-3+VT ✓
	174.882 - 172.509	0.002	0.158	0.000	0.015	0.000	0.160 ✓	1.333	H1-3+VT ✓
	172.509 - 170.137	0.002	0.183	0.000	0.016	0.000	0.185 ✓	1.333	H1-3+VT ✓
	170.137 - 167.764	0.005	0.226	0.000	0.039	0.003	0.232 ✓	1.333	H1-3+VT ✓
	167.764 - 165.392	0.005	0.294	0.000	0.039	0.003	0.300 ✓	1.333	H1-3+VT ✓
	165.392 - 163.019	0.005	0.355	0.000	0.038	0.003	0.361 ✓	1.333	H1-3+VT ✓
	163.019 - 160.646	0.005	0.410	0.000	0.038	0.002	0.416 ✓	1.333	H1-3+VT ✓
	160.646 -	0.008	0.489	0.000	0.059	0.002	0.499	1.333	H1-3+VT ✓

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B+T Group 1717 S. Boulder, Suit 300 Tulsa, OK 74119 Phone: (918) 587-4630 FAX: (918) 295-0265	Project:	Date: 13:43:56 11/19/14
	Client: Crown Castle	Designed by: Nagabharana Nayak

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
	158.274								
	158.274 - 155.901	0.008	0.572	0.000	0.058	0.002	0.581	1.333	H1-3+VT
	155.901 - 153.528	0.008	0.646	0.000	0.057	0.002	0.655	1.333	H1-3+VT
	153.528 - 151.156	0.008	0.714	0.000	0.056	0.002	0.723	1.333	H1-3+VT
	151.156 - 148.783	0.008	0.775	0.000	0.056	0.002	0.784	1.333	H1-3+VT
	148.783 - 146.411	0.008	0.830	0.000	0.055	0.002	0.839	1.333	H1-3+VT
	146.411 - 144.038	0.008	0.880	0.000	0.055	0.002	0.890	1.333	H1-3+VT
	144.038 - 141.665	0.009	0.929	0.000	0.056	0.003	0.939	1.333	H1-3+VT
	141.665 - 139.293	0.013	0.984	0.000	0.075	0.003	0.998	1.333	H1-3+VT
	139.293 - 136.92	0.013	1.054	0.000	0.074	0.003	1.068	1.333	H1-3+VT
	136.92 - 133.08	0.005	0.483	0.000	0.031	0.001	0.489	1.333	H1-3+VT
L2	136.92 - 133.08	0.005	0.473	0.000	0.029	0.001	0.479	1.333	H1-3+VT
	133.08 - 130.828	0.009	0.851	0.000	0.049	0.002	0.861	1.333	H1-3+VT
	130.828 - 128.577	0.009	0.885	0.000	0.049	0.002	0.895	1.333	H1-3+VT
	128.577 - 126.325	0.009	0.916	0.000	0.048	0.002	0.926	1.333	H1-3+VT
	126.325 - 124.073	0.009	0.945	0.000	0.048	0.002	0.954	1.333	H1-3+VT
	124.073 - 121.822	0.009	0.971	0.000	0.047	0.002	0.981	1.333	H1-3+VT
	121.822 - 119.57	0.009	0.995	0.000	0.047	0.002	1.005	1.333	H1-3+VT
	119.57 - 117.318	0.010	1.018	0.000	0.046	0.002	1.028	1.333	H1-3+VT
	117.318 - 115.067	0.010	1.038	0.000	0.046	0.001	1.048	1.333	H1-3+VT
	115.067 - 112.815	0.010	1.057	0.000	0.045	0.001	1.067	1.333	H1-3+VT
	112.815 - 110.563	0.010	1.075	0.000	0.045	0.001	1.085	1.333	H1-3+VT
	110.563 - 108.312	0.010	1.091	0.000	0.045	0.001	1.101	1.333	H1-3+VT
	108.312 - 106.06	0.010	1.106	0.000	0.044	0.001	1.116	1.333	H1-3+VT
	106.06 - 103.808	0.010	1.120	0.000	0.044	0.001	1.130	1.333	H1-3+VT
	103.808 - 101.557	0.010	1.132	0.000	0.044	0.001	1.143	1.333	H1-3+VT
	101.557 - 99.305	0.010	1.144	0.000	0.043	0.001	1.155	1.333	H1-3+VT

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
	99.305 - 97.0533	0.010	1.155	0.000	0.043	0.001	1.166	1.333	H1-3+VT
	97.0533 - 94.8017	0.011	1.165	0.000	0.043	0.001	1.176	1.333	H1-3+VT
	94.8017 - 92.55	0.011	1.174	0.000	0.042	0.001	1.185	1.333	H1-3+VT
	92.55 - 87.46	0.006	0.512	0.000	0.026	0.000	0.518	1.333	H1-3+VT
L3	92.55 - 87.46	0.006	0.612	0.000	0.021	0.000	0.618	1.333	H1-3+VT
	87.46 - 86.23	0.011	1.072	0.000	0.043	0.001	1.084	1.333	H1-3+VT
	86.23 - 85	0.012	1.080	0.000	0.043	0.001	1.092	1.333	H1-3+VT
L4	85 - 84	0.009	0.870	0.000	0.034	0.001	0.880	1.333	H1-3+VT
	84 - 83	0.009	0.874	0.000	0.035	0.001	0.884	1.333	H1-3+VT
	83 - 82	0.009	0.879	0.000	0.035	0.001	0.888	1.333	H1-3+VT
	82 - 81	0.010	0.883	0.000	0.034	0.001	0.893	1.333	H1-3+VT
	81 - 80	0.010	0.887	0.000	0.034	0.001	0.897	1.333	H1-3+VT
	80 - 79	0.010	0.891	0.000	0.034	0.001	0.901	1.333	H1-3+VT
	79 - 78	0.010	0.895	0.000	0.034	0.001	0.905	1.333	H1-3+VT
	78 - 77	0.010	0.899	0.000	0.034	0.001	0.909	1.333	H1-3+VT
	77 - 76	0.010	0.903	0.000	0.034	0.001	0.913	1.333	H1-3+VT
	76 - 75	0.010	0.906	0.000	0.034	0.001	0.917	1.333	H1-3+VT
	75 - 74	0.010	0.910	0.000	0.034	0.001	0.920	1.333	H1-3+VT
L5	74 - 72.9531	0.011	0.956	0.000	0.036	0.001	0.967	1.333	H1-3+VT
	72.9531 - 71.9063	0.011	0.960	0.000	0.036	0.001	0.971	1.333	H1-3+VT
	71.9063 - 70.8594	0.011	0.964	0.000	0.036	0.001	0.975	1.333	H1-3+VT
	70.8594 - 69.8125	0.011	0.967	0.000	0.036	0.001	0.979	1.333	H1-3+VT
	69.8125 - 68.7656	0.011	0.971	0.000	0.036	0.001	0.982	1.333	H1-3+VT
	68.7656 - 67.7188	0.011	0.975	0.000	0.036	0.001	0.986	1.333	H1-3+VT
	67.7188 - 66.6719	0.011	0.978	0.000	0.036	0.000	0.990	1.333	H1-3+VT
	66.6719 - 65.625	0.011	0.981	0.000	0.036	0.000	0.993	1.333	H1-3+VT
	65.625 - 64.5781	0.011	0.985	0.000	0.036	0.000	0.996	1.333	H1-3+VT

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
	64.5781 - 63.5313	0.012	0.988	0.000	0.036	0.000	1.000	1.333	H1-3+VT
	63.5313 - 62.4844	0.012	0.991	0.000	0.036	0.000	1.003	1.333	H1-3+VT
	62.4844 - 61.4375	0.012	0.994	0.000	0.036	0.000	1.006	1.333	H1-3+VT
	61.4375 - 60.3906	0.012	0.997	0.000	0.036	0.000	1.009	1.333	H1-3+VT
	60.3906 - 59.3438	0.012	1.000	0.000	0.036	0.000	1.012	1.333	H1-3+VT
	59.3438 - 58.2969	0.012	1.003	0.000	0.036	0.000	1.015	1.333	H1-3+VT
	58.2969 - 57.25	0.012	1.005	0.000	0.036	0.000	1.018	1.333	H1-3+VT
L6	57.25 - 56.235	0.011	0.953	0.000	0.034	0.000	0.965	1.333	H1-3+VT
	56.235 - 55.22	0.011	0.955	0.000	0.034	0.000	0.967	1.333	H1-3+VT
	55.22 - 54.205	0.012	0.958	0.000	0.033	0.000	0.970	1.333	H1-3+VT
	54.205 - 53.19	0.012	0.960	0.000	0.033	0.000	0.972	1.333	H1-3+VT
	53.19 - 52.175	0.012	0.962	0.000	0.033	0.000	0.974	1.333	H1-3+VT
	52.175 - 51.16	0.012	0.964	0.000	0.033	0.000	0.977	1.333	H1-3+VT
	51.16 - 50.145	0.012	0.967	0.000	0.033	0.000	0.979	1.333	H1-3+VT
	50.145 - 49.13	0.012	0.969	0.000	0.033	0.000	0.981	1.333	H1-3+VT
	49.13 - 42.88	0.007	0.535	0.000	0.018	0.000	0.542	1.333	H1-3+VT
L7	49.13 - 42.88	0.007	0.515	0.000	0.017	0.000	0.521	1.333	H1-3+VT
	42.88 - 41.817	0.015	1.133	0.000	0.038	0.000	1.149	1.333	H1-3+VT
	41.817 - 40.754	0.015	1.135	0.000	0.037	0.000	1.151	1.333	H1-3+VT
	40.754 - 39.691	0.015	1.137	0.000	0.037	0.000	1.152	1.333	H1-3+VT
	39.691 - 38.628	0.015	1.139	0.000	0.037	0.000	1.154	1.333	H1-3+VT
	38.628 - 37.565	0.015	1.141	0.000	0.037	0.000	1.156	1.333	H1-3+VT
	37.565 - 36.502	0.015	1.142	0.000	0.037	0.000	1.157	1.333	H1-3+VT
	36.502 - 35.439	0.015	1.144	0.000	0.037	0.000	1.159	1.333	H1-3+VT
	35.439 - 34.376	0.015	1.145	0.000	0.037	0.000	1.161	1.333	H1-3+VT
	34.376 - 33.313	0.015	1.146	0.000	0.037	0.000	1.162	1.333	H1-3+VT

tnxTower	Job: 95171.003.01- Rocky Hill,CT (BU# 842872)	Page: 29 of 30
B+T Group 1717 S. Boulder, Suit 300 Tulsa, OK 74119 Phone: (918) 587-4630 FAX: (918) 295-0265	Project	Date: 13:43:56 11/19/14
	Client: Crown Castle	Designed by: Nagabharana Nayak

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
	33.313 - 32.25	0.015	1.148	0.000	0.036	0.000	1.163	1.333	H1-3+VT
L8	32.25 - 30.6375	0.016	1.211	0.000	0.038	0.000	1.227	1.333	H1-3+VT
	30.6375 - 29.025	0.016	1.212	0.000	0.038	0.000	1.229	1.333	H1-3+VT
	29.025 - 27.4125	0.016	1.214	0.000	0.038	0.000	1.231	1.333	H1-3+VT
	27.4125 - 25.8	0.016	1.216	0.000	0.038	0.000	1.232	1.333	H1-3+VT
	25.8 - 24.1875	0.016	1.217	0.000	0.038	0.000	1.234	1.333	H1-3+VT
	24.1875 - 22.575	0.016	1.218	0.000	0.037	0.000	1.235	1.333	H1-3+VT
	22.575 - 20.9625	0.017	1.220	0.000	0.037	0.000	1.237	1.333	H1-3+VT
	20.9625 - 19.35	0.017	1.221	0.000	0.037	0.000	1.238	1.333	H1-3+VT
	19.35 - 17.7375	0.017	1.222	0.000	0.037	0.000	1.239	1.333	H1-3+VT
	17.7375 - 16.125	0.017	1.223	0.000	0.037	0.000	1.240	1.333	H1-3+VT
	16.125 - 14.5125	0.017	1.223	0.000	0.037	0.000	1.241	1.333	H1-3+VT
	14.5125 - 12.9	0.017	1.224	0.000	0.037	0.000	1.241	1.333	H1-3+VT
	12.9 - 11.2875	0.017	1.225	0.000	0.036	0.000	1.242	1.333	H1-3+VT
	11.2875 - 9.675	0.017	1.225	0.000	0.036	0.000	1.243	1.333	H1-3+VT
	9.675 - 8.0625	0.017	1.226	0.000	0.036	0.000	1.243	1.333	H1-3+VT
	8.0625 - 6.45	0.017	1.226	0.000	0.036	0.000	1.244	1.333	H1-3+VT
	6.45 - 4.8375	0.017	1.226	0.000	0.036	0.000	1.244	1.333	H1-3+VT
	4.8375 - 3.225	0.017	1.227	0.000	0.036	0.000	1.244	1.333	H1-3+VT
	3.225 - 1.6125	0.018	1.227	0.000	0.036	0.000	1.245	1.333	H1-3+VT
	1.6125 - 0	0.018	1.227	0.000	0.035	0.000	1.245	1.333	H1-3+VT

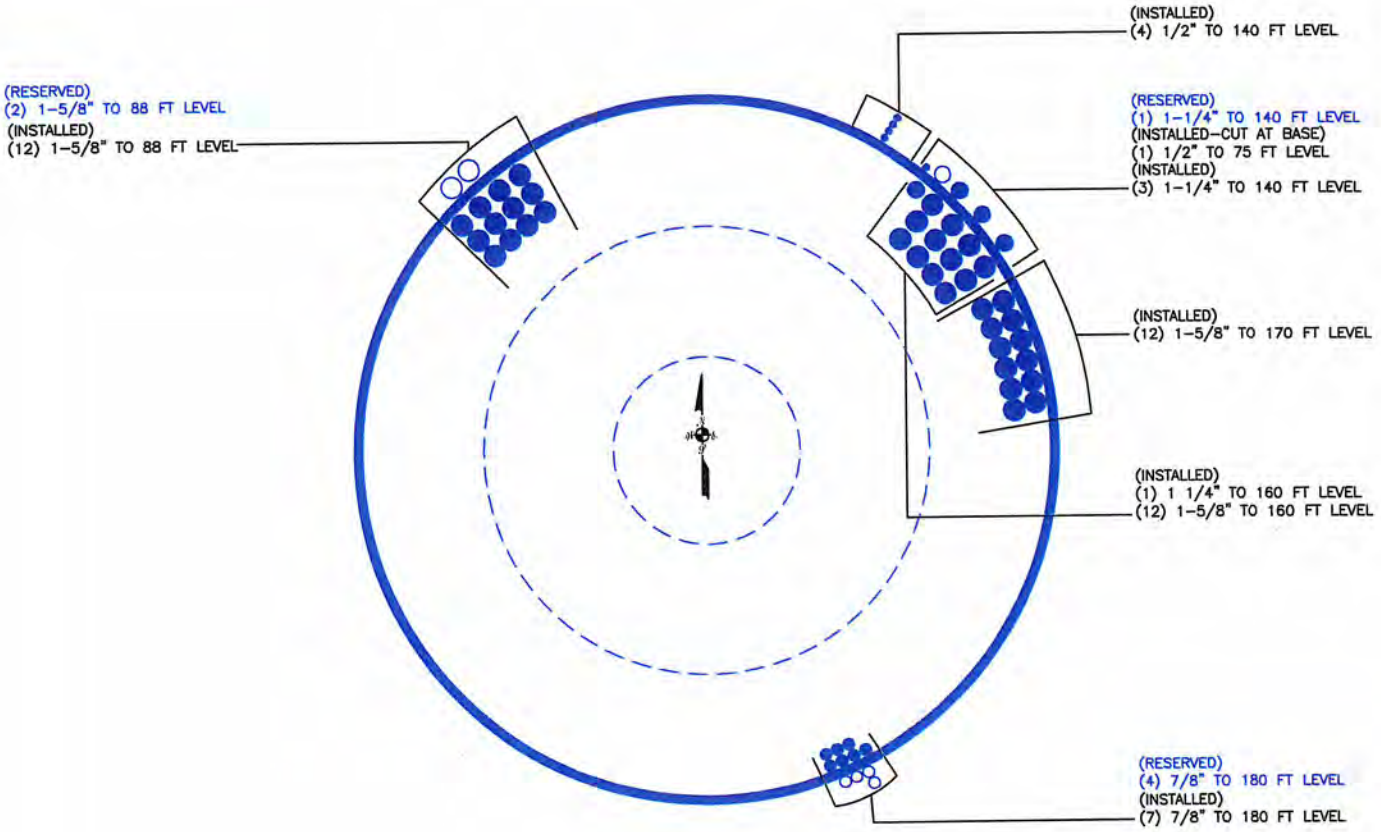
Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
L1	182 - 133.08	Pole	TP26.02x14.5x0.25	1	-9.677	1025.753	80.5	Pass**
L2	133.08 - 87.46	Pole	TP36.15x24.616x0.375	2	-17.157	2140.225	89.7	Pass**
L3	87.46 - 85	Pole	TP35.97x34.213x0.554	3	-22.750	2620.251	82.8	Pass**
L4	85 - 74	Pole	TP38.529x35.97x0.704	4	-26.972	3534.583	69.8	Pass**
L5	74 - 57.25	Pole	TP42.426x38.529x0.669	5	-33.444	3718.337	77.0	Pass**
L6	57.25 - 42.88	Pole	TP45.77x42.426x0.709	6	-36.736	4119.436	74.1	Pass**
L7	42.88 - 32.25	Pole	TP47.494x43.566x0.618	7	-44.924	3944.667	87.7	Pass**
L8	32.25 - 0	Pole	TP55x47.494x0.567	8	-57.340	4336.142	93.4	Pass**
							Summary	
						Pole (L8)	93.4	Pass**
						RATING =	**93.4**	**Pass****

**See "Appendix C" for Calculations.

APPENDIX B

BASE LEVEL DRAWING

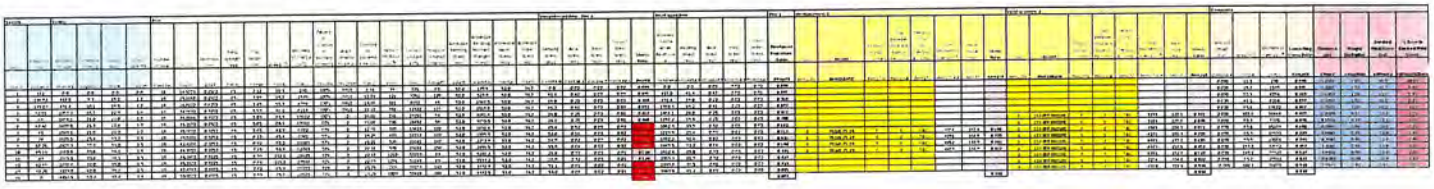


BUSINESS UNIT:842872

APPENDIX C

ADDITIONAL CALCULATIONS

Reinforced Pole Stress
and Effective Thickness Check



Reinforcement Capacity

AeroSolutions LLC
5500 Flatirons Parkway, Suite 100
Boulder, CO 80301
720-304-6882

Dimensions and Properties														Compression				Axial				
																		ASD-9			LRFD	
Model	Weight (lb/ft)	Area (in^2)	Moment of Inertia (in^4)	Moment of Inertia (in^4)	Centroid from Mating Edge (in)	Centroid from Bolt Hole Center (in)	Web Thickness (in)	Width (in)	Flange Width (in)	Flange Thickness (in)	Hole Diameter (in)	Yield Stress (ksi)	Ultimate Stress (ksi)	Slender. Ratio Coefficient	Unbraced Length (in)	Slender. Ratio Coefficient	Unbraced Length (in)	Allowable Axial (kip)	Allowable Axial w/ increase (kip)	Governing Axial	Design Axial Strength (kip)	Governing Axial
Model	*Wt*	*A*	*Ix*	*Iy*	*Y*	*X*	*Tw*	*W*	*Wf*	*Tf*	*Dh*	*Fy*	*Fu*	*Kx*	*Lx*	*Ky*	*Ly*	*PAll*	*PallInc*	*Ptype ASD*	*phiPn*	*Ptype LRFD*
CCI-XFP-040075	10.2	3.00	0.14	4.00	0.375	0	0.75	4	0	0	1.1875	65	80	0.80	16	1.00	16	82.5	110.0	Rupture	123.8	Rupture
CCI-XFP-045100	15.3	4.50	0.38	7.59	0.5	0	1	4.5	0	0	1.1875	65	80	0.80	20	1.00	20	129.7	172.9	Compress.	195.0	Rupture
CCI-XFP-060100	20.4	6.00	0.50	18.00	0.5	0	1	6	0	0	1.1875	65	80	0.80	16	1.00	16	188.5	251.3	Compress.	285.0	Rupture
CCI-XFP-065125	27.6	8.13	1.06	28.61	0.625	0	1.25	6.5	0	0	1.1875	65	80	0.80	19	1.00	19	260.6	347.5	Compress.	393.8	Rupture
CCI-XFP-085125	36.2	10.63	1.38	63.97	0.625	0	1.25	8.5	0	0	1.1875	65	80	0.80	17	1.00	17	330.9	441.2	Compress.	541.1	Compress.
PL1x5.75-14	19.6	5.75	0.48	15.84	0.5	0	1	5.75	0	0	1.1875	65	80	0.80	14	1.00	14	210.8	281.0	Rupture	170.0	Rupture

