ROBINSON & COLE LLP

KENNETH C. BALDWIN

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EM-VER-155-100610

ORIGINAL

June 10, 2010

Via Hand Delivery

S. Derek Phelps
Executive Director
Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051

Re: **Notice of Exempt Modification – Antenna Swap**
1358 New Britain Avenue (aka 7 Berkshire Road), West Hartford, Connecticut

Dear Mr. Phelps:

Cellco Partnership d/b/a Verizon Wireless ("Cellco") currently maintains wireless telecommunications antennas at the 105-foot level of the existing 130-foot tower at the above-referenced address. The tower is owned by Crown Castle. The Council approved Cellco's use of this tower in 1998. Cellco now intends to modify its installation by replacing all twelve (12) of its antennas with six (6) model LPA-80063/4CF cellular antennas, three (3) model MG D3-800T0 PCS antennas; and three (3) model BXA-70063-4CF LTE antennas, all at the same 105-foot level on the tower. Attached behind Tab 1 are the specifications for the proposed replacement antennas.

Please accept this letter 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 Scott Slifka, Mayor for the Town of West Hartford. A copy of this letter is also being sent to West Hartford United Methodist, the owner of the property on which the tower is located.

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

1. The proposed modifications will not result in any increase in the height of the existing tower. Cellco's antennas will be located at the same 105-foot level on the existing tower.

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

3. The proposed modifications will not increase noise levels at the facility by six decibels or more.

4. The operation of the replacement antennas will not increase radio frequency (RF) power density levels at the facility to a level at or above the Federal Communications Commission (FCC) adopted safety standard. A power density table for Cellco's modified facility is included behind Tab 2.

Also attached is a Structural Modification Report confirming that the tower, with modifications, and foundation can support Cellco's proposed antenna modification. (See Tab 3) .

For the foregoing reasons, Cellco respectfully submits that the proposed modifications to the above-referenced telecommunications facility constitutes an exempt modification under R.C.S.A. § 16-50j-72(b)(2).

Sincerely,

Kenneth C. Baldwin

Enclosures
Copy to:
Scott Slifka, West Hartford Mayor
West Hartford United Methodist
Sandy M. Carter

Vertically Polarized Log Periodic 63° / 13.0 dBd
806-960 MHz

LPA-80063/4CF __
When ordering replace "__" with connector type.

Mechanical specifications

Length	1205	mm	47.4	in
Width	386	mm	15.2	in
Depth	335	mm	13.2	in
Depth with z-bracket	375	mm	14.8	in
Weight [4]	9.1	kg	20	lbs
Wind Area Fore/Aft	0.47	m^2	5.0	ft^2
Wind Area Side	0.40	m^2	4.4	ft^2
Max Wind Survivability	>201	km/hr	>125	mph
Wind Load @ 100 mph (161 km/hr)				
Fore/Aft	665	N	150	lbf
Side	577	N	130	lbf

Antenna consisting of aluminum alloy with brass feedlines covered by a gray, UV safe fiberglass radome. RoHS compliant.

Mounting & Downtilting

Mounting hardware attaches to pipe diameter Ø50-102 mm; Ø2.0-4.0 in. If the lock-down brace is used, the maximum diameter is Ø88.9 mm (3.5 in).

Mounting & Downtilt Bracket Kit 21699999

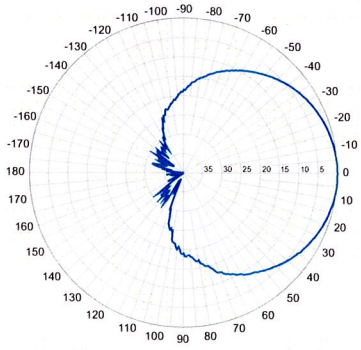
Electrical specifications

Frequency Range	806-960 MHz
Impedance	50Ω
Connector [3]	NE or E-DIN Female 1 port / Center
VSWR [1]	≤ 1.4:1
Polarization	Vertical
Gain [1]	13.0 dBd 15.0 dBi
Power Rating [2]	500 W
Half Power Angle [1]	
Horizontal Beamwidth	63°
Vertical Beamwidth	15°
Electrical downtilt [5]	0°
Null fill [1]	10%
Lightning protection	Direct ground

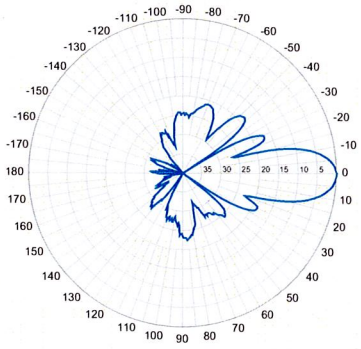
1) Typical values.
2) Power rating limited by connector only.
3) NE indicates an elongated N connector.
E-DIN indicates an elongated DIN connector.
4) Antenna weight does not include brackets.
5) Add'l downtilts may be available. Check website for details.

Improvements to mechanical and/or electrical performance of the antenna may be made without notice.

Radiation-pattern[1]



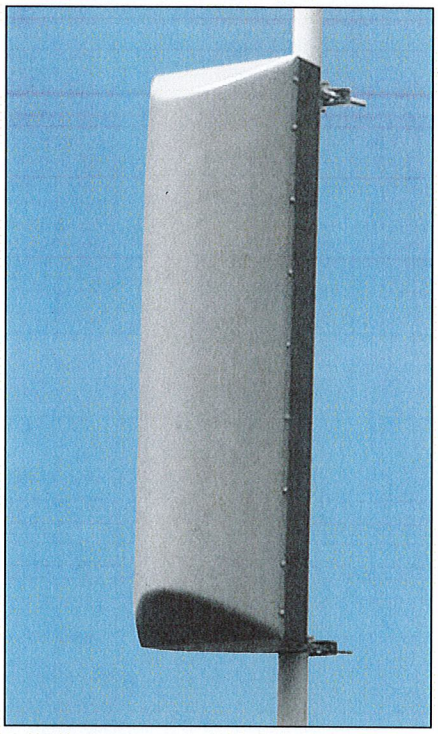
Horizontal



Vertical

Radiation patterns for all antennas are measured with the antenna mounted on a fiberglass pole.

Mounting on a metal pole will typically improve the front-to-back ratio.



Featuring our Exclusive 3T Technology™ Antenna Design:

- True log-periodic design allows for superior front-to-side characteristics to minimize sector overlap.
- Unique feedline design eliminates the need for conventional solder joints in the signal path.
- A non-collinear system with access to every radiating element for broad bandwidth and superior performance.
- Air as insulation for virtually no internal signal loss.

Warranty:
This antenna is under a five-year limited warranty for repair or replacement.

Revision Date: 12/26/08

806-960 MHz

815.399.0001 • antel@antelinc.com • www.antelinc.com

Amphenol Antel, Inc. The Antenna Technology Company

SINGLE-BAND PANEL ANTENNA

BROADBAND 1700-2170 MHZ

MGD3-800TX

1710-1880	1850-1990	1920-2170
H66° V7.2°	H64° V6.6°	H63° V6.3°
Fixed Tilt 0°2,°4,°6,°	Fixed Tilt 0°2,°4,°6,°	Fixed Tilt 0°2,°4,°6,°

ELECTRICAL SPECIFICATIONS

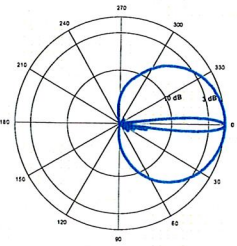
BROADBAND *1710-2170 MHz*

Antenna Model	MGD3-800TX		
Polarization	± 45°		
Frequency	1710 - 1880	1850 - 1990	1920 - 2170
Horizontal Beamwidth	66°	64°	63°
Vertical Beamwidth	7.2°	6.6°	6.3°
Gain (dBi)	17.9	18	18.5
Vertical Electrical Tilt	FIXED 0°, 2°, 4°, 6°	FIXED 0°, 2°, 4°, 6°	FIXED 0°, 2°, 4°, 6°
Upper Sidelobe Suppression for the 1st lobe above main beam (dB)	20	20	20
Front-to-Back Ratio /Cpol @ ± 20° (dB)	> 30	> 30	> 30
VSWR	< 1.4 : 1	< 1.4 : 1	< 1.4 : 1
Cross Polar Ratio @ ± 60° (dB)	> 10	> 10	> 10
Isolation Between Ports (dB)	> 30	> 30	> 30
Maximum Power Per Input (W)	250		
Intermodulation (dBc)	< - 150		
Impedance (Ω)	50		

MECHANICAL SPECIFICATIONS

Connectors	2 X 7/16 Female
Connector Position	Bottom
Survival Wind Speed mph (km/h)	124 (200)
Front Windload lbs (N) @ 160 km/h	83 (370)
Lateral Windload lbs (N) @ 160 km/h	38 (170)
Radome Color	Grey, paintable
Temperature Range F (°C)	-67° to 140° (-55° to +60°)
Humidity	100%
Antenna Weight lbs (kg)	15.43 (7)
Antenna Dimension in (mm) H X W X D	53 X 6.29 X 3.54 (1340 X 160 X 90)

H&V Pattern



RYMSA Telecom Group (Headquarters)

RYMSA TELECOM GROUP

www.rymsawireless.com

RYMSA México

RYMSA Wireless U.S.A.

Slant ±45° Dual Polarized FET Panel 63° / 13 dBd
696-900 MHz

Mechanical specifications

Length	1205	mm	47.4	in
Width	285	mm	11.2	in
Depth	126	mm	5.0	in
Depth with z-bracket	166	mm	6.5	in
Weight [4]	4.5	kg	9.9	lbs
Wind Area Fore/Aft	0.36	m^2	3.9	ft^2
Wind Area Side	0.15	m^2	1.7	ft^2
Max Wind Survivability	>201	km/hr	>125	mph
Wind Load @ 100 mph (161 km/hr)				
Fore/Aft	522	N	117	lbf
Side	244	N	55	lbf

Antenna consisting of aluminum alloy with brass feedlines covered by a UV safe fiber-glass radome. RoHS compliant.

Mounting & Downtilting

Mounting hardware attaches to pipe diameter Ø50-160 mm; Ø2.0-6.3 in.

Mounting Bracket Kit	36210002
Downtilt Bracket Kit	36114003

Electrical specifications

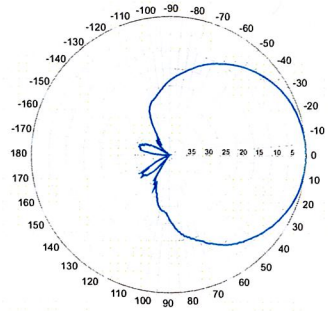
Frequency Range	696-900 MHz
Impedance	50Ω
Connector [3]	NE or E-DIN Female 2 ports / Center
VSWR [1]	≤ 1.4:1
Polarization	Slant ±45°
Isolation Between Ports [1]	< -30 dB
Gain [1]	13.0 dBd 15.0 dBi
Power Rating [2]	500 W
Half Power Angle [1]	
Horizontal Beamwidth	63°
Vertical Beamwidth	15°
Electrical downtilt [5]	0°
Null fill [1]	5%
Lightning protection	Direct ground

Patented Dipole Design: U.S. Patent No. 6,608,600 B2

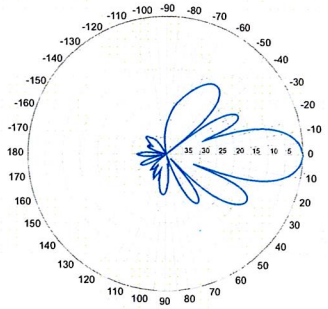
1) Typical values.
2) Power rating limited by connector only.
3) NE indicates an elongated N connector. E-DIN indicates an elongated DIN connector.
4) Antenna weight does not include brackets.
5) Add'l downtilts may be available. Check website for details.

Improvements to mechanical and/or electrical performance of the antenna may be made without notice.

Radiation-pattern[1]
750 MHz

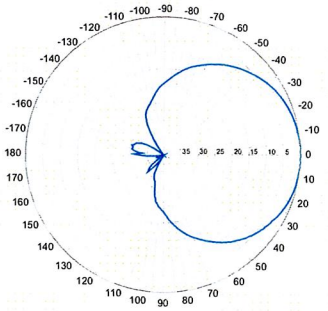


Horizontal

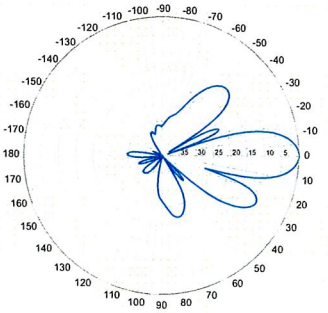


Vertical

850 MHz



Horizontal

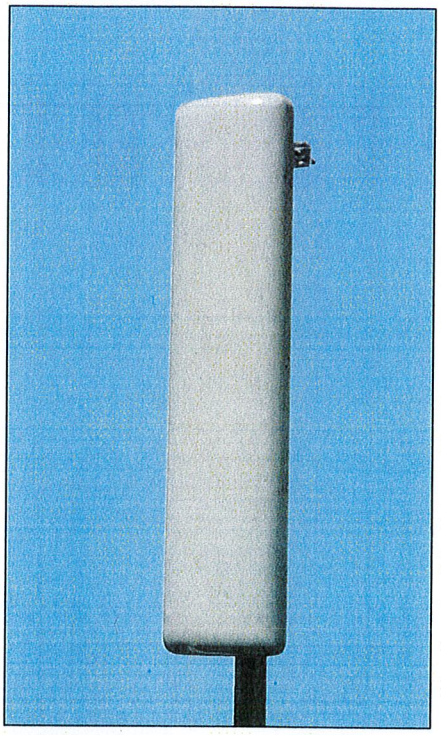


Vertical

696-900 MHz

BXA-70063/4CF __

When ordering replace "__" with connector type.



Featuring our Exclusive 3T Technology™ Antenna Design:

- Watercut brass feedline assembly for consistent performance.
- Unique feedline design eliminates the need for conventional solder joints in the signal path.
- A non-collinear system with access to every radiating element for broad band-width and superior performance.
- Air as insulation for virtually no internal signal loss.

Warranty:
This antenna is under a five-year limited warranty for repair or replacement.

Revision Date: 10/27/08

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Amphenol Antel, Inc. The Antenna Technology Company

	General	Power	Density					
Site Name: Corbins Corner (West Hartford)								
Tower Height: Verizon @ 105Ft.								
CARRIER	**# OF CHAN.**	**WATTS ERP**	**HEIGHT**	**CALC. POWER DENS**	**FREQ.**	**MAX. PERMISS. EXP.**	**FRACTION MPE**	**Total**
*Nextel	9	100	128	0.0198	851	0.5673	3.48%	
*AT&T	4	275	95	0.0438	1900	1.0000	4.38%	
*Sprint	11	118	118	0.0335	1900	1.0000	3.35%	
*Pocket	3	631	96	0.0739	2130	1.0000	7.39%	
*VoiceStream	4	288	85	0.0573	1930	1.0000	5.73%	
Verizon	**3**	**367**	**105**	**0.0359**	**1970**	**1.0000**	**3.59%**	
Verizon	**9**	**308**	**105**	**0.0904**	**869**	**0.5793**	**15.61%**	
Verizon	**1**	**627**	**105**	**0.0204**	**757**	**0.4973**	**4.11%**	
								47.64%
* Source: Siting Council								

Sabre™ Towers & Poles
A Division of Sabre Industries, Inc.

www.iets.com
IETS
Engineering Services

Date: **June 03, 2010**

Mr. Josh Mostow
Crown Castle USA Inc.
1200 MacArthur Blvd.
Mahwah, NJ 35226
(201) 236-9059

IETS
129 Greenwich Road
Charlotte, NC 28211
(704) 522-1131
towerdata@iets.com

Subject: **Structural Modification Report**

Carrier Designation:	***Verizon Wireless* Co-Locate**	
	Carrier Site Number:	Corbins Corner
	Carrier Site Name:	2010441880
Crown Castle Designation:	**Crown Castle BU Number:**	876324
	Crown Castle Site Name:	West Hartford United Methodist
	Crown Castle JDE Job Number:	128828
Engineering Firm Designation:	**IETS Project Number:**	2010-70136
	Sabre Project Number:	11-05047
Site Data:	**1358 New Britain Avenue, West Hartford, CT, Hartford County**	
	Latitude *41° 43' 50.4"*, Longitude *-72° 45' 13.2"*	
	120 Foot - Monopole Tower w/ Proposed 10ft Extension	

Dear Mr. Mostow,

IETS 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 Pending, in accordance with application 95574, revision 14.

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: Modified Structure w/ Existing + Reserved + Proposed **Sufficient Capacity**
Note: See Table I and Table II for the proposed and existing/reserved loading, respectively.

The analysis has been performed in accordance with the TIA/EIA-222-F standard and local code requirements based upon a wind speed of 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 *IETS* appreciate the opportunity of providing our continuing professional services to you and Crown Castle USA Inc. If you have any questions or need further assistance on this or any other projects please give us a call.

Respectfully submitted by:

Ted Haile, P.E.
Senior Project Engineer

William A. Griswold, Jr., P.E.
Chief Engineer

RISATower Report - version 5.4.1.8

TABLE OF CONTENTS

1) INTRODUCTION

The tower is a 130 ft monopole tower designed by Rohn in January of 1997. The tower was originally designed for a wind speed of 85 mph per TIA/EIA-222-E. The tower was modified according to Vertical Solutions project 080497.15 dated July 31, 2008.

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
105	105	3	Antel	BXA-70063/4CF	12	7/8	-
		6	Antel	LPA-80063/4CF			
		6	RFS Celwave	FD9R6004/2C-3L			
		3	Rymsa Wireless	MG D3-800Tx			

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
127	127	3	Argus Tech.	LLPX310R	1	5/16	2
		3	Dragonwave	A-ANT-18G-2-C	4	1/2	
		3	Dragonwave	Horizon Compact	2	1/4	
		3	Samsung Telecom	WIMAX DAP Head	3	5/8	
		1	Mounts	Side Arm [SO 702-3]			
116	116	2	EMS Wireless	RR65-12-00DBL	9	7/8	2
		4	EMS Wireless	RR90-11-00DBL			
		6	Decibel	950F65T2E-M	3	7/8	1
		1	Mounts	Platform [LP 304-1]	6	1-1/4	
105	105	6	Antel	WPA-80090/4CF	12	7/8	3
		6	Decibel	DB950F65T2E-M			
		1	Mounts	Platform Mount [LP 404-1]	-	-	1
96	96	3	RFS Celwave	APX18-206517-CT2	6	1-5/8	1
		1	Mounts	Pipe Mount [PM 602-3]			
60	60	2	Kathrein	OG-860/1920/GPS-A	2	1/2	1
		2	Mounts	Side Arm [SO 701-1]			
50	50	1	Lucent	KS24019-L112A	1	1/2	1
		1	Tower Mounts	Side Arm [SO 701-1]			

Notes:
1) Existing Equipment.
2) Reserved Equipment – Pending Application
3) To be replaced by proposed loading

Table 3 - Design Antenna and Cable Information

Mounting Level (ft)	Number of Antennas	Antenna Model	Number of Feed Lines	Feed Line Size (in)
TOP	12	ALP9212 w/Cellular Platform	12	1-5/8
100	12	Generic 8' Panel	12	1-5/8

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
Geotechnical Report	SEA Consultants	1529734	CCISITES
Tower Foundation Drawings	Rohn	1615437	CCISITES
Tower Manufacturer Drawings	Rohn	1771422	CCISITES
Tower Reinforcement Drawings	Vertical Solutions	2364340	CCISITES
Post-Modification Inspection	Vertical Solutions	2364340	CCISITES
Failing Tower Structural Analysis	PJF	2608583	CCISITES

3.1) Analysis Method

RISATower (version 5.4.1.8), 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) Monopole was reinforced in conformance with the referenced modification drawings.
5) Based on the assumptions that the tower manufacturer has designed the flange plates at splices to adequately develop the full capacity of the unreinforced shaft section using unpublished and/or proprietary methodologies, this analysis assumes no additional analysis of the flange plate will be required if the shaft and flange bolts are at allowable usage capacity of 100% or less.
6) According to Paul J Ford's findings, the existing bridge stiffeners at 30ft and 60ft are considered ineffective in this analysis.
7) The modified bridge stiffeners carry the full moment capacity of the section
8) Connections of the new bridge stiffeners to the pole designed to meet and/or exceed the actual capacities of the modified bridge element.
9) The stealth panel and all other antennas and coax at level 120'ft are assumed to be removed.
10) Based on the structural analysis performed by Paul J Ford, controlling SLA and MLA load cases are not considered in this analysis.

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

4) ANALYSIS RESULTS

Table 5 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	130 - 120	Pole	P16 x 3/16	1	-0.65	304.91	11.9	Pass
L2	120 - 90	Pole	P24x1/4	2	-7.06	589.19	87.9	Pass
L3	90 - 73.5	Pole	P24x3/8	3	-9.10	934.94	92.1	Pass
L4	73.5 - 60	Pole	10-7411 P24x0.5949	4	-11.39	1469.38	82.9	Pass
L5	60 - 40	Pole	10-7411 P30x0.5429	5	-15.45	1526.64	91.7	Pass
L6	40 - 30	Pole	10-7411 P30x0.7022	6	-17.80	1963.92	83.9	Pass
L7	30 - 20	Pole	10-7411 P36x0.5569	7	-20.14	1780.61	87.3	Pass
L8	20 - 0	Pole	10-7411 P36x0.6901	8	-25.64	2198.20	90.5	Pass
							Summary	
						Pole (L3)	92.1	Pass
						Rating =	92.1	Pass

Table 6 - Tower Component Stresses vs. Capacity - LC4

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Bolts	-	91.5	Pass
1	Base Plate	-	81.4	Pass
1	Foundation	-	92.0	Pass
1	Flange Connection	120	70.0	Pass
1	Flange Connection	90	45.0	Pass
1	Bridge Stiffener	60	70.8	Pass
1	Bridge Stiffener	30	84.7	Pass
1	Reinforcing Plates	60' – 75'	83.5	Pass
1	Reinforcing Plates	40' – 60'	82.8	Pass
1	Reinforcing Plates	30' – 40'	75.8	Pass
1	Reinforcing Plates	20' – 30'	68.4	Pass
1	Reinforcing Plates	0 – 20'	70.9	Pass

Structure Rating (max from all components) =	92.1%

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

APPENDIX A

RISA TOWER OUTPUT

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 1.0000 in.
Ice thickness is considered to increase with height.
Ice density of 56 pcf.
A wind speed of 38 mph is used in combination with ice.
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, feedline supports, and appurtenance mounts are not considered.

