Robinson+Cole

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Also admitted in Massachusetts

June 19, 2018

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

Re: **Notice of Exempt Modification – Facility Modification**
3965 Congress Street, Fairfield, Connecticut

Dear Ms. Bachman:

Cellco Partnership d/b/a Verizon Wireless ("Cellco") currently maintains twelve (12) antennas at the 80-foot level of the existing 150-foot tower at 3965 Congress Street in Fairfield, Connecticut (the "Property"). The tower and Property are owned by the Town of Fairfield. The Council approved Cellco's use of this tower in 2004. Cellco now intends to replace six (6) of its existing antennas with three (3) model NHH-65B-R2B, 700 MHz antennas and three (3) model NHH-65B-R2B, 2100 MHz antennas, at the same level on the tower. Cellco also intends to install nine (9) remote radio heads ("RRHs") behind its antennas. Included in Attachment 1 are specifications for Cellco's replacement antennas and RRHs.

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 Michael Tetreau, Fairfield's First Selectman; and James Wendt, Fairfield's Planning Director.

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 an increase in the height of the existing tower. Cellco's replacement antennas and RRHs will be installed at the 80-foot level of the tower.

2. The proposed modifications will not involve any change 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, or to levels that exceed state and local criteria.

4. The operation of the replacement antennas and RRHs will not increase radio frequency (RF) emissions at the facility to a level at or above the Federal Communications Commission (FCC) safety standard. A cumulative General Power Density table for Cellco's modified facility is included in Attachment 2.

5. The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site.

6. The tower and its foundation, with certain modifications, can support Cellco's proposed modifications. (*See* Structural Analysis Report included in Attachment 3). Included in Attachment 4 is a Mount Structural Analysis Report confirming that with certain modifications, Cellco's antenna mounting system will support Cellco's proposed modifications.

A copy of the parcel map and owner information for the Property is included in Attachment 5. A Certificate of Mailing verifying that this filing was sent to municipal officials is included in Attachment 6.

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:
Michael Tetreau, First Selectman
James Wendt, Planning Director
Tim Parks

ATTACHMENT 1

Product Specifications

COMMSCOPE®

NHH-65B-R2B

6-port sector antenna, 2x 698–896 and 4x 1695–2360 MHz, 65° HPBW, 2x RET. Both high bands share the same electrical tilt.

- Interleaved dipole technology providing for attractive, low wind load mechanical package
- Internal SBT on low and high band allow remote RET control from the radio over the RF jumper cable
- Separate RS-485 RET input/output for low and high band
- One RET for low band and one RET for both high bands to ensure same tilt level for 4x Rx or 4x MIMO

Electrical Specifications

Frequency Band, MHz	698–806	806–896	1695–1880	1850–1990	1920–2200	2300–2360
Gain, dBi	14.9	15.0	17.7	17.9	18.4	18.7
Beamwidth, Horizontal, degrees	65	60	71	69	64	57
Beamwidth, Vertical, degrees	12.4	11.2	5.7	5.2	4.9	4.6
Beam Tilt, degrees	0–14	0–14	0–7	0–7	0–7	0–7
USLS (First Lobe), dB	13	14	18	18	19	18
Front-to-Back Ratio at 180°, dB	30	29	31	30	29	31
Isolation, dB	25	25	25	25	25	25
Isolation, Intersystem, dB	30	30	30	30	30	30
VSWR | Return Loss, dB	1.5 | 14.0	1.5 | 14.0	1.5 | 14.0	1.5 | 14.0	1.5 | 14.0	1.5 | 14.0
PIM, 3rd Order, 2 x 20 W, dBc	-153	-153	-153	-153	-153	-153
Input Power per Port, maximum, watts	350	350	350	350	350	350
Polarization	±45°	±45°	±45°	±45°	±45°	±45°
Impedance	50 ohm	50 ohm	50 ohm	50 ohm	50 ohm	50 ohm

Electrical Specifications, BASTA*

Frequency Band, MHz	698–806	806–896	1695–1880	1850–1990	1920–2200	2300–2360
Gain by all Beam Tilts, average, dBi	14.5	14.5	17.3	17.7	18.1	18.5
Gain by all Beam Tilts Tolerance, dB	±0.6	±1.1	±0.4	±0.4	±0.5	±0.3
Gain by Beam Tilt, average, dBi	0 ° | 14.4	0 ° | 14.7	0 ° | 17.2	0 ° | 17.6	0 ° | 18.0	0 ° | 18.3
	7 ° | 14.6	7 ° | 14.7	4 ° | 17.3	4 ° | 17.7	4 ° | 18.2	4 ° | 18.5
	14 ° | 14.3	14 ° | 14.1	7 ° | 17.3	7 ° | 17.7	7 ° | 18.1	7 ° | 18.6
Beamwidth, Horizontal Tolerance, degrees	±2	±2.1	±3	±4.1	±6.5	±2.9
Beamwidth, Vertical Tolerance, degrees	±0.7	±0.7	±0.3	±0.2	±0.3	±0.2
USLS, beampeak to 20° above beampeak, dB	13	14	16	16	17	15
Front-to-Back Total Power at 180° ± 30°, dB	23	22	27	27	25	25
CPR at Boresight, dB	22	21	23	23	22	19
CPR at Sector, dB	10	7	16	13	11	4

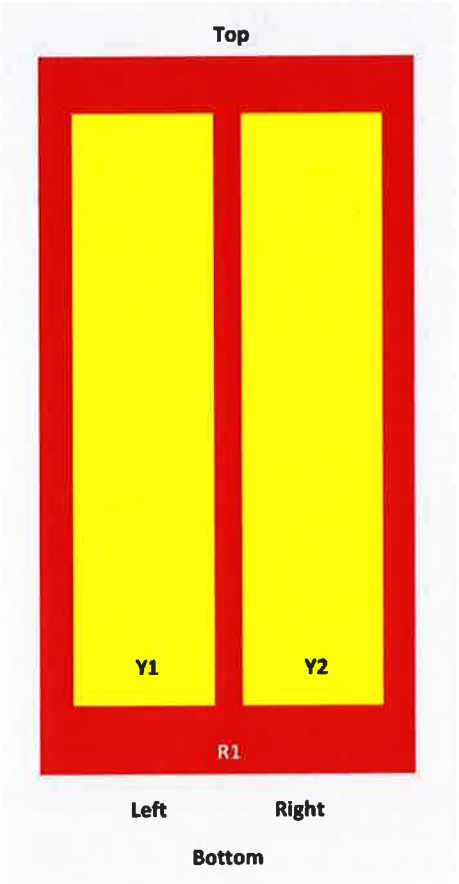
* CommScope® supports NGMN recommendations on Base Station Antenna Standards (BASTA). To learn more about the benefits of BASTA, download the whitepaper Time to Raise the Bar on BSAs.

Array Layout

Product Specifications

NHH-65B-R2B

NHH



Array	Freq (MHz)	Conns	RET (SRET)	AISG RET UID
R1	698-896	1-2	1	ANxxxxxxxxxxxxxxx1
Y1	1695-2360	3-4	2	ANxxxxxxxxxxxxxxx2
Y2	1695-2360	5-6		

View from the front of the antenna

(Sizes of colored boxes are not true depictions of array sizes)

General Specifications

Operating Frequency Band	1695 – 2360 MHz | 698 – 896 MHz
Antenna Type	Sector
Band	Multiband
Performance Note	Outdoor usage

Mechanical Specifications

RF Connector Quantity, total	6
RF Connector Quantity, low band	2
RF Connector Quantity, high band	4
RF Connector Interface	7-16 DIN Female
Color	Light gray

Product Specifications

NHH-65B-R2B

Grounding Type	RF connector body grounded to reflector and mounting bracket
Radiator Material	Low loss circuit board
Radome Material	Fiberglass, UV resistant
Reflector Material	Aluminum
RF Connector Location	Bottom
Wind Loading, frontal	610.0 N @ 150 km/h 137.1 lbf @ 150 km/h
Wind Loading, lateral	195.0 N @ 150 km/h 43.8 lbf @ 150 km/h
Wind Loading, rear	717.0 N @ 150 km/h 161.2 lbf @ 150 km/h
Wind Speed, maximum	241 km/h | 150 mph

Dimensions

Length	1828.0 mm | 72.0 in
Width	301.0 mm | 11.9 in
Depth	180.0 mm | 7.1 in
Net Weight, without mounting kit	19.8 kg | 43.7 lb

Remote Electrical Tilt (RET) Information

Input Voltage	10–30 Vdc
Internal Bias Tee	Port 1 | Port 3
Internal RET	High band (1) | Low band (1)
Power Consumption, idle state, maximum	2.0 W
Power Consumption, normal conditions, maximum	13.0 W
Protocol	3GPP/AISG 2.0 (Single RET)
RET Interface	8-pin DIN Female | 8-pin DIN Male
RET Interface, quantity	2 female | 2 male

Packed Dimensions

Length	1952.0 mm | 76.9 in
Width	409.0 mm | 16.1 in
Depth	299.0 mm | 11.8 in
Shipping Weight	32.3 kg | 71.2 lb

Regulatory Compliance/Certifications

Agency	Classification
RoHS 2011/65/EU	Compliant by Exemption
China RoHS SJ/T 11364-2006	Above Maximum Concentration Value (MCV)
ISO 9001:2008	Designed, manufactured and/or distributed under this quality management system

Product Specifications

NHH-65B-R2B

Included Products

BSAMNT-1 — Wide Profile Antenna Downtilt Mounting Kit for 2.4 - 4.5 in (60 - 115 mm) OD round members. Kit contains one scissor top bracket set and one bottom bracket set.

* Footnotes

Performance Note	Severe environmental conditions may degrade optimum performance

ALCATEL-LUCENT B13 RRH4X30-4R

Alcatel-Lucent B13 Remote Radio Head 4x30-4R is the newest addition of Remote Radio Head to the extended product line of Alcatel-Lucent's distributed Base Station solutions, aimed at facilitating smooth RF site acquisition and related civil engineering.

Supporting 2Tx/4Tx MIMO and 4-way Rx diversity, Alcatel-Lucent B13 RRH4x30-4R allows operators to have a compact radio solution to deploy LTE in the 700U band (700 MHz, 3GPP band 13), providing them with the means to achieve high capacity, high quality and high coverage with minimum site requirements.

The Alcatel-Lucent B13 RRH4x30-4R product has four transmit RF paths, offering the possibility to **select, via software only, 2Tx or 4Tx MIMO configurations** with either 2x60 W or 4x30 W RF output power. It supports also 4-way Rx diversity and up to 10MHz instantaneous bandwidth.

The Alcatel-Lucent B13 RRH4x30-4R is a near zero-footprint solution and operates noise free, simplifying negotiations with site property owners and minimizing environmental impacts.

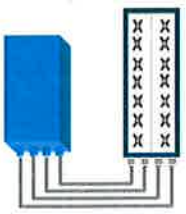
Its compactness and slim design makes the Alcatel-Lucent B13 RRH4x30-4R easy to install close to the antenna: operators can therefore locate this Remote Radio Head where RF design conditions are deemed ideal, minimizing trade-offs between available sites and RF optimum sites, together with reducing the RF feeder needs and installation costs.

FEATURES

- Supporting LTE in 700 MHz band (700U, 3GPP band 13)
- LTE 2Tx or 4Tx MIMO (SW switchable)
- Output power: Up to 2x60W or 4x30W
- 10MHz LTE carrier with 4Rx Diversity
- Convection-cooled (fan-less)
- Supports AISG 2.0 ALD devices (RET, TMA) through RS485 or RF ports

BENEFITS

- Compact to reduce additional footprint when adding LTE in 700U band
- MIMO scheme operation selection (2Tx or 4Tx) by software only
- Improves downlink spectral efficiency through MIMO4
- Increases LTE coverage thanks to 4Rx diversity capability and best in class Rx sensitivity
- Flexible mounting options: Pole or Wall



4x30W with 4T4R
or
2x60W with 2T4R

Can be switched between modes via SW w/o site visit

Alcatel·Lucent

Features & performance	
Number of TX/RX paths	4 duplexed (either 4T4R or 2T4R by SW)
Frequency band	U700 (C) (3GPP bands 13): DL: 746 - 756 MHz / UL: 777 - 787 MHz
Instantaneous bandwidth - #carriers	10MHz – 1 LTE carrier (in 10MHz occupied bandwidth)
LTE carrier bandwidth	10 MHz
RF output power	2x60W or 4x30W (by SW)
Noise figure – RX Diversity scheme	2 dB typ. (<2.5 dB max) – 2 or 4 way Rx diversity
Sizes (HxWxD) in mm (in.) Volume in L Weight in kg (lb) (w/o mounting HW)	550 x 305 x 230 (21.6" x 12.0" x 9") (with solar shield) 38 (with solar shield) 26 (57.2) (with solar shield)
DC voltage range DC power consumption	-40.5 to -57V at full performance, -36 to -57V with relaxation on power consumption 550W typical @100% RF load (in 2Tx or 4Tx mode)
Environmental conditions Wind load (@150km/h or 93mph)	-40°C (-40°F) /+55°C (+131°F) IP65 Frontal:<200N / Lateral :<150N
Antenna ports	4 ports 7/16 DIN female (50 ohms) VSWR < 1.5
CPRI ports	2 CPRI ports (HW ready for Rate7, 9.8 Gbps) SFP single mode dual fiber
AISG interfaces	1 AISG2.0 output (RS485) Integrated Smart bias Tees (x2)
Misc. Interfaces	4 external alarms (1 connector) – 4 RF Tx & 4 RF Rx monitor ports - 1 DC connector (2 pins)
Installation conditions	Pole and wall mounting
Regulatory compliance	3GPP 36.141 / 3GPP 36.113 / GR-1089-CORE / GR-3108-CORE / UL 60950-1 / FCC Part 27

ALCATEL-LUCENT B25 RRH4X30

Alcatel-Lucent Band 25 Remote Radio Head 4x30W is the new addition of Remote Radio Head to the extended product line of Alcatel-Lucent's distributed Base Station solutions, aimed at facilitating smooth RF site acquisition and related civil engineering.

Supporting 2Tx/4Tx MIMO and 4-way Rx diversity, Alcatel-Lucent B25 RRH4x30 allows operators to have a compact radio solution to deploy LTE in the PCS band (1.9 GHz, 3GPP band 25), providing them with the means to achieve high capacity, high quality and high coverage with minimum site requirements.

The Alcatel-Lucent B25 RRH4x30 product has four transmit RF paths, offering the possibility to **select, via software only, 2Tx or 4Tx MIMO configurations** with either 2x60 W or 4x30 W RF output power. It supports also 4-way Rx diversity, LTE carriers from 3 MHz up to 20 MHz and up to 65 MHz instantaneous bandwidth.

The Alcatel-Lucent B25 RRH4x30 is a near zero-footprint solution and operates noise free, simplifying negotiations with site property owners and minimizing environmental impacts.

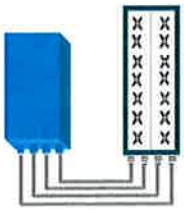
Its compactness and slim design makes the Alcatel-Lucent B25 RRH4x30 easy to install close to the antenna: operators can therefore locate this Remote Radio Head where RF design conditions are deemed ideal, minimizing trade-offs between available sites and RF optimum sites, together with reducing the RF feeder needs and installation costs.

FEATURES

- Supporting LTE in 1.9 GHz band (PCS, 3GPP band 2 & 25)
- LTE 2Tx or 4Tx MIMO (SW switchable)
- Output power: Up to 2x60W or 4x30W
- Ready for 3, 5, 10, 15 or 20MHz LTE carrier operation with 4Rx Diversity
- Ready to support up to 4 carriers anywhere in 65MHz instantaneous bandwidth
- Convection-cooled (fan-less)
- Supports AISG 2.0 devices (RET, TMA) through RS485 or RF ports

BENEFITS

- Compact to reduce additional footprint when adding LTE in PCS band
- MIMO scheme operation selection (2Tx or 4Tx) by software only
- Full flexibility for multiple carriers operation over entire PCS spectrum
- Improves downlink spectral efficiency and cell edge throughput through MIMO4
- Increases LTE coverage thanks to 4-way Rx diversity capability and best in class Rx sensitivity
- Flexible mounting options (Pole or Wall)



4x30W with 4T4R
or
2x60W with 2T4R

Can be switched between modes via SW w/o site visit

Alcatel·Lucent

Features & performance	
Number of TX/RX paths	4 duplexed (either 4T4R or 2T4R by SW)
Frequency band	3GPP bands 2 & 25 (PCS-G) DL: 1930 - 1995 MHz UL: 1850 - 1915 MHz
Instantaneous bandwidth - #carriers	65MHz – Up to 4 LTE carriers (in 40MHz occupied bandwidth)
LTE carrier bandwidth	3, 5, 10, 15 or 20 MHz
RF output power	2x60W or 4x30W (by SW)
Noise figure (3GPP band 2) RX Diversity scheme	2.0 dB typ. (<2.5 dB max) 2 or 4 way Rx diversity
Sizes (HxWxD)(w/ solar shield) in mm (in.) Volume (w/ solar shield) in L Weight (w/ solar shield) in kg (lb)	538 x 304 x 182 (21.2" x 12.0" x 7.2") 30 24 (53)
DC voltage range DC power consumption	-40.5 to -57V at full performance, -38 to -57V with relaxation on power consumption 550W typical @100% RF load
Environmental conditions Wind load (@150km/h or 93mph)	-40°C (-40°F) /+55°C (+131°F) IP65 Frontal:<200N / Lateral :<150N
Antenna ports	4 ports 7/16 DIN female (50 ohms) VSWR < 1.5 (> 14dB)
CPRI ports	2 CPRI ports (HW ready for Rate7 / 9.8 Gbps)
AISG interfaces	1 AISG2.0 output (RS485), +24V/2A DC power Integrated Smart Bias Tees (x2)
Misc. Interfaces	1 external alarms connector (4 alarms) 4 RF Tx & 4 RF Rx monitor ports 1 DC connector (2 pins)
Installation conditions	Pole and wall mounting
Regulatory compliance	3GPP 36.141 / 3GPP 36.113 / GR-1089-CORE / GR-3108-CORE / UL 60950-1 / FCC Part 27

ALCATEL-LUCENT B66A RRH4X45

The Alcatel-Lucent B66a Remote Radio Head 4x45 is the newest addition of Remote Radio Head to the extended product line of Alcatel-Lucent's distributed Base Station solutions, aimed at facilitating smooth RF site acquisition and related civil engineering. Its operational range covers beyond that of B4 (AWS) and B10 (AWS+).

Supporting 2Tx/4Tx MIMO and 2-way/4-way Rx diversity, the Alcatel-Lucent B66a RRH4x45 allows operators to have a compact radio solution to deploy LTE in the 2100 band (3GPP band 4, 10, and 66), providing them with the means to achieve high capacity, high quality, high reliability, large instantaneous bandwidth, and high coverage with minimum site requirements.

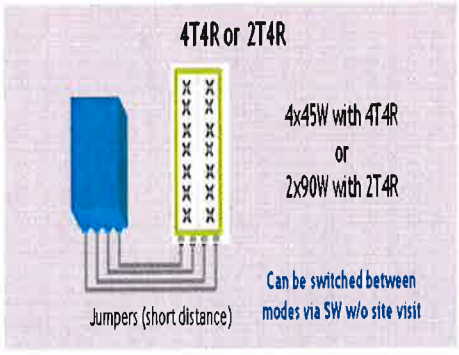
The Alcatel-Lucent B66a RRH4x45 product has four transmit RF paths, offering the possibility to **select, via software only, 2Tx or 4Tx MIMO configurations** with either 2x90W or 4x45W RF output power. It also supports 4-way Rx diversity at the 70 MHz instantaneous bandwidth.

The Alcatel-Lucent B66a RRH4x45 is a compact (near zero-footprint) solution and operates noise free, simplifying negotiations with site property owners and minimizing environmental impacts.

Its compactness and slim design makes the Alcatel-Lucent B66a RRH4x45 easy to install close to the antenna: operators can therefore locate this Remote Radio Head where RF design conditions are deemed ideal, minimizing trade-offs between available sites and RF optimum sites, together with reducing the RF feeder needs and installation costs.

FEATURES

- Supporting LTE in 2110 - 2180 MHz band/DL, 1710-1780MHz/UL (3GPP band 4, 10, and 66a)
- LTE 2Tx or 4Tx MIMO (SW selectable)
- Configuration: 2T2R/2T4R/4T4R
- Output power: Up to 2x90W or 4x45W (SW configurable)
- 70MHz LTE carrier with 4Rx Diversity
- Convection-cooled (fan-less)
- Supports AISG 2.0 ALD devices (RET, TMA) through RS485 or RF ports



BENEFITS

- Compact to reduce additional footprint when adding LTE in AWS 1-3 band
- Selection of MIMO configuration (2Tx or 4Tx) by software only
- Improves downlink spectral efficiency through 4Tx MIMO
- Increases LTE coverage thanks to 4Rx diversity capability and best in class Rx sensitivity
- Flexible mounting options: Pole or Wall

Features & Performance	
Number of TX/RX paths	4 duplexed (either 4T4R or 2T4R selectable by SW)
Frequency band	AWS 1-3, B4/B66a DL: 2110-2180 MHz / UL: 1710-1780 MHz
Instantaneous bandwidth - #carriers	70 MHz – 4 LTE MIMO carriers (in 70 MHz occupied bandwidth)
LTE carrier bandwidth	5, 10, 15, 20 MHz
RF output power	2x90W or 4x45W (selectable by SW)
Noise figure – RX Diversity scheme Receiver Sensivity (FRC A1-3)	2 dB typical (<2.5 dB max) – 2 or 4 way Rx diversity -104.5 dBm maximum
Sizes (HxWxD) in mm (in.) Volume in Liters Weight in kg (lb) (w/o mounting HW)	655x299x182 (25.8x11.8x7.2) (with solar shield) 640x290x160 (25.2x11.4x6.3) (without solar shield) 35.5 (with solar shield) 29.7 (without solar shield) 25.8kg (56.8lb) (with solar shield)
DC voltage range DC power consumption	Nominal -48V, -40.5 to -57V at full performance, -36 to -57V with relaxation on power consumption 750W typical @100% RF load (in 2Tx or 4Tx mode); Add 58W for 2A*29V for AISG
Environmental conditions Wind load (@150km/h or 93mph)	-40°C (-40°F) /+55°C (+131°F) UL50E Type 4 Enclosure 250N (56lb) Frontal/150N (34lb) Lateral
Antenna ports	4 ports 4.3-10 female (50 ohms) VSWR < 1.5
CPRI ports	2 CPRI ports (HW ready for Rate 7, 9.8 Gbps) SFP: SMDF (HW supports also SMSF and MMDF)
AISG interfaces	1 AISG 2.0 output (RS485) Integrated Smart Bias Tees (x2)
Misc. Interfaces	4 external alarms (1 connector) 1 DC connector (2 pins)
Installation conditions	Pole and wall mounting
Regulatory compliance	3GPP 36.141 / 3GPP 36.113 / GR-487 / GR-1089-CORE / GR-3108-CORE / UL 60950-1 / FCC Part 27 / FCC Part 15 / GR-3178-CORE

ATTACHMENT 2

	General	Power	Density					
Site Name: Fairfield 2								
Tower Height: 150Ft								
CARRIER	**# OF CHAN.**	**WATTS ERP**	**HEIGHT**	**CALC. POWER DENS**	**FREQ.**	**MAX. PERMISS. EXP.**	**FRACTION MPE**	**Total**
*AT&T	2	552	127	850	0.0271	0.5667	0.48%	
*AT&T	2	896	127	1900	0.0440	1.0000	0.44%	
*AT&T	2	552	127	850	0.0271	0.5667	0.48%	
*AT&T	2	940	127	700	0.0462	0.4667	0.99%	
*AT&T	2	1791	127	1900	0.0880	1.0000	0.88%	
*T-Mobile	8	175	110	3	0.0465	20.0000	0.02%	
*T-Mobile	2	778	110	2100	0.0517	1.0000	0.52%	
*Sprint	1	438	138	850	0.0090	0.5667	0.16%	
*Sprint	2	438	138	850	0.0181	0.5667	0.32%	
*Sprint	5	623	138	1900	0.0643	1.0000	0.64%	
*Sprint	2	1556	138	1900	0.0642	1.0000	0.64%	
*Sprint	8	778	138	2500	0.1285	1.0000	1.28%	
*Sprint	2	795	138	11500	0.0328	1.0000	0.33%	
*Sprint	2	576	150	19500	0.0200	1.0000	0.20%	
*Nextel	18	100	156	851	0.0288	0.5673	0.51%	
*Town	1	40	108	470.46	0.0014	0.3136	0.04%	
*Town	1	40	108	470.47	0.0014	0.3136	0.04%	
*Town	1	40	108	470.48	0.0014	0.3137	0.04%	
VZW PCS	**0**	**1802**	**80**	**0.0000**	**1970**	**1.0000**	**0.00%**	
VZW Cellular	**3**	**398**	**80**	**0.0671**	**869**	**0.5793**	**11.58%**	
VZW AWS	**1**	**7593**	**80**	**0.4266**	**2145**	**1.0000**	**42.66%**	
VZW 700	**1**	**2261**	**80**	**0.1270**	**746**	**0.4973**	**25.54%**	
								87.81%
* Source: Siting Council								

ATTACHMENT 3

PJF PAUL J. FORD & COMPANY

Structural Analysis Report

Report Date:	October 10, 2017
Client:	On Air Engineering, LLC 88 Foundry Pond Road Cold Spring, NY 10516 Attn: David Weinpahl, P.E. Phone: (201) 456-4624 dweinpahl@onaireng.com
Structure:	Existing 150-ft Monopole
Verizon Site Name:	Fairfield 2 CT
Owner:	Town of Fairfield
Site Address:	3965 Congress St., Fairfield, CT
Latitude, Longitude:	41° 11' 18.05"N, 73° 17' 56.66"W
PJF Project:	A42917-0012.001.7805

Paul J. Ford and Company is pleased to submit this "**Structural Analysis Report**". The purpose of this analysis is to determine if the structure has sufficient capacity to support the proposed equipment described herein.

Analysis Criteria:

Reference Standard:	This analysis has been performed in accordance with the 2016 Connecticut State Building Code per Section 1609.3 and Appendix N as required for use in the ANSI/TIA-222-G-2005 Standard, "Structural Standard for Antenna Supporting Structures and Antennas", with ANSI/TIA-222-G-1-2007 and ANSI/TIA-222-G-2-2009 Addenda per Exception #5 of Section 1609.1.1.
Ultimate Wind Speed:	125 mph 3-second gust wind speed without ice (Risk Category II)
Nominal Wind Speed:	97 mph 3-second gust wind speed without ice
Ice Wind Speed:	50 mph 3-second gust wind speed with 0.75" ice
Service Wind Speed:	60 mph 3-second gust wind speed (Serviceability) without ice
TIA-222 Criteria:	Topographic Category I, Exposure Category C

Proposed Appurtenance Loads:

The structure was analyzed with the addition of the proposed appurtenance loads shown in Table 1 combined with the existing and reserved loads shown in Table 2 of this report.