Rein1

Bottom	Top	Qty	Model	Position	T or T&C
49	74	3	L1x5.75-14	F	T&C
74	85	3	L1x5.75-14	F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C

Flats (Used for relative orientation only. Actual flat numbers may vary.)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
		1						1						1			
			1						1						1		

Rein2

Bottom	Top	Qty	Model	Position	T or T&C
0	32.25	3	FP-065125	F	T&C
32.25	57.25	3	FP-065125	F	T&C
57.25	88	3	FP-060100	F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
				1						1					1		
				1						1						1	
				1						1						1	
				1						1						1	

Rein3

Bottom	Top	Qty	Model	Position	T or T&C
0				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C

Anchor Rod Information for TIA/EIA-222-F and TIA-222-G-2

Site Information	
ID:	842872
Name:	ROCKY HILL
App. #:	269932 Rev. 1

AeroSolutions LLC
Optimizing Your Tower Infrastructure

Base Reactions		
Moment:	4457	ft-kip
Axial:	50	kip
Shear:	38	kip
Base Plate Type:	Circular	

Design Information	
TIA Code:	F
ASIF:	1.333
Failure:	95%
eta Factor:	0.50

Original Anchor Rod Data		
Quantity:	16	
Diameter:	2.25	in
Material:	A615 GR 75	
Bolt Circle:	64.0	in
Bolt Spacing:		in
Bolt Group Area:	63.62	in^2
Bolt Group MOIx:	32572	in^4

Reactions Seen by Original AR Group		
Moment:	3791.1	kip-ft
Axial:	50.2	kip
Shear:	37.8	kip

Original AR Capacity Check		
Tension Load:	174.6	kip
Allowable load:	194.8	kip
AR Capacity:	89.6%	Pass

First Added Anchor Rod Data		
Quantity:	4	
Diameter:	1.75	in
Material:	F1554 GR 105	
Bolt Circle:	69.0	in
Bolt Group Area:	9.62	in^2
Bolt Group MOIx:	5726	in^4

Reactions Seen by First Added AR Group		
Moment:	666.4	kip-ft
Axial:	0.0	kip
Shear:	0.0	kip

First Added AR Capacity Check		
Tension Load:	113.7	kip
Allowable load:	132.3	kip
AR Capacity:	85.9%	Pass

Second Added Anchor Rod Data		
Quantity:		
Diameter:		in
Material:		
Bolt Circle:		in
Bolt Group Area:	0.00	in^2
Bolt Group MOIx:	0	in^4

Reactions Seen by Second Added AR Group		
Moment:	0.0	kip-ft
Axial:	0.0	kip
Shear:	0.0	kip

Second Added AR Capacity Check		
Tension Load:	0.0	kip
Allowable load:	0.0	kip
AR Capacity:	0.0%	

Third Added Anchor Rod Data		
Quantity:		
Diameter:		in
Material:		
Bolt Circle:		in
Bolt Group Area:	0.00	in^2
Bolt Group MOIx:	0	in^4

Reactions Seen by Second Added AR Group		
Moment:	0.0	kip-ft
Axial:	0.0	kip
Shear:	0.0	kip

Second Added AR Capacity Check		
Tension Load:	0.0	kip
Allowable load:	0.0	kip
AR Capacity:	0.0%	

Rev.4.1

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

TIA Rev F

Site Data

BU#: *842872*
Site Name: *ROCKY HILL*
App #: *269932 Rev. 0*

Pole Manufacturer:	*Other*

Reactions		
Moment:	3791.1	ft-kips
Axial:	57	kips
Shear:	37.811232	kips

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

Anchor Rod Data		
Qty:	16	
Diam:	2.25	in
Rod Material:	A615-J	
Strength (Fu):	100	ksi
Yield (Fy):	75	ksi
Bolt Circle:	64	in

Plate Data		
Diam:	70	in
Thick:	2	in
Grade:	60	ksi
Single-Rod B-eff:	10.91	in

Stiffener Data (Welding at both sides)		
Config:	1	*
Weld Type:	Both	
Groove Depth:	0.5	in **
Groove Angle:	45	degrees
Fillet H. Weld:	0.5	in
Fillet V. Weld:	0.375	in
Width:	6.5	in
Height:	36	in
Thick:	1.25	in
Notch:	0.75	in
Grade:	65	ksi
Weld str.:	80	ksi

Pole Data		
Diam:	55	in
Thick:	0.4375	in
Grade:	65	ksi
# of Sides:	18	"0" IF Round
Fu	80	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor		
ASIF:	1.333	

Anchor Rod Results

		Stiffened
Maximum Rod Tension:	174.1 Kips	Service, ASD
Allowable Tension:	195.0 Kips	Fty*ASIF
Anchor Rod Stress Ratio:	89.3% Pass	

Base Plate Results

	Flexural Check	Stiffened
Base Plate Stress:	45.2 ksi	Service, ASD
Allowable Plate Stress:	60.0 ksi	0.75*Fy*ASIF
Base Plate Stress Ratio:	75.3% Pass	Y.L. Length: N/A, Roark

Stiffener Results

Horizontal Weld :	63.6% Pass
Vertical Weld:	21.4% Pass
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	2.2% Pass
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	33.4% Pass
Plate Comp. (AISC Bracket):	28.1% Pass

Pole Results

Pole Punching Shear Check:	3.4% Pass

* 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

==========

Pile Plus for Windows, Version 2012-06.030

Analysis of Individual Piles and Drilled Shafts
Subjected to Lateral Loading Using the p-y Method

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==========

This copy of LPile is licensed to:

sdfg
asdf

Serial Number of Security Device: 136083354
Company Name Stored in Security Device: B+T Group

Files Used for Analysis

Path to file locations: C:\Users\btabb\Desktop\
Name of input data file: 95171.003.01_L-Pile_Rev-G.lp6d
Name of output report file: 95171.003.01_L-Pile_Rev-G.lp6o
Name of plot output file: 95171.003.01_L-Pile_Rev-G.lp6p
Name of runtime messeage file: 95171.003.01_L-Pile_Rev-G.lp6r

---

Date and Time of Analysis

Date: December 4, 2014 Time: 9:46:46

Problem Title

Foundation Analysis - MS VANCLEAVE CCI 801209
Job Number: 85139.182.03
Client: US Cellular
Engineer: Santhosha
Description:

Program Options

Engineering units are US Customary Units: pounds, inches, feet

Basic Program Options:

This analysis computes pile response to lateral loading and will compute nonlinear moment-curvature and nominal moment capacity for section types with nonlinear properties.

Computation Options:
- Analysis does not use p-y multipliers (individual pile or shaft only)
- Analysis assumes no shear resistance at pile tip
- Analysis for fixed-length pile or shaft only
- No computation of foundation stiffness matrix values
- Report pile response for full length of pile
- Analysis assumes no loading by soil movements acting on pile
- No p-y curves to be computed and reported for user-specified depths

Solution Control Parameters:

- Number of pile increments = 100
- Maximum number of iterations allowed = 1000
- Deflection tolerance for convergence = 1.0000E-05 in
- Maximum allowable deflection = 300.0000 in

Pile Response Output Options:
- Values of pile-head deflection, bending moment, shear force, and soil reaction are printed for full length of pile.
- Printing Increment (nodal spacing of output points) = 1

Pile Structural Properties and Geometry

Total Number of Sections = 1

Total Pile Length = 18.50 ft

Depth of ground surface below top of pile = 0.00 ft

Pile dimensions used for p-y curve computations defined using 2 points.
p-y curves are computed using values of pile diameter interpolated over the length of the pile.

Point	Depth X ft	Pile Diameter in
1	0.00000	84.0000000
2	18.500000	84.0000000

Input Structural Properties:

Pile Section No. 1:

Section Type	= Drilled Shaft (Bored Pile)
Section Length	= 18.50000000 ft
Section Diameter	= 84.00000000 in

Ground Slope and Pile Batter Angles

Ground Slope Angle = 0.000 degrees
= 0.000 radians

Pile Batter Angle = 0.000 degrees
= 0.000 radians

Soil and Rock Layering Information

The soil profile is modelled using 8 layers

Layer 1 is soft clay, p-y criteria by Matlock, 1970

Distance from top of pile to top of layer = 0.0000 ft

Distance from top of pile to bottom of layer = 1.00000 ft
Effective unit weight at top of layer = 130.00000 pcf
Effective unit weight at bottom of layer = 130.00000 pcf
Undrained cohesion at top of layer = 0.01000 psf
Undrained cohesion at bottom of layer = 0.01000 psf
Epsilon-50 at top of layer = 0.0000
Epsilon-50 at bottom of layer = 0.0000

NOTE: Internal default values for Epsilon-50 will be computed for the above soil layer.

Layer 2 is sand, p-y criteria by Reese et al., 1974

Distance from top of pile to top of layer = 1.00000 ft
Distance from top of pile to bottom of layer = 3.00000 ft
Effective unit weight at top of layer = 109.00000 pcf
Effective unit weight at bottom of layer = 109.00000 pcf
Friction angle at top of layer = 33.00000 deg.
Friction angle at bottom of layer = 33.00000 deg.
Subgrade k at top of layer = 0.0000 pci
Subgrade k at bottom of layer = 0.0000 pci

NOTE: Internal default values for subgrade k will be computed for the above soil layer.

Layer 3 is sand, p-y criteria by Reese et al., 1974

Distance from top of pile to top of layer = 3.00000 ft
Distance from top of pile to bottom of layer = 5.00000 ft
Effective unit weight at top of layer = 112.00000 pcf
Effective unit weight at bottom of layer = 112.00000 pcf
Friction angle at top of layer = 34.00000 deg.

Friction angle at bottom of layer = 34.00000 deg.
Subgrade k at top of layer = 0.0000 pci
Subgrade k at bottom of layer = 0.0000 pci

NOTE: Internal default values for subgrade k will be computed for the above soil layer.

Layer 4 is sand, p-y criteria by Reese et al., 1974

Distance from top of pile to top of layer = 5.00000 ft
Distance from top of pile to bottom of layer = 7.00000 ft
Effective unit weight at top of layer = 109.00000 pcf
Effective unit weight at bottom of layer = 190.00000 pcf
Friction angle at top of layer = 33.00000 deg.
Friction angle at bottom of layer = 33.00000 deg.
Subgrade k at top of layer = 0.0000 pci
Subgrade k at bottom of layer = 0.0000 pci

NOTE: Internal default values for subgrade k will be computed for the above soil layer.

Layer 5 is sand, p-y criteria by Reese et al., 1974

Distance from top of pile to top of layer = 7.00000 ft
Distance from top of pile to bottom of layer = 8.50000 ft
Effective unit weight at top of layer = 122.00000 pcf
Effective unit weight at bottom of layer = 122.00000 pcf
Friction angle at top of layer = 35.00000 deg.
Friction angle at bottom of layer = 35.00000 deg.
Subgrade k at top of layer = 0.0000 pci
Subgrade k at bottom of layer = 0.0000 pci

NOTE: Internal default values for subgrade k will be computed for the above soil layer.

Layer 6 is sand, p-y criteria by Reese et al., 1974

Distance from top of pile to top of layer = 8.50000 ft
Distance from top of pile to bottom of layer = 10.00000 ft
Effective unit weight at top of layer = 60.00000 pcf
Effective unit weight at bottom of layer = 60.00000 pcf
Friction angle at top of layer = 35.00000 deg.
Friction angle at bottom of layer = 35.00000 deg.
Subgrade k at top of layer = 0.0000 pci
Subgrade k at bottom of layer = 0.0000 pci

NOTE: Internal default values for subgrade k will be computed for the above soil layer.

Layer 7 is sand, p-y criteria by Reese et al., 1974

Distance from top of pile to top of layer = 10.00000 ft
Distance from top of pile to bottom of layer = 15.00000 ft
Effective unit weight at top of layer = 60.00000 pcf
Effective unit weight at bottom of layer = 60.00000 pcf
Friction angle at top of layer = 35.00000 deg.
Friction angle at bottom of layer = 35.00000 deg.
Subgrade k at top of layer = 0.0000 pci
Subgrade k at bottom of layer = 0.0000 pci

NOTE: Internal default values for subgrade k will be computed for the above soil layer.

Layer 8 is sand, p-y criteria by Reese et al., 1974

Distance from top of pile to top of layer = 15.00000 ft
Distance from top of pile to bottom of layer = 18.50000 ft
Effective unit weight at top of layer = 60.00000 pcf
Effective unit weight at bottom of layer = 60.00000 pcf
Friction angle at top of layer = 35.00000 deg.
Friction angle at bottom of layer = 35.00000 deg.
Subgrade k at top of layer = 0.0000 pci
Subgrade k at bottom of layer = 0.0000 pci

NOTE: Internal default values for subgrade k will be computed for the above soil layer.

(Depth of lowest soil layer extends 0.00 ft below pile tip)

**** Warning - Possible Input Data Error ****

Values entered for effective unit weights of soil were outside the limits of 0.011574 pci (20 pcf) or 0.0810019 pci (140 pcf) This data may be erroneous. Please check your data.

Summary of Soil Properties

Layer Num.	Layer Soil Type (p-y Curve Criteria)	Layer Depth ft	Effective Unit Wt. pcf	Undrained Cohesion psf	Angle of Friction deg.	Uniaxial qu psi	GSI	RQD % or Epsilon 50	Strain Factor J	kpy pci	Rock Mass Rock Emass psi	krm	In-situ Test Type	In-situ Test Property	Elastic Subgrade Mod. pci
1	Soft Clay	0.00	130.000	0.01000	--	--	--	default	--	--	--	--	--	--	--

		1.000	130.000	0.01000	--	--	--	default	--	--	--	--	--	--	--			
2	Sand (Reese, et al.)		1.000	109.000	--	33.000	--	--	--	--	default	--	--	--	--	--		
		3.000	109.000	--	33.000	--	--	--	--	default	--	--	--	--	--			
3	Sand (Reese, et al.)		3.000	112.000	--	34.000	--	--	--	--	default	--	--	--	--	--		
		5.000	112.000	--	34.000	--	--	--	--	default	--	--	--	--	--			
4	Sand (Reese, et al.)		5.000	109.000	--	33.000	--	--	--	--	default	--	--	--	--	--		
		7.000	190.000	--	33.000	--	--	--	--	default	--	--	--	--	--			
5	Sand (Reese, et al.)		7.000	122.000	--	35.000	--	--	--	--	default	--	--	--	--	--		
		8.500	122.000	--	35.000	--	--	--	--	default	--	--	--	--	--			
6	Sand (Reese, et al.)		8.500	60.000	--	35.000	--	--	--	--	default	--	--	--	--	--		
		10.000	60.000	--	35.000	--	--	--	--	default	--	--	--	--	--			
7	Sand (Reese, et al.)		10.000	60.000	--	35.000	--	--	--	--	default	--	--	--	--	--		
		15.000	60.000	--	35.000	--	--	--	--	default	--	--	--	--	--			
8	Sand (Reese, et al.)		15.000	60.000	--	35.000	--	--	--	--	default	--	--	--	--	--		
		18.500	60.000	--	35.000	--	--	--	--	default	--	--	--	--	--			

Loading Type

Static loading criteria were used when computing p-y curves for all analyses.

Pile-head Loading and Pile-head Fixity Conditions

Number of loads specified = 1

Load No.	Load Type	Condition 1		Condition 2		Axial Thrust Force, lbs
1	1	V =	38000. lbs	M =	53460000. in-lbs	57000.

V = perpendicular shear force applied to pile head
M = bending moment applied to pile head
y = lateral deflection relative to pile axis
S = pile slope relative to original pile batter angle
R = rotational stiffness applie to pile head
Axial thrust is assumed to be acting axially for all pile batter angles.

Computations of Nominal Moment Capacity and Nonlinear Bending Stiffness

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Axial thrust force values were determined from pile-head loading conditions

Number of Pile Sections Analyzed = 1

Pile Section No. 1:

Dimensions and Properties of Drilled Shaft:

Length of Section	=	18.50000000 ft
Shaft Diameter	=	84.00000000 in
Concrete Cover Thickness	=	3.00000000 in
Number of Reinforcing Bars	=	20 bars
Yield Stress of Reinforcing Bars	=	60.00000000 ksi
Modulus of Elasticity of Reinforcing Bars	=	29000. ksi
Gross Area of Shaft	=	5541.76944093 sq. in.
Total Area of Reinforcing Steel	=	31.20000000 sq. in.
Area Ratio of Steel Reinforcement	=	0.56 percent
Edge-to-Edge Bar Spacing	=	10.57131568 in
Rebar Offset	=	0.0000000 in

Axial Structural Capacities:

Nom. Axial Structural Capacity = 0.85 Fc Ac + Fy As = 15923.952 kips
Tensile Load for Cracking of Concrete = -2099.867 kips
Nominal Axial Tensile Capacity = -1872.000 kips

Reinforcing Bar Dimensions and Positions Used in Computations:

Bar Number	Bar Diam. inches	Bar Area sq. in.	X inches	Y inches
1	1.41000	1.56000	38.29500	0.00000
2	1.41000	1.56000	36.42071	11.83381
3	1.41000	1.56000	30.98131	22.50924
4	1.41000	1.56000	22.50924	30.98131
5	1.41000	1.56000	11.83381	36.42071
6	1.41000	1.56000	0.00000	38.29500
7	1.41000	1.56000	-11.83381	36.42071
8	1.41000	1.56000	-22.50924	30.98131
9	1.41000	1.56000	-30.98131	22.50924
10	1.41000	1.56000	-36.42071	11.83381
11	1.41000	1.56000	-38.29500	0.00000
12	1.41000	1.56000	-36.42071	-11.83381
13	1.41000	1.56000	-30.98131	-22.50924
14	1.41000	1.56000	-22.50924	-30.98131
15	1.41000	1.56000	-11.83381	-36.42071
16	1.41000	1.56000	0.00000	-38.29500
17	1.41000	1.56000	11.83381	-36.42071
18	1.41000	1.56000	22.50924	-30.98131
19	1.41000	1.56000	30.98131	-22.50924
20	1.41000	1.56000	36.42071	-11.83381

Concrete Properties:

Compressive Strength of Concrete	=	3.00000000 ksi
Modulus of Elasticity of Concrete	=	3122.01857778 ksi
Modulus of Rupture of Concrete	=	-0.41079191 ksi
Compression Strain at Peak Stress	=	0.00163356
Tensile Strain at Fracture of Concrete	=	-0.00011596
Maximum Coarse Aggregate Size	=	0.75000000 in

Number of Axial Thrust Force Values Determined from Pile-head Loadings = 1

Number	Axial Thrust Force kips
1	57.000

Definitions of Run Messages and Notes:

C = concrete in section has cracked in tension.
Y = stress in reinforcing steel has reached yield stress.
T = ACI 318-08 criteria for tension-controlled section met, tensile strain in reinforcement exceeds 0.005 while simultaneously compressive strain in concrete more than than 0.003. See ACI 318-08, Section 10.3.4.
Z = depth of tensile zone in concrete section is less than 10 percent of section depth.

Bending Stiffness (EI) = Computed Bending Moment / Curvature.
Position of neutral axis is measured from edge of compression side of pile.

Compressive stresses and strains are positive in sign.
Tensile stresses and strains are negative in sign.