Options

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

Pole Section Geometry

Section	Elevation ft	Section Length ft	Pole Size	Pole Grade	Socket Length ft
L1	130.00-120.00	10.00	P16 x 3/16	A572-42 (42 ksi)	
L2	120.00-90.00	30.00	P24x1/4	A572-42 (42 ksi)	
L3	90.00-73.50	16.50	P24x3/8	A572-42 (42 ksi)	
L4	73.50-60.00	13.50	10-7411 P24x0.5949	A572-42 (42 ksi)	
L5	60.00-40.00	20.00	10-7411 P30x0.5429	37.99 ksi (Modified A53-B-42) (38 ksi)	
L6	40.00-30.00	10.00	10-7411 P30x0.7022	37.99 ksi (Modified A53-B-42) (38 ksi)	
L7	30.00-20.00	10.00	10-7411 P36x0.5569	35.90 ksi (modified A53-B-42) (36 ksi)	
L8	20.00-0.00	20.00	10-7411 P36x0.6901	35.90 ksi (modified A53-B-42) (36 ksi)	

Tower Elevation	Gusset Area (per face)	Gusset Thickness	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals	Double Angle Stitch Bolt Spacing Horizontals
ft	ft^2	in					in	in
L1 130.00-120.00				1	1	1		
L2 120.00-90.00				1	1	1		
L3 90.00-73.50				1	1	1		
L4 73.50-60.00				1	1	0.94		
L5 60.00-40.00				1	1	0.96		
L6 40.00-30.00				1	1	0.93		
L7 30.00-20.00				1	1	0.97		
L8 20.00-0.00				1	1	0.94		

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
*****								
5/16" (Internally Routed) (P)	A	No	CaAa (Out Of Face)	127.00 - 0.00	1	No Ice	0.00	0.06
						1/2" Ice	0.00	0.06
						1" Ice	0.00	0.06
						2" Ice	0.00	0.06
						4" Ice	0.00	0.06
1/4" Cable (Internally Routed) (P)	A	No	CaAa (Out Of Face)	127.00 - 0.00	2	No Ice	0.00	0.06
						1/2" Ice	0.00	0.06
						1" Ice	0.00	0.06
						2" Ice	0.00	0.06
						4" Ice	0.00	21.29
5/8 Cable (Internally Routed) (P)	A	No	CaAa (Out Of Face)	127.00 - 0.00	3	No Ice	0.00	0.15
						1/2" Ice	0.00	0.15
						1" Ice	0.00	0.15
						2" Ice	0.00	0.15
						4" Ice	0.00	0.15
1/2 Cable (Internally Routed) (P)	A	No	CaAa (Out Of Face)	127.00 - 0.00	4	No Ice	0.00	0.14
						1/2" Ice	0.00	0.14
						1" Ice	0.00	0.14
						2" Ice	0.00	0.14
						4" Ice	0.00	0.14
2" Rigid Conduit (P)	A	No	CaAa (Out Of Face)	127.00 - 0.00	1	No Ice	0.20	2.80
						1/2" Ice	0.30	4.33
						1" Ice	0.40	6.47
						2" Ice	0.60	12.57
						4" Ice	1.00	32.12
*****								
1 1/4 Cable (E)	C	No	Inside Pole	116.00 - 0.00	6	No Ice	0.00	0.63
						1/2" Ice	0.00	0.63
						1" Ice	0.00	0.63
						2" Ice	0.00	0.63
						4" Ice	0.00	0.63
7/8 Cable (R)	C	No	Inside Pole	116.00 - 0.00	3	No Ice	0.00	0.33
						1/2" Ice	0.00	0.33
						1" Ice	0.00	0.33
						2" Ice	0.00	0.33
						4" Ice	0.00	0.33
****								
7/8 Cable (E)	C	No	Inside Pole	116.00 - 0.00	3	No Ice	0.00	0.33
						1/2" Ice	0.00	0.33
						1" Ice	0.00	0.33
						2" Ice	0.00	0.33
						4" Ice	0.00	0.33

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
7/8 Cable (R)	C	No	Inside Pole	116.00 - 0.00	6	No Ice	0.00	0.33
						1/2" Ice	0.00	0.33
						1" Ice	0.00	0.33
						2" Ice	0.00	0.33
						4" Ice	0.00	0.33
****								
7/8 Cable (R)	B	No	Inside Pole	105.00 - 0.00	12	No Ice	0.00	0.33
						1/2" Ice	0.00	0.33
						1" Ice	0.00	0.33
						2" Ice	0.00	0.33
						4" Ice	0.00	0.33
****								
1 5/8 Cable (E)	A	No	Inside Pole	96.00 - 0.00	6	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
						2" Ice	0.00	0.82
						4" Ice	0.00	0.82
****								
1/2 Cable (Shielded) (E)	C	No	CaAa (Out Of Face)	60.00 - 0.00	1	No Ice	0.00	0.14
						1/2" Ice	0.00	0.76
						1" Ice	0.00	2.00
						2" Ice	0.00	6.30
						4" Ice	0.00	22.23
1/2 Cable (Shielded) (E)	C	No	CaAa (Out Of Face)	60.00 - 0.00	1	No Ice	0.00	0.14
						1/2" Ice	0.00	0.76
						1" Ice	0.00	2.00
						2" Ice	0.00	6.30
						4" Ice	0.00	22.23
****								
1/2 Cable (Shielded) (E)	C	No	CaAa (Out Of Face)	50.00 - 0.00	1	No Ice	0.00	0.14
						1/2" Ice	0.00	0.76
						1" Ice	0.00	2.00
						2" Ice	0.00	6.30
						4" Ice	0.00	22.23
****								
PL 1-1/4" (Shielded)	A	No	CaAa (Out Of Face)	22.00 - 0.00	1	No Ice	0.00	0.00
						1/2" Ice	0.00	0.00
						1" Ice	0.00	0.00
						2" Ice	0.00	0.00
						4" Ice	0.00	0.00
PL 1-1/4"	B	No	CaAa (Out Of Face)	22.00 - 0.00	1	No Ice	0.21	0.00
						1/2" Ice	0.32	0.00
						1" Ice	0.43	0.00
						2" Ice	0.65	0.00
						4" Ice	1.10	0.00
PL 1-1/4"	C	No	CaAa (Out Of Face)	22.00 - 0.00	1	No Ice	0.21	0.00
						1/2" Ice	0.32	0.00
						1" Ice	0.43	0.00
						2" Ice	0.65	0.00
						4" Ice	1.10	0.00
PL 1" (Shielded)	A	No	CaAa (Out Of Face)	25.00 - 22.00	1	No Ice	0.00	0.00
						1/2" Ice	0.00	0.00
						1" Ice	0.00	0.00
						2" Ice	0.00	0.00
						4" Ice	0.00	0.00
PL 1"	B	No	CaAa (Out Of Face)	25.00 - 22.00	1	No Ice	0.17	0.00
						1/2" Ice	0.28	0.00
						1" Ice	0.39	0.00
						2" Ice	0.61	0.00
						4" Ice	1.06	0.00
PL 1"	C	No	CaAa (Out Of Face)	25.00 - 22.00	1	No Ice	0.17	0.00
						1/2" Ice	0.28	0.00
						1" Ice	0.39	0.00
						2" Ice	0.61	0.00
						4" Ice	1.06	0.00
PL 1-1/4" (Shielded)	A	No	CaAa (Out Of Face)	43.00 - 25.00	1	No Ice	0.00	0.00
						1/2" Ice	0.00	0.00
						1" Ice	0.00	0.00
						2" Ice	0.00	0.00

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
						4" Ice	0.00	0.00
PL 1-1/4"	B	No	CaAa (Out Of Face)	43.00 - 25.00	1	No Ice	0.21	0.00
						1/2" Ice	0.32	0.00
						1" Ice	0.43	0.00
						2" Ice	0.65	0.00
						4" Ice	1.10	0.00
PL 1-1/4"	C	No	CaAa (Out Of Face)	43.00 - 25.00	1	No Ice	0.21	0.00
						1/2" Ice	0.32	0.00
						1" Ice	0.43	0.00
						2" Ice	0.65	0.00
						4" Ice	1.10	0.00
PL 1" (Shielded)	A	No	CaAa (Out Of Face)	56.00 - 43.00	1	No Ice	0.00	0.00
						1/2" Ice	0.00	0.00
						1" Ice	0.00	0.00
						2" Ice	0.00	0.00
						4" Ice	0.00	0.00
PL 1"	B	No	CaAa (Out Of Face)	56.00 - 43.00	1	No Ice	0.17	0.00
						1/2" Ice	0.28	0.00
						1" Ice	0.39	0.00
						2" Ice	0.61	0.00
						4" Ice	1.06	0.00
PL 1"	C	No	CaAa (Out Of Face)	56.00 - 43.00	1	No Ice	0.17	0.00
						1/2" Ice	0.28	0.00
						1" Ice	0.39	0.00
						2" Ice	0.61	0.00
						4" Ice	1.06	0.00
PL 1-1/4" (Shielded)	A	No	CaAa (Out Of Face)	64.00 - 56.00	1	No Ice	0.00	0.00
						1/2" Ice	0.00	0.00
						1" Ice	0.00	0.00
						2" Ice	0.00	0.00
						4" Ice	0.00	0.00
PL 1-1/4"	B	No	CaAa (Out Of Face)	64.00 - 56.00	1	No Ice	0.21	0.00
						1/2" Ice	0.32	0.00
						1" Ice	0.43	0.00
						2" Ice	0.65	0.00
						4" Ice	1.10	0.00
PL 1-1/4"	C	No	CaAa (Out Of Face)	64.00 - 56.00	1	No Ice	0.21	0.00
						1/2" Ice	0.32	0.00
						1" Ice	0.43	0.00
						2" Ice	0.65	0.00
						4" Ice	1.10	0.00
PL 1" (Shielded)	A	No	CaAa (Out Of Face)	75.00 - 64.00	1	No Ice	0.00	0.00
						1/2" Ice	0.00	0.00
						1" Ice	0.00	0.00
						2" Ice	0.00	0.00
						4" Ice	0.00	0.00
PL 1"	B	No	CaAa (Out Of Face)	75.00 - 64.00	1	No Ice	0.17	0.00
						1/2" Ice	0.28	0.00
						1" Ice	0.39	0.00
						2" Ice	0.61	0.00
						4" Ice	1.06	0.00
PL 1"	C	No	CaAa (Out Of Face)	75.00 - 64.00	1	No Ice	0.17	0.00
						1/2" Ice	0.28	0.00
						1" Ice	0.39	0.00
						2" Ice	0.61	0.00
						4" Ice	1.06	0.00

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	130.00-120.00	A	0.000	0.000	0.000	1.400	0.03
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00
L2	120.00-90.00	A	0.000	0.000	0.000	6.000	0.15
		B	0.000	0.000	0.000	0.000	0.06

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
		C	0.000	0.000	0.000	0.000	0.20
L3	90.00-73.50	A	0.000	0.000	0.000	3.300	0.15
		B	0.000	0.000	0.000	0.250	0.07
		C	0.000	0.000	0.000	0.250	0.13
L4	73.50-60.00	A	0.000	0.000	0.000	2.700	0.12
		B	0.000	0.000	0.000	2.417	0.05
		C	0.000	0.000	0.000	2.417	0.10
L5	60.00-40.00	A	0.000	0.000	0.000	4.000	0.18
		B	0.000	0.000	0.000	3.625	0.08
		C	0.000	0.000	0.000	3.625	0.16
L6	40.00-30.00	A	0.000	0.000	0.000	2.000	0.09
		B	0.000	0.000	0.000	2.083	0.04
		C	0.000	0.000	0.000	2.083	0.08
L7	30.00-20.00	A	0.000	0.000	0.000	2.000	0.09
		B	0.000	0.000	0.000	1.958	0.04
		C	0.000	0.000	0.000	1.958	0.08
L8	20.00-0.00	A	0.000	0.000	0.000	4.000	0.18
		B	0.000	0.000	0.000	4.167	0.08
		C	0.000	0.000	0.000	4.167	0.16

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	130.00-120.00	A	1.173	0.000	0.000	0.000	3.043	0.06
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.00
L2	120.00-90.00	A	1.149	0.000	0.000	0.000	12.894	0.29
		B		0.000	0.000	0.000	0.000	0.06
		C		0.000	0.000	0.000	0.000	0.20
L3	90.00-73.50	A	1.115	0.000	0.000	0.000	6.979	0.22
		B		0.000	0.000	0.000	0.622	0.07
		C		0.000	0.000	0.000	0.622	0.13
L4	73.50-60.00	A	1.088	0.000	0.000	0.000	5.638	0.18
		B		0.000	0.000	0.000	5.681	0.05
		C		0.000	0.000	0.000	5.681	0.10
L5	60.00-40.00	A	1.051	0.000	0.000	0.000	8.204	0.26
		B		0.000	0.000	0.000	8.297	0.08
		C		0.000	0.000	0.000	8.297	0.27
L6	40.00-30.00	A	1.007	0.000	0.000	0.000	4.014	0.13
		B		0.000	0.000	0.000	4.321	0.04
		C		0.000	0.000	0.000	4.321	0.14
L7	30.00-20.00	A	1.000	0.000	0.000	0.000	4.000	0.13
		B		0.000	0.000	0.000	4.181	0.04
		C		0.000	0.000	0.000	4.181	0.14
L8	20.00-0.00	A	1.000	0.000	0.000	0.000	8.000	0.25
		B		0.000	0.000	0.000	8.611	0.08
		C		0.000	0.000	0.000	8.611	0.27

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	130.00-120.00	0.0000	-0.1900	0.0000	-0.3320
L2	120.00-90.00	0.0000	-0.2727	0.0000	-0.4919
L3	90.00-73.50	0.0000	-0.2486	0.0000	-0.4307
L4	73.50-60.00	0.0000	-0.0246	0.0000	0.0028
L5	60.00-40.00	0.0000	-0.0230	0.0000	0.0044
L6	40.00-30.00	0.0000	0.0100	0.0000	0.0293
L7	30.00-20.00	0.0000	-0.0052	0.0000	0.0185
L8	20.00-0.00	0.0000	0.0104	0.0000	0.0311

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
****										
***										
LLPX310R w/ Mount Pipe (P)	A	From Face	4.00	0.00	0.0000	127.00	No Ice	5.07	2.98	0.05
							1/2" Ice	5.48	3.53	0.08
							1" Ice	5.91	4.09	0.13
							2" Ice	6.79	5.31	0.23
							4" Ice	8.70	8.13	0.54
LLPX310R w/ Mount Pipe (P)	B	From Face	4.00	0.00	0.0000	127.00	No Ice	5.07	2.98	0.05
							1/2" Ice	5.48	3.53	0.08
							1" Ice	5.91	4.09	0.13
							2" Ice	6.79	5.31	0.23
							4" Ice	8.70	8.13	0.54
LLPX310R w/ Mount Pipe (P)	C	From Face	4.00	0.00	0.0000	127.00	No Ice	5.07	2.98	0.05
							1/2" Ice	5.48	3.53	0.08
							1" Ice	5.91	4.09	0.13
							2" Ice	6.79	5.31	0.23
							4" Ice	8.70	8.13	0.54
WIMAX DAP HEAD (P)	A	From Face	4.00	0.00	0.0000	127.00	No Ice	1.80	0.78	0.03
							1/2" Ice	1.99	0.92	0.04
							1" Ice	2.18	1.07	0.06
							2" Ice	2.59	1.39	0.09
							4" Ice	3.51	2.14	0.20
WIMAX DAP HEAD (P)	B	From Face	4.00	0.00	0.0000	127.00	No Ice	1.80	0.78	0.03
							1/2" Ice	1.99	0.92	0.04
							1" Ice	2.18	1.07	0.06
							2" Ice	2.59	1.39	0.09
							4" Ice	3.51	2.14	0.20
WIMAX DAP HEAD (P)	C	From Face	4.00	0.00	0.0000	127.00	No Ice	1.80	0.78	0.03
							1/2" Ice	1.99	0.92	0.04
							1" Ice	2.18	1.07	0.06
							2" Ice	2.59	1.39	0.09
							4" Ice	3.51	2.14	0.20
HORIZON COMPACT (P)	A	From Leg	4.00	0.00	0.0000	127.00	No Ice	0.84	0.43	0.01
							1/2" Ice	0.97	0.52	0.02
							1" Ice	1.10	0.63	0.03
							2" Ice	1.39	0.86	0.05
							4" Ice	2.08	1.43	0.12
HORIZON COMPACT (P)	B	From Leg	4.00	0.00	0.0000	127.00	No Ice	0.84	0.43	0.01
							1/2" Ice	0.97	0.52	0.02
							1" Ice	1.10	0.63	0.03
							2" Ice	1.39	0.86	0.05
							4" Ice	2.08	1.43	0.12
HORIZON COMPACT (P)	C	From Leg	4.00	0.00	0.0000	127.00	No Ice	0.84	0.43	0.01
							1/2" Ice	0.97	0.52	0.02
							1" Ice	1.10	0.63	0.03
							2" Ice	1.39	0.86	0.05
							4" Ice	2.08	1.43	0.12
Side Arm Mount [SO 702-3] (P)	C	None			0.0000	127.00	No Ice	3.22	3.22	0.08
							1/2" Ice	4.15	4.15	0.11
							1" Ice	5.08	5.08	0.15
							2" Ice	6.94	6.94	0.21
							4" Ice	10.66	10.66	0.34

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
***									
(2) 950F65T2E-M w/ Mount Pipe (E)	A	From Face	4.00 0.00 0.00	0.0000	116.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.36 6.91 7.44 8.53 10.84	5.66 6.55 7.31 8.95 12.54	0.04 0.09 0.15 0.30 0.72
(2) 950F65T2E-M w/ Mount Pipe (E)	B	From Face	4.00 0.00 0.00	0.0000	116.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.36 6.91 7.44 8.53 10.84	5.66 6.55 7.31 8.95 12.54	0.04 0.09 0.15 0.30 0.72
(2) 950F65T2E-M w/ Mount Pipe (E)	C	From Face	4.00 0.00 0.00	0.0000	116.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.36 6.91 7.44 8.53 10.84	5.66 6.55 7.31 8.95 12.54	0.04 0.09 0.15 0.30 0.72
Platform Mount [LP 304-1] (E)	C	None		0.0000	116.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	17.46 22.44 27.42 37.38 57.30	17.46 22.44 27.42 37.38 57.30	1.35 1.62 1.90 2.45 3.55
RR65-12-00DBL w/ Mount Pipe (P)	A	From Face	4.00 0.00 0.00	0.0000	116.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.84 6.29 6.76 7.72 9.77	4.45 5.12 5.80 7.22 10.31	0.04 0.08 0.14 0.27 0.64
(2) RR90-11-00DBL w/ Mount Pipe (P)	B	From Face	4.00 0.00 0.00	0.0000	116.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.84 6.29 6.76 7.72 9.77	4.45 5.12 5.80 7.22 10.31	0.04 0.08 0.14 0.27 0.64
RR65-12-00DBL w/ Mount Pipe (P)	C	From Face	4.00 0.00 0.00	0.0000	116.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.84 6.29 6.76 7.72 9.77	4.45 5.12 5.80 7.22 10.31	0.04 0.08 0.14 0.27 0.64
(2) RR90-11-00DBL w/ Mount Pipe (P)	C	From Face	4.00 0.00 0.00	0.0000	116.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.84 6.29 6.76 7.72 9.77	4.45 5.12 5.80 7.22 10.31	0.04 0.08 0.14 0.27 0.64
*** ** ****									
BXA-70063/4CF w/ Mount Pipe (P)	A	From Face	4.00 0.00 0.00	0.0000	105.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.40 5.84 6.30 7.24 9.26	3.62 4.22 4.83 6.16 9.18	0.03 0.07 0.12 0.23 0.57
BXA-70063/4CF w/ Mount Pipe (P)	B	From Face	4.00 0.00 0.00	0.0000	105.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.40 5.84 6.30 7.24 9.26	3.62 4.22 4.83 6.16 9.18	0.03 0.07 0.12 0.23 0.57
BXA-70063/4CF w/ Mount	C	From Face	4.00	0.0000	105.00	No Ice	5.40	3.62	0.03

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Pipe			0.00			1/2"	5.84	4.22	0.07
(P)			0.00			Ice	6.30	4.83	0.12
						1" Ice	7.24	6.16	0.23
						2" Ice	9.26	9.18	0.57
						4" Ice			
(2) LPA-80063/4CF w/ Mount Pipe	A	From Face	4.00	0.0000	105.00	No Ice	7.25	7.26	0.04
(P)			0.00			1/2"	7.72	7.96	0.10
			0.00			Ice	8.20	8.67	0.18
						1" Ice	9.19	10.16	0.34
						2" Ice	11.32	13.39	0.80
						4" Ice			
(2) LPA-80063/4CF w/ Mount Pipe	B	From Face	4.00	0.0000	105.00	No Ice	7.25	7.26	0.04
(P)			0.00			1/2"	7.72	7.96	0.10
			0.00			Ice	8.20	8.67	0.18
						1" Ice	9.19	10.16	0.34
						2" Ice	11.32	13.39	0.80
						4" Ice			
(2) LPA-80063/4CF w/ Mount Pipe	C	From Face	4.00	0.0000	105.00	No Ice	7.25	7.26	0.04
(P)			0.00			1/2"	7.72	7.96	0.10
			0.00			Ice	8.20	8.67	0.18
						1" Ice	9.19	10.16	0.34
						2" Ice	11.32	13.39	0.80
						4" Ice			
MG D3-800Tx w/ Mount Pipe	A	From Face	4.00	0.0000	105.00	No Ice	3.57	3.42	0.03
(P)			0.00			1/2"	3.98	4.12	0.07
			0.00			Ice	4.39	4.78	0.11
						1" Ice	5.33	6.16	0.21
						2" Ice	7.34	9.18	0.52
						4" Ice			
MG D3-800Tx w/ Mount Pipe	B	From Face	4.00	0.0000	105.00	No Ice	3.57	3.42	0.03
(P)			0.00			1/2"	3.98	4.12	0.07
			0.00			Ice	4.39	4.78	0.11
						1" Ice	5.33	6.16	0.21
						2" Ice	7.34	9.18	0.52
						4" Ice			
MG D3-800Tx w/ Mount Pipe	C	From Face	4.00	0.0000	105.00	No Ice	3.57	3.42	0.03
(P)			0.00			1/2"	3.98	4.12	0.07
			0.00			Ice	4.39	4.78	0.11
						1" Ice	5.33	6.16	0.21
						2" Ice	7.34	9.18	0.52
						4" Ice			
(2) FD9R6004/2C-3L	A	From Face	4.00	0.0000	105.00	No Ice	0.37	0.08	0.00
(P)			0.00			1/2"	0.45	0.14	0.01
			0.00			Ice	0.54	0.20	0.01
						1" Ice	0.75	0.34	0.02
						2" Ice	1.28	0.74	0.06
						4" Ice			
(2) FD9R6004/2C-3L	B	From Face	4.00	0.0000	105.00	No Ice	0.37	0.08	0.00
(P)			0.00			1/2"	0.45	0.14	0.01
			0.00			Ice	0.54	0.20	0.01
						1" Ice	0.75	0.34	0.02
						2" Ice	1.28	0.74	0.06
						4" Ice			
(2) FD9R6004/2C-3L	C	From Face	4.00	0.0000	105.00	No Ice	0.37	0.08	0.00
(P)			0.00			1/2"	0.45	0.14	0.01
			0.00			Ice	0.54	0.20	0.01
						1" Ice	0.75	0.34	0.02
						2" Ice	1.28	0.74	0.06
						4" Ice			
Platform Mount [LP 404-1]	C	None		0.0000	105.00	No Ice	32.79	32.79	2.04
(E)						1/2"	44.63	44.63	2.48
						Ice	56.47	56.47	2.91
						1" Ice	80.15	80.15	3.77
						2" Ice	127.51	127.51	5.50
						4" Ice			

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
*									
******									
APX18-206517-CT2 w/ Mount Pipe (E)	A	From Face	1.00 0.00 0.00	0.0000	96.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.36 5.91 6.44 7.51 9.86	4.73 5.90 6.79 8.58 12.36	0.05 0.09 0.15 0.28 0.68
APX18-206517-CT2 w/ Mount Pipe (E)	B	From Face	1.00 0.00 0.00	0.0000	96.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.36 5.91 6.44 7.51 9.86	4.73 5.90 6.79 8.58 12.36	0.05 0.09 0.15 0.28 0.68
APX18-206517-CT2 w/ Mount Pipe (E)	C	From Face	1.00 0.00 0.00	0.0000	96.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.36 5.91 6.44 7.51 9.86	4.73 5.90 6.79 8.58 12.36	0.05 0.09 0.15 0.28 0.68
Pipe Mount [PM 602-3] (E)	C	None		0.0000	96.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.68 9.50 11.32 14.96 22.24	7.68 9.50 11.32 14.96 22.24	0.28 0.35 0.43 0.58 0.87
*****									
OG-860/1920/GPS-A (E)	B	From Face	3.00 0.00 0.00	0.0000	60.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.33 0.43 0.55 0.80 1.41	0.40 0.51 0.63 0.89 1.52	0.00 0.01 0.01 0.02 0.08
OG-860/1920/GPS-A (E)	C	From Face	3.00 0.00 0.00	0.0000	60.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.33 0.43 0.55 0.80 1.41	0.40 0.51 0.63 0.89 1.52	0.00 0.01 0.01 0.02 0.08
Side Arm Mount [SO 701-1] (E)	B	None		0.0000	60.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.85 1.14 1.43 2.01 3.17	1.67 2.34 3.01 4.35 7.03	0.07 0.08 0.09 0.12 0.18
Side Arm Mount [SO 701-1] (E)	C	None		0.0000	60.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.85 1.14 1.43 2.01 3.17	1.67 2.34 3.01 4.35 7.03	0.07 0.08 0.09 0.12 0.18
****									
KS24019-L112A (E)	B	From Face	3.00 0.00 0.00	0.0000	50.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.16 0.22 0.30 0.48 0.95	0.16 0.22 0.30 0.48 0.95	0.01 0.01 0.01 0.02 0.06
Side Arm Mount [SO 701-1] (E)	B	None		0.0000	50.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.85 1.14 1.43 2.01 3.17	1.67 2.34 3.01 4.35 7.03	0.07 0.08 0.09 0.12 0.18
*									