Summary of Analysis Results:

Existing Structure:	87.9% Pass
Existing Foundation:	62.4% Pass

We at Paul J. Ford and Company appreciate the opportunity of providing our continuing professional services to you and Wireless Edge. If you have any questions or need further assistance on this or any other projects please give us a call.

Respectfully Submitted by:
Paul J. Ford and Company

Jared Smith, E.I.
Structural Designer
jsmith@pjfweb.com

10.10.17

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 150 ft Monopole tower designed by Valmont. The tower's original design codes are unknown.

2) ANALYSIS CRITERIA

This analysis has been performed in accordance with the 2016 Connecticut State Building Code based upon an ultimate 3-second gust wind speed of 125 mph converted to a nominal 3-second gust wind speed of 97 mph per Section 1609.3 and Appendix N as required for use in the ANSI/TIA-222-G-2005 Standard, "Structural Standard for Antenna Supporting Structures and Antennas", with ANSI/TIA-222-G-1-2007 and ANSI/TIA-222-G-2-2009 Addenda per Exception #5 of Section 1609.1.1. Risk Category II, Exposure Category C and Topographic Category 1 with a maximum Topographic Factor, Kzt, of 1.0 were used in this analysis.

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
78.0	80.0	3	alcatel lucent	RRH2x60-700U	1 (E)	1-1/4	-
		3	alcatel lucent	RRH2x90-AWS			
		1	rfs	RC3DC-3315-PF-48 (OVP Box)			
		3	alcatel lucent	RRH2X60-PCS			
		6	commscope	NHH-65B-R2B w/ Mount Pipe			

(E) Coax mounted externally and exposed to the wind.

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
149.0	157.0	1	andrew	DB810KE-SY	-	-	1
	154.0	2	_au_ericsson	10' Dipole			
	149.0	3	tower mounts	12' T-Arms			
138.0	138.0	1	tower mounts	13' Platform Mount w/ Handrails	3 (I)	1-5/8	1
		3	alcatel lucent	1900 MHz RRH			
		3	alcatel lucent	800 MHz RRH			
		3	rfs celwave	APXVSPP18-C-A20 w/ Mount Pipe			
129.0	129.0	3	ericsson	RRUS 12 w/ A2	-	-	2
		3	ericsson	RRUS-12			
		1	raycap	DC6-48-60-18-8F w/ Mount Pipe	2 (E) 1 (E)	1-5/8 3/8	1
		1	tower mounts	Ring Mount			
		3	ericsson	RRUS-11			
125.0	127.0	3	cci antennas	HPA-65R-BUU-H6 w/ Mount Pipe	-	-	2
		6	powerwave	7770.00 w/ Mount Pipe	12 (E)	1-1/4	1
		12	powerwave	LGP214nn			
	125.0	1	tower mounts	Low Profile Platform Mount			
113.0	113.0	1	tower mounts	13' Platform Mount w/ Handrails	12 (E)	1-1/4	1
		6	miscl	10" x 8" x 3" TMAs			
		3	rfs celwave	APX16DWV-16DWV-S-E-ACU w/ Mount Pipe			
104.0	104.0	4	tower mounts	Standoff Mount	4 (I)	1-5/8	1
		2	andrew	ASPA685			
		1	andrew	DB222E			
		1	rfs celwave	PD 1142-2B			
78.0	80.0	1	tower mounts	Low Profile Platform Mount	12 (E) 1 (E)	1-5/8 1-1/4	1
		1	rfs	RC3DC-3315-PF-48 (OVP Box)			
		3	amphenol	BXA-70063-6CF w/ Mount Pipe			
		3	amphenol	BXA-171063-12CF w/ Mount Pipe			
		3	alcatel lucent	RRH2X40-AWS	-	-	3
		3	amphenol	BXA-171063-12CF-EDIN-X w/ Mount Pipe			
		3	amphenol	BXA-70063-6CF-EDIN-X w/ Mount Pipe			
40.0	40.0	1	tower mounts	Standoff Mount	1 (E)	1/2	1
		1	gps	GPS			

Notes:
1) Existing Equipment
2) Reserved Equipment
3) Equipment To Be Removed
(E) Coax mounted externally and exposed to the wind.
(I) Coax mounted internally and shielded to the wind.

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
STRUCTURAL ANALYSIS	CENTEK, 8/30/16	16071.42	On Air Engineering

3.1) Analysis Method

tnxTower (version 7.0.5.1), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A.

3.2) Assumptions

1) Tower and structures were built in accordance with the manufacturer's specifications.
2) The tower and structures have been maintained in accordance with the manufacturer's specification.
3) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2. All existing and reserved loading were obtained from the referenced structural analysis.
4) At the time of the analysis, tower drawings, foundation drawings, and the geotechnical report were unavailable. All information was based off of the structural analysis report listed in Table 3.

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

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	150 - 95.83	Pole	TP33.469x23.61x0.281	1	-13.14	1938.05	46.4	Pass
L2	95.83 - 47.83	Pole	TP41.644x31.9661x0.375	2	-26.32	3318.11	73.7	Pass
L3	47.83 - 30	Pole	TP44.139x39.7709x0.438	3	-34.62	4336.82	76.5	Pass
L4	30 - 0	Pole	TP49.6x44.139x0.58	4	-46.94	6748.13	63.8	Pass
							Summary	
						Pole (L3)	76.5	Pass
						Rating =	76.5	Pass

Table 5 - Tower Component Stresses vs. Capacity

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	87.9	Pass
1	Base Plate	0	56.3	Pass
1	Base Foundation Steel	0	54.4	Pass
1	Base Foundation Soil Interaction	0	62.4	Pass

Structure Rating (max from all components) =	87.9%

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

APPENDIX A

TNXTOWER OUTPUT

Tower Input Data

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

1) Tower is located in Fairfield County, Connecticut.
2) ASCE 7-10 Wind Data is used (wind speeds converted to nominal values).
3) Basic wind speed of 97 mph.
4) Structure Class II.
5) Exposure Category C.
6) Topographic Category 1.
7) Crest Height 0.0000 ft.
8) Nominal ice thickness of 0.7500 in.
9) Ice thickness is considered to increase with height.
10) Ice density of 56.00 pcf.
11) A wind speed of 50 mph is used in combination with ice.
12) Temperature drop of 50 °F.
13) Deflections calculated using a wind speed of 60 mph.
14) A non-linear (P-delta) analysis was used.
15) Pressures are calculated at each section.
16) Stress ratio used in pole design is 1.
17) Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

Consider Moments - Legs	Distribute Leg Loads As Uniform	Use ASCE 10 X-Brace Ly Rules
Consider Moments - Horizontals	Assume Legs Pinned	Calculate Redundant Bracing Forces
Consider Moments - Diagonals	√ Assume Rigid Index Plate	Ignore Redundant Members in FEA
Use Moment Magnification	√ Use Clear Spans For Wind Area	SR Leg Bolts Resist Compression
√ Use Code Stress Ratios	Use Clear Spans For KL/r	All Leg Panels Have Same Allowable
√ Use Code Safety Factors - Guys	Retension Guys To Initial Tension	Offset Girt At Foundation
Escalate Ice	√ Bypass Mast Stability Checks	√ Consider Feed Line Torque
Always Use Max Kz	√ Use Azimuth Dish Coefficients	Include Angle Block Shear Check
Use Special Wind Profile	√ Project Wind Area of Appurt.	Use TIA-222-G Bracing Resist. Exemption
Include Bolts In Member Capacity	Autocalc Torque Arm Areas	Use TIA-222-G Tension Splice Exemption
Leg Bolts Are At Top Of Section	Add IBC .6D+W Combination	Poles
Secondary Horizontal Braces Leg	Sort Capacity Reports By Component	√ Include Shear-Torsion Interaction
Use Diamond Inner Bracing (4 Sided)	Triangulate Diamond Inner Bracing	Always Use Sub-Critical Flow
SR Members Have Cut Ends	Treat Feed Line Bundles As Cylinder	Use Top Mounted Sockets
SR Members Are Concentric		

Tapered Pole Section Geometry

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	150.0000-95.8300	54.1700	5.17	12	23.6100	33.4690	0.2810	1.1240	A572-65 (65 ksi)
L2	95.8300-47.8300	53.1700	6.17	12	31.9661	41.6440	0.3750	1.5000	A572-65 (65 ksi)
L3	47.8300-30.0000	24.0000	0.00	12	39.7709	44.1390	0.4380	1.7520	A572-65 (65 ksi)
L4	30.0000-0.0000	30.0000		12	44.1390	49.6000	0.5800	2.3200	A572-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	24.4429	21.1085	1466.3462	8.3518	12.2300	119.8977	2971.2149	10.3890	5.5744	19.838
	34.6497	30.0292	4221.7391	11.8813	17.3369	243.5112	8554.3879	14.7794	8.2166	29.241
L2	34.0679	38.1462	4859.2074	11.3096	16.5584	293.4585	9846.0716	18.7744	7.5619	20.165
	43.1130	49.8323	10832.9048	14.7743	21.5716	502.1838	21950.4020	24.5260	10.1556	27.082
L3	42.3365	55.4736	10954.3159	14.0812	20.6013	531.7281	22196.4139	27.3024	9.4848	21.655
	45.6961	61.6341	15024.1551	15.6450	22.8640	657.1096	30443.0114	30.3345	10.6554	24.327
L4	45.6961	81.3508	19701.6917	15.5941	22.8640	861.6904	39920.9687	40.0384	10.2749	17.715
	51.3497	91.5498	28079.5237	17.5492	25.6928	1092.8946	56896.7277	45.0580	11.7384	20.239

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
L1 150.0000-95.8300				1	1	1			
L2 95.8300-47.8300				1	1	1			
L3 47.8300-30.0000				1	1	1			
L4 30.0000-0.0000				1	1	1			

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight klf
AVA6-50(1-1/4")	C	No	CaAa (Out Of Face)	125.0000 - 0.0000	11	No Ice	0.0000	0.00
						1/2" Ice	0.0000	0.00
						1" Ice	0.0000	0.00
AVA6-50(1-1/4")	C	No	CaAa (Out Of Face)	110.0000 - 0.0000	2	No Ice	0.1560	0.00
						1/2" Ice	0.2560	0.00
						1" Ice	0.3560	0.00
AVA6-50(1-1/4")	C	No	CaAa (Out Of Face)	110.0000 - 0.0000	10	No Ice	0.0000	0.00
						1/2" Ice	0.0000	0.00
						1" Ice	0.0000	0.00
AL7-50(1-5/8)	C	No	CaAa (Out Of Face)	77.0000 - 0.0000	2	No Ice	0.1960	0.00
						1/2" Ice	0.2960	0.00
						1" Ice	0.3960	0.00
AL7-50(1-5/8)	C	No	CaAa (Out Of Face)	77.0000 - 0.0000	10	No Ice	0.0000	0.00
						1/2" Ice	0.0000	0.00
						1" Ice	0.0000	0.00
AL7-50(1 5/8")	C	No	Inside Pole	104.0000 - 0.0000	4	No Ice	0.0000	0.00
						1/2" Ice	0.0000	0.00
						1" Ice	0.0000	0.00
FSJ4-50B(1/2")	C	No	CaAa (Out Of Face)	40.0000 - 30.0000	1	No Ice	0.0520	0.00
						1/2" Ice	0.1520	0.00
						1" Ice	0.2520	0.00
HS2RP-50 (3/8" air)	C	No	CaAa (Out Of Face)	129.0000 - 0.0000	1	No Ice	0.0000	0.00
						1/2" Ice	0.0000	0.00
						1" Ice	0.0000	0.00
AL7-50(1-5/8")	C	No	CaAa (Out Of Face)	129.0000 - 0.0000	2	No Ice	0.0000	0.00
						1/2" Ice	0.0000	0.00
						1" Ice	0.0000	0.00

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight klf
AL7-50(1-5/8")	C	No	Inside Pole	138.0000 - 0.0000	3	No Ice	0.0000	0.00
						1/2" Ice	0.0000	0.00
						1" Ice	0.0000	0.00
FXL-1480(1 1/4")	C	No	CaAa (Out Of Face)	77.0000 - 0.0000	2	No Ice	0.0000	0.00
						1/2" Ice	0.0000	0.00
						1" Ice	0.0000	0.00
***								
AVA6-50(1-1/4")	C	No	CaAa (Out Of Face)	125.0000 - 110.0000	1	No Ice	0.1560	0.00
						1/2" Ice	0.2560	0.00
						1" Ice	0.3560	0.00
AVA6-50(1-1/4")	C	No	CaAa (Out Of Face)	110.0000 - 0.0000	1	No Ice	0.0000	0.00
						1/2" Ice	0.0000	0.00
						1" Ice	0.0000	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	150.0000-	A	0.000	0.000	0.000	0.000	0.00
	95.8300	B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	6.761	0.35
L2	95.8300-47.8300	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	26.411	0.95
L3	47.8300-30.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	13.072	0.41
L4	30.0000-0.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	21.120	0.68

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	150.0000-	A	1.709	0.000	0.000	0.000	0.000	0.00
	95.8300	B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	21.575	4.72
L2	95.8300-47.8300	A	1.620	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	79.166	13.28
L3	47.8300-30.0000	A	1.524	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	39.423	5.42
L4	30.0000-0.0000	A	1.384	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	54.325	7.38

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	150.0000-95.8300	-0.1633	0.0943	-0.4285	0.2474
L2	95.8300-47.8300	-0.6013	0.3471	-1.3158	0.7597
L3	47.8300-30.0000	-0.7672	0.4430	-1.6576	0.9570
L4	30.0000-0.0000	-0.7524	0.4344	-1.5099	0.8717

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
10' Dipole	A	From Leg	4.0000 0.00 5.00	0.0000	149.0000	No Ice 1/2" Ice 1" Ice	5.4000 7.4000 9.4000	5.4000 7.4000 9.4000	0.04 0.14 0.24
10' Dipole	C	From Leg	4.0000 0.00 5.00	0.0000	149.0000	No Ice 1/2" Ice 1" Ice	5.4000 7.4000 9.4000	5.4000 7.4000 9.4000	0.04 0.14 0.24
DB810KE-SY	B	From Leg	4.0000 0.00 8.00	0.0000	149.0000	No Ice 1/2" Ice 1" Ice	5.0375 6.7500 8.4792	5.0375 6.7500 8.4792	0.04 0.07 0.12
(4) 5' x 2' Pipe Mount	A	From Leg	4.0000 0.00 0.00	0.0000	149.0000	No Ice 1/2" Ice 1" Ice	1.0000 1.3932 1.7031	1.0000 1.3932 1.7031	0.03 0.04 0.05
(4) 5' x 2' Pipe Mount	B	From Leg	4.0000 0.00 0.00	0.0000	149.0000	No Ice 1/2" Ice 1" Ice	1.0000 1.3932 1.7031	1.0000 1.3932 1.7031	0.03 0.04 0.05
(4) 5' x 2' Pipe Mount	C	From Leg	4.0000 0.00 0.00	0.0000	149.0000	No Ice 1/2" Ice 1" Ice	1.0000 1.3932 1.7031	1.0000 1.3932 1.7031	0.03 0.04 0.05
Valmont T-Arms	C	None		0.0000	149.0000	No Ice 1/2" Ice 1" Ice	11.5900 15.4400 19.2900	11.5900 15.4400 19.2900	0.77 0.99 1.21
***									
APXVSPP18-C-A20 w/ Mount Pipe	A	From Leg	4.0000 0.00 0.00	0.0000	138.0000	No Ice 1/2" Ice 1" Ice	8.2619 8.8215 9.3462	6.9458 8.1266 9.0212	0.08 0.15 0.23
APXVSPP18-C-A20 w/ Mount Pipe	B	From Leg	4.0000 0.00 0.00	0.0000	138.0000	No Ice 1/2" Ice 1" Ice	8.2619 8.8215 9.3462	6.9458 8.1266 9.0212	0.08 0.15 0.23
APXVSPP18-C-A20 w/ Mount Pipe	C	From Leg	4.0000 0.00 0.00	0.0000	138.0000	No Ice 1/2" Ice 1" Ice	8.2619 8.8215 9.3462	6.9458 8.1266 9.0212	0.08 0.15 0.23
FD RRH 4x45 1900	A	From Leg	4.0000 0.00 0.00	0.0000	138.0000	No Ice 1/2" Ice 1" Ice	2.3199 2.5246 2.7367	2.2384 2.4409 2.6509	0.06 0.08 0.11
FD RRH 4x45 1900	B	From Leg	4.0000 0.00 0.00	0.0000	138.0000	No Ice 1/2" Ice 1" Ice	2.3199 2.5246 2.7367	2.2384 2.4409 2.6509	0.06 0.08 0.11

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
FD RRH 4x45 1900	C	From Leg	4.0000 0.00 0.00	0.0000	138.0000	No Ice 1/2" Ice 1" Ice	2.3199 2.5246 2.7367	2.2384 2.4409 2.6509	0.06 0.08 0.11
FD-RRH-2x50-800	A	From Leg	4.0000 0.00 0.00	0.0000	138.0000	No Ice 1/2" Ice 1" Ice	1.3617 1.5187 1.6831	3.0083 3.2231 3.4454	0.05 0.08 0.10
FD-RRH-2x50-800	B	From Leg	4.0000 0.00 0.00	0.0000	138.0000	No Ice 1/2" Ice 1" Ice	1.3617 1.5187 1.6831	3.0083 3.2231 3.4454	0.05 0.08 0.10
FD-RRH-2x50-800	C	From Leg	4.0000 0.00 0.00	0.0000	138.0000	No Ice 1/2" Ice 1" Ice	1.3617 1.5187 1.6831	3.0083 3.2231 3.4454	0.05 0.08 0.10
12.5' Platform Mount	C	None		0.0000	138.0000	No Ice 1/2" Ice 1" Ice	32.0300 38.7100 45.3900	32.0300 38.7100 45.3900	1.34 1.80 2.26
***									
RRUS-11	A	From Leg	4.0000 0.00 0.00	0.0000	129.0000	No Ice 1/2" Ice 1" Ice	2.7908 2.9984 3.2134	1.1923 1.3395 1.4957	0.05 0.07 0.09
RRUS-11	B	From Leg	4.0000 0.00 0.00	0.0000	129.0000	No Ice 1/2" Ice 1" Ice	2.7908 2.9984 3.2134	1.1923 1.3395 1.4957	0.05 0.07 0.09
RRUS-11	C	From Leg	4.0000 0.00 0.00	0.0000	129.0000	No Ice 1/2" Ice 1" Ice	2.7908 2.9984 3.2134	1.1923 1.3395 1.4957	0.05 0.07 0.09
RRUS-12	A	From Leg	4.0000 0.00 0.00	0.0000	129.0000	No Ice 1/2" Ice 1" Ice	3.1450 3.3648 3.5920	1.2854 1.4379 1.5998	0.05 0.07 0.10
RRUS-12	B	From Leg	4.0000 0.00 0.00	0.0000	129.0000	No Ice 1/2" Ice 1" Ice	3.1450 3.3648 3.5920	1.2854 1.4379 1.5998	0.05 0.07 0.10
RRUS-12	C	From Leg	4.0000 0.00 0.00	0.0000	129.0000	No Ice 1/2" Ice 1" Ice	3.1450 3.3648 3.5920	1.2854 1.4379 1.5998	0.05 0.07 0.10
RRUS 12 w/ A2	A	From Leg	4.0000 0.00 0.00	0.0000	129.0000	No Ice 1/2" Ice 1" Ice	3.1620 3.3824 3.6101	1.8360 2.0130 2.1975	0.08 0.11 0.14
RRUS 12 w/ A2	B	From Leg	4.0000 0.00 0.00	0.0000	129.0000	No Ice 1/2" Ice 1" Ice	3.1620 3.3824 3.6101	1.8360 2.0130 2.1975	0.08 0.11 0.14
RRUS 12 w/ A2	C	From Leg	4.0000 0.00 0.00	0.0000	129.0000	No Ice 1/2" Ice 1" Ice	3.1620 3.3824 3.6101	1.8360 2.0130 2.1975	0.08 0.11 0.14
DC6-48-60-18-8F w/ Mount Pipe	C	From Leg	4.0000 0.00 0.00	0.0000	129.0000	No Ice 1/2" Ice 1" Ice	2.6915 4.0025 4.8512	2.6915 4.0025 4.8512	0.05 0.09 0.13
Valmont Uni-Tri Brackets	C	None		0.0000	129.0000	No Ice 1/2" Ice 1" Ice	7.5000 8.9000 10.3000	7.5000 8.9000 10.3000	0.25 0.33 0.41

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) 7770.00 w/ Mount Pipe	A	From Leg	4.0000 0.00 2.00	0.0000	125.0000	No Ice 1/2" Ice 1" Ice	5.7460 6.1791 6.6067	4.2543 5.0137 5.7109	0.06 0.10 0.16
(2) 7770.00 w/ Mount Pipe	B	From Leg	4.0000 0.00 2.00	0.0000	125.0000	No Ice 1/2" Ice 1" Ice	5.7460 6.1791 6.6067	4.2543 5.0137 5.7109	0.06 0.10 0.16
(2) 7770.00 w/ Mount Pipe	C	From Leg	4.0000 0.00 2.00	0.0000	125.0000	No Ice 1/2" Ice 1" Ice	5.7460 6.1791 6.6067	4.2543 5.0137 5.7109	0.06 0.10 0.16
HPA-65R-BUU-H6 w/ Mount Pipe	A	From Leg	4.0000 0.00 2.00	0.0000	125.0000	No Ice 1/2" Ice 1" Ice	9.8953 10.4700 11.0098	8.1125 9.3041 10.2095	0.08 0.16 0.25
HPA-65R-BUU-H6 w/ Mount Pipe	B	From Leg	4.0000 0.00 2.00	0.0000	125.0000	No Ice 1/2" Ice 1" Ice	9.8953 10.4700 11.0098	8.1125 9.3041 10.2095	0.08 0.16 0.25
HPA-65R-BUU-H6 w/ Mount Pipe	C	From Leg	4.0000 0.00 2.00	0.0000	125.0000	No Ice 1/2" Ice 1" Ice	9.8953 10.4700 11.0098	8.1125 9.3041 10.2095	0.08 0.16 0.25
(4) LGP214nn	A	From Leg	4.0000 0.00 2.00	0.0000	125.0000	No Ice 1/2" Ice 1" Ice	1.0500 1.1815 1.3204	0.2292 0.2969 0.3731	0.01 0.02 0.03
(4) LGP214nn	B	From Leg	4.0000 0.00 2.00	0.0000	125.0000	No Ice 1/2" Ice 1" Ice	1.0500 1.1815 1.3204	0.2292 0.2969 0.3731	0.01 0.02 0.03
(4) LGP214nn	C	From Leg	4.0000 0.00 2.00	0.0000	125.0000	No Ice 1/2" Ice 1" Ice	1.0500 1.1815 1.3204	0.2292 0.2969 0.3731	0.01 0.02 0.03
12.5' Low Profile Platform Mount	C	None		0.0000	125.0000	No Ice 1/2" Ice 1" Ice	14.6600 18.8700 23.0800	14.6600 18.8700 23.0800	1.25 1.48 1.71
***									
APX16DWV-16DWV-S-E-ACU w/ Mount Pipe	A	From Leg	4.0000 0.00 0.00	0.0000	113.0000	No Ice 1/2" Ice 1" Ice	6.3145 6.7432 7.1701	3.2893 3.9953 4.6615	0.06 0.11 0.16
APX16DWV-16DWV-S-E-ACU w/ Mount Pipe	B	From Leg	4.0000 0.00 0.00	0.0000	113.0000	No Ice 1/2" Ice 1" Ice	6.3145 6.7432 7.1701	3.2893 3.9953 4.6615	0.06 0.11 0.16
APX16DWV-16DWV-S-E-ACU w/ Mount Pipe	C	From Leg	4.0000 0.00 0.00	0.0000	113.0000	No Ice 1/2" Ice 1" Ice	6.3145 6.7432 7.1701	3.2893 3.9953 4.6615	0.06 0.11 0.16
(2) 10" x 8" x 3" TMAs	A	From Leg	4.0000 0.00 0.00	0.0000	113.0000	No Ice 1/2" Ice 1" Ice	0.6667 0.7704 0.8815	0.2577 0.3309 0.4110	0.01 0.02 0.02
(2) 10" x 8" x 3" TMAs	B	From Leg	4.0000 0.00 0.00	0.0000	113.0000	No Ice 1/2" Ice 1" Ice	0.6667 0.7704 0.8815	0.2577 0.3309 0.4110	0.01 0.02 0.02
(2) 10" x 8" x 3" TMAs	C	From Leg	4.0000 0.00 0.00	0.0000	113.0000	No Ice 1/2" Ice	0.6667 0.7704 0.8815	0.2577 0.3309 0.4110	0.01 0.02 0.02

