Robinson+Cole

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February 22, 2017

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**
36 Hatchetts Hill Road, Old Lyme, Connecticut

Dear Ms. Bachman:

Cellco Partnership d/b/a Verizon Wireless ("Cellco") currently maintains twelve (12) wireless telecommunications antennas at the 175-foot level on an existing 190-foot monopole tower at 36 Hatchetts Hill Road in Old Lyme, Connecticut (the "Property"). The tower is owned by Crown Castle ("Crown"). Cellco now intends to modify its facility by replacing six (6) of its existing antennas with three (3) model SBNHH-1D65B, 700/2100 MHz antennas and three (3) model SBNHH-1D65B, 1900 MHz antennas, all at the same level on the tower. Cellco also intends to replace three (3) remote radio heads ("RRHs"), install six (6) new RRHs behind its antennas and install two (2) new HYBRIFLEX™ antenna cables. Included in Attachment 1 are specifications for the replacement antennas, RRHs and HYBRIFLEX™ cables.

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 Bonnie Reemsnyder, First Selectwoman of the Town of Old Lyme, Kim Groves, Old Lyme's Land Use Administrator, Hatchetts Hill LLC, the owner of the Property and Crown, the tower owner.

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. The replacement antennas and RRHs will be located at the same 175-foot level on the 190-foot 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 modified facility 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 with 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 can support Cellco's proposed modifications. (*See* Structural Analysis Report included in Attachment 3).

A copy of the Old Lyme Assessor's Parcel Map and property owner information is included in Attachment 4.

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:
Bonnie Reemsnyder, Old Lyme First Selectwoman
Kim Groves, Old Lyme Land Use Administrator
Hatchetts Hill LLC
Crown Castle
Tim Parks

ATTACHMENT 1

Product Specifications

COMMSCOPE®

SBNHH-1D65B

Multiband Antenna, 698–896 and 2x 1695–2360 MHz, 65° horizontal beamwidth, internal RET. Both high bands share the same electrical tilt.

- Interleaved dipole technology providing for attractive, low wind load mechanical package

Electrical Specifications

Frequency Band, MHz	698–806	806–896	1695–1880	1850–1990	1920–2200	2300–2360
Gain, dBi	14.9	14.7	17.7	18.2	18.6	18.6
Beamwidth, Horizontal, degrees	68	66	69	66	63	58
Beamwidth, Vertical, degrees	12.1	10.7	5.6	5.2	5.0	4.5
Beam Tilt, degrees	0–14	0–14	0–7	0–7	0–7	0–7
USLS (First Lobe), dB	14	13	15	15	15	13
Front-to-Back Ratio at 180°, dB	27	29	28	28	28	27
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	300
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	14.3	17.4	17.9	18.2	18.3
Gain by all Beam Tilts Tolerance, dB	±0.5	±0.8	±0.4	±0.3	±0.5	±0.3
	0 ° | 14.6	0 ° | 14.5	0 ° | 17.4	0 ° | 17.8	0 ° | 18.1	0 ° | 18.2
Gain by Beam Tilt, average, dBi	7 ° | 14.6	7 ° | 14.4	3 ° | 17.5	3 ° | 17.9	3 ° | 18.3	3 ° | 18.4
	14 ° | 14.2	14 ° | 13.6	7 ° | 17.4	7 ° | 17.9	7 ° | 18.2	7 ° | 18.4
Beamwidth, Horizontal Tolerance, degrees	±2.2	±3.4	±2	±4.6	±5.7	±4.3
Beamwidth, Vertical Tolerance, degrees	±0.8	±1	±0.3	±0.2	±0.3	±0.2
USLS, beampeak to 20° above beampeak, dB	16	14	16	16	16	15
Front-to-Back Total Power at 180° ± 30°, dB	25	26	27	26	26	26
CPR at Boresight, dB	22	23	21	20	20	22
CPR at Sector, dB	13	11	16	12	11	4

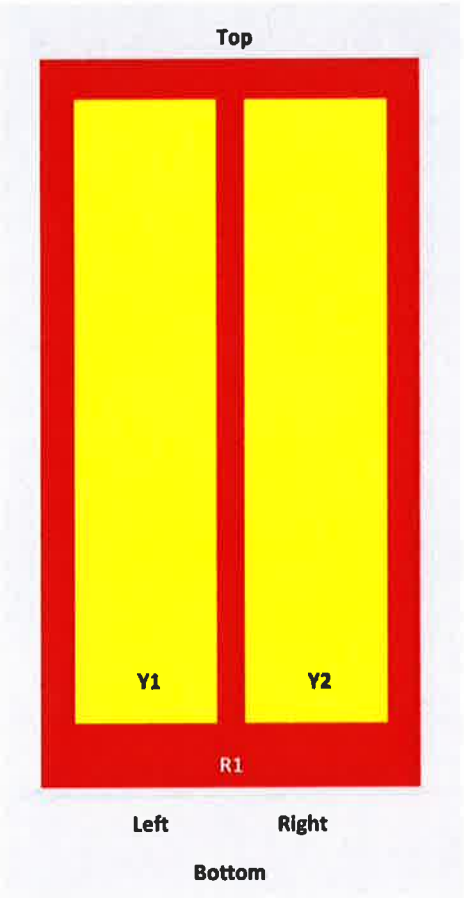
* CommScope® supports NGMN recommendations on Base Station Antenna Standards (BASTA). To learn more about the benefits of BASTA, download the whitepaper Time to Raise the Bar on BSAs.

Array Layout

Product Specifications

SBNHH-1D65B

SBNHH 65



Array	Freq (MHz)	Conns	RET (MRET)	AISG RET UID
R1	698-896	1-2	1	ANxxxxxxxxxxxxxxxx.1
Y1	1695-2360	3-4	2	ANxxxxxxxxxxxxxxxx.2
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

Product Specifications

SBNHH-1D65B

Color	Light gray
Grounding Type	RF connector inner conductor and body grounded to reflector and mounting bracket
Radiator Material	Aluminum | Low loss circuit board
Radome Material	Fiberglass, UV resistant
Reflector Material	Aluminum
RF Connector Location	Bottom
Wind Loading, frontal	618.0 N @ 150 km/h 138.9 lbf @ 150 km/h
Wind Loading, lateral	197.0 N @ 150 km/h 44.3 lbf @ 150 km/h
Wind Loading, rear	728.0 N @ 150 km/h 163.7 lbf @ 150 km/h
Wind Speed, maximum	241 km/h | 150 mph

Dimensions

Length	1851.0 mm | 72.9 in
Width	301.0 mm | 11.9 in
Depth	180.0 mm | 7.1 in
Net Weight, without mounting kit	18.4 kg | 40.6 lb

Remote Electrical Tilt (RET) Information

Input Voltage	10–30 Vdc
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 (Multi-RET)
RET Interface	8-pin DIN Female | 8-pin DIN Male
RET Interface, quantity	1 female | 1 male

Packed Dimensions

Length	2025.0 mm | 79.7 in
Width	390.0 mm | 15.4 in
Depth	296.0 mm | 11.7 in
Shipping Weight	31.0 kg | 68.3 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

SBNHH-1D65B

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.

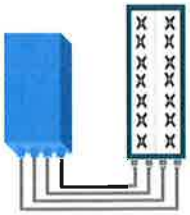
Its compactness and slim design makes the Alcatel-Lucent B13 RRH4x30-4R easy to install close to the antenna: operators can therefore locate this Remote Radio Head where RF design conditions are deemed ideal, minimizing trade-offs between available sites and RF optimum sites, together with reducing the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

TECHNICAL SPECIFICATIONS

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, -38 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.

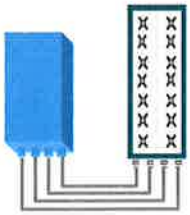
Its compactness and slim design makes the Alcatel-Lucent B25 RRH4x30 easy to install close to the antenna: operators can therefore locate this Remote Radio Head where RF design conditions are deemed ideal, minimizing trade-offs between available sites and RF optimum sites, together with reducing the 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 580W 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.

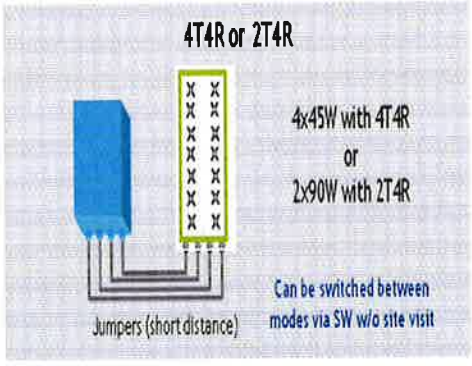
The Alcatel-Lucent B66a RRH4x45 product has four transmit RF paths, offering the possibility to **select, via software only, 2Tx or 4Tx MIMO configurations** with either 2x90W or 4x45W RF output power. It also supports 4-way Rx diversity at the 70 MHz instantaneous bandwidth.

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

TECHNICAL SPECIFICATIONS

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, -38 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

Product Data Sheet HB158-1-08U8-S8J18

HYBRIFLEX™ RRH Hybrid Feeder Cabling Solution, 1-5/8", Single-Mode Fiber

Product Description

RFS' HYBRIFLEX Remote Radio Head (RRH) hybrid feeder cabling solution combines optical fiber and DC power for RRHs in a single lightweight aluminum corrugated cable, making it the world's most innovative solution for RRH deployments.

It was developed to reduce installation complexity and costs at Cellular sites. HYBRIFLEX allows mobile operators deploying an RRH architecture to standardize the RRH installation process and eliminate the need for and cost of cable grounding. HYBRIFLEX combines optical fiber (multi-mode or single-mode) and power in a single corrugated cable. It eliminates the need for junction boxes and can connect multiple RRHs with a single feeder. Standard RFS CELLFLEX® accessories can be used with HYBRIFLEX cable. Both pre-connectorized and on-site options are available.

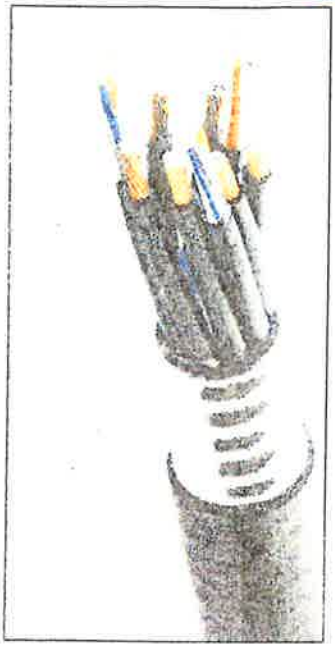


Figure 1: HYBRIFLEX Series

Features/Benefits

- Aluminum corrugated armor with outstanding bending characteristics – minimizes installation time and enables mechanical protection and shielding
- Same accessories as 1 5/8" coaxial cable
- Outer conductor grounding – Eliminates typical grounding requirements and saves on installation costs
- Lightweight solution and compact design – Decreases tower loading
- Robust cabling – Eliminates need for expensive cable trays and ducts
- Installation of tight bundled fiber optic cable pairs directly to the RRH – Reduces CAPEX and wind load by eliminating need for interconnection
- Optical fiber and power cables housed in single corrugated cable – Saves CAPEX by standardizing RRH cable installation and reducing installation requirements
- Outdoor polyethylene jacket – Ensures long-lasting cable protection

Technical Specifications

Outer Conductor Armor	Corrugated Aluminum	[mm (in)]	46.5 (1.83)
Jacket:	Polyethylene, PE	[mm (in)]	50.3 (1.98)
UV-Protection	Individual and External Jacket		Yes

Weight, Approximate	[kg/m (lb/ft)]	1.9 (1.30)
Minimum Bending Radius, Single Bending	[mm (in)]	200 (8)
Minimum Bending Radius, Repeated Bending	[mm (in)]	500 (20)
Recommended/Maximum Clamp Spacing	[m (ft)]	1.0 / 1.2 (3.25 / 4.0)

DC-Resistance Outer Conductor Armor	[Ω/km (Ω/1000ft)]	068 (0.205)
DC-Resistance Power Cable, 8.4mm² (8AWG)	[Ω/km (Ω/1000ft)]	2.1 (0.307)

Version		Single-mode OM3
Quantity, Fiber Count		16 (8 pairs)
Core/Clad	[µm]	50/125
Primary Coating (Acrylate)	[µm]	245
Buffer Diameter, Nominal	[µm]	900
Secondary Protection, Jacket, Nominal	[mm (in)]	2.0 (0.08)
Minimum Bending Radius	[mm (in)]	104 (4.1)
Insertion Loss @ wavelength 850nm	dB/km	3.0
Insertion Loss @ wavelength 1310nm	dB/km	1.0
Standards (Meets or exceeds)		UL94-V0, UL1666 RoHS Compliant