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft	C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
*								
*								

Dishes

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 ft^2	Weight K
A-ANT-18G-2-C (P,F=18.0)	A	Paraboloid w/o Radome	From Face	4.00 0.00 0.00	0.0000		127.00	2.17	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.72 4.01 4.30 4.88 6.04	0.03 0.05 0.07 0.11 0.19
A-ANT-18G-2-C (P,F=18.0)	B	Paraboloid w/o Radome	From Face	4.00 0.00 0.00	0.0000		127.00	2.17	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.72 4.01 4.30 4.88 6.04	0.03 0.05 0.07 0.11 0.19
A-ANT-18G-2-C (P,F=18.0)	C	Paraboloid w/o Radome	From Face	4.00 0.00 0.00	0.0000		127.00	2.17	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.72 4.01 4.30 4.88 6.04	0.03 0.05 0.07 0.11 0.19

Load Combinations

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

Comb. No.	Description
28	Dead+Wind 30 deg - Service
29	Dead+Wind 60 deg - Service
30	Dead+Wind 90 deg - Service
31	Dead+Wind 120 deg - Service
32	Dead+Wind 150 deg - Service
33	Dead+Wind 180 deg - Service
34	Dead+Wind 210 deg - Service
35	Dead+Wind 240 deg - Service
36	Dead+Wind 270 deg - Service
37	Dead+Wind 300 deg - Service
38	Dead+Wind 330 deg - Service

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	14	37.41	0.00	0.00
	Max. H_x	11	25.64	16.95	-0.14
	Max. H_z	2	25.64	-0.02	17.07
	Max. M_x	2	1552.24	-0.02	17.07
	Max. M_z	5	1537.25	-16.95	-0.09
	Max. Torsion	10	1.50	14.73	-8.56
	Min. Vert	1	25.64	0.00	0.00
	Min. H_x	5	25.64	-16.95	-0.09
	Min. H_z	8	25.64	0.02	-17.12
	Min. M_x	8	-1558.09	0.02	-17.12
	Min. M_z	11	-1536.89	16.95	-0.14
	Min. Torsion	4	-1.50	-14.77	8.58

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	25.64	0.00	0.00	-0.28	-0.17	0.00
Dead+Wind 0 deg - No Ice	25.64	0.02	-17.07	-1552.24	-2.95	0.82
Dead+Wind 30 deg - No Ice	25.64	8.39	-14.82	-1348.88	-757.89	1.33
Dead+Wind 60 deg - No Ice	25.64	14.77	-8.58	-781.88	-1342.70	1.50
Dead+Wind 90 deg - No Ice	25.64	16.95	0.09	12.19	-1537.25	1.27
Dead+Wind 120 deg - No Ice	25.64	14.70	8.52	773.31	-1334.39	0.68
Dead+Wind 150 deg - No Ice	25.64	8.56	14.68	1330.30	-779.51	-0.09
Dead+Wind 180 deg - No Ice	25.64	-0.02	17.12	1558.09	2.60	-0.82
Dead+Wind 210 deg - No Ice	25.64	-8.60	14.70	1333.06	783.97	-1.33
Dead+Wind 240 deg - No Ice	25.64	-14.73	8.56	778.11	1336.81	-1.50
Dead+Wind 270 deg - No Ice	25.64	-16.95	0.14	17.74	1536.89	-1.27
Dead+Wind 300 deg - No Ice	25.64	-14.74	-8.54	-777.07	1339.58	-0.68
Dead+Wind 330 deg - No Ice	25.64	-8.36	-14.80	-1346.11	752.74	0.09
Dead+Ice	37.41	0.00	0.00	0.30	-0.38	-0.00
Dead+Wind 0 deg+Ice	37.41	0.00	-5.13	-477.49	-0.81	0.25
Dead+Wind 30 deg+Ice	37.41	2.53	-4.45	-414.53	-234.72	0.39
Dead+Wind 60 deg+Ice	37.41	4.45	-2.58	-239.79	-414.71	0.44
Dead+Wind 90 deg+Ice	37.41	5.11	0.03	4.05	-475.45	0.37
Dead+Wind 120 deg+Ice	37.41	4.44	2.56	238.91	-412.82	0.19
Dead+Wind 150 deg+Ice	37.41	2.58	4.42	410.70	-241.16	-0.04
Dead+Wind 180 deg+Ice	37.41	-0.00	5.15	479.89	-0.03	-0.25
Dead+Wind 210 deg+Ice	37.41	-2.59	4.42	411.09	241.00	-0.39
Dead+Wind 240 deg+Ice	37.41	-4.44	2.57	239.59	412.38	-0.44
Dead+Wind 270 deg+Ice	37.41	-5.11	0.03	4.83	474.61	-0.37
Dead+Wind 300 deg+Ice	37.41	-4.45	-2.57	-239.10	413.48	-0.19
Dead+Wind 330 deg+Ice	37.41	-2.53	-4.45	-414.13	233.20	0.04
Dead+Wind 0 deg - Service	25.64	0.01	-6.67	-606.98	-1.26	0.32
Dead+Wind 30 deg - Service	25.64	3.28	-5.79	-527.47	-296.38	0.52
Dead+Wind 60 deg - Service	25.64	5.77	-3.35	-305.82	-525.01	0.59
Dead+Wind 90 deg - Service	25.64	6.62	0.04	4.60	-601.04	0.50
Dead+Wind 120 deg -	25.64	5.74	3.33	302.13	-521.75	0.27

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Service						
Dead+Wind 150 deg - Service	25.64	3.34	5.73	519.87	-304.84	-0.03
Dead+Wind 180 deg - Service	25.64	-0.01	6.69	608.93	0.91	-0.32
Dead+Wind 210 deg - Service	25.64	-3.36	5.74	520.95	306.36	-0.52
Dead+Wind 240 deg - Service	25.64	-5.75	3.34	304.01	522.48	-0.59
Dead+Wind 270 deg - Service	25.64	-6.62	0.05	6.77	600.69	-0.50
Dead+Wind 300 deg - Service	25.64	-5.76	-3.34	-303.94	523.56	-0.27
Dead+Wind 330 deg - Service	25.64	-3.26	-5.78	-526.39	294.15	0.03

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
1	0.00	-25.64	0.00	0.00	25.64	0.00	0.000%
2	0.02	-25.64	-17.07	-0.02	25.64	17.07	0.000%
3	8.39	-25.64	-14.82	-8.39	25.64	14.82	0.000%
4	14.77	-25.64	-8.58	-14.77	25.64	8.58	0.000%
5	16.95	-25.64	0.09	-16.95	25.64	-0.09	0.000%
6	14.70	-25.64	8.52	-14.70	25.64	-8.52	0.000%
7	8.56	-25.64	14.68	-8.56	25.64	-14.68	0.000%
8	-0.02	-25.64	17.12	0.02	25.64	-17.12	0.000%
9	-8.60	-25.64	14.70	8.60	25.64	-14.70	0.000%
10	-14.73	-25.64	8.56	14.73	25.64	-8.56	0.000%
11	-16.95	-25.64	0.14	16.95	25.64	-0.14	0.000%
12	-14.74	-25.64	-8.54	14.74	25.64	8.54	0.000%
13	-8.36	-25.64	-14.80	8.36	25.64	14.80	0.000%
14	0.00	-37.41	0.00	0.00	37.41	0.00	0.000%
15	0.00	-37.41	-5.13	-0.00	37.41	5.13	0.000%
16	2.53	-37.41	-4.45	-2.53	37.41	4.45	0.000%
17	4.45	-37.41	-2.58	-4.45	37.41	2.58	0.000%
18	5.11	-37.41	0.03	-5.11	37.41	-0.03	0.000%
19	4.44	-37.41	2.56	-4.44	37.41	-2.56	0.000%
20	2.58	-37.41	4.42	-2.58	37.41	-4.42	0.000%
21	-0.00	-37.41	5.15	0.00	37.41	-5.15	0.000%
22	-2.59	-37.41	4.42	2.59	37.41	-4.42	0.000%
23	-4.44	-37.41	2.57	4.44	37.41	-2.57	0.000%
24	-5.11	-37.41	0.03	5.11	37.41	-0.03	0.000%
25	-4.45	-37.41	-2.57	4.45	37.41	2.57	0.000%
26	-2.53	-37.41	-4.45	2.53	37.41	4.45	0.000%
27	0.01	-25.64	-6.67	-0.01	25.64	6.67	0.000%
28	3.28	-25.64	-5.79	-3.28	25.64	5.79	0.000%
29	5.77	-25.64	-3.35	-5.77	25.64	3.35	0.000%
30	6.62	-25.64	0.04	-6.62	25.64	-0.04	0.000%
31	5.74	-25.64	3.33	-5.74	25.64	-3.33	0.000%
32	3.34	-25.64	5.73	-3.34	25.64	-5.73	0.000%
33	-0.01	-25.64	6.69	0.01	25.64	-6.69	0.000%
34	-3.36	-25.64	5.74	3.36	25.64	-5.74	0.000%
35	-5.75	-25.64	3.34	5.75	25.64	-3.34	0.000%
36	-6.62	-25.64	0.05	6.62	25.64	-0.05	0.000%
37	-5.76	-25.64	-3.34	5.76	25.64	3.34	0.000%
38	-3.26	-25.64	-5.78	3.26	25.64	5.78	0.000%

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	130 - 120	26.634	33	1.7426	0.0087

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L2	120 - 90	22.992	33	1.7274	0.0087
L3	90 - 73.5	12.636	33	1.4665	0.0044
L4	73.5 - 60	8.084	33	1.1356	0.0026
L5	60 - 40	5.236	33	0.8643	0.0017
L6	40 - 30	2.235	33	0.5492	0.0009
L7	30 - 20	1.247	33	0.3901	0.0006
L8	20 - 0	0.564	33	0.2591	0.0004

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
127.00	A-ANT-18G-2-C	33	25.541	1.7394	0.0087	382338
116.00	(2) 950F65T2E-M w/ Mount Pipe	33	21.538	1.7149	0.0084	22336
105.00	BXA-70063/4CF w/ Mount Pipe	33	17.607	1.6501	0.0070	6524
96.00	APX18-206517-CT2 w/ Mount Pipe	33	14.549	1.5553	0.0054	4130
60.00	OG-860/1920/GPS-A	33	5.236	0.8643	0.0017	3393
50.00	KS24019-L112A	33	3.562	0.7018	0.0012	3447

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	130 - 120	68.041	8	4.4519	0.0221
L2	120 - 90	58.746	8	4.4129	0.0222
L3	90 - 73.5	32.302	8	3.7485	0.0114
L4	73.5 - 60	20.673	8	2.9035	0.0068
L5	60 - 40	13.393	8	2.2104	0.0043
L6	40 - 30	5.718	8	1.4050	0.0023
L7	30 - 20	3.191	8	0.9980	0.0015
L8	20 - 0	1.444	8	0.6629	0.0009

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
127.00	A-ANT-18G-2-C	8	65.252	4.4436	0.0223	159167
116.00	(2) 950F65T2E-M w/ Mount Pipe	8	55.034	4.3811	0.0215	8887
105.00	BXA-70063/4CF w/ Mount Pipe	8	44.997	4.2164	0.0178	2584
96.00	APX18-206517-CT2 w/ Mount Pipe	8	37.188	3.9749	0.0138	1633
60.00	OG-860/1920/GPS-A	8	13.393	2.2104	0.0043	1331
50.00	KS24019-L112A	8	9.110	1.7950	0.0032	1351

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
L1	130 - 120 (1)	P16 x 3/16	10.00	0.00	0.0	24.558	9.3143	-0.65	228.74	0.003
L2	120 - 90 (2)	P24x1/4	30.00	0.00	0.0	23.696	18.6532	-7.06	442.00	0.016
L3	90 - 73.5 (3)	P24x3/8	16.50	0.00	0.0	25.200	27.8325	-9.10	701.38	0.013

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 $\frac{P}{P_a}$
L4	73.5 - 60 (4)	10-7411 P24x0.5949	13.50	0.00	0.0	25.200	43.7426	-11.39	1102.31	0.010
L5	60 - 40 (5)	10-7411 P30x0.5429	20.00	0.00	0.0	22.795	50.2412	-15.45	1145.27	0.013
L6	40 - 30 (6)	10-7411 P30x0.7022	10.00	0.00	0.0	22.795	64.6317	-17.80	1473.31	0.012
L7	30 - 20 (7)	10-7411 P36x0.5569	10.00	0.00	0.0	21.542	62.0096	-20.14	1335.79	0.015
L8	20 - 0 (8)	10-7411 P36x0.6901	20.00	0.00	0.0	21.542	76.5523	-25.64	1649.06	0.016

Pole Bending Design Data

Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
L1	130 - 120 (1)	P16 x 3/16	11.54	3.804	24.558	0.155	0.00	0.000	24.558	0.000
L2	120 - 90 (2)	P24x1/4	248.71	27.228	23.696	1.149	0.00	0.000	23.696	0.000
L3	90 - 73.5 (3)	P24x3/8	452.85	33.574	27.720	1.211	0.00	0.000	27.720	0.000
L4	73.5 - 60 (4)	10-7411 P24x0.5949	630.57	30.296	27.720	1.093	0.00	0.000	27.720	0.000
L5	60 - 40 (5)	10-7411 P30x0.5429	916.98	30.279	25.075	1.208	0.00	0.000	25.075	0.000
L6	40 - 30 (6)	10-7411 P30x0.7022	1068.95	27.730	25.075	1.106	0.00	0.000	25.075	0.000
L7	30 - 20 (7)	10-7411 P36x0.5569	1226.38	27.198	23.696	1.148	0.00	0.000	23.696	0.000
L8	20 - 0 (8)	10-7411 P36x0.6901	1558.09	28.198	23.696	1.190	0.00	0.000	23.696	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V K	Actual f_v ksi	Allow. F_v ksi	Ratio $\frac{f_v}{F_v}$	Actual T kip-ft	Actual f_{vt} ksi	Allow. F_{vt} ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
L1	130 - 120 (1)	P16 x 3/16	1.76	0.378	16.800	0.023	0.01	0.001	14.201	0.000
L2	120 - 90 (2)	P24x1/4	11.96	1.282	16.800	0.076	0.76	0.041	11.901	0.003
L3	90 - 73.5 (3)	P24x3/8	12.78	0.919	16.800	0.055	0.76	0.028	16.800	0.002
L4	73.5 - 60 (4)	10-7411 P24x0.5949	13.55	0.620	16.800	0.037	0.76	0.018	16.800	0.001
L5	60 - 40 (5)	10-7411 P30x0.5429	14.95	0.595	15.197	0.039	0.82	0.014	15.197	0.001
L6	40 - 30 (6)	10-7411 P30x0.7022	15.46	0.479	15.197	0.031	0.82	0.011	15.197	0.001
L7	30 - 20 (7)	10-7411 P36x0.5569	16.04	0.517	14.361	0.036	0.82	0.009	14.361	0.001
L8	20 - 0 (8)	10-7411 P36x0.6901	17.13	0.447	14.361	0.031	0.82	0.007	14.361	0.001

Pole Interaction Design Data

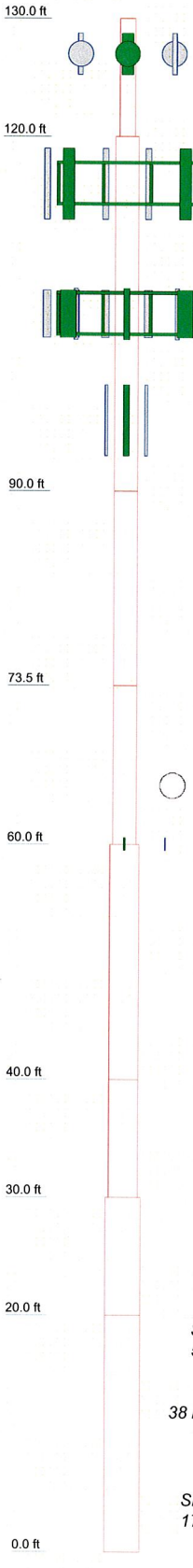
Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	130 - 120 (1)	0.003	0.155	0.000	0.023	0.000	0.158 ✔	1.333	H1-3+VT ✔
L2	120 - 90 (2)	0.016	1.149	0.000	0.076	0.003	1.171 ✔	1.333	H1-3+VT ✔
L3	90 - 73.5 (3)	0.013	1.211	0.000	0.055	0.002	1.227 ✔	1.333	H1-3+VT ✔
L4	73.5 - 60 (4)	0.010	1.093	0.000	0.037	0.001	1.105 ✔	1.333	H1-3+VT ✔
L5	60 - 40 (5)	0.013	1.208	0.000	0.039	0.001	1.223 ✔	1.333	H1-3+VT ✔
L6	40 - 30 (6)	0.012	1.106	0.000	0.031	0.001	1.119 ✔	1.333	H1-3+VT ✔
L7	30 - 20 (7)	0.015	1.148	0.000	0.036	0.001	1.164 ✔	1.333	H1-3+VT ✔
L8	20 - 0 (8)	0.016	1.190	0.000	0.031	0.001	1.207 ✔	1.333	H1-3+VT ✔

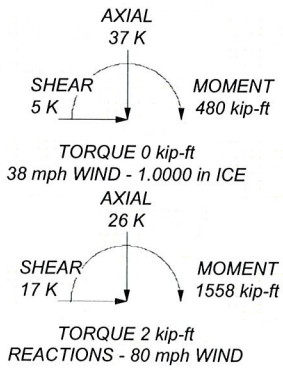
Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
L1	130 - 120	Pole	P16 x 3/16	1	-0.65	304.91	11.9	Pass
L2	120 - 90	Pole	P24x1/4	2	-7.06	589.19	87.9	Pass
L3	90 - 73.5	Pole	P24x3/8	3	-9.10	934.94	92.1	Pass
L4	73.5 - 60	Pole	10-7411 P24x0.5949	4	-11.39	1469.38	82.9	Pass
L5	60 - 40	Pole	10-7411 P30x0.5429	5	-15.45	1526.64	91.7	Pass
L6	40 - 30	Pole	10-7411 P30x0.7022	6	-17.80	1963.92	83.9	Pass
L7	30 - 20	Pole	10-7411 P36x0.5569	7	-20.14	1780.61	87.3	Pass
L8	20 - 0	Pole	10-7411 P36x0.6901	8	-25.64	2198.20	90.5	Pass
							Summary	
						Pole (L3)	92.1	Pass
						RATING =	**92.1**	**Pass**

Section	Size	Length (ft)	Grade	Weight (K)
1	P16 x 3/16	10.00	A588-42	0.3
2	P24x1/4	30.00	A572-42	1.9
3	P24x3/8	16.50		1.6
4	10-7411 P24x0.5949	13.50		1.9
5	10-7411 P30x0.5429	20.00	37.99 ksi (Modified A53-B-42)	3.3
6	10-7411 P30x0.7022	10.00		2.0
7	10-7411 P36x0.5569	10.00	35.90 ksi (modified A53-B-42)	2.0
8	10-7411 P36x0.6901	20.00		4.9
				17.9





DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
LLPX310R w/ Mount Pipe (P)	127	(2) LPA-80063/4CF w/ Mount Pipe (P)	105
LLPX310R w/ Mount Pipe (P)	127	(2) LPA-80063/4CF w/ Mount Pipe (P)	105
LLPX310R w/ Mount Pipe (P)	127	MG D3-800Tx w/ Mount Pipe (P)	105
WIMAX DAP HEAD (P)	127	MG D3-800Tx w/ Mount Pipe (P)	105
WIMAX DAP HEAD (P)	127	MG D3-800Tx w/ Mount Pipe (P)	105
WIMAX DAP HEAD (P)	127	(2) FD9R6004/2C-3L (P)	105
HORIZON COMPACT (P)	127	(2) FD9R6004/2C-3L (P)	105
HORIZON COMPACT (P)	127	(2) FD9R6004/2C-3L (P)	105
HORIZON COMPACT (P)	127	Platform Mount [LP 404-1] (E)	105
Side Arm Mount [SO 702-3] (P)	127	BXA-70063/4CF w/ Mount Pipe (P)	105
A-ANT-18G-2-C (P,F=18.0)	127	BXA-70063/4CF w/ Mount Pipe (P)	105
A-ANT-18G-2-C (P,F=18.0)	127	BXA-70063/4CF w/ Mount Pipe (P)	105
A-ANT-18G-2-C (P,F=18.0)	127	Pipe Mount [PM 602-3] (E)	96
Platform Mount [LP 304-1] (E)	116	APX18-206517-CT2 w/ Mount Pipe (E)	96
RR65-12-00DBL w/ Mount Pipe (P)	116	APX18-206517-CT2 w/ Mount Pipe (E)	96
(2) RR90-11-00DBL w/ Mount Pipe (P)	116	APX18-206517-CT2 w/ Mount Pipe (E)	96
RR65-12-00DBL w/ Mount Pipe (P)	116	Side Arm Mount [SO 701-1] (E)	60
(2) RR90-11-00DBL w/ Mount Pipe (P)	116	OG-860/1920/GPS-A (E)	60
(2) 950F65T2E-M w/ Mount Pipe (E)	116	OG-860/1920/GPS-A (E)	60
(2) 950F65T2E-M w/ Mount Pipe (E)	116	Side Arm Mount [SO 701-1] (E)	60
(2) 950F65T2E-M w/ Mount Pipe (E)	116	Side Arm Mount [SO 701-1] (E)	50
(2) LPA-80063/4CF w/ Mount Pipe (P)	105	KS24019-L112A (E)	50

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A588-42	42 ksi	63 ksi	37.99 ksi (Modified A53-B-42)	38 ksi	63 ksi
A572-42	42 ksi	60 ksi	35.90 ksi (modified A53-B-42)	36 ksi	63 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: 92.1%

IETS
129 Greenwich Road
Charlotte, NC 28211
Phone: (704) 522-1131
FAX: (704) 522-1280

Job: *West Hartford United Methodist*			
Project: *BU #876324 (PJF #37510-0287 R3)*			
Client: Crown Castle International	Drawn by: Ted Haile	App'd:	
Code: TIA/EIA-222-F	Date: 05/27/10	Scale: NTS	
Path: N:\2010-70100 Thru 70199\2010-70136 MP 876324 West Hartford UM (MOD)\Calc\2010-70136.876324.eri		Dwg No. E-1	

APPENDIX B

MODIFICATION & BASE LEVEL DRAWINGS

www.iets.com

IETS Engineering Services

WEST HARTFORD UM

BU#: 876324

PROJECT DESCRIPTION:
TELECOMMUNICATIONS TOWER UPGRADE

SITE NAME:
WEST HARTFORD UNITED METHODIST

SITE ADDRESS:
1358 NEW BRITAIN AVENUE
WEST HARTFORD, CT
HARTFORD COUNTY

SITE OWNER
CROWN CASTLE USA
1200 MACARTHUR BLVD
MAHWAH, NJ 35226
CONTACT: MR. JOSH MOSTOW (201) 236 9059

EXISTING STRUCTURE INFO:
LATITUDE: 41° 43' 50.4"
LONGITUDE: -72° 45' 13.2"

CONSULTING FIRMS:

INDUSTRIAL ENGINEERING & TESTING SERVICES, P.C.
WILLIAM A. GRISWOLD JR., P.E.
(704) 522-1131

VICINITY MAP

SHEET NO.	DESCRIPTION
01	TITLE PAGE - GENERAL SITE INFORMATION
02	TOWER ELEVATION
03	SECTIONS & DETAILS
04	SECTIONS & DETAILS
05	SECTIONS & DETAILS
PMI	PMI CHECKLIST

Approved By:

ZONING INFORMATION:

Sabre Towers & Poles
A Division of Sabre Industries, Inc.