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						1" Ice			
12.5' Platform Mount	C	None		0.0000	113.0000	No Ice	32.0300	32.0300	1.34
						1/2" Ice	38.7100	38.7100	1.80
						1" Ice	45.3900	45.3900	2.26
***									
4.5' Standoff Mount	A	From Leg	2.0000 0.00 0.00	0.0000	104.0000	No Ice	1.6700	3.2700	0.06
						1/2" Ice	2.5100	4.9900	0.09
						1" Ice	3.3500	6.7100	0.12
4.5' Standoff Mount	B	From Leg	2.0000 0.00 0.00	0.0000	104.0000	No Ice	1.6700	3.2700	0.06
						1/2" Ice	2.5100	4.9900	0.09
						1" Ice	3.3500	6.7100	0.12
4.5' Standoff Mount	C	From Leg	2.0000 0.00 0.00	0.0000	104.0000	No Ice	1.6700	3.2700	0.06
						1/2" Ice	2.5100	4.9900	0.09
						1" Ice	3.3500	6.7100	0.12
4.5' Standoff Mount	A	From Leg	2.0000 0.00 0.00	0.0000	104.0000	No Ice	1.6700	3.2700	0.06
						1/2" Ice	2.5100	4.9900	0.09
						1" Ice	3.3500	6.7100	0.12
1142-2B	A	From Leg	4.0000 0.00 0.00	0.0000	104.0000	No Ice	1.1200	1.1200	0.01
						1/2" Ice	2.5350	2.5350	0.02
						1" Ice	3.9667	3.9667	0.04
DB222E	B	From Leg	4.0000 0.00 0.00	0.0000	104.0000	No Ice	8.8194	3.0868	0.02
						1/2" Ice	9.6341	4.2851	0.05
						1" Ice	10.3974	5.4958	0.09
1142-2B	C	From Leg	4.0000 0.00 0.00	0.0000	104.0000	No Ice	1.1200	1.1200	0.01
						1/2" Ice	2.5350	2.5350	0.02
						1" Ice	3.9667	3.9667	0.04
(2) ASPA685	A	From Leg	4.0000 0.00 0.00	0.0000	104.0000	No Ice	7.3500	7.3500	0.02
						1/2" Ice	9.4875	9.4875	0.07
						1" Ice	11.6417	11.6417	0.14
***									
(2) NHH-65B-R2B w/ Mount Pipe	A	From Leg	4.0000 0.00 2.00	0.0000	78.0000	No Ice	8.3164	7.0042	0.07
						1/2" Ice	8.8765	8.1855	0.14
						1" Ice	9.4016	9.0806	0.21
(2) NHH-65B-R2B w/ Mount Pipe	B	From Leg	4.0000 0.00 2.00	0.0000	78.0000	No Ice	8.3164	7.0042	0.07
						1/2" Ice	8.8765	8.1855	0.14
						1" Ice	9.4016	9.0806	0.21
(2) NHH-65B-R2B w/ Mount Pipe	C	From Leg	4.0000 0.00 2.00	0.0000	78.0000	No Ice	8.3164	7.0042	0.07
						1/2" Ice	8.8765	8.1855	0.14
						1" Ice	9.4016	9.0806	0.21
700 U 2x60 W/SOLAR SHIELD	A	From Leg	4.0000 0.00 2.00	0.0000	78.0000	No Ice	2.1500	1.6125	0.06
						1/2" Ice	2.3398	1.7856	0.08
						1" Ice	2.5370	1.9662	0.10
700 U 2x60 W/SOLAR SHIELD	B	From Leg	4.0000 0.00 2.00	0.0000	78.0000	No Ice	2.1500	1.6125	0.06
						1/2" Ice	2.3398	1.7856	0.08
						1" Ice	2.5370	1.9662	0.10
700 U 2x60 W/SOLAR SHIELD	C	From Leg	4.0000 0.00 2.00	0.0000	78.0000	No Ice	2.1500	1.6125	0.06
						1/2" Ice	2.3398	1.7856	0.08
						1" Ice	2.5370	1.9662	0.10
BXA-70063-6CF-EDIN-X w/ Mount Pipe	A	From Leg	4.0000 0.00	0.0000	78.0000	No Ice	7.8065	5.8008	0.04
						1/2"	8.3569	6.9529	0.10

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
			2.00			Ice	8.8720	7.8191	0.17
						1" Ice			
BXA-70063-6CF-EDIN-X w/ Mount Pipe	B	From Leg	4.0000	0.0000	78.0000	No Ice	7.8065	5.8008	0.04
			0.00			1/2"	8.3569	6.9529	0.10
			2.00			Ice	8.8720	7.8191	0.17
						1" Ice			
BXA-70063-6CF-EDIN-X w/ Mount Pipe	C	From Leg	4.0000	0.0000	78.0000	No Ice	7.8065	5.8008	0.04
			0.00			1/2"	8.3569	6.9529	0.10
			2.00			Ice	8.8720	7.8191	0.17
						1" Ice			
BXA-171063-12CF-EDIN-X w/ Mount Pipe	A	From Leg	4.0000	0.0000	78.0000	No Ice	5.0353	5.2954	0.04
			0.00			1/2"	5.5890	6.4667	0.08
			2.00			Ice	6.1094	7.3557	0.14
						1" Ice			
BXA-171063-12CF-EDIN-X w/ Mount Pipe	B	From Leg	4.0000	0.0000	78.0000	No Ice	5.0353	5.2954	0.04
			0.00			1/2"	5.5890	6.4667	0.08
			2.00			Ice	6.1094	7.3557	0.14
						1" Ice			
BXA-171063-12CF-EDIN-X w/ Mount Pipe	C	From Leg	4.0000	0.0000	78.0000	No Ice	5.0353	5.2954	0.04
			0.00			1/2"	5.5890	6.4667	0.08
			2.00			Ice	6.1094	7.3557	0.14
						1" Ice			
RRH2X60-PCS	A	From Leg	4.0000	0.0000	78.0000	No Ice	2.2000	1.7233	0.06
			0.00			1/2"	2.3926	1.9015	0.08
			2.00			Ice	2.5926	2.0870	0.10
						1" Ice			
RRH2X60-PCS	B	From Leg	4.0000	0.0000	78.0000	No Ice	2.2000	1.7233	0.06
			0.00			1/2"	2.3926	1.9015	0.08
			2.00			Ice	2.5926	2.0870	0.10
						1" Ice			
RRH2X60-PCS	C	From Leg	4.0000	0.0000	78.0000	No Ice	2.2000	1.7233	0.06
			0.00			1/2"	2.3926	1.9015	0.08
			2.00			Ice	2.5926	2.0870	0.10
						1" Ice			
RRH AWS	A	From Leg	4.0000	0.0000	78.0000	No Ice	2.5000	1.8943	0.04
			0.00			1/2"	2.7093	2.0795	0.07
			2.00			Ice	2.9259	2.2717	0.09
						1" Ice			
RRH AWS	B	From Leg	4.0000	0.0000	78.0000	No Ice	2.5000	1.8943	0.04
			0.00			1/2"	2.7093	2.0795	0.07
			2.00			Ice	2.9259	2.2717	0.09
						1" Ice			
RRH AWS	C	From Leg	4.0000	0.0000	78.0000	No Ice	2.5000	1.8943	0.04
			0.00			1/2"	2.7093	2.0795	0.07
			2.00			Ice	2.9259	2.2717	0.09
						1" Ice			
RC3DC-3315-PF-48	A	From Leg	4.0000	0.0000	78.0000	No Ice	3.7922	2.5116	0.03
			0.00			1/2"	4.0441	2.7247	0.06
			2.00			Ice	4.3033	2.9449	0.10
						1" Ice			
RC3DC-3315-PF-48	C	From Leg	4.0000	0.0000	78.0000	No Ice	3.7922	2.5116	0.03
			0.00			1/2"	4.0441	2.7247	0.06
			2.00			Ice	4.3033	2.9449	0.10
						1" Ice			
12.5' Platform Mount	C	None		0.0000	78.0000	No Ice	32.0300	32.0300	1.34
						1/2"	38.7100	38.7100	1.80
						Ice	45.3900	45.3900	2.26
						1" Ice			
***									
4.5' Standoff Mount	A	From Leg	2.0000	0.0000	40.0000	No Ice	1.6700	3.2700	0.06
			0.00			1/2"	2.5100	4.9900	0.09
			0.00			Ice	3.3500	6.7100	0.12
						1" Ice			
GPS	A	From Leg	4.0000	0.0000	40.0000	No Ice	0.0000	0.0000	0.00
			0.00			1/2"	0.0000	0.0000	0.00

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00			Ice 1" Ice	0.0000	0.0000	0.00

Tower Pressures - No Ice

$G_H = 1.100$

Section Elevation ft	z ft	K_Z	q_z ksf	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg %	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
L1 150.0000-95.8300	121.6686	1.319	0.030	133.377	A	0.000	133.377	133.377	100.00	0.000	0.000
					B	0.000	133.377		100.00	0.000	0.000
					C	0.000	133.377		100.00	0.000	6.761
L2 95.8300-47.8300	71.3182	1.179	0.027	154.362	A	0.000	154.362	154.362	100.00	0.000	0.000
					B	0.000	154.362		100.00	0.000	0.000
					C	0.000	154.362		100.00	0.000	26.411
L3 47.8300-30.0000	38.8016	1.037	0.024	65.401	A	0.000	65.401	65.401	100.00	0.000	0.000
					B	0.000	65.401		100.00	0.000	0.000
					C	0.000	65.401		100.00	0.000	13.072
L4 30.0000-0.0000	14.7087	0.85	0.019	121.307	A	0.000	121.307	121.307	100.00	0.000	0.000
					B	0.000	121.307		100.00	0.000	0.000
					C	0.000	121.307		100.00	0.000	21.120

Tower Pressure - With Ice

$G_H = 1.100$

Section Elevation ft	z ft	K_Z	q_z ksf	t_Z in	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg %	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
L1 150.0000-95.8300	121.6686	1.319	0.008	1.7091	148.807	A	0.000	148.807	148.807	100.00	0.000	0.000
						B	0.000	148.807		100.00	0.000	0.000
						C	0.000	148.807		100.00	0.000	21.575
L2 95.8300-47.8300	71.3182	1.179	0.007	1.6202	168.034	A	0.000	168.034	168.034	100.00	0.000	0.000
						B	0.000	168.034		100.00	0.000	0.000
						C	0.000	168.034		100.00	0.000	79.166
L3 47.8300-30.0000	38.8016	1.037	0.006	1.5245	70.215	A	0.000	70.215	70.215	100.00	0.000	0.000
						B	0.000	70.215		100.00	0.000	0.000
						C	0.000	70.215		100.00	0.000	39.423
L4 30.0000-0.0000	14.7087	0.85	0.005	1.3836	128.225	A	0.000	128.225	128.225	100.00	0.000	0.000
						B	0.000	128.225		100.00	0.000	0.000
						C	0.000	128.225		100.00	0.000	54.325

Tower Pressure - Service

$G_H = 1.100$

Section Elevation ft	z ft	K_Z	q_z ksf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1 150.0000-95.8300	121.6686	1.319	0.010	133.377	A	0.000	133.377	133.377	100.00	0.000	0.000
					B	0.000	133.377		100.00	0.000	0.000
					C	0.000	133.377		100.00	0.000	6.761
L2 95.8300-47.8300	71.3182	1.179	0.009	154.362	A	0.000	154.362	154.362	100.00	0.000	0.000
					B	0.000	154.362		100.00	0.000	0.000
					C	0.000	154.362		100.00	0.000	26.411
L3 47.8300-30.0000	38.8016	1.037	0.008	65.401	A	0.000	65.401	65.401	100.00	0.000	0.000
					B	0.000	65.401		100.00	0.000	0.000
					C	0.000	65.401		100.00	0.000	13.072
L4 30.0000-0.0000	14.7087	0.85	0.007	121.307	A	0.000	121.307	121.307	100.00	0.000	0.000
					B	0.000	121.307		100.00	0.000	0.000
					C	0.000	121.307		100.00	0.000	21.120

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.6 Wind 0 deg - No Ice
3	0.9 Dead+1.6 Wind 0 deg - No Ice
4	1.2 Dead+1.6 Wind 30 deg - No Ice
5	0.9 Dead+1.6 Wind 30 deg - No Ice
6	1.2 Dead+1.6 Wind 60 deg - No Ice
7	0.9 Dead+1.6 Wind 60 deg - No Ice
8	1.2 Dead+1.6 Wind 90 deg - No Ice
9	0.9 Dead+1.6 Wind 90 deg - No Ice
10	1.2 Dead+1.6 Wind 120 deg - No Ice
11	0.9 Dead+1.6 Wind 120 deg - No Ice
12	1.2 Dead+1.6 Wind 150 deg - No Ice
13	0.9 Dead+1.6 Wind 150 deg - No Ice
14	1.2 Dead+1.6 Wind 180 deg - No Ice
15	0.9 Dead+1.6 Wind 180 deg - No Ice
16	1.2 Dead+1.6 Wind 210 deg - No Ice
17	0.9 Dead+1.6 Wind 210 deg - No Ice
18	1.2 Dead+1.6 Wind 240 deg - No Ice
19	0.9 Dead+1.6 Wind 240 deg - No Ice
20	1.2 Dead+1.6 Wind 270 deg - No Ice
21	0.9 Dead+1.6 Wind 270 deg - No Ice
22	1.2 Dead+1.6 Wind 300 deg - No Ice
23	0.9 Dead+1.6 Wind 300 deg - No Ice
24	1.2 Dead+1.6 Wind 330 deg - No Ice
25	0.9 Dead+1.6 Wind 330 deg - No Ice
26	1.2 Dead+1.0 Ice+1.0 Temp
27	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
28	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
29	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
30	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
31	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
32	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
33	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
34	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
39	Dead+Wind 0 deg - Service
40	Dead+Wind 30 deg - Service
41	Dead+Wind 60 deg - Service
42	Dead+Wind 90 deg - Service
43	Dead+Wind 120 deg - Service
44	Dead+Wind 150 deg - Service
45	Dead+Wind 180 deg - Service
46	Dead+Wind 210 deg - Service
47	Dead+Wind 240 deg - Service
48	Dead+Wind 270 deg - Service

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

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	150 - 95.83	Pole	Max Tension	8	0.00	0.00	-0.00
			Max. Compression	26	-35.20	7.11	-0.08
			Max. Mx	20	-13.14	580.31	0.31
			Max. My	2	-13.17	0.98	579.10
			Max. Vy	20	-22.06	580.31	0.31
			Max. Vx	14	21.86	0.23	-578.91
			Max. Torque	20			-3.11
L2	95.83 - 47.83	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-68.68	25.93	-9.73
			Max. Mx	20	-26.32	1972.77	4.23
			Max. My	14	-26.33	-2.77	-1961.55
			Max. Vy	20	-36.79	1972.77	4.23
			Max. Vx	14	36.61	-2.77	-1961.55
			Max. Torque	17			-3.45
L3	47.83 - 30	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-85.57	37.32	-15.57
			Max. Mx	20	-34.62	2915.16	6.02
			Max. My	14	-34.63	-3.95	-2898.35
			Max. Vy	20	-41.67	2915.16	6.02
			Max. Vx	14	41.42	-3.95	-2898.35
			Max. Torque	17			-4.32
L4	30 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-106.18	50.10	-22.91
			Max. Mx	20	-46.94	4235.28	7.79
			Max. My	14	-46.94	-5.24	-4210.63
			Max. Vy	20	-46.33	4235.28	7.79
			Max. Vx	14	46.08	-5.24	-4210.63
			Max. Torque	17			-5.02

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	26	106.18	-0.00	0.00
	Max. H_x	20	46.97	46.30	0.08
	Max. H_z	3	35.23	0.08	46.06
	Max. M_x	2	4207.90	0.08	46.06
	Max. M_z	8	4227.16	-46.30	-0.08
	Max. Torsion	5	5.02	-23.08	39.85
	Min. Vert	21	35.23	46.30	0.08
	Min. H_x	9	35.23	-46.30	-0.08
	Min. H_z	14	46.97	-0.08	-46.06
	Min. M_x	14	-4210.63	-0.08	-46.06
	Min. M_z	20	-4235.28	46.30	0.08
	Min. Torsion	17	-5.02	23.08	-39.85

Tower Mast Reaction Summary

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
Dead Only	39.14	-0.00	0.00	1.11	3.19	0.00
1.2 Dead+1.6 Wind 0 deg - No Ice	46.97	-0.08	-46.06	-4207.90	13.11	-4.84
0.9 Dead+1.6 Wind 0 deg - No Ice	35.23	-0.08	-46.06	-4174.01	12.02	-4.84
1.2 Dead+1.6 Wind 30 deg - No Ice	46.97	23.08	-39.85	-3639.47	-2103.89	-5.02
0.9 Dead+1.6 Wind 30 deg - No Ice	35.23	23.08	-39.85	-3610.17	-2087.74	-5.02
1.2 Dead+1.6 Wind 60 deg - No Ice	46.97	40.06	-22.96	-2095.35	-3656.06	-3.85
0.9 Dead+1.6 Wind 60 deg - No Ice	35.23	40.06	-22.96	-2078.63	-3627.28	-3.85
1.2 Dead+1.6 Wind 90 deg - No Ice	46.97	46.30	0.08	10.56	-4227.16	-1.66
0.9 Dead+1.6 Wind 90 deg - No Ice	35.23	46.30	0.08	10.13	-4193.84	-1.66
1.2 Dead+1.6 Wind 120 deg - No Ice	46.97	40.14	23.10	2113.98	-3665.18	0.98
0.9 Dead+1.6 Wind 120 deg - No Ice	35.23	40.14	23.10	2096.42	-3636.33	0.98
1.2 Dead+1.6 Wind 150 deg - No Ice	46.97	23.22	39.93	3651.35	-2119.74	3.36
0.9 Dead+1.6 Wind 150 deg - No Ice	35.23	23.22	39.93	3621.28	-2103.46	3.36
1.2 Dead+1.6 Wind 180 deg - No Ice	46.97	0.08	46.06	4210.63	-5.24	4.84
0.9 Dead+1.6 Wind 180 deg - No Ice	35.23	0.08	46.06	4175.88	-6.17	4.84
1.2 Dead+1.6 Wind 210 deg - No Ice	46.97	-23.08	39.85	3642.22	2111.73	5.02
0.9 Dead+1.6 Wind 210 deg - No Ice	35.23	-23.08	39.85	3612.22	2093.57	5.02
1.2 Dead+1.6 Wind 240 deg - No Ice	46.97	-40.06	22.96	2098.12	3663.91	3.86
0.9 Dead+1.6 Wind 240 deg - No Ice	35.23	-40.06	22.96	2080.69	3633.12	3.86
1.2 Dead+1.6 Wind 270 deg - No Ice	46.97	-46.30	-0.08	-7.79	4235.28	1.66
0.9 Dead+1.6 Wind 270 deg - No Ice	35.23	-46.30	-0.08	-8.07	4199.70	1.66
1.2 Dead+1.6 Wind 300 deg - No Ice	46.97	-40.14	-23.10	-2111.22	3673.07	-0.98
0.9 Dead+1.6 Wind 300 deg - No Ice	35.23	-40.14	-23.10	-2094.37	3642.19	-0.98
1.2 Dead+1.6 Wind 330 deg - No Ice	46.97	-23.22	-39.93	-3648.61	2127.62	-3.37
0.9 Dead+1.6 Wind 330 deg - No Ice	35.23	-23.22	-39.93	-3619.24	2109.32	-3.36
1.2 Dead+1.0 Ice+1.0 Temp	106.18	0.00	-0.00	22.91	50.10	-0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	106.18	-0.01	-12.15	-1202.91	51.64	-2.36
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	106.18	6.10	-10.51	-1037.99	-565.09	-2.34
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	106.18	10.59	-6.06	-588.78	-1016.93	-1.69
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	106.18	12.23	0.01	24.35	-1182.81	-0.59
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	106.18	10.60	6.08	637.12	-1018.28	0.67
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	106.18	6.12	10.53	1085.32	-567.44	1.75
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	106.18	0.01	12.15	1248.87	48.91	2.36
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	106.18	-6.10	10.51	1083.95	665.62	2.34
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	106.18	-10.58	6.06	634.75	1117.46	1.69
1.2 Dead+1.0 Wind 270	106.18	-12.23	-0.01	21.63	1283.34	0.59

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
deg+1.0 Ice+1.0 Temp						
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	106.18	-10.60	-6.08	-591.13	1118.83	-0.67
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	106.18	-6.12	-10.53	-1039.35	667.99	-1.75
Dead+Wind 0 deg - Service	39.14	-0.02	-9.85	-895.64	5.23	-0.15
Dead+Wind 30 deg - Service	39.14	4.94	-8.53	-774.52	-445.78	-0.56
Dead+Wind 60 deg - Service	39.14	8.57	-4.91	-445.56	-776.46	-0.83
Dead+Wind 90 deg - Service	39.14	9.91	0.02	3.09	-898.22	-0.88
Dead+Wind 120 deg - Service	39.14	8.59	4.94	451.22	-778.42	-0.69
Dead+Wind 150 deg - Service	39.14	4.97	8.54	778.74	-449.16	-0.31
Dead+Wind 180 deg - Service	39.14	0.02	9.85	897.91	1.32	0.15
Dead+Wind 210 deg - Service	39.14	-4.94	8.53	776.79	452.33	0.56
Dead+Wind 240 deg - Service	39.14	-8.57	4.91	447.83	783.01	0.83
Dead+Wind 270 deg - Service	39.14	-9.91	-0.02	-0.82	904.77	0.88
Dead+Wind 300 deg - Service	39.14	-8.59	-4.94	-448.94	784.97	0.69
Dead+Wind 330 deg - Service	39.14	-4.97	-8.54	-776.47	455.71	0.31

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	-39.14	0.00	0.00	39.14	-0.00	0.000%
2	-0.08	-46.97	-46.06	0.08	46.97	46.06	0.001%
3	-0.08	-35.23	-46.06	0.08	35.23	46.06	0.001%
4	23.08	-46.97	-39.85	-23.08	46.97	39.85	0.000%
5	23.08	-35.23	-39.85	-23.08	35.23	39.85	0.000%
6	40.06	-46.97	-22.96	-40.06	46.97	22.96	0.000%
7	40.06	-35.23	-22.96	-40.06	35.23	22.96	0.000%
8	46.30	-46.97	0.08	-46.30	46.97	-0.08	0.004%
9	46.30	-35.23	0.08	-46.30	35.23	-0.08	0.003%
10	40.14	-46.97	23.10	-40.14	46.97	-23.10	0.000%
11	40.14	-35.23	23.10	-40.14	35.23	-23.10	0.000%
12	23.22	-46.97	39.93	-23.22	46.97	-39.93	0.000%
13	23.22	-35.23	39.93	-23.22	35.23	-39.93	0.000%
14	0.08	-46.97	46.06	-0.08	46.97	-46.06	0.001%
15	0.08	-35.23	46.06	-0.08	35.23	-46.06	0.003%
16	-23.08	-46.97	39.85	23.08	46.97	-39.85	0.000%
17	-23.08	-35.23	39.85	23.08	35.23	-39.85	0.000%
18	-40.06	-46.97	22.96	40.06	46.97	-22.96	0.000%
19	-40.06	-35.23	22.96	40.06	35.23	-22.96	0.000%
20	-46.30	-46.97	-0.08	46.30	46.97	0.08	0.001%
21	-46.30	-35.23	-0.08	46.30	35.23	0.08	0.003%
22	-40.14	-46.97	-23.10	40.14	46.97	23.10	0.000%
23	-40.14	-35.23	-23.10	40.14	35.23	23.10	0.000%
24	-23.22	-46.97	-39.93	23.22	46.97	39.93	0.000%
25	-23.22	-35.23	-39.93	23.22	35.23	39.93	0.000%
26	0.00	-106.18	0.00	-0.00	106.18	0.00	0.001%
27	-0.01	-106.18	-12.15	0.01	106.18	12.15	0.000%
28	6.11	-106.18	-10.51	-6.10	106.18	10.51	0.000%
29	10.59	-106.18	-6.06	-10.59	106.18	6.06	0.000%
30	12.23	-106.18	0.01	-12.23	106.18	-0.01	0.000%
31	10.60	-106.18	6.08	-10.60	106.18	-6.08	0.000%
32	6.12	-106.18	10.53	-6.12	106.18	-10.53	0.000%
33	0.01	-106.18	12.15	-0.01	106.18	-12.15	0.000%
34	-6.11	-106.18	10.51	6.10	106.18	-10.51	0.000%
35	-10.59	-106.18	6.06	10.58	106.18	-6.06	0.000%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
36	-12.23	-106.18	-0.01	12.23	106.18	0.01	0.000%
37	-10.60	-106.18	-6.08	10.60	106.18	6.08	0.000%
38	-6.12	-106.18	-10.53	6.12	106.18	10.53	0.000%
39	-0.02	-39.14	-9.85	0.02	39.14	9.85	0.001%
40	4.94	-39.14	-8.53	-4.94	39.14	8.53	0.001%
41	8.57	-39.14	-4.91	-8.57	39.14	4.91	0.001%
42	9.91	-39.14	0.02	-9.91	39.14	-0.02	0.001%
43	8.59	-39.14	4.94	-8.59	39.14	-4.94	0.001%
44	4.97	-39.14	8.54	-4.97	39.14	-8.54	0.001%
45	0.02	-39.14	9.85	-0.02	39.14	-9.85	0.001%
46	-4.94	-39.14	8.53	4.94	39.14	-8.53	0.001%
47	-8.57	-39.14	4.91	8.57	39.14	-4.91	0.001%
48	-9.91	-39.14	-0.02	9.91	39.14	0.02	0.001%
49	-8.59	-39.14	-4.94	8.59	39.14	4.94	0.001%
50	-4.97	-39.14	-8.54	4.97	39.14	8.54	0.001%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	6	0.00000001	0.00000001
2	Yes	13	0.00000001	0.00007751
3	Yes	13	0.00000001	0.00005974
4	Yes	15	0.00000001	0.00008868
5	Yes	15	0.00000001	0.00006298
6	Yes	15	0.00000001	0.00009766
7	Yes	15	0.00000001	0.00006960
8	Yes	12	0.00006645	0.00013561
9	Yes	12	0.00004483	0.00010930
10	Yes	15	0.00000001	0.00009367
11	Yes	15	0.00000001	0.00006654
12	Yes	15	0.00000001	0.00009228
13	Yes	15	0.00000001	0.00006555
14	Yes	13	0.00000001	0.00007003
15	Yes	12	0.00004485	0.00014829
16	Yes	15	0.00000001	0.00009849
17	Yes	15	0.00000001	0.00007015
18	Yes	15	0.00000001	0.00008944
19	Yes	15	0.00000001	0.00006342
20	Yes	13	0.00000001	0.00005704
21	Yes	12	0.00004482	0.00012339
22	Yes	15	0.00000001	0.00009494
23	Yes	15	0.00000001	0.00006743
24	Yes	15	0.00000001	0.00009638
25	Yes	15	0.00000001	0.00006852
26	Yes	10	0.00000001	0.00011152
27	Yes	14	0.00000001	0.00011214
28	Yes	14	0.00000001	0.00012005
29	Yes	14	0.00000001	0.00012091
30	Yes	14	0.00000001	0.00010905
31	Yes	14	0.00000001	0.00012375
32	Yes	14	0.00000001	0.00012423
33	Yes	14	0.00000001	0.00011575
34	Yes	14	0.00000001	0.00013412
35	Yes	14	0.00000001	0.00013316
36	Yes	14	0.00000001	0.00011867
37	Yes	14	0.00000001	0.00013052
38	Yes	14	0.00000001	0.00012984
39	Yes	12	0.00000001	0.00002708
40	Yes	12	0.00000001	0.00002373
41	Yes	12	0.00000001	0.00003567
42	Yes	12	0.00000001	0.00002995
43	Yes	12	0.00000001	0.00002376
44	Yes	12	0.00000001	0.00003026
45	Yes	12	0.00000001	0.00002711

46	Yes	12	0.00000001	0.00003300
47	Yes	12	0.00000001	0.00002344
48	Yes	12	0.00000001	0.00003032
49	Yes	12	0.00000001	0.00003467
50	Yes	12	0.00000001	0.00002559

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	150 - 95.83	21.73	48	1.1598	0.0027
L2	101 - 47.83	10.44	48	0.9615	0.0026
L3	54 - 30	2.91	48	0.5150	0.0009
L4	30 - 0	0.86	48	0.2736	0.0004