Size (Power)	[mm² (AWG)]	8.4 (8)
Quantity, Wire Count (Power)		16 (8 pairs)
Size (Alarm)	[mm² (AWG)]	0.8 (18)
Quantity, Wire Count (Alarm)		4 (2 pairs)
Type		UV protected
Strands		19
Primary Jacket Diameter, Nominal	[mm (in)]	6.8 (0.27)
Standards (Meets or exceeds)		NFPA 130, ICEA S-95-658 UL Type XHHW-2, UL 44 UL-LS Limited Smoke, UL VW-1 IEEE-383 (1974), IEEE1202/FT4 RoHS Compliant

Installation Temperature	[°C (°F)]	-40 to +65 (-40 to149)
Operation Temperature	[°C (°F)]	-40 to +65 (-40 to149)

* This data is provisional and subject to change

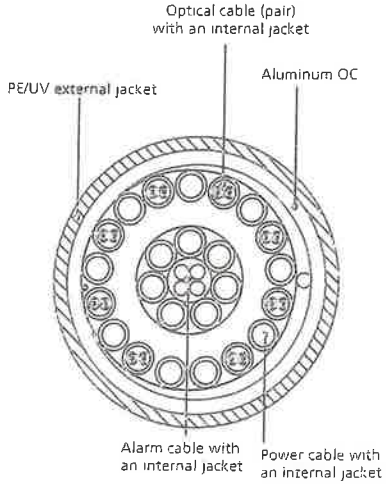


Figure 2: Construction Detail

ATTACHMENT 2

	General	Power	Density					
Site Name: Old Lyme								
Tower Height: 190Ft.								
CARRIER	**# OF CHAN.**	**WATTS ERP**	**HEIGHT**	**CALC. POWER DENS**	**FREQ.**	**MAX. PERMISS. EXP.**	**FRACTION MPE**	**Total**
*AT&T-GSM	1	315	168	880	0.0043	0.5867	0.07%	
*AT&T-GSM	6	251	168	880	0.0206	0.5867	0.35%	
*AT&T-GSM	1	350	168	1900	0.0048	1.0000	0.05%	
*AT&T-GSM	1	630	168	734	0.0086	0.4893	0.18%	
*AT&T-GSM	1	2133	168	1900	0.0292	1.0000	0.29%	
*T-Mobile	8	160	185	1945	0.0144	1.0000	0.14%	
*T-Mobile	2	639	185	2100	0.0143	1.0000	0.14%	
Verizon PCS	**11**	**2968**	**175**	**0.3833**	**1970**	**1.0000**	**38.33%**	
Verizon Cellular	**9**	**249**	**175**	**0.0263**	**869**	**0.5793**	**4.54%**	
Verizon AWS	**1**	**6907**	**175**	**0.0811**	**2145**	**1.0000**	**8.11%**	
Verizon 700	**1**	**1595**	**175**	**0.0187**	**746**	**0.4973**	**3.77%**	
								55.98%
* Source: Siting Council								

ATTACHMENT 3

PJF PAUL J. FORD & COMPANY

Date: **October 28, 2016**

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

Paul J Ford and Company
250 E. Broad Street, Suite 600
Columbus, OH 43215
614.221.6679
jjohnson@pjfweb.com

Subject: **Structural Analysis Report**

Carrier Designation:	***Verizon Wireless* Co-Locate**	
	Carrier Site Number:	117864
	Carrier Site Name:	Old Lyme RELO CT
Crown Castle Designation:	**Crown Castle BU Number:**	823529
	Crown Castle Site Name:	CT038/EastLyme/ I-95/ X72
	Crown Castle JDE Job Number:	392785
	Crown Castle Work Order Number:	1319024
	Crown Castle Application Number:	354095 Rev. 4
Engineering Firm Designation:	**Paul J Ford and Company Project Number:**	37516-3105.004.7805
Site Data:	**38 Hatchetts Hill Road, Old Lyme, New London County, CT**	
	Latitude *41° 19' 3.26"*, Longitude *-72° 16' 11.87"*	
	190 Foot - Monopole Tower	

Dear Timothy Howell,

Paul J Ford and Company is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above mentioned tower. This analysis has been performed in accordance with the Crown Castle Structural 'Statement of Work' and the terms of Crown Castle Purchase Order Number 963645, in accordance with application 354095, revision 4.

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

LC7: Existing + Reserved + Proposed Equipment **Sufficient Capacity**
Note: See Table I and Table II for the proposed and existing/reserved loading, respectively.

This analysis has been performed in accordance with the 2016 Connecticut State Building Code based upon an ultimate 3-second gust wind speed of 135 mph converted to a nominal 3-second gust wind speed of 105 mph per Section 1609.3 and Appendix N as required for use in the TIA-222-G Standard per Exception #5 of Section 1609.1.1. Exposure Category B with a maximum topographic factor, Kzt, of 1.0 and Risk Category II were used in this analysis.

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

Respectfully submitted by:

Joshua Johnson, E.I.
Structural Designer

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

10-28-16

tnxTower Report - version 7.0.5.1

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 190 ft Monopole tower designed by PIROD MANUFACTURES INC. in December of 1998. The tower was originally designed for a wind speed of 85 mph per TIA/EIA-222-F.

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 135 mph converted to a nominal 3-second gust wind speed of 105 mph per Section 1609.3 and Appendix N as required for use in the TIA-222-G Standard per Exception #5 of Section 1609.1.1. Exposure Category B with a maximum topographic factor, Kzt, of 1.0 and Risk Category II 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
175.0	175.0	6	andrew	SBNHH-1D65B w/ Mount Pipe	2 (E)	1-5/8	-
		3	alcatel lucent	RRH4X45-AWS4 B66			
		3	alcatel lucent	RRH2X60-PCS			
		3	alcatel lucent	RRH2x60-700			
		2	rfs celwave	DB-T1-6Z-12AB-0Z			

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
190.0	190.0	3	rfs celwave	APX16DWV-16DWV-S-E-A20 w/ Mount Pipe	12 (I)	1-5/8	1
		6	rfs celwave	ATMAA1412D-1A20			
		1	tower mounts	Platform Mount [LP 405-1]			
175.0	178.0	1	gps	GPS_A	1 (I) 12 (I)	1/2 1-5/8	1
	175.0	6	antel	LPA-80080/4CF w/ Mount Pipe			
		6	rfs celwave	FD9R6004/2C-3L			
		1	tower mounts	Platform Mount [LP 403-1]			
		3	antel	BXA-171085-8BF-EDIN-0 w/ Mount Pipe	-	-	3
		3	antel	BXA-70063/6CF w/ Mount Pipe			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
165.0	168.0	3	andrew	SBNHH-1D65A w/ Mount Pipe	1 (C) 2 (C) 12 (I) 2 (I)	3/8 3/4 1-1/4 2	2
		3	ericsson	RRUS12/RRUS A2			
		3	ericsson	RRUS 11			1
		3	kmw communications	AM-X-CD-14-65-00T-RET w/ Mount Pipe			
		3	powerwave technologies	7770.00 w/ Mount Pipe			
		6	powerwave technologies	TT19-08BP111-001			
		1	raycap	DC6-48-60-18-8F			
	165.0	1	-	Flat-Membered Handrail			
		1	tower mounts	Platform Mount [LP 714-1]			

Notes:
1) Existing Equipment
2) Reserved Equipment
3) Equipment To Be Removed
(I) Coax mounted internally and shielded from the wind. See coax layout in Appendix B.
(E) Coax mounted externally and shielded from the wind. See coax layout in Appendix B.
(C) Coax mounted within a 2" conduit and shielded from the wind. See coax layout in Appendix B.

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	FDH, 1423I91600, 3/27/2014	3500965	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	Pirod, A-115008-Q-77682, 12/09/1998	3505479	CCISITES
4-POST-MODIFICATION INSPECTION	PJF, 32912-0003, 1/9/2012	3826084	CCISITES
4-TOWER MANUFACTURER DRAWINGS	Pirod, A-115008-Q-77682, 12/09/1998	3500968	CCISITES

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 and the referenced drawings.
4) Monopole was reinforced in conformance with the referenced modification drawings.
5) In accordance with discussions with CCI Corporate Engineering: Based on the assumption that the monopole manufacturer (ROHN/PiRod) has designed the flange plates at splices to adequately develop the full capacity of the unreinforced shaft section using unpublished and/or proprietary methodologies, we are assuming that if our analysis shows that both the existing shaft and the existing flange bolts are at a usage capacity of 100% or less, then the existing flange plates are at a usage capacity of 100% or less and no additional analysis of the flange plate is required.
6) The monopole is sufficient without the shaft reinforcements, therefore, the shaft reinforcements was excluded from the analysis and the Pirod assumption mentioned above (Assumption #5) was used for all flanges in this analysis.

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	190 - 160	Pole	P24x0.375	1	-12.53	1052.07	40.7	Pass
L2	160 - 140	Pole	30" x 0.375"	2	-16.47	1311.06	66.3	Pass
L3	140 - 120	Pole	36" x 0.375"	3	-21.06	1490.10	78.9	Pass
L4	120 - 100	Pole	42" x 0.375"	4	-26.28	1668.87	85.7	Pass
L5	100 - 80	Pole	P48x0.375	5	-32.11	1847.49	89.6	Pass
L6	80 - 60	Pole	P54x3/8	6	-38.55	2026.00	92.0	Pass
L7	60 - 40	Pole	P60x3/8	7	-45.60	2204.43	93.4	Pass
L8	40 - 20	Pole	P60x1/2	8	-54.58	3125.69	82.9	Pass
L9	20 - 0	Pole	P60x5/8	9	-65.38	4139.15	76.9	Pass
							Summary	
						Pole (L7)	93.4	Pass
						RATING =	**93.4**	**Pass**

Table 5 - Tower Component Stresses vs. Capacity – LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1,2	Flange Connection	160	40.7	Pass
1,2	Flange Connection	140	67.1	Pass
1,2	Flange Connection	120	82.1	Pass
1,2,3	Flange Connection	100	90.8	Pass
1,2,3	Flange Connection	80	96.0	Pass
1,2,3	Flange Connection	60	92.0	Pass
1,2,3	Flange Connection	40	93.4	Pass
1,2,3	Flange Connection	20	82.9	Pass
1	Anchor Rods	0	57.6	Pass
1,2	Base Plate	0	76.9	Pass
1	Base Foundation	0	77.3	Pass

Structure Rating (max from all components) =	**96.0%**

Notes:
1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity consumed.
2) See Assumption #5.
3) See Assumption #6.

4.1) Recommendations

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

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 New London County, Connecticut.
2) ASCE 7-10 Wind Data is used (wind speeds converted to nominal values).
3) Basic wind speed of 105.00 mph.
4) Structure Class II.
5) Exposure Category B.
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 50.00 mph is used in combination with ice.
12) Temperature drop of 50.00 °F.
13) Deflections calculated using a wind speed of 60.00 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		

Pole Section Geometry

Section	Elevation ft	Section Length ft	Pole Size	Pole Grade	Socket Length ft
L1	190.0000-160.0000	30.0000	P24x0.375	A53-B-42 (42 ksi)	
L2	160.0000-140.0000	20.0000	30" x 0.375"	A53-B-42 (42 ksi)	
L3	140.0000-	20.0000	36" x 0.375"	A53-B-42	

Section	Elevation ft	Section Length ft	Pole Size	Pole Grade	Socket Length ft
	120.0000			(42 ksi)	
L4	120.0000-100.0000	20.0000	42" x 0.375"	A53-B-42 (42 ksi)	
L5	100.0000-80.0000	20.0000	P48x0.375	A53-B-42 (42 ksi)	
L6	80.0000-60.0000	20.0000	P54x3/8	A53-B-42 (42 ksi)	
L7	60.0000-40.0000	20.0000	P60x3/8	A53-B-42 (42 ksi)	
L8	40.0000-20.0000	20.0000	P60x1/2	A53-B-42 (42 ksi)	
L9	20.0000-0.0000	20.0000	P60x5/8	A53-B-42 (42 ksi)	