Axial Thrust Force = 57.000 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Concrete Stress ksi	Max Steel Stress ksi	Msg	Run
0.000000313	2978.2894345	9530526190.	50.6549680	0.0000158	-0.0000104	0.0573827	0.4552544		
0.000000625	5942.2195655	9507551305.	46.3415183	0.0000290	-0.0000235	0.1044915	0.8323275		
0.000000938	8891.0101562	9483744167.	44.9038300	0.0000421	-0.0000367	0.1512205	1.2094041		
0.000001250	11825.	9459725440.	44.1850453	0.0000552	-0.0000498	0.1975697	1.5864829		
0.000001563	14743.	9435621742.	43.7538167	0.0000684	-0.0000629	0.2435390	1.9635636		
0.000001875	17647.	9411475465.	43.4663644	0.0000815	-0.0000760	0.2891283	2.3406461		
0.000002188	20535.	9387304856.	43.2610701	0.0000946	-0.0000891	0.3343377	2.7177304		
0.000002500	23408.	9363119027.	43.1071245	0.0001078	-0.0001022	0.3791672	3.0948165		
0.000002813	26266.	9338923040.	42.9874111	0.0001209	-0.0001153	0.4236167	3.4719045		
0.000003125	26266.	8405030736.	21.7708774	0.0000680	-0.0001945	0.2400608	-5.6014518	C	
0.000003438	26266.	7640937033.	21.4477368	0.0000737	-0.0002150	0.2596184	-6.1938100	C	
0.000003750	26266.	7004192280.	21.1678521	0.0000794	-0.0002356	0.2789673	-6.7873211	C	
0.000004063	26266.	6465408258.	20.9306779	0.0000850	-0.0002562	0.2982428	-7.3808733	C	
0.000004375	26266.	6003593383.	20.7280960	0.0000907	-0.0002768	0.3174606	-7.9743353	C	
0.000004688	26266.	5603353824.	20.5518707	0.0000963	-0.0002974	0.3365991	-8.5678863	C	
0.000005000	26266.	5253144210.	20.3919425	0.0001020	-0.0003180	0.3555703	-9.1622683	C	
0.000005313	26266.	4944135727.	20.2514311	0.0001076	-0.0003387	0.3744847	-9.7565576	C	
0.000005625	26266.	4669461520.	20.1271019	0.0001132	-0.0003593	0.3933422	-10.3507540	C	
0.000005938	26266.	4423700387.	20.0164015	0.0001188	-0.0003799	0.4121427	-10.9448571	C	
0.000006250	26266.	4202515368.	19.9172870	0.0001245	-0.0004005	0.4308861	-11.5388667	C	
0.000006563	26266.	4002395588.	19.8281047	0.0001301	-0.0004211	0.4495723	-12.1327825	C	
0.000006875	26266.	3820468516.	19.7475016	0.0001358	-0.0004417	0.4682013	-12.7266043	C	
0.000007188	26266.	3654361189.	19.6711041	0.0001414	-0.0004624	0.4866942	-13.3210105	C	
0.000007500	26266.	3502096140.	19.6011806	0.0001470	-0.0004830	0.5051221	-13.9153932	C	

0.000007813	26266.	3362012294.	19.5372826	0.0001526	-0.0005036	0.5234934	-14.5096781	C
0.000008125	26266.	3232704129.	19.4787162	0.0001583	-0.0005242	0.5418080	-15.1038650	C
0.000008438	26266.	3112974347.	19.4248903	0.0001639	-0.0005449	0.5600660	-15.6979534	C
0.000008750	26266.	3001796691.	19.3752980	0.0001695	-0.0005655	0.5782671	-16.2919431	C
0.000009063	26266.	2898286461.	19.3295027	0.0001752	-0.0005861	0.5964112	-16.8858338	C
0.000009375	26266.	2801676912.	19.2871258	0.0001808	-0.0006067	0.6144984	-17.4796252	C
0.000009688	26266.	2711300237.	19.2478375	0.0001865	-0.0006273	0.6325285	-18.0733169	C
0.0000100	26266.	2626572105.	19.2113494	0.0001921	-0.0006479	0.6505014	-18.6669086	C
0.0000103	26266.	2546979011.	19.1774080	0.0001978	-0.0006685	0.6684170	-19.2604001	C
0.0000106	26266.	2472067863.	19.1457896	0.0002034	-0.0006891	0.6862752	-19.8537911	C
0.0000109	26266.	2401437353.	19.1162961	0.0002091	-0.0007097	0.7040759	-20.4470811	C
0.0000113	26266.	2334730760.	19.0887514	0.0002147	-0.0007303	0.7218191	-21.0402698	C
0.0000116	26266.	2271629929.	19.0629984	0.0002204	-0.0007508	0.7395046	-21.6333571	C
0.0000119	26266.	2211850194.	19.0388967	0.0002261	-0.0007714	0.7571324	-22.2263424	C
0.0000122	26266.	2155136086.	19.0163201	0.0002318	-0.0007920	0.7747023	-22.8192256	C
0.0000128	26266.	2050007497.	18.9752995	0.0002431	-0.0008331	0.8096682	-24.0046840	C
0.0000134	26266.	1954658311.	18.9391540	0.0002545	-0.0008743	0.8444015	-25.1897296	C
0.0000141	26266.	1867784608.	18.9072402	0.0002659	-0.0009154	0.8789014	-26.3743598	C
0.0000147	26266.	1788304412.	18.8778993	0.0002773	-0.0009565	0.9131166	-27.5590510	C
0.0000153	26266.	1715312395.	18.8515896	0.0002887	-0.0009976	0.9470831	-28.7434597	C
0.0000159	26266.	1648045242.	18.8283030	0.0003001	-0.0010387	0.9808171	-29.9274249	C
0.0000166	26266.	1585854856.	18.8077038	0.0003115	-0.0010797	1.0143176	-31.1109435	C
0.0000172	26266.	1528187407.	18.7895049	0.0003229	-0.0011208	1.0475838	-32.2940123	C
0.0000178	26473.	1486184048.	18.7734601	0.0003344	-0.0011618	1.0806150	-33.4766282	C
0.0000184	27342.	1482969143.	18.7593562	0.0003459	-0.0012029	1.1134100	-34.6587884	C
0.0000191	28211.	1479925094.	18.7470083	0.0003574	-0.0012439	1.1459683	-35.8404886	C
0.0000197	29079.	1477035288.	18.7362549	0.0003689	-0.0012849	1.1782889	-37.0217260	C
0.0000203	29946.	1474285252.	18.7269546	0.0003804	-0.0013259	1.2103708	-38.2024973	C
0.0000209	30813.	1471662239.	18.7189828	0.0003919	-0.0013668	1.2422133	-39.3827990	C
0.0000216	31679.	1469154975.	18.7122295	0.0004035	-0.0014078	1.2738154	-40.5626278	C
0.0000222	32544.	1466753454.	18.7065973	0.0004151	-0.0014487	1.3051762	-41.7419801	C
0.0000228	33408.	1464448764.	18.7019992	0.0004266	-0.0014896	1.3362947	-42.9208524	C
0.0000234	34271.	1462232943.	18.6983579	0.0004382	-0.0015305	1.3671702	-44.0992411	C
0.0000241	35134.	1460098851.	18.6956040	0.0004499	-0.0015714	1.3978015	-45.2771425	C

0.0000247	35995.	1458040069.	18.6936753	0.0004615	-0.0016122	1.4281878	-46.4545530	C
0.0000253	36856.	1456050809.	18.6925158	0.0004732	-0.0016531	1.4583281	-47.6314688	C
0.0000259	37716.	1454125840.	18.6920748	0.0004848	-0.0016939	1.4882214	-48.8078862	C
0.0000266	38576.	1452260419.	18.6923067	0.0004965	-0.0017347	1.5178668	-49.9838012	C
0.0000272	39434.	1450450237.	18.6931699	0.0005082	-0.0017755	1.5472633	-51.1592100	C
0.0000278	40292.	1448691370.	18.6946269	0.0005199	-0.0018163	1.5764098	-52.3341087	C
0.0000284	41149.	1446980236.	18.6966433	0.0005317	-0.0018571	1.6053053	-53.5084932	C
0.0000291	42004.	1445313560.	18.6991879	0.0005434	-0.0018978	1.6339489	-54.6823594	C
0.0000297	42859.	1443688337.	18.7022321	0.0005552	-0.0019385	1.6623395	-55.8557033	C
0.0000303	43714.	1442101811.	18.7057497	0.0005670	-0.0019792	1.6904760	-57.0285206	C
0.0000309	44567.	1440551444.	18.7097168	0.0005788	-0.0020199	1.7183573	-58.2008072	C
0.0000316	45420.	1439034897.	18.7141115	0.0005907	-0.0020606	1.7459825	-59.3725587	C
0.0000322	46271.	1437550010.	18.7189133	0.0006025	-0.0021012	1.7733504	-60.0000000	CY
0.0000328	47122.	1436094785.	18.7241038	0.0006144	-0.0021419	1.8004599	-60.0000000	CY
0.0000334	47963.	1434410276.	18.7285371	0.0006262	-0.0021825	1.8272232	-60.0000000	CY
0.0000341	48740.	1430893388.	18.7250450	0.0006378	-0.0022234	1.8530842	-60.0000000	CY
0.0000347	49445.	1425429636.	18.7128807	0.0006491	-0.0022646	1.8779715	-60.0000000	CY
0.0000353	50005.	1416078568.	18.6828378	0.0006597	-0.0023065	1.9011490	-60.0000000	CY
0.0000359	50536.	1406207612.	18.6503241	0.0006702	-0.0023485	1.9238067	-60.0000000	CY
0.0000366	51065.	1396660025.	18.6192789	0.0006808	-0.0023905	1.9462567	-60.0000000	CY
0.0000372	51595.	1387419428.	18.5896304	0.0006913	-0.0024324	1.9684984	-60.0000000	CY
0.0000397	53212.	1340772311.	18.4195720	0.0007310	-0.0026027	2.0501121	-60.0000000	CY
0.0000422	54587.	1293924161.	18.2448823	0.0007697	-0.0027740	2.1262911	-60.0000000	CY
0.0000447	55908.	1251078661.	18.0867257	0.0008083	-0.0029455	2.1990310	-60.0000000	CY
0.0000472	56725.	1202127613.	17.8722454	0.0008433	-0.0031204	2.2623424	-60.0000000	CY
0.0000497	57521.	1157651496.	17.6779771	0.0008784	-0.0032954	2.3229287	-60.0000000	CY
0.0000522	58313.	1117366903.	17.5049114	0.0009135	-0.0034702	2.3811447	-60.0000000	CY
0.0000547	59101.	1080697781.	17.3501831	0.0009488	-0.0036449	2.4369630	-60.0000000	CY
0.0000572	59790.	1045503128.	17.1956570	0.0009834	-0.0038204	2.4889891	-60.0000000	CY
0.0000597	60198.	1008547730.	17.0048404	0.0010150	-0.0039988	2.5342503	-60.0000000	CY
0.0000622	60600.	974477183.	16.8306915	0.0010467	-0.0041771	2.5775267	-60.0000000	CY
0.0000647	61001.	943004858.	16.6717520	0.0010785	-0.0043553	2.6188415	-60.0000000	CY
0.0000672	61399.	913840117.	16.5263475	0.0011104	-0.0045334	2.6581730	-60.0000000	CY
0.0000697	61794.	886734011.	16.3930448	0.0011424	-0.0047114	2.6954994	-60.0000000	CY

0.0000722	62181.	861386390.	16.2610784	0.0011738	-0.0048899	2.7300406	-60.0000000	CY
0.0000747	62565.	837696365.	16.1384677	0.0012053	-0.0050684	2.7625433	-60.0000000	CY
0.0000772	62947.	815511676.	16.0253464	0.0012370	-0.0052468	2.7930770	-60.0000000	CY
0.0000797	63268.	793956507.	15.9102225	0.0012678	-0.0054259	2.8208600	-60.0000000	CY
0.0000822	63476.	772333027.	15.7834328	0.0012972	-0.0056065	2.8453641	-60.0000000	CY
0.0000847	63651.	751592967.	15.6597220	0.0013262	-0.0057876	2.8677792	-60.0000000	CY
0.0000872	63823.	732025152.	15.5442765	0.0013553	-0.0059685	2.8885124	-60.0000000	CY
0.0000897	63987.	713442712.	15.4259543	0.0013835	-0.0061502	2.9069390	-60.0000000	CY
0.0000922	64149.	695850008.	15.3147299	0.0014118	-0.0063319	2.9237390	-60.0000000	CY
0.0000947	64309.	679171777.	15.2104500	0.0014402	-0.0065135	2.9389211	-60.0000000	CY
0.0000972	64468.	663337193.	15.1125930	0.0014688	-0.0066950	2.9524674	-60.0000000	CY
0.0000997	64626.	648282528.	15.0206899	0.0014974	-0.0068764	2.9643592	-60.0000000	CY
0.0001022	64782.	633950288.	14.9343185	0.0015261	-0.0070576	2.9745778	-60.0000000	CY
0.0001047	64936.	620288460.	14.8530972	0.0015549	-0.0072388	2.9831038	-60.0000000	CY
0.0001072	65090.	607249881.	14.7766805	0.0015839	-0.0074199	2.9899175	-60.0000000	CY
0.0001097	65241.	594791681.	14.7047552	0.0016129	-0.0076008	2.9949985	-60.0000000	CY
0.0001122	65387.	582833054.	14.6297948	0.0016413	-0.0077825	2.9982551	-60.0000000	CY
0.0001147	65530.	571380530.	14.5585646	0.0016697	-0.0079641	2.9998370	-60.0000000	CY
0.0001172	65672.	560401885.	14.4914889	0.0016982	-0.0081455	2.9967921	-60.0000000	CY
0.0001197	65812.	549868864.	14.4282360	0.0017269	-0.0083269	2.9962849	-60.0000000	CY
0.0001222	65951.	539756164.	14.3684668	0.0017556	-0.0085081	2.9988583	-60.0000000	CY
0.0001247	66089.	530038306.	14.3119872	0.0017845	-0.0086892	2.9999576	-60.0000000	CY
0.0001272	66212.	520584360.	14.2556601	0.0018131	-0.0088706	2.9959855	-60.0000000	CY
0.0001297	66310.	511305820.	14.1966138	0.0018411	-0.0090526	2.9952824	-60.0000000	CY
0.0001322	66404.	502343931.	14.1395766	0.0018691	-0.0092347	2.9980096	-60.0000000	CY
0.0001347	66454.	493396303.	14.0747753	0.0018957	-0.0094181	2.9995180	-60.0000000	CY
0.0001372	66504.	484769475.	14.0129604	0.0019224	-0.0096013	2.9998441	-60.0000000	CY
0.0001522	66771.	438742905.	13.6730867	0.0020809	-0.0107029	3.0000000	-60.0000000	CY
0.0001672	67005.	400778215.	13.3925853	0.0022391	-0.0118047	2.9992132	60.0000000	CY
0.0001822	67225.	368985318.	13.1712063	0.0023996	-0.0129041	2.9935686	60.0000000	CY
0.0001972	67430.	341961330.	12.9886548	0.0025612	-0.0140025	2.9965446	60.0000000	CY
0.0002122	67613.	318645645.	12.8190354	0.0027200	-0.0151037	2.9941618	60.0000000	CY
0.0002272	67783.	298357528.	12.6815734	0.0028811	-0.0162027	2.9985268	60.0000000	CY
0.0002422	67933.	280496414.	12.5767325	0.0030459	-0.0172978	2.9855398	60.0000000	CYT

0.0002572	68067.	264659517.	12.4952076	0.0032136	-0.0183901	2.9981806	60.0000000 CYT
0.0002722	68191.	250530205.	12.4306703	0.0033835	-0.0194803	2.9927023	60.0000000 CYT
0.0002872	68284.	237768829.	12.3679778	0.0035519	-0.0205718	2.9803674	60.0000000 CYT
0.0003022	68334.	226131543.	12.2949103	0.0037154	-0.0216684	2.9935391	60.0000000 CYT
0.0003172	68343.	215464645.	12.2480963	0.0038849	-0.0227588	2.9998001	60.0000000 CYT

Summary of Results for Nominal (Unfactored) Moment Capacity for Section 1

Moment values interpolated at maximum compressive strain = 0.003
or maximum developed moment if pile fails at smaller strains.

Load No.	Axial Thrust kips	Nominal Mom. Cap. in-kip	Max. Comp. Strain
1	57.000	67891.035	0.00300000

Note note that the values of moment capacity in the table above are not factored by a strength reduction factor (phi-factor).

In ACI 318-08, the value of the strength reduction factor depends on whether the transverse reinforcing steel bars are spirals or tied hoops.

The above values should be multiplied by the appropriate strength reduction factor to compute ultimate moment capacity according to ACI 318-08, Section 9.3.2.2 or the value required by the design standard being followed.

ERROR 2 in computing i_BottomNodeInLayer
Num_Nodes_To_Assign = 101
ilayer = 8
klayer = 9

jlayer = 9
i_Number_of_Layers = 8

Computed Values of Pile Loading and Deflection
for Lateral Loading for Load Case Number 1

Pile-head conditions are Shear and Moment (Loading Type 1)

Shear force at pile head = 38000.000 lbs
Applied moment at pile head = 53460000.000 in-lbs
Axial thrust load on pile head = 57000.000 lbs

Depth X inches	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi*	Bending Stiffness lb-in^2	Soil Res. p lb/in	Soil Spr. Es*h lb/inch	Distrib. Lat. Load lb/inch
0.00	4.1288	53460000.	38000.	-0.0257	0.000	1.329E+12	-0.008700	0.002339	0.000
2.220	4.0719	53547607.	38000.	-0.0256	0.000	1.329E+12	-0.0260	0.0142	0.000
4.440	4.0151	53635203.	38000.	-0.0255	0.000	1.329E+12	-0.0259	0.0143	0.000
6.660	3.9585	53722788.	38000.	-0.0254	0.000	1.323E+12	-0.0257	0.0144	0.000
8.880	3.9022	53810360.	38000.	-0.0253	0.000	1.320E+12	-0.0256	0.0146	0.000
11.100	3.8460	53897922.	38000.	-0.0253	0.000	1.317E+12	-0.0255	0.0147	0.000
13.320	3.7900	53985471.	37919.	-0.0252	0.000	1.314E+12	-73.0812	42.8074	0.000
15.540	3.7342	54072649.	37622.	-0.0251	0.000	1.311E+12	-193.7514	115.1849	0.000
17.760	3.6787	54158861.	37059.	-0.0250	0.000	1.308E+12	-314.1261	189.5682	0.000
19.980	3.6233	54243512.	36227.	-0.0249	0.000	1.305E+12	-435.1741	266.6305	0.000
22.200	3.5682	54326008.	35125.	-0.0248	0.000	1.302E+12	-557.4421	346.8233	0.000
24.420	3.5132	54405744.	33750.	-0.0247	0.000	1.300E+12	-681.2467	430.4802	0.000
26.640	3.4585	54482111.	32098.	-0.0246	0.000	1.297E+12	-806.7705	517.8682	0.000
28.860	3.4039	54554490.	30166.	-0.0245	0.000	1.295E+12	-934.1132	609.2166	0.000
31.080	3.3496	54622254.	27949.	-0.0244	0.000	1.293E+12	-1063.3218	704.7328	0.000

33.300	3.2955	54684765.	25443.	-0.0243	0.000	1.291E+12	-1194.4076	804.6122	0.000
35.520	3.2416	54741378.	22644.	-0.0242	0.000	1.289E+12	-1327.3575	909.0453	0.000
37.740	3.1879	54791437.	19484.	-0.0241	0.000	1.287E+12	-1519.3231	1058.0419	0.000
39.960	3.1344	54833997.	15951.	-0.0240	0.000	1.286E+12	-1663.1086	1177.9387	0.000
42.180	3.0811	54868348.	12109.	-0.0240	0.000	1.284E+12	-1798.2993	1295.7173	0.000
44.400	3.0280	54893824.	7967.3741	-0.0239	0.000	1.284E+12	-1933.1087	1417.2631	0.000
46.620	2.9752	54909761.	3526.8190	-0.0238	0.000	1.283E+12	-2067.3913	1542.6431	0.000
48.840	2.9225	54915497.	-1211.0964	-0.0237	0.000	1.283E+12	-2201.0010	1671.9273	0.000
51.060	2.8701	54910374.	-6244.7158	-0.0236	0.000	1.283E+12	-2333.7912	1805.1884	0.000
53.280	2.8178	54893737.	-11572.	-0.0235	0.000	1.284E+12	-2465.6156	1942.5034	0.000
55.500	2.7658	54864936.	-17190.	-0.0234	0.000	1.285E+12	-2596.0144	2083.7017	0.000
57.720	2.7140	54823329.	-23097.	-0.0233	0.000	1.286E+12	-2724.8534	2228.8640	0.000
59.940	2.6624	54768281.	-29287.	-0.0232	0.000	1.288E+12	-2852.3718	2378.3871	0.000
62.160	2.6110	54699163.	-35607.	-0.0231	0.000	1.290E+12	-2840.5746	2415.1653	0.000
64.380	2.5599	54616034.	-42049.	-0.0230	0.000	1.293E+12	-2963.5469	2570.0970	0.000
66.600	2.5089	54518288.	-48770.	-0.0229	0.000	1.296E+12	-3091.6530	2735.6661	0.000
68.820	2.4581	54405292.	-55782.	-0.0228	0.000	1.300E+12	-3224.8511	2912.4555	0.000
71.040	2.4076	54276392.	-63094.	-0.0227	0.000	1.304E+12	-3363.0708	3101.0658	0.000
73.260	2.3572	54130906.	-70719.	-0.0226	0.000	1.309E+12	-3506.2157	3302.1188	0.000
75.480	2.3071	53968127.	-78667.	-0.0225	0.000	1.314E+12	-3654.1657	3516.2619	0.000
77.700	2.2571	53787329.	-86949.	-0.0225	0.000	1.320E+12	-3806.7791	3744.1727	0.000
79.920	2.2074	53587757.	-95574.	-0.0224	0.000	1.327E+12	-3963.8940	3986.5632	0.000
82.140	2.1578	53368638.	-104553.	-0.0223	0.000	1.335E+12	-4125.3300	4244.1850	0.000
84.360	2.1085	53129177.	-113928.	-0.0222	0.000	1.343E+12	-4320.1792	4548.6740	0.000
86.580	2.0593	52868413.	-123659.	-0.0221	0.000	1.350E+12	-4446.1843	4793.0812	0.000
88.800	2.0104	52585726.	-133666.	-0.0220	0.000	1.358E+12	-4569.4362	5045.9161	0.000
91.020	1.9616	52280507.	-143944.	-0.0219	0.000	1.367E+12	-4689.8226	5307.6138	0.000
93.240	1.9130	51952165.	-154485.	-0.0218	0.000	1.377E+12	-4807.2337	5578.6533	0.000
95.460	1.8646	51600120.	-165284.	-0.0218	0.000	1.387E+12	-4921.5619	5859.5623	0.000
97.680	1.8164	51223809.	-176334.	-0.0217	0.000	1.394E+12	-5032.7024	6150.9242	0.000
99.900	1.7684	50822685.	-187626.	-0.0216	0.000	1.401E+12	-5140.5532	6453.3835	0.000
102.120	1.7205	50396215.	-199137.	-0.0215	0.000	1.409E+12	-5230.2105	6748.5527	0.000
104.340	1.6729	49943960.	-210799.	-0.0214	0.000	1.417E+12	-5276.0922	7001.7728	0.000
106.560	1.6253	49465691.	-222562.	-0.0214	0.000	1.425E+12	-5320.7691	7267.4271	0.000