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Charlotte, NC 28211
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Fax:(704)522-1280

REVISIONS			
NO.	DATE	DESCRIPTION	BY
0	05-27-10	ORIGINAL RELEASE	TH

DRAWN BY: T. HAILE
CHECKED BY: W. GRISWOLD
DRAWING DATE: 05-27-10

SITE NAME & BU#

SITE NAME: WEST HARTFORD UM
BU #: 876324

SITE INFORMATION

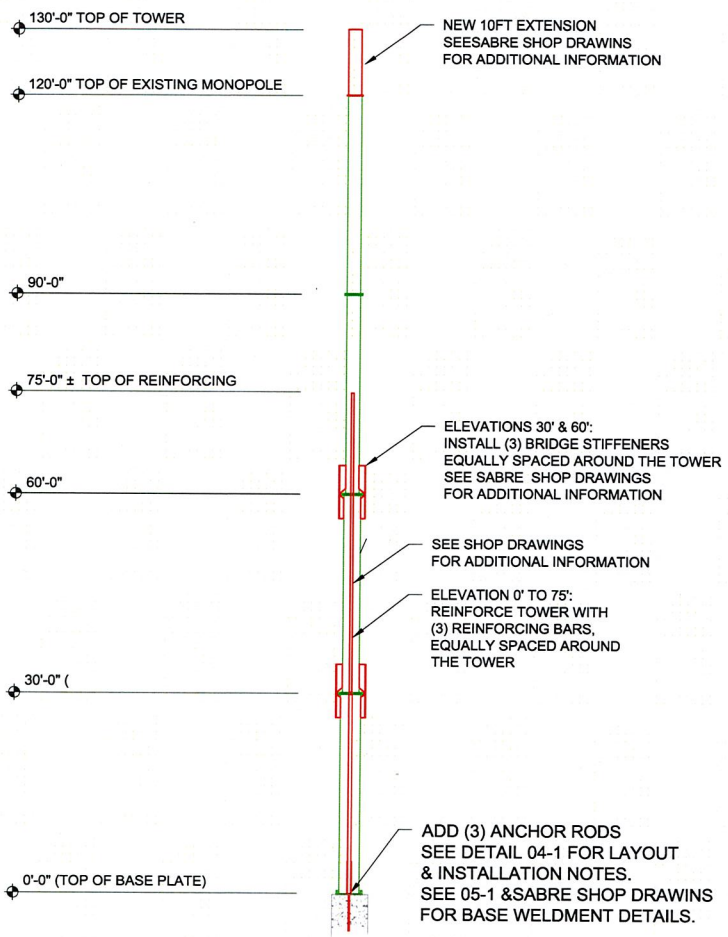
120' MONOPOLE W/ 10' EXTENSION
1358 NEW BRITAIN AVENUE
WEST HARTFORD, CT
HARTFORD COUNTY

SHEET TITLE

TITLE PAGE

SHEET NUMBER

2010-70136-01



ELEVATION 02-1

SCALE: NTS

THE MODIFICATIONS WERE DESIGNED BASED UPON A FASTEST MILE WIND SPEED OF 80 MPH IN ACCORDANCE WITH TIA/EIA-222-F STANDARD AND LOCAL CODE REQUIREMENTS.

GENERAL NOTES

1. ALL WORK SHALL COMPLY WITH CROWN CASTLE USA CUTTING, WELDING, & SAFETY GUIDELINES (ATTACHED) & ALL CCUSA SAFETY POLICIES.
2. ALL DIMENSIONS AND DETAILS SHOWN HAVE BEEN OBTAINED FROM EXISTING DRAWINGS. ACTUAL SITE DIMENSIONS MUST BE VERIFIED PRIOR TO FABRICATION OF ANY MATERIAL.
3. REATTACH ALL CABLE LADDERS OR OTHER MOUNTINGS TO NEW REINFORCING MATERIAL TO MATCH EXISTING LOCATION. ALL TELECOMMUNICATION EQUIPMENT MUST REMAIN IN SERVICE DURING NEW TOWER WORK, UNLESS NOTED OTHERWISE.
4. CONTRACTOR SHALL SUBMIT TO ENGINEER ANY INTENT TO DEVIATE FROM PLANS AND DETAILS FOR APPROVAL PRIOR TO START OF ANY WORK.
5. CONTACT THE ENGINEER CONCERNING ANY CHANGES OR MODIFICATIONS THAT MAY BE REQUIRED DUE TO THE EXISTING CONDITIONS PRIOR TO START OF ANY WORK.
6. CONTRACTOR SHALL BE EXPERIENCED IN TYPE OF WORK REPRESENTED IN THESE DRAWINGS. CONTRACTOR SHALL BE LICENSED AND REGISTERED IN THE STATE AND/OR COUNTY IN WHICH THE WORK IS TO BE PERFORMED.
7. CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING ALL WORK SCHEDULES AND MATERIAL ACCESS WITH RESIDENT LEASING AGENT. CONTRACTOR SHALL BE RESPONSIBLE FOR SAFEGUARDING ALL EXISTING STRUCTURES AND BURIED UTILITIES IMPACTED BY THIS CONSTRUCTION.
8. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL SAFETY PRECAUTIONS AND PROGRAMS. CONTRACTOR SHALL BE RESPONSIBLE FOR ENSURING THAT ALL WORK IS PERFORMED IN ACCORDANCE WITH APPLICABLE LOCAL, STATE, AND FEDERAL SAFETY CODES AND REGULATIONS.
9. DO NOT INSTALL NEW BOLTED REINFORCING OVER EXISTING FEEDLINE STRAPPING. ALL EXTERNAL FEEDLINES SHALL BE REATTACHED AFTER NEW REINFORCING IS INSTALLED.

WELD INSPECTION NOTES:

1. PRIOR TO INSTALLING THE EXTENSION, TOP FLANGE PLATE SHALL BE VISUALLY INSPECTED FOR CRACKS, WELD QUALITY AND SURFACE CONDITION.

STRUCTURAL STEEL NOTES

1. ALL NEW STEEL PLATE SHALL TO BE ASTM A-572 GRADE 65 MATERIAL, UNLESS NOTED OTHERWISE.
2. ALL NEW STEEL PLATE SHALL BE HOT DIP GALVANIZED IN ACCORDANCE WITH ASTM A-123.
3. STEEL DESIGN, DETAILING, AND ERECTION TO BE IN ACCORDANCE WITH AISC MANUAL OF STEEL CONSTRUCTION, LATEST EDITION AND TIA/EIA-222-F.

WELDING NOTES

1. ALL WELDING SHALL COMPLY WITH THE LATEST EDITION OF AWS D1.1 STRUCTURAL WELDING CODE - STEEL.
2. ALL NEW WELD ZONES SHALL BE BARE BASE METAL AND FREE OF EXISTING GALVANIZING PRIOR TO ANY NEW WELDING.
3. WELD MINIMUM SIZE TO BE 3/16" FILLET, E80XX UNLESS NOTED OTHERWISE.
4. WELDING TO BE DONE ONLY WHERE INDICATED ON THE DRAWINGS OR SPECIFICALLY APPROVED BY THE ENGINEER.
5. TOUCH UP CUT OR DAMAGED GALVANIZED AREAS AND WELD-AFFECTED AREAS WITH COLD APPLIED GALVANIZING IN ACCORDANCE WITH CROWN ENGINEERING BULITEN ENG-BUL-10149.
6. IN ACCORDANCE WITH AWS D1.1 SECTION 1.3.6.1, ALL OF THE FOLLOWING REQUIREMENTS ARE MANDATORY.
7. ALL WELDERS SHALL BE QUALIFIED PER AWS D1.1 SECTION 4 FOR THE POSITIONS AND ELECTRODE SPECIFICATION ON THE pWPS AND OR WPS.
8. THE pWPS (PREQUALIFIED WELDING PROCEDURE SPECIFICATION) AND OR WPS (WELDING ROCEDURE SPECIFICATION) SHALL BE FURNISHED TO IETS FOR APPROVAL PRIOR TO MOBILIZATION OR INSTALLATION.
9. EACH WELDERS WPQ (WELDER PERFORMANCE QUALIFICATION) FOR THE POSITIONS AND WELDING PROCEDURE (pWPS OR WPS) SHALL BE FURNISHED TO IETS PRIOR TO MOBILIZATION OR INSTALLATION.
10. IF A WPS IS FURNISHED IT SHALL REFER TO A SUPPORTING PQR (PERFORMANCE QUALIFICATION RECORD).
11. PER AWS D1.1 SECTION 6.6, "THE CONTRACTOR SHALL BE RESPONSIBLE FOR VISUAL INSPECTIONS AND NECESSARY CORRECTION OF ALL DEFICIENCIES IN MATERIAL AND WORKMANSHIP IN CONFORMANCE WITH THE REQUIREMENTS OF THIS CODE."
12. ALL INSPECTORS SHALL BE QUALIFIED PER AWS D1.1 SECTION 6.4. INSPECTOR QUALIFICATIONS SHALL BE SUBMITTED TO IETS PRIOR TO FINAL INSPECTION.
13. A VISUAL INSPECTION REPORT SHALL BE SUBMITTED TO IETS FOR APPROVAL PRIOR TO FINAL INSPECTION.

REINFORCING SUMMARY

ELEVATION	DESCRIPTION	NO. & SIZE	MATERIAL	REF. DRAWINGS
BASE	ANCHOR RODS	(3) 1-3/4" DIA. WILLIAMS 150KSI ALL-THREAD BARS AT 49-1/2" BOLT CIRCLE & 8'0" EMBEDMENT, ATTACHED TO POLE BY SABRE BASE WELDMENT	150SKI	02, 04, 05 & Sabre Part Drawings
30' & 60'	BRIDGE STIFFENERS	(3) BRIDGE STIFFENERS	65KSI	02& Sabre Part Drawings
0' TO 30'	REINFORCING PLATES	(3) SABRE PL 1" x 6" REINF. PLATES ANCHORED TO THE FOUNDATION BY SABRE BASE WELDMENT	65 KSI	02& Sabre Part Drawings
30' TO 75'	REINFORCING PLATES	(3) SABRE PL 1" x 4.5" REINF. PLATES	65 KSI	02& Sabre Part Drawings
120' TO 130'	TOWER EXTENSION	(1) 10FT LONG 16" OD. x 0.1875" POLE EXTENSION w/ (1)PL 1-1/2" x 28" OD FLANGE PLATE (12) PL 1/2"x 8'x 1'-0" STIFFENERS, (9) 3/4" A325 BOLTS & (3) 6'W x 12'H MOUSE HOLES	42 KSI (POLE) 50 KSI (PLATES) A325 (BOLTS)	02, 03& Sabre Part Drawings

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REVISIONS			
NO.	DATE	DESCRIPTION	BY
0	05-27-10	ORIGINAL RELEASE	TH

DRAWN BY: T. HAILE
CHECKED BY: W. GRISWOLD
DRAWING DATE: 05-27-10

SITE NAME & BU#

SITE NAME: WEST HARTFORD UM
BU #: 876324

SITE INFORMATION

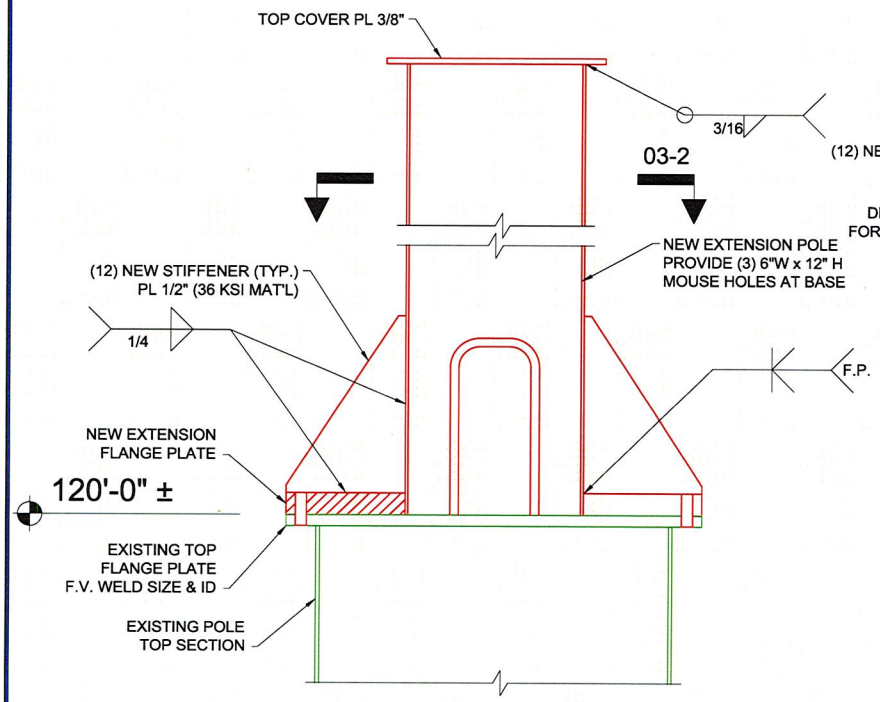
120' MONOPOLE W/ 10' EXTENSION
1358 NEW BRITAIN AVENUE
WEST HARTFORD, CT
HARTFORD COUNTY

SHEET TITLE

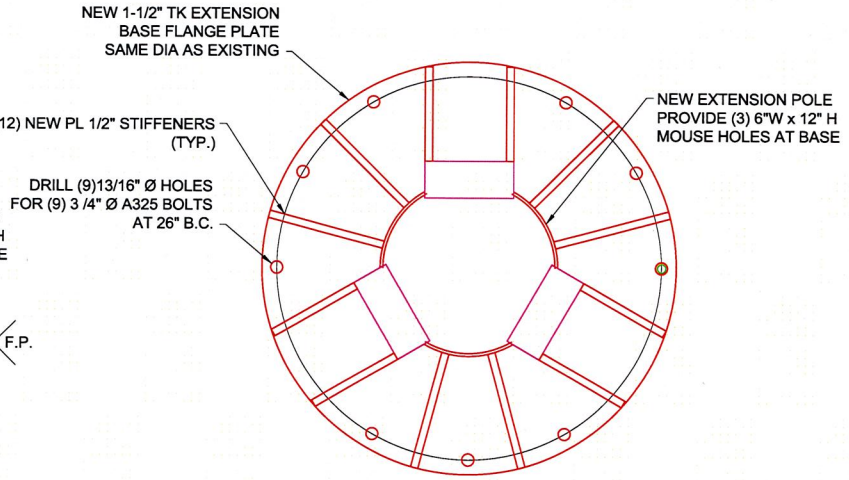
TOWER ELEVATION

SHEET NUMBER

2010-70136-02



SECTION 03-1
SCALE: NTS



SECTION 03-2
SCALE: NTS

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NO.	DATE	DESCRIPTION	BY
0	05-27-10	ORIGINAL RELEASE	TH

DRAWN BY: T. HAILE
CHECKED BY: W. GRISWOLD
DRAWING DATE: 05-27-10

SITE NAME & BU#

SITE NAME: WEST HARTFORD UM
BU #: 876324

SITE INFORMATION

120' MONOPOLE W/ 10' EXTENSION
1358 NEW BRITAIN AVENUE
WEST HARTFORD, CT
HARTFORD COUNTY

SHEET TITLE

SECTIONS & DETAILS

SHEET NUMBER

2010-70136-03

FOUNDATION DRILLING:

1. DRILL NEW ANCHOR BOLT HOLES 8'-0" DEEP.

2. USE A TEMPLATE TO LOCATE HOLES.

3. CLEAN HOLES WITH A WIRE BRUSH AND COMPRESSED AIR OR WATER. HOLE SHALL BE CLEAN AND DRY BEFORE INSTALLATION OF EPOXY.

EPOXY AND ANCHOR BOLT INSTALLATION:

1. EPOXY MANUFACTURER'S REPRESENTATIVE OR IETS REPRESENTATIVE SHALL INSPECT THE HOLES BEFORE THE INSTALLATION OF EPOXY AND BE ON THE SITE DURING THE INSTALLATION OF EPOXY.

2. EPOXY SHALL BE "HILTI RE 500".

3. HOLES SHALL BE FILLED WITH 6'-0" OF EPOXY, STARTING FROM THE BOTTOM OF THE HOLES.

4. NEW ANCHOR BOLTS SHALL BE 1-3/4" DIAMETER "WILLIAMS 150 KSI ALL-THREAD-BAR" WITH STANDARD THREAD (2" ACTUAL DIAMETER). ORDER FROM www.williamsform.com. NEW ANCHOR BOLTS SHALL BE SET WITHIN 90 MINUTES OF INITIAL EPOXY POUR IN ASSOCIATED HOLE.

5. EACH ANCHOR BOLT SHALL BE SET BEFORE THE NEXT HOLE IS FILLED WITH EPOXY.

ANCHOR BOLT TESTING:

1. ALL FOUR (3) ANCHOR RODS SHALL BE TESTED PER ASTM 488-96 (2003) USING A CONTINUOUS LOAD APPLICATION PRIOR TO INSTALLING BASEPLATE STIFFENERS.

2. SUITABLE EQUIPMENT SHALL BE USED TO PERFORM TESTS REQUIRED TO VERIFY CORRECT INSTALLATION AND PROVIDE PROOF LOADS AND DISPLACEMENT TESTS ON ANCHOR RODS.

3. TEST SYSTEM SUPPORT SHALL BE OF SUFFICIENT SIZE AND DESIGN TO PREVENT DAMAGE TO SURROUNDING STRUCTURAL ELEMENTS, EQUIPMENT AND FOUNDATION.

4. TEST SYSTEM SHALL HAVE TWO (2) PRESSURE GAUGES IN SERIES TO ENSURE PROPER GAUGE FUNCTION.

5. FORCES SHALL BE APPLIED THROUGH THE CENTER OF THE ANCHOR ROD AND PERPENDICULAR TO THE SURFACE OF THE FOUNDATION.

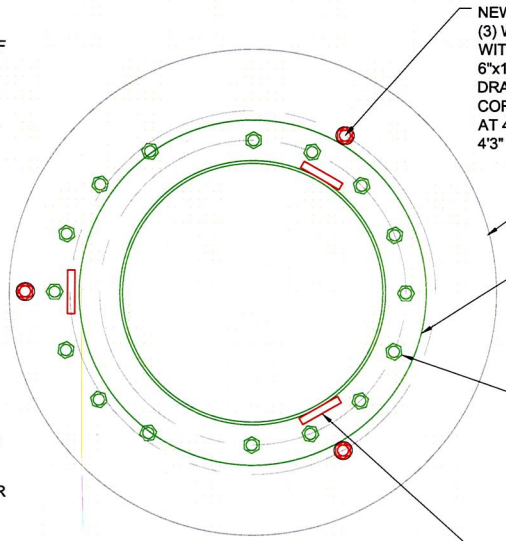
6. APPLY AN INITIAL LOAD OF 6 KIPS TO BRING ALL THE TEST SYSTEM COMPONENTS INO FULL BEARING PRIOR TO BEGINING THE TEST.

7. THE ANCHOR ROD SHALL BE BROUGHT TO A TARGET TENSION LOAD OF 120 KIPS. A LOADING RATE OF 45 TO 105 KIPS PER MINUTE SHALL BE USED TO A MINIMUM OF 1 AND A MAXIMUM OF 3 MINUTES OF TOTAL TEST TIME.

INSTALLATION AND TEST RESULTS REPORTING:

1. A WRITTEN OBSERVATION REPORT SHALL BE SUBMITTED BY THE EPOXY MANUFACTURER'S REPRESENTATIVE OR IETS REPRESENTATIVE.

2. THE RESULTS OF THE TEST SHALL BE DOCUMENTED PER CROWN CASTLE SPECIFICATION FOR TESTING POST-INSTALLED ANCHOR RODS.



SECTION 04-1
SCALE: NTS

ANCHOR ROD BRACKET WELDMENT NOT SHOWN FOR CLARITY

Sabre Towers & Poles
A Division of Sabre Industries, Inc.

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IETS Engineering Services
129 Greenwich Road
Charlotte, NC 28211
Ph:(704)522-1131
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REVISIONS			
NO.	DATE	DESCRIPTION	BY
0	05-27-10	ORIGINAL RELEASE	TH

DRAWN BY: T. HAILE
CHECKED BY: W. GRISWOLD
DRAWING DATE: 05-27-10

SITE NAME & BU#

SITE NAME: WEST HARTFORD UM
BU #: 876324

SITE INFORMATION

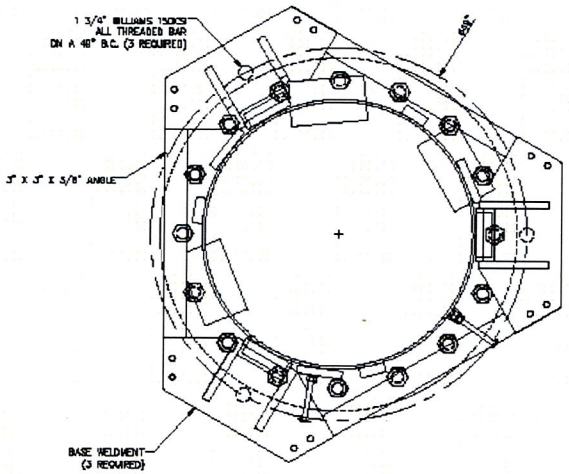
120' MONOPOLE W/ 10' EXTENSION
1358 NEW BRITAIN AVENUE
WEST HARTFORD, CT
HARTFORD COUNTY

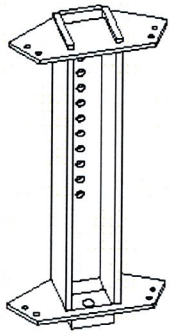
SHEET TITLE

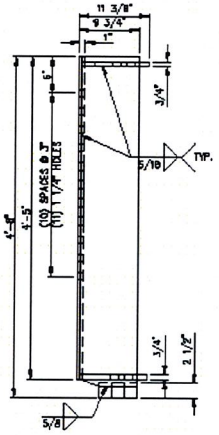
SECTIONS & DETAILS

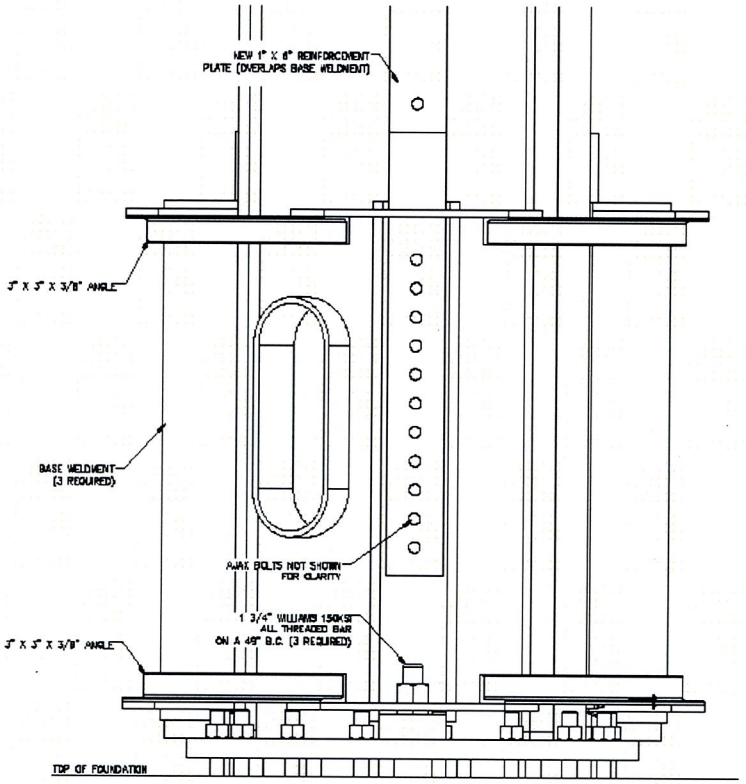
SHEET NUMBER

2010-70136-04









BASE WELDMENT 05-1
SCALE: NTS

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REVISIONS	NO.	DATE	DESCRIPTION	BY
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DRAWN BY: T. HAILE
CHECKED BY: W. GRISWOLD
DRAWING DATE: 05-27-10

SITE NAME & BU#

SITE NAME: WEST HARTFORD UM
BU #: 876324

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SHEET NUMBER

2010-70136-05

POST-MODIFICATION CHECKLIST

CONSTRUCTION/INSTALLATION INSPECTIONS AND TESTING REQUIRED (COMPLETED BY EOR)	REPORT ITEM
PRE-CONSTRUCTION	
X	PMI CHECKLIST DRAWING
X	EXHIBIT B: CROWN APPROVED A&E VENDOR AGREEEMENT (REQUIRED FOR TURNKEY PROJECTS)
X	BUILDING PERMIT (AS REQUIRED)
	EOR APPROVED SHOP DRAWINGS
X	FABRICATION INSPECTION
X	FABRICATOR WELD INSPECTION
X	MATERIAL TEST REPORT (MTR)
	FABRICATOR NDE INSPECTION
X	VISUAL INSPECTION OF EXISTING MONOPOLE TO TOP FLANGE PLATE WELDS
X	PACKING SLIPS
ADDITIONAL TESTING AND INSPECTIONS:	
CONSTRUCTION	
X	CONSTRUCTION INSPECTIONS
	FOUNDATION INSPECTIONS
	CONCRETE COMP. STRENGTH AND SLUMP TESTS
	POST INSTALLED ANCHOR ROD EPOXY/GROUT VERIFICATION
	BASE PLATE GROUT VERIFICATION
X	CONTRACTOR'S CERTIFIED WELD INSPECTION
	EARTHWORK: LIFT AND DENSITY
X	GALVANIZING VERIFICATION
X	REDLINE CONSTRUCTION DOCUMENTS
ADDITIONAL TESTING AND INSPECTIONS:	
POST-CONSTRUCTION	
X	AS-BUILT/RECORD DRAWINGS (STAMPED)
	FOUNDATION INSPECTIONS
X	BASE LEVEL DRAWING (COAX PLACEMENT)
X	POST INSTALLED ANCHOR ROD PULL-OUT TESTING
	CERTIFICATE OF OCCUPANCY
X	PHOTOGRAPHS
	EXHIBIT C: CERTIFICATE OF COMPLIANCE (REQUIRED WHEN CROWN DOES NOT ISSUE A PO FOR PMI)
X	PMI REPORT
ADDITIONAL TESTING AND INSPECTIONS:	

NOTE: X DENOTES A DOCUMENT NEEDED FOR THE PMI REPORT

POST MODIFICATION INSPECTION NOTES:

GENERAL

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

ALL PMI'S SHALL BE CONDUCTED BY AN APPROVED ENGINEERING VENDOR (AEV) THAT IS APPROVED TO PERFORM ELEVATED WORK FOR CROWN.