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
LDF7-50A(1-5/8")	C	No	Inside Pole	190.0000 - 0.0000	12	No Ice	0.0000	0.82
						1/2" Ice	0.0000	0.82
						1" Ice	0.0000	0.82
*								
LDF4-50A(1/2")	C	No	Inside Pole	175.0000 - 0.0000	1	No Ice	0.0000	0.15
						1/2" Ice	0.0000	0.15
						1" Ice	0.0000	0.15
LDF7-50A(1-5/8")	C	No	Inside Pole	175.0000 - 0.0000	12	No Ice	0.0000	0.82
						1/2" Ice	0.0000	0.82
						1" Ice	0.0000	0.82
HB158-1-08U8-S8J18(1-5/8")	C	No	CaAa (Out Of Face)	175.0000 - 0.0000	1	No Ice	0.0000	1.30
						1/2" Ice	0.0000	2.81
						1" Ice	0.0000	4.94
HB158-1-08U8-S8J18(1-5/8")	C	No	CaAa (Out Of Face)	175.0000 - 0.0000	1	No Ice	0.1980	1.30
						1/2" Ice	0.2980	2.81
						1" Ice	0.3980	4.94
*								
LDF6-50A(1-1/4")	C	No	Inside Pole	165.0000 - 0.0000	12	No Ice	0.0000	0.66
						1/2" Ice	0.0000	0.66
						1" Ice	0.0000	0.66
WC166(2")	C	No	Inside Pole	165.0000 - 0.0000	2	No Ice	0.0000	2.80
						1/2" Ice	0.0000	2.80
						1" Ice	0.0000	2.80
FB-L98B-034-XXX(3/8")	C	No	Inside Pole	165.0000 - 0.0000	1	No Ice	0.0000	0.06
						1/2" Ice	0.0000	0.06
						1" Ice	0.0000	0.06
WR-VG86ST-BRD(3/4")	C	No	Inside Pole	165.0000 - 0.0000	2	No Ice	0.0000	0.58
						1/2" Ice	0.0000	0.58
						1" Ice	0.0000	0.58
*								
Climbing Ladder	A	No	CaAa (Out Of Face)	190.0000 - 10.0000	1	No Ice	0.2900	7.90
						1/2" Ice	0.5500	10.60
						1" Ice	0.8100	13.30
1" Flat Reinforcement	A	No	CaAa (Out Of Face)	23.5000 - 17.2500	1	No Ice	0.1667	0.00
						1/2" Ice	0.2778	0.00
						1" Ice	0.3889	0.00
1" Flat Reinforcement	A	No	CaAa (Out Of Face)	90.5000 - 36.7500	1	No Ice	0.1667	0.00
						1/2" Ice	0.2778	0.00
						1" Ice	0.3889	0.00
1" Flat Reinforcement	A	No	CaAa (Out Of Face)	106.7500 - 98.2500	1	No Ice	0.1667	0.00
						1/2" Ice	0.2778	0.00
						1" Ice	0.3889	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	190.0000-160.0000	A	0.000	0.000	0.000	8.700	0.24
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	2.970	0.56
L2	160.0000-140.0000	A	0.000	0.000	0.000	5.800	0.16
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	3.960	0.74
L3	140.0000-120.0000	A	0.000	0.000	0.000	5.800	0.16
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	3.960	0.74
L4	120.0000-100.0000	A	0.000	0.000	0.000	6.925	0.16
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	3.960	0.74
L5	100.0000-80.0000	A	0.000	0.000	0.000	7.842	0.16
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	3.960	0.74
L6	80.0000-60.0000	A	0.000	0.000	0.000	9.133	0.16
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	3.960	0.74
L7	60.0000-40.0000	A	0.000	0.000	0.000	9.133	0.16
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	3.960	0.74
L8	40.0000-20.0000	A	0.000	0.000	0.000	6.925	0.16
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	3.960	0.74
L9	20.0000-0.0000	A	0.000	0.000	0.000	3.358	0.08
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	3.960	0.74

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	190.0000-160.0000	A	1.772	0.000	0.000	0.000	36.348	0.52
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	8.287	0.81
L2	160.0000-140.0000	A	1.745	0.000	0.000	0.000	23.950	0.35
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	10.941	1.07
L3	140.0000-120.0000	A	1.720	0.000	0.000	0.000	23.692	0.34
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	10.842	1.06
L4	120.0000-100.0000	A	1.692	0.000	0.000	0.000	27.059	0.34
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	10.728	1.06
L5	100.0000-80.0000	A	1.658	0.000	0.000	0.000	29.602	0.34
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	10.593	1.05
L6	80.0000-60.0000	A	1.617	0.000	0.000	0.000	33.139	0.33
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	10.429	1.04
L7	60.0000-40.0000	A	1.564	0.000	0.000	0.000	32.345	0.33
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	10.215	1.03
L8	40.0000-20.0000	A	1.486	0.000	0.000	0.000	24.606	0.32
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	9.903	1.01
L9	20.0000-0.0000	A	1.331	0.000	0.000	0.000	11.094	0.15
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	9.285	0.97

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
L1	190.0000-160.0000	-0.1077	-0.3020	-0.1897	-0.8513
L2	160.0000-140.0000	-0.2152	-0.2397	-0.3917	-0.7640
L3	140.0000-120.0000	-0.2212	-0.2464	-0.4214	-0.8200
L4	120.0000-100.0000	-0.2226	-0.3210	-0.4300	-1.0042
L5	100.0000-80.0000	-0.2241	-0.3831	-0.4378	-1.1600
L6	80.0000-60.0000	-0.2245	-0.4684	-0.4387	-1.3565
L7	60.0000-40.0000	-0.2274	-0.4744	-0.4490	-1.3824
L8	40.0000-20.0000	-0.2320	-0.3345	-0.4612	-1.0570
L9	20.0000-0.0000	-0.2397	-0.0963	-0.4832	-0.3877

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
(2) ATMAA1412D-1A20	A	From Leg	4.0000 0.00 0.00	0.0000	190.0000	No Ice 1/2" Ice 1" Ice	1.0000 1.1259 1.2593	0.4074 0.4965 0.5926	0.01 0.02 0.03
(2) ATMAA1412D-1A20	B	From Leg	4.0000 0.00 0.00	0.0000	190.0000	No Ice 1/2" Ice 1" Ice	1.0000 1.1259 1.2593	0.4074 0.4965 0.5926	0.01 0.02 0.03
(2) ATMAA1412D-1A20	C	From Leg	4.0000 0.00 0.00	0.0000	190.0000	No Ice 1/2" Ice 1" Ice	1.0000 1.1259 1.2593	0.4074 0.4965 0.5926	0.01 0.02 0.03
APX16DWV-16DWV-S-E-A20 w/ Mount Pipe	A	From Leg	4.0000 0.00 0.00	0.0000	190.0000	No Ice 1/2" Ice 1" Ice	6.8239 7.2751 7.7192	3.4938 4.2631 4.9598	0.06 0.11 0.16
APX16DWV-16DWV-S-E-A20 w/ Mount Pipe	B	From Leg	4.0000 0.00 0.00	0.0000	190.0000	No Ice 1/2" Ice 1" Ice	6.8239 7.2751 7.7192	3.4938 4.2631 4.9598	0.06 0.11 0.16
APX16DWV-16DWV-S-E-A20 w/ Mount Pipe	C	From Leg	4.0000 0.00 0.00	0.0000	190.0000	No Ice 1/2" Ice 1" Ice	6.8239 7.2751 7.7192	3.4938 4.2631 4.9598	0.06 0.11 0.16
Platform Mount [LP 405-1]	C	None		0.0000	190.0000	No Ice 1/2" Ice 1" Ice	20.8000 28.1000 35.4000	20.8000 28.1000 35.4000	1.80 2.07 2.33
*									
(2) SBNHH-1D65B w/ Mount Pipe	A	From Leg	4.0000 0.00 0.00	0.0000	175.0000	No Ice 1/2" Ice 1" Ice	8.4186 8.9558 9.4801	7.4197 8.4535 9.3468	0.08 0.15 0.23
(2) SBNHH-1D65B w/ Mount Pipe	B	From Leg	4.0000 0.00 0.00	0.0000	175.0000	No Ice 1/2" Ice 1" Ice	8.4186 8.9558 9.4801	7.4197 8.4535 9.3468	0.08 0.15 0.23
(2) SBNHH-1D65B w/ Mount Pipe	C	From Leg	4.0000 0.00 0.00	0.0000	175.0000	No Ice 1/2" Ice 1" Ice	8.4186 8.9558 9.4801	7.4197 8.4535 9.3468	0.08 0.15 0.23
(2) RRH2x60-700	A	From Leg	4.0000 0.00 0.00	0.0000	175.0000	No Ice 1/2" Ice	3.5002 3.7609 4.0285	1.8157 2.0519 2.2894	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
RRH2x60-700	B	From Leg	4.0000 0.00 0.00	0.0000	175.0000	1" Ice No Ice 1/2" Ice 1" Ice	3.5002 3.7609 4.0285	1.8157 2.0519 2.2894	0.06 0.08 0.11
(2) DB-T1-6Z-12AB-0Z	B	From Leg	4.0000 0.00 0.00	0.0000	175.0000	1" Ice No Ice 1/2" Ice 1" Ice	3.3636 3.5972 3.8383	2.1921 2.3950 2.6056	0.02 0.04 0.08
RRH4X45-AWS4 B66	B	From Leg	4.0000 0.00 0.00	0.0000	175.0000	1" Ice No Ice 1/2" Ice 1" Ice	2.6600 2.8781 3.1037	1.5861 1.7690 1.9588	0.06 0.08 0.11
(2) RRH4X45-AWS4 B66	C	From Leg	4.0000 0.00 0.00	0.0000	175.0000	1" Ice No Ice 1/2" Ice 1" Ice	2.6600 2.8781 3.1037	1.5861 1.7690 1.9588	0.06 0.08 0.11
RRH2X60-PCS	B	From Leg	4.0000 0.00 0.00	0.0000	175.0000	1" Ice No Ice 1/2" Ice 1" Ice	2.2000 2.3926 2.5926	1.7233 1.9015 2.0870	0.06 0.08 0.10
(2) RRH2X60-PCS	C	From Leg	4.0000 0.00 0.00	0.0000	175.0000	1" Ice No Ice 1/2" Ice 1" Ice	2.2000 2.3926 2.5926	1.7233 1.9015 2.0870	0.06 0.08 0.10
GPS_A	B	From Face	4.0000 0.00 3.00	0.0000	175.0000	1" Ice No Ice 1/2" Ice 1" Ice	0.2550 0.3205 0.3934	0.2550 0.3205 0.3934	0.00 0.00 0.01
(2) LPA-80080/4CF w/ Mount Pipe	A	From Leg	4.0000 0.00 0.00	0.0000	175.0000	1" Ice No Ice 1/2" Ice 1" Ice	2.8561 3.2195 3.5922	6.5689 7.1948 7.8369	0.03 0.08 0.13
(2) LPA-80080/4CF w/ Mount Pipe	B	From Leg	4.0000 0.00 0.00	0.0000	175.0000	1" Ice No Ice 1/2" Ice 1" Ice	2.8561 3.2195 3.5922	6.5689 7.1948 7.8369	0.03 0.08 0.13
(2) LPA-80080/4CF w/ Mount Pipe	C	From Leg	4.0000 0.00 0.00	0.0000	175.0000	1" Ice No Ice 1/2" Ice 1" Ice	2.8561 3.2195 3.5922	6.5689 7.1948 7.8369	0.03 0.08 0.13
(2) FD9R6004/2C-3L	A	From Leg	4.0000 0.00 0.00	0.0000	175.0000	1" Ice No Ice 1/2" Ice 1" Ice	0.3142 0.3862 0.4656	0.0762 0.1189 0.1685	0.00 0.01 0.01
(2) FD9R6004/2C-3L	B	From Leg	4.0000 0.00 0.00	0.0000	175.0000	1" Ice No Ice 1/2" Ice 1" Ice	0.3142 0.3862 0.4656	0.0762 0.1189 0.1685	0.00 0.01 0.01
(2) FD9R6004/2C-3L	C	From Leg	4.0000 0.00 0.00	0.0000	175.0000	1" Ice No Ice 1/2" Ice 1" Ice	0.3142 0.3862 0.4656	0.0762 0.1189 0.1685	0.00 0.01 0.01
Platform Mount [LP 403-1]	C	None		0.0000	175.0000	No Ice 1/2" Ice 1" Ice	18.8500 24.3000 29.7500	18.8500 24.3000 29.7500	1.50 1.80 2.09
SBNHH-1D65A w/ Mount Pipe	A	From Leg	4.0000 0.00 3.00	0.0000	165.0000	No Ice 1/2" Ice 1" Ice	5.8154 6.2024 6.5968	5.0515 5.7157 6.3790	0.06 0.11 0.17
SBNHH-1D65A w/ Mount Pipe	B	From Leg	4.0000 0.00 3.00	0.0000	165.0000	No Ice 1/2" Ice	5.8154 6.2024 6.5968	5.0515 5.7157 6.3790	0.06 0.11 0.17