108.780	1.5780	48961190.	-234420.	-0.0213	0.000	1.429E+12	-5362.3634	7543.9218	0.000
111.000	1.5309	48430251.	-246367.	-0.0212	0.000	1.432E+12	-5400.8791	7832.1867	0.000
113.220	1.4839	47872686.	-258397.	-0.0211	0.000	1.435E+12	-5436.3193	8133.2624	0.000
115.440	1.4370	47288318.	-270501.	-0.0211	0.000	1.436E+12	-5468.6860	8448.3172	0.000
117.660	1.3904	46676989.	-282674.	-0.0210	0.000	1.437E+12	-5497.9533	8778.6236	0.000
119.880	1.3439	46038556.	-294908.	-0.0209	0.000	1.438E+12	-5523.2372	9124.2059	0.000
122.100	1.2975	45372892.	-307407.	-0.0208	0.000	1.439E+12	-5737.0528	9815.9851	0.000
124.320	1.2513	44678945.	-320155.	-0.0208	0.000	1.440E+12	-5747.5985	10197.	0.000
126.540	1.2053	43956663.	-332921.	-0.0207	0.000	1.442E+12	-5753.3218	10597.	0.000
128.760	1.1594	43206018.	-345694.	-0.0206	0.000	1.443E+12	-5754.0635	11018.	0.000
130.980	1.1136	42427006.	-358463.	-0.0206	0.000	1.445E+12	-5749.6515	11462.	0.000
133.200	1.0680	41619649.	-371216.	-0.0205	0.000	1.446E+12	-5739.8991	11931.	0.000
135.420	1.0226	40783995.	-383942.	-0.0204	0.000	1.448E+12	-5724.6031	12428.	0.000
137.640	0.9772	39920121.	-396627.	-0.0204	0.000	1.449E+12	-5703.5406	12957.	0.000
139.860	0.9321	39028129.	-409259.	-0.0203	0.000	1.451E+12	-5676.4665	13520.	0.000
142.080	0.8870	38108154.	-421825.	-0.0203	0.000	1.453E+12	-5643.8795	14125.	0.000
144.300	0.8421	37160356.	-434323.	-0.0202	0.000	1.455E+12	-5615.6773	14805.	0.000
146.520	0.7973	36184875.	-446751.	-0.0202	0.000	1.458E+12	-5580.6162	15539.	0.000
148.740	0.7526	35181883.	-459093.	-0.0201	0.000	1.460E+12	-5538.2684	16336.	0.000
150.960	0.7081	34151590.	-471332.	-0.0200	0.000	1.463E+12	-5488.1458	17207.	0.000
153.180	0.6636	33094242.	-483451.	-0.0200	0.000	1.465E+12	-5429.6858	18164.	0.000
155.400	0.6193	32010129.	-495430.	-0.0199	0.000	1.468E+12	-5362.2331	19222.	0.000
157.620	0.5751	30899582.	-507248.	-0.0199	0.000	1.471E+12	-5285.0157	20402.	0.000
159.840	0.5310	29762982.	-518883.	-0.0199	0.000	1.475E+12	-5197.1115	21730.	0.000
162.060	0.4869	28600763.	-530310.	-0.0198	0.000	1.479E+12	-5097.4021	23239.	0.000
164.280	0.4430	27413417.	-541443.	-0.0198	0.000	1.483E+12	-4932.5540	24717.	0.000
166.500	0.3992	26201756.	-551926.	-0.0197	0.000	9.339E+12	-4511.0509	25087.	0.000
168.720	0.3554	24967862.	-561457.	-0.0197	0.000	9.349E+12	-4075.0999	25457.	0.000
170.940	0.3116	23713884.	-570003.	-0.0197	0.000	9.360E+12	-3624.7004	25827.	0.000
173.160	0.2678	22442041.	-577534.	-0.0197	0.000	9.371E+12	-3159.8510	26197.	0.000
175.380	0.2240	21154624.	-584017.	-0.0197	0.000	9.382E+12	-2680.5497	26567.	0.000
177.600	0.1802	19853996.	-589420.	-0.0197	0.000	9.392E+12	-2186.7940	26937.	0.000
179.820	0.1365	18542589.	-593710.	-0.0197	0.000	9.403E+12	-1678.5809	27306.	0.000
182.040	0.0927	17222910.	-600719.	-0.0197	0.000	9.414E+12	-4635.9279	111000.	0.000

184.260	0.0490	15880382.	-608584.	-0.0197	0.000	9.425E+12	-2448.9273	111000.	0.000
186.480	0.005247	14525785.	-611593.	-0.0197	0.000	9.437E+12	-262.3419	111000.	0.000
188.700	-0.0385	13169894.	-609749.	-0.0197	0.000	9.447E+12	1923.8642	111000.	0.000
190.920	-0.0822	11823484.	-603052.	-0.0197	0.000	9.460E+12	4109.7268	111000.	0.000
193.140	-0.1259	10497328.	-591502.	-0.0197	0.000	9.469E+12	6295.2814	111000.	0.000
195.360	-0.1696	9202198.	-575101.	-0.0197	0.000	9.480E+12	8480.5628	111000.	0.000
197.580	-0.2133	7948863.	-553849.	-0.0197	0.000	9.489E+12	10666.	111000.	0.000
199.800	-0.2570	6748092.	-527746.	-0.0197	0.000	9.499E+12	12850.	111000.	0.000
202.020	-0.3007	5610653.	-496793.	-0.0197	0.000	9.509E+12	15035.	111000.	0.000
204.240	-0.3444	4547313.	-460990.	-0.0197	0.000	9.515E+12	17220.	111000.	0.000
206.460	-0.3881	3568838.	-420338.	-0.0197	0.000	9.523E+12	19404.	111000.	0.000
208.680	-0.4318	2685994.	-374836.	-0.0197	0.000	9.531E+12	21588.	111000.	0.000
210.900	-0.4755	1909545.	-324486.	-0.0197	0.000	9.531E+12	23773.	111000.	0.000
213.120	-0.5191	1250257.	-269286.	-0.0197	0.000	9.531E+12	25957.	111000.	0.000
215.340	-0.5628	718894.	-209238.	-0.0197	0.000	9.531E+12	28141.	111000.	0.000
217.560	-0.6065	326221.	-144341.	-0.0197	0.000	9.531E+12	30325.	111000.	0.000
219.780	-0.6502	83001.	-74595.	-0.0197	0.000	9.531E+12	32509.	111000.	0.000
222.000	-0.6939	0.000	0.000	-0.0197	0.000	9.531E+12	34693.	55500.	0.000

* This analysis makes computations of pile response using nonlinear moment-curvature relationships. The above values of total stress are computed for combined axial and bending stress in elastic sections and do not equal actual stresses in concrete and steel in the range of nonlinear bending.

Output Verification: Computed forces and moments are within specified convergence limits.

Output Summary for Load Case No. 1:

Pile-head deflection = 4.1288384 inches
Computed slope at pile head = -0.0257070 radians
Maximum bending moment = **54915497**. inch-lbs
Maximum shear force = -611593. lbs
Depth of maximum bending moment = 48.8400000 inches below pile head

Depth of maximum shear force = 186.4800000 inches below pile head
Number of iterations = 53
Number of zero deflection points = 1

Summary of Pile Response(s)

Definitions of Pile-head Loading Conditions:

Load Type 1: Load 1 = Shear, lbs, and Load 2 = Moment, in-lbs
Load Type 2: Load 1 = Shear, lbs, and Load 2 = Slope, radians
Load Type 3: Load 1 = Shear, lbs, and Load 2 = Rotational Stiffness, in-lbs/radian
Load Type 4: Load 1 = Top Deflection, inches, and Load 2 = Moment, in-lbs
Load Type 5: Load 1 = Top Deflection, inches, and Load 2 = Slope, radians

Load Case No.	Load Type No.	Pile-head Condition 1 V(lbs) or y(inches)	Pile-head Condition 2 in-lb, rad., or in-lb/rad.	Axial Loading lbs	Pile-head Deflection inches	Maximum Moment in-lbs	Maximum Shear lbs	Pile-head Rotation radians
1	1	V = 38000.	M = 53460000.	57000.	4.12883837	54915497.	-611593.	-0.02570705

The analysis ended normally.

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

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

Site Data

BU#: *814822*
Site Name: *Gardendale, AL*
App #: *269932 Revision # 1*

Maximum Shaft Superimposed Forces		
TIA Revision:	F	
Max. Service Shaft M:	4576.291	ft-kips (* **Note**)
Max. Service Shaft P:	57	kips
Max Axial Force Type:	Comp.	

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

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

Load Factor	Shaft Factored Loads		
1.30	Mu:	5949.179	ft-kips
1.30	Pu:	74.1	kips

Pier Properties

Concrete:

Pier Diameter =	7.0	ft
Concrete Area =	5541.8	in^2

Reinforcement:

Clear Cover to **Tie**=	3.00	in
Horiz. **Tie** Bar Size=	3	
Vert. Cage Diameter =	6.32	ft
Vert. Cage Diameter =	75.84	in
Vertical Bar Size =	11	
Bar Diameter =	1.41	in
Bar Area =	1.56	in^2
Number of Bars =	28	
As Total=	43.68	in^2
A s/ Aconc, Rho:	0.0079	0.79%

Material Properties

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

ACI 318 Code

Select Analysis ACI Code= 2002

Seismic Properties

Seismic Design Category = B
Seismic Risk = **Low**

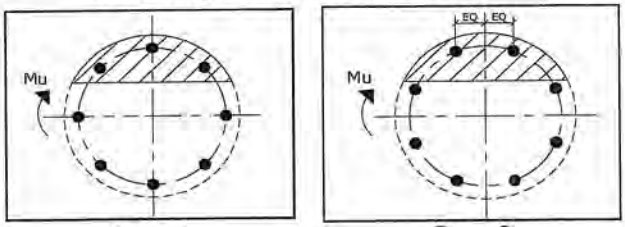
Solve (Run) <-- Press Upon Completing All Input

ACI 10.5 , ACI 21.10.4, and IBC 1810.
Min As for Flexural, Tension Controlled, Shafts:

(3)*(Sqrt(f'c)/Fy:	0.0027
200 / Fy:	0.0033

Results:

Governing Orientation Case: **2**



Case 1 Case 2

Dist. From Edge to Neutral Axis: **15.66** in
Extreme Steel Strain, εt: **0.0123**
εt > 0.0050, Tension Controlled
Reduction Factor,φ: **0.900**

Minimum Rho Check:

Actual Req'd Min. Rho:	0.33%	Flexural
Provided Rho:	0.79%	OK

Ref. Shaft Max Axial Capacities, ϕ Max(Pn or Tn):		
Max Pu = (φ=0.65) Pn.		
Pn per ACI 318 (10-2)	8653.28	kips
at Mu=(ϕ=0.65)Mn=	5273.52	ft-kips
Max Tu, (φ=0.9) Tn =	2358.72	kips
at Mu=ϕ=(0.90)Mn=	0.00	ft-kips

Output Note: Negative Pu=Tension

For Axial Compression, φ Pn = Pu:	74.10	kips
Drilled Shaft Moment Capacity, φMn:	**6822.34**	ft-kips
Drilled Shaft Superimposed Mu:	**5949.18**	ft-kips

(Mu/φMn, Drilled Shaft Flexure CSR:	**87.2%**

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

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

Site Data

BU#: *814822*
Site Name: *Gardendale, AL*
App #: *269932 Revision # 1*

Maximum Shaft Superimposed Forces		
TIA Revision:	F	
Max. Service Shaft M:	3096.696	ft-kips (* Note)
Max. Service Shaft P:	57	kips
Max Axial Force Type:	Comp.	

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

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

Load Factor	Shaft Factored Loads		
1.30	Mu:	4025.705	ft-kips
1.30	Pu:	74.1	kips

Pier Properties		
Concrete:		
Pier Diameter =	7.0	ft
Concrete Area =	5541.8	in^2
Reinforcement:		
Clear Cover to **Tie**=	3.00	in
Horiz. **Tie** Bar Size=	3	
Vert. Cage Diameter =	6.32	ft
Vert. Cage Diameter =	75.84	in
Vertical Bar Size =	11	
Bar Diameter =	1.41	in
Bar Area =	1.56	in^2
Number of Bars =	20	
As Total=	31.2	in^2
A s/ Aconc, Rho:	0.0056	0.56%

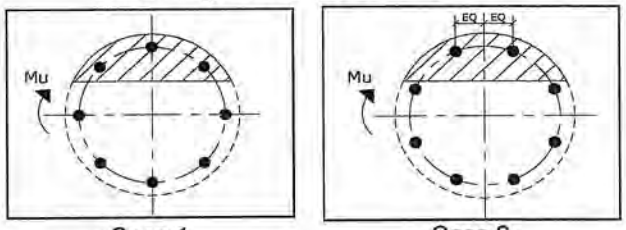
Material Properties		
Concrete Comp. strength, f'c =	3000	psi
Reinforcement yield strength, Fy =	60	ksi
Reinforcing Modulus of Elasticity, E =	29000	ksi
Reinforcement yield strain =	0.00207	
Limiting compressive strain =	0.003	
ACI 318 Code		
Select Analysis ACI Code=	2002	
Seismic Properties		
Seismic Design Category =	B	
Seismic Risk =	**Low**	

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

ACI 10.5 , ACI 21.10.4, and IBC 1810.
Min As for Flexural, Tension Controlled, Shafts:
(3)*(Sqrt(f'c)/Fy: 0.0027
200 / Fy: 0.0033

Results:

Governing Orientation Case: **1**



Case 1 Case 2

Dist. From Edge to Neutral Axis: **13.47** in
Extreme Steel Strain, εt: **0.0148**
εt > 0.0050, Tension Controlled
Reduction Factor,φ: **0.900**

Minimum Rho Check:
Actual Req'd Min. Rho: 0.33% Flexural
Provided Rho: 0.56% OK

Ref. Shaft Max Axial Capacities, ϕ Max(Pn or Tn):		
Max Pu = (φ=0.65) Pn,		
Pn per ACI 318 (10-2)	8280.46	kips
at Mu=(ϕ=0.65)Mn=	5058.95	ft-kips
Max Tu, (φ=0.9) Tn =	1684.8	kips
at Mu=ϕ=(0.90)Mn=	0.00	ft-kips

Output Note: Negative Pu=Tension

For Axial Compression, φ Pn = Pu:	74.10	kips
Drilled Shaft Moment Capacity, φMn:	**5082.54**	ft-kips
Drilled Shaft Superimposed Mu:	**4025.71**	ft-kips

(Mu/φMn, Drilled Shaft Flexure CSR:	**79.2%**

APPENDIX D

TOWER MODIFICATION DRAWINGS

TOWER MODIFICATION DRAWINGS PREPARED FOR: CROWN CASTLE

SITE NAME: ROCKY HILL
BU NUMBER: 842872

SITE ADDRESS:
52 NEW BRITAIN AVENUE
ROCKY HILL, CT 06067
HARTFORD COUNTY, USA

MAP

DIRECTIONS

FROM I-91 SOUTH: 12. TAKE EXIT 23 FOR WEST ST TOWARD STATE ROUTE 3 ROCKY HILL 0.2 MI 13. TURN RIGHT ONTO WEST ST 0.3 MI 14. TURN RIGHT ONTO CT-3 N 0.8 MI 15. TURN LEFT ONTO CT-160 W DESTINATION WILL BE ON THE LEFT.

PROJECT CONTACTS:

1. CROWN TOWER STRUCTURAL ANALYST
   TIMOTHY HOWELL
   (980) 209-8242
   TIMOTHY.HOWELL@CROWNCASTLE.COM
   3530 TORINGDON WAY SUITE 300
   CHARLOTTE, NC 28277

2. CROWN PROJECT MANAGER
   JERRY BRUNO
   (781) 970-0069
   JERRY.BRUNO.CONTRACTOR@CROWNCASTLE.COM

3. CROWN CONSTRUCTION MANAGER
   N/A

4. B+T GROUP PROJECT ENGINEER
   BRADEN TABB, E.I.
   (918) 587-4630
   BTABB@BTGRP.COM
   1717 S BOULDER AVENUE, SUITE 300
   TULSA, OK 74119

5. B+T GROUP ENGINEER (EOR)
   CHAD E TUTTLE, P.E.
   (918) 587-4630
   CTUTTLE@BTGRP.COM
   1717 S BOULDER AVENUE, SUITE 300
   TULSA, OK 74119

TOWER INFORMATION

TOWER MANUFACTURER / DWG #:	EEI / GS51668
TOWER HEIGHT / TYPE:	182' MONOPOLE
TOWER LOCATION: DATUM: (NAD 1983)	LAT. 41° 39' 36.89" LONG. -72° 40' 50.58" ELEV. 204 FT AMSL
STRUCTURAL DESIGN DRAWING REPORT:	B+T GROUP / WO. # 967052
STRUCTURAL ANALYSIS REPORT:	B+T GROUP / WO. # 950302
STRUCTURAL ANALYSIS DATE:	10/27/14
APPLICATION ID / REVISION #:	299932 / 1
CCISITES DOCUMENT ID:	5366165

CODE COMPLIANCE

THIS REINFORCEMENT DESIGN IS BASED ON THE REQUIREMENTS OF TIA/EIA-222-F STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWERS AND ANTENNA SUPPORTING STRUCTURES USING FASTEST MILE WIND SPEED OF 60 MPH WITH NO ICE, 38 MPH WITH 1.00 INCH ICE THICKNESS AND 50 MPH UNDER SERVICE LOADS.

DRAWINGS INCLUDED

SHEET NUMBER	DESCRIPTION
S1	TITLE SHEET
S2	MODIFICATION INSPECTION NOTES AND CHECKLIST
S3	GENERAL NOTES, AJAX BOLT NOTES AND DETAIL
S4	TOWER ELEV., SCHEDULES & TX LINE DIST. DIAG.
S5	TOWER SECTION (0'-35') AND ANCHOR ROD AND ANCHOR ROD BRACKET DETAILS
S6	TOWER SECTIONS (35'-60' AND 60'-90')
S7	IN-LINE SPLICE DETAIL
D1	DETAILS
D2	DETAILS
D3	PART DETAILS

B+T GRP
1717 S. BOULDER AVE. SUITE 300
TULSA, OK 74119
PH: (918) 587-4630
www.btgrp.com

CROWN CASTLE

ISSUED FOR:

REV	DATE	DESCRIPTION
0	12/04/14	ISSUED FOR CONSTRUCTION

PROJECT NO:	05171.003.01
PROJECT ENG:	BRADEN TABB
DRAWN BY:	RA
CHECKED BY:	NSH

B+T ENGINEERING, INC.

STATE OF CONNECTICUT
CHAD E. TUTTLE
No. 23024
LICENSED
PROFESSIONAL ENGINEER

IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS DOCUMENT.