TO ENSURE THAT THE REQUIREMENTS OF THE PMI ARE MET, IT IS VITAL THAT THE GENERAL CONTRACTOR (GC) AND THE PMI 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 : POST MODIFICATION INSPECTION SOW FOR FURTHER DETAILS AND REQUIREMENTS.

ENGINEER OF RECORD

THE EOR SHALL SUBMIT THIS PMI CHECKLIST IDENTIFYING ALL REQUIRED DOCUMENTS AND INSPECTIONS REQUIRED FOR THE ACCEPTANCE OF THE MODIFICATION INSTALLATION.

- FOR DESIGN-BID-BUILD (DBB) THE CHECKLIST SHALL BE SUBMITTED WITH THE MODIFICATION DRAWINGS.
- FOR TURNKEY PROJECTS THIS CHECKLIST SHALL BE SUBMITTED AS PART OF THE BID RESPONSE PACKAGE AND AS PART OF THE FINAL MODIFICATION DRAWING PACKAGE.

PMI INSPECTOR

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

- REVIEW THE REQUIREMENTS OF THE PMI CHECKLIST
- BEGIN DEVELOPING A SCHEDULE TO CONDUCT ON-SITE PMI INSPECTIONS, INCLUDING FOUNDATION INSPECTIONS

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

GENERAL CONTRACTOR

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

- REVIEW THE REQUIREMENTS OF THE PMI CHECKLIST
- BEGIN DEVELOPING A SCHEDULE TO CONDUCT ON-SITE PMI INSPECTIONS, INCLUDING FOUNDATION INSPECTIONS
- BETTER UNDERSTAND ALL INSPECTION AND TESTING REQUIREMENTS

THE GC SHALL COORDINATE AND CONDUCT ALL CONSTRUCTION INSPECTIONS AND REPORTS AS IDENTIFIED IN THE PMI CHECKLIST AND SUBMIT SAID INSPECTIONS AND REPORTS TO THE PMI INSPECTOR.

RECOMMENDATIONS

IT IS SUGGESTED THAT THE GC PROVIDE A MINIMUM OF 5 BUSINESS DAYS NOTICE, PREFERABLY 10, TO THE PMI INSPECTOR AS TO WHEN THE SITE WILL BE READY FOR THE PMI TO BE CONDUCTED.

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

- THE GC AND PMI INSPECTOR COORDINATE CLOSELY THROUGHOUT THE ENTIRE PROJECT.
- WHEN POSSIBLE, IT IS PREFERRED TO HAVE THE GC AND PMI 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 PMI INSPECTION(S) TO COMMENCE WITH ONE SITE VISIT.
- WHEN POSSIBLE, IT IS PREFERRED TO HAVE THE GC AND PMI INSPECTOR ON-SITE DURING THE PMI TO HAVE ANY DEFICIENCIES CORRECTED DURING THE INITIAL PMI. THEREFORE, THE GC MAY CHOOSE TO COORDINATE THE PMI CAREFULLY TO ENSURE ALL CONSTRUCTION FACILITIES ARE AT THEIR DISPOSAL WHEN THE PMI INSPECTOR IS ON SITE.

CANCELLATION OR DELAYS IN SCHEDULED PMI

IF THE GC AND PMI INSPECTOR AGREE TO A DATE ON WHICH THE PMI 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.). 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 PMI'S

IF THE MODIFICATION INSTALLATION WOULD FAIL THE PMI ("REJECTED"), 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 PMI.
- OR, WITH CROWN'S APPROVAL, THE GC MAY WORK WITH THE EOR TO RE-ANALYZE THE MODIFICATION/REINFORCEMENT USING THE AS-BUILT CONDITION

ALL ASSOCIATED COST FOR CORRECTING "REJECTED" PMI'S SHALL BE BORN BY THE GC.

PAYMENT

PAYMENT OF PMI INSPECTOR

- WHEN CROWN ISSUES A PO DIRECTLY TO AN AEV FOR PMI SERVICES, FULL PAYMENT FOR THE PMI SERVICES MAY BE RELEASED WHEN A PMI REPORT ADHERES TO THE REQUIREMENTS OF THE PMI CHECKLIST AND ENG-SOW-10007 : PMI SOW. EXCEPTIONS MAY BE MADE WHEN THE PMI INSPECTOR PERFORMED DUE DILIGENCE IN REQUESTING INSPECTION AND TESTING DOCUMENTATION FROM THE GC BUT WAS UNABLE TO OBTAIN.

PAYMENT OF GENERAL CONTRACTOR

- PAYMENT FOR THE GC INSTALLATION SERVICES MAY BE RELEASED UPON RECEIPT OF A "PASSING" OR A "PASS AS NOTED" PMI REPORT AND ALL CLOSE OUT MATERIALS.

PMI VERIFICATION INSPECTIONS

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

ALL VERIFICATION INSPECTIONS SHALL BE HELD TO THE SAME SPECIFICATIONS AND REQUIREMENTS AS CONTAINED HEREIN AND THE CONTRACT DOCUMENTS.

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

REJECTABLE INDICATIONS WILL BE RELAYED TO THE ORIGINAL PMI INSPECTOR AND THE GC. APPROPRIATE DISCIPLINARY ACTION MAY RESULT DEPENDENT UPON THE FREQUENCY AND THE LEVEL OF SEVERITY OF THE REJECTIONS.

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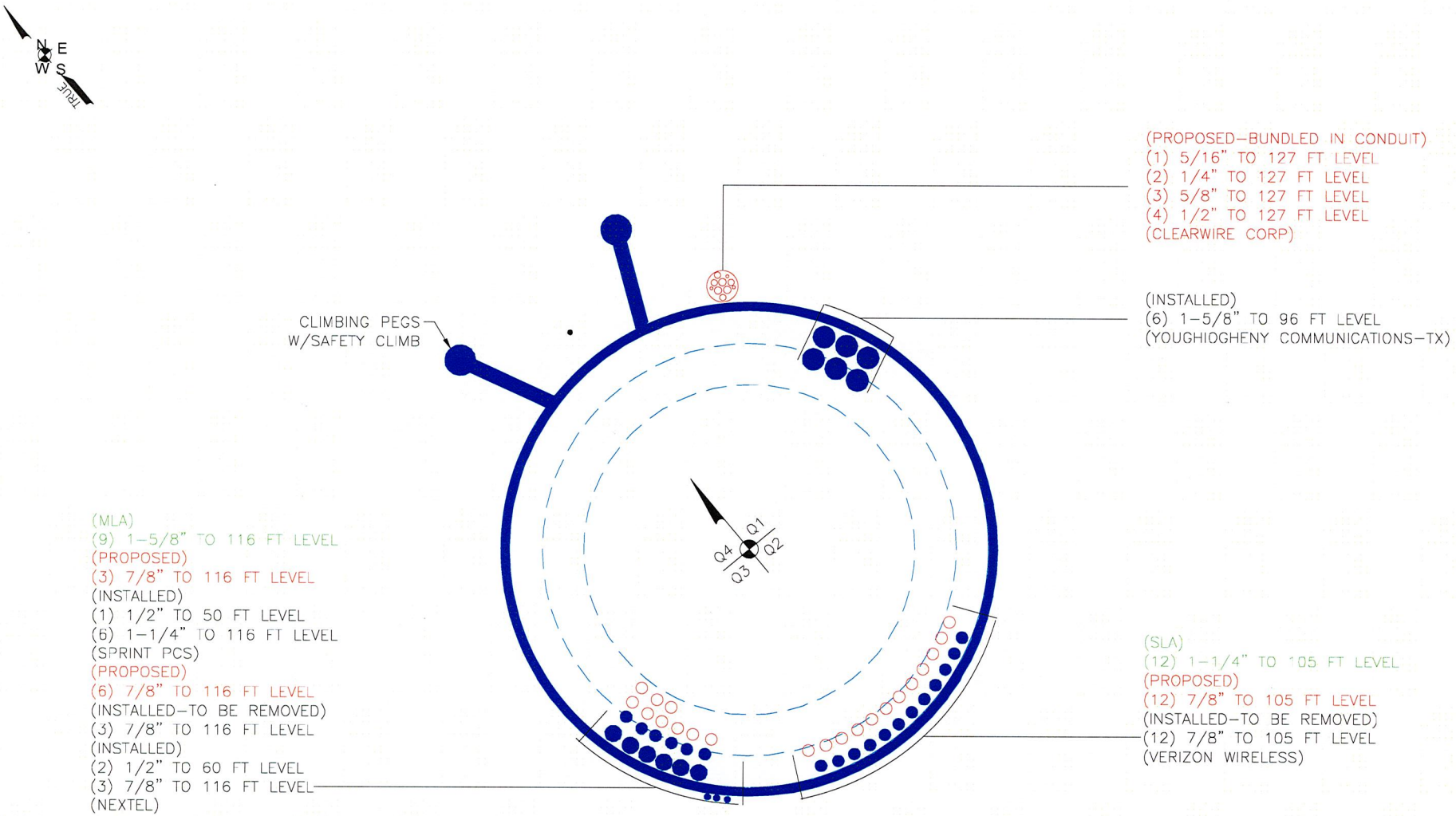
PMI CHECKLIST

SHEET NUMBER

2010-70136-PMI


N
E
W
S
TRUE
(PROPOSED–BUNDLED IN CONDUIT)
(1) 5/16" TO 127 FT LEVEL
(2) 1/4" TO 127 FT LEVEL
(3) 5/8" TO 127 FT LEVEL
(4) 1/2" TO 127 FT LEVEL
(CLEARWIRE CORP)
(INSTALLED)
(6) 1–5/8" TO 96 FT LEVEL
(YOUGHIOGHENY COMMUNICATIONS–TX)
CLIMBING PEGS
W/SAFETY CLIMB
Q1
Q2
Q3
Q4
(MLA)
(9) 1–5/8" TO 116 FT LEVEL
(PROPOSED)
(3) 7/8" TO 116 FT LEVEL
(INSTALLED)
(1) 1/2" TO 50 FT LEVEL
(6) 1–1/4" TO 116 FT LEVEL
(SPRINT PCS)
(PROPOSED)
(6) 7/8" TO 116 FT LEVEL
(INSTALLED–TO BE REMOVED)
(3) 7/8" TO 116 FT LEVEL
(INSTALLED)
(2) 1/2" TO 60 FT LEVEL
(3) 7/8" TO 116 FT LEVEL
(NEXTEL)
(SLA)
(12) 1–1/4" TO 105 FT LEVEL
(PROPOSED)
(12) 7/8" TO 105 FT LEVEL
(INSTALLED–TO BE REMOVED)
(12) 7/8" TO 105 FT LEVEL
(VERIZON WIRELESS)

APPENDIX C

ADDITIONAL CALCULATIONS

IETS Project Number 2010-70136
Sabre Project Number 11-05047

Composite pole properties

Section No.	Elevation ft	Number Of Sides	Pole bottom diameter in	Pole wall in	Pole A in^2	Pole I in^4	Face Width in	Number of new plates	New plate width in	New plate thickness in	New plate Area in^2	Radius to new plate CL in	I for new plates in^4	I composite in^4	EQ Thickness in	Weight Factor
L4	60-73.5	Round	24	0.375	27.83	1942.30	0.00	3	4.5	1	4.50	12.50	1055	2997.0	0.5949	0.94
L5	40-60	Round	30	0.375	34.90	3829.44	0.00	3	4.5	1	4.50	15.50	1622	5451.1	0.5429	0.93
L6	30-40	Round	30	0.529	48.96	5317.18	0.00	3	4.5	1	4.50	15.50	1622	6938.9	0.7022	0.97
L7	20-30	Round	36	0.375	41.97	6658.92	0.00	3	6	1	6.00	18.50	3080	9739.2	0.5569	0.94
L8	0-20	Round	36	0.504	56.21	8854.09	0.00	3	6	1	6.00	18.50	3080	11934.3	0.6901	0.00

Axial and bending checks for existing pole material

Section No.	Elevation ft	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio P / P_a	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio f_{bx} / F_{bx}	Comb. Stress Ratio	Allow. Stress Ratio	CSR / ASR
L4	60-73.5	25.20	27.83	-11.39	701.38	0.02	630.57	30.30	27.72	1.093	1.11	1.333	0.832
L5	40-60	25.08	34.90	-15.45	875.15	0.02	916.98	30.28	25.08	1.208	1.23	1.333	0.919
L6	30-40	22.80	48.96	-17.8	1116.03	0.02	1068.95	27.73	25.08	1.106	1.12	1.333	0.842
L7	20-30	23.70	41.97	-20.14	994.51	0.02	1226.38	27.20	23.70	1.148	1.17	1.333	0.876
L8	0-20	21.54	56.21	-25.64	1210.81	0.02	1558.09	28.20	23.70	1.190	1.21	1.333	0.909

Checks for new plate material

Section No.	Elevation ft	Plate Avg. Stress ksi	Plate Load kips	Plate Capacity kips	Load / Capacity Ratio	Allow. Stress Ratio	CSR / ASR
L4	60-73.5	31.560	142.0	127.6	1.113	1.333	0.835
L5	40-60	31.289	140.8	127.6	1.103	1.333	0.828
L6	30-40	28.654	128.9	127.6	1.011	1.333	0.758
L7	20-30	27.955	167.7	184.0	0.912	1.333	0.684
L8	0-20	28.983	173.9	184.0	0.945	1.333	0.709

Sabre Monopole Reinforcing
Allowable Stress Design Calculations
Revision 1.1 - November 2, 2009

					References/Comments
Reinforcing Section Properties					
Width	w	4 1/2	in		
Thickness	t	1	in		
Bolt hole diameter		1 1/4	in		Ajax M20 bolt with 29 mm OD sleeve
Allowable stress increase		1.000			Clause 3.1.1.1[1]
Minimum yield strength	F_y	65	ksi		
Minimum tensile strength	F_u	80	ksi		
Modulus of elasticity	E	29000	ksi		
Gross area	A_g	4.50	in^2		
Gross Area Tension Strength					
Design axial tensile strength		175.5	kips	*	B1, D1[2]
Net Area Tension Strength					
Reduction factor	U	1.00			
Net Area	A_n	3.19	in^2		B2[2]
Effective net area	A_e	3.19	in^2		B3[2]
Design axial tensile strength		127.6	kips	*	D1[2]
Compression Strength					
Maximum bolt spacing	l	20.625	in		
Width/thickness ratio	w/t	4.50			
Effective yield stress	F'_y	65	ksi		
Effective length factor	K	0.80			Table C-C2.1(b)[2]
Centroidal moment of inertia	I	0.375	in^4		
Centroidal radius of gyration	r	0.289	in		
Effective slenderness ratio	Kl/r	57.09			
	C_c	93.84			
Allowable stress	F_a	28.38	ksi		E2[2]
Design axial compression strength		127.7	kips	*	
Bolt Shear Strength		138.0	kips	*	(6) Ajax M20 threads intercepted
Controlling strength		127.6	kips	*	Net Area controls

*Including allowable stress increase of 1.000

[1]ANSI/TIA/EIA-222-F-1996

[2]AISC Manual of Steel Construction, 9th edition, 1989 - Specification for Structural Steel Buildings, June 1, 1989

Sabre Monopole Reinforcing
Allowable Stress Design Calculations
Revision 1.1 - November 2, 2009

Connection Design					References/Comments
Plate width		4 1/2	in		
Plate thickness		1	in		
Design load		127.6	kips	*	Tension - Net Area
Splice Bolts					
Bolt shear capacity		23	kips		Ajax M20 threads intercepted
Bolt shear capacity		23	kips	*	with 29 mm OD, Fu = 120 ksi sleeve[3]
Number of bolts required		5.5			
Selected number of bolts		6			
Selected number of bolts > required?		Yes			
Splice Welds					
Minimum weld size		5/16	in		Table J2.4[4]
Maximum weld size		15/16	in		J2.2b[4]
Electrode classification number	F_{EXX}	80	ksi		ASTM A572 Grade 65
Angle of loading	θ	90	degrees		J2.4(a)[5]
Allowable Stress factor		0.30			Table J2.5[4], Fillet Welds, Shear
Allowable Stress		36.00	ksi	*	
Fillet leg size required		0.56	in		Based on 2 fillet welds along width
Selected weld size		5/8	in		
Weld size > required?		Yes			
Weld size > minimum?		Yes			
Weld size < maximum?		Yes			

*Including allowable stress increase equal to 1.000

[3] See Crown Castle Document #ENG-STD-10148 "AJAX bolt single shear capacity", dated 01/22/09

[4] AISC Manual of Steel Construction, 9th edition, 1989 - Specification for Structural Steel Buildings, June 1, 1989

[5] AISC Steel Construction Manual, 13th edition, 2005 - Specification for Structural Steel Buildings, March 9, 2005

Sabre Monopole Reinforcing
Allowable Stress Design Calculations
Revision 1.1 - November 2, 2009

					References/Comments
Reinforcing Section Properties					
Width	w	6	in		
Thickness	t	1	in		
Bolt hole diameter		1 1/4	in		Ajax M20 bolt with 29 mm OD sleeve
Allowable stress increase		1.000			Clause 3.1.1.1[1]
Minimum yield strength	F_y	65	ksi		
Minimum tensile strength	F_u	80	ksi		
Modulus of elasticity	E	29000	ksi		
Gross area	A_g	6.00	in^2		
Gross Area Tension Strength					
Design axial tensile strength		234.0	kips	*	B1, D1[2]
Net Area Tension Strength					
Reduction factor	U	1.00			
Net Area	A_n	4.69	in^2		B2[2]
Effective net area	A_e	4.69	in^2		B3[2]
Design axial tensile strength		187.6	kips	*	D1[2]
Compression Strength					
Maximum bolt spacing	l	16.375	in		
Width/thickness ratio	w/t	6.00			
Effective yield stress	F'_y	65	ksi		
Effective length factor	K	0.80			Table C-C2.1(b)[2]
Centroidal moment of inertia	I	0.500	in^4		
Centroidal radius of gyration	r	0.289	in		
Effective slenderness ratio	Kl/r	45.33			
	C_c	93.84			
Allowable stress	F_a	31.31	ksi		E2[2]
Design axial compression strength		187.9	kips	*	
Bolt Shear Strength		184.0	kips	*	(8) Ajax M20 threads intercepted
Controlling strength		184.0	kips	*	**Bolt shear controls**

*Including allowable stress increase of 1.000

[1]ANSI/TIA/EIA-222-F-1996

[2]AISC Manual of Steel Construction, 9th edition, 1989 - Specification for Structural Steel Buildings, June 1, 1989

Sabre Monopole Reinforcing
Allowable Stress Design Calculations
Revision 1.1 - November 2, 2009

					References/Comments
Connection Design					
Plate width		6	in		
Plate thickness		1	in		
Design load		184.0	kips	*	Bolts
Splice Bolts					
Bolt shear capacity		23	kips		Ajax M20 threads intercepted
Bolt shear capacity		23	kips	*	with 29 mm OD, Fu = 120 ksi sleeve[3]
Number of bolts required		8.0			
Selected number of bolts		8			
Selected number of bolts > required?		NO			
Splice Welds					
Minimum weld size		5/16	in		Table J2.4[4]
Maximum weld size		15/16	in		J2.2b[4]
Electrode classification number	F_{EXX}	80	ksi		ASTM A572 Grade 65
Angle of loading	θ	90	degrees		J2.4(a)[5]
Allowable Stress factor		0.30			Table J2.5[4], Fillet Welds, Shear
Allowable Stress		36.00	ksi	*	
Fillet leg size required		0.60	in		Based on 2 fillet welds along width
Selected weld size		3/4	in		
Weld size > required?		Yes			
Weld size > minimum?		Yes			
Weld size < maximum?		Yes			

*Including allowable stress increase equal to 1.000

[3] See Crown Castle Document #ENG-STD-10148 "AJAX bolt single shear capacity", dated 01/22/09

[4] AISC Manual of Steel Construction, 9th edition, 1989 - Specification for Structural Steel Buildings, June 1, 1989

[5] AISC Steel Construction Manual, 13th edition, 2005 - Specification for Structural Steel Buildings, March 9, 2005

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

Site Data

BU#: *876324*
Site Name: *West Hartford UM*
App #: *87979 R3*

Connection Type:	*Butt*
Pole Manufacturer:	Other

Reactions		
Moment:	89	ft-kips
Axial:	1	kips
Shear:	2	kips
Elevation:	120 BOT	feet

Bolt Data			
Qty:	9		
Diameter (in.):	0.75	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:	75	<-- Disregard	Bolt Fty:
N/A:	55	<-- Disregard	44.00
Circle (in.):	26		

Plate Data		
Diam:	28	in
Thick, t:	0.75	in
Grade (Fy):	36	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	4.75	in

Stiffener Data (Welding at Both Sides)		
Config:	0	*
Weld Type:	Fillet	
Groove Depth:	0.25	<-- Disregard
Groove Angle:	45	<-- Disregard
Fillet H. Weld:	0.25	in
Fillet V. Weld:	0.25	in
Width:	3	in
Height:	8	in
Thick:	0.5	in
Notch:	0.375	in
Grade:	36	ksi
Weld str.:	70	ksi

Pole Data		
Diam:	24	in
Thick:	0.25	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	60	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor		
ASIF:	1.333	

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

Flange Bolt Results

Bolt Tension Capacity, **B**:	25.91 kips	
Max Bolt directly applied T:	18.15 Kips	
Min. PL "tc" for **B** cap. **w/o** Pry:	0.754 in	
Min PL "treq" for actual **T w/ Pry**:	0.467 in	
Min PL "t1" for actual **T w/o Pry**:	0.631 in	
T allowable with Prying:	25.83 kips	0≤α'≤1 case
Prying Force, Q:	0.00 kips	
Total Bolt Tension=T+Q:	18.15 kips	
Prying Bolt Stress Ratio=(T+Q)/(B):	70.0% **Pass**	