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
SBNHH-1D65A w/ Mount Pipe	C	From Leg	4.0000 0.00 3.00	0.0000	165.0000	1" Ice No Ice 1/2" Ice 1" Ice	5.8154 6.2024 6.5968	5.0515 5.7157 6.3790	0.06 0.11 0.17
RRUS12/RRUS A2	A	From Leg	4.0000 0.00 3.00	0.0000	165.0000	1" Ice No Ice 1/2" Ice 1" Ice	3.1435 3.3632 3.5904	1.8351 2.0121 2.1965	0.07 0.10 0.13
RRUS12/RRUS A2	B	From Leg	4.0000 0.00 3.00	0.0000	165.0000	1" Ice No Ice 1/2" Ice 1" Ice	3.1435 3.3632 3.5904	1.8351 2.0121 2.1965	0.07 0.10 0.13
RRUS12/RRUS A2	C	From Leg	4.0000 0.00 3.00	0.0000	165.0000	1" Ice No Ice 1/2" Ice 1" Ice	3.1435 3.3632 3.5904	1.8351 2.0121 2.1965	0.07 0.10 0.13
AM-X-CD-14-65-00T-RET w/ Mount Pipe	A	From Leg	4.0000 0.00 3.00	0.0000	165.0000	1" Ice No Ice 1/2" Ice 1" Ice	5.2316 5.6179 6.0119	4.0153 4.6330 5.2567	0.05 0.10 0.15
AM-X-CD-14-65-00T-RET w/ Mount Pipe	B	From Leg	4.0000 0.00 3.00	0.0000	165.0000	1" Ice No Ice 1/2" Ice 1" Ice	5.2316 5.6179 6.0119	4.0153 4.6330 5.2567	0.05 0.10 0.15
AM-X-CD-14-65-00T-RET w/ Mount Pipe	C	From Leg	4.0000 0.00 3.00	0.0000	165.0000	1" Ice No Ice 1/2" Ice 1" Ice	5.2316 5.6179 6.0119	4.0153 4.6330 5.2567	0.05 0.10 0.15
RRUS 11	A	From Leg	4.0000 0.00 3.00	0.0000	165.0000	1" Ice No Ice 1/2" Ice 1" Ice	2.7908 2.9984 3.2134	1.1923 1.3395 1.4957	0.05 0.07 0.10
RRUS 11	B	From Leg	4.0000 0.00 3.00	0.0000	165.0000	1" Ice No Ice 1/2" Ice 1" Ice	2.7908 2.9984 3.2134	1.1923 1.3395 1.4957	0.05 0.07 0.10
RRUS 11	C	From Leg	4.0000 0.00 3.00	0.0000	165.0000	1" Ice No Ice 1/2" Ice 1" Ice	2.7908 2.9984 3.2134	1.1923 1.3395 1.4957	0.05 0.07 0.10
7770.00 w/ Mount Pipe	A	From Leg	4.0000 0.00 3.00	0.0000	165.0000	1" Ice No Ice 1/2" Ice 1" Ice	5.8095 6.2677 6.6966	4.6091 5.5082 6.2127	0.09 0.14 0.21
7770.00 w/ Mount Pipe	B	From Leg	4.0000 0.00 3.00	0.0000	165.0000	1" Ice No Ice 1/2" Ice 1" Ice	5.8095 6.2677 6.6966	4.6091 5.5082 6.2127	0.09 0.14 0.21
7770.00 w/ Mount Pipe	C	From Leg	4.0000 0.00 3.00	0.0000	165.0000	1" Ice No Ice 1/2" Ice 1" Ice	5.8095 6.2677 6.6966	4.6091 5.5082 6.2127	0.09 0.14 0.21
DC6-48-60-18-8F	C	From Leg	4.0000 0.00 3.00	0.0000	165.0000	1" Ice No Ice 1/2" Ice 1" Ice	0.9167 1.4583 1.6431	0.9167 1.4583 1.6431	0.02 0.04 0.06
(2) TT19-08BP111-001	A	From Leg	4.0000 0.00 3.00	0.0000	165.0000	1" Ice No Ice 1/2" Ice 1" Ice	0.5527 0.6487 0.7520	0.4455 0.5342 0.6303	0.02 0.02 0.03
(2) TT19-08BP111-001	B	From Leg	4.0000 0.00 3.00	0.0000	165.0000	1" Ice No Ice 1/2" Ice 1" Ice	0.5527 0.6487 0.7520	0.4455 0.5342 0.6303	0.02 0.02 0.03

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
(2) TT19-08BP111-001	C	From Leg	4.0000 0.00 3.00	0.0000	165.0000	No Ice 1/2" Ice 1" Ice	0.5527 0.6487 0.7520	0.4455 0.5342 0.6303	0.02 0.02 0.03
Platform Mount [LP 714-1]	C	None		0.0000	165.0000	No Ice 1/2" Ice 1" Ice	37.4700 44.2300 50.9900	37.4700 44.2300 50.9900	1.60 2.04 2.48
Flat-Membered Handrail	C	None		0.0000	165.0000	No Ice 1/2" Ice 1" Ice	12.0000 17.9000 22.8000	12.0000 17.9000 22.8000	0.46 0.63 0.81

Tower Pressures - No Ice

G_H = 1.100

Section Elevation ft	z ft	K_Z	q_z psf	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 190.0000-160.0000	175.0000	1.16	31.09	60.000	A	0.000	60.000	60.000	100.00	0.000	8.700
					B	0.000	60.000		100.00	0.000	0.000
					C	0.000	60.000		100.00	0.000	2.970
L2 160.0000-140.0000	150.0000	1.11	29.75	50.000	A	0.000	50.000	50.000	100.00	0.000	5.800
					B	0.000	50.000		100.00	0.000	0.000
					C	0.000	50.000		100.00	0.000	3.960
L3 140.0000-120.0000	130.0000	1.065	28.56	60.000	A	0.000	60.000	60.000	100.00	0.000	5.800
					B	0.000	60.000		100.00	0.000	0.000
					C	0.000	60.000		100.00	0.000	3.960
L4 120.0000-100.0000	110.0000	1.016	27.23	70.000	A	0.000	70.000	70.000	100.00	0.000	6.925
					B	0.000	70.000		100.00	0.000	0.000
					C	0.000	70.000		100.00	0.000	3.960
L5 100.0000-80.0000	90.0000	0.959	25.71	80.000	A	0.000	80.000	80.000	100.00	0.000	7.842
					B	0.000	80.000		100.00	0.000	0.000
					C	0.000	80.000		100.00	0.000	3.960
L6 80.0000-60.0000	70.0000	0.892	23.93	90.000	A	0.000	90.000	90.000	100.00	0.000	9.133
					B	0.000	90.000		100.00	0.000	0.000
					C	0.000	90.000		100.00	0.000	3.960
L7 60.0000-40.0000	50.0000	0.811	21.74	100.000	A	0.000	100.000	100.000	100.00	0.000	9.133
					B	0.000	100.000		100.00	0.000	0.000
					C	0.000	100.000		100.00	0.000	3.960
L8 40.0000-20.0000	30.0000	0.701	18.78	100.000	A	0.000	100.000	100.000	100.00	0.000	6.925
					B	0.000	100.000		100.00	0.000	0.000
					C	0.000	100.000		100.00	0.000	3.960
L9 20.0000-0.0000	10.0000	0.7	18.77	100.000	A	0.000	100.000	100.000	100.00	0.000	3.358
					B	0.000	100.000		100.00	0.000	0.000
					C	0.000	100.000		100.00	0.000	3.960

Tower Pressure - With Ice

G_H = 1.100

Section Elevation ft	z ft	K_Z	q_z psf	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 190.0000-160.0000	175.0000	1.16	7.05	1.7723	68.862	A	0.000	68.862	68.862	100.00	0.000	36.348
						B	0.000	68.862		100.00	0.000	0.000
						C	0.000	68.862		100.00	0.000	8.287
L2 160.0000-	150.0000	1.11	6.75	1.7452	55.817	A	0.000	55.817	55.817	100.00	0.000	23.950

Section Elevation ft	z ft	K_z	q_z psf	t_z in	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
140.0000						B	0.000	55.817		100.00	0.000	0.000
						C	0.000	55.817		100.00	0.000	10.941
L3 140.0000-120.0000	130.0000	1.065	6.48	1.7204	65.735	A	0.000	65.735	65.735	100.00	0.000	23.692
						B	0.000	65.735		100.00	0.000	0.000
						C	0.000	65.735		100.00	0.000	10.842
L4 120.0000-100.0000	110.0000	1.016	6.17	1.6919	75.640	A	0.000	75.640	75.640	100.00	0.000	27.059
						B	0.000	75.640		100.00	0.000	0.000
						C	0.000	75.640		100.00	0.000	10.728
L5 100.0000-80.0000	90.0000	0.959	5.83	1.6583	85.528	A	0.000	85.528	85.528	100.00	0.000	29.602
						B	0.000	85.528		100.00	0.000	0.000
						C	0.000	85.528		100.00	0.000	10.593
L6 80.0000-60.0000	70.0000	0.892	5.43	1.6171	95.390	A	0.000	95.390	95.390	100.00	0.000	33.139
						B	0.000	95.390		100.00	0.000	0.000
						C	0.000	95.390		100.00	0.000	10.429
L7 60.0000-40.0000	50.0000	0.811	4.93	1.5636	105.212	A	0.000	105.212	105.212	100.00	0.000	32.345
						B	0.000	105.212		100.00	0.000	0.000
						C	0.000	105.212		100.00	0.000	10.215
L8 40.0000-20.0000	30.0000	0.701	4.26	1.4858	104.953	A	0.000	104.953	104.953	100.00	0.000	24.606
						B	0.000	104.953		100.00	0.000	0.000
						C	0.000	104.953		100.00	0.000	9.903
L9 20.0000-0.0000	10.0000	0.7	4.26	1.3312	104.437	A	0.000	104.437	104.437	100.00	0.000	11.094
						B	0.000	104.437		100.00	0.000	0.000
						C	0.000	104.437		100.00	0.000	9.285

Tower Pressure - Service

$G_H = 1.100$

Section Elevation ft	z ft	K_z	q_z psf	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 190.0000-160.0000	175.0000	1.16	9.08	60.000	A	0.000	60.000	60.000	100.00	0.000	8.700
					B	0.000	60.000		100.00	0.000	0.000
					C	0.000	60.000		100.00	0.000	2.970
L2 160.0000-140.0000	150.0000	1.11	8.69	50.000	A	0.000	50.000	50.000	100.00	0.000	5.800
					B	0.000	50.000		100.00	0.000	0.000
					C	0.000	50.000		100.00	0.000	3.960
L3 140.0000-120.0000	130.0000	1.065	8.34	60.000	A	0.000	60.000	60.000	100.00	0.000	5.800
					B	0.000	60.000		100.00	0.000	0.000
					C	0.000	60.000		100.00	0.000	3.960
L4 120.0000-100.0000	110.0000	1.016	7.96	70.000	A	0.000	70.000	70.000	100.00	0.000	6.925
					B	0.000	70.000		100.00	0.000	0.000
					C	0.000	70.000		100.00	0.000	3.960
L5 100.0000-80.0000	90.0000	0.959	7.51	80.000	A	0.000	80.000	80.000	100.00	0.000	7.842
					B	0.000	80.000		100.00	0.000	0.000
					C	0.000	80.000		100.00	0.000	3.960
L6 80.0000-60.0000	70.0000	0.892	6.99	90.000	A	0.000	90.000	90.000	100.00	0.000	9.133
					B	0.000	90.000		100.00	0.000	0.000
					C	0.000	90.000		100.00	0.000	3.960
L7 60.0000-40.0000	50.0000	0.811	6.35	100.000	A	0.000	100.000	100.000	100.00	0.000	9.133
					B	0.000	100.000		100.00	0.000	0.000
					C	0.000	100.000		100.00	0.000	3.960
L8 40.0000-20.0000	30.0000	0.701	5.49	100.000	A	0.000	100.000	100.000	100.00	0.000	6.925
					B	0.000	100.000		100.00	0.000	0.000
					C	0.000	100.000		100.00	0.000	3.960
L9 20.0000-0.0000	10.0000	0.7	5.48	100.000	A	0.000	100.000	100.000	100.00	0.000	3.358
					B	0.000	100.000		100.00	0.000	0.000
					C	0.000	100.000		100.00	0.000	3.960

Load Combinations

Comb. No.	Description

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
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	190 - 160	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-28.03	0.05	-1.61
			Max. Mx	20	-12.54	245.24	0.35
			Max. My	14	-12.54	-0.47	-244.76
			Max. Vy	20	-17.19	245.24	0.35
			Max. Vx	2	-17.14	1.03	243.84
			Max. Torque	18			0.93
L2	160 - 140	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-33.83	0.47	-1.38
			Max. Mx	20	-16.48	614.42	1.53
			Max. My	14	-16.48	-1.39	-612.73
			Max. Vy	20	-19.70	614.42	1.53