ROCKY HILL
842872
52 NEW BRITAIN AVENUE
ROCKY HILL, CT
EXISTING 182' MONOPOLE

SHEET TITLE
TITLE SHEET

SHEET NUMBER:	REVISION:
S1	0

S:\Projects\Crown Castle\05171_842872_Rocky Hill\Tnw\ 05171.003.01_Rocky Hill-842872-Tnw_Mod.dwg, - Tnw151 - Ubm Rotec - December 4, 2014 - 1:35 PM

MI CHECKLIST

REQUIRED	REPORT ITEM	BRIEF DESCRIPTION
		PRE-CONSTRUCTION
X	MI CHECKLIST DRAWING	THIS CHECKLIST SHALL BE INCLUDED IN THE MI REPORT.
X	EOR APPROVAL	ONCE THE PRE-MODIFICATION MAPPING IS COMPLETE AND PRIOR TO FABRICATION, THE CONTRACTOR SHALL PROVIDE DETAILED ASSEMBLY DRAWINGS AND/OR SHOP DRAWINGS AS NECESSARY FOR NON-STANDARD PARTS. THESE ARE TO INCLUDE, BUT ARE NOT LIMITED TO, A VISUAL LAYOUT OF NEW REINFORCEMENT, EXISTING REINFORCEMENT CONFIGURATION, PORTHOLES, MOUNTS, STEP PEGS, SAFETY CLIMBS AND ANY OTHER MISCELLANEOUS ITEMS WHICH MAY AFFECT SUCCESSFUL INSTALLATION OF MODIFICATIONS ON THE TOWER. THESE DRAWINGS SHALL BE SUBMITTED TO THE EOR FOR APPROVAL. APPROVED ASSEMBLY/SHOP DRAWINGS SHALL BE SUBMITTED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
N/A	FABRICATION INSPECTION	A LETTER FROM THE FABRICATOR, STATING THAT THE WORK WAS PERFORMED IN ACCORDANCE WITH INDUSTRY STANDARDS AND THE CONTRACT DOCUMENTS SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
X	FABRICATOR CERTIFIED WELD INSPECTION	A VISUAL OBSERVATION BY A CWI OF A PORTION OF WELDING ON THE PROPOSED STRUCTURAL MEMBERS IS REQUIRED AND A WRITTEN REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
X	MATERIAL TEST REPORT (MTR)	MILL CERTIFICATION SHALL BE PROVIDED FOR ALL STEEL AS SPECIFIED IN THE MODIFICATION DRAWINGS AND THIS DOCUMENTATION SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
N/A	FABRICATOR NDE INSPECTION	CRITICAL SHOP WELDS THAT REQUIRE TESTING (PER ENG-STD-10069) ARE NOTED ON THESE CONTRACT DRAWINGS. A CERTIFIED WELD INSPECTOR SHALL PERFORM NON-DESTRUCTIVE EXAMINATION AND A REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
X	NDE REPORT OF MONOPOLE BASE PLATE	A NDE (PER ENG-SOW-10033) OF THE POLE TO BASE PLATE CONNECTION IS REQUIRED AND A WRITTEN REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
X	PACKING SLIPS	THE MATERIAL SHIPPING LIST SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
		CONSTRUCTION (PERFORMED BY CONTRACTOR)
X	CONSTRUCTION INSPECTIONS	A LETTER FROM THE GENERAL CONTRACTOR STATING THAT THE WORKMANSHIP WAS PERFORMED IN ACCORDANCE WITH INDUSTRY STANDARDS AND THESE CONTRACT DRAWINGS.
N/A	FOUNDATION INSPECTIONS	A VISUAL OBSERVATION OF THE EXCAVATION AND REBAR SHALL BE PERFORMED BEFORE PLACING THE CONCRETE. A WRITTEN REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
N/A	CONCRETE COMP. STRENGTH AND SLUMP TESTS	THE CONCRETE MIX DESIGN, SLUMP TEST, AND COMPRESSIVE STRENGTH TESTS SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
X	POST INSTALLED ANCHOR ROD VERIFICATION	POST INSTALLED ANCHOR ROD VERIFICATION SHALL BE PERFORMED IN ACCORDANCE WITH CROWN REQUIREMENTS AND A REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
N/A	BASE PLATE GROUT VERIFICATION	THE GENERAL CONTRACTOR SHALL PROVIDE DOCUMENTATION TO THE MI INSPECTOR THAT CERTIFIES THAT THE GROUT WAS INSTALLED IN ACCORDANCE WITH CROWN ENG-PRC-10012 FOR INCLUSION IN THE MI REPORT.
X	CONTRACTOR'S CERTIFIED WELD INSPECTION	A CERTIFIED WELD INSPECTOR SHALL INSPECT AND TEST AS NECESSARY ALL FIELD WELDS. CWI SHALL FOLLOW ALL THE PROCEDURES SPECIFIED IN CROWN STANDARD DOCUMENTS ENG-SOW-10066, ENG-STD-10069 AND SRV-STD-10159. A REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT. FULL PENETRATION WELDS IN THE VICINITY OF BASE OF THE TOWER ARE REQUIRED TO BE 100% NDE INSPECTED BY UT IN ACCORDANCE WITH AWS D1.1. PARTIAL PENETRATION AND FILLET WELDS IN THE VICINITY OF BASE OF THE TOWER ARE REQUIRED TO BE 50% NDE INSPECTED BY MP IN ACCORDANCE WITH AWS D1.1.
N/A	EARTHWORK: LIFT AND DENSITY	FOUNDATION SUB-GRADES SHALL BE INSPECTED AND APPROVED BY A GEOTECHNICAL ENGINEER AND A REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
X	ON SITE COLD GALVANIZING VERIFICATION	THE GENERAL CONTRACTOR SHALL PROVIDE DOCUMENTATION TO THE MI INSPECTOR VERIFYING THAT ANY ON-SITE COLD GALVANIZING WAS APPLIED IN ACCORDANCE WITH ENG-BUL-10149.
N/A	GUY WIRE TENSION REPORT	THE GENERAL CONTRACTOR SHALL PROVIDE A REPORT TO THE MI INSPECTOR INDICATING THE TEMPERATURE AND TENSION IN EVERY GUY CABLE AS PART OF PLUMB AND TENSION PROCEDURE FOR INCLUSION IN THE MI REPORT.
X	GC AS-BUILT DOCUMENTS	THE GENERAL CONTRACTOR SHALL SUBMIT A COPY OF THE CONTRACT DRAWINGS EITHER STATING "INSTALLED AS DESIGNED" OR NOTING ANY CHANGES THAT WERE REQUIRED AND APPROVED BY THE ENGINEER OF RECORD.
		POST-CONSTRUCTION
X	MI INSPECTOR REDLINE OR RECORD DRAWING(S)	THE MI INSPECTOR SHALL OBSERVE AND REPORT ANY DISCREPANCIES BETWEEN THE CONTRACTORS REDLINE DRAWING AND THE ACTUAL COMPLETED INSTALLATION.
X	POST INSTALLED ANCHOR ROD PULL-OUT TESTING	POST-INSTALLED ANCHOR RODS SHALL BE TESTED IN ACCORDANCE WITH ENG-PRC-10119 AND A REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
X	PHOTOGRAPHS	PHOTOGRAPHS SHALL BE SUBMITTED TO THE MI WHICH DOCUMENT ALL PHASES OF THE CONSTRUCTION. THE PHOTOS SHALL BE ORGANIZED IN A MANNER THAT EASILY IDENTIFIES THE EXACT LOCATION OF THE PHOTO.
ADDITIONAL TESTING AND INSPECTIONS:		

NOTE: X DENOTES A DOCUMENT NEEDED FOR THE MI REPORT AND N/A DENOTES A DOCUMENT THAT IS NOT REQUIRED FOR THE MI REPORT

MODIFICATION INSPECTION NOTES:

GENERAL

THE MODIFICATION INSPECTION (MI) IS A VISUAL INSPECTION OF TOWER MODIFICATIONS AND A REVIEW OF CONSTRUCTION INSPECTIONS AND OTHER REPORTS TO ENSURE THE INSTALLATION WAS CONSTRUCTED IN ACCORDANCE WITH THE CONTRACT DOCUMENTS, NAMELY THE MODIFICATION DRAWINGS, AS DESIGNED BY THE ENGINEER OF RECORD (EOR).

THE MI IS TO CONFIRM INSTALLATION CONFIGURATION AND WORKMANSHIP ONLY AND IS NOT A REVIEW OF THE MODIFICATION DESIGN ITSELF, NOR DOES THE MI INSPECTOR TAKE OWNERSHIP OF THE MODIFICATION DESIGN. OWNERSHIP OF THE STRUCTURAL MODIFICATION DESIGN EFFECTIVENESS AND INTEGRITY RESIDES WITH THE EOR AT ALL TIMES.

ALL MI'S SHALL BE CONDUCTED BY A CROWN ENGINEERING VENDOR (AEV) OR ENGINEERING SERVICE VENDOR (AESV) THAT IS APPROVED TO PERFORM ELEVATED WORK FOR CROWN. SEE ENG-BUL-10173 LIST OF APPROVED MI VENDORS.

TO ENSURE THAT THE REQUIREMENTS OF THE MI ARE MET, IT IS VITAL THAT THE GENERAL CONTRACTOR (GC) AND THE MI INSPECTOR BEGIN COMMUNICATING AND COORDINATING AS SOON AS A PO IS RECEIVED. IT IS EXPECTED THAT EACH PARTY WILL BE PROACTIVE IN REACHING OUT TO THE OTHER PARTY. IF CONTACT INFORMATION IS NOT KNOWN, CONTACT YOUR CROWN POINT OF CONTACT (POC).

REFER TO ENG-SOW-10007 : MODIFICATION INSPECTION SOW FOR FURTHER DETAILS AND REQUIREMENTS.

MI INSPECTOR

THE MI INSPECTOR IS REQUIRED TO CONTACT THE GC AS SOON AS RECEIVING A PO FOR THE MI TO, AT A MINIMUM:

- REVIEW THE REQUIREMENTS OF THE MI CHECKLIST
- WORK WITH THE GC TO DEVELOP A SCHEDULE TO CONDUCT ON-SITE INSPECTIONS, INCLUDING FOUNDATION INSPECTIONS

THE MI INSPECTOR IS RESPONSIBLE FOR COLLECTING ALL GENERAL CONTRACTOR (GC) INSPECTION AND TEST REPORTS, REVIEWING THE DOCUMENTS FOR ADHERENCE TO THE CONTRACT DOCUMENTS, CONDUCTING THE IN-FIELD INSPECTIONS, AND SUBMITTING THE MI REPORT TO CROWN.

GENERAL CONTRACTOR

THE GC IS REQUIRED TO CONTACT THE MI INSPECTOR AS SOON AS RECEIVING A PO FOR THE MODIFICATION INSTALLATION OR TURNKEY PROJECT TO, AT A MINIMUM:

- REVIEW THE REQUIREMENTS OF THE MI CHECKLIST
- WORK WITH THE MI INSPECTOR TO DEVELOP A SCHEDULE TO CONDUCT ON-SITE MI INSPECTIONS, INCLUDING FOUNDATION INSPECTIONS
- BETTER UNDERSTAND ALL INSPECTION AND TESTING REQUIREMENTS

THE GC SHALL PERFORM AND RECORD THE TEST AND INSPECTION RESULTS IN ACCORDANCE WITH THE REQUIREMENTS OF THE MI CHECKLIST AND ENG-SOW-10007.

RECOMMENDATIONS

THE FOLLOWING RECOMMENDATIONS AND SUGGESTIONS ARE OFFERED TO ENHANCE THE EFFICIENCY AND EFFECTIVENESS OF DELIVERING A MI REPORT:

- IT IS SUGGESTED THAT THE GC PROVIDE A MINIMUM OF 5 BUSINESS DAYS NOTICE, PREFERABLY 10, TO THE MI INSPECTOR AS TO WHEN THE SITE WILL BE READY FOR THE MI TO BE CONDUCTED.
- THE GC AND MI INSPECTOR COORDINATE CLOSELY THROUGHOUT THE ENTIRE PROJECT.
- WHEN POSSIBLE, IT IS PREFERRED TO HAVE THE GC AND MI INSPECTOR ON-SITE SIMULTANEOUSLY FOR ANY GUY WIRE TENSIONING OR RE-TENSIONING OPERATIONS.
- IT MAY BE BENEFICIAL TO INSTALL ALL TOWER MODIFICATIONS PRIOR TO CONDUCTING THE FOUNDATION INSPECTIONS TO ALLOW FOUNDATION AND MI INSPECTION(S) TO COMMENCE WITH ONE SITE VISIT.
- WHEN POSSIBLE, IT IS PREFERRED TO HAVE THE GC AND MI INSPECTOR ON-SITE DURING THE MI TO HAVE ANY DEFICIENCIES CORRECTED DURING THE INITIAL MI. THEREFORE, THE GC MAY CHOOSE TO COORDINATE THE MI CAREFULLY TO ENSURE ALL CONSTRUCTION FACILITIES ARE AT THEIR DISPOSAL WHEN THE MI INSPECTOR IS ON SITE.

CANCELLATION OR DELAYS IN SCHEDULED MI

IF THE GC AND MI INSPECTOR AGREE TO A DATE ON WHICH THE MI WILL BE CONDUCTED, AND EITHER PARTY CANCELS OR DELAYS, CROWN SHALL NOT BE RESPONSIBLE FOR ANY COSTS, FEES, LOSS OF DEPOSITS AND/OR OTHER PENALTIES RELATED TO THE CANCELLATION OR DELAY INCURRED BY EITHER PARTY FOR ANY TIME (E.G. TRAVEL AND LODGING, COSTS OF KEEPING EQUIPMENT ON-SITE, ETC.). IF CROWN CONTRACTS DIRECTLY FOR A THIRD PARTY MI, EXCEPTIONS MAY BE MADE IN THE EVENT THAT THE DELAY/CANCELLATION IS CAUSED BY WEATHER OR OTHER CONDITIONS THAT MAY COMPROMISE THE SAFETY OF THE PARTIES INVOLVED.

CORRECTION OF FAILING MI'S

IF THE MODIFICATION INSTALLATION WOULD FAIL THE MI ("FAILED MI"), THE GC SHALL WORK WITH CROWN TO COORDINATE A REMEDIATION PLAN IN ONE OF TWO WAYS:

- CORRECT FAILING ISSUES TO COMPLY WITH THE SPECIFICATIONS CONTAINED IN THE ORIGINAL CONTRACT DOCUMENTS AND COORDINATE A SUPPLEMENT MI.
- OR, WITH CROWN'S APPROVAL, THE GC MAY WORK WITH THE EOR TO RE-ANALYZE THE MODIFICATION/REINFORCEMENT USING THE AS-BUILT CONDITION

MI VERIFICATION INSPECTIONS

CROWN RESERVES THE RIGHT TO CONDUCT A MI VERIFICATION INSPECTION TO VERIFY THE ACCURACY AND COMPLETENESS OF PREVIOUSLY COMPLETED MI INSPECTION(S) ON TOWER MODIFICATION PROJECTS.

ALL VERIFICATION INSPECTIONS SHALL BE HELD TO THE SAME SPECIFICATIONS AND REQUIREMENTS IN THE CONTRACT DOCUMENTS AND IN ACCORDANCE WITH ENG-SOW-10007.

VERIFICATION INSPECTION MAY BE CONDUCTED BY AN INDEPENDENT AEV/AESV FIRM AFTER A MODIFICATION PROJECT IS COMPLETED, AS MARKED BY THE DATE OF AN ACCEPTED "PASSING MI" OR "PASS AS NOTED MI" REPORT FOR THE ORIGINAL PROJECT.

REQUIRED PHOTOS

BETWEEN THE GC AND THE MI INSPECTOR THE FOLLOWING PHOTOGRAPHS, AT A MINIMUM, ARE TO BE TAKEN AND INCLUDED IN THE MI REPORT:

- PRE-CONSTRUCTION GENERAL SITE CONDITION
- PHOTOGRAPHS DURING THE REINFORCEMENT MODIFICATION CONSTRUCTION/ERECTION AND INSPECTION
  - RAW MATERIALS
  - PHOTOS OF ALL CRITICAL DETAILS
  - FOUNDATION MODIFICATIONS
  - WELD PREPARATION
  - BOLT INSTALLATION AND TORQUE
  - FINAL INSTALLED CONDITION
  - SURFACE COATING REPAIR
- POST CONSTRUCTION PHOTOGRAPHS
  - FINAL INFIELD CONDITION

PHOTOS OF ELEVATED MODIFICATIONS TAKEN FROM THE GROUND SHALL BE CONSIDERED INADEQUATE.

THIS IS NOT A COMPLETE LIST OF REQUIRED PHOTOS, PLEASE REFER TO ENG-SOW-10007.

B+T GRP
1717 S. BOULDER AVE.
SUITE 300
TULSA, OK 74119
PH: (918) 587-4630
www.btgrp.com

CROWN CASTLE

ISSUED FOR:

REV	DATE	DESCRIPTION
0	12/04/14	ISSUED FOR CONSTRUCTION

PROJECT NO:	93171.023.01
PROJECT ENG:	BRADEN TABB
DRAWN BY:	RA
CHECKED BY:	NGH

B+T ENGINEERING, INC.

STATE OF CONNECTICUT — CHAD TUTTLE — No. 23924 — LICENSED — PROFESSIONAL ENGINEER — 12/4/14

IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS DOCUMENT.

ROCKY HILL
842872

53 NEW BRITAIN AVENUE
ROCKY HILL, CT

EXISTING 182' MONOPOLE

SHEET TITLE

MODIFICATION INSPECTION NOTES AND CHECKLIST

SHEET NUMBER: S2

REVISION: 0

NOTES:

1. ALL STRUCTURAL BOLTS SHALL BE INSTALLED AND TIGHTENED TO THE PRE-TENSIONED CONDITION ACCORDING TO THE REQUIREMENTS OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009.

2. ALL STRUCTURAL BOLTS SHALL BE INSPECTED ACCORDING TO THE REQUIREMENTS OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009.

3. ALL AJAX M20 BOLTS WITH SHEAR SLEEVES SHALL BE PRE-TENSIONED AND TIGHTENED UNTIL THE DIRECT TENSION INDICATOR (DTI) WASHERS SHOW THAT THE PROPER BOLT TENSION HAS BEEN REACHED. SEE NOTES AND DETAIL BELOW FOR THE USE OF DIRECT TENSION INDICATOR (DTI) WASHERS WITH THE AJAX M20 BOLTS.

4. ALL AJAX BOLTS SHALL BE INSTALLED USING DIRECT TENSION INDICATORS (DTI'S) AND HARDENED WASHERS. DTI'S SHALL BE THE SQUIRTER® STYLE, MADE TO ASTM F959 LATEST REVISION, AND HARDENED WASHERS SHALL CONFORM TO ASTM F436 AND HAVE A HARDNESS OF HRC 38 OR HIGHER.

5. AS AN ALTERNATIVE TO USING DTI WASHERS, AJAX BOLTS MAY BE PRETENSIONED PER AISC TURN-OF-NUT METHOD.

NOTES FOR AJAX M20 "ONE-SIDE" BOLTS WITH DIRECT TENSION INDICATORS (DTI'S):

DTI'S REQUIRED: DTI'S SHALL BE "SELF-INDICATING" SQUIRTER® STYLE DTI'S MADE WITH SILICONE EMBEDDED IN THEM, INSPECTED BY MEANS OF THE VISUAL EJECTION OF SILICONE AS THE DTI PROTRUSIONS COMPRESS. SQUIRTER® DTI'S SHALL BE CALIBRATED PER MANUFACTURER'S INSTRUCTIONS PRIOR TO USE.

THE DIRECT TENSION INDICATOR (DTI) WASHERS SHALL BE THE "SQUIRTER® STYLE" AS MANUFACTURED BY:

APPLIED BOLTING TECHNOLOGY PRODUCTS, INC.
1413 ROCKINGHAM ROAD
BELLOWS FALLS, VERMONT 05101, USA
PHONE 1-800-562-1959
WEBSITE: WWW.APPLIEDBOLTING.COM

DISTRIBUTORS OF SQUIRTER® DTI'S:
HTTP://WWW.APPLIEDBOLTING.COM/APPLIED-BOLTING-DISTRUBUTORS.HTML

DTI: USE DIRECT TENSION INDICATOR (DTI) WASHERS COMPATIBLE WITH 3/4" NOMINAL A325 BOLTS FOR THE AJAX M20 BOLTS. DTI'S SHALL NOT BE HOT-DIP GALVANIZED. DTI'S SHALL BE MECHANICALLY GALVANIZED (MG) BY THE COLD MECHANICAL PROCESS ONLY AS PROVIDED BY THE DTI MANUFACTURER.

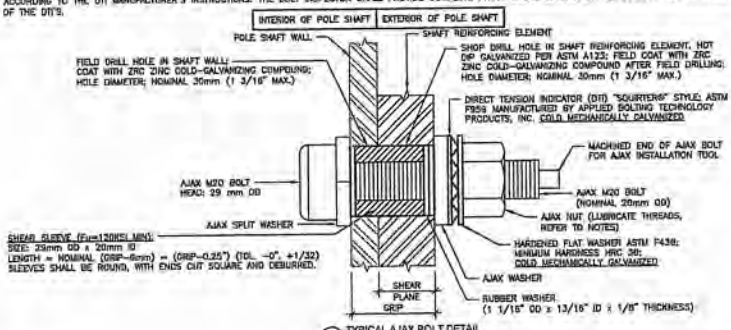
HARDENED WASHERS REQUIRED: USE A HARDENED WASHER FOR A 3/4" NOMINAL BOLT BETWEEN THE TOP OF THE DIRECT TENSION INDICATOR (DTI) WASHER AND THE NUT OF THE AJAX M20 BOLT. HARDENED WASHERS SHALL CONFORM TO ASTM F436 AND HAVE A MINIMUM HARDNESS OF HRC 38 OR HIGHER. THE HARDENED WASHERS SHALL BE MECHANICALLY GALVANIZED BY THE COLD MECHANICAL PROCESS. ALTERNATIVELY, CORRECTLY MADE HOT DIP GALVANIZED HARDENED FLAT WASHERS HAVING A MINIMUM HARDNESS OF HRC 38 CAN BE USED; CONTRACTOR SHALL PROVIDE DOCUMENTATION OF WASHER SPECIFICATION AND HARDNESS.

NUT LUBRICATION REQUIRED: PROPERLY LUBRICATE THE THREADS OF THE NUT OF THE AJAX BOLT SO THAT IT CAN BE PROPERLY TIGHTENED WITHOUT GALLING AND/OR LOCKING UP ON THE BOLT THREADS. CONTRACTOR SHALL FOLLOW DTI MANUFACTURER INSTRUCTIONS FOR PROPER LUBRICATION AND TIGHTENING.