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
149.0000	10' Dipole	48	21.49	1.1572	0.0027	70515
138.0000	APXVSPP18-C-A20 w/ Mount Pipe	48	18.81	1.1276	0.0028	29381
129.0000	RRUS-11	48	16.66	1.0996	0.0028	16789
125.0000	(2) 7770.00 w/ Mount Pipe	48	15.72	1.0854	0.0028	14102
113.0000	APX16DWV-16DWV-S-E-ACU w/ Mount Pipe	48	12.99	1.0331	0.0028	9528
104.0000	4.5' Standoff Mount	48	11.06	0.9815	0.0026	7670
78.0000	(2) NHH-65B-R2B w/ Mount Pipe	48	6.23	0.7639	0.0018	6300
40.0000	4.5' Standoff Mount	48	1.55	0.3715	0.0006	4886

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	150 - 95.83	101.75	20	5.4372	0.0133
L2	101 - 47.83	48.91	22	4.5095	0.0113
L3	54 - 30	13.65	22	2.4139	0.0044
L4	30 - 0	4.04	22	1.2818	0.0022

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
149.0000	10' Dipole	20	100.61	5.4251	0.0132	15291
138.0000	APXVSPP18-C-A20 w/ Mount Pipe	20	88.09	5.2868	0.0129	6370
129.0000	RRUS-11	20	78.01	5.1563	0.0129	3638
125.0000	(2) 7770.00 w/ Mount Pipe	20	73.61	5.0898	0.0128	3055
113.0000	APX16DWV-16DWV-S-E-ACU w/ Mount Pipe	20	60.83	4.8450	0.0123	2061
104.0000	4.5' Standoff Mount	22	51.79	4.6035	0.0116	1657
78.0000	(2) NHH-65B-R2B w/ Mount Pipe	22	29.19	3.5820	0.0078	1354

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
40.0000	4.5' Standoff Mount	22	7.25	1.7411	0.0030	1044

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
L1	150 - 95.83 (1)	TP33.469x23.61x0.281	54.1700	0.0000	0.0	29.1778	-13.14	1938.05	0.007
L2	95.83 - 47.83 (2)	TP41.644x31.9661x0.375	53.1700	0.0000	0.0	48.4762	-26.32	3318.11	0.008
L3	47.83 - 30 (3)	TP44.139x39.7709x0.438	24.0000	0.0000	0.0	61.6341	-34.62	4336.82	0.008
L4	30 - 0 (4)	TP49.6x44.139x0.58	30.0000	0.0000	0.0	91.5498	-46.94	6748.13	0.007

Pole Bending Design Data

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L1	150 - 95.83 (1)	TP33.469x23.61x0.281	580.44	1272.22	0.456	0.00	1272.22	0.000
L2	95.83 - 47.83 (2)	TP41.644x31.9661x0.375	1973.98	2710.00	0.728	0.00	2710.00	0.000
L3	47.83 - 30 (3)	TP44.139x39.7709x0.438	2916.66	3853.07	0.757	0.00	3853.07	0.000
L4	30 - 0 (4)	TP49.6x44.139x0.58	4236.59	6713.11	0.631	0.00	6713.11	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	150 - 95.83 (1)	TP33.469x23.61x0.281	22.11	969.02	0.023	2.41	2579.66	0.001
L2	95.83 - 47.83 (2)	TP41.644x31.9661x0.375	36.82	1659.06	0.022	0.95	5495.04	0.000
L3	47.83 - 30 (3)	TP44.139x39.7709x0.438	41.68	2168.41	0.019	0.29	7812.81	0.000
L4	30 - 0 (4)	TP49.6x44.139x0.58	46.34	3374.07	0.014	0.98	13612.08	0.000

Pole Interaction Design Data

Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	150 - 95.83	0.007	0.456	0.000	0.023	0.001	0.464	1.000	4.8.2

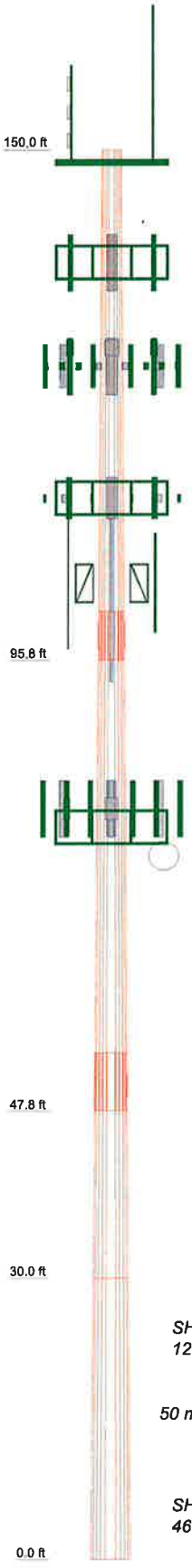
Section No.	Elevation ft	Ratio P_u / ϕP_n	Ratio M_{ux} / ϕM_{nx}	Ratio M_{uy} / ϕM_{ny}	Ratio V_u / ϕV_n	Ratio T_u / ϕT_n	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L2	95.83 - 47.83 (1)	0.008	0.728	0.000	0.022	0.000	0.737	1.000	4.8.2
L3	47.83 - 30 (2)	0.008	0.757	0.000	0.019	0.000	0.765	1.000	4.8.2
L4	30 - 0 (3)	0.007	0.631	0.000	0.014	0.000	0.638	1.000	4.8.2

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L1	150 - 95.83	Pole	TP33.469x23.61x0.281	1	-13.14	1938.05	46.4	Pass
L2	95.83 - 47.83	Pole	TP41.644x31.9661x0.375	2	-26.32	3318.11	73.7	Pass
L3	47.83 - 30	Pole	TP44.139x39.7709x0.438	3	-34.62	4336.82	76.5	Pass
L4	30 - 0	Pole	TP49.6x44.139x0.58	4	-46.94	6748.13	63.8	Pass
							Summary	
						Pole (L3)	76.5	Pass
						RATING =	**76.5**	**Pass**

APPENDIX B

ADDITIONAL CALCULATIONS



Section	1	2	3	4
Length (ft)	54.1700	53.1700	24.0000	30.0000
Number of Sides	12	12	12	12
Thickness (in)	0.2810	0.3750	0.4380	0.5800
Socket Length (ft)	5.1700	6.1700		
Top Dia (in)	23.6100	31.9661	39.7709	44.1390
Bot Dia (in)	33.4690	41.6440	44.1390	49.6000
Grade		A572-65		
Weight (K)	4.7	8.0	4.8	8.8

26.3

ALL REACTIONS ARE FACTORED

AXIAL 106 K

SHEAR 12 K — *MOMENT 1285 kip-ft*

TORQUE 2 kip-ft

50 mph WIND - 0.7500 in ICE

AXIAL 47 K

SHEAR 46 K — *MOMENT 4237 kip-ft*

TORQUE 5 kip-ft

REACTIONS - 97 mph WIND

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
10' Dipole	149	(2) 10" x 8" x 3" TMAs	113
10' Dipole	149	(2) 10" x 8" x 3" TMAs	113
DB810KE-SY	149	(2) 10" x 8" x 3" TMAs	113
(4) 5' x 2' Pipe Mount	149	12.5' Platform Mount	113
(4) 5' x 2' Pipe Mount	149	4.5' Standoff Mount	104
(4) 5' x 2' Pipe Mount	149	4.5' Standoff Mount	104
Valmont T-Arms	149	4.5' Standoff Mount	104
APXVSPP18-C-A20 w/ Mount Pipe	138	4.5' Standoff Mount	104
APXVSPP18-C-A20 w/ Mount Pipe	138	1142-2B	104
APXVSPP18-C-A20 w/ Mount Pipe	138	DB222E	104
FD RRH 4x45 1900	138	1142-2B	104
FD RRH 4x45 1900	138	(2) ASPA685	104
FD RRH 4x45 1900	138	(2) NHH-65B-R2B w/ Mount Pipe	78
FD-RRH-2x50-800	138	(2) NHH-65B-R2B w/ Mount Pipe	78
FD-RRH-2x50-800	138	(2) NHH-65B-R2B w/ Mount Pipe	78
FD-RRH-2x50-800	138	700 U 2x60 W/SOLAR SHIELD	78
12.5' Platform Mount	138	700 U 2x60 W/SOLAR SHIELD	78
RRUS-11	129	700 U 2x60 W/SOLAR SHIELD	78
RRUS-11	129	BXA-70063-6CF-EDIN-X w/ Mount Pipe	78
RRUS-11	129		
RRUS-12	129	BXA-70063-6CF-EDIN-X w/ Mount Pipe	78
RRUS-12	129		
RRUS-12	129	BXA-70063-6CF-EDIN-X w/ Mount Pipe	78
RRUS 12 w/ A2	129		
RRUS 12 w/ A2	129	BXA-171063-12CF-EDIN-X w/ Mount Pipe	78
RRUS 12 w/ A2	129		
DC6-48-60-18-8F w/ Mount Pipe	129	BXA-171063-12CF-EDIN-X w/ Mount Pipe	78
Valmont Uni-Tri Brackets	129		
(2) 7770.00 w/ Mount Pipe	125	BXA-171063-12CF-EDIN-X w/ Mount Pipe	78
(2) 7770.00 w/ Mount Pipe	125		
(2) 7770.00 w/ Mount Pipe	125	RRH2X60-PCS	78
HPA-65R-BUU-H6 w/ Mount Pipe	125	RRH2X60-PCS	78
HPA-65R-BUU-H6 w/ Mount Pipe	125	RRH2X60-PCS	78
HPA-65R-BUU-H6 w/ Mount Pipe	125	RRH AWS	78
(4) LGP214nn	125	RRH AWS	78
(4) LGP214nn	125	RRH AWS	78
(4) LGP214nn	125	RC3DC-3315-PF-48	78
12.5' Low Profile Platform Mount	125	RC3DC-3315-PF-48	78
APX16DWV-16DWV-S-E-ACU w/ Mount Pipe	113	12.5' Platform Mount	78
		4.5' Standoff Mount	40
APX16DWV-16DWV-S-E-ACU w/ Mount Pipe	113	GPS	40
APX16DWV-16DWV-S-E-ACU w/ Mount Pipe	113		

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower is located in Fairfield County, Connecticut.
2. Tower designed for Exposure C to the TIA-222-G Standard.
3. Tower designed for a 97 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 50 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Structure Class II.
7. Topographic Category 1 with Crest Height of 0.0000 ft
8. TOWER RATING: 76.5%

Paul J Ford and Company
250 E. Broad Street Suite 600
Coilumbus, OH 43215
Phone: 614.221.6679
FAX: 614.448.4105

Job: 150' MP, Fairfield, CT			
Project: 42917-0012			
Client: CCI	Drawn by: Jared Smith	App'd:	
Code: TIA-222-G	Date: 10/10/17	Scale: N	
Path: G:\TOWER\429_On Air Engineering\2017\42917-0012 Fairfield 2 CT\42917-0012.001.7805.eri		Dwg No.	

PAUL J. FORD & COMPANY
250 E Broad St, Ste 600 • Columbus, OH 43215
Phone 614.221.6679 www.pauljford.com

Job Number: 42917-0012.001.7805
Site Number:
Site Name: Fairfield 2 CT

By: JWS
Date: 10/10/2017

DRILLED PIER SOIL AND STEEL ANALYSIS - TIA-222-G

Factored Base Reactions from RISA

	Comp. (+)	Tension (-)	
Moment, Mu =	4237.0		k-ft
Shear, Vu =	46.0		kips
Axial Load, Pu1 =	47.0		kips (from 1.2D + 1.6W)*
Axial Load, Pu2 =	35.3	0.0	kips (from 0.9D + 1.6W)**
OTMu =	4283.0	0.0	k-ft @ Ground

***Axial Load, Pu1 will be used for Soil Compression Analysis.**
****Axial Load, Pu2 will be used for Steel Analysis.**

Safety Factors / Load Factors / Φ Factors

Tower Type =	Monopole DP
ACI Code =	ACI 318-08
Seismic Design Category =	D
Reference Standard =	TIA-222-G
Use 1.3 Load Factor?	No
Load Factor =	1.00

Drilled Pier Parameters

Diameter =	6.5 ft
Height Above Grade =	1 ft
Depth Below Grade =	25.5 ft
fc' =	3 ksi
εc =	0.003 in/in
L / D Ratio =	4.08
Mat Ftdn. Cap Width =	ft
Mat Ftdn. Cap Length =	ft
Depth Below Grade =	ft

	Safety Factor	Φ Factor
Soil Lateral Resistance =	2.00	0.75
Skin Friction =	2.00	0.75
End Bearing =	2.00	0.75
Concrete Wt. Resist Uplift =	1.25	

Load Combinations Checked per TIA-222-G

1. (0.75) Ult. Skin Friction + (0.75) Ult. End Bearing + (1.2) Effective Soil Wt. - (1.2) Buoyant Conc. Wt. ≥ Comp.
2. (0.75) Ult. Skin Friction + (0.9) Buoyant Conc. Wt. ≥ Uplift

Steel Parameters

Number of Bars =	40
Rebar Size =	#11
Rebar Fy =	60 ksi
Rebar MOE =	29000 ksi
Tie Size =	#3
Side Clear Cover to Ties =	4 in

Soil Parameters

Water Table Depth =	99.00 ft
Depth to Ignore Soil =	3.25 ft
Depth to Full Cohesion =	19.5 ft
Full Cohesion Starts at?	3 x Diameter

Above Full Cohesion Lateral Resistance = 4(Cohesion)(Dia)(H)
Below Full Cohesion Lateral Resistance = 8(Cohesion)(Dia)(H)

Direct Embed Pole Shaft Parameters

Dia @ Grade =	in
Dia @ Depth Below Grade =	in
Number of Sides =	
Thickness =	in
Fy =	ksi
Backfill Condition =	

Maximum Capacity Ratios

Maximum Soil Ratio =	110.0%
Maximum Steel Ratio =	105.0%

Define Soil Layers

Note: Cohesion = Undrained Shear Strength = Unconfined Compressive Strength / 2

Layer	Thickness ft	Unit Weight pcf	Cohesion psf	Friction Angle degrees	Soil Type	Ultimate End Bearing psf	Comp. Ult. Skin Friction psf	Tension Ult. Skin Friction psf	Depth ft
1	4	100		30	Sand				4
2	9.5	120		35	Sand				13.5
3	13.5	105		30	Sand	4500			27
4									
5									
6									
7									
8									
9									
10									
11									
12									

Soil Results: Overturning

Depth to COR =	18.03	ft, from Grade	
Bending Moment, Mu =	5112.46	k-ft, from COR	
Resisting Moment, ΦMn =	8196.41	k-ft, from COR	
MOMENT RATIO =	**62.4%**	**OK**	

Shear, Vu =	46.00	kips
Resisting Shear, ΦVn =	73.75	kips
SHEAR RATIO =	**62.4%**	**OK**

Soil Results: Uplift

Uplift, Tu =	0.00	kips
Uplift Capacity, ΦTn =	118.71	kips
UPLIFT RATIO =	**0.0%**	**OK**

Soil Results: Compression

Compression, Cu =	47.00	kips
Comp. Capacity, ΦCn =	65.20	kips
COMPRESSION RATIO =	**72.1%**	**OK**

Steel Results (ACI 318-08):

Minimum Steel Area =	15.93	sq in
Actual Steel Area =	62.40	sq in
Axial, ΦPn (min) =	-3369.60	kips, Where ΦMn = 0 k-ft
Axial, ΦPn (max) =	8200.25	kips, Where ΦMn = 0 k-ft

Axial Load, Pu =	66.61	kips @ 6.00 ft Below Grade
Moment, Mu =	4509.11	k-ft @ 6.00 ft Below Grade
Moment, ΦMn =	8291.74	k-ft
MOMENT RATIO =	**54.4%**	**OK**

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#: *0*
Site Name: *Fairfield 2 CT*
App #:

Loads Already Factored		
For M (WL)	1	<----Disregard
For P (DL)	1	<----Disregard

Pier Properties

Concrete:

Pier Diameter =	6.5	ft
Concrete Area =	4778.4	in^2

Reinforcement:

Clear Cover to **Tie**=	4.00	in
Horiz. **Tie** Bar Size=	3	
Vert. Cage Diameter =	5.65	ft
Vert. Cage Diameter =	67.84	in
Vertical Bar Size =	11	
Bar Diameter =	1.41	in
Bar Area =	1.56	in^2
Number of Bars =	40	
As Total=	62.4	in^2
A s/ Aconc, Rho:	0.0131	1.31%

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

Minimum Rho Check:

Actual Req'd Min. Rho:	0.33%	Flexural
Provided Rho:	1.31%	OK

Ref. Shaft Max Axial Capacities, ϕ Max(Pn or Tn):		
Max Pu = (φ=0.65) Pn.		
Pn per ACI 318 (10-2)	8200.25	kips
at Mu=(ϕ=0.65)Mn=	4517.55	ft-kips
Max Tu, (φ=0.9) Tn =	3369.6	kips
at Mu=ϕ=(0.90)Mn=	0.00	ft-kips

Maximum Shaft Superimposed Forces

TIA Revision:	G	
Max. Factored Shaft Mu:	4509.11	ft-kips **(* Note)**
Max. Factored Shaft Pu:	66.61	kips
Max Axial Force Type:	Comp.	

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

Load Factor	Shaft Factored Loads		
1.00	Mu:	4509.11	ft-kips
1.00	Pu:	66.61	kips

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=	2008

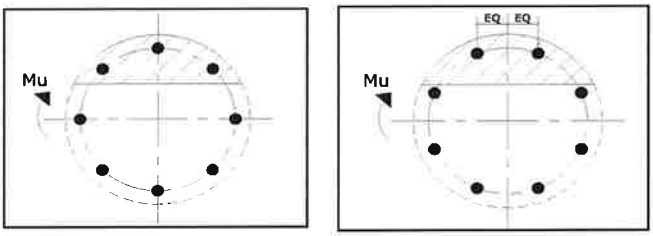
Seismic Properties

Seismic Design Category =	D
Seismic Risk =	**High**

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

Results:

Governing Orientation Case: **1**



Case 1 Case 2

Dist. From Edge to Neutral Axis:	**18.49**	in
Extreme Steel Strain, εt:	**0.0088**	
	εt > 0.0050, Tension Controlled	
Reduction Factor,φ:	**0.900**	

Output Note: Negative Pu=Tension

For Axial Compression, φ Pn = Pu:	66.61	kips
Drilled Shaft Moment Capacity, φMn:	**8291.74**	ft-kips
Drilled Shaft Superimposed Mu:	**4509.11**	ft-kips

(Mu/φMn, Drilled Shaft Flexure CSR:	**54.4%**

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

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

Site Data

BU#:	
Site Name:	
App #:	
Pole Manufacturer:	*Other*

Reactions		
Mu:	4237	ft-kips
Axial, Pu:	47	kips
Shear, Vu:	46	kips
Eta Factor, η	0.5	TIA G (Fig. 4-4)

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

Anchor Rod Data		
Qty:	16	
Diam:	2.25	in
Rod Material:	A615-J	
Strength (Fu):	100	ksi
Yield (Fy):	75	ksi
Bolt Circle:	57.85	in

Anchor Rod Results

		Rigid
Max Rod (Cu+ Vu/ή):	228.4 Kips	AISC LRFD
Allowable Axial, Φ*Fu*Anet:	260.0 Kips	φ*Tn
Anchor Rod Stress Ratio:	87.9% **Pass**	

Plate Data		
Diam:	63.85	in
Thick:	2.75	in
Grade:	60	ksi
Single-Rod B-eff:	9.97	in

Base Plate Results Flexural Check

		Rigid
Base Plate Stress:	30.4 ksi	AISC LRFD
Allowable Plate Stress:	54.0 ksi	φ*Fy
Base Plate Stress Ratio:	56.3% **Pass**	Y.L. Length: 29.77

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

n/a

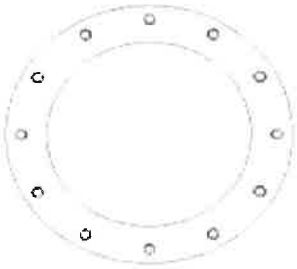
Stiffener Results

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

Pole Results

Pole Punching Shear Check: n/a

Pole Data		
Diam:	49.6	in
Thick:	0.58	in
Grade:	65	ksi
# of Sides:	12	"0" IF Round
Fu	80	ksi
Reinf. Fillet Weld	0	"0" if None



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

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

ATTACHMENT 4

PJF PAUL J. FORD & COMPANY

Report Date:	February 7, 2018
Client:	On Air Engineering, LLC 88 Foundry Pond Road Cold Spring, NY 10516 Attn: David Weinpahl, P.E. (201) 456-4624 dweinpahl@onaireng.com
Verizon Site Name:	Fairfield 2 CT
Structure:	Town of Fairfield Monopole
Site Address:	3965 Congress St
City, County, State:	Fairfield, Fairfield County, CT
Latitude, Longitude:	41.187875, -73.297617
PJF Project:	A42918-0009.001.7190

Paul J. Ford and Company is pleased to submit this "**Mount Structural Analysis Report**". The purpose of this analysis is to determine if the mount has sufficient capacity to support the proposed equipment described herein.

Analysis Criteria:

Reference Standard:	2016 Connecticut State Building Code with the ANSI/TIA-222-G-2005 Standard, "Structural Standard for Antenna Supporting Structures and Antennas", with ANSI/TIA-222-G-1-2007 and ANSI/TIA-222-G-2-2009 Addenda per Exception #5 of Section 1609.1.1.
Ultimate Wind Speed:	125 mph 3-second gust wind speed without ice, Risk Category II
Nominal Wind Speed:	97 mph 3-second gust wind speed without ice
Ice Wind Speed:	50 mph 3-second gust wind speed with 0.75" ice
TIA-222 Criteria:	Topographic Category 1, Exposure Category B

Proposed Appurtenance Loads:

The mount was analyzed with the addition of the proposed appurtenance loads shown in Table 1 combined with the existing loads shown in Table 2 of this report.

Summary of Analysis Results:

Existing Antenna Mount: **Pass @ 81.2%***

***Sufficient upon completion of the changes listed in the 'Recommendations' section of this report.**

We at Paul J. Ford and Company appreciate the opportunity of providing our continuing professional services to you and On Air Engineering, LLC. If you have any questions or need further assistance on this or any other projects please give us a call.

Respectfully Submitted by:
Paul J. Ford and Company

Jonathan Sommer, EI
Structural Designer
jsommer@pjfweb.com

STATE OF CONNECTICUT
JUSTIN T. KLINE
No. 30301
LICENSED
PROFESSIONAL ENGINEER

2.5.18

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a monopole tower with an existing mount at the 78-ft centerline. The existing mount was manufactured by Valmont dated 5/1/2009.

2) ANALYSIS CRITERIA

This analysis has been performed in accordance with the 2016 Connecticut State Building Code based upon an ultimate 3-second gust wind speed of 125 mph converted to a nominal 3-second gust wind speed of 97 mph per Section 1609.3 and Appendix N as required for use in the ANSI/TIA-222-G-2005 Standard, "Structural Standard for Antenna Supporting Structures and Antennas", with ANSI/TIA-222-G-1-2007 and ANSI/TIA-222-G-2-2009 Addenda per Exception #5 of Section 1609.1.1. Risk Category II, Exposure Category B and Topographic Category 1 with a maximum Topographic Factor, Kzt, of 1.0 were used in this analysis.

Table 1 – Proposed Antenna Information

Mounting Level (feet)	Center Line Elevation (feet)	Number of Antennas	Antenna Manufacturer	Antenna Model	Note
78.0	80.0	6	Commscope	NHH-65B-R2B	1
		3	Alcatel Lucent	RH_2X60-700U	
		3	Alcatel Lucent	RH_2X90-AWS	
		3	Alcatel Lucent	RH_2X60-PCS	2

Notes:
1) Proposed equipment
2) Reserved equipment

Table 2 – Existing Antenna Information

Mounting Level (feet)	Center Line Elevation (feet)	Number of Antennas	Antenna Manufacturer	Antenna Model	Note
78.0	80.0	3	Amphenol	BXA-70063-6CF	1
		3	Amphenol	BXA-171063-12CF	
		3	Amphenol	BXA-70063-6CF	2
		3	Amphenol	BXA-171063-12CF	
		3	Alcatel Lucent	RH_2X40-AWS	

Notes:
1) Existing equipment
2) Equipment to be removed and not considered in this analysis

3) ANALYSIS PROCEDURE

Table 3 – Documents Provided

Document	Remarks	Reference	Source
Mount Manufacturer Drawings	Valmont, 5/1/2009	-	Valmont
Site Photos	-	-	On Air Engineering
Construction Drawings	RedSwing, 08/21/2016	28503AE	On Air Engineering
RF Rec	Verizon	046105-0091	On Air Engineering

3.1) Analysis Method

RISA-3D (version 15.0.4), a commercially available analysis software package, was used to create a three-dimensional model of the mount and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A.

3.2) Assumptions

1) *The analysis of the existing monopole tower or the effect of the mount attachment to the tower is not within the current scope of work.*
2) *The antenna mounting system was properly fabricated, installed and maintained in good condition, twist free and plumb in accordance with its original design and manufacturer's specifications and all bolts are tightened as specified by the manufacturer and AISC requirements.*
3) *The configuration of antennas, mounts, and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.*
4) *All member connections are assumed to have been designed to meet or exceed the load carrying capacity of the connected member unless otherwise specified in this report.*
5) *This analysis will be required to be revised if the existing conditions in the field differ from those shown in the above referenced documents or assumed in this analysis. No allowance was made for any damaged, missing, or rusted members.*
6) *Steel grades have been assumed as follows:*
   - *a) Channel, Solid Round, Angle, Plate, Unistrut* — *ASTM A36 (GR 36)*
   - *b) Pipe* — *ASTM A53 (GR 35)*
   - *c) HSS (Rectangular)* — *ASTM 500 (GR B-46)*
   - *d) HSS (Round)* — *ASTM 500 (GR B-42)*
   - *e) Connection Bolts* — *ASTM A325*
7) *SitePro1 HRK14 Handrail Kit is installed properly as shown in manufacturer drawings attached at the end of this report.*
8) *SitePro1 SFS-H Stabilizer Kits are installed properly as shown in manufacturer drawings attached at the end of this report.*
9) *SitePro1 MM01 Stand Off Arms are installed properly as shown in manufacturer drawings attached at the end of this report.*
10) *SitePro1 LWRM Collar is installed properly as shown in manufacturer drawings attached at the end of this report.*
11) *SitePro1 PRK-1245L Platform Reinforcement Kit is installed properly as shown in manufacturer drawings attached at the end of this report.*

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

4) ANALYSIS RESULTS

Table 4 – Mount Component Stresses vs. Capacity

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Mount Pipes	78.0	10.4	Pass
1	Face Horizontal		81.2	Pass
1	Standoff Members		79.9	Pass
1	Bracing Members		10.7	Pass
1	Support Rail		48.1	Pass

Structural Rating (max from all components) =	81.2%

Notes:
1. See additional documentation in "Appendix A – RISA 3D Output" for calculations supporting the % capacity consumed.