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vx	2	-19.65	2.09	612.22
			Max. Torque	6			-0.74
L3	140 - 120	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-40.43	0.97	-1.09
			Max. Mx	20	-21.07	1034.26	2.77
			Max. My	14	-21.08	-2.30	-1031.29
			Max. Vy	20	-22.25	1034.26	2.77
			Max. Vx	2	-22.21	3.17	1031.26
			Max. Torque	8			-0.45
L4	120 - 100	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-47.82	1.53	-0.76
			Max. Mx	20	-26.28	1506.62	4.04
			Max. My	2	-26.29	4.27	1502.86
			Max. Vy	20	-24.96	1506.62	4.04
			Max. Vx	2	-24.91	4.27	1502.86
			Max. Torque	29			0.62
L5	100 - 80	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-55.98	2.16	-0.39
			Max. Mx	20	-32.11	2033.68	5.35
			Max. My	2	-32.12	5.37	2029.16
			Max. Vy	20	-27.73	2033.68	5.35
			Max. Vx	2	-27.68	5.37	2029.16
			Max. Torque	5			1.09
L6	80 - 60	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-64.89	2.85	0.04
			Max. Mx	20	-38.55	2616.48	6.69
			Max. My	2	-38.56	6.48	2611.24
			Max. Vy	20	-30.53	2616.48	6.69
			Max. Vx	2	-30.49	6.48	2611.24
			Max. Torque	19			-1.84
L7	60 - 40	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-74.51	3.59	0.51
			Max. Mx	20	-45.61	3253.48	8.06
			Max. My	2	-45.61	7.59	3247.55
			Max. Vy	20	-33.15	3253.48	8.06
			Max. Vx	2	-33.10	7.59	3247.55
			Max. Torque	19			-2.59
L8	40 - 20	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-85.88	4.29	0.99
			Max. Mx	20	-54.58	3936.86	9.42
			Max. My	2	-54.58	8.68	3930.25
			Max. Vy	20	-35.17	3936.86	9.42
			Max. Vx	2	-35.12	8.68	3930.25
			Max. Torque	19			-3.09
L9	20 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-98.68	4.91	1.05
			Max. Mx	20	-65.38	4658.18	10.52
			Max. My	2	-65.38	9.76	4650.67
			Max. Vy	20	-36.94	4658.18	10.52
			Max. Vx	2	-36.89	9.76	4650.67
			Max. Torque	19			-3.32

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	26	98.68	-0.00	0.00
	Max. H_x	20	65.39	36.92	0.05
	Max. H_z	3	49.04	0.05	36.88
	Max. M_x	2	4650.67	0.05	36.88
	Max. M_z	8	4655.33	-36.92	-0.05
	Max. Torsion	7	3.32	-31.96	18.40
	Min. Vert	21	49.04	36.92	0.05
	Min. H_x	9	49.04	-36.92	-0.05
	Min. H_z	15	49.04	-0.05	-36.88

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
	Min. M_x	14	-4646.81	-0.05	-36.88
	Min. M_z	20	-4658.18	36.92	0.05
	Min. Torsion	19	-3.32	31.96	-18.40

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	54.49	-0.00	-0.00	-1.57	0.93	0.00
1.2 Dead+1.6 Wind 0 deg - No Ice	65.39	-0.05	-36.88	-4650.67	9.76	-2.02
0.9 Dead+1.6 Wind 0 deg - No Ice	49.04	-0.05	-36.88	-4603.94	9.36	-2.02
1.2 Dead+1.6 Wind 30 deg - No Ice	65.39	18.42	-31.92	-4024.46	-2320.17	-3.08
0.9 Dead+1.6 Wind 30 deg - No Ice	49.04	18.42	-31.92	-3983.67	-2297.22	-3.08
1.2 Dead+1.6 Wind 60 deg - No Ice	65.39	31.96	-18.40	-2319.37	-4028.09	-3.31
0.9 Dead+1.6 Wind 60 deg - No Ice	49.04	31.96	-18.40	-2295.67	-3988.03	-3.32
1.2 Dead+1.6 Wind 90 deg - No Ice	65.39	36.92	0.05	6.67	-4655.33	-2.66
0.9 Dead+1.6 Wind 90 deg - No Ice	49.04	36.92	0.05	7.06	-4609.30	-2.67
1.2 Dead+1.6 Wind 120 deg - No Ice	65.39	32.00	18.48	2330.38	-4036.65	-1.30
0.9 Dead+1.6 Wind 120 deg - No Ice	49.04	32.00	18.48	2307.50	-3996.49	-1.31
1.2 Dead+1.6 Wind 150 deg - No Ice	65.39	18.50	31.97	4029.17	-2335.04	0.42
0.9 Dead+1.6 Wind 150 deg - No Ice	49.04	18.50	31.97	3989.27	-2311.92	0.41
1.2 Dead+1.6 Wind 180 deg - No Ice	65.39	0.05	36.88	4646.81	-7.42	2.02
0.9 Dead+1.6 Wind 180 deg - No Ice	49.04	0.05	36.88	4601.06	-7.63	2.02
1.2 Dead+1.6 Wind 210 deg - No Ice	65.39	-18.42	31.92	4020.60	2322.51	3.08
0.9 Dead+1.6 Wind 210 deg - No Ice	49.04	-18.42	31.92	3980.81	2298.96	3.08
1.2 Dead+1.6 Wind 240 deg - No Ice	65.39	-31.96	18.40	2315.52	4030.43	3.31
0.9 Dead+1.6 Wind 240 deg - No Ice	49.04	-31.96	18.40	2292.80	3989.75	3.32
1.2 Dead+1.6 Wind 270 deg - No Ice	65.39	-36.92	-0.05	-10.52	4658.18	2.66
0.9 Dead+1.6 Wind 270 deg - No Ice	49.04	-36.92	-0.05	-9.93	4611.04	2.68
1.2 Dead+1.6 Wind 300 deg - No Ice	65.39	-32.00	-18.48	-2334.24	4039.00	1.30
0.9 Dead+1.6 Wind 300 deg - No Ice	49.04	-32.00	-18.48	-2310.37	3998.23	1.31
1.2 Dead+1.6 Wind 330 deg - No Ice	65.39	-18.50	-31.97	-4033.03	2337.38	-0.42
0.9 Dead+1.6 Wind 330 deg - No Ice	49.04	-18.50	-31.97	-3992.15	2313.65	-0.41
1.2 Dead+1.0 Ice+1.0 Temp	98.68	0.00	-0.00	-1.05	4.91	-0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	98.68	-0.01	-10.98	-1389.32	6.96	-0.80
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	98.68	5.49	-9.51	-1202.53	-688.35	-1.66
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	98.68	9.51	-5.48	-693.71	-1197.81	-2.08
1.2 Dead+1.0 Wind 90	98.68	10.99	0.01	0.72	-1384.84	-1.94

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 120	98.68	9.52	5.50	694.70	-1199.48	-1.27
deg+1.0 Ice+1.0 Temp 1.2 Dead+1.0 Wind 150	98.68	5.50	9.51	1202.28	-691.25	-0.27
deg+1.0 Ice+1.0 Temp 1.2 Dead+1.0 Wind 180	98.68	0.01	10.98	1387.40	3.62	0.80
deg+1.0 Ice+1.0 Temp 1.2 Dead+1.0 Wind 210	98.68	-5.49	9.51	1200.61	698.93	1.66
deg+1.0 Ice+1.0 Temp 1.2 Dead+1.0 Wind 240	98.68	-9.51	5.48	691.80	1208.38	2.08
deg+1.0 Ice+1.0 Temp 1.2 Dead+1.0 Wind 270	98.68	-10.99	-0.01	-2.63	1395.41	1.93
deg+1.0 Ice+1.0 Temp 1.2 Dead+1.0 Wind 300	98.68	-9.52	-5.50	-696.61	1210.06	1.27
deg+1.0 Ice+1.0 Temp 1.2 Dead+1.0 Wind 330	98.68	-5.50	-9.51	-1204.20	701.83	0.27
deg+1.0 Ice+1.0 Temp Dead+Wind 0 deg - Service	54.49	-0.01	-6.73	-845.60	2.53	0.08
Dead+Wind 30 deg - Service	54.49	3.36	-5.83	-731.75	-420.38	0.17
Dead+Wind 60 deg - Service	54.49	5.83	-3.36	-422.25	-730.39	0.21
Dead+Wind 90 deg - Service	54.49	6.74	0.01	-0.05	-844.43	0.20
Dead+Wind 120 deg - Service	54.49	5.84	3.37	421.74	-731.95	0.13
Dead+Wind 150 deg - Service	54.49	3.38	5.84	730.10	-423.08	0.03
Dead+Wind 180 deg - Service	54.49	0.01	6.73	842.39	-0.59	-0.08
Dead+Wind 210 deg - Service	54.49	-3.36	5.83	728.54	422.33	-0.17
Dead+Wind 240 deg - Service	54.49	-5.83	3.36	419.04	732.34	-0.21
Dead+Wind 270 deg - Service	54.49	-6.74	-0.01	-3.16	846.38	-0.20
Dead+Wind 300 deg - Service	54.49	-5.84	-3.37	-424.95	733.90	-0.13
Dead+Wind 330 deg - Service	54.49	-3.38	-5.84	-733.31	425.03	-0.03

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
1	0.00	-54.49	0.00	0.00	54.49	0.00	0.000%
2	-0.05	-65.39	-36.88	0.05	65.39	36.88	0.009%
3	-0.05	-49.04	-36.88	0.05	49.04	36.88	0.008%
4	18.42	-65.39	-31.92	-18.42	65.39	31.92	0.000%
5	18.42	-49.04	-31.92	-18.42	49.04	31.92	0.000%
6	31.96	-65.39	-18.40	-31.96	65.39	18.40	0.000%
7	31.96	-49.04	-18.40	-31.96	49.04	18.40	0.000%
8	36.93	-65.39	0.05	-36.92	65.39	-0.05	0.009%
9	36.93	-49.04	0.05	-36.92	49.04	-0.05	0.008%
10	32.00	-65.39	18.48	-32.00	65.39	-18.48	0.000%
11	32.00	-49.04	18.48	-32.00	49.04	-18.48	0.000%
12	18.50	-65.39	31.97	-18.50	65.39	-31.97	0.000%
13	18.50	-49.04	31.97	-18.50	49.04	-31.97	0.000%
14	0.05	-65.39	36.88	-0.05	65.39	-36.88	0.009%
15	0.05	-49.04	36.88	-0.05	49.04	-36.88	0.008%
16	-18.42	-65.39	31.92	18.42	65.39	-31.92	0.000%
17	-18.42	-49.04	31.92	18.42	49.04	-31.92	0.000%
18	-31.96	-65.39	18.40	31.96	65.39	-18.40	0.000%
19	-31.96	-49.04	18.40	31.96	49.04	-18.40	0.000%
20	-36.93	-65.39	-0.05	36.92	65.39	0.05	0.005%
21	-36.93	-49.04	-0.05	36.92	49.04	0.05	0.008%
22	-32.00	-65.39	-18.48	32.00	65.39	18.48	0.000%
23	-32.00	-49.04	-18.48	32.00	49.04	18.48	0.000%
24	-18.50	-65.39	-31.97	18.50	65.39	31.97	0.000%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
25	-18.50	-49.04	-31.97	18.50	49.04	31.97	0.000%
26	0.00	-98.68	0.00	-0.00	98.68	0.00	0.001%
27	-0.01	-98.68	-10.98	0.01	98.68	10.98	0.001%
28	5.49	-98.68	-9.51	-5.49	98.68	9.51	0.000%
29	9.51	-98.68	-5.48	-9.51	98.68	5.48	0.000%
30	10.99	-98.68	0.01	-10.99	98.68	-0.01	0.001%
31	9.52	-98.68	5.50	-9.52	98.68	-5.50	0.000%
32	5.50	-98.68	9.51	-5.50	98.68	-9.51	0.000%
33	0.01	-98.68	10.98	-0.01	98.68	-10.98	0.001%
34	-5.49	-98.68	9.51	5.49	98.68	-9.51	0.000%
35	-9.51	-98.68	5.48	9.51	98.68	-5.48	0.000%
36	-10.99	-98.68	-0.01	10.99	98.68	0.01	0.001%
37	-9.52	-98.68	-5.50	9.52	98.68	5.50	0.000%
38	-5.50	-98.68	-9.51	5.50	98.68	9.51	0.000%
39	-0.01	-54.49	-6.73	0.01	54.49	6.73	0.002%
40	3.36	-54.49	-5.83	-3.36	54.49	5.83	0.002%
41	5.84	-54.49	-3.36	-5.83	54.49	3.36	0.002%
42	6.74	-54.49	0.01	-6.74	54.49	-0.01	0.002%
43	5.84	-54.49	3.37	-5.84	54.49	-3.37	0.002%
44	3.38	-54.49	5.84	-3.38	54.49	-5.84	0.002%
45	0.01	-54.49	6.73	-0.01	54.49	-6.73	0.002%
46	-3.36	-54.49	5.83	3.36	54.49	-5.83	0.002%
47	-5.84	-54.49	3.36	5.83	54.49	-3.36	0.002%
48	-6.74	-54.49	-0.01	6.74	54.49	0.01	0.002%
49	-5.84	-54.49	-3.37	5.84	54.49	3.37	0.002%
50	-3.38	-54.49	-5.84	3.38	54.49	5.84	0.002%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	6	0.00000001	0.00000001
2	Yes	16	0.00011077	0.00014105
3	Yes	16	0.00007590	0.00012080
4	Yes	22	0.00000001	0.00009982
5	Yes	21	0.00000001	0.00014836
6	Yes	22	0.00000001	0.00010282
7	Yes	22	0.00000001	0.00007642
8	Yes	16	0.00011077	0.00012367
9	Yes	16	0.00007590	0.00010894
10	Yes	22	0.00000001	0.00010201
11	Yes	22	0.00000001	0.00007572
12	Yes	22	0.00000001	0.00010204
13	Yes	22	0.00000001	0.00007577
14	Yes	16	0.00011079	0.00010134
15	Yes	16	0.00007591	0.00009044
16	Yes	22	0.00000001	0.00010273
17	Yes	22	0.00000001	0.00007634
18	Yes	22	0.00000001	0.00009989
19	Yes	21	0.00000001	0.00014844
20	Yes	17	0.00005745	0.00008713
21	Yes	16	0.00007590	0.00013724
22	Yes	22	0.00000001	0.00010315
23	Yes	22	0.00000001	0.00007657
24	Yes	22	0.00000001	0.00010295
25	Yes	22	0.00000001	0.00007640
26	Yes	6	0.00000001	0.00002218
27	Yes	19	0.00000001	0.00014501
28	Yes	20	0.00000001	0.00009230
29	Yes	20	0.00000001	0.00009349
30	Yes	19	0.00000001	0.00014516
31	Yes	20	0.00000001	0.00009296
32	Yes	20	0.00000001	0.00009333
33	Yes	19	0.00000001	0.00014538
34	Yes	20	0.00000001	0.00009414
35	Yes	20	0.00000001	0.00009318
36	Yes	19	0.00000001	0.00014627