NOTE: COMPLETELY COMPRESSED DTI'S SHOWING NO VISIBLE REMAINING GAP ARE ACCEPTABLE. DTI WASHERS SHALL BE PLACED DIRECTLY AGAINST THE OUTER AJAX WASHER WITH THE DTI BUMPS FACING AWAY FROM THE AJAX WASHER. PLACE A HARDENED WASHER BETWEEN THE DTI AND AJAX NUT. THE DTI BUMPS SHALL BEAR AGAINST THE UNDERSIDE OF A HARDENED FLAT WASHER, NEVER DIRECTLY AGAINST THE NUT.

CONTRACTOR SHALL FOLLOW DTI MANUFACTURER'S INSTRUCTIONS FOR INSTALLATION, LUBRICATION, TIGHTENING AND INSPECTION.

INSPECTION REQUIRED: ALL AJAX BOLTS SHALL BE INSPECTED ACCORDING TO THE REQUIREMENTS OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 30, 2009, BY A QUALIFIED BOLT INSPECTOR. DURING INSTALLATION, THE BOLT INSPECTOR SHALL VERIFY AND DOCUMENT THE SHOP-DRILLED AND FIELD-DRILLED HOLE SIZES; THE INSTALLATION OF THE AJAX BOLT ASSEMBLY, INCLUDING THE SHEAR SLEEVE PLACEMENT AND NUT LUBRICATION AND THE CONTRACTOR'S TENSIONING PROCEDURE. IN ADDITION, ALL AJAX BOLTS AND DTI'S SHALL BE VISUALLY INSPECTED ACCORDING TO THE DTI MANUFACTURER'S INSTRUCTIONS. THE BOLT INSPECTOR SHALL PROVIDE COMPLETE PHOTO DOCUMENTATION OF ALL BOLTS AFTER TIGHTENING CLEARLY SHOWING THE CONDITION OF THE DTI'S.



1 TYPICAL AJAX BOLT DETAIL
SCALE: N.T.S.

GENERAL NOTES

1.1 ALL WORK SHALL COMPLY WITH THE TIA/EIA-222-F STANDARD AS WELL AS ANY OTHER GOVERNING BUILDING CODES.
1.2 FIELD WORK WILL BE DONE AROUND EXISTING COAXIAL CABLE AND EQUIPMENT. ALL WORK SHALL BE DONE IN A MANNER SUCH THAT NO DAMAGE OCCURS TO THE EXISTING EQUIPMENT OR THE STRUCTURE.
1.3 A MINIMUM OF TWO COATS OF ZINGA COLD GALVANIZING COMPOUND (OR APPROVED EQUIVALENT) SHALL BE APPLIED TO ANY FIELD CUTS OR FIELD DRILLED HOLES.
1.4 THE USE OF A GAS TORCH OR WELDER WILL NOT BE PERMITTED ON THE TOWER WITHOUT THE CONSENT OF THE OWNER.
1.5 IN LIEU OF TEMPORARY BRACING CONTRACTOR MAY HAVE A STABILITY ANALYSIS PERFORMED BY AN ENGINEER LICENSED IN THE STATE THE TOWER IS LOCATED. THE ANALYSIS SHALL USE A MINIMUM WIND SPEED OF 45 mph (3-SEC) PER TIA-1019.

FABRICATION

2.1 ALL WORK SHALL BE DONE IN ACCORDANCE WITH A.I.S.C. "SPECIFICATIONS FOR THE DESIGN, FABRICATION AND ERECTION OF STRUCTURAL STEEL FOR BUILDINGS."
2.2 STRUCTURAL STEEL SHALL MEET THE FOLLOWING SPECIFICATIONS:

	YIELD	ASTM SPEC'S
A. STEEL SHAPES AND PLATES, U.N.O.	65ksi	A572
B. STEEL TUBE (HSS)	46ksi	A500 GR III

2.3 ALL NEW MATERIAL INCLUDING STRUCTURAL STEEL AND FASTENERS SHALL BE HOT DIPPED GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123 AND A153.
2.4 WELDING SHALL MEET ANSI/AWS D1.1 STRUCTURAL WELDING CODE (LATEST REVISION). ELECTRODES SHALL BE E80 SERIES.
2.5 CONTRACTOR SHALL PROVIDE SHOP FABRICATION DRAWINGS TO B+T GROUP 5 DAYS PRIOR TO FABRICATION.

KEY NOTES

(E) TOWER MODIFICATION I.D.

B+T GRP
1717 S. BOULDER AVE.
SUITE 300
TULSA, OK 74119
PH: (918) 587-4630
www.btgrp.com

CROWN CASTLE

ISSUED FOR:

REV	DATE	DESCRIPTION
0	12/04/14	ISSUED FOR CONSTRUCTION

PROJECT NO:	95171.503.01
PROJECT ENG:	BRADEN TABB
DRAWN BY:	RA
CHECKED BY:	NGN

B+T ENGINEERING, INC.

STATE OF CONNECTICUT
CHAD TUTTLE
No. 23924
LICENSED
PROFESSIONAL ENGINEER
12/4/14

IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS DOCUMENT.

ROCKY HILL
842572
52 NEW BRITAIN AVENUE
ROCKY HILL, CT
EXISTING 152' MONOPOLE

SHEET TITLE:
GENERAL NOTES, AJAX BOLT NOTES AND DETAIL

SHEET NUMBER: S3
REVISION: 0

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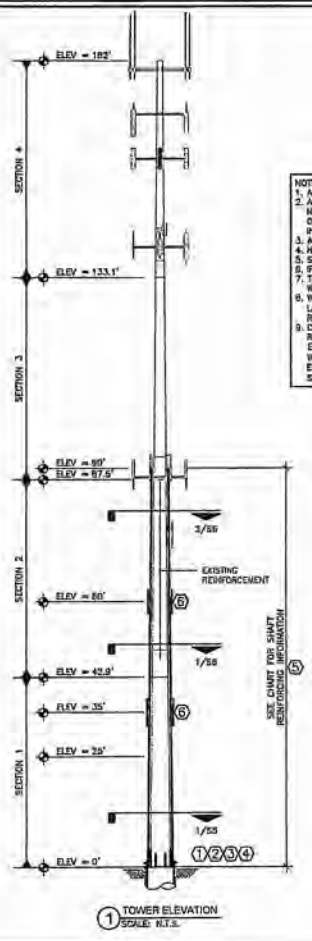


1 TOWER ELEVATION
SCALE: N.T.S.

CCI: FLAT PLATE-BILL OF MATERIALS (65KSI)

BOTTOM ELEVATION	TOP ELEVATION	FLAT PLATE DESIGNATION	FLAT PLATE LENGTH	FLAT PLATE QUANTITY	AJAX BOLTS PER PLATE	TOTAL AJAX BOLT QTY	TERMINATION BOLTS (BOTTOM)	TERMINATION BOLTS (TOP)	MAXIMUM INTERMEDIATE BOLT SPACING	TOTAL STEEL WEIGHT
0'-0"	35'-0"	CCI-WSFP-06512535	35'-0"	1	31	31	WELD	11	19"	867 LBS.
0'-0"	35'-0"	FP1**	35'-0"	2	29	36	WELD	11	19"	1934 LBS.
23'-0"	60'-0"	CCI-SFP-06512535	25'-0"	1	40	40	11	11	18"	987 LBS.
35'-0"	60'-0"	CCI-SFP-06512525	25'-0"	2	34	68	11	11	19"	1381 LBS.
60'-0"	90'-0"	CCI-SFP-06010030	30'-0"	3	35	105	8	8	16"	1836 LBS.
** UNIQUE PART. SEE DETAILS SHEET 03						302				7005 LBS.

NOTES:
1. AJAX BOLTS ARE TO BE 20mm DIAMETER WITH CORRESPONDING 28mm DIAMETER SLEEVE WITH MATCHING STEEL GRADE.
2. ALL STEEL SHALL BE HOT-DIP GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123. ALTERNATIVELY, ALL NEW STIFFENER PLATE STEEL REINFORCING MAY BE COLD GALVANIZED AS FOLLOWS: APPLY A MINIMUM OF TWO COATS OF ZRC-BRAND ZINC-RICH COLD GALVANIZING COMPOUND. FILM THICKNESS: 1-860-831-3275 FOR PRODUCT INFORMATION.
3. ALL SHIMS SHALL BE ASTM A36.
4. HOLES FOR AJAX BOLTS AND SHEAR SLEEVES ARE 30mm UNLESS NOTED OTHERWISE.
5. SHOP WELDS ARE ASSUMED E80XX OR GREATER, PER STANDARD SPLICE DETAIL.
6. IF SCOPE OF MODIFICATION REQUIRES REMOVAL OF TOWER ID TAG, IT MUST BE REPLACED.
7. THE CLIMBING FACILITIES, SAFETY CLIMB AND ALL PARTS THEREOF SHALL NOT BE IMPEDED, MODIFIED OR ALTERED WITHOUT THE EXPRESS APPROVAL OF THE ENGINEER OF RECORD OR TOWER OWNER.
8. WHERE POSSIBLE, CLIMBING HARDWARE SHOULD REMAIN IN-LINE ALONG THE POLE. IF AN OBSTRUCTION CAUSES A LATERAL OFFSET OF 2'-0" OR MORE, CLIMBING ANCHORS SHALL BE PROVIDED AT EACH CHANGE IN ALIGNMENT. IF NEW REINFORCEMENT REQUIRES STEP BOLT BRACKETS, INSTALL PRIOR TO GALVANIZATION OF STEEL.
9. CONTRACTOR SHALL BE RESPONSIBLE FOR PROPER FITTING OF REINFORCEMENT ON MONOPOLES. SHIMS FOR MONOPOLE REINFORCEMENT MEMBER SHALL BE REQUIRED WHERE GAPS BETWEEN THE POLE SHAFT AND REINFORCING MEMBER EXIST AT FASTENER LOCATIONS. FOR INTERMEDIATE CONNECTIONS, THE MINIMUM SHIM LENGTH AND WIDTH SHALL BE THE WIDTH OF THE REINFORCING MEMBER. FOR TERMINATION CONNECTIONS, A CONTINUOUS SHIM PLATE (PREFERRED) OR EQUIVALENT INDIVIDUAL SHIM PLATES THE WIDTH OF THE REINFORCING MEMBER MAY BE USED. SHIM THICKNESSES SHALL BE NO LESS THAN 1/16". STACKING OF SHIMS IS PERMITTED.

NEW CCI FLAT PLATE (65KSI) REINFORCING ELEMENTS

START ELEVATION	END ELEVATION	QTY	FLAT #	FLAT PLATE *
0.0'	35.0'	1	5	CCI-WSFP-06512535
0.0'	35.0'	2	11 & 16	FP1**
25.0'	60.0'	1	17	CCI-SFP-06512535
35.0'	60.0'	2	5 & 11	CCI-SFP-06512525
60.0'	90.0'	3	5, 11 & 17	CCI-SFP-06010030

* SEE CMRP 65 KSI PARTS CATALOG EDITION 2 REV. 1 FOR PART DETAILS

ALL BOLTS SHALL BE AJAX M20 BOLTS WITH HIGH STRENGTH SHEAR SLEEVES (ASTM A519 WITH MIN. Fu=120 KSI). CONTACT SUPPLIER FOR MATERIAL (PLATE AND BOLTS) AND INSTALLATION PROCEDURES.

EXISTING MEMBER SCHEDULE

SECTION	NUMBER OF SIDES	THICKNESS	BOTTOM DIAMETER	TOP DIAMETER	LAP SPLICE
1	18	0.4375"	55.00"	43.568"	75"
2	18	0.375"	43.77"	34.213"	61"
3	18	0.3750"	34.19"	24.818"	45"
4	18	0.3500"	26.02"	14.500"	—

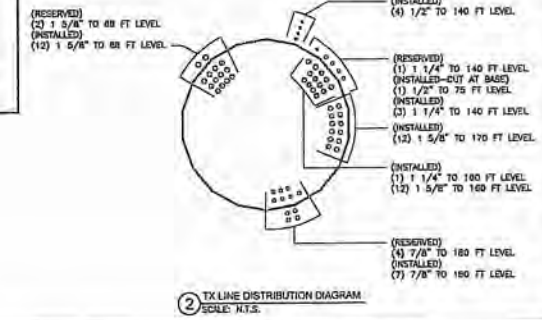
EXISTING TOWER HAS BEEN PREVIOUSLY MODIFIED. REFERENCE DRAWINGS BY B+T GROUP DATED 06/27/12

EXISTING TOWER HAS BEEN PREVIOUSLY MODIFIED. REFERENCE DRAWINGS BY B+T GROUP DATED 05/17/13

TOWER MODIFICATIONS:

1. CONTRACTOR SHALL BUDGET A SITE VISIT TO CHECK CRITICAL DIMENSIONS AND VERIFY UNKNOWN CONDITIONS PRIOR TO STEEL FABRICATION.
2. THE NEW AND EXISTING TRANSMISSION LINES MUST BE DISTRIBUTED AS SHOWN IN THE TX LINE DIST. DIAGRAM RE: DETAIL 2/S4.
3. INSTALL NEW ANCHOR RODS AND ANCHOR ROD BRACKETS WITH FOOT PADS RE: SHEET S5.
4. REMOVE AND REPLACE BASE PLATE STIFFENERS RE: SHEET S5.
5. INSTALL NEW REINFORCING ELEMENTS RE: SHEET S5 AND S6.
6. INSTALL NEW IN-LINE SPLICES RE: SHEET S7.

* CONTRACTOR SHALL PROVIDE TEMPORARY BRACING FOR ALL REMOVE AND REPLACE PROCEDURES.
** MODIFICATIONS SHALL BE COMPLETED PRIOR TO ADDING THE PROPOSED APPURTENANCES.



2 TX LINE DISTRIBUTION DIAGRAM
SCALE: N.T.S.

B+T GRP
8717 S. BOULDER AVE, SUITE 300
TULSA, OK 74119
PH: (918) 587-4630
www.btgrp.com

CROWN CASTLE

ISSUED FOR:

REV	DATE	DESCRIPTION
0	12/04/14	ISSUED FOR CONSTRUCTION

PROJECT NO:	15171.003.01
PROJECT ENG:	BRADEN TABB
DRAWN BY:	RA
CHECKED BY:	RGN

B+T ENGINEERING, INC.

STATE OF CONNECTICUT — CHRISTOPHER GIBSON TUTTLE — No. 23924 — LICENSED PROFESSIONAL ENGINEER — 12/4/14

IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS DOCUMENT.

ROCKY HILL
842872
52 NEW BRITAIN AVENUE
ROCKY HILL, CT
EXISTING 182' MONOPOLE

SHEET TITLE
TOWER ELEV., SCHEDULES, AND TX LINE DIST. DIAGRAM

SHEET NUMBER	REVISION
S4	0

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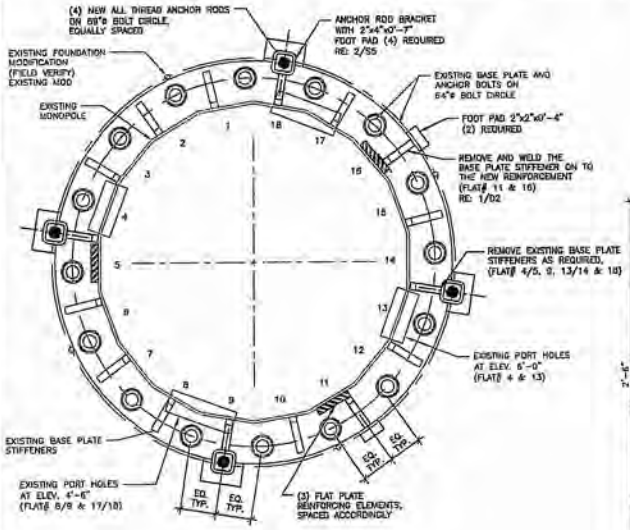
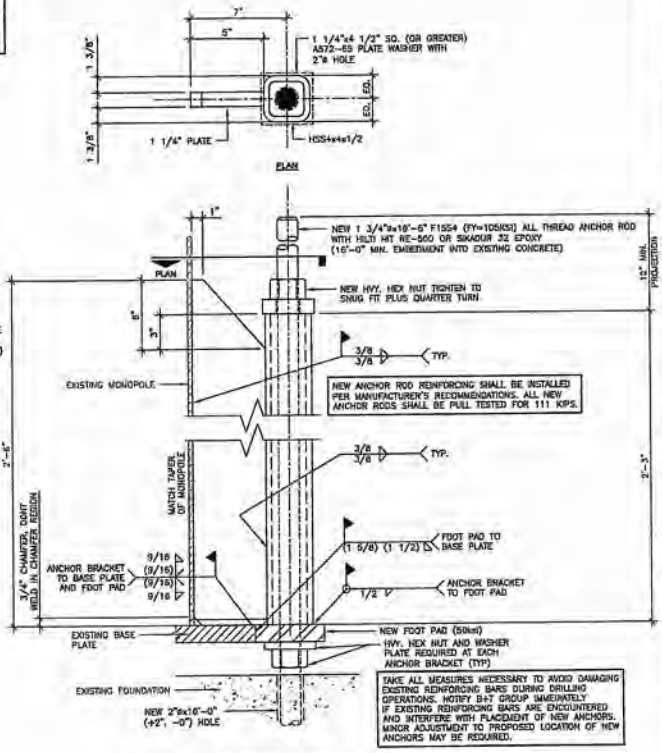
CONTRACTOR NOTE:
ALL OF THE ANCHOR ROD BRACKETS AND BASE PLATE STIFFENERS (ON FLAT# 11 & 16) ARE SUBSTITUTING BASE STIFFENERS AT RESPECTIVE LOCATIONS. CONTRACTOR SHALL INSTALL THESE PLATES CENTERED BETWEEN EXISTING ANCHOR RODS. IF THE LAYOUT SHOWN IN 1/S5 IS NOT FEASIBLE CONSTRUCTION PLEASE CONTACT THE EOR IMMEDIATELY.



1 TOWER SECTION (0'-35')
SCALE: N.T.S.



TAKE ALL MEASURES NECESSARY TO AVOID DAMAGING EXISTING REINFORCING BARS DURING DRILLING OPERATIONS. NOTIFY B+T GROUP IMMEDIATELY IF EXISTING REINFORCING BARS ARE ENCOUNTERED AND INTERFERE WITH PLACEMENT OF NEW ANCHORS. MINOR ADJUSTMENT TO PROPOSED LOCATION OF NEW ANCHORS MAY BE REQUIRED.

2 ANCHOR ROD BRACKET
SCALE: N.T.S.

B+T GRP
1717 S. BOULDER AVE.
SUITE 300
TULSA, OK 74115
PH: (919) 587-4830
www.btgrp.com

CROWN CASTLE

ISSUED FOR:

REV	DATE	DESCRIPTION
0	12/04/14	ISSUED FOR CONSTRUCTION

PROJECT NO:	95171.003.01
PROJECT ENG:	BRADEN TABB
DRAWN BY:	RA
CHECKED BY:	NGH

B+T ENGINEERING, INC.

STATE OF CONNECTICUT
CHAD TUTTLE
No. 23924
LICENSED
PROFESSIONAL ENGINEER
12/4/14

IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS DOCUMENT.

ROCKY HILL
842672
52 NEW BRITAIN AVENUE
ROCKY HILL, CT
EXISTING 162' MONOPOLE

SHEET TITLE:
TOWER SECTION 0'-35' AND ANCHOR ROD AND ANCHOR ROD BRACKET DETAILS

SHEET NUMBER: S5
REVISION: 0

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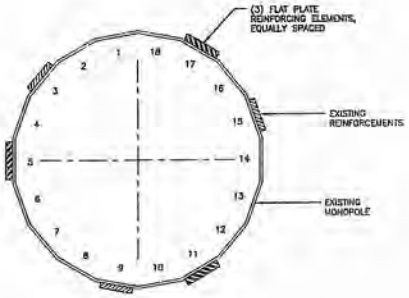
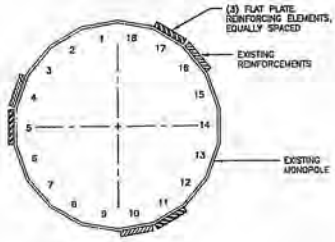


1 TOWER SECTION (35'-60')
SCALE: N.T.S.



2 TOWER SECTION (60'-90')
SCALE: N.T.S.

B+T GRP
1717 S. BOULDER AVE.
SUITE 300
TULSA, OK 74119
PH: (918) 587-4630
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CROWN CASTLE

ISSUED FOR:

REV	DATE	DESCRIPTION
0	12/04/14	ISSUED FOR CONSTRUCTION

PROJECT NO:	95171.003.01
PROJECT ENG:	BRADEN TABB
DRAWN BY:	RA
CHECKED BY:	NGN

B+T ENGINEERING, INC.