Rigid
Service, ASD
Fty*ASIF

Exterior Flange Plate Results Flexural Check

Compression Side Plate Stress:	26.1 ksi	
Allowable Plate Stress:	36.0 ksi	
Compression Plate Stress Ratio:	72.6% **Pass**	
No Prying		
Tension Side Stress Ratio, (treq/t)^2:	38.7% **Pass**	

Rigid
Service ASD
0.75*Fy*ASIF
Comp. Y.L. Length: 7.50

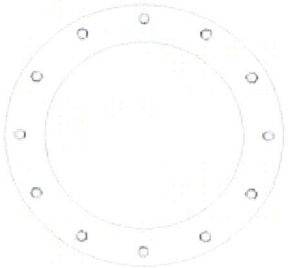
n/a

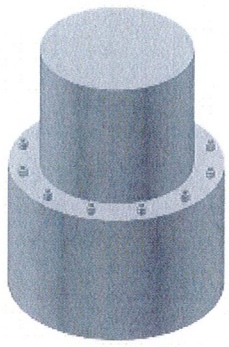
Stiffener Results

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

Pole Results

Pole Punching Shear Check: n/a





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

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

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

Site Data

BU#: *876324*
Site Name: *West Hartford UM*
App #: *87979 R3*

Connection Type:	*Butt*
Pole Manufacturer:	Rohn

Reactions		
Moment:	245.93	ft-kips
Axial:	6.99	kips
Shear:	11.88	kips
Elevation:	90 (TOP)	feet

Bolt Data			
Qty:	20		
Diameter (in.):	1	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:	75	<-- Disregard	Bolt Fty:
N/A:	55	<-- Disregard	44.00
Circle (in.):	28		

Plate Data		
Diam:	32	in
Thick, t:	1.5	in
Grade (Fy):	36	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	3.77	in

Stiffener Data (Welding at Both Sides)		
Config:	0	*
Weld Type:	Fillet	
Groove Depth:	0.25	<-- Disregard
Groove Angle:	45	<-- Disregard
Fillet H. Weld:	0.25	in
Fillet V. Weld:	0.25	in
Width:	3	in
Height:	8	in
Thick:	0.5	in
Notch:	0.375	in
Grade:	36	ksi
Weld str.:	70	ksi

Pole Data		
Diam:	24	in
Thick:	0.25	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	60	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor		
ASIF:	1.333	

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

Flange Bolt Results

Rigid
Service, ASD
Fty*ASIF

Bolt Tension Capacity, **B**:	46.07 kips	
Max Bolt directly applied T:	20.73 Kips	
Min. PL "tc" for **B** cap. **w/o** Pry:	1.748 in	
Min PL "treq" for actual **T w/ Pry**:	0.895 in	
Min PL "t1" for actual **T w/o Pry**:	1.173 in	
T allowable with Prying:	41.51 kips	0≤α'≤1 case
Prying Force, Q:	0.00 kips	
Total Bolt Tension=T+Q:	20.73 kips	
Prying Bolt Stress Ratio=(T+Q)/(B):	45.0% **Pass**	

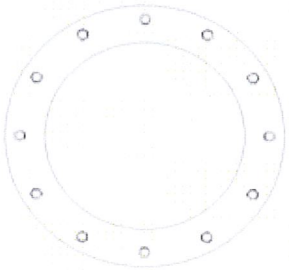
Exterior Flange Plate Results Flexural Check

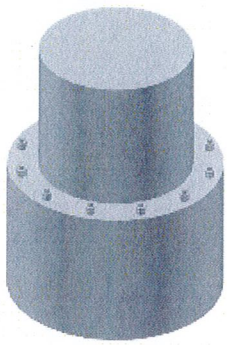
Rigid
Service ASD
0.75*Fy*ASIF
Comp. Y.L. Length: 14.42

Compression Side Plate Stress:	Rohn/Pirod, OK
Allowable Plate Stress:	36.0 ksi
Compression Plate Stress Ratio:	Rohn/Pirod, OK
No Prying	
Tension Side Stress Ratio, (treq/t)^2:	35.6% **Pass**

n/a

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





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

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

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

Site Data

BU#: *876324*
Site Name: *West Hartford UM*
App #: *87979 R3*

Connection Type:	*Butt*
Pole Manufacturer:	Rohn

Reactions		
Moment:	245.93	ft-kips
Axial:	6.99	kips
Shear:	11.88	kips
Elevation:	90 (BOT)	feet

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

Bolt Data			
Qty:	20		
Diameter (in.):	1	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:	75	<-- Disregard	Bolt Fty: 44.00
N/A:	55	<-- Disregard	
Circle (in.):	28		

Plate Data		
Diam:	32	in
Thick, t:	1.5	in
Grade (Fy):	36	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	3.77	in

Stiffener Data (Welding at Both Sides)		
Config:	0	*
Weld Type:	Fillet	
Groove Depth:	0.25	<-- Disregard
Groove Angle:	45	<-- Disregard
Fillet H. Weld:	0.25	in
Fillet V. Weld:	0.25	in
Width:	3	in
Height:	8	in
Thick:	0.5	in
Notch:	0.375	in
Grade:	36	ksi
Weld str.:	70	ksi

Pole Data		
Diam:	24	in
Thick:	0.375	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	60	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor		
ASIF:	1.333	

Flange Bolt Results

Rigid
Service, ASD
Fty*ASIF

Bolt Tension Capacity, **B**:	46.07 kips	
Max Bolt directly applied T:	20.73 Kips	
Min. PL "tc" for **B** cap. **w/o** Pry:	1.748 in	
Min PL "treq" for actual **T w/ Pry**:	0.895 in	
Min PL "t1" for actual **T w/o Pry**:	1.173 in	
T allowable with Prying:	41.51 kips	0≤α'≤1 case
Prying Force, Q:	0.00 kips	
Total Bolt Tension=T+Q:	20.73 kips	
Prying Bolt Stress Ratio=(T+Q)/(B):	45.0% **Pass**	

Exterior Flange Plate Results Flexural Check

Rigid
Service ASD
0.75*Fy*ASIF
Comp. Y.L. Length: 14.42

Compression Side Plate Stress:	Rohn/Pirod, OK
Allowable Plate Stress:	36.0 ksi
Compression Plate Stress Ratio:	Rohn/Pirod, OK
No Prying	
Tension Side Stress Ratio, (treq/t)^2:	35.6% **Pass**

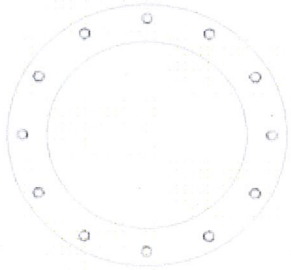
n/a

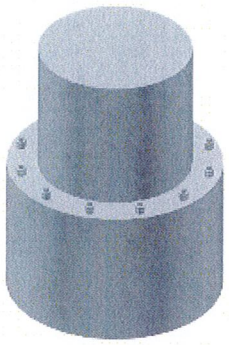
Stiffener Results N/A for Rohn / Pirod

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

Pole Results

Pole Punching Shear Check: N/A





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

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

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West Hartford UM

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5/27/2010
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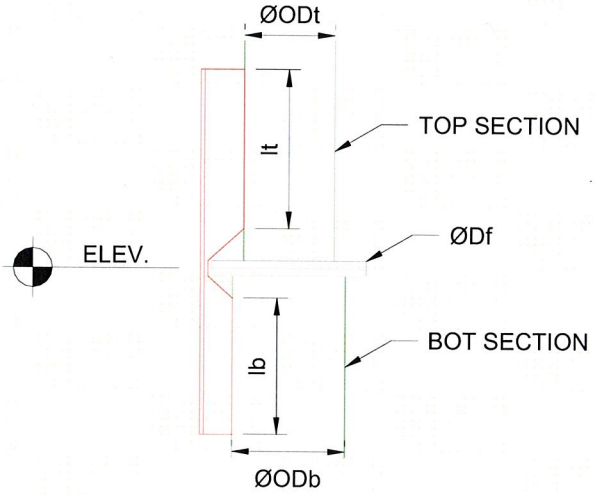
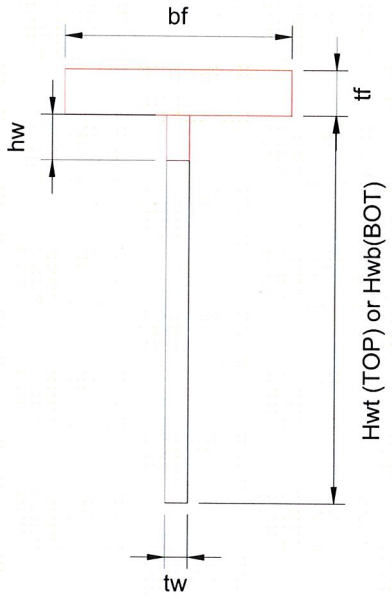
Assumptions:

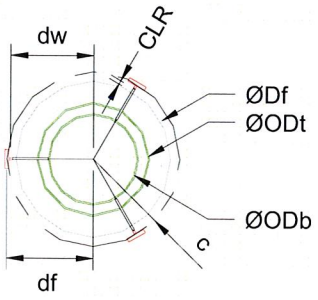
1. Bridge Stiffeners are to be designed to carry the full moment applied to the flange
2. Welds are to be designed for the full capacity of the bridge stiffener,



ELEV.



BRIDGE STIFFENER ELEMENT



PLAN

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30ft Elevation:

Dimensions and Section Properties:

$ODt := 30in$ $ODb := 36in$ $D_{flange} := 47in$ $CLR := 1in$

$t_{pt} := 0.375in$ $t_{pb} := 0.375in$

$l_t := 60in$ $l_b := 54in$

$b_f := 6.5in$ $t_f := 1in$ $d_f := 26in$

$h_w := 1in$ $t_w := 1in$ $d_w := 25in$

$H_{wt} := 10.5in$ $H_{wb} := 7.5in$

$A_{bridge} := b_f \cdot t_f + h_w \cdot t_w$ $A_{bridge} = 7.5\,in^2$

$$c := \frac{D_{flange}}{2} + CLR + h_w + t_f - \frac{\left[0.5 \cdot b_f \cdot t_f^{\,2} + h_w \cdot t_w \cdot \left(t_f + 0.5 \cdot t_w\right)\right]}{A_{bridge}} \qquad c = 25.87\,in$$

$$I_{bridge} := 1.5 \cdot \left(\frac{b_f \cdot t_f^{\,3}}{12} + b_f \cdot t_f \cdot d_f^{\,2} + \frac{t_w \cdot h_w^{\,3}}{12} + t_w \cdot h_w \cdot d_w^{\,2}\right) \qquad I_{bridge} = 7529\,in^4$$

Determine Loads in Plates:

$M_{30} := 1068.95ft \cdot kip$

$$P_{Plate} := \frac{M_{30} \cdot c}{I_{bridge}} \cdot A_{bridge} \qquad P_{Plate} = 331\,kip$$

Check Plate Capacity:

Unbraced length of plate is 0, therefore, compression is OK by inspection - Tension controls

$F_y := 65ksi$ $F_u := 80ksi$ $A_g := A_{bridge}$ $A_e := A_{bridge}$

$F_{yp} := 42ksi$ $F_{up} := 60ksi$

$$P_n := \min\left(0.6F_y \cdot A_g, 0.5 \cdot F_u \cdot A_e\right) \cdot \frac{4}{3} \qquad P_n = 390\,kip$$

$$PlateCapacity := \frac{P_{Plate}}{P_n} \qquad PlateCapacity = 84.7\,\%$$

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30ft Elevation:

Check Weld Capacity Above Flange:

Welds are under shear as well as bending due to eccentricity of weld group and the neutral axis of the the built-up member.

Using AISC 9th Ed. Table XIX PG 4-75

$l_t = 60\,in$ $D := 4$

$e_t := c - \frac{ODt}{2}$ $e_t = 10.87\,in$

$a := \frac{e_t}{l_t}$ $a = 0.18$ with k = 0 => $C := 1.236\,\frac{kip}{in}$ and E80XX $C_1 := 1.14$

$P_{allowable} := \left(C \cdot C_1 \cdot D \cdot l_t\right) \cdot \frac{4}{3}$ $P_{allowable} = 450.89\,kip$

$Capacity := \frac{P_n}{P_{allowable}}$ $Capacity = 86.5\,\%$

Check Weld Capacity Below Flange:

$l_b = 54\,in$ $D := 4$

$e_b := c - \frac{ODb}{2}$ $e_b = 7.87\,in$

$a := \frac{e_b}{l_b}$ $a = 0.15$ with k = 0 => $C := 1.414\,\frac{kip}{in}$ and E80XX $C_1 := 1.14$

$P_{allowable} := \left(C \cdot C_1 \cdot D \cdot l_b\right) \cdot \frac{4}{3}$ $P_{allowable} = 464.24\,kip$

$Capacity := \frac{P_n}{P_{allowable}}$ $Capacity = 84\,\%$

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30ft Elevation:

Check Web Stability:

Top: $f_{vt} := \frac{P_n}{t_w \cdot l_t}$ $f_{vt} = 6.5\,ksi$ $f_{bt} := \frac{P_n \cdot e_t}{\left(\frac{t_w \cdot l_t^2}{6}\right)}$ $f_{bt} = 7.06\,ksi$

Allowable Stresses: $F_v := (0.4 \cdot F_y) \cdot \frac{4}{3}$ $F_v = 34.7\,ksi$

CK Compactness: $\frac{H_{wt}}{t_w} = 10.5$ $\frac{127}{\sqrt{F_{yw}}} = 15.8$ $\frac{176}{\sqrt{F_{yw}}} = 21.8$

$\frac{H_{wt}}{t_w} < \frac{176}{\sqrt{F_{yf}}}$ => Compact Section $F_b := (0.6 \cdot F_y) \cdot \frac{4}{3}$ $F_b = 52\,ksi$

Ck Flexure - Shear Interaction: $\frac{f_{bt}}{F_b} + \left(\frac{f_{vt}}{F_v}\right)^2 = 17.1\,\%$

Bottom: $f_{vb} := \frac{P_n}{t_w \cdot l_b}$ $f_{vb} = 7.22\,ksi$ $f_{bb} := \frac{P_n \cdot e_b}{\left(\frac{t_w \cdot l_b^2}{6}\right)}$ $f_{bt} = 7.06\,ksi$

Allowable Stresses: $F_v := (0.4 \cdot F_y) \cdot \frac{4}{3}$ $F_v = 34.7\,ksi$

CK Compactness: $\frac{H_{wb}}{t_w} = 7.5$ $\frac{127}{\sqrt{F_{yw}}} = 15.8$ $\frac{176}{\sqrt{F_{yw}}} = 21.8$

$\frac{H_{wt}}{t_w} < \frac{127}{\sqrt{F_{yf}}}$ => Compact section => $F_b := (0.6 \cdot F_y) \cdot \frac{4}{3}$ $F_b = 52\,ksi$

Ck Flexure - Shear Interaction: $\frac{f_{bt}}{F_b} + \left(\frac{f_{vt}}{F_v}\right)^2 = 17.1\,\%$

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30ft Elevation:

Check Punching Shear:

Top: Punching shear force per 1inch strip $P_{pt} := f_{bt} \cdot t_w \cdot 1\,in$ $P_{pt} = 7.06\,kip$

Allowable punching shear resistance: $P_{allpt} := 2 \cdot t_{pt} \cdot 1\,in \cdot (0.4 \cdot F_{yp}) \cdot \frac{4}{3}$ $P_{allpt} = 16.8\,kip$

$$Capacity := \frac{P_{pt}}{P_{allpt}} \qquad Capacity = 42\,\%$$

Bottom: Punchin shear force per 1inch strip $P_{pb} := f_{bb} \cdot t_w \cdot 1\,in$ $P_{pb} = 6.31\,kip$

Allowable punching shear resistance: $P_{allpb} := 2 \cdot t_{pb} \cdot 1\,in \cdot (0.4 \cdot F_{yp}) \cdot \frac{4}{3}$ $P_{allpb} = 16.8\,kip$

$$Capacity := \frac{P_{pb}}{P_{allpb}} \qquad Capacity = 37.6\,\%$$

At 30-ft Elev.USE:

- Bridge Element Flange: **PL 1" x 6.5"x 11"**
- Bridge Element Web: **PL 1"x10.5"** above flange & **PL 1"x7.5"** above and below flange, respectively.
- Bridge Element Web to Existing Mating Flange Plate Clearance: **1"** from flange plate clipped at **45°** above and below mating flange plates.
- Welds E80XX: **1/4"** Double Fillet **60"**& **54"** in length above and below flange, respectively.

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60ft Elevation:

Dimensions and Section Properties:

$ODt := 24in$ $ODb := 30in$ $D_{flange} := 41in$ $CLR := 1in$

$t_{pt} := 0.375in$ $t_{pb} := 0.375in$

$l_t := 48in$ $l_b := 42in$

$b_f := 5in$ $t_f := 1in$ $d_f := 23in$

$h_w := 1in$ $t_w := 1in$ $d_w := 22in$

$H_{wt} := 11.5in$ $H_{wb} := 8.5in$

$A_{bridge} := b_f \cdot t_f + h_w \cdot t_w$ $A_{bridge} = 6\ in^2$

$$c := \frac{D_{flange}}{2} + CLR + h_w + t_f - \frac{\left[0.5 \cdot b_f \cdot t_f^{\,2} + h_w \cdot t_w \cdot \left(t_f + 0.5 \cdot t_w\right)\right]}{A_{bridge}} \qquad c = 22.83\ in$$

$$I_{bridge} := 1.5 \cdot \left(\frac{b_f \cdot t_f^{\,3}}{12} + b_f \cdot t_f \cdot d_f^{\,2} + \frac{t_w \cdot h_w^{\,3}}{12} + t_w \cdot h_w \cdot d_w^{\,2} \right) \qquad I_{bridge} = 4694\ in^4$$

Determine Loads in Plates:

$M_{60} := 630.57ft \cdot kip$

$$P_{Plate} := \frac{M_{60} \cdot c}{I_{bridge}} \cdot A_{bridge} \qquad P_{Plate} = 221\ kip$$

Check Plate Capacity:

Unbraced length of plate is 0, therefore, compression is OK by inspection - Tension controls

$F_y := 65ksi$ $F_u := 80ksi$ $A_g := A_{bridge}$ $A_e := A_{bridge}$

$F_{yp} := 42ksi$ $F_{up} := 60ksi$

$$P_n := \min\left(0.6F_y \cdot A_g, 0.5 \cdot F_u \cdot A_e\right) \cdot \frac{4}{3} \qquad P_n = 312\ kip$$

$$PlateCapacity := \frac{P_{Plate}}{P_n} \qquad PlateCapacity = 70.8\ \%$$

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West Hartford UM

IETS Project #: 2010-70136
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60ft Elevation:

Check Weld Capacity Above Flange:

Welds are under shear as well as bending due to eccentricity of weld group and the neutral axis of the the built-up member.

Using AISC 9th Ed. Table XIX PG 4-75

$l_t = 48\,in$ $D := 4$

$e_t := c - \frac{ODt}{2}$ $e_t = 10.83\,in$

$a := \frac{e_t}{l_t}$ $a = 0.23$ with k = 0 => $C := 1.236\,\frac{kip}{in}$ and E80XX $C_1 := 1.14$

$P_{allowable} := \left(C \cdot C_1 \cdot D \cdot l_t\right) \cdot \frac{4}{3}$ $P_{allowable} = 360.71\,kip$

$Capacity := \frac{P_n}{P_{allowable}}$ $Capacity = 86.5\,\%$

Check Weld Capacity Below Flange:

$l_b = 42\,in$ $D := 4$

$e_b := c - \frac{ODb}{2}$ $e_b = 7.83\,in$

$a := \frac{e_b}{l_b}$ $a = 0.19$ with k = 0 => $C := 1.338\,\frac{kip}{in}$ and E80XX $C_1 := 1.14$

$P_{allowable} := \left(C \cdot C_1 \cdot D \cdot l_b\right) \cdot \frac{4}{3}$ $P_{allowable} = 341.67\,kip$

$Capacity := \frac{P_n}{P_{allowable}}$ $Capacity = 91.3\,\%$

CCI BU# 876324
West Hartford UM

IETS Project #: 2010-70136
5/27/2010
Designed By: TH

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60ft Elevation:

Check Web Stability:

Top: $f_{vt} := \frac{P_n}{t_w \cdot l_t}$ $f_{vt} = 6.5\,ksi$ $f_{bt} := \frac{P_n \cdot e_t}{\left(\frac{t_w \cdot l_t^2}{6}\right)}$ $f_{bt} = 8.8\,ksi$

Allowable Stresses: $F_v := (0.4 \cdot F_y) \cdot \frac{4}{3}$ $F_v = 34.7\,ksi$

CK Compactness: $\frac{H_{wt}}{t_w} = 11.5$ $\frac{127}{\sqrt{F_{yw}}} = 15.8$ $\frac{176}{\sqrt{F_{yw}}} = 21.8$

$\frac{H_{wt}}{t_w} < \frac{127}{\sqrt{F_{yf}}}$ => Compact Section $F_b := (0.6 \cdot F_y) \cdot \frac{4}{3}$ $F_b = 52\,ksi$

Ck Flexure - Shear Interaction: $\frac{f_{bt}}{F_b} + \left(\frac{f_{vt}}{F_v}\right)^2 = 20.4\,\%$

Bottom: $f_{vb} := \frac{P_n}{t_w \cdot l_b}$ $f_{vb} = 7.43\,ksi$ $f_{bb} := \frac{P_n \cdot e_b}{\left(\frac{t_w \cdot l_b^2}{6}\right)}$ $f_{bt} = 8.8\,ksi$

Allowable Stresses: $F_v := (0.4 \cdot F_y) \cdot \frac{4}{3}$ $F_v = 34.7\,ksi$

CK Compactness: $\frac{H_{wb}}{t_w} = 8.5$ $\frac{127}{\sqrt{F_{yw}}} = 15.8$ $\frac{176}{\sqrt{F_{yw}}} = 21.8$

$\frac{H_{wt}}{t_w} < \frac{127}{\sqrt{F_{yw}}}$ => Compact Section $F_b := (0.6 \cdot F_y) \cdot \frac{4}{3}$ $F_b = 52\,ksi$

Ck Flexure - Shear Interaction: $\frac{f_{bt}}{F_b} + \left(\frac{f_{vt}}{F_v}\right)^2 = 20.4\,\%$

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60ft Elevation:

Check Punching Shear:

Top: Punchin shear force per 1inch strip $P_{pt} := f_{bt} \cdot t_w \cdot 1\,in$ $P_{pt} = 8.8\,kip$

Allowable punching shear resistance: $P_{allpt} := 2 \cdot t_{pt} \cdot 1\,in \cdot (0.4 \cdot F_{yp}) \cdot \frac{4}{3}$ $P_{allpt} = 16.8\,kip$

$$Capacity := \frac{P_{pt}}{P_{allpt}} \qquad Capacity = 52.4\,\%$$

Bottom: Punchin shear force per 1inch strip $P_{pb} := f_{bb} \cdot t_w \cdot 1\,in$ $P_{pb} = 8.31\,kip$

Allowable punching shear resistance: $P_{allpb} := 2 \cdot t_{pb} \cdot 1\,in \cdot (0.4 \cdot F_{yp}) \cdot \frac{4}{3}$ $P_{allpb} = 16.8\,kip$

$$Capacity := \frac{P_{pb}}{P_{allpb}} \qquad Capacity = 49.5\,\%$$

At 60-ft Elev. USE:

- Bridge Element Flange: **PL 1" x 5"x 9'-0"**
- Bridge Element Web: **PL 1"x10.5"** above flange & **PL 1"x7.5"** above and below flange, respectively.
- Bridge Element Web to Existing Mating Flange Plate Clearance: **1"** from flange plate clipped at **45º** above and below mating flange plates.
- Welds E80XX: **1/4"** Double Fillet **48"**& **42"** in length above and below flange, respectively.