37	Yes	20	0.00000001	0.00009423
38	Yes	20	0.00000001	0.00009360
39	Yes	16	0.00000001	0.00001251
40	Yes	16	0.00000001	0.00003513
41	Yes	16	0.00000001	0.00002948
42	Yes	16	0.00000001	0.00009520
43	Yes	16	0.00000001	0.00003485
44	Yes	16	0.00000001	0.00003208
45	Yes	16	0.00000001	0.00001254
46	Yes	16	0.00000001	0.00003002
47	Yes	16	0.00000001	0.00003606
48	Yes	16	0.00000001	0.00001350
49	Yes	16	0.00000001	0.00003109
50	Yes	16	0.00000001	0.00003347

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	190 - 160	19.200	49	0.9205	0.0016
L2	160 - 140	13.516	49	0.8588	0.0011
L3	140 - 120	10.125	49	0.7441	0.0007
L4	120 - 100	7.252	49	0.6169	0.0004
L5	100 - 80	4.909	49	0.4938	0.0003
L6	80 - 60	3.069	49	0.3792	0.0002
L7	60 - 40	1.693	49	0.2735	0.0001
L8	40 - 20	0.743	49	0.1764	0.0001
L9	20 - 0	0.186	49	0.0866	0.0000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
190.0000	(2) ATMAA1412D-1A20	49	19.200	0.9205	0.0016	77883
175.0000	(2) SBNHH-1D65B w/ Mount Pipe	49	16.307	0.9021	0.0014	25961
165.0000	SBNHH-1D65A w/ Mount Pipe	49	14.429	0.8775	0.0012	15576

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	190 - 160	105.704	22	5.0781	0.0023
L2	160 - 140	74.417	22	4.7358	0.0024
L3	140 - 120	55.748	22	4.1025	0.0023
L4	120 - 100	39.928	22	3.4005	0.0025
L5	100 - 80	27.030	22	2.7212	0.0023
L6	80 - 60	16.896	22	2.0886	0.0020
L7	60 - 40	9.318	22	1.5062	0.0015
L8	40 - 20	4.090	22	0.9712	0.0010
L9	20 - 0	1.025	22	0.4763	0.0005

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
190.0000	(2) ATMAA1412D-1A20	22	105.704	5.0781	0.0023	14403
175.0000	(2) SBNHH-1D65B w/ Mount Pipe	22	89.777	4.9758	0.0024	4799
165.0000	SBNHH-1D65A w/ Mount Pipe	22	79.439	4.8396	0.0024	2877

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	190 - 160 (1)	P24x0.375	30.0000	0.0000	0.0	27.8325	-12.53	1052.07	0.012
L2	160 - 140 (2)	30" x 0.375"	20.0000	0.0000	0.0	34.9011	-16.47	1311.06	0.013
L3	140 - 120 (3)	36" x 0.375"	20.0000	0.0000	0.0	41.9697	-21.06	1490.10	0.014
L4	120 - 100 (4)	42" x 0.375"	20.0000	0.0000	0.0	49.0383	-26.28	1668.87	0.016
L5	100 - 80 (5)	P48x0.375	20.0000	0.0000	0.0	56.1069	-32.11	1847.49	0.017
L6	80 - 60 (6)	P54x3/8	20.0000	0.0000	0.0	63.1755	-38.55	2026.00	0.019
L7	60 - 40 (7)	P60x3/8	20.0000	0.0000	0.0	70.2440	-45.60	2204.43	0.021
L8	40 - 20 (8)	P60x1/2	20.0000	0.0000	0.0	93.4624	-54.58	3125.69	0.017
L9	20 - 0 (9)	P60x5/8	20.0000	0.0000	0.0	116.5830	-65.38	4139.15	0.016

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	190 - 160 (1)	P24x0.375	245.50	623.72	0.394	0.00	623.72	0.000
L2	160 - 140 (2)	30" x 0.375"	615.41	947.86	0.649	0.00	947.86	0.000
L3	140 - 120 (3)	36" x 0.375"	1036.05	1338.81	0.774	0.00	1338.81	0.000
L4	120 - 100 (4)	42" x 0.375"	1509.24	1796.56	0.840	0.00	1796.56	0.000
L5	100 - 80 (5)	P48x0.375	2037.14	2321.11	0.878	0.00	2321.11	0.000
L6	80 - 60 (6)	P54x3/8	2620.81	2912.46	0.900	0.00	2912.46	0.000
L7	60 - 40 (7)	P60x3/8	3258.68	3570.61	0.913	0.00	3570.61	0.000
L8	40 - 20 (8)	P60x1/2	3942.93	4860.41	0.811	0.00	4860.41	0.000
L9	20 - 0 (9)	P60x5/8	4665.00	6198.18	0.753	0.00	6198.18	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	190 - 160 (1)	P24x0.375	17.22	526.03	0.033	0.48	1019.71	0.000
L2	160 - 140 (2)	30" x 0.375"	19.74	655.53	0.030	0.37	1598.37	0.000
L3	140 - 120 (3)	36" x 0.375"	22.29	745.05	0.030	0.25	2189.07	0.000
L4	120 - 100 (4)	42" x 0.375"	24.99	834.44	0.030	0.04	2868.84	0.000
L5	100 - 80 (5)	P48x0.375	27.76	923.75	0.030	0.27	3637.70	0.000
L6	80 - 60 (6)	P54x3/8	30.57	1013.00	0.030	0.70	4495.63	0.000
L7	60 - 40 (7)	P60x3/8	33.18	1102.21	0.030	1.13	5442.62	0.000
L8	40 - 20 (8)	P60x1/2	35.20	1562.84	0.023	1.34	7685.07	0.000
L9	20 - 0 (9)	P60x5/8	36.97	2069.58	0.018	1.30	10134.58	0.000

Pole Interaction Design Data

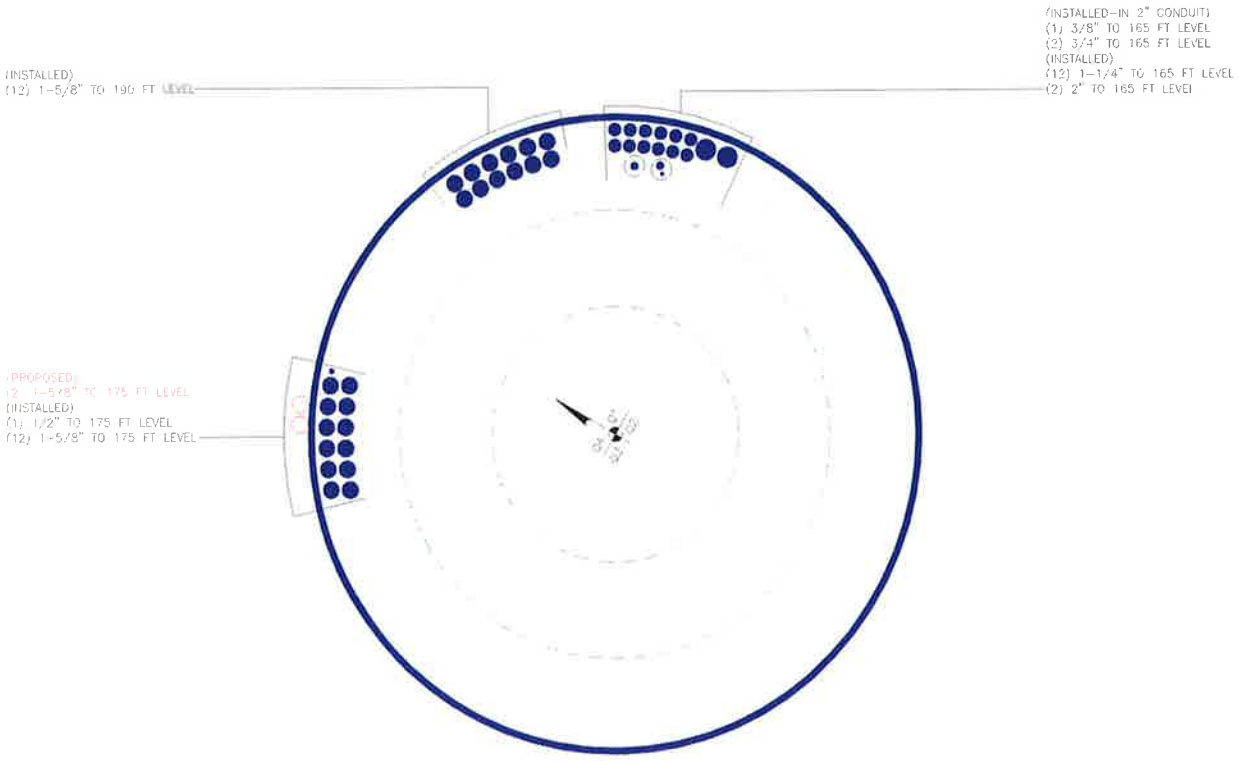
Section No.	Elevation ft	Ratio P_u / ϕP_n	Ratio M_{ux} / ϕM_{nx}	Ratio M_{uy} / ϕM_{ny}	Ratio V_u / ϕV_n	Ratio T_u / ϕT_n	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	190 - 160 (1)	0.012	0.394	0.000	0.033	0.000	0.407 ✔	1.000	4.8.2 ✔
L2	160 - 140 (2)	0.013	0.649	0.000	0.030	0.000	0.663 ✔	1.000	4.8.2 ✔
L3	140 - 120 (3)	0.014	0.774	0.000	0.030	0.000	0.789 ✔	1.000	4.8.2 ✔
L4	120 - 100 (4)	0.016	0.840	0.000	0.030	0.000	0.857 ✔	1.000	4.8.2 ✔
L5	100 - 80 (5)	0.017	0.878	0.000	0.030	0.000	0.896 ✔	1.000	4.8.2 ✔
L6	80 - 60 (6)	0.019	0.900	0.000	0.030	0.000	0.920 ✔	1.000	4.8.2 ✔
L7	60 - 40 (7)	0.021	0.913	0.000	0.030	0.000	0.934 ✔	1.000	4.8.2 ✔
L8	40 - 20 (8)	0.017	0.811	0.000	0.023	0.000	0.829 ✔	1.000	4.8.2 ✔
L9	20 - 0 (9)	0.016	0.753	0.000	0.018	0.000	0.769 ✔	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	190 - 160	Pole	P24x0.375	1	-12.53	1052.07	40.7	Pass
L2	160 - 140	Pole	30" x 0.375"	2	-16.47	1311.06	66.3	Pass
L3	140 - 120	Pole	36" x 0.375"	3	-21.06	1490.10	78.9	Pass
L4	120 - 100	Pole	42" x 0.375"	4	-26.28	1668.87	85.7	Pass
L5	100 - 80	Pole	P48x0.375	5	-32.11	1847.49	89.6	Pass
L6	80 - 60	Pole	P54x3/8	6	-38.55	2026.00	92.0	Pass
L7	60 - 40	Pole	P60x3/8	7	-45.60	2204.43	93.4	Pass
L8	40 - 20	Pole	P60x1/2	8	-54.58	3125.69	82.9	Pass
L9	20 - 0	Pole	P60x5/8	9	-65.38	4139.15	76.9	Pass
							Summary	
						Pole (L7)	93.4	Pass
						RATING =	**93.4**	**Pass**