STATE OF CONNECTICUT
CHAD SUTTLE
No. 23924
LICENSED
PROFESSIONAL ENGINEER
12/4/14

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ROCKY HILL
842872

82 NEW BRITAIN AVENUE
ROCKY HILL, CT

EXISTING 182' MONOPOLE

SHEET TITLE
TOWER SECTIONS
35'-60' AND 60'-90'

SHEET NUMBER: S6
REVISION: 0

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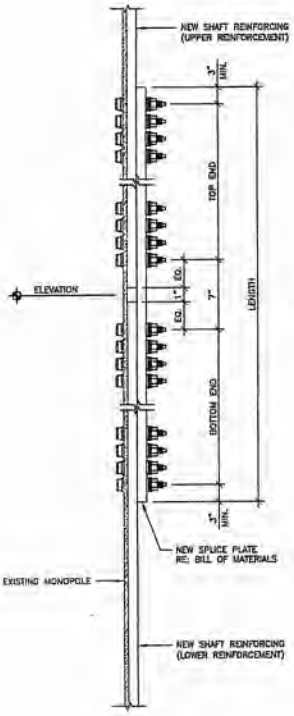

1 FLAT PLATE IN-LINE SPLICE DETAIL
SCALE: N.T.S.

SPLICE PLATE-BILL OF MATERIALS (65KSI)

ELEVATION	WIDTH	THICKNESS	LENGTH	QTY	QTY OF BOLTS (TOP END)	QTY OF BOLTS (BOTTOM END)	AMX BOLTS PER SPLICE	TOTAL AMX BOLTS	TOTAL STEEL WEIGHT
35'-0"	6 1/2"	1 1/4"	6'-1"	2	11	11	22	44	336 LBS.
60'-0"	6"	1"	5'-4"	3	8	11	19	57	326 LBS.
							TOTAL:	101	662 LBS.

* O.C. DISTANCE ON TERMINATION BOLTS TO BE 3 IN. U.N.O.
** USE SHIM PLATES AS REQUIRED.
***BOLT QTY INCLUDED IN S4 BILL OF MATERIALS
****STEEL WEIGHT NOT INCLUDED IN S4 BILL OF MATERIALS.

B+T GRP
1717 S. BOULDER AVE.
SUITE 550
TULSA, OK 74119
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CROWN CASTLE

ISSUED FOR:

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0	12/04/14	ISSUED FOR CONSTRUCTION

PROJECT NO:	95171.003.01
PROJECT ENG:	BRADEN TABB
DRAWN BY:	RA
CHECKED BY:	NGN

B+T ENGINEERING, INC.

STATE OF CONNECTICUT
CHAD J. LITTLE
No. 23924
LICENSED
PROFESSIONAL ENGINEER
12/4/14

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ROCKY HILL
842872
52 NEW BRITAIN AVENUE
ROCKY HILL, CT
EXISTING 182' MONOPOLE

SHEET TITLE
IN-LINE SPLICE DETAIL

SHEET NUMBER:	REVISION:
S7	0

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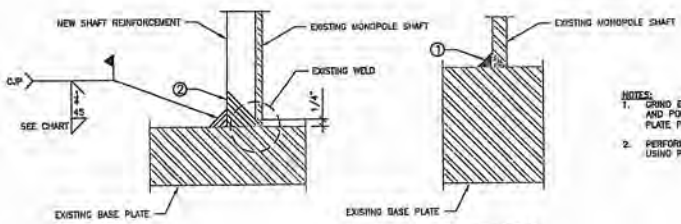
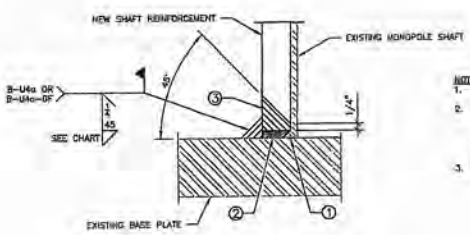


1 WELD DETAIL-OPTION 1
SCALE: N.T.S.

EXISTING WELD

NOTES:
1. GRIND EXISTING FILLET WELD FLUSH TO BASE PLATE AND POLE FOR THE WIDTH OF THE REINFORCEMENT PLATE PLUS 1/4" ON EACH SIDE (DO NOT OVER GRIND)
2. PERFORM CJP WELD WITH REINFORCING FILLET WELD USING POLE AS BACKING BAR

PART NUMBER	PLATE SIZE	MINIMUM REINFORCING WELD
CCI-WSFP-040075 CCI-WAFP-040075	3/4" x 4"	1/4"
CCI-WSFP-045100 CCI-WAFP-045100	1" x 4 1/2"	1/4"
CCI-WSFP-060100 CCI-WAFP-060100 FP1	1" x 6"	3/8"
CCI-WSFP-065125 CCI-WAFP-065125	1 1/4" x 6 1/2"	1/2"
CCI-WSFP-085125 CCI-WAFP-085125	1 1/4" x 8 1/2"	5/8"



2 WELD DETAIL-OPTION 2
SCALE: N.T.S.

NOTES:
1. CLEAN EXISTING WELD FROM GALVANIZING
2. BUILD A PLATFORM WITH WELD AT THE SAME HEIGHT OF THE EXISTING FILLET WELD (TO REDUCE THE AMOUNT OF WELD TO BUILD THE PLATFORM, IT IS ALLOWABLE TO PARTIALLY GRIND THE HEIGHT OF THE EXISTING FILLET WELD TO A 1/4" MINIMUM)
3. PERFORM CJP WELD WITH REINFORCING FILLET WELD USING POLE AS BACKING BAR

B+T GRP
1717 S. BOULDER AVE.
SUITE 350
TULSA, OK 74119
PH: (918) 587-4630
www.btgrp.com

CROWN CASTLE

ISSUED FOR:

REV	DATE	DESCRIPTION
0	12/04/14	ISSUED FOR CONSTRUCTION

PROJECT NO:	55171.003.01
PROJECT ENG:	BRADEN TABB
DRAWN BY:	RA
CHECKED BY:	NGN

B+T ENGINEERING, INC.

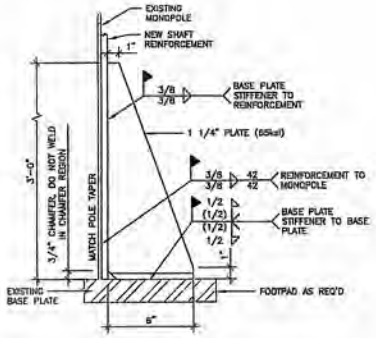
STATE OF CONNECTICUT
CHAD BOTTLE
No. 23924
LICENSED
PROFESSIONAL ENGINEER
12/4/14

IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS DOCUMENT.

ROCKY HILL
842872
52 NEW BRITAIN AVENUE
ROCKY HILL, CT
EXISTING 182' MONOPOLE

SHEET TITLE
DETAILS

SHEET NUMBER: D1
REVISION: 0



1 BASE PLATE STIFFENER
SCALE: N.T.S.

B+T GRP
1717 S. BOULDER AVE.
SUITE 300
TULSA, OK 74119
PH: (918) 587-4630
www.btgrp.com

CROWN CASTLE

ISSUED FOR:

REV	DATE	DESCRIPTION
0	12/04/14	ISSUED FOR CONSTRUCTION

PROJECT NO:	95171.003.01
PROJECT ENG:	BRADEN TABB
DRAWN BY:	RA
CHECKED BY:	NGN

B+T ENGINEERING, INC.

STATE OF CONNECTICUT
CHAD TUTTLE
No. 23924
LICENSED
PROFESSIONAL ENGINEER
12/4/14

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ROCKY HILL
842872

52 NEW BRITAIN AVENUE
ROCKY HILL, CT

EXISTING 182' MONOPOLE

SHEET TITLE

DETAILS

SHEET NUMBER:	REVISION:
D2	0

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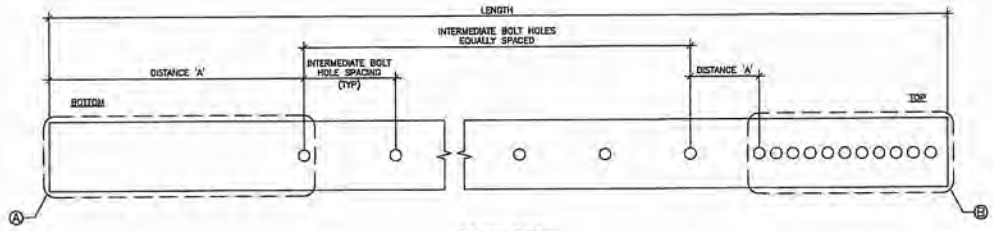
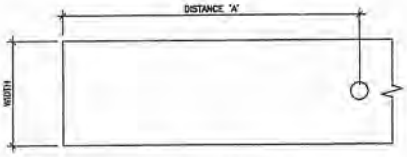
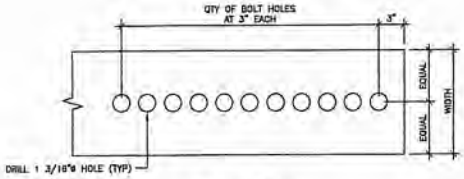


1 UNIQUE PART
SCALE: N.T.S.



2 DETAIL A (BOTTOM)
SCALE: N.T.S.



3 DETAIL B (TOP)
SCALE: N.T.S.

PART NUMBER	BLACK WEIGHT (LBS)	WIDTH	THICKNESS	LENGTH	DISTANCE 'A'	TOTAL QTY OF 1 3/16"ø BOLT HOLES	QTY OF BOLT HOLES (BOTTOM END)	QTY OF BOLT HOLES (TOP END)	INTERMEDIATE BOLT HOLE SPACING
FP1	967	6 1/2"	1 1/4"	35'-0"	4'-5"	29	WELD	11	1'-7"

B+T GRP
1717 S. BOULDER AVE.
SUITE 300
TULSA, OK 74119
PH: (919) 587-4630
www.bgrp.com

CROWN CASTLE

ISSUED FOR:

REV	DATE	DESCRIPTION
0	12/04/14	ISSUED FOR CONSTRUCTION

PROJECT NO:	85171.003.01
PROJECT ENG:	BRADEN TABB
DRAWN BY:	RA
CHECKED BY:	NGN

B+T ENGINEERING, INC.

STATE OF CONNECTICUT
CHAD TUTTLE
No. 23924
LICENSED
PROFESSIONAL ENGINEER
12/4/14

IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS DOCUMENT.

ROCKY HILL
842872
52 NEW BRITAIN AVENUE
ROCKY HILL, CT
EXISTING 182' MONOPOLE

SHEET TITLE
PART DETAILS

SHEET NUMBER: D3
REVISION: 0

S:\Projects\Crown Castle\85171_842872_Rocky Hill\TOW MOD\85171.003.01_Rocky Hill-842872-Tow Mod.dwg - Sheet:D3 - User: Gwood - December 4, 2014 - 1:16 PM

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

Calculated Radio Frequency Emissions

at&t

CT1039

(Rocky Hill Old Main Street)

699 Old Main Street, Rocky Hill, CT 06067

July 11, 2012

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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 monopole tower located at 699 Old Main Street, Rocky Hill, CT. The coordinates of the tower are 41-40-05.80 N, 72-38-16.71 W.

AT&T is proposing the following modifications:

1) Install three 700 MHz LTE antennas (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
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Omnipoint	148.5	1930	3	200	0.0108	1.0000	1.08%
Rocky Hill PD	148.5	458.5	1	40	0.0006	0.3057	0.19%
Rocky Hill FD	148.5	453.4125	1	40	0.0006	0.3023	0.19%
Rocky Hill PW	148.5	45.84	1	100	0.0016	0.2000	0.81%
Rocky Hill Hotline	75	45.86	1	100	0.0072	0.2000	3.62%
Rocky Hill Intercity	75	154.265	1	45	0.0077	0.2000	3.87%
RAFS	50	465.075	1	40	0.0093	0.3101	3.01%
Rocky Hill PD	50	458.925	1	40	0.0111	0.3060	3.63%
Rocky Hill PD	40	458.575	1	40	0.0177	0.3057	5.79%
Wethersfield	40	458.275	1	40	0.0225	0.3055	7.37%
Sprint	130	1962.5	11	534	0.1250	1.0000	12.50%
T-Mobile GSM	148.5	1945	8	126	0.0164	1.0000	1.64%
T-Mobile UMTS	148.5	2100	2	711	0.0232	1.0000	2.32%
Pocket	95	2130	3	631	0.0754	1.0000	7.54%
Verizon	140	1970	3	456	0.0251	1.0000	2.51%
Verizon	140	869	9	384	0.0634	0.5793	10.94%
Nextel	115	851	12	100	0.0326	0.5673	5.75%
AT&T UMTS	105	880	2	649	0.0042	0.5867	0.72%
AT&T UMTS	105	1900	2	1387	0.0090	1.0000	0.90%
AT&T LTE	105	734	1	1615	0.0053	0.4893	1.08%
AT&T GSM	105	880	1	324	0.0011	0.5867	0.18%
AT&T GSM	105	1900	4	832	0.0109	1.0000	1.09%
						Total	**76.72%**

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

[1] The existing CSC filing for AT&T 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 3/29/2012. 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 Tower Engineering Professionals Structural Analysis dated June 13, 2012

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 below the limits for the general public. The highest expected percent of Maximum Permissible Exposure at ground level is **76.72% 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

July 11, 2012
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

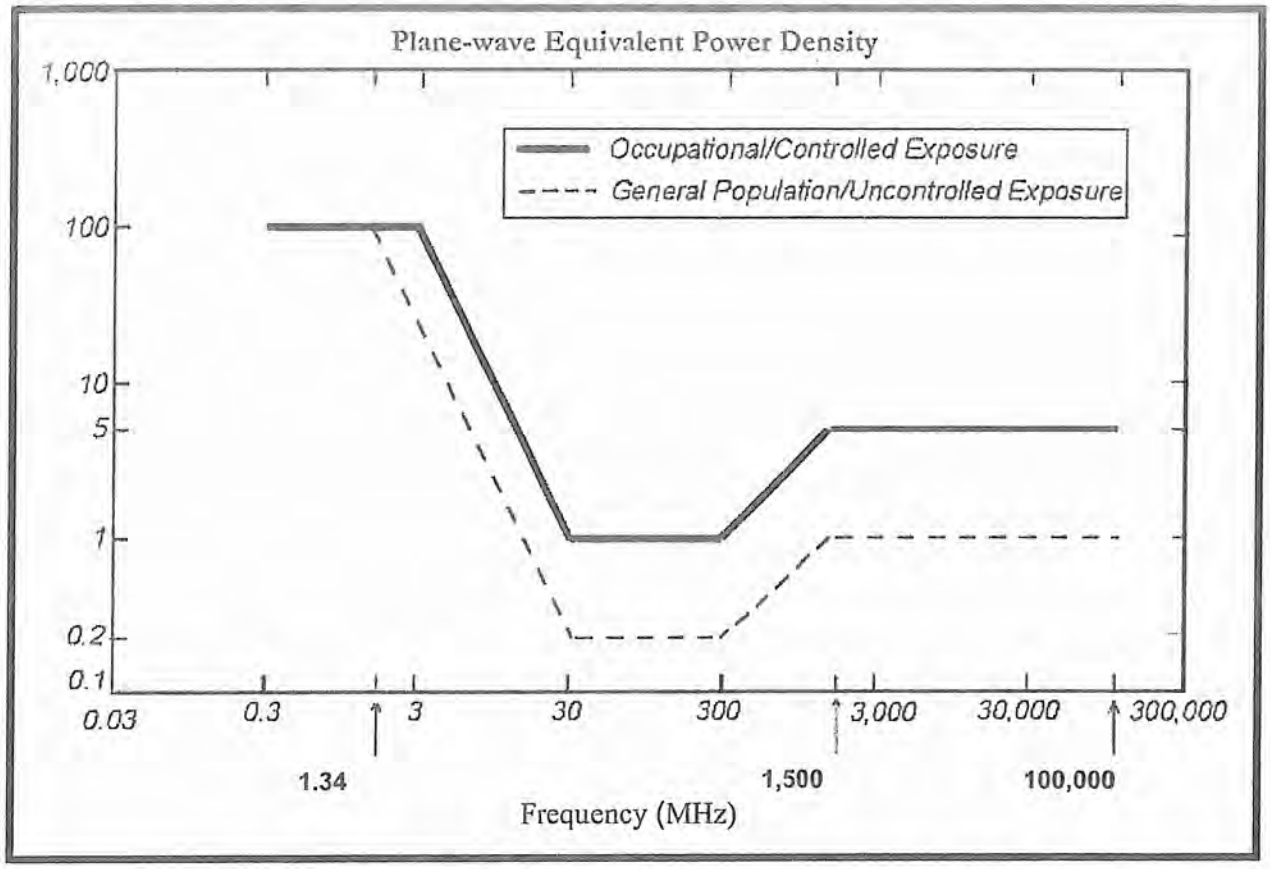
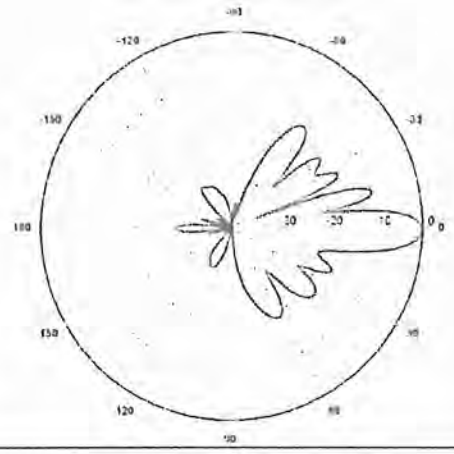


Figure 1: Graph of FCC Limits for Maximum Permissible Exposure (MPE)

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

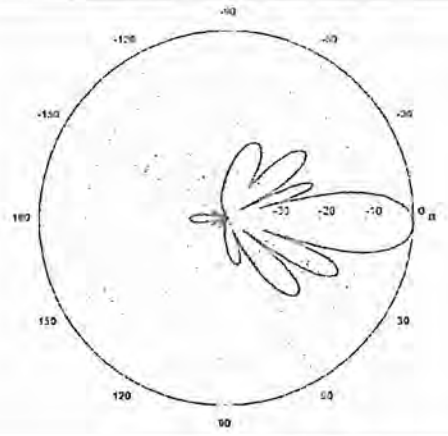
700 MHz

Manufacturer:	Powerwave
Model #:	P65-17-XLH-RR
Frequency Band:	698-806 MHz
Gain:	14.3 dBd
Vertical Beamwidth:	8.4°
Horizontal Beamwidth:	70°
Polarization:	± 45°
Size L x W x D:	96"x12"x6"



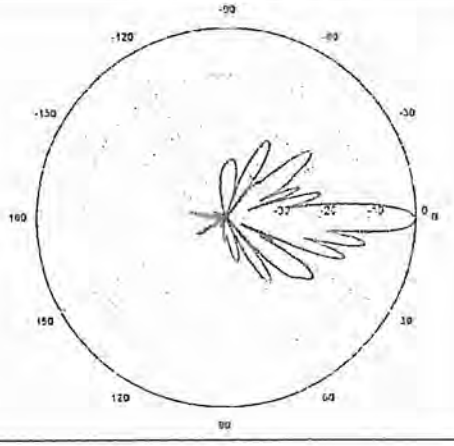
850 MHz

Manufacturer:	Powerwave
Model #:	7750
Frequency Band:	824-896 MHz
Gain:	12.5 dBd
Vertical Beamwidth:	14.9°
Horizontal Beamwidth:	69°
Polarization:	Dual Linear ±45°
Size L x W x D:	63.0" x 11.0" x 4.0"



1900 MHz

Manufacturer:	Powerwave
Model #:	7750
Frequency Band:	1850-1990 MHz
Gain:	15.6 dBd
Vertical Beamwidth:	6.6°
Horizontal Beamwidth:	65°
Polarization:	Dual Linear ±45°
Size L x W x D:	63.0" x 11.0" x 4.0"



PROJECT INFORMATION

SCOPE OF WORK:	UNMANNED TELECOMMUNICATIONS FACILITY MODIFICATIONS
SITE ADDRESS:	699 OLD MAIN STREET ROCKY HILL, CT 06067
LATITUDE:	41.666111 N 41° 39' 57.99" N
LONGITUDE:	72.637777 W 72° 38' 15.99" W
JURISDICTION:	NATIONAL, STATE & LOCAL CODES OR ORDINANCES
CURRENT USE:	TELECOMMUNICATIONS FACILITY
PROPOSED USE:	TELECOMMUNICATIONS FACILITY

at&t

SITE NUMBER: CT1039
SITE NAME: ROCKY HILL OLD MAIN STREET

DRAWING INDEX

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T-1	TITLE SHEET	1
GN-1	GENERAL NOTES	1
A-1	COMPOUND & EQUIPMENT PLAN	1
A-2	ANTENNA LAYOUT & ELEVATION	1
A-3	DETAILS	1
G-1	PLUMBING DIAGRAM & GROUNDING DETAILS	1

VICINITY MAP

DIRECTIONS:
START OUT GOING NORTHEAST ON ENTERPRISE DR TOWARD CAPITOL BLVD. 0.4 MI. TURN LEFT ONTO CAPITOL BLVD. 0.3 MI. TURN RIGHT ONTO WEST ST. 1.4 MI. TURN LEFT ONTO MAIN ST/CT-99. 0.8 MI. TURN RIGHT ONTO CT-160/GLASTONBURY AVE. 0.0 MI. TURN SLIGHT LEFT ONTO OLD MAIN ST. 0.2 MI. END AT 699 OLD MAIN ST. ROCKY HILL, CT 06067

GENERAL NOTES

1. THIS DOCUMENT IS THE CREATION, DESIGN, PROPERTY AND COPYRIGHTED WORK OF AT&T. ANY DUPLICATION OR USE WITHOUT EXPRESS WRITTEN CONSENT IS STRICTLY PROHIBITED. DUPLICATION AND USE BY GOVERNMENT AGENCIES FOR THE PURPOSES OF CONDUCTING THEIR LAWFULLY AUTHORIZED REGULATORY AND ADMINISTRATIVE FUNCTIONS IS SPECIFICALLY ALLOWED.
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.