4.1) Recommendations

The mount will require reinforcement to adequately support the proposed loads. Listed below is a brief description of the required modification:

- Install SitePro1 PRK-1245L Platform Reinforcement Kit as indicated in Appendix B – Supplemental Modification Information and in conformance with the attached manufacturer drawings.
- Install (3) SitePro1 MM01 Stand Off Arms on new SitePro1 LWRM Collar approximately 42" above existing platform boom. Install new (3) 3.5" O.D. SCH 40 vertical pipes on new MM01 kits. See Appendix B – Supplemental Modification Information.
- Install SitePro1 SFS-H Sector Frame Stabilizer Kits on proposed SitePro1 HRK14 Handrail Kit as shown on the attached manufacturer drawings. Connect to vertical pipes on new Collar/Stand Off Arm assembly. See Appendix B – Supplemental Modification Information.

5) CONCLUSION

The mount will have sufficient capacity to carry the proposed loading configuration once the recommendations are met and properly installed.

This analysis is presented based upon the assumptions listed herein and information provided by the wireless carrier. If the existing conditions are different than those presented here, Paul J. Ford and Company should be contacted to verify the validity of the conclusions presented here.

STANDARD CONDITIONS FOR FURNISHING OF PROFESSIONAL ENGINEERING SERVICES ON EXISTING MOUNTS BY PAUL J. FORD AND COMPANY

1) It is the responsibility of the client to ensure that the information provided to Paul J. Ford and Company is accurate and complete. Paul J. Ford and Company will rely on the accuracy and completeness of such information in performing or furnishing services under this project.

2) If the existing conditions are not as represented on the referenced drawings and/or documents, Paul J. Ford and Company should be contacted immediately to evaluate the significance of the deviation.

3) The mount has been analyzed according to the minimum design loads recommended by the Reference Standard. If additional design loads are required, Paul J. Ford and Company should be made aware of this prior to the start of the project.

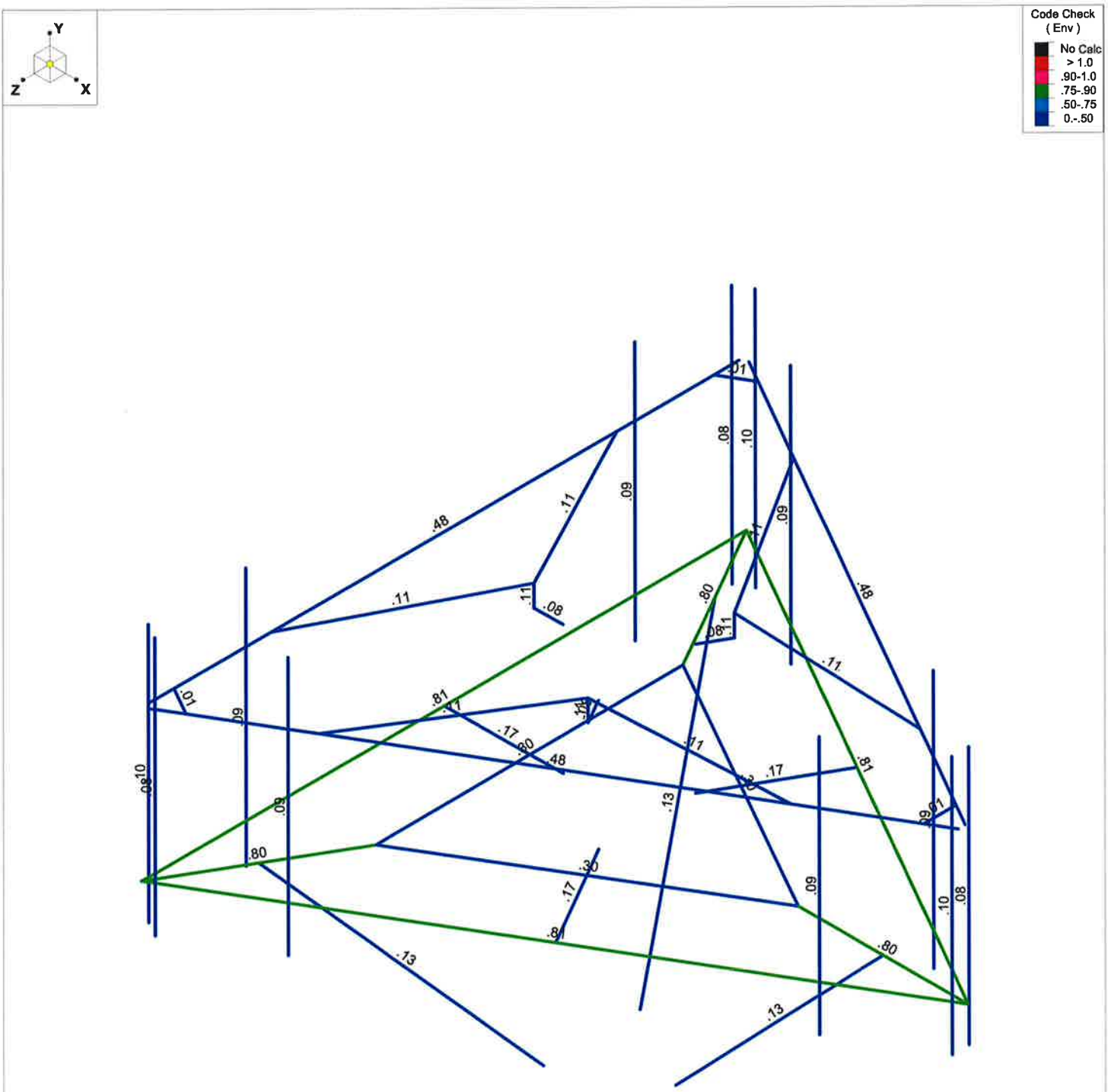
4) The standard of care for all Professional Engineering Services performed or furnished by Paul J. Ford and Company under this project will be the skill and care used by members of the Consultant's profession practicing under similar circumstances at the same time and in the same locality.

5) All Services are performed, results obtained, and recommendations made in accordance with generally accepted engineering principles and practices. Paul J. Ford and Company is not responsible for the conclusions, opinions and/or recommendations made by others based on the information supplied herein.

****

APPENDIX A

RISA 3D OUTPUT



Member Code Checks Displayed (Enveloped)
Envelope Only Solution

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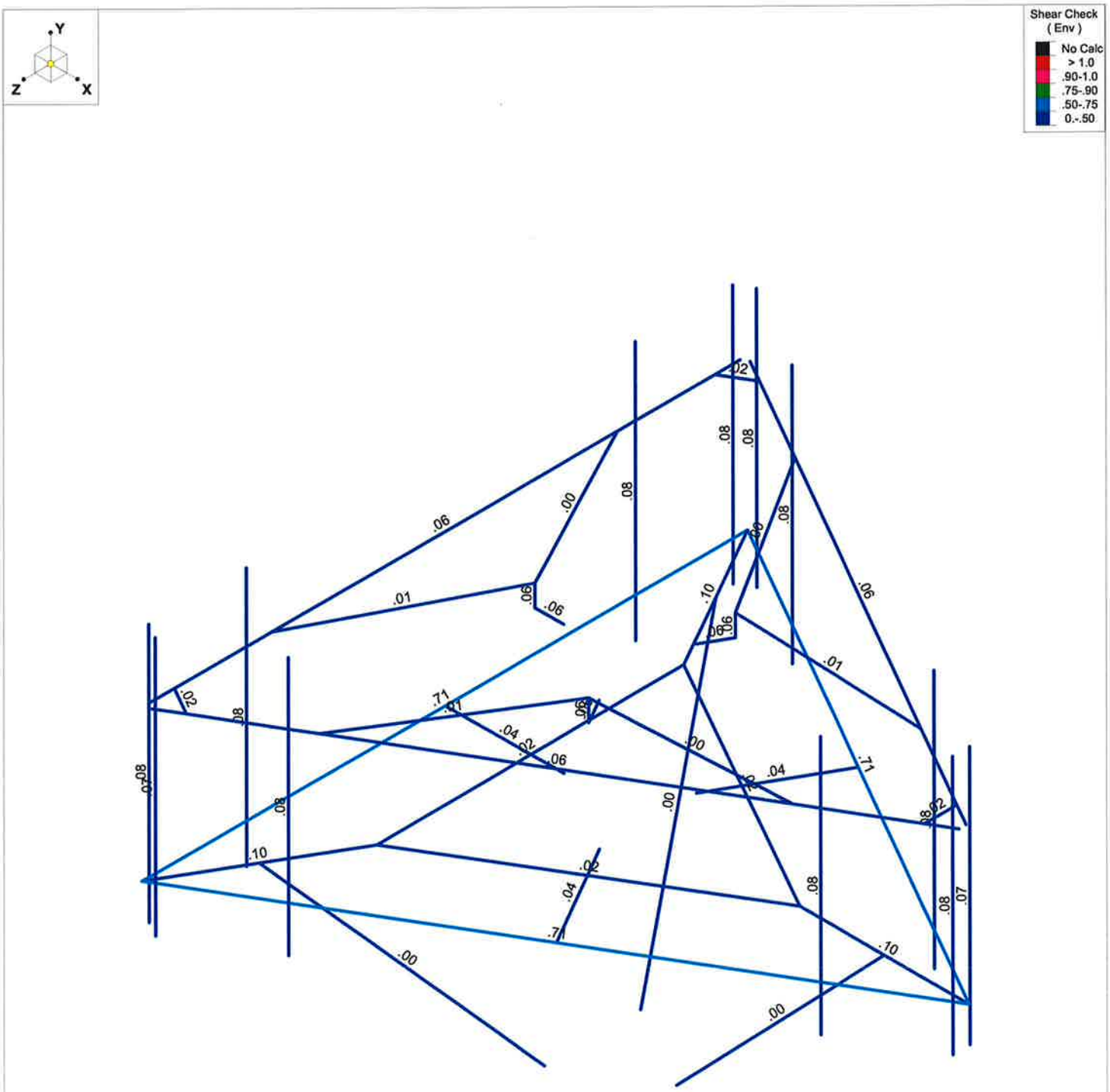

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Envelope Only Solution

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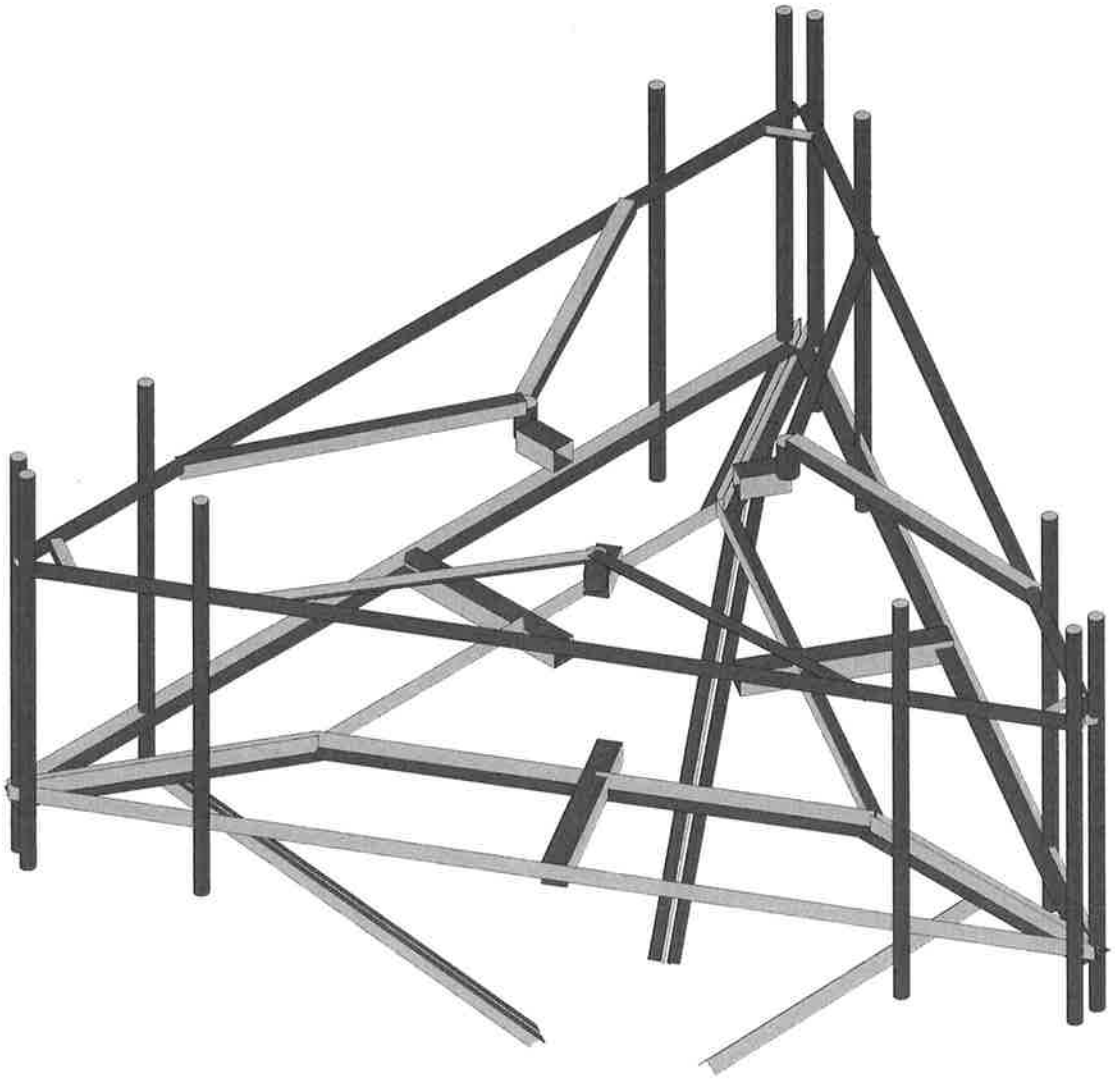

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JRS		Feb 7, 2018 at 2:40 PM
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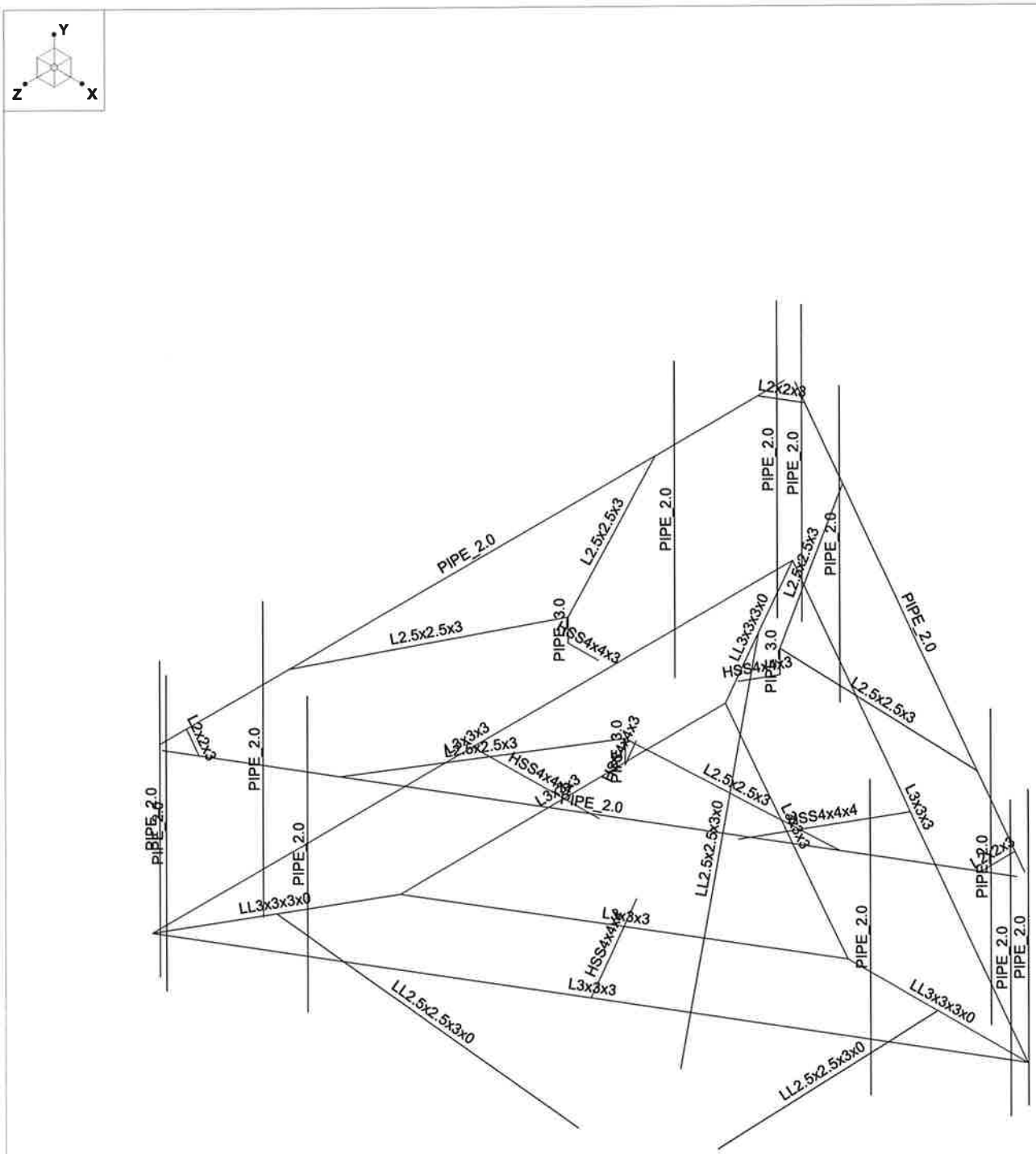
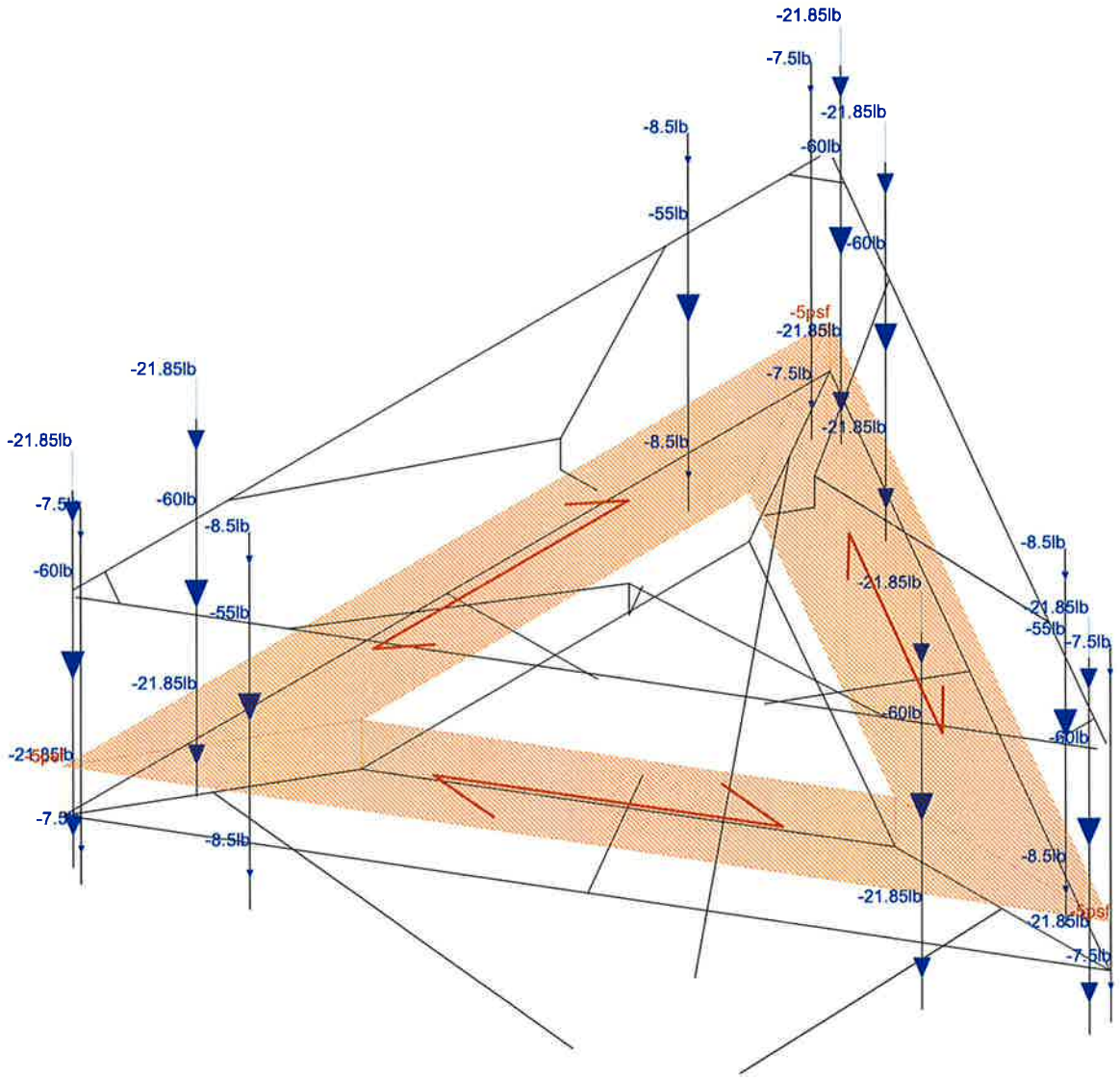


Envelope Only Solution

Paul J. Ford and Company	Fairfield 2 CT	SK - 4
JRS		Feb 7, 2018 at 2:40 PM
42918-0009		42918-0009.001.7190 (LP-140-001...



Loads: BLC 1, Dead
Envelope Only Solution

Paul J. Ford and Company	Fairfield 2 CT	SK - 5
JRS		Feb 7, 2018 at 2:40 PM
42918-0009		42918-0009.001.7190 (LP-140-001...

(Global) Model Settings

Display Sections for Member Calcs	5
Max Internal Sections for Member Calcs	97
Include Shear Deformation?	Yes
Increase Nailing Capacity for Wind?	Yes
Include Warping?	Yes
Trans Load Btwn Intersecting Wood Wall?	Yes
Area Load Mesh (in^2)	144
Merge Tolerance (in)	.12
P-Delta Analysis Tolerance	0.50%
Include P-Delta for Walls?	Yes
Automatically Iterate Stiffness for Walls?	No
Max Iterations for Wall Stiffness	3
Gravity Acceleration (in/sec^2)	386.4
Wall Mesh Size (in)	12
Eigensolution Convergence Tol. (1.E-)	4
Vertical Axis	Y
Global Member Orientation Plane	XZ
Static Solver	Sparse Accelerated
Dynamic Solver	Accelerated Solver

Hot Rolled Steel Code	AISC 14th(360-10): LRFD
Adjust Stiffness?	Yes(Iterative)
RISAConnection Code	None
Cold Formed Steel Code	None
Wood Code	None
Wood Temperature	< 100F
Concrete Code	None
Masonry Code	None
Aluminum Code	None - Building

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

(Global) Model Settings, Continued

Seismic Code	ASCE 7-05
Seismic Base Elevation (in)	Not Entered
Add Base Weight?	Yes
Ct X	.02
Ct Z	.02
T X (sec)	Not Entered
T Z (sec)	Not Entered
R X	3
R Z	3
Ct Exp. X	.75
Ct Exp. Z	.75
SD1	1
SDS	1
S1	1
TL (sec)	5
Occupancy Cat	I or II
Drift Cat	Other
Om Z	1
Om X	1
Cd Z	4
Cd X	4
Rho Z	1
Rho X	1

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (\1E...	Density[k/ft...	Yield[ksi]	Ry	Fu[ksi]	Rt
1	A53 Gr. B (35 ksi)	29000	11154	.3	.65	.49	35	1.5	60	1.2
2	A500 Gr. B (46ksi)	29000	11154	.3	.65	.49	46	1.5	58	1.2
3	A36	29000	11154	.3	.65	.49	36	1.5	58	1.2

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rules
1	C4	A1	A3			PIPE_2.0	None	None	A53 Gr. B ...	Typical
2	C3	A4	A6			PIPE_2.0	None	None	A53 Gr. B ...	Typical
3	C2	A7	A9			PIPE_2.0	None	None	A53 Gr. B ...	Typical
4	C1	A10	A12			PIPE_2.0	None	None	A53 Gr. B ...	Typical
5	M17	A2	N36			1/2"	None	None	A36	Typical
6	M18	A5	N37			1/2"	None	None	A36	Typical
7	M19	A8	N38			1/2"	None	None	A36	Typical
8	M20	A11	N39			1/2"	None	None	A36	Typical
9	B4	N32	N34			PIPE_2.0	None	None	A53 Gr. B ...	Typical
10	B3	N35	N37A			PIPE_2.0	None	None	A53 Gr. B ...	Typical
11	B2	N38A	N40			PIPE_2.0	None	None	A53 Gr. B ...	Typical
12	B1	N41	N43			PIPE_2.0	None	None	A53 Gr. B ...	Typical
13	M37	N33	N53			1/2"	None	None	A36	Typical
14	M38	N36A	N54			1/2"	None	None	A36	Typical
15	M39	N39A	N55			1/2"	None	None	A36	Typical
16	M40	N42	N56			1/2"	None	None	A36	Typical
17	A4	N63	N65			PIPE_2.0	None	None	A53 Gr. B ...	Typical
18	A3	N66	N68			PIPE_2.0	None	None	A53 Gr. B ...	Typical
19	A2	N69	N71			PIPE_2.0	None	None	A53 Gr. B ...	Typical
20	A1	N72	N74			PIPE_2.0	None	None	A53 Gr. B ...	Typical
21	M45	B1	B4			L3x3x3	None	None	A36	Typical
22	M46	B2	B1			L3x3x3	None	None	A36	Typical
23	M47	B4	B2			L3x3x3	None	None	A36	Typical

Member Primary Data (Continued)