APPENDIX B

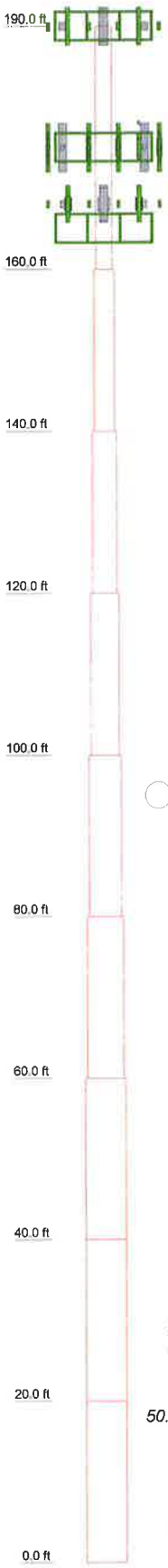
BASE LEVEL DRAWING



APPENDIX C

ADDITIONAL CALCULATIONS

Section	Size	Length (ft)	Grade	Weight (K)
1	P24x0.375	30.0000	A53-B-42	2.8
2	30" x 0.375"	20.0000		2.4
3	36" x 0.375"	20.0000		2.9
4	42" x 0.375"	20.0000		3.3
5	P48x0.375	20.0000		3.8
6	P54x3/8	20.0000		4.3
7	P60x3/8	20.0000		4.8
8	P60x1/2	20.0000		6.4
9	P60x5/8	20.0000		7.9
				38.6



ALL REACTIONS ARE FACTORED

AXIAL 99 K

SHEAR 11 K

MOMENT 1396 kip-ft

TORQUE 2 kip-ft
50.00 mph WIND - 0.7500 in ICE

AXIAL 65 K

SHEAR 37 K

MOMENT 4665 kip-ft

TORQUE 3 kip-ft
REACTIONS - 105.00 mph WIND

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
(2) ATMAA1412D-1A20	190	(2) FD9R6004/2C-3L	175
(2) ATMAA1412D-1A20	190	Platform Mount [LP 403-1]	175
(2) ATMAA1412D-1A20	190	SBNHH-1D65A w/ Mount Pipe	165
APX16DWV-16DWV-S-E-A20 w/ Mount Pipe	190	SBNHH-1D65A w/ Mount Pipe	165
		SBNHH-1D65A w/ Mount Pipe	165
APX16DWV-16DWV-S-E-A20 w/ Mount Pipe	190	RRUS12/RRUS A2	165
		RRUS12/RRUS A2	165
APX16DWV-16DWV-S-E-A20 w/ Mount Pipe	190	RRUS12/RRUS A2	165
Platform Mount [LP 405-1]	190	AM-X-CD-14-65-00T-RET w/ Mount Pipe	165
(2) SBNHH-1D65B w/ Mount Pipe	175		
(2) SBNHH-1D65B w/ Mount Pipe	175	AM-X-CD-14-65-00T-RET w/ Mount Pipe	165
(2) SBNHH-1D65B w/ Mount Pipe	175	AM-X-CD-14-65-00T-RET w/ Mount Pipe	165
(2) RRH2x60-700	175		
RRH2x60-700	175	RRUS 11	165
(2) DB-T1-6Z-12AB-0Z	175	RRUS 11	165
RRH4X45-AWS4 B66	175	RRUS 11	165
(2) RRH4X45-AWS4 B66	175	7770.00 w/ Mount Pipe	165
RRH2X60-PCS	175	7770.00 w/ Mount Pipe	165
(2) RRH2X60-PCS	175	7770.00 w/ Mount Pipe	165
GPS_A	175	DC6-48-60-18-8F	165
(2) LPA-80080/4CF w/ Mount Pipe	175	(2) TT19-08BP111-001	165
(2) LPA-80080/4CF w/ Mount Pipe	175	(2) TT19-08BP111-001	165
(2) LPA-80080/4CF w/ Mount Pipe	175	(2) TT19-08BP111-001	165
(2) FD9R6004/2C-3L	175	Platform Mount [LP 714-1]	165
(2) FD9R6004/2C-3L	175	Flat-Membered Handrail	165

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower is located in New London County, Connecticut.
2. Tower designed for Exposure B to the TIA-222-G Standard.
3. Tower designed for a 105.00 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 50.00 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60.00 mph wind.
6. Tower Structure Class II.
7. Topographic Category 1 with Crest Height of 0.0000 ft
8. TOWER RATING: 93.4%

PJF
Paul J. Ford and Company
250 East Broad St., Suite 600
Columbus, Ohio
Phone: 614.221.6679
FAX:

Job: *190 ft Step Pole [CT038/EASTLYME/I-95/X*			
Project: *PJF #37516-3105 / BU #823529*			
Client: CCI	Drawn by: jjohnson	App'd:	
Code: TIA-222-G	Date: 10/28/16	Scale: NTS	
Path:		Dwg No. E-1	

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

Site Data

BU#: *823529*
Site Name: *CT038/EastLyme/I-95/ X7*
App #:

Reactions		
Mu	245.5	ft-kips
Axial, Pu:	12.53	kips
Shear, Vu:	17.22	kips
Elevation:	160	feet

Bolt Threads:
X-Excluded
φVn=φ(0.55*Ab*Fu)
φ=0.75, φ*Vn (kips):
38.88

Pole Manufacturer:	Pirod

If No stiffeners, Criteria:	TIA G

<-Only Applcable to Unstiffened Cases

Bolt Data			
Qty:	20		
Diameter (in.):	1	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:	0	<-- Disregard	
N/A:	0	<-- Disregard	
Circle (in.):	27		

Plate Data		
Diam:	30	in
Thick, t:	1.25	in
Grade (Fy):	36	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	3.77	in

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

Pole Data		
Diam:	24	in
Thick:	0.375	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	63	ksi
Reinf. Fillet Weld	0	"0" if None

Flange Bolt Results

			Rigid
Bolt Tension Capacity, φ*Tn,**B1**:	54.54	kips	φ*Tn
Adjusted φ*Tn (due to Vu=Vu/Qty), **B**:	54.53	kips	φTn[(1-(Vu/φVn)^2]^0.5
Max Bolt directly applied Tu:	21.20	Kips	
Min. PL "tc" for **B** cap. **w/o** Pry:	1.052	in	
Min PL "treq" for actual **T w/ Pry:**	0.500	in	
Min PL "t1" for actual **T w/o Pry:**	0.656	in	
T allowable w/o Prying:	54.54	kips	α'<0 case
Prying Force, q:	0.00	kips	
Total Bolt Tension=Tu+q:	21.20	kips	
Non-Prying Bolt Stress Ratio, Tu/B:	38.9%	Pass	

Exterior Flange Plate Results Flexural Check

			Rigid
Compression Side Plate Stress:	Rohn/Pirod,	OK	TIA G
Allowable Plate Stress:	32.4	ksi	φ*Fy
Compression Plate Stress Ratio:	Rohn/Pirod,	OK	Comp. Y.L. Length: 12.37
No Prying			
Tension Side Stress Ratio, (treq/t)^2:	16.0%	Pass	

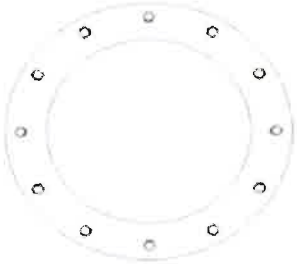
n/a

Stiffener Results N/A for Rohn / Pirod

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

Pole Results

Pole Punching Shear Check: N/A



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

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

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

Site Data

BU#: *823529*
Site Name: *CT038/EastLyme/I-95/ X7*
App #:

Reactions		
Moment:	245.5	ft-kips
Axial:	12.53	kips
Shear:	17.22	kips
Exterior Flange Run, T+q:	21.2	kips

Bolt Threads:
X-Excluded
φVn=φ(0.55*Ab*Fu)
φ=0.75, φ*Vn (kips):
38.88

Manufacturer: Pirod

Elevation: 160 feet

Bolt Data			
Qty:	20		
Diam:	1	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:	0	<-- Disregard	
N/A:	0	<-- Disregard	
Circle:	27	in	

Interior Flange Bolt Results

Maximum Bolt Tension, Tu:	21.2	Kips, Ext. Flange Tu+q
Adjusted φ*Tn (due to Vu=Vu/Qty), I	54.5	Kips
Bolt Stress Ratio:	38.9%	Pass

Plate Data		
Plate Outer Diam:	29.25	in
Plate Inner Diam:	24	in (Hole @ Ctr)
Thick:	1.25	in
Grade:	36	ksi
Effective Width:	4.59	in

Interior Flange Plate Results Flexural Check

Controlling Bolt Axial Force:	22.4	Kips, Ext. Cu=Interior Cu
Plate Stress:	Rohn/Pirod	OK
Allowable Plate Stress, φ*Fy:	32.4	ksi
Plate Stress Ratio:	Rohn/Pirod	OK

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

n/a

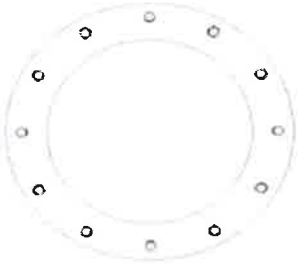
Stiffener Results N/A for Rohn / Pirod

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

Pole Results

Pole Punching Shear Check: N/A

Pole Data		
Pole OuterDiam:	30	in
Thick:	0.375	in
Pole Inner Diam:	29.25	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	63	ksi



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

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

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

Site Data

BU#: *823529*
Site Name: *CT038/EastLyme/I-95/ X7*
App #:

Reactions		
Mu	615.41	ft-kips
Axial, Pu:	16.47	kips
Shear, Vu:	19.74	kips
Elevation:	140	feet

Bolt Threads:
X-Excluded
φVn=φ(0.55*Ab*Fu)
φ=0.75, φ*Vn (kips):
38.88

Pole Manufacturer:	Pirod

If No stiffeners, Criteria:	TIA G	<-Only Applcable to Unstiffened Cases

Bolt Data

Qty:	24		
Diameter (in.):	1	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:	0	<-- Disregard	
N/A:	0	<-- Disregard	
Circle (in.):	33		

Plate Data

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

Stiffener Data (Welding at Both Sides)

Config:	0	*
Weld Type:	0	
Groove Depth:	0	in **
Groove Angle:	0	degrees
Fillet H. Weld:	0	<-- Disregard
Fillet V. Weld:	0	in
Width:	0	in
Height:	0	in
Thick:	0	in
Notch:	0	in
Grade:	0	ksi
Weld str.:	0	ksi

Pole Data

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

Flange Bolt Results

Bolt Tension Capacity, φ*Tn,**B1**:	54.54	kips	Rigid / φ*Tn
Adjusted φ*Tn (due to Vu=Vu/Qty), **B**:	54.53	kips	φTn[(1-(Vu/φVn)^2]^0.5
Max Bolt directly applied Tu:	36.61	Kips	
Min. PL "tc" for **B** cap. **w/o** Pry:	1.031	in	
Min PL "treq" for actual **T w/ Pry:**	0.642	in	
Min PL "t1" for actual **T w/o Pry:**	0.845	in	
T allowable w/o Prying:	54.54	kips	α'<0 case
Prying Force, q:	0.00	kips	
Total Bolt Tension=Tu+q:	36.61	kips	
Non-Prying Bolt Stress Ratio, Tu/B:	67.1%	Pass	