CALL

BEFORE YOU DIG

CALL TOLL FREE 800-922-4455

UNDERGROUND SERVICE ALERT

Hudson Design Group LLC
28 Lord Road, Suite 280
Marlborough, MA 01752
Tel: (978) 557-5553
Fax: (978) 886-3366

NEXLINK GLOBAL SERVICES
a UniTel GLOBAL SERVICES company
800 MARSHALL PHELPS ROAD UNIT#: 2A
WINDSOR, CT 06095

SITE NUMBER: CT1039
SITE NAME: ROCKY HILL
OLD MAIN STREET
699 OLD MAIN STREET
ROCKY HILL, CT 06067
HARTFORD COUNTY

at&t
500 ENTERPRISE DRIVE, SUITE 3A
ROCKY HILL, CT 06095

NO.	DATE	REVISIONS	BY	CHK	APP'D
1	04/18/12	CONSTRUCTION REVISED	SF	DC	DPH
0	03/09/12	ISSUED FOR REVIEW	MJS	DC	DPH

SCALE: AS SHOWN DESIGNED BY: MJS DRAWN BY: MJS

Daniel P. Hannon
No. 24178
LICENSED PROFESSIONAL ENGINEER

AT&T

TITLE SHEET (LTE)

JOB NUMBER	DRAWING NUMBER	REV
1039.01	T-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 - NEXLINK
   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	TYP	TYPICAL
EGR	EQUIPMENT GROUND RING	REQ	REQUIRED		

Hudson Design Group LLC

NEXLINK GLOBAL SERVICES
a UniTek GLOBAL SERVICES company
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WINDSOR, CT 06095

SITE NUMBER: CT1039
SITE NAME: ROCKY HILL
OLD MAIN STREET
699 OLD MAIN STREET
ROCKY HILL, CT 06067
HARTFORD COUNTY

at&t
500 ENTERPRISE DRIVE, SUITE 3A
ROCKY HILL, CT 06095

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0	03/09/12	ISSUED FOR REVIEW	MJS	DG	DPH

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

AT&T

GENERAL NOTES (LTE)

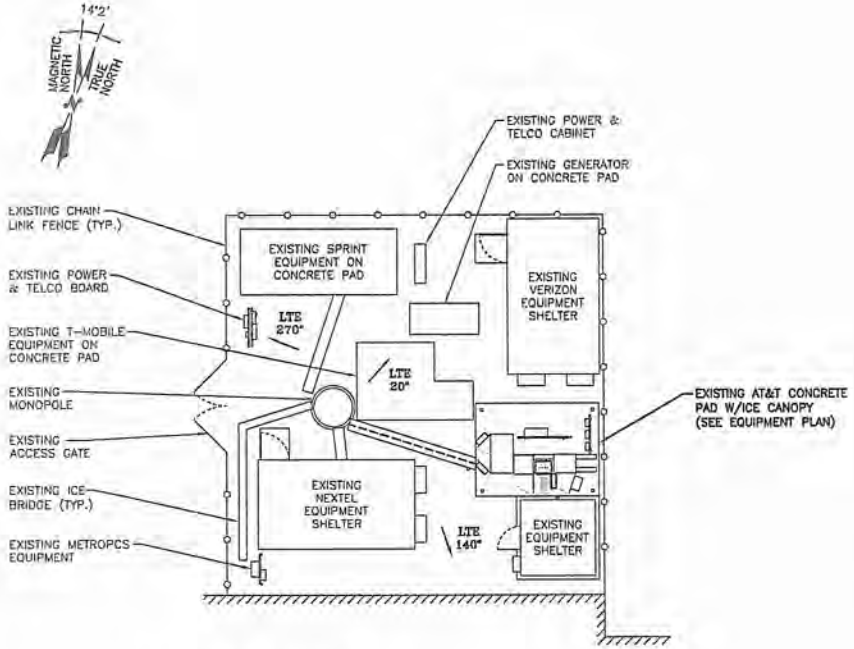
JOB NUMBER	DRAWING NUMBER	REV
1039.01	GN-1	1

NOTE:

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

NOTE:

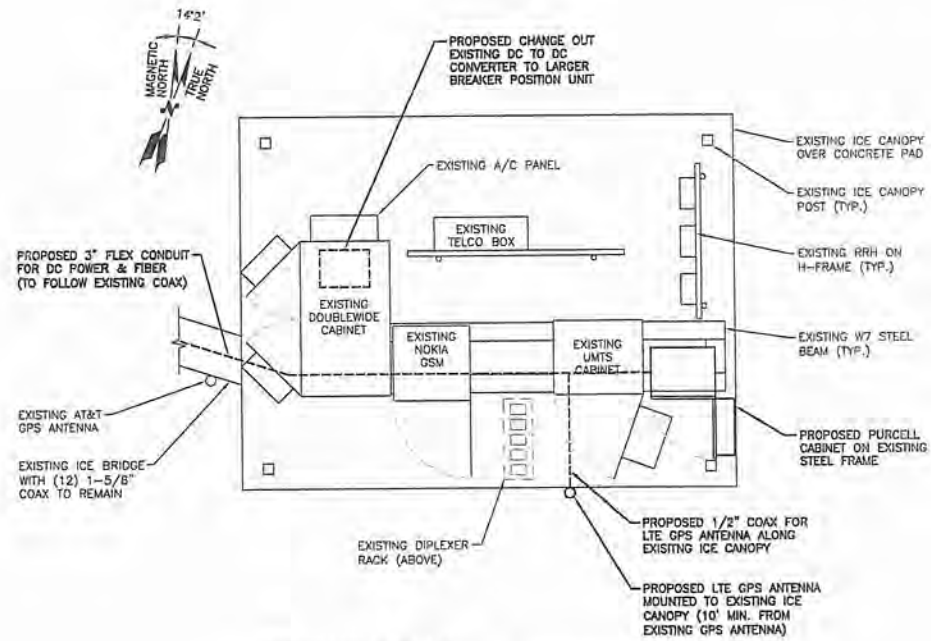
AN ANALYSIS FOR THE CAPACITY OF THE EXISTING STRUCTURES TO SUPPORT THE PROPOSED EQUIPMENT SHALL BE DETERMINED PRIOR TO CONSTRUCTION.



COMPOUND PLAN

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

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



EQUIPMENT PLAN

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

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

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

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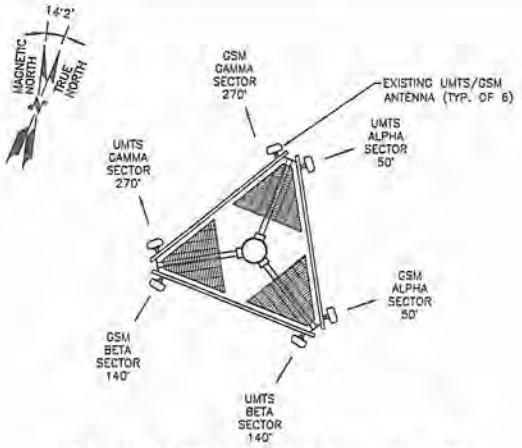
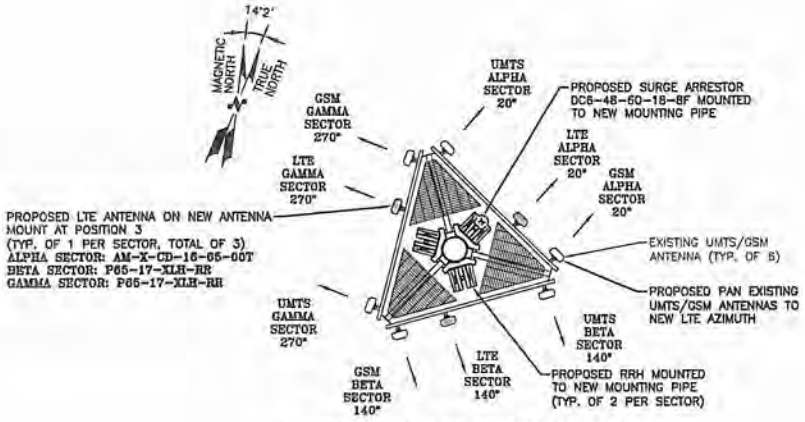
COMPOUND & EQUIPMENT PLAN (LTE)

JOB NUMBER	DRAWING NUMBER	REV
1039.01	A-1	1



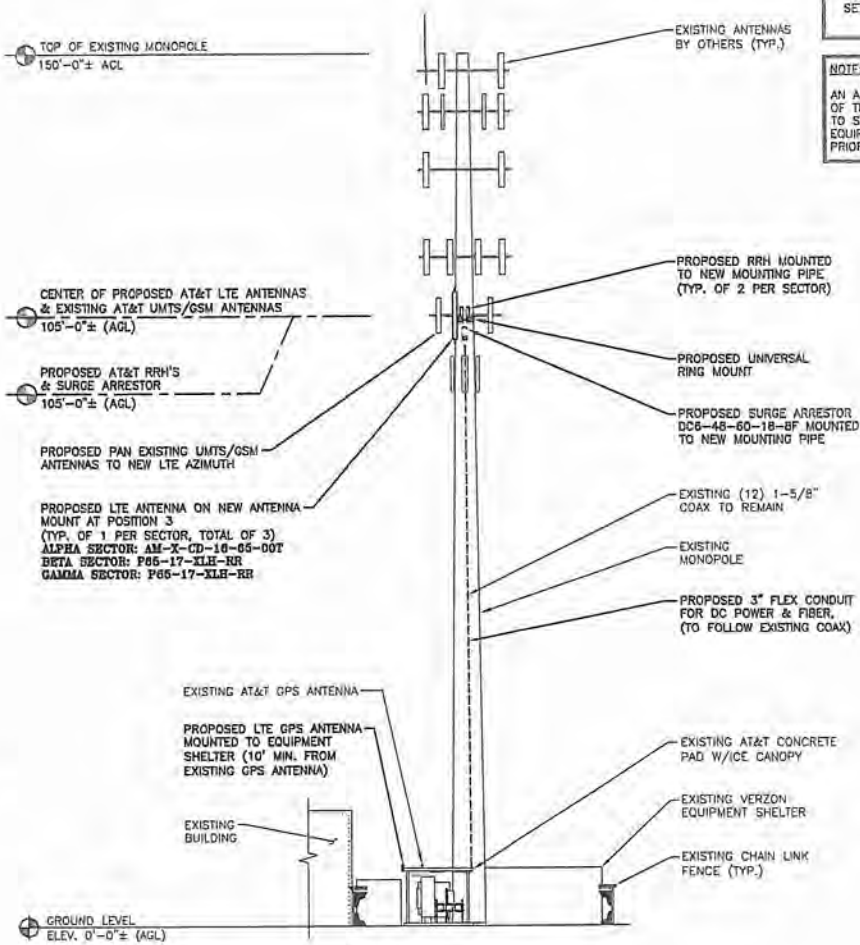
EXISTING UMTS/GSM ANTENNA PLAN

SCALE: N.T.S.



PROPOSED LTE ANTENNA PLAN

SCALE: N.T.S.



SOUTH ELEVATION

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

NOTE:

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

NOTE:

AN ANALYSIS FOR THE CAPACITY OF THE EXISTING STRUCTURES TO SUPPORT THE PROPOSED EQUIPMENT SHALL BE DETERMINED PRIOR TO CONSTRUCTION.

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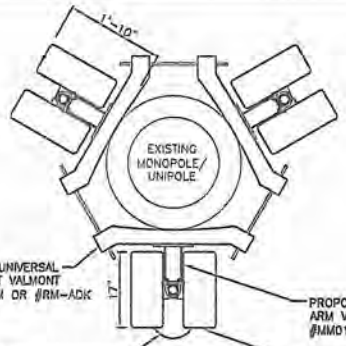
ANTENNA LAYOUT & ELEVATION (LTE)

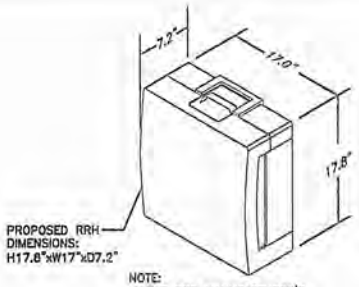
JOB NUMBER	DRAWING NUMBER	REV
1039.01	A-2	1



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



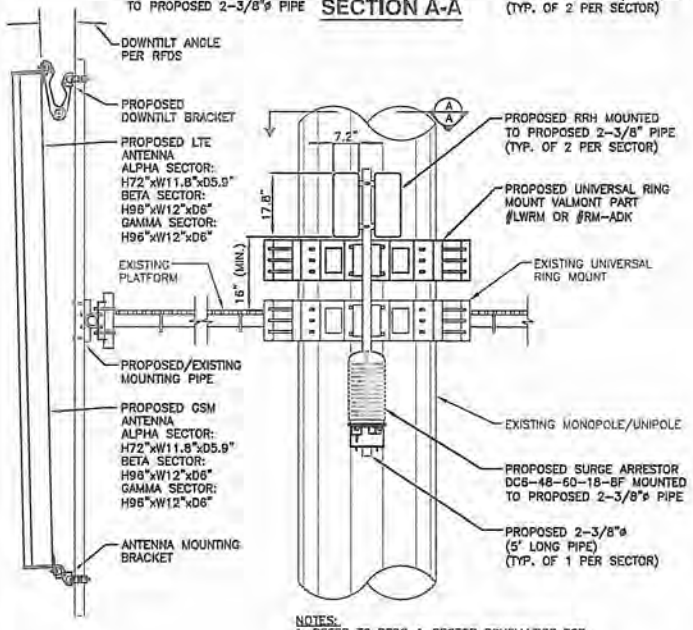
NOTE:
MOUNT PER MANUFACTURER'S SPECIFICATIONS.

RRH DETAIL

SCALE: N.T.S.

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

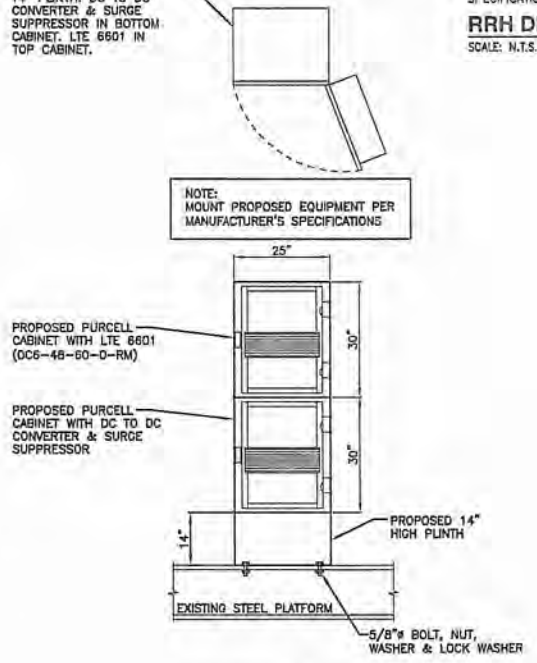
NOTE:
AN ANALYSIS FOR THE CAPACITY OF THE EXISTING STRUCTURES TO SUPPORT THE PROPOSED EQUIPMENT SHALL BE DETERMINED PRIOR TO CONSTRUCTION.



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

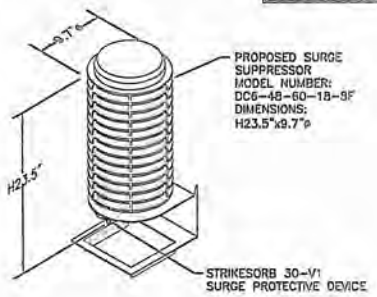
PROPOSED LTE/GSM ANTENNA, RRH & SURGE ARRESTOR MOUNTING DETAIL

SCALE: N.T.S.



PROPOSED EQUIPMENT MOUNTING DETAIL

SCALE: N.T.S.

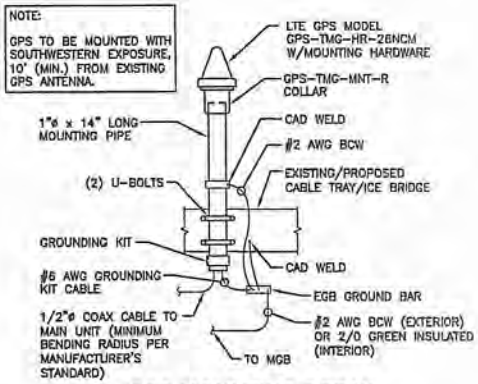


NOTE:
MOUNT PER MANUFACTURER'S SPECIFICATIONS.

DC SURGE SUPPRESSOR DETAIL

SCALE: N.T.S.

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



GPS MOUNTING DETAIL

SCALE: N.T.S.

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Building Zero North, Suite 2-301
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TEL: (973) 557-7553
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a subsidiary of NEXLINK GLOBAL SERVICES company
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No. 24178
LICENSED PROFESSIONAL ENGINEER

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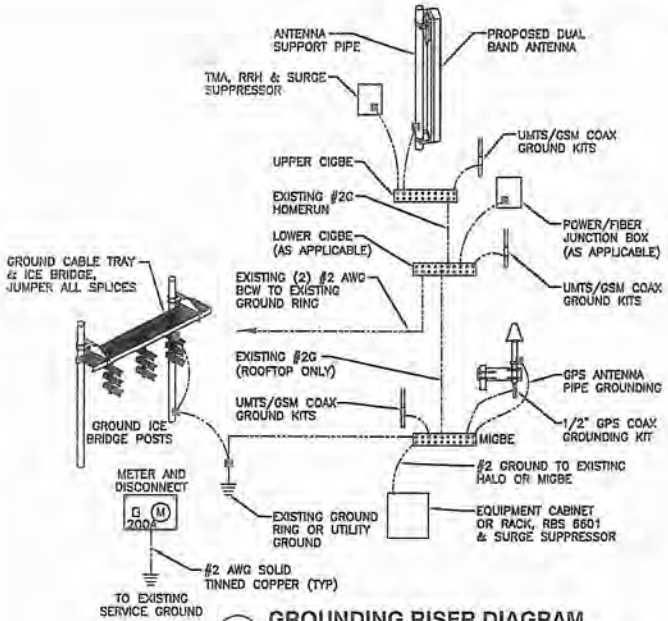
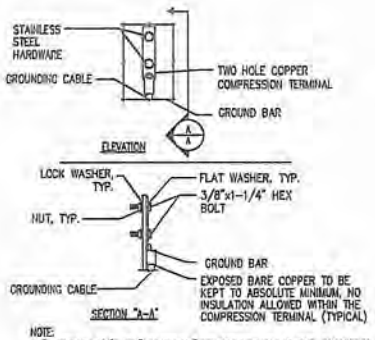
DETAILS (LTE)

JOB NUMBER	DRAWING NUMBER	REV
1039.01	A-3	1



1 — N.T.S.

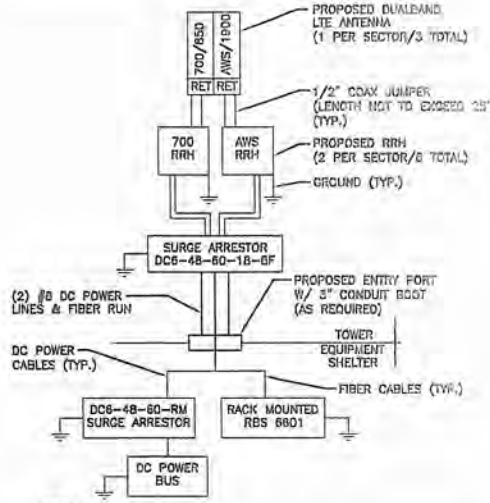
GROUNDING RISER DIAGRAM



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

2 — N.T.S.

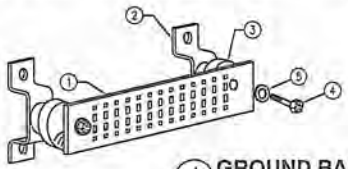


NOTES:
1. CONTRACTOR TO CONFIRM ALL PARTS.
2. INSTALL ALL EQUIPMENT TO MANUFACTURER'S RECOMMENDATIONS.

PLUMBING DIAGRAM

3 — 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



GROUND BAR - DETAIL

4 — N.T.S.

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)

Hudson Design Group LLC
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El Paso, TX 79902
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Fax: (915) 330-3356

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STATE OF CONNECTICUT — DANIEL P. HAMM — No. 21779 — LICENSED PROFESSIONAL ENGINEER

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PLUMBING DIAGRAM & GROUNDING DETAILS (LTE)

JOB NUMBER	DRAWING NUMBER	REV
1039.01	G-1	1