	Label	I Joint	J Joint	K Joint	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rules
24	M48	C5	C6			HSS4x4x4	None	None	A500 Gr. ...	Typical
25	M49	C1	C2			HSS4x4x4	None	None	A500 Gr. ...	Typical
26	M50	C3	C4			HSS4x4x4	None	None	A500 Gr. ...	Typical
27	M51	N92	N93			L3x3x3	None	None	A36	Typical
28	M52	N93	N91			L3x3x3	None	None	A36	Typical
29	M53	N91	N92			L3x3x3	None	None	A36	Typical
30	M54	B1	N93		180	LL3x3x3x0	None	None	A36	Typical
31	M55	N91	B2		180	LL3x3x3x0	None	None	A36	Typical
32	M56	N92	B4		180	LL3x3x3x0	None	None	A36	Typical
33	M57	N64	N84			1/2"	None	None	A36	Typical
34	M58	N67	N85			1/2"	None	None	A36	Typical
35	M59	N70	N86			1/2"	None	None	A36	Typical
36	M60	N73	N87			1/2"	None	None	A36	Typical
37	M61	N65A	N64A			PIPE_2.0	None	None	A53 Gr. B ...	Typical
38	M62	N68A	N72A			1/2"	None	None	A36	Typical
39	M63	N69A	N73A			1/2"	None	None	A36	Typical
40	M64	N70A	N74A			1/2"	None	None	A36	Typical
41	M65	N71A	N75			1/2"	None	None	A36	Typical
42	M66	N77	N76			HSS4x4x3	None	None	A500 Gr. ...	Typical
43	M67	N77	N78			PIPE_3.0	None	None	A53 Gr. B ...	Typical
44	M68	N80	N78		90	L2.5x2.5x3	None	None	A36	Typical
45	M69	N81	N78		180	L2.5x2.5x3	None	None	A36	Typical
46	M70	N83	N82			PIPE_2.0	None	None	A53 Gr. B ...	Typical
47	M71	N86A	N90			1/2"	None	None	A36	Typical
48	M72	N87A	N91B			1/2"	None	None	A36	Typical
49	M73	N88	N92B			1/2"	None	None	A36	Typical
50	M74	N89	N93B			1/2"	None	None	A36	Typical
51	M75	N95	N94			HSS4x4x3	None	None	A500 Gr. ...	Typical
52	M76	N95	N96			PIPE_3.0	None	None	A53 Gr. B ...	Typical
53	M77	N97	N96		90	L2.5x2.5x3	None	None	A36	Typical
54	M78	N98	N96		180	L2.5x2.5x3	None	None	A36	Typical
55	M79	N100	N99			PIPE_2.0	None	None	A53 Gr. B ...	Typical
56	M80	N103	N107			1/2"	None	None	A36	Typical
57	M81	N104	N108			1/2"	None	None	A36	Typical
58	M82	N105	N109			1/2"	None	None	A36	Typical
59	M83	N106	N110			1/2"	None	None	A36	Typical
60	M84	N112	N111			HSS4x4x3	None	None	A500 Gr. ...	Typical
61	M85	N112	N113			PIPE_3.0	None	None	A53 Gr. B ...	Typical
62	M86	N114	N113		90	L2.5x2.5x3	None	None	A36	Typical
63	M87	N115	N113		180	L2.5x2.5x3	None	None	A36	Typical
64	M88	N67A	N101		90	L2x2x3	None	None	A36	Typical
65	M89	N85A	N66A		90	L2x2x3	None	None	A36	Typical
66	M90	N84A	N102		90	L2x2x3	None	None	A36	Typical
67	M91	N119	N116			LL2.5x2.5x3x0	None	None	A36	Typical
68	M92	N120	N117			LL2.5x2.5x3x0	None	None	A36	Typical
69	M93	N121	N118			LL2.5x2.5x3x0	None	None	A36	Typical

Member Advanced Data

	Label	I Release	J Release	I Offset[in]	J Offset[in]	T/C Only	Physical	Analysis ...	Inactive	Seismic Design ...
1	C4						Yes			None
2	C3						Yes			None
3	C2						Yes			None
4	C1						Yes			None
5	M17						Yes		Exclude	None
6	M18						Yes		Exclude	None

Member Advanced Data (Continued)

	Label	I Release	J Release	I Offset[in]	J Offset[in]	T/C Only	Physical	Analysis ...	Inactive	Seismic Design ...
7	M19						Yes		Exclude	None
8	M20						Yes		Exclude	None
9	B4						Yes			None
10	B3						Yes			None
11	B2						Yes			None
12	B1						Yes			None
13	M37						Yes		Exclude	None
14	M38						Yes		Exclude	None
15	M39						Yes		Exclude	None
16	M40						Yes		Exclude	None
17	A4						Yes			None
18	A3						Yes			None
19	A2						Yes			None
20	A1						Yes			None
21	M45						Yes			None
22	M46						Yes			None
23	M47						Yes			None
24	M48						Yes			None
25	M49						Yes			None
26	M50						Yes			None
27	M51						Yes			None
28	M52						Yes			None
29	M53						Yes			None
30	M54						Yes			None
31	M55						Yes			None
32	M56						Yes			None
33	M57						Yes		Exclude	None
34	M58						Yes		Exclude	None
35	M59						Yes		Exclude	None
36	M60						Yes		Exclude	None
37	M61						Yes			None
38	M62	OOOXOX					Yes		Exclude	None
39	M63	OOOXOX					Yes		Exclude	None
40	M64	OOOXOX					Yes		Exclude	None
41	M65	OOOXOX					Yes		Exclude	None
42	M66						Yes			None
43	M67						Yes			None
44	M68	BenPIN	BenPIN				Yes			None
45	M69	BenPIN	BenPIN				Yes			None
46	M70						Yes			None
47	M71	OOOXOX					Yes		Exclude	None
48	M72	OOOXOX					Yes		Exclude	None
49	M73	OOOXOX					Yes		Exclude	None
50	M74	OOOXOX					Yes		Exclude	None
51	M75						Yes			None
52	M76						Yes			None
53	M77	BenPIN	BenPIN				Yes			None
54	M78	BenPIN	BenPIN				Yes			None
55	M79						Yes			None
56	M80	OOOXOX					Yes		Exclude	None
57	M81	OOOXOX					Yes		Exclude	None
58	M82	OOOXOX					Yes		Exclude	None
59	M83	OOOXOX					Yes		Exclude	None
60	M84						Yes			None
61	M85						Yes			None
62	M86	BenPIN	BenPIN				Yes			None
63	M87	BenPIN	BenPIN				Yes			None

Member Advanced Data (Continued)

	Label	I Release	J Release	I Offset[in]	J Offset[in]	T/C Only	Physical	Analysis ...	Inactive	Seismic Design ...
64	M88	BenPIN	BenPIN				Yes			None
65	M89	BenPIN	BenPIN				Yes			None
66	M90	BenPIN	BenPIN				Yes			None
67	M91	BenPIN	BenPIN				Yes			None
68	M92	BenPIN	BenPIN				Yes			None
69	M93	BenPIN	BenPIN				Yes			None

Hot Rolled Steel Design Parameters

	Label	Shape	Length[in]	Lbyy[in]	Lbzz[in]	Lcomp top[in]	Lcomp bot[in]	L-torqu...	Kyy	Kzz	Cb	Function
1	C4	PIPE_2.0	72			Lbyy						Lateral
2	C3	PIPE_2.0	72			Lbyy						Lateral
3	C2	PIPE_2.0	72			Lbyy						Lateral
4	C1	PIPE_2.0	72			Lbyy						Lateral
5	M17	1/2"	1.003			Lbyy						Lateral
6	M18	1/2"	1.003			Lbyy						Lateral
7	M19	1/2"	1.003			Lbyy						Lateral
8	M20	1/2"	1.003			Lbyy						Lateral
9	B4	PIPE_2.0	72			Lbyy						Lateral
10	B3	PIPE_2.0	72			Lbyy						Lateral
11	B2	PIPE_2.0	72			Lbyy						Lateral
12	B1	PIPE_2.0	72			Lbyy						Lateral
13	M37	1/2"	1.003			Lbyy						Lateral
14	M38	1/2"	1.003			Lbyy						Lateral
15	M39	1/2"	1.003			Lbyy						Lateral
16	M40	1/2"	1.003			Lbyy						Lateral
17	A4	PIPE_2.0	72			Lbyy						Lateral
18	A3	PIPE_2.0	72			Lbyy						Lateral
19	A2	PIPE_2.0	72			Lbyy						Lateral
20	A1	PIPE_2.0	72			Lbyy						Lateral
21	M45	L3x3x3	168	84	84	Lbyy						Lateral
22	M46	L3x3x3	168	84	84	Lbyy						Lateral
23	M47	L3x3x3	168	84	84	Lbyy						Lateral
24	M48	HSS4x4x4	33			Lbyy						Lateral
25	M49	HSS4x4x4	33			Lbyy						Lateral
26	M50	HSS4x4x4	33			Lbyy						Lateral
27	M51	L3x3x3	85.717			Lbyy						Lateral
28	M52	L3x3x3	85.717			Lbyy						Lateral
29	M53	L3x3x3	85.717			Lbyy						Lateral
30	M54	LL3x3x3x0	47.508			Lbyy						Lateral
31	M55	LL3x3x3x0	47.508			Lbyy						Lateral
32	M56	LL3x3x3x0	47.508			Lbyy						Lateral
33	M57	1/2"	1.003			Lbyy						Lateral
34	M58	1/2"	1.003			Lbyy						Lateral
35	M59	1/2"	1.003			Lbyy						Lateral
36	M60	1/2"	1.003			Lbyy						Lateral
37	M61	PIPE_2.0	164	84	84	Lbyy						Lateral
38	M62	1/2"	1.003			Lbyy						Lateral
39	M63	1/2"	1.003			Lbyy						Lateral
40	M64	1/2"	1.003			Lbyy						Lateral
41	M65	1/2"	1.003			Lbyy						Lateral
42	M66	HSS4x4x3	8									Lateral
43	M67	PIPE_3.0	6									Lateral
44	M68	L2.5x2.5x3	54.12									Lateral
45	M69	L2.5x2.5x3	54.12									Lateral
46	M70	PIPE_2.0	164	84	84	Lbyy						Lateral

Hot Rolled Steel Design Parameters (Continued)

	Label	Shape	Length[in]	Lbyy[in]	Lbzz[in]	Lcomp top[in]	Lcomp bot[in]	L-torqu...	Kyy	Kzz	Cb	Function
47	M71	1/2"	1.003			Lbyy						Lateral
48	M72	1/2"	1.003			Lbyy						Lateral
49	M73	1/2"	1.003			Lbyy						Lateral
50	M74	1/2"	1.003			Lbyy						Lateral
51	M75	HSS4x4x3	8									Lateral
52	M76	PIPE_3.0	6									Lateral
53	M77	L2.5x2.5x3	54.12									Lateral
54	M78	L2.5x2.5x3	54.12									Lateral
55	M79	PIPE_2.0	164	84	84	Lbyy						Lateral
56	M80	1/2"	1.003			Lbyy						Lateral
57	M81	1/2"	1.003			Lbyy						Lateral
58	M82	1/2"	1.003			Lbyy						Lateral
59	M83	1/2"	1.003			Lbyy						Lateral
60	M84	HSS4x4x3	8									Lateral
61	M85	PIPE_3.0	6									Lateral
62	M86	L2.5x2.5x3	54.12									Lateral
63	M87	L2.5x2.5x3	54.12									Lateral
64	M88	L2x2x3	9									Lateral
65	M89	L2x2x3	9									Lateral
66	M90	L2x2x3	9									Lateral
67	M91	LL2.5x2.5x3...	83.273									Lateral
68	M92	LL2.5x2.5x3...	83.273									Lateral
69	M93	LL2.5x2.5x3...	83.273									Lateral

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distributed	Area(Me...	Surface(P...
1	Dead	None		-1.1			42		9	
2	Live	None							9	
3	Wind 0	None					84	138		
4	Wind 30	None					84	138		
5	Wind 60	None					84	138		
6	Wind 90	None					84	138		
7	Wind 120	None					84	138		
8	Wind 150	None					84	138		
9	Ice Load	None					42	69	9	
10	Ice 0	None					84	138		
11	Ice 30	None					84	138		
12	Ice 60	None					84	138		
13	Ice 90	None					84	138		
14	Ice 120	None					84	138		
15	Ice 150	None					84	138		
16	BLC 1 Transient Area...	None						27		
17	BLC 2 Transient Area...	None						27		
18	BLC 9 Transient Area...	None						27		

Load Combinations

	Description	Sol...	PD...	SRSS	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...
1	1.4 D	Yes	Y		1	1.4																		
2	1.2 D + 1....	Yes	Y		1	1.2	2	1.6																
3	1.2 D + 1....	Yes	Y		1	1.2	3	1.6																
4	1.2 D + 1....	Yes	Y		1	1.2	4	1.6																
5	1.2 D + 1....	Yes	Y		1	1.2	5	1.6																
6	1.2 D + 1....	Yes	Y		1	1.2	6	1.6																
7	1.2 D + 1....	Yes	Y		1	1.2	7	1.6																

Load Combinations (Continued)

	Description	Sol..	PD...	SRSS	BLC	Fact..	BLC	Fact..	BLC	Fact..	BLC	Fact..	BLC	Fact..	BLC	Fact..	BLC	Fact..	BLC	Fact..	BLC	Fact..	BLC	Fact...
8	1.2 D + 1....	Yes	Y		1	1.2	8	1.6																
9	1.2 D + 1....	Yes	Y		1	1.2	3	-1.6																
10	1.2 D + 1....	Yes	Y		1	1.2	4	-1.6																
11	1.2 D + 1....	Yes	Y		1	1.2	5	-1.6																
12	1.2 D + 1....	Yes	Y		1	1.2	6	-1.6																
13	1.2 D + 1....	Yes	Y		1	1.2	7	-1.6																
14	1.2 D + 1....	Yes	Y		1	1.2	8	-1.6																
15	1.2 D + 1....	Yes	Y		1	1.2	9	1	10	1														
16	1.2 D + 1....	Yes	Y		1	1.2	9	1	11	1														
17	1.2 D + 1....	Yes	Y		1	1.2	9	1	12	1														
18	1.2 D + 1....	Yes	Y		1	1.2	9	1	13	1														
19	1.2 D + 1....	Yes	Y		1	1.2	9	1	14	1														
20	1.2 D + 1....	Yes	Y		1	1.2	9	1	15	1														
21	1.2 D + 1....	Yes	Y		1	1.2	9	1	10	-1														
22	1.2 D + 1....	Yes	Y		1	1.2	9	1	11	-1														
23	1.2 D + 1....	Yes	Y		1	1.2	9	1	12	-1														
24	1.2 D + 1....	Yes	Y		1	1.2	9	1	13	-1														
25	1.2 D + 1....	Yes	Y		1	1.2	9	1	14	-1														
26	1.2 D + 1....	Yes	Y		1	1.2	9	1	15	-1														

Envelope Joint Reactions

	Joint		X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	C1	max	181.024	12	1418.004	2	1581.736	4	.023	3	1.153	13	-.609	6
2		min	-306.662	6	233.52	6	-1570.556	10	-.082	21	-1.185	7	-2.715	2
3	C3	max	1441.917	12	1418.004	2	922.05	4	-.496	13	1.153	9	1.382	2
4		min	-1369.306	6	233.031	14	-820.99	10	-2.337	2	-1.185	3	.297	3
5	C5	max	1431.447	12	1418.004	2	802.821	14	2.365	2	1.152	5	1.332	2
6		min	-1376.05	6	233.014	10	-914.324	8	.525	11	-1.186	11	.251	9
7	N76	max	1202.878	12	94.757	24	728.493	4	.359	4	.483	4	.579	6
8		min	-1197.329	6	29.162	5	-733.182	10	-.361	10	-.486	10	-.619	12
9	N94	max	1026.745	13	94.759	20	1076.812	3	.519	3	.483	12	.516	7
10		min	-1020.234	7	29.17	13	-1080.942	9	-.553	9	-.486	6	-.501	13
11	N111	max	842.815	11	94.759	16	1236.388	3	.631	3	.483	8	.431	5
12		min	-850.582	5	29.173	9	-1227.138	9	-.594	9	-.486	14	-.409	11
13	N116	max	-356.532	12	2927.331	21	2397.889	15	0	13	0	7	0	7
14		min	-1385.812	18	909.278	5	677.493	9	0	7	0	13	0	13
15	N117	max	2759.125	25	2927.328	17	59.143	4	0	3	0	3	0	9
16		min	801.106	7	909.169	13	-63.364	10	0	9	0	9	0	3
17	N118	max	-360.303	12	2927.33	15	-675.331	3	0	5	0	11	0	5
18		min	-1397.535	18	909.256	9	-2391.139	21	0	11	0	5	0	11
19	Totals:	max	6189.212	12	11166.928	17	5958.087	3						
20		min	-6189.212	6	3583.267	11	-5958.087	9						

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

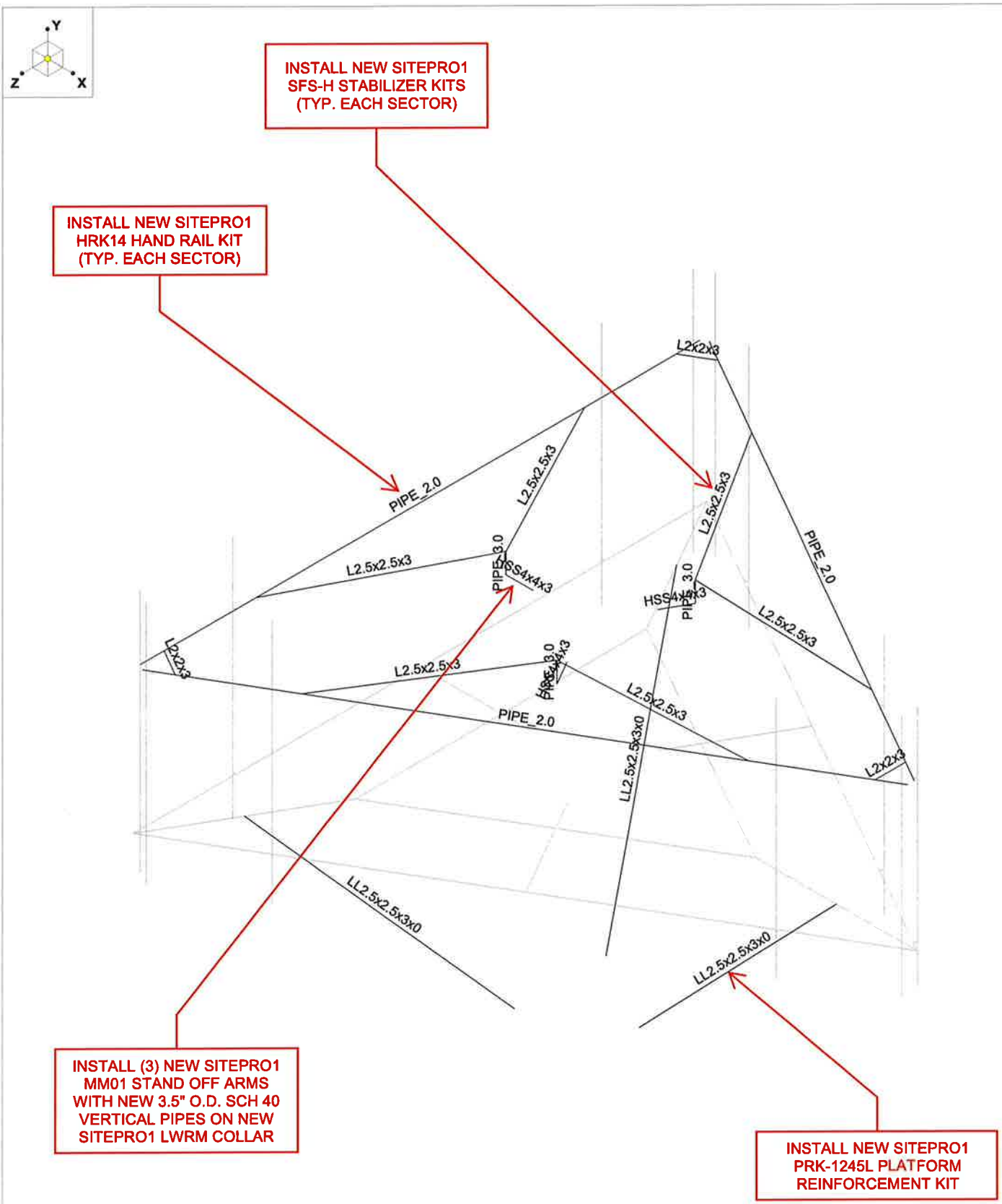
	Member	Shape	Code Check	Loc[in]	LC	Shear Check	Lo...	...	...	phi*P...	phi*P...	phi*M...	phi*M.....	Eqn
1	M47	L3x3x3	.812	168	25	.713	168	z	13	1198...	35316	1.32	2.735	... H2-1
2	M45	L3x3x3	.812	168	21	.711	168	z	9	1198...	35316	1.32	2.735	... H2-1
3	M46	L3x3x3	.812	168	17	.707	168	z	5	1198...	35316	1.32	2.735	... H2-1
4	M55	LL3x3x3...	.799	47.508	25	.097	23....	y	25	5053...	70632	4.823	2.345	... H1-1b
5	M54	LL3x3x3...	.799	0	17	.097	23....	y	17	5053...	70632	4.823	2.345	... H1-1b
6	M56	LL3x3x3...	.799	47.508	21	.097	23....	y	21	5053...	70632	4.823	2.345	... H1-1b
7	M79	PIPE_2.0	.481	34.167	3	.059	32....		3	1785...	32130	1.872	1.872	... H1-1b
8	M61	PIPE_2.0	.480	34.167	5	.059	32....		5	1785...	32130	1.872	1.872	1 H1-1b
9	M70	PIPE_2.0	.479	34.167	7	.059	32....		13	1785...	32130	1.872	1.872	... H1-1b

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

	Member	Shape	Code Check	Loc[in]	LC	Shear Check	Lo...	...	...	phi*P...	phi*P...	phi*M...	phi*M...	Eqn
10	M52	L3x3x3	.303	0	17	.024	0	y	17	1150...	35316	1.32	2.525	H2-1
11	M51	L3x3x3	.303	0	21	.024	0	y	21	1150...	35316	1.32	2.525	H2-1
12	M53	L3x3x3	.303	0	25	.024	0	y	25	1150...	35316	1.32	2.525	H2-1
13	M49	HSS4x4...	.169	0	2	.044	0	z	10	1351...	139518	16.181	16.181	H1-1b
14	M50	HSS4x4...	.169	0	2	.044	0	z	6	1351...	139518	16.181	16.181	H1-1b
15	M48	HSS4x4...	.169	0	2	.044	0	z	14	1351...	139518	16.181	16.181	H1-1b
16	M93	LL2.5x2...	.127	83.273	19	.004	0	y	25	3155...	58320	3.3	2.55	H1-...
17	M91	LL2.5x2...	.127	83.273	17	.004	83....	y	21	3155...	58320	3.3	2.55	H1-...
18	M92	LL2.5x2...	.127	83.273	23	.004	0	y	17	3155...	58320	3.3	2.55	H1-...
19	M69	L2.5x2....	.114	27.624	6	.005	54....	z	13	1494...	2919...	.873	1.703	H2-1
20	M87	L2.5x2....	.114	27.624	10	.005	54....	z	5	1494...	2919...	.873	1.703	H2-1
21	M78	L2.5x2....	.114	27.624	14	.005	54....	z	9	1494...	2919...	.873	1.703	H2-1
22	M68	L2.5x2....	.107	27.624	6	.005	54....	y	11	1494...	2919...	.873	1.703	H2-1
23	M85	PIPE_3.0	.107	0	3	.063	0		3	6511...	65205	5.749	5.749	H1-1b
24	M86	L2.5x2....	.107	27.624	10	.005	54....	y	9	1494...	2919...	.873	1.703	H2-1
25	M77	L2.5x2....	.107	27.624	14	.005	0	y	13	1494...	2919...	.873	1.703	H2-1
26	M76	PIPE_3.0	.107	0	7	.063	0		7	6511...	65205	5.749	5.749	H1-1b
27	M67	PIPE_3.0	.107	0	11	.063	0		11	6511...	65205	5.749	5.749	H1-1b
28	A1	PIPE_2.0	.104	12	11	.081	54		5	2086...	32130	1.872	1.872	H1-1b
29	B1	PIPE_2.0	.104	12	3	.081	54		9	2086...	32130	1.872	1.872	H1-1b
30	C1	PIPE_2.0	.104	12	7	.081	54		13	2086...	32130	1.872	1.872	H1-1b
31	A2	PIPE_2.0	.094	54	11	.076	54		5	2086...	32130	1.872	1.872	H1-1b
32	C2	PIPE_2.0	.094	54	7	.077	54		13	2086...	32130	1.872	1.872	H1-1b
33	B2	PIPE_2.0	.094	54	3	.077	54		9	2086...	32130	1.872	1.872	H1-1b
34	B3	PIPE_2.0	.086	54	13	.076	54		7	2086...	32130	1.872	1.872	H1-1b
35	C3	PIPE_2.0	.086	54	5	.077	54		11	2086...	32130	1.872	1.872	H1-1b
36	A3	PIPE_2.0	.086	54	9	.076	54		3	2086...	32130	1.872	1.872	H1-1b
37	B4	PIPE_2.0	.082	12	13	.074	54		7	2086...	32130	1.872	1.872	H1-1b
38	A4	PIPE_2.0	.082	12	9	.075	54		3	2086...	32130	1.872	1.872	H1-1b
39	C4	PIPE_2.0	.082	12	5	.075	54		11	2086...	32130	1.872	1.872	H1-1b
40	M84	HSS4x4...	.079	8	3	.059	8	z	14	1066...	106812	12.662	12.662	H1-1b
41	M75	HSS4x4...	.079	8	7	.059	8	z	6	1066...	106812	12.662	12.662	H1-1b
42	M66	HSS4x4...	.078	8	11	.059	8	z	10	1066...	106812	12.662	12.662	H1-1b
43	M89	L2x2x3	.009	4.5	4	.017	0	z	13	2274...	2339...	.558	1.239	H2-1
44	M88	L2x2x3	.009	4.5	8	.017	0	z	5	2274...	2339...	.558	1.239	H2-1
45	M90	L2x2x3	.009	4.5	12	.017	0	z	9	2274...	2339...	.558	1.239	H2-1

APPENDIX B

SUPPLEMENTAL MODIFICATION INFORMATION



Envelope Only Solution

Paul J. Ford and Company	Fairfield 2 CT	SK - 6
JRS		Feb 7, 2018 at 2:38 PM
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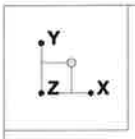