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

TIA Rev F

Site Data

BU#: *876324*
Site Name: *West Hartford UM*
App #: *87979 R3*

Pole Manufacturer:	*Other*

Anchor Rod Data		
Qty:	16	
Diam:	1.5	in
Rod Material:	Other	
Strength (Fu):	125	ksi
Yield (Fy):	109	ksi
Bolt Circle:	41	in

Plate Data		
Diam:	47	in
Thick:	2	in
Grade:	36	ksi
Single-Rod B-eff:	7.07	in

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

Pole Data		
Diam:	36	in
Thick:	0.375	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	60	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor		
ASIF:	1.333	

*Reactions		
Moment:	1216.80	ft-kips
Axial:	21.89	kips
Shear:	14.32	kips

**** Reactions proportioned for modified bolt pattern***

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

Anchor Rod Results

		Rigid
Maximum Rod Tension:	87.7 Kips	Service, ASD
Allowable Tension:	97.2 Kips	Fty*ASIF
Anchor Rod Stress Ratio:	90.2% **Pass**	

Base Plate Results Flexural Check

		Rigid
Base Plate Stress:	29.3 ksi	Service ASD
Allowable Plate Stress:	36.0 ksi	0.75*Fy*ASIF
Base Plate Stress Ratio:	81.4% **Pass**	Y.L. Length: 19.62

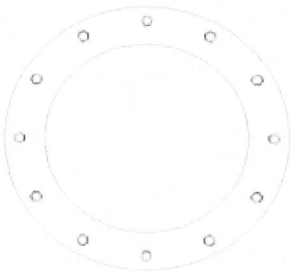
n/a

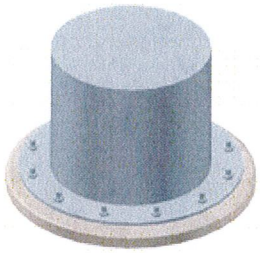
Stiffener Results

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

Pole Results

Pole Punching Shear Check: n/a





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

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

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

TIA Rev F

Site Data

BU#: *876324*
Site Name: *West Hartford UM*
App #: *87979 R3*

Pole Manufacturer:	*Rohn*

Anchor Rod Data		
Qty:	3	
Diam:	1.75	in
Rod Material:	Other	
Strength (Fu):	150	ksi
Yield (Fy):	127	ksi
Bolt Circle:	49.5	in

Plate Data		
Diam:	47	in
Thick:	2	in
Grade:	36	ksi
Single-Rod B-eff:	28.75	in

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

Pole Data		
Diam:	36	in
Thick:	0.375	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	60	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor		
ASIF:	1.333	

*Reactions		
Moment:	453.38	ft-kips
Axial:	4.11	kips
Shear:	2.68	kips

**** Reactions proportioned for modified bolt pattern***

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

Anchor Rod Results

Maximum Rod Tension:	145.2 Kips	Non-Rigid
Allowable Tension:	158.7 Kips	Service, ASD
Anchor Rod Stress Ratio:	91.5% **Pass**	Fty*ASIF

Base Plate Results

Base Plate Stress:	Flexural Check Rohn/Pirod, OK	Non-Rigid
Allowable Plate Stress:	36.0 ksi	Service ASD
Base Plate Stress Ratio:	Rohn/Pirod, OK	0.75*Fy*ASIF
		Y.L. Length: 20.00

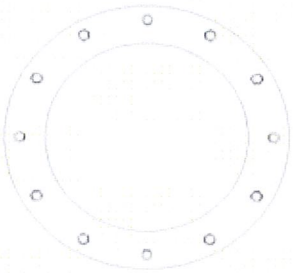
n/a

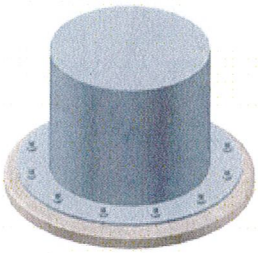
Stiffener Results N/A for Rohn / Pirod

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

Pole Results

Pole Punching Shear Check: N/A





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

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

New Anchor Rod Embedment Depths

Rod Material Type	Williams Gr. 150 All-Thrd		
Rod Size	1-3/4" W. 150 All-Thrd (R71)		
Bonding Agent	Hilti HIT-RE 500	1,800.00	Bond Strength - PSI
$Ø_{D4.5}$	Ignore ACI Req.	1.00	Ignore ACI
Hilti Product Ø	Not Hilti Product	1.00	Not Hilti Product
Crown Safety Factor	New Anchor	4.00	Crown Design

New Anchor Info		
Fy	120	KSI
Tensile Area	2.60	In^2
Working Load	187.2	Kips
Hole Diameter	2.500	Inches
Base Dev. Length	53.0	Inches

Caisson Diameter	65	Inches
f'_c of Concrete	3,000	PSI
F_y of Existing Rebar	60,000	PSI
New Bolt Circle	49.5	Inches
Number of New Bolts	3	
Existing Dowel Size Known	Yes	
Exisiting Dowel Size	#9	
Number of Existing Dowels	20	

Existing Dowel (Reinforcing Steel) Data					
Dev. Length	Area	Dowel Circle Dia.	No. of Dowels	Dowel Spacing	% Steel
61.8	1.00	57.0	20	9.6	0.60

Dist Btwn Circles	No. Dowels Req'd	1:1.5 Slope Dist.
3.8	8	2.5

Required Embedment Length
94 Inches

----- Warning ! -----
Check Capacity of Existing
Reinforcing Cage !

Comments and Assumptions:

This spreadsheet was developed using the procedures presented by Rolando Farias of Crown Castle. These procedures are shown on the appropriate tabs.

Caissons with any F'c and Fy may be used. A number of different types and sizes of Anchor Rods may be chosen using the 2 drop down buttons. The embedment depth is computed based on an unfactored load of 0.6 x Fy x Tensile Area. The shear strength between the bonding agent and the existing concrete is provided via a drop down button as well. All holes are assumed to be 1/2" larger than the maximum diameter of the anchor rod.

The center of the reinforcing cage bars are assumed to be 4 inches from the exterior face of the caisson. The size of the caisson existing vertical steel can be input if known. If unknown the spreadsheet assumes #9 bars.

Revised December 15, 2009 - WAG
Revised March 23, 2010 - WAG
Revised April 22, 2010 - WAG

CCI BU# 815541
OH North Mentor

IETS Project #: 2010-70137
5/27/2010
Designed By: TH

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Anchor Rod Bracket Weldment Design:

Eccentricity: $e_{AB} = 6.75\,in$

T&B angle strut-tie Spacing: $l_{bkB} := 51.5in$

Max A.B Force $F_{AB} := 192kip$

Max Momnet on new A.B. $M_{AB} := F_{AB} \cdot e_{AB} \cdot \frac{4}{3}$ $M_{AB} = 144\,ft \cdot kip$

Load in Bracket T&B Struts: $P_{ubkB} := \frac{M_{AB}}{2 l_{bkB} \cdot \cos\left(\frac{\pi}{3}\right)}$ $P_{ubkB} = 34\,kip$

Strut : L3 x 3 x 3/8 $t_s := 0.375in$ $F_{ys} := 36ksi$ $F_{us} := 58ksi$

$A_s := 2.11in^2$ $r_z := 0.587in$ $r_y := 0.913in$ $I_s := 1.76in^4$ $L_s := 41.255in$ $\frac{L_s}{r_z} = 70$ < 200 [OK!]

Bolts: (2) 3/4" Dia. A325 Bolts $d_b := 0.75in$ $d_H := d_b + 0.125in$

Net Area: $A_{sn} := A_s - t_s \cdot (d_H)$ $A_{sn} = 1.78\,in^2$

Effective Area: $A_{se} := U \cdot A_{sn}$ $A_{se} = 1.6\,in^2$

Tensile Capacity: $\frac{P_{ubkB}}{\min(0.6 \cdot F_{ys} \cdot A_s, .5 \cdot F_{us} \cdot A_{se})} = 73.6\,\%$

Single Angle Compression Check AISC 2005 Eqns E5-1 and E5-2:

$$KL/r := \begin{cases} 72 + 0.75 \cdot \frac{L_s}{r_y} & \text{if } 0 \le \frac{L_s}{r_y} \le 80 \\ 32 + 1.25 \cdot \frac{L_s}{r_y} & \end{cases} \qquad KL/r = 88.5$$

$F_{cr} := \frac{\pi^2 \cdot E}{KL/r^2} \cdot A_s$ $F_{cr} = 77\,kip$ $P_{all} := \frac{F_{cr}}{\Omega_c}$ $P_{all} = 39\,kip$ $\frac{P_{ubkB}}{P_{all}} = 87\,\%$

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OH North Mentor

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Bolt Shear Strength: $P_{all} := 2 \cdot 19.4kip$ $P_{all} = 38.8\,kip$ $\frac{P_{ubkB}}{P_{all}} = 86.5\,\%$

Block Shear Strength:

L3 x 3 x 3/8

$g := 1.75in$ $l_e := 1.5in$ $S := 2.5in$ $LL := 3in$ $SL := 3in$

$A_{gv} := t_s \cdot (l_e + S)$ $A_{gv} = 1.5\,in^2$

$A_{nv} := t_s \cdot (l_e + S - 1.5d_H)$ $A_{nv} = 1.01\,in^2$

$A_{gt} := t_s \cdot (LL - g)$ $A_{gt} = 0.469\,in^2$

$A_{nt} := t_s \cdot (LL - g - .5d_H)$ $A_{nt} = 0.305\,in^2$

$$\phi R_n := \begin{cases} \phi \cdot \min(0.6 \cdot F_{ys} \cdot A_{gv} + F_{us} \cdot A_{nt}, 0.6F_{us} \cdot A_{nv} + F_{us} \cdot A_{nt}) & \text{if } F_{us} \cdot A_{nt} \geq 0.6F_{us} \cdot A_{nv} \\ \phi \cdot \min(0.6F_{us} \cdot A_{nv} + F_{ys} \cdot A_{gt}, 0.6F_{us} \cdot A_{nv} + F_{us} \cdot A_{nt}) \end{cases}$$

$\frac{P_{ubkB}}{\phi R_n} = 86.1\,\%$

Bearing Strength:

Hole nearest the edge: $L_{cNS} := l_e - 0.5d_H$ $L_{cNS} = 1.06\,in$

$\phi R_{nNS} := \phi \cdot \min(1.2 \cdot L_{cNS} \cdot t_s \cdot F_{us}, 2.4 \cdot t_s \cdot d_b \cdot F_{us})$ $\phi R_{nNS} = 20.8\,kip$

The other hole: $L_{cFS} := S - d_H$ $L_{cFS} = 1.63\,in$

$\phi R_{nFS} := \phi \cdot \min(1.2 \cdot L_{cFS} \cdot t_s \cdot F_{us}, 2.4 \cdot t_s \cdot d_b \cdot F_{us})$ $\phi R_{nFS} = 29.36\,kip$

$\frac{P_{ubkB}}{\phi R_{nNS} + \phi R_{nFS}} = 66.9\,\%$

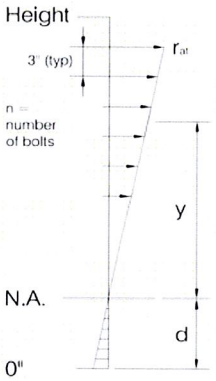
Sabre base shoe weldment for 11-05047 (BU876324)

Allowable Stress Design Calculations

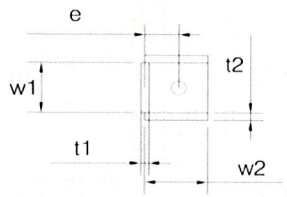
Revision 1.0 - September 4, 2009

					References/Comments
Reinforcing Section Properties					
Width	w	6	in		
Thickness	t	1	in		
Controlling strength		187.6	kips	*	See plate calculations
Anchor Bolt					
Minimum tensile strength	F_{ub}	150	ksi		
Nominal anchor bolt diameter	d	1 3/4	in		
Design allowable load		192.0	kips	*	See plate calculations
Design load for base shoe		187.6	kips	*	Plate strength controls
Pole material properties					
Minimum tensile strength	F_u	60	ksi		
Wall thickness	t	3/8	in		
Check of pullout through pole wall					
Allowable pullout capacity	Rn / Ω	10.5	kips	*	Equation on page 7-13[1]
	dw	1.65	in		42 mm OD washer for 20 mm AJAX bolt
	Ω	3.0			

To calculate maximum bolt tension, use procedure on pages 7-10 and 7-11[1]



	Height	50.000	in		To account for 6" space at top (instead of 3")
	n	11			Maximum = 18 (for Ix calculation)
	b_{eff}	3.000	in		
	A_b	0.487	in^2		AJAX 20 mm bolt only (excluding sleeve)
	y	22.9	in		
	d	9.05	in		
	Quadratic	0.0			Use goal seek and set Quadratic = 0 by changing 'd'



	r_{at}	5.8	kips	*	Very conservative analysis because
	P_a	187.6	kips	*	Tension-compression struts will resist
	e	6.750	in		moment (instead of Ajax bolts)
	c	37.9	in		
	Ix	4045	in^4		
r_{at} / Pullout capacity		0.55			Acceptable when value is less than 1.00

*Excludes 1/3 allowable stress increase

[1] AISC Steel Construction Manual, 13th edition, 2005 - Specification for Structural Steel Buildings, March 9, 2005

Sabre base shoe weldment for 11-05047 (BU876324)

Allowable Stress Design Calculations

Revision 1.0 - September 4, 2009

Check of bolts for combined shear and tension

					References/Comments
Shear per bolt and sleeve		17.1	kips		
Bolt and sleeve - allowable shear	V_{all}	23.0	kips	*	AJAX 20 mm bolt with sleeve[2]
	V/V_{all}	0.74			Acceptable when value is less than 1.00

Check of stresses in weldment - just above base plate

Width	$w1$	7	in		Plate against pole
Thickness	$t1$	1	in		
Width	$w2$	9 1/4	in		Side plates
Thickness	$t2$	1	in		
Neutral Axis distance from pole	NA	3.855	in		
	d	3.355	in		
	Equation	0.0			Use goal seek and set Equation = 0 by changing 'd'
Moment of interia	I	241.1	in^4		
Distance to extreme fibre	y_{max}	5.895	in		Very conservative analysis because
Moment	M	1266.3	in*kips		Tension-compression struts will resist
Maximum stress	σ	31.0	ksi		moment (instead of Ajax bolts)
Plate material	F_y	65	ksi		
Allowable stress		39.0	ksi	*	0.6*Fy
Maximum / Allowable stress		0.79			Acceptable when value is less than 1.00

Base plate thickness

Design as hanger type connection with load in each side gusset = Pa/2 and load in anchor bolt = Pa (design load for base shoe)

				References/Comments
tmin	2.17	in		Plate thickness equation on page 9-10[1]
b'	2.94	in		plate width/2 - hole diameter/2 + side plate width/2
p	6.00	in		
F_u	65	ksi	*	ASTM A572 Grade 50
Selected thickness	2.50	in		

*Excludes 1/3 allowable stress increase

[1] AISC Steel Construction Manual, 13th edition, 2005 - Specification for Structural Steel Buildings, March 9, 2005

[2] See Crown Castle Document #ENG-STD-10148 "AJAX bolt single shear capacity", dated 01/22/09

Weld calculations

References/Comments

Welds connecting side plates to plate against pole

Design load for base shoe is shared equally by the two side plates

	P_a	93.8	kips	*
	l	50.000	in	
	r_{py}	1.9	kips/in	
	e	6.750	in	
	Ip	10416.7	in^4/in^2	
	c	40.9	in	
	r_{mx}	2.5	kips/in	
	r_a	3.1	kips/in	
Weld strength	Rn / Ω	1.06	*D kips/in	D is required fillet weld leg size (16ths)
Required weld size		3.00	in	Fillet weld size in 16ths
Minimum weld size		5/16	in	Table J2.3 Page 16.1-95[1]
Selected weld size		5/16	in	

Welds connecting side plates to base plate

Total weld length	l	24	in	Top and bottom of base plate
	P_a	187.6	kips	*
	P_a / l	7.8	kips/in	
Weld strength	Rn / Ω	1.06	*D kips/in	**Excludes** 50% increase
Required weld size		7.40	in	Fillet weld size in 16ths
Minimum weld size		5/16	in	Table J2.3 Page 16.1-95[1]
Selected weld size		5/8	in	

*Excludes 1/3 allowable stress increase

[1] AISC Steel Construction Manual, 13th edition, 2005 - Specification for Structural Steel Buildings, March 9, 2005

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#: *876324*
Site Name: *West Hartford UM*
App #: *87979 Revision 3*

Maximum Shaft Superimposed Forces		
TIA Revision:	F	
Max. Service Shaft M:	1735.7	ft-kips **(* Note)**
Max. Service Shaft P:	27	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:	2256.41	ft-kips
1.30	Pu:	35.1	kips

Pier Properties		
Concrete:		
Pier Diameter =	5.5	ft
Concrete Area =	3421.2	in^2
Reinforcement:		
Clear Cover to **Tie**=	4.00	in
Horiz. **Tie** Bar Size=	5	
Vert. Cage Diameter =	4.64	ft
Vert. Cage Diameter =	55.62	in
Vertical Bar Size =	9	
Bar Diameter =	1.13	in
Bar Area =	1	in^2
Number of Bars =	20	
As Total=	20	in^2
A s/ Aconc, Rho:	0.0058	0.58%

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 =	C	
Seismic Risk =	**Moderate**	

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	
IBC 1810.1.2:	0.0025	SDC C
Governing:	0.0033	**0.33%**

ACI 10.8 and 10.9
Min As for Columns, Comp. Controlled, Shafts:

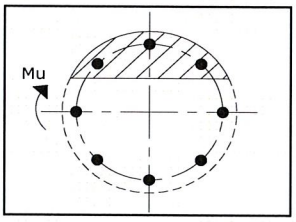
Min As:	0.0050	**0.50%**

Minimum Rho Check:

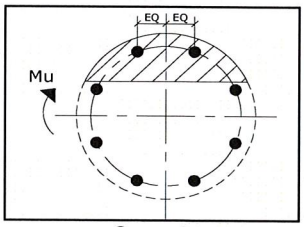
Actual Req'd Min. Rho:	0.33%	Flexural
Provided Rho:	0.58%	OK

Results:

Governing Orientation Case: **1**



Case 1



Case 2

Dist. From Edge to Neutral Axis:	**11.24**	in
Extreme Steel Strain, εt:	**0.0132**	
εt > 0.0050, Tension Controlled		
Reduction Factor,φ:	**0.900**	

<-- Comment Box

Ref. Shaft Max Axial Capacities, ϕ Max(Pn or Tn):		
Max Pu = (φ=0.65) Pn.		
Pn per ACI 318 (10-2)	5133.98	kips
at Mu=(ϕ=0.65)Mn=	2421.64	ft-kips
Max Tu, (φ=0.9) Tn =	1080	kips
at Mu=ϕ=(0.90)Mn=	0.00	ft-kips

Output Note: Negative Pu=Tension

For Axial Compression, φ Pn = Pu:	35.10	kips
Drilled Shaft Moment Capacity, φMn:	**2452.87**	ft-kips
Drilled Shaft Superimposed Mu:	**2256.41**	ft-kips

(Mu/φMn, Drilled Shaft Flexure CSR:	**91.99%**

CAISSON Version 4.91 11:06:13 AM Thursday, May 27, 2010
Industrial Engineering & Testing Services

```
*******************************************************************************
*                                                                             *
*  PIER FOUNDATIONS ANALYSIS AND DESIGN - (C) 1995,2002 POWER LINE SYSTEMS, INC.*
*                                                                             *
*******************************************************************************
```

*** ANALYSIS IDENTIFICATION : 2010-70136
NOTES : 876324 West Hartford UM

*** PIER PROPERTIES CONCRETE STRENGTH (ksi) = 3.00 STEEL STRENGTH (ksi) = 60.00

DIAMETER (ft) = 5.500 DISTANCE FROM TOP OF PIER TO GROUND LEVEL (ft) = 0.50

*** SOIL PROPERTIES

LAYER	TYPE	THICKNESS (ft)	DEPTH AT TOP OF LAYER (ft)	DENSITY (pcf)	CU (psf)	KP	PHI (degrees)
1	C	5.00	0.00	125.0	0.0		
2	C	5.00	5.00	125.0	4000.0		
3	C	25.00	10.00	125.0	4000.0		

*** DESIGN (FACTORED) LOADS AT TOP OF PIER MOMENT (ft-k) = 1558.0 VERTICAL (k) = 27.0 SHEAR (k) = 18.0
ADDITIONAL SAFETY FACTOR AGAINST SOIL FAILURE = 8.30

*** CALCULATED PIER LENGTH (ft) = 24.500

*** CHECK OF SOILS PROPERTIES AND ULTIMATE RESISTING FORCES ALONG PIER

TYPE	TOP OF LAYER BELOW TOP OF PIER (ft)	THICKNESS (ft)	DENSITY (pcf)	CU (psf)	KP	FORCE (k)	ARM (ft)
C	0.50	5.00	125.0	0.0		0.00	3.00
C	5.50	5.00	125.0	4000.0		880.00	8.00
C	10.50	4.92	125.0	4000.0		866.79	12.96
C	15.42	9.08	125.0	4000.0		-1597.21	19.96

*** SHEAR AND MOMENTS ALONG PIER

DISTANCE BELOW TOP OF PIER (ft)	WITH THE ADDITIONAL SAFETY FACTOR SHEAR (k)	WITH THE ADDITIONAL SAFETY FACTOR MOMENT (ft-k)	WITHOUT ADDITIONAL SAFETY FACTOR SHEAR (k)	WITHOUT ADDITIONAL SAFETY FACTOR MOMENT (ft-k)
0.00	149.6	13608.5	18.0	1639.6
2.45	149.6	13974.9	18.0	1683.7
4.90	149.6	14341.4	18.0	1727.9
7.35	-176.0	14406.7	-21.2	1735.7
9.80	-607.2	13447.2	-73.2	1620.2
12.25	-1038.4	11431.3	-125.1	1377.3
14.70	-1469.6	8359.0	-177.1	1007.1
17.15	-1293.6	4754.0	-155.9	572.8
19.60	-862.4	2112.9	-103.9	254.6
22.05	-431.2	528.2	-52.0	63.6
24.50	-0.0	0.0	-0.0	0.0

*** TOTAL REINFORCEMENT PCT = 0.44 REINFORCEMENT AREA (in^2) = 15.05
*** USABLE AXIAL CAP. (k) = 27.0 USABLE MOMENT CAP. (ft-k) = 1806.9

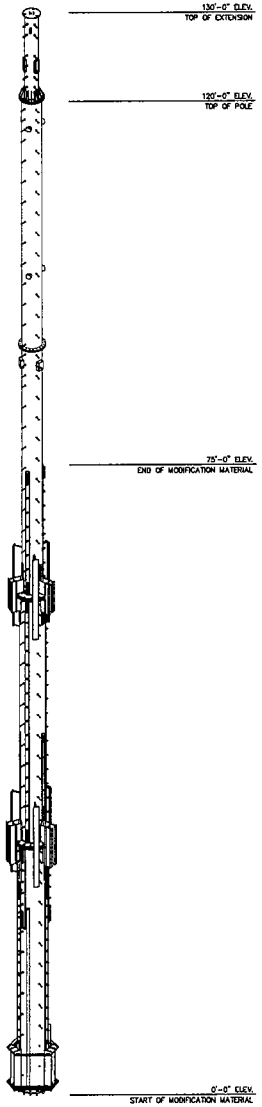
*** US Standard Re-Bars (Select one of the following):

76	BARS #4	(AREA = 0.20 in^2	DIA = 0.500 in)	AT SPACING (in) =	2.31
49	BARS #5	(AREA = 0.31 in^2	DIA = 0.625 in)	AT SPACING (in) =	3.59
35	BARS #6	(AREA = 0.44 in^2	DIA = 0.750 in)	AT SPACING (in) =	5.03
26	BARS #7	(AREA = 0.60 in^2	DIA = 0.875 in)	AT SPACING (in) =	6.77
20	BARS #8	(AREA = 0.79 in^2	DIA = 1.000 in)	AT SPACING (in) =	8.80
16	BARS #9	(AREA = 1.00 in^2	DIA = 1.128 in)	AT SPACING (in) =	11.00
12	BARS #10	(AREA = 1.27 in^2	DIA = 1.270 in)	AT SPACING (in) =	14.66
10	BARS #11	(AREA = 1.56 in^2	DIA = 1.410 in)	AT SPACING (in) =	17.59
7	BARS #14	(AREA = 2.25 in^2	DIA = 1.693 in)	AT SPACING (in) =	25.13

*** WEIGHT OF CAISSON (kips) = 87.312
*** PRESSURE UNDER CAISSON DUE TO INPUT DESIGN AXIAL LOAD (psf) = 1136.4

APPENDIX D

INSTALLATION DRAWINGS



ELEVATION

Sabre™ Towers & Poles

CROWN CASTLE USA, INC.