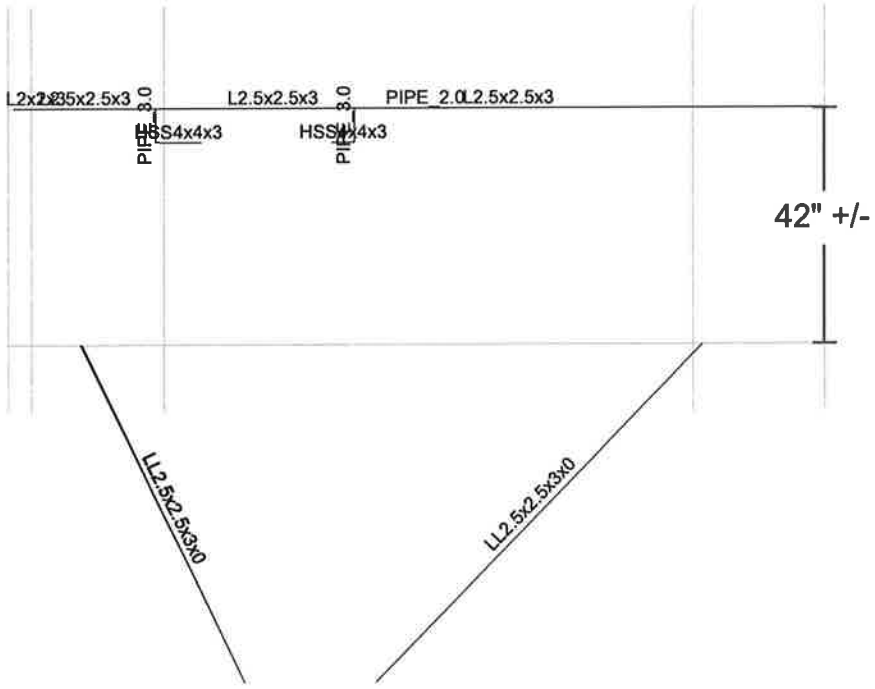

Envelope Only Solution

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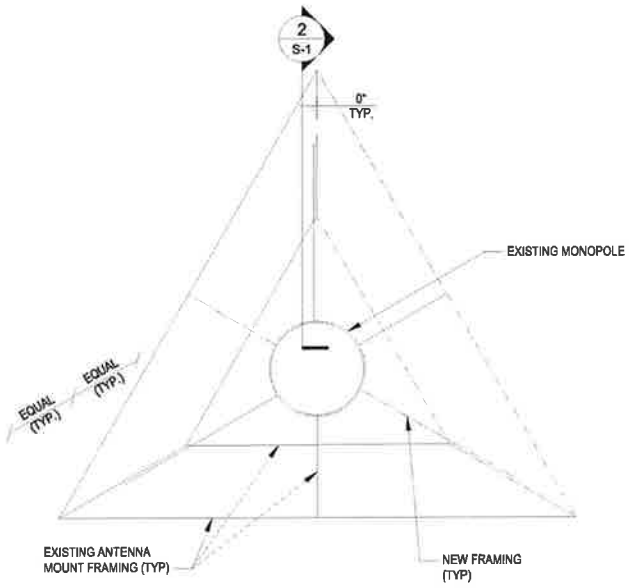
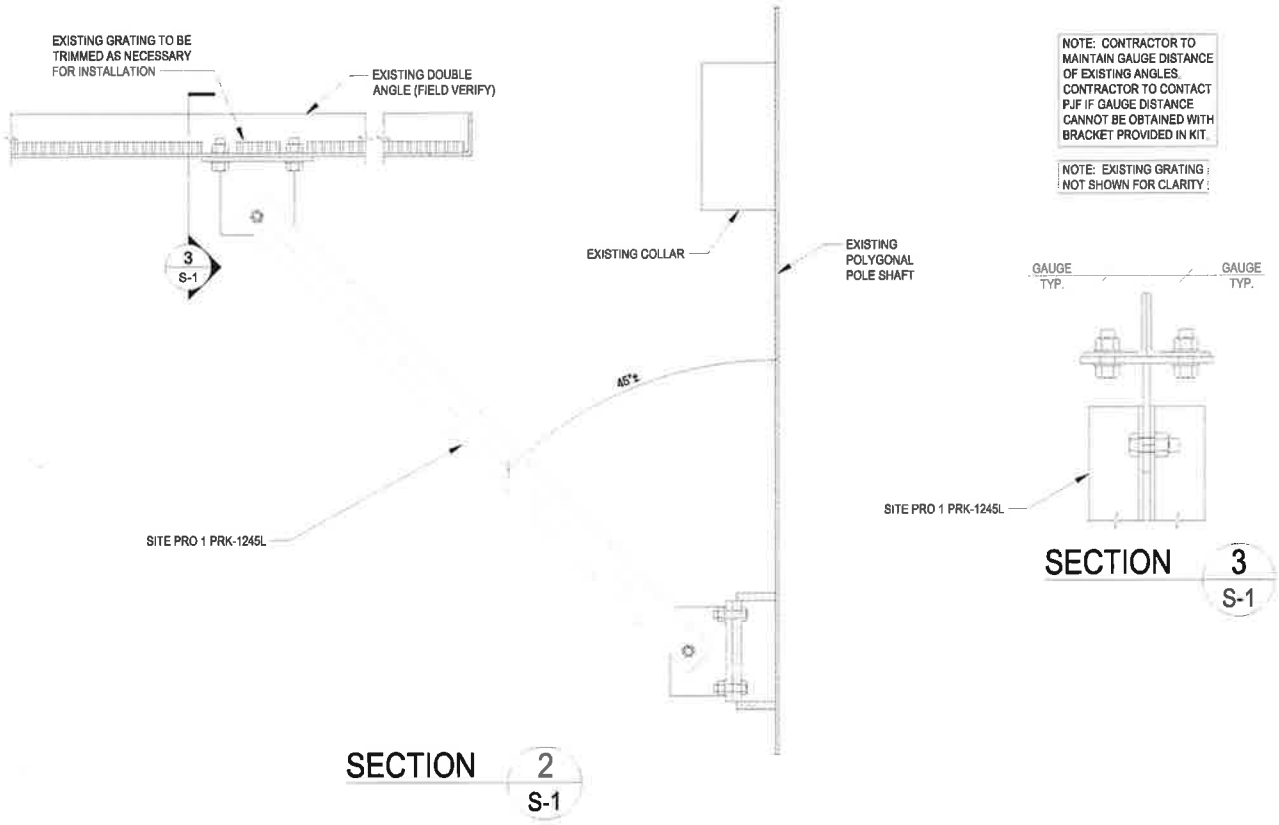


ANTENNA MOUNT PLAN 1 S-1



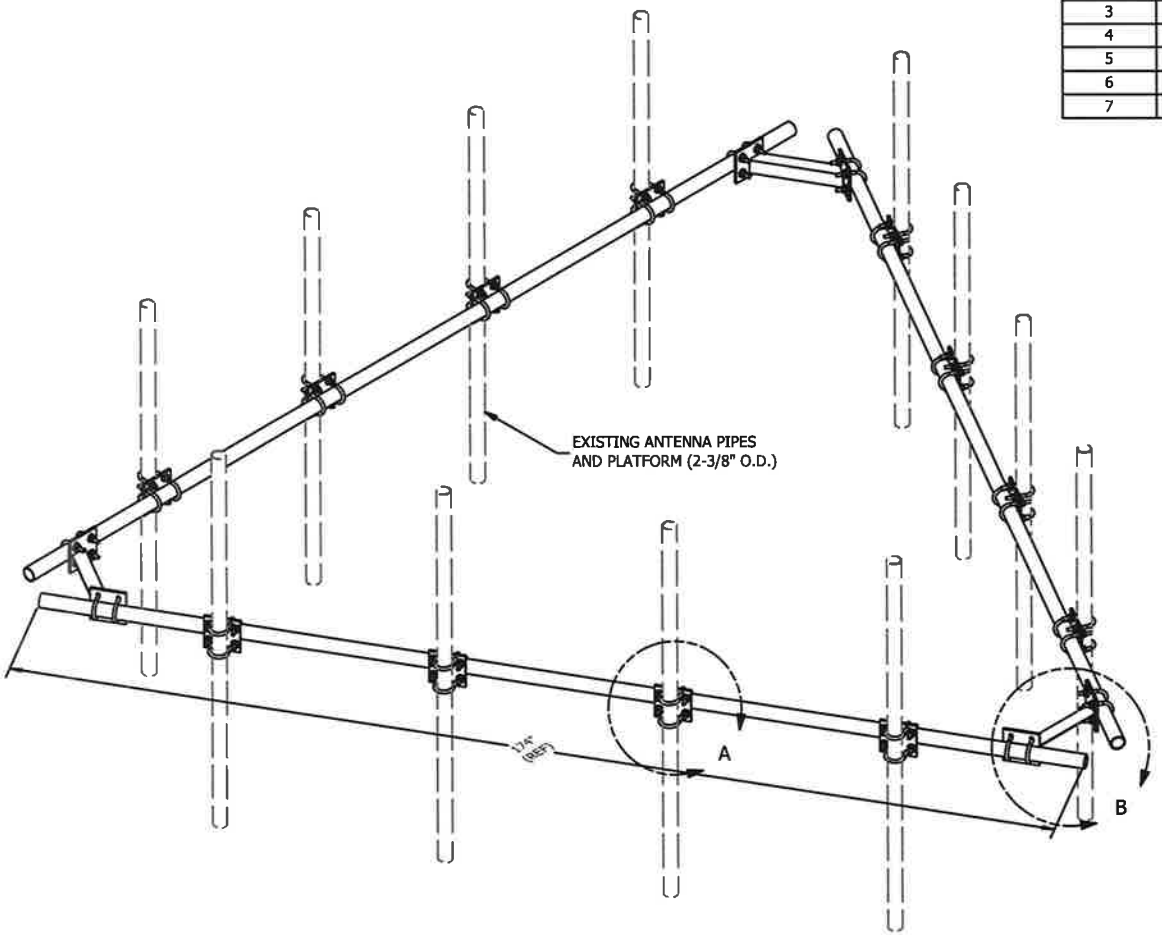
SECTION 2 S-1

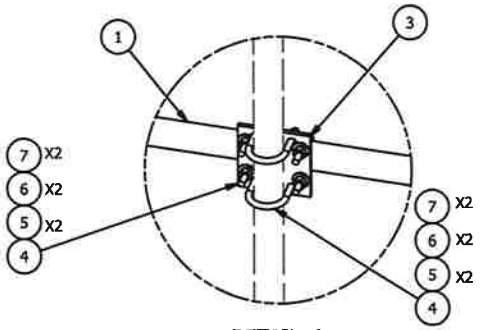
SECTION 3 S-1

APPENDIX C

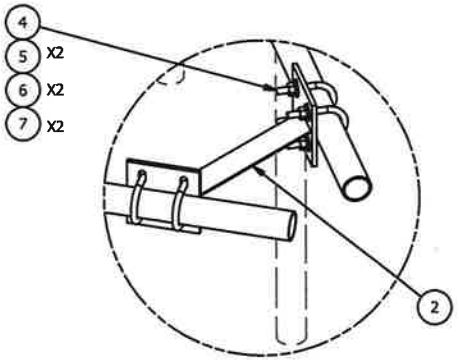
MANUFACTURER DRAWINGS (FOR REFERENCE ONLY)

PARTS LIST						
ITEM	QTY	PART NO.	PART DESCRIPTION	LENGTH	UNIT WT.	NET WT
1	3	P2174	2-3/8" OD X 174" Sch 40 Galvanized Pipe	174 in	55.75	167.24
2	3	X-AHCP	ANGLE HANDRAIL CORNER PLATE		12.92	38.76
3	12	SCX1	CROSSOVER PLATE 2-3/8" X 2-3/8"		3.71	44.50
4	60	X-UB1212	1/2" X 2-1/2" X 4-1/2" X 2" U-BOLT (HDG.)		0.73	43.90
5	120	G12FW	1/2" HDG USS FLATWASHER		0.03	4.08
6	120	G12LW	1/2" HDG LOCKWASHER		0.01	1.67
7	120	G12NUT	1/2" HDG HEAVY 2H HEX NUT		0.07	8.58
					TOTAL WT. #	302.34





DETAIL A



DETAIL B

TOLERANCE NOTES

TOLERANCES ON DIMENSIONS, UNLESS OTHERWISE NOTED ARE:
SAWED, SHEARED AND GAS CUT EDGES *(± 0.030")*
DRILLED AND GAS CUT HOLES *(± 0.030")* - NO CONING OF HOLES
LASER CUT EDGES AND HOLES *(± 0.010")* - NO CONING OF HOLES
BENDS ARE ± 1/2 DEGREE
ALL OTHER MACHINING *(± 0.030")*
ALL OTHER ASSEMBLY *(± 0.060")*

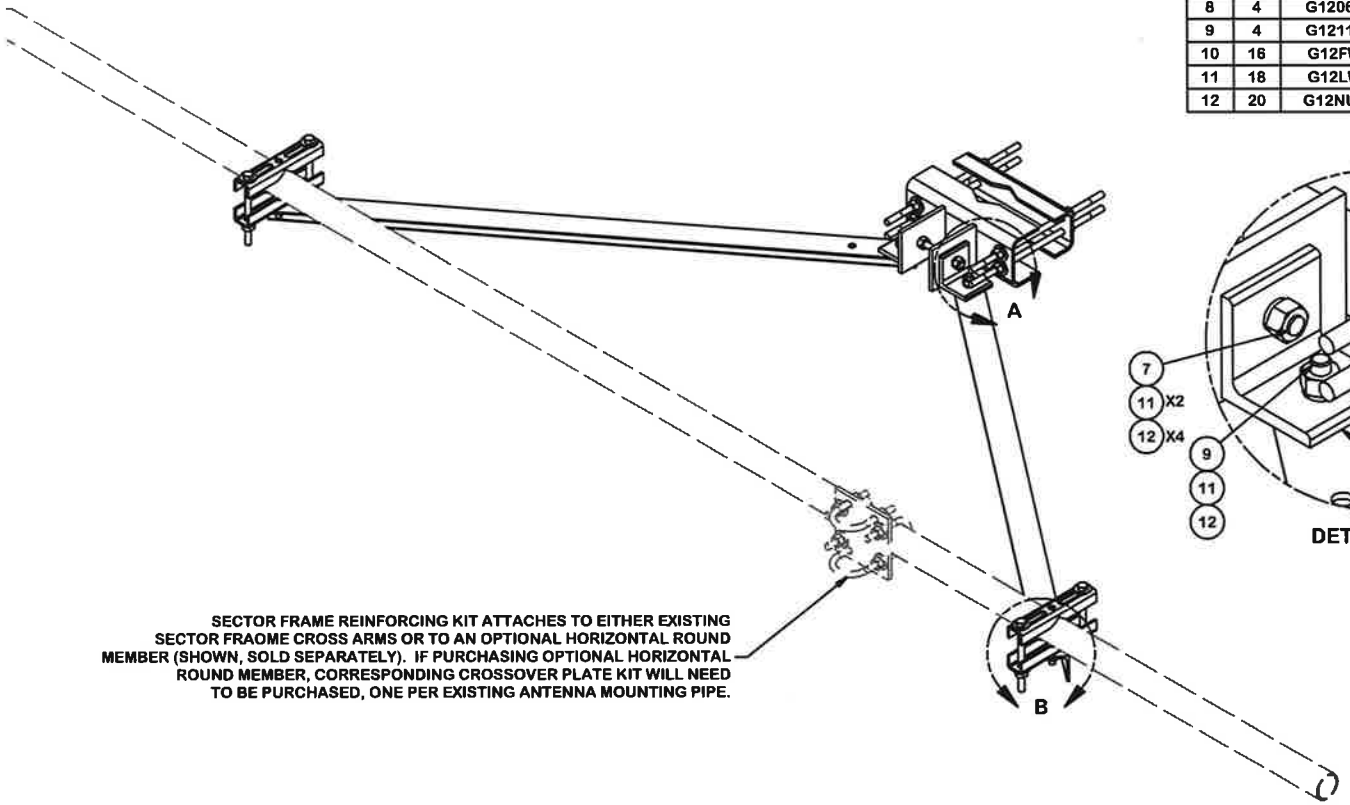
REVISION HISTORY			
V	DESCRIPTION OF REVISIONS	CPD BY	DATE
	REPLACED HCP WITH X-AHCP	CEK	7/11/2014

DESCRIPTION: HANDRAIL KIT FOR 14'-6" FACE

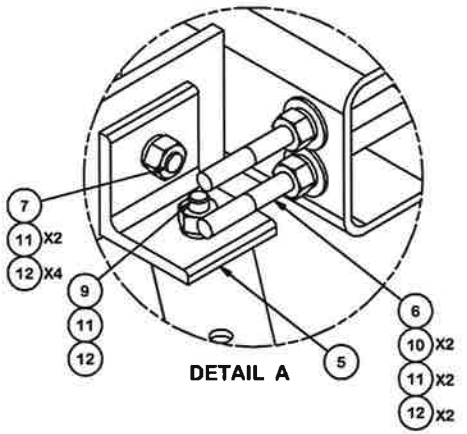
CPD NO.	DRAWN BY	ENG. APPROVAL	PART NO.
	KC8 5/30/2012		HRK14
CLASS / SUB	DRAWING USAGE	CHECKED BY	DWG. NO.
81 / 01	CUSTOMER	BMC 7/14/2014	HRK14

SITE PRO 1
A valmont COMPANY
Engineering Support Team: 1-888-753-7446
Locations: New York, NY; Atlanta, GA; Los Angeles, CA; Plymouth, IN; Salem, OR; Dallas, TX

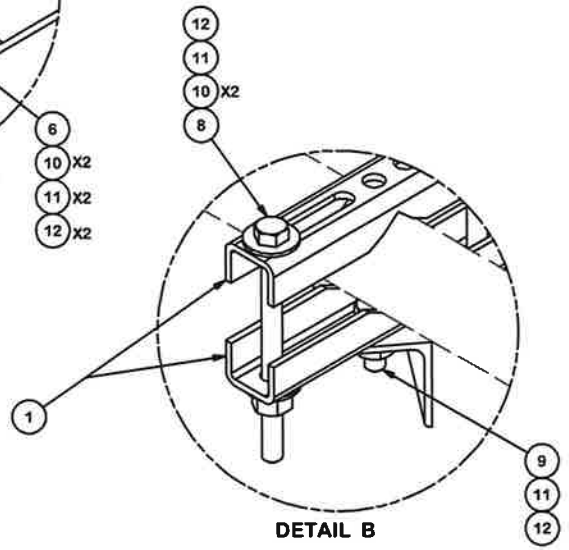
PARTS LIST						
ITEM	QTY	PART NO.	PART DESCRIPTION	LENGTH	UNIT WT.	NET WT
1	4	X-STU	STIFF ARM CHANNEL BRACKET		1.37	5.49
2	2	X-232697	TRPD-HD DIAGONAL ANGLE - SITR PRO 1	52 1/2 in	14.21	28.42
3	1	CFS	LOWER GATE FOOT WELDMENT		12.72	12.72
4	1	GBB	GATE BACKING BAR		4.53	4.53
5	2	SHCM-T	CHAIN MOUNT TIGHTENER BRACKET	3 in	1.84	3.68
6	4	G12R-15	1/2" x 15" THREADED ROD (HDG.)		0.55	2.20
6	4	G12R-12	1/2" x 12" THREADED ROD (HDG.)		0.55	2.20
7	1	G12R-6	1/2" x 6" GALV. THREADED ROD		0.33	0.33
8	4	G12065	1/2" x 6-1/2" HDG HEX BOLT GR5 FULL THREAD	6 1/2 in	0.41	1.64
9	4	G12112	1/2" x 1-1/2" HDG HEX BOLT GR5	1 1/2 in	0.15	0.59
10	16	G12FW	1/2" HDG USS FLATWASHER		0.03	0.54
11	18	G12LW	1/2" HDG LOCKWASHER		0.01	0.25
12	20	G12NUT	1/2" HDG HEAVY 2H HEX NUT		0.07	1.43
					TOTAL WT. #	65.66



SECTOR FRAME REINFORCING KIT ATTACHES TO EITHER EXISTING SECTOR FRAOME CROSS ARMS OR TO AN OPTIONAL HORIZONTAL ROUND MEMBER (SHOWN, SOLD SEPARATELY). IF PURCHASING OPTIONAL HORIZONTAL ROUND MEMBER, CORRESPONDING CROSSOVER PLATE KIT WILL NEED TO BE PURCHASED, ONE PER EXISTING ANTENNA MOUNTING PIPE.



DETAIL A



DETAIL B

TOLERANCE NOTES

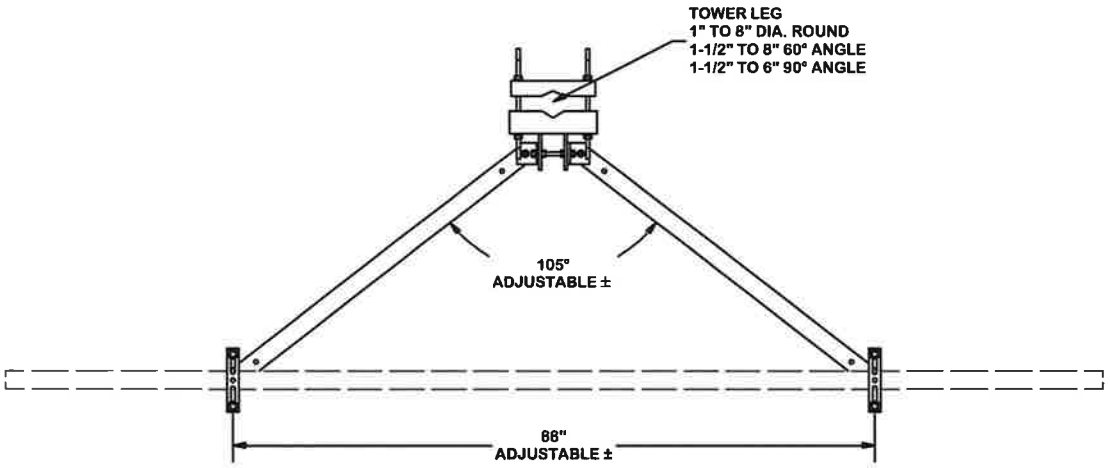
TOLERANCES ON DIMENSIONS, UNLESS OTHERWISE NOTED ARE:
SAWED, SHEARED AND GAS CUT EDGES *(± 0.030")*
DRILLED AND GAS CUT HOLES *(± 0.030")* - NO CONING OF HOLES
LASER CUT EDGES AND HOLES *(± 0.010")* - NO CONING OF HOLES
BENDS ARE ± 1/2 DEGREE
ALL OTHER MACHINING *(± 0.030")*
ALL OTHER ASSEMBLY *(± 0.060")*

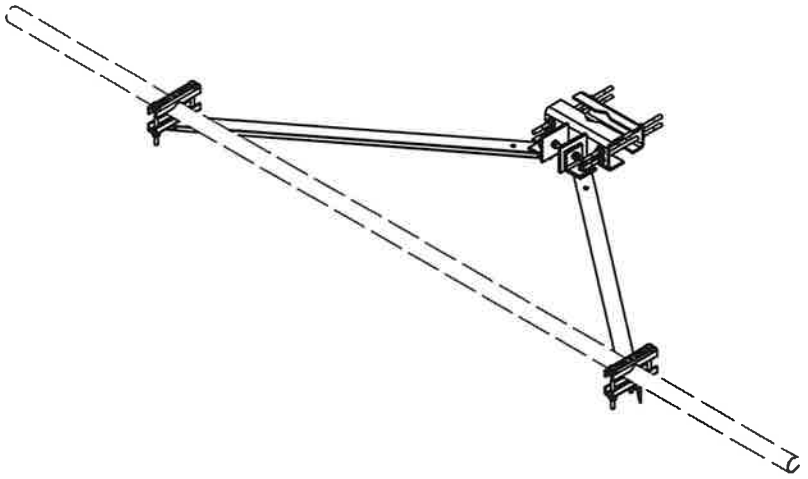
DESCRIPTION
SECTOR FRAME
STABILIZER - HORIZONTAL

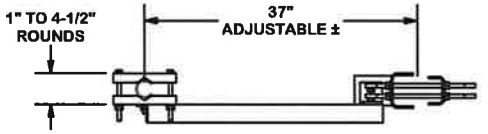
SITE PRO 1
A valmont COMPANY
Engineering Support Team: 1-888-753-7446
Locations: New York, NY; Atlanta, GA; Los Angeles, CA; Plymouth, IN; Salem, OR; Dallas, TX

CPD NO.	DRAWN BY	ENG. APPROVAL	PART NO.
5563	CEK 4/29/2014		SFS-H

CLASS	SUB	DRAWING USAGE	CHECKED BY	DWG. NO.
81	01	CUSTOMER	BMC 4/30/2014	SFS-H







TOLERANCE NOTES

TOLERANCES ON DIMENSIONS, UNLESS OTHERWISE NOTED ARE:
SAWED, SHEARED AND GAS CUT EDGES *(± 0.030")*
DRILLED AND GAS CUT HOLES *(± 0.030")* - NO CONING OF HOLES
LASER CUT EDGES AND HOLES *(± 0.010")* - NO CONING OF HOLES
BENDS ARE ± 1/2 DEGREE
ALL OTHER MACHINING *(± 0.030")*
ALL OTHER ASSEMBLY *(± 0.060")*

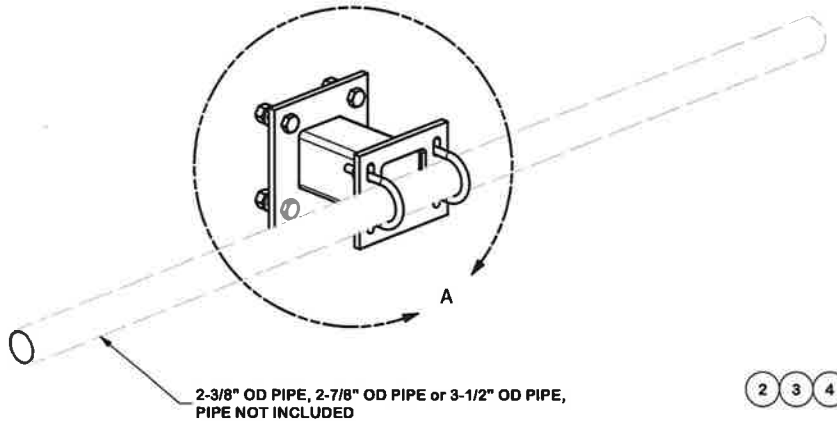
DESCRIPTION: SECTOR FRAME STABILIZER - HORIZONTAL

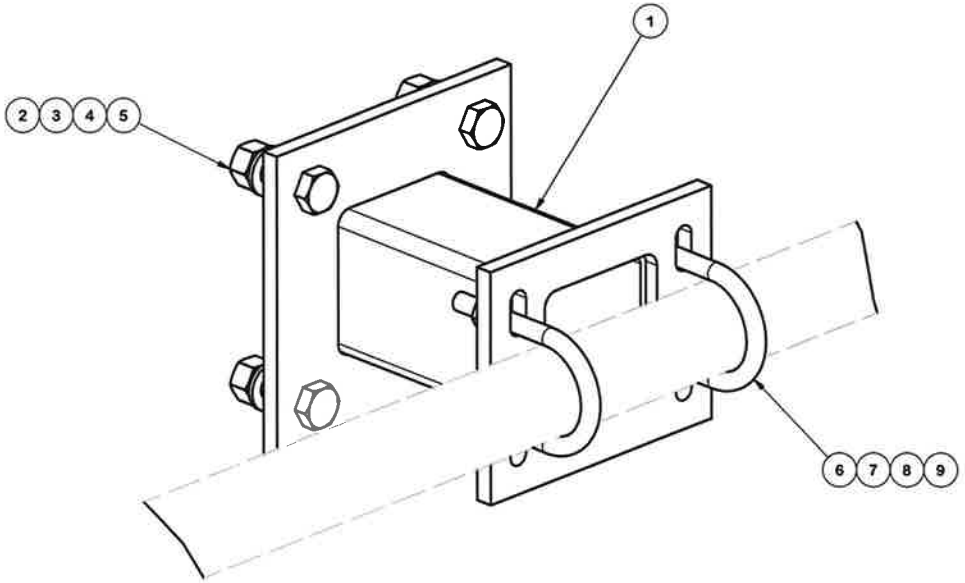
CPD NO.	DRAWN BY	ENG. APPROVAL	PART NO.
5563	CEK 4/29/2014		SFS-H

CLASS	SUB	DRAWING USAGE	CHECKED BY	DWG. NO.
81	01	CUSTOMER	BMC 4/30/2014	SFS-H

SITE PRO 1
A valmont COMPANY
Engineering Support Team: 1-888-753-7446
Locations: New York, NY; Atlanta, GA; Los Angeles, CA; Plymouth, IN; Salem, OR; Dallas, TX

PARTS LIST						
ITEM	QTY	PART NO.	PART DESCRIPTION	LENGTH	UNIT WT.	NET WT
1	1	X-WWM01	8" STAND-OFF ARM / WALL MOUNT		18.12	18.12
2	4	A582112	5/8" x 2-1/2" HDG A325 HEX BOLT	2 1/2 in	0.33	1.34
3	4	A58FW	5/8" HDG A325 FLATWASHER		0.03	0.14
4	4	G58LW	5/8" HDG LOCKWASHER		0.03	0.10
5	4	A58NUT	5/8" HDG A325 HEX NUT		0.13	0.52
6	2	X-UB1212	1/2" X 2-1/2" X 4-1/2" X 2" GALV. U-BOLT		0.66	1.31
6	2	X-UB1300	1/2" X 3" X 5" X 2" GALV U-BOLT		0.70	1.39
6	2	X-UB1358	1/2" X 3-5/8" X 5-1/2" X 3" GALV U-BOLT		0.77	1.54
7	4	G12FW	1/2" HDG USS FLATWASHER		0.03	0.14
8	4	G12LW	1/2" HDG LOCKWASHER		0.01	0.06
9	4	G12NUT	1/2" HDG HEAVY 2H HEX NUT		0.07	0.29
					TOTAL WT. #	26.06





DETAIL A

TOLERANCE NOTES

TOLERANCES ON DIMENSIONS, UNLESS OTHERWISE NOTED ARE:
SAWED, SHEARED AND GAS CUT EDGES *(± 0.030")*
DRILLED AND GAS CUT HOLES *(± 0.030")* - NO CONING OF HOLES
LASER CUT EDGES AND HOLES *(± 0.010")* - NO CONING OF HOLES
BENDS ARE ± 1/2 DEGREE
ALL OTHER MACHINING *(± 0.030")*
ALL OTHER ASSEMBLY *(± 0.060")*

DESCRIPTION: 6" STAND-OFF ANTENNA WALL MOUNT, SITE PRO 1

CPD NO.	DRAWN BY	ENG. APPROVAL	PART NO.
4714	RH18 3/23/2010		MM01

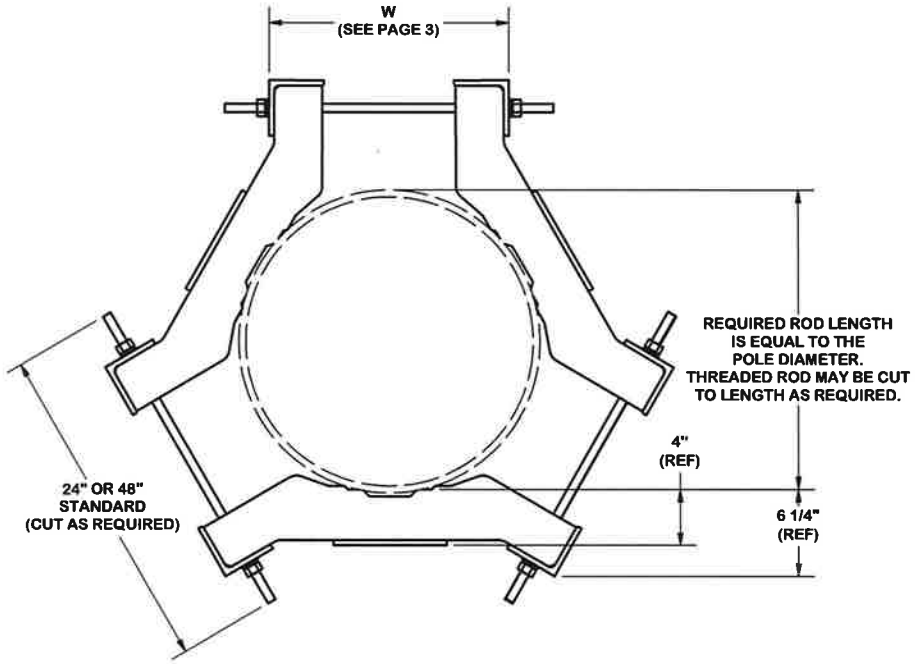
CLASS	SUB	DRAWING USAGE	CHECKED BY	DWG. NO.
81	01	CUSTOMER	BMC 5/10/2010	MM01

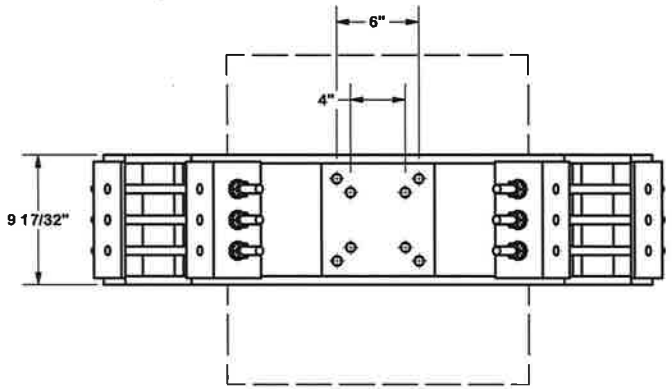
SITE PRO 1
A valmont COMPANY

Engineering Support Team:
1-888-753-7446

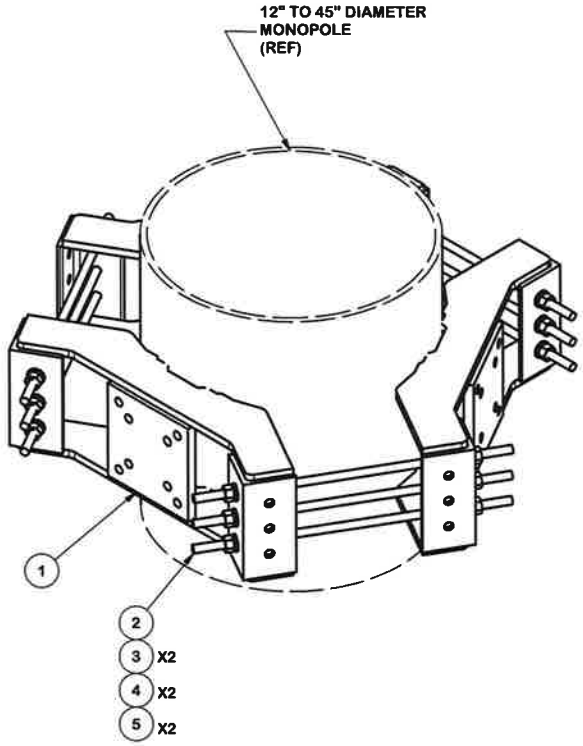
Locations:
New York, NY
Atlanta, GA
Los Angeles, CA
Plymouth, IN
Salem, OR
Dallas, TX

1 OF 1





PARTS LIST						
ITEM	QTY	PART NO.	PART DESCRIPTION	LENGTH	UNIT WT.	NET WT
1	3	X-LWRM	RING MOUNT WELDMENT		68.16	204.48
2	9	G58R-48	5/8" x 48" THREADED ROD (HDG.)		0.55	4.94
2	9	G58R-24	5/8" x 24" THREADED ROD (HDG.)		0.55	4.94
3	18	A58FW	5/8" HDG A325 FLATWASHER		0.03	0.61
4	18	G58LW	5/8" HDG LOCKWASHER		0.03	0.47
5	18	A58NUT	5/8" HDG A325 HEX NUT		0.13	2.34
					TOTAL WT. #	264.35



TOLERANCE NOTES

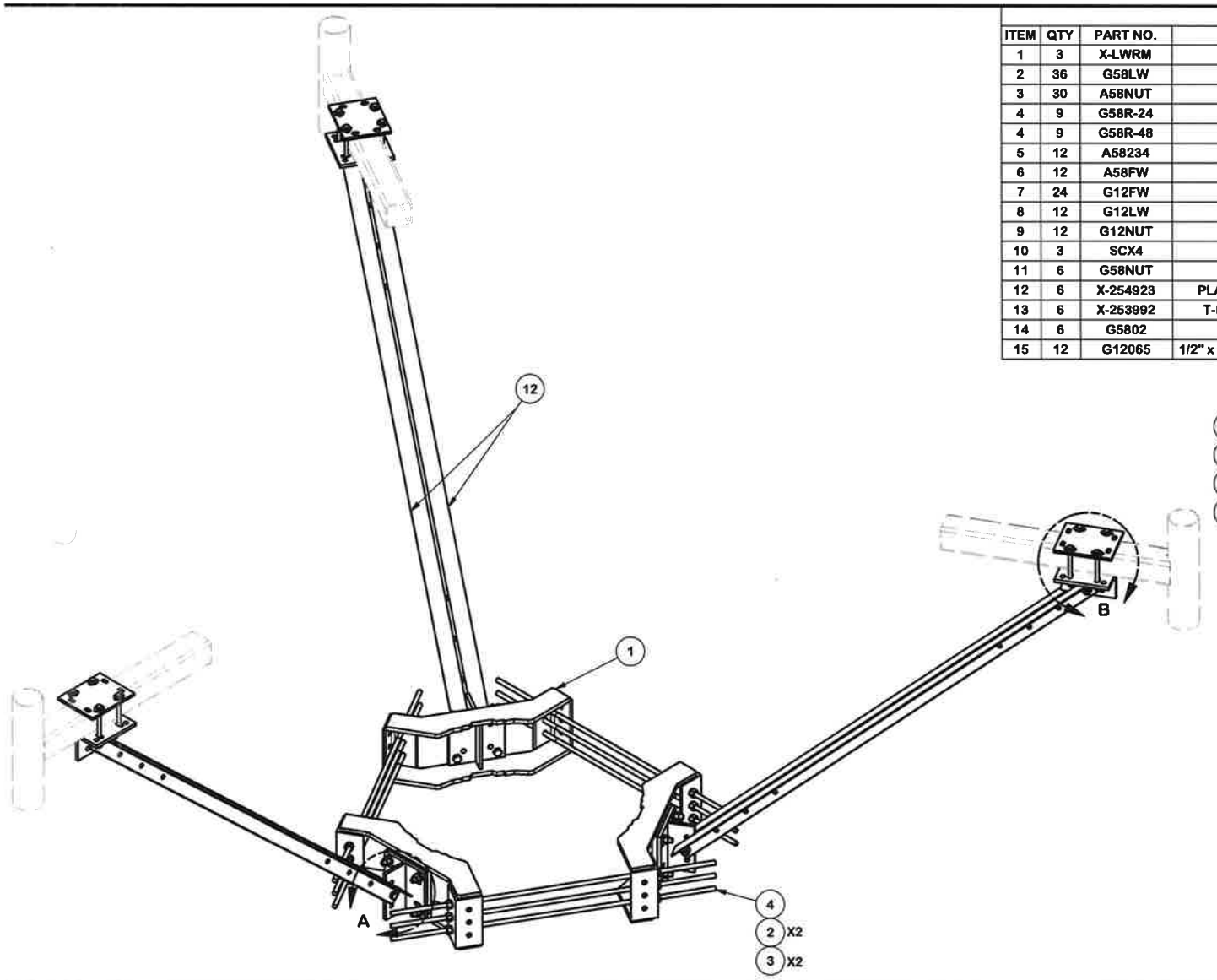
TOLERANCES ON DIMENSIONS, UNLESS OTHERWISE NOTED ARE:
SAWED, SHEARED AND GAS CUT EDGES *(± 0.030")*
DRILLED AND GAS CUT HOLES *(± 0.030")* - NO CONING OF HOLES
LASER CUT EDGES AND HOLES *(± 0.010")* - NO CONING OF HOLES
BENDS ARE ± 1/2 DEGREE
ALL OTHER MACHINING *(± 0.030")*
ALL OTHER ASSEMBLY *(± 0.060")*

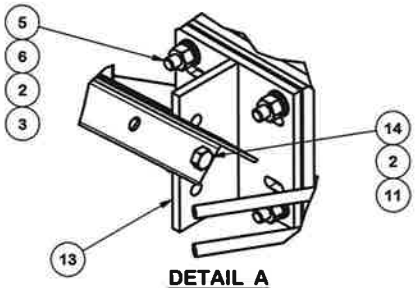
REVISION HISTORY				
	DESCRIPTION OF REVISIONS	CPD	BY	DATE
	REDRAWN IN INV, UPDATED TABLES & VIEWS		KC8	7/25/2012

DESCRIPTION
RING MOUNT
ASSEMBLY
12" TO 45" DIAMETER POLE

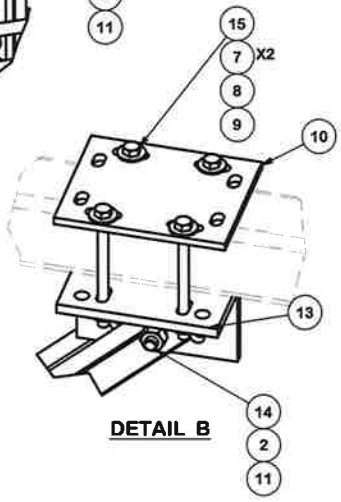
CPD NO.	DRAWN BY	ENG. APPROVAL	PART NO.
4433	BMC 3/17/2009		LWRM
CLASS / SUB	DRAWING USAGE	CHECKED BY	DWG. NO.
81 / 01	CUSTOMER	CEK 8/24/2012	LWRM

SITE PRO 1
A valmont COMPANY
Engineering Support Team: 1-888-753-7446
Locations:
New York, NY
Atlanta, GA
Los Angeles, CA
Plymouth, IN
Salem, OR
Dallas, TX





DETAIL A



DETAIL B

PARTS LIST

ITEM	QTY	PART NO.	PART DESCRIPTION	LENGTH	UNIT WT.	NET WT
1	3	X-LWRM	RING MOUNT WELDMENT		68.81	206.42
2	36	G58LW	5/8" HDG LOCKWASHER		0.03	0.94
3	30	A58NUT	5/8" HDG A325 HEX NUT		0.13	3.90
4	9	G58R-24	5/8" x 24" THREADED ROD (HDG.)		0.55	4.94
4	9	G58R-48	5/8" x 48" THREADED ROD (HDG.)		0.55	4.94
5	12	A58234	5/8" x 2-3/4" HDG A325 HEX BOLT	2 3/4 in	0.36	4.27
6	12	A58FW	5/8" HDG A325 FLATWASHER		0.03	0.41
7	24	G12FW	1/2" HDG USS FLATWASHER		0.03	0.82
8	12	G12LW	1/2" HDG LOCKWASHER		0.01	0.17
9	12	G12NUT	1/2" HDG HEAVY 2H HEX NUT		0.07	0.86
10	3	SCX4	CROSSOVER PLATE	8 1/2 In	6.02	18.06
11	6	G58NUT	5/8" HDG HEAVY 2H HEX NUT		0.13	0.78
12	6	X-254923	PLATFORM REINFORCEMENT KIT ANGLE	84 in	22.83	137.00
13	6	X-253992	T-BRACKET FOR REINFORCEMENT KIT		13.55	81.27
14	6	G5802	5/8" x 2" HDG HEX BOLT GR5		0.27	1.62
15	12	G12065	1/2" x 6-1/2" HDG HEX BOLT GR5 FULL THREAD	6 1/2 in	0.41	4.91
					TOTAL WT. #	515.92

TOLERANCE NOTES

TOLERANCES ON DIMENSIONS, UNLESS OTHERWISE NOTED ARE:
SAWED, SHEARED AND GAS CUT EDGES *(± 0.030")*
DRILLED AND GAS CUT HOLES *(± 0.030")* - NO CONING OF HOLES
LASER CUT EDGES AND HOLES *(± 0.010")* - NO CONING OF HOLES
BENDS ARE ± 1/2 DEGREE
ALL OTHER MACHINING *(± 0.030")*
ALL OTHER ASSEMBLY *(± 0.060")*

DESCRIPTION
PLATFORM REINFORCEMENT
ON A 12" T0 45" POLE
7' ANGLE

SITE PRO 1
A valmont COMPANY

Engineering Support Team: 1-888-753-7446

Locations:
New York, NY
Atlanta, GA
Los Angeles, CA
Plymouth, IN
Salem, OR
Dallas, TX

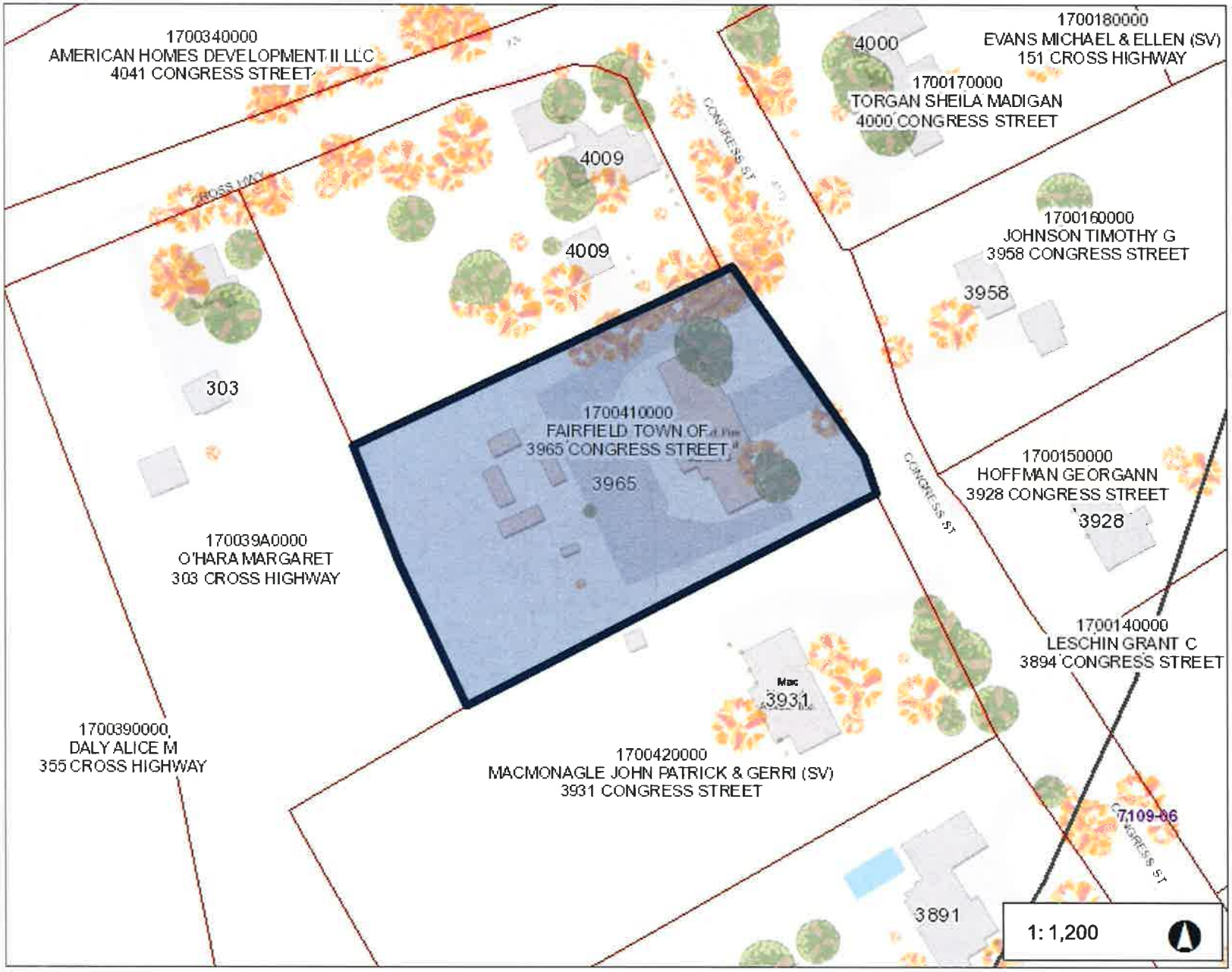
CPD NO.	DRAWN BY	ENG. APPROVAL	PART NO.
4488	CEK 7/15/2014		PRK-1245L

CLASS	SUB	DRAWING USAGE	CHECKED BY	DWG. NO.
81	01	CUSTOMER	BMC 7/22/2014	PRK-1245L

ATTACHMENT 5

Town of Fairfield

Title



Legend

- Parcels
- Local Basin Boundary
  - Major
  - Regional
  - Subregional
  - Local
- Local Basin Area

200.0 0 100.00 200.0 Feet

WGS_1984_Web_Mercator_Auxiliary_Sphere
Created by Greater Bridgeport Regional Council

This map is a user generated static output from an Internet mapping site and is for reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable.
THIS MAP IS NOT TO BE USED FOR NAVIGATION

METROCOG
Connecticut Metropolitan Council of Governments

3965 CONGRESS STREET

Location	3965 CONGRESS STREET	**Mblu**	170/ 41/ / /
Acct#	05308	**Owner**	FAIRFIELD TOWN OF
Assessment	$939,330	**Appraisal**	$1,341,900
PID	14189	**Building Count**	1

Current Value

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2017	$508,400	$833,500	$1,341,900

Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2017	$355,880	$583,450	$939,330

Owner of Record

Owner	FAIRFIELD TOWN OF
Co-Owner	
Address	725 OLD POST ROAD FAIRFIELD, CT 06824

Sale Price	$0
Certificate	
Book & Page	395/ 523
Sale Date	

Ownership History

Ownership History				
Owner	**Sale Price**	**Certificate**	**Book & Page**	**Sale Date**
FAIRFIELD TOWN OF	$0		395/ 523	

Building Information

Building 1 : Section 1

Year Built:	1959
Living Area:	3,848
Replacement Cost:	$670,756
Building Percent Good:	60
Replacement Cost Less Depreciation:	$402,500

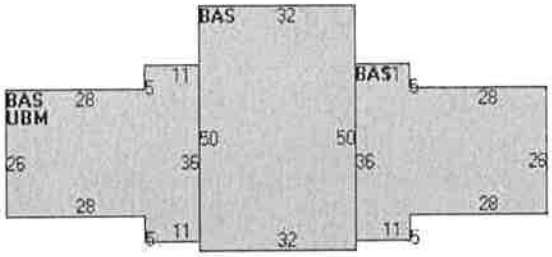
Building Attributes	
Field	**Description**

STYLE	Fire Station
MODEL	Ind/Comm
Stories:	1
Occupancy	1
Exterior Wall 1	Vinyl Siding
Exterior Wall 2	Brick/Masonry
Roof Structure	Gable/Hip
Roof Cover	Asphalt
Interior Wall 1	Minim/Masonry
Interior Wall 2	Plywood Panel
Interior Floor 1	Concr-Finished
Interior Floor 2	Vinyl/Asphalt
Heating Fuel	Gas
Heating Type	Hot Water
AC Type	None
Bldg Use	Fire Dept
Total Rooms	
Total Bedrms	00
Total Baths	0
Liv Area	
Effect Area	
1st Floor Use:	9032
Heat/AC	None
Frame Type	Masonry
Baths/Plumbing	Average

Building Photo

(http://images.vgsi.com/photos2/FairfieldCTPhotos//\02\03\13/

Building Layout



(http://images.vgsi.com/photos2/FairfieldCTPhotos//Sketches/1

Building Sub-Areas (sq ft)			
Code	Description	Gross Area	Living Area
BAS	First Floor	3,848	3,848
UBM	Basement, Unfinished	1,124	0
		4,972	3,848

Extra Features

Extra Features				
Code	Description	Size	Value	Bldg #
SPR1	SPRINKLERS-WET	4972 S.F.	$6,900	1

Land

Land Use

Use Code 9032
Description Fire Dept

Land Line Valuation

Size (Acres) 1.2
Depth 0

Zone
Neighborhood C6
Alt Land Appr No
Category

Assessed Value $583,450
Appraised Value $833,500

Outbuildings

Outbuildings						Legend
Code	**Description**	**Sub Code**	**Sub Description**	**Size**	**Value**	**Bldg #**
PAV1	PAVING-ASPHALT			5000 S.F.	$15,800	1
LT1	LIGHTS-IN W/PL			1 UNITS	$700	1
SHD2	W/LIGHTS ETC			80 S.F.	$1,200	1
GEN1	GENERATOR			1 UNITS	$10,000	1
SHD5	CELL SHED			300 SF	$16,200	1
SHD5	CELL SHED			300 SF	$16,200	1
SHD5	CELL SHED			300 SF	$16,200	1
SHD5	CELL SHED			300 SF	$16,200	1
FN4	FENCE-8' CHAIN			600 L.F.	$6,500	1

Valuation History

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2017	$508,400	$833,500	$1,341,900
2016	$508,400	$833,500	$1,341,900
2015	$508,400	$833,500	$1,341,900

Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2017	$355,880	$583,450	$939,330
2016	$355,880	$583,450	$939,330
2015	$355,880	$583,450	$939,330

ATTACHMENT 6

UNITED STATES POSTAL SERVICE®

Certificate of Mailing — Firm

Name and Address of Sender	TOTAL NO. of Pieces Listed by Sender	TOTAL NO. of Pieces Received at Post Office™	Affix Stamp Here ***Postmark with Date of Receipt.***
Kenneth C. Baldwin, Esq. Robinson & Cole LLP 280 Trumbull Street Hartford, CT 06103	2	2	neopost 06/19/2018 US POSTAGE $002.38⁰ ZIP 06103 041L12206380
	Postmaster, per *(name of receiving employee)*		ANN STREET STATION 06103 JUN 19 2018 U.S.P.S.

USPS® Tracking Number Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Special Handling	Parcel Airlift
1.	Michael C. Tetreau, First Selectman Town of Fairfield Sullivan Independence Hall 725 Old Post Road Fairfield, CT 06824				
2.	James Wendt, Planning Director Town of Fairfield Sullivan Independence Hall 725 Old Post Road Fairfield, CT 06824				
3.					
4.					
5.					
6.					