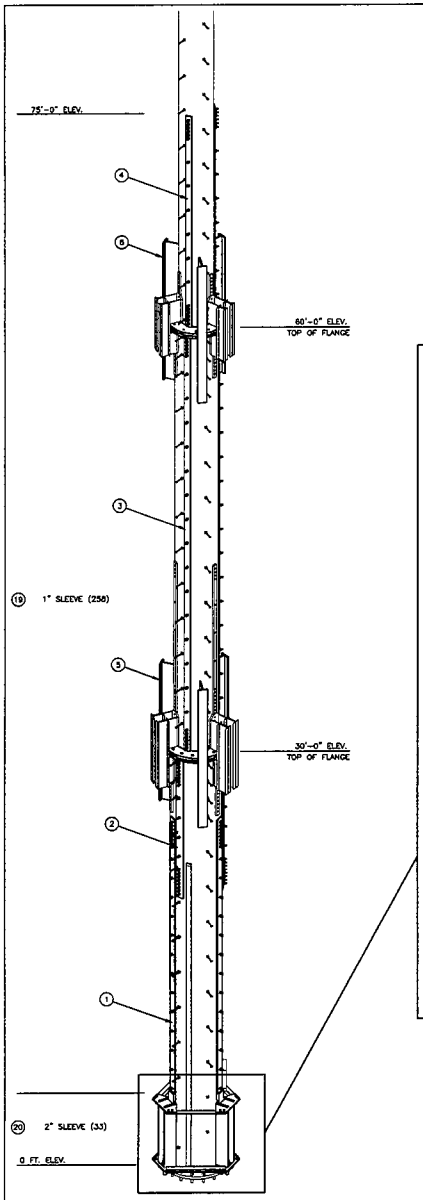
WEST HARTFORD UNITED METHODIST, CT (BU# 876324)

120 FT. EXISTING MONOPOLE

REV	DATE	DRAWN	DESCRIPTION

DATE	6/8/10
DRAWN BY	MLC
CHECKED BY	MC

SIZE	DRAWING NO.	REV
D	11-05047-MR	0
SCALE		PAGE
None		1 OF 4



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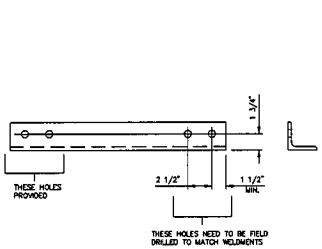
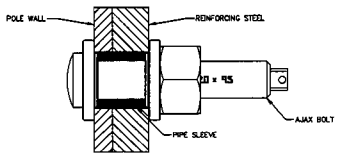


8 ANGLE BRACE DETAIL



TYPICAL AJAX BOLT INSTALLATION

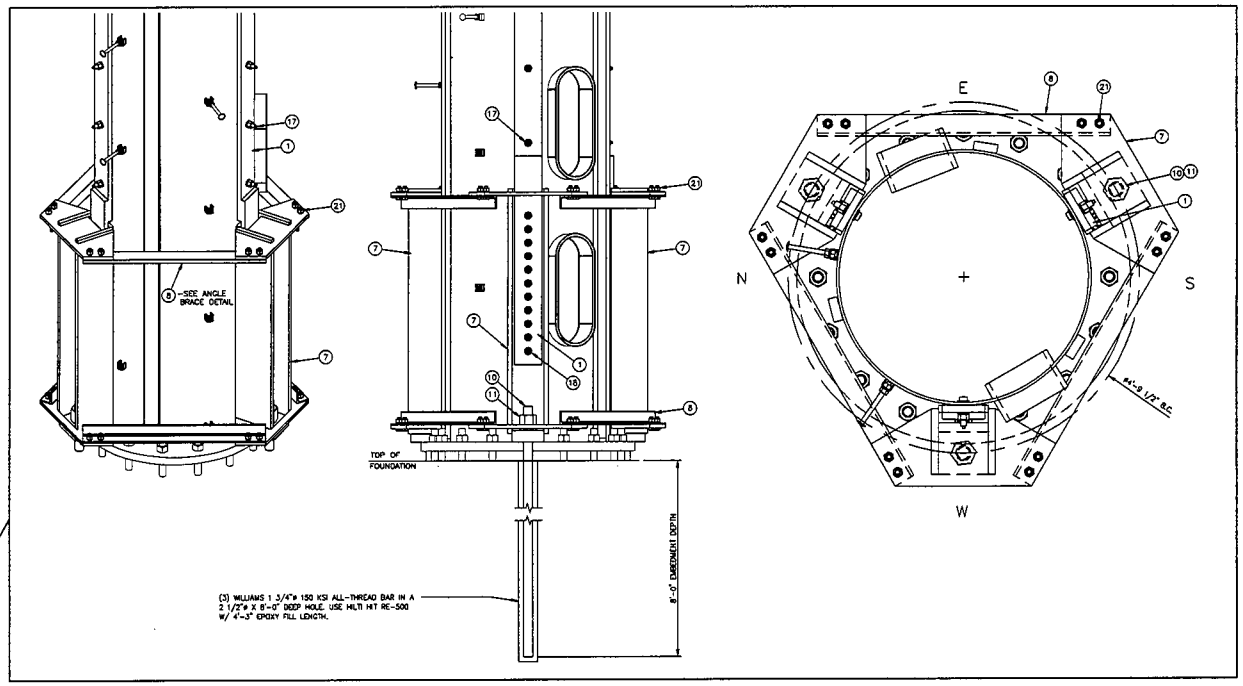
NOTES:

1. INSTALL REINFORCEMENT STEEL AS SHOWN IN ELEVATION VIEW.
2. USE AJAX BOLTS W/SLEEVES TO ATTACH THE REINFORCEMENT STEEL TO THE EXISTING POLE AS SHOWN IN ELEVATION VIEW AND DETAILS.
3. ALL HOLES DRILLED IN EXISTING MONOPOLE SHALL BE 1 3/16"ø.
4. ALL HOLES DRILLED IN EXISTING MONOPOLE SHALL BE CLEANED AND TOUCHED UP WITH ZINC RICH PAINT.
5. AJAX BOLTS ARE TO BE TIGHTENED PER AISC SNUG TIGHT CONDITION PLUS 1/3 TURN.

MAXIMUM BOLT SPACING PER PLATE SIZE	
PLATE SIZE	BOLT SPACING
1" X 4 1/2"	20 5/8"
1" X 8"	16 3/8"

MONOPOLE REINFORCEMENT

ITEM	QTY.	PART NO.	DESCRIPTION	WEIGHT
1.	3	MW00124	WELDMENT, MONOPOLE REINFORCEMENT (1" X 8" X 26'-6")	1482
2.	3	MW00128	WELDMENT, MONOPOLE REINFORCEMENT (1" X 8" X 16'-6")	616
3.	3	M500369	PLATE, MONOPOLE REINFORCEMENT (1" X 4 1/2" X 28'-7 1/2")	1386
4.	3	M300093	PLATE, MONOPOLE REINFORCEMENT (1" X 4 1/2" X 15'-6")	885
5.	3	MW00126	WELDMENT, BRIDGE STIFFNER	1770
6.	3	MW00127	WELDMENT, BRIDGE STIFFNER	1293
7.	3	MW00125	WELDMENT, ANCHOR BOLT ATTACHMENT	1523
8.	6	M300368	ANGLE, BRACE	150
10.	3	C40979105	ANCHOR ROD, 1 3/4 X 9'-3 WILLIAMS 150 KSI	251
11.	3	C40979301	NUT, WILLIAMS 1 3/4"	10
12.	1	11-05047-01	PIPE POLE EXTENSION, 16" O.D. X .1875 X 10'-0"	806
13.	1	C30170011	PLATE, TOP COVER KIT (12"-16")	39
14.	3	C30136004	ACCESS PORT COVER KIT	22
15.	11	C40044002	STEP BOLT ASSEMBLY 5/8 # X 7	11
16.	1	C40011001	STEP BOLT ANCHOR BRACKET	1
17.	256	C40132002	AJAX BOLT ASSEMBLY (M20 X 95mm)	256
18.	33	C40132003	AJAX BOLT ASSEMBLY (M20 X 135mm)	33
19.	258	M300226	PIPE, SLEEVE (1")	129
20.	33	M300242	PIPE, SLEEVE (2")	17
21.	24	C40029045	BOLT ASSEMBLY, 3/4 X 2 1/2 A325	18
22.	9	C40029050	BOLT ASSEMBLY, 3/4 X 3 3/4 A325	9
23.	1	C30188506	150' SAFETY CLIMB WITH HARNESS	100
24.	18	C40166005	REINFORCEMENT PLATE LIFTING LUG ASSEMBLY	6
			TOTAL WEIGHT	10655



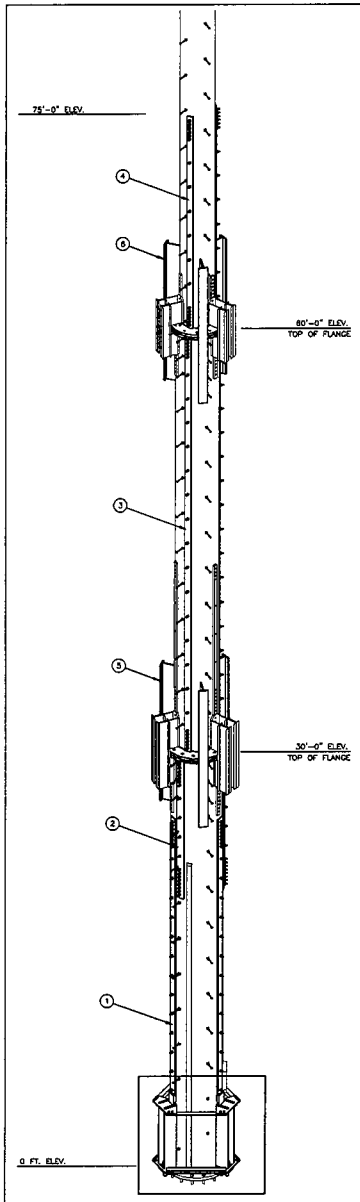
NOTE:
CONTRACTOR SHALL FIELD VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS BEFORE PROCEEDING WITH THE WORK. REPORT ANY AND ALL DISCREPANCIES TO SABRE TOWER AND POLES AND PROJECT MANAGER IMMEDIATELY.

REV	DATE	DRAWN	DESCRIPTION

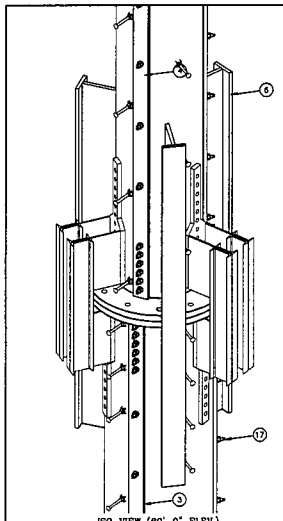
CROWN CASTLE USA INC.
WEST HARTFORD UNITED METHODIST, CT (SU#878324)
120 FT. EXISTING MONOPOLE

DATE	6/5/19
DRAWN BY	MLC
CHECKED BY	MC

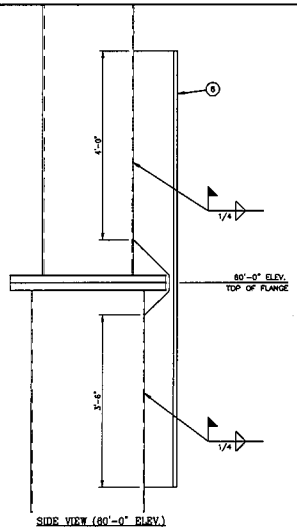
SIZE D | DRAWING NO. 11-05047-MR | REV 0
SCALE None | PAGE 2 OF 4



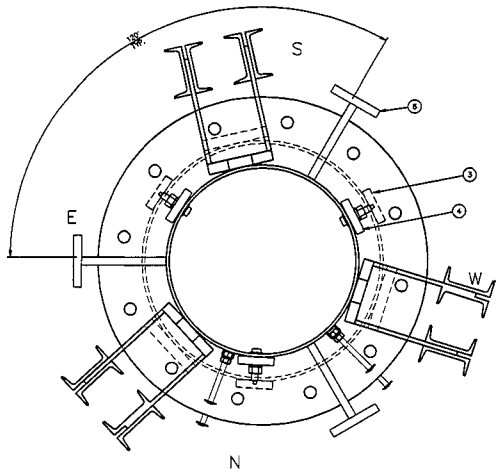
ELEVATION



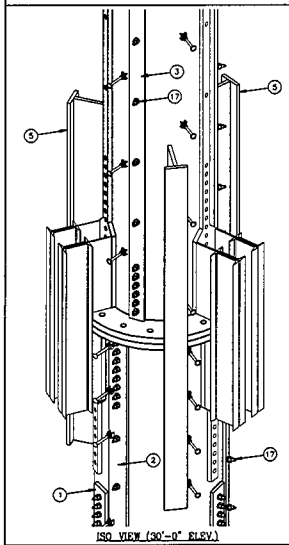
ISO VIEW (80'-0" ELEV.)



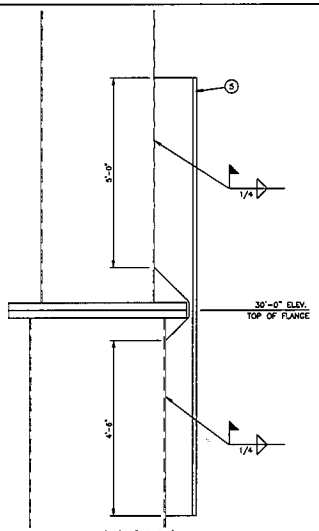
SIDE VIEW (80'-0" ELEV.)



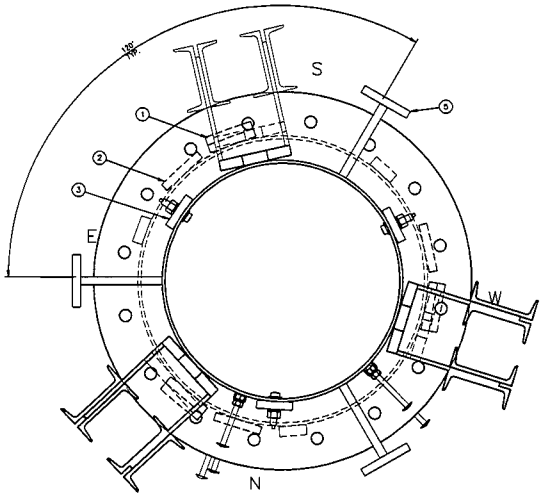
PLAN VIEW (80'-0" ELEV.)



ISO VIEW (30'-0" ELEV.)



SIDE VIEW (30'-0" ELEV.)



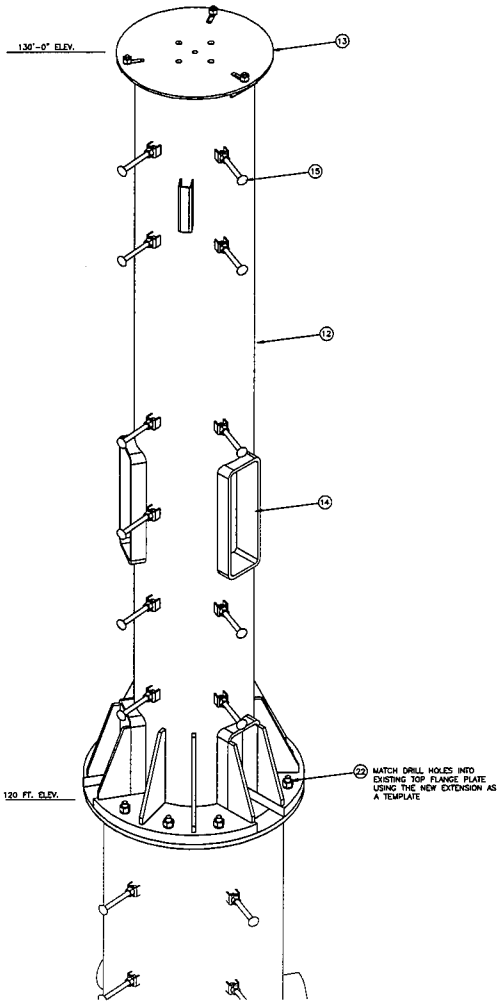
PLAN VIEW (30'-0" ELEV.)

NOTE:
CONTRACTOR SHALL FIELD VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS BEFORE PROCEEDING WITH THE WORK. REPORT ANY AND ALL DISCREPANCIES TO SABRE TOWER AND POLES AND PROJECT MANAGER IMMEDIATELY.

REV	DATE	DRAWN	DESCRIPTION

CROWN CASTLE USA INC.
WEST HARTFORD UNITED METHODIST, CT (SU#876324)
120 FT. EXISTING MONOPOLE

DATE	6/8/10	SIZE D	DRAWING NO. 11-05047-MR	REV 0
DRAWN BY	MLC			
CHECKED BY	MC		SCALE None	PAGE 3 OF 4



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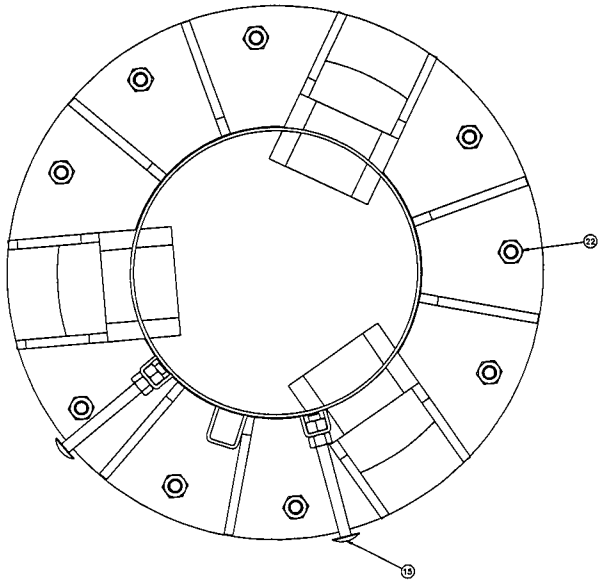

PLAN VIEW

NOTE:
CONTRACTOR SHALL FIELD VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS BEFORE PROCEEDING WITH THE WORK. REPORT ANY AND ALL DISCREPANCIES TO SABRE TOWER AND POLES AND PROJECT MANAGER IMMEDIATELY.

REV	DATE	DRAWN	DESCRIPTION

CROWN CASTLE USA INC.
WEST HARTFORD UNITED METHODIST, CT (SU#676324)
120 FT. EXISTING MONOPOLE

DATE	6/15/10	SIZE: D	DRAWING NO.: 11-05047-MR	REV: 0
DRAWN BY	MLC			
CHECKED BY	MC		SCALE: None	PAGE: 4 OF 4

CUSTOMER CROWN CASTLE USA, INC.

SITE WEST HARTFORD UNITED METHODIST, CT (BU#876324)

B.O.M. MODIFICATION MATERIAL FOR 120 FT. EXISTING MONOPOLE

PC=PIECE OR=ORANGE
PLT=PALLET WH=WHITE
BDL=BUNDLE O/W=OR & WH
CRT=CRATE N/R=NOT REQ'D
D=DRUM SP=SPECIAL
BX=BOX

ITEM NO.	NO. REQ'D.	DRAWING NUMBER	DRAWING REV	PART NO.	DESCRIPTION	TOTAL WEIGHT LBS.	PAINT	PACKING KIT	PACKING QTY. OF PKG'S.	PACKING PKG. NO.
1.					MODIFICATION MATERIAL					
2.	1	11-05047-01	0	11-05047-01	PIPE POLE EXTENSION, 16" O.D. X .1875 X 10'-0"	806	N/R			
3.	1			C30170011	PLATE, TOP COVER KIT (12"-16")	39	N/R			
4.	3			C30136004	ACCESS PORT COVER KIT	22	N/R			
5.	3	MW00124	0	MW00124	WELDMENT, MONOPOLE REINFORCEMENT (1" X 6" X 20'-0")	1482	N/R			
6.	3	MW00128	0	MW00128	WELDMENT, MONOPOLE REINFORCEMENT (1" X 6" X 10'-0")	616	N/R			
7.	3	MS00399	0	MS00399	PLATE, MONOPOLE REINFORCEMENT (1" X 4 1/2" X 29'-7 1/2")	1386	N/R			
8.	3	MS00093	0	MS00093	PLATE, MONOPOLE REINFORCEMENT (1" X 4 1/2" X 15'-0")	695	N/R			
9.	3	MW00125	0	MW00125	WELDMENT, ANCHOR BOLT ATTACHMENT	1523	N/R			
10.	3	MW00126	0	MW00126	WELDMENT, BRIDGE STIFFENER	1770	N/R			
11.	3	MW00127	0	MW00127	WELEMENT, BRIDGE STIFFENER	1293	N/R			
12.	6	MS00398	0	MS00398	ANGLE, BRACE 3" X 3" X 3/8" X 4'-0"	180	N/R			
13.	263	MS00226	0	MS00226	PIPE, SLEEVE (1" LENGTH)	132	N/R			
14.	34	MS00242	0	MS00242	PIPE, SLEEVE (2" LENGTH)	17	N/R			
15.	3			C40979105	ANCHOR ROD, 1 3/4" X 9'-3" WILLIAMS 150 KSI	251	N/R			
16.	3			C40979301	NUT, 1 3/4" WILLIAMS	10	N/R			
17.	1			C30188506	150' SAFETY CLIMB WITH HARNESS	100	N/R			
18.										
19.										
20.										

REV	DATE	DRW	CHK	DESCRIPTION

DATE 6/7/10
DRAWN BY MLC
CHECKED BY MC

JOB NO. 11-05047
PRINT NO. BOM-1
PAGE 1 OF 2

CUSTOMER CROWN CASTLE USA, INC.

SITE WEST HARTFORD UNITED METHODIST, CT (BU#876324)

B.O.M. MODIFICATION MATERIAL FOR 120 FT. EXISTING MONOPOLE

PC=PIECE OR=ORANGE
PLT=PALLET WH=WHITE
BDL=BUNDLE O/W=OR & WH
CRT=CRATE N/R=NOT REQ'D
D=DRUM SP=SPECIAL
BX=BOX

ITEM NO.	NO. REQ'D.	DRAWING NUMBER	DRAWING REV	PART NO.	DESCRIPTION	TOTAL WEIGHT LBS.	PAINT	PACKING KIT	PACKING QTY. OF PKG'S.	PACKING PKG. NO.
1.					HARDWARE					
2.	263			C40132002	AJAX BOLT ASSEMBLY (M20 X 95MM)	263	N/R			
3.	34			C40132003	AJAX BOLT ASSEMBLY (M20 X 135MM)	34	N/R			
4.	11			C40044002	STEP BOLT ASSEMBLY, 5/8 ø X 7 H.D.G.	11				
5.	1			C40011001	STEP BOLT ANCHOR BRACKET	1	N/R			
6.	25			C40026045	BOLT ASSEMBLY, 3/4 ø X 2 1/2 A325	19				
7.	10			C40026050	BOLT ASSEMBLY, 3/4 ø X 3 3/4 A325	10				
8.	18			C40166005	REINFORCEMENT PLATE LIFTING LUG ASSEMBLY	5	N/R			
9.										
10.										
11.										
12.										
13.										
14.										
15.										
16.										
17.										
18.										
19.	4			C40068001	CAN OF COLD GALV. SPRAY	4				
20.					REFERENCE DRAWING: 11-05047-MR (REV. 0)					

REV	DATE	DRW	CHK	DESCRIPTION

DATE 6/7/10
DRAWN BY MLC
CHECKED BY MC

JOB NO. 11-05047
PRINT NO. BOM-1
PAGE 2 OF 2