Exterior Flange Plate Results — Flexural Check

Compression Side Plate Stress:	Rohn/Pirod,	OK	Rigid / TIA G
Allowable Plate Stress:	32.4	ksi	φ*Fy
Compression Plate Stress Ratio:	Rohn/Pirod,	OK	Comp. Y.L. Length: 13.75
No Prying			
Tension Side Stress Ratio, (treq/t)^2:	26.4%	Pass	

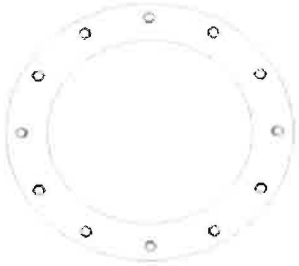
n/a

Stiffener Results — N/A for Rohn / Pirod

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

Pole Results

Pole Punching Shear Check: N/A



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

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

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

Site Data

BU#: *823529*
Site Name: *CT038/EastLyme/I-95/ X7*
App #:

Reactions		
Moment:	615.41	ft-kips
Axial:	16.47	kips
Shear:	19.74	kips
Exterior Flange Run, T+q:	36.61	kips

Bolt Threads:
X-Excluded
φVn=φ(0.55*Ab*Fu)
φ=0.75, φ*Vn (kips):
38.88

Elevation: 140 feet

Manufacturer:	Pirod

Bolt Data			
Qty:	24		
Diam:	1	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:	0	<-- Disregard	
N/A:	0	<-- Disregard	
Circle:	33	in	

Interior Flange Bolt Results

Maximum Bolt Tension, Tu:	36.6	Kips, Ext. Tu=Interior Tu
Adjusted φ*Tn (due to Vu=Vu/Qty), I	54.5	Kips
Bolt Stress Ratio:	67.1%	Pass

Plate Data		
Plate Outer Diam:	35.25	in
Plate Inner Diam:	30	in (Hole @ Ctr)
Thick:	1.25	in
Grade:	36	ksi
Effective Width:	4.61	in

Interior Flange Plate Results Flexural Check

Controlling Bolt Axial Force:	38.0	Kips, Ext. Cu=Interior Cu
Plate Stress:	Rohn/Pirod	OK
Allowable Plate Stress, φ*Fy:	32.4	ksi
Plate Stress Ratio:	Rohn/Pirod	OK

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

n/a

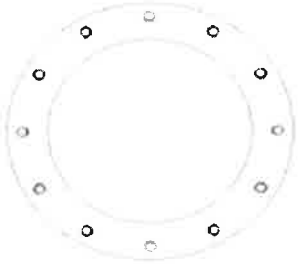
Stiffener Results N/A for Rohn / Pirod

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

Pole Results

Pole Punching Shear Check: N/A

Pole Data		
Pole OuterDiam:	36	in
Thick:	0.375	in
Pole Inner Diam:	35.25	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	63	ksi



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

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

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

Site Data

BU#: *823529*
Site Name: *CT038/EastLyme/I-95/ X7*
App #:

Reactions		
Mu	1036.05	ft-kips
Axial, Pu:	21.06	kips
Shear, Vu:	22.29	kips
Elevation:	120	feet

Bolt Threads:
X-Excluded
φVn=φ(0.55*Ab*Fu)
φ=0.75, φ*Vn (kips):
38.88

Pole Manufacturer:	Pirod

If No stiffeners, Criteria:	TIA G

<-Only Applcable to Unstiffened Cases

Bolt Data			
Qty:	28		
Diameter (in.):	1	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:	0	<-- Disregard	
N/A:	0	<-- Disregard	
Circle (in.):	39		

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

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

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

Flange Bolt Results

Bolt Tension Capacity, φ*Tn,**B1**:	54.54	kips	Rigid
Adjusted φ*Tn (due to Vu=Vu/Qty), **B**:	54.53	kips	φ*Tn
Max Bolt directly applied Tu:	44.79	Kips	φTn[(1-(Vu/φVn)^2]^0.5
Min. PL "tc" for **B** cap. **w/o** Pry:	1.017	in	
Min PL "treq" for actual **T w/ Pry:**	0.699	in	
Min PL "t1" for actual **T w/o Pry:**	0.921	in	
T allowable w/o Prying:	54.54	kips	α'<0 case
Prying Force, q:	0.00	kips	
Total Bolt Tension=Tu+q:	44.79	kips	
Non-Prying Bolt Stress Ratio, Tu/B:	82.1%	Pass	

Exterior Flange Plate Results — Flexural Check

Compression Side Plate Stress:	Rohn/Pirod,	OK	Rigid
Allowable Plate Stress:	32.4	ksi	TIA G
Compression Plate Stress Ratio:	Rohn/Pirod,	OK	φ*Fy
No Prying			Comp. Y.L. Length: 15.00
Tension Side Stress Ratio, (treq/t)^2:	31.3%	Pass	

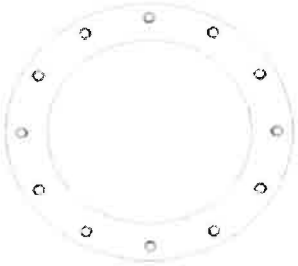
n/a

Stiffener Results — N/A for Rohn / Pirod

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

Pole Results

Pole Punching Shear Check: N/A



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

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

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

Site Data

BU#: *823529*
Site Name: *CT038/EastLyme/I-95/ X7*
App #:

Reactions		
Moment:	1036.05	ft-kips
Axial:	21.06	kips
Shear:	22.29	kips
Exterior Flange Run, T+q:	44.79	kips

Bolt Threads:
X-Excluded
φVn=φ(0.55*Ab*Fu)
φ=0.75, φ*Vn (kips):
38.88

Elevation: 120 feet

Manufacturer:	Pirod

Bolt Data			
Qty:	28		
Diam:	1	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:	0	<-- Disregard	
N/A:	0	<-- Disregard	
Circle:	39	in	

Interior Flange Bolt Results

Maximum Bolt Tension, Tu:	44.8	Kips, Ext. Flange Tu+q
Adjusted φ*Tn (due to Vu=Vu/Qty), I	54.5	Kips
Bolt Stress Ratio:	82.1%	Pass

Plate Data		
Plate Outer Diam:	41.25	in
Plate Inner Diam:	36	in (Hole @ Ctr)
Thick:	1.25	in
Grade:	36	ksi
Effective Width:	4.63	in

Interior Flange Plate Results Flexural Check

Controlling Bolt Axial Force:	46.3	Kips, Ext. Cu=Interior Cu
Plate Stress:	Rohn/Pirod	OK
Allowable Plate Stress, φ*Fy:	32.4	ksi
Plate Stress Ratio:	Rohn/Pirod	OK

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

n/a

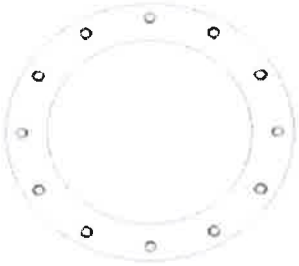
Stiffener Results N/A for Rohn / Pirod

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

Pole Results

Pole Punching Shear Check: N/A

Pole Data		
Pole OuterDiam:	42	in
Thick:	0.375	in
Pole Inner Diam:	41.25	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	63	ksi



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

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

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

Site Data

BU#: *823529*
Site Name: *CT038/EastLyme/I-95/ X7:*
App #:

Reactions		
Mu	1509.24	ft-kips
Axial, Pu:	26.28	kips
Shear, Vu:	24.99	kips
Elevation:	100	feet

Bolt Threads:
X-Excluded
φVn=φ(0.55*Ab*Fu)
φ=0.75, φ*Vn (kips):
38.88

Pole Manufacturer:	Pirod

If No stiffeners, Criteria: TIA G <-Only Applcable to Unstiffened Cases

Bolt Data			
Qty:	32		
Diameter (in.):	1	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:	0	<-- Disregard	
N/A:	0	<-- Disregard	
Circle (in.):	45		

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

Stiffener Data (Welding at Both Sides)		
Config:	2	*
Weld Type:	Fillet	
Groove Depth:	0	<-- Disregard
Groove Angle:	0	<-- Disregard
Fillet H. Weld:	0.3125	in
Fillet V. Weld:	0.3125	in
Width:	3	in
Height:	5	in
Thick:	0.625	in
Notch:	0.5	in
Grade:	36	ksi
Weld str.:	70	ksi

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

Flange Bolt Results — Rigid

Bolt Tension Capacity, φ*Tn,**B1**:	54.54 kips	φ*Tn
Adjusted φ*Tn (due to Vu=Vu/Qty), **B**:	54.53 kips	φTn[(1-(Vu/φVn)^2]^0.5
Max Bolt directly applied Tu:	49.49 Kips	
Min. PL "tc" for **B** cap. **w/o** Pry:	1.006 in	
Min PL "treq" for actual **T w/ Pry:**	0.855 in	
Min PL "t1" for actual **T w/o Pry:**	0.959 in	
T allowable w/o Prying:	54.54 kips	α'<0 case
Prying Force, q:	0.00 kips	
Total Bolt Tension=Tu+q:	49.49 kips	
Non-Prying Bolt Stress Ratio, Tu/B:	90.8% Pass	

Exterior Flange Plate Results — Flexural Check — Rigid

Compression Side Plate Stress:	Rohn/Pirod, OK	TIA G
Allowable Plate Stress:	32.4 ksi	φ*Fy
Compression Plate Stress Ratio:	Rohn/Pirod, OK	Comp. Y.L. Length: 16.16
No Prying		
Tension Side Stress Ratio, (treq/t)^2:	46.8% Pass	

b/Le>2, Stiffeners are not fully effective

Stiffener Results — N/A for Rohn / Pirod

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

Pole Results

Pole Punching Shear Check: N/A

* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt
** Note: for complete joint penetration groove welds the groove depth must be exactly 1/2 the stiffener thickness for calculation purposes

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

Site Data

BU#: *823529*
Site Name: *CT038/EastLyme/I-95/ X7*
App #:

Reactions		
Moment:	1509.24	ft-kips
Axial:	26.28	kips
Shear:	24.99	kips
Exterior Flange Run, T+q:	49.49	kips

Bolt Threads:
X-Excluded
φVn=φ(0.55*Ab*Fu)
φ=0.75, φ*Vn (kips):
38.88

Elevation: 100 feet

Manufacturer:	Pirod

Bolt Data			
Qty:	32		
Diam:	1	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:	0	<-- Disregard	
N/A:	0	<-- Disregard	
Circle:	45	in	

Interior Flange Bolt Results

Maximum Bolt Tension, Tu:	49.5	Kips, Ext. Flange Tu+q
Adjusted φ*Tn (due to Vu=Vu/Qty), I	54.5	Kips
Bolt Stress Ratio:	90.8%	Pass

Plate Data		
Plate Outer Diam:	47.25	in
Plate Inner Diam:	42	in (Hole @ Ctr)
Thick:	1.25	in
Grade:	36	ksi
Effective Width:	4.64	in

Interior Flange Plate Results Flexural Check

Controlling Bolt Axial Force:	51.1	Kips, Ext. Cu=Interior Cu
Plate Stress:	Rohn/Pirod	OK
Allowable Plate Stress, φ*Fy:	32.4	ksi
Plate Stress Ratio:	Rohn/Pirod	OK

Stiffener Data (Welding at Both Sides)		
Config:	2	*
Weld Type:	Fillet	
Groove Depth:	0	<-- Disregard
Groove Angle:	0	<-- Disregard
Fillet H. Weld:	0.3125	in
Fillet V. Weld:	0.3125	in
Width:	2	in
Height:	3.5	in
Thick:	0.625	in
Notch:	0.5	in
Grade:	36	ksi
Weld str.:	70	ksi

b/Le>2, Stiffeners are not fully effective

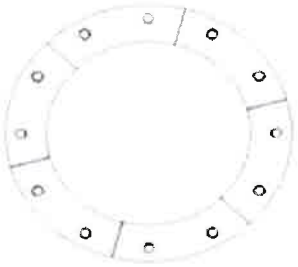
Stiffener Results N/A for Rohn / Pirod

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

Pole Data		
Pole OuterDiam:	48	in
Thick:	0.375	in
Pole Inner Diam:	47.25	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	63	ksi

Pole Results

Pole Punching Shear Check:	N/A



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

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

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

Site Data

BU#: *823529*
Site Name: *CT038/EastLyme/I-95/ X7*
App #:

Reactions		
Mu	2037.14	ft-kips
Axial, Pu:	32.11	kips
Shear, Vu:	27.76	kips
Elevation:	80	feet

Bolt Threads:
X-Excluded
φVn=φ(0.55*Ab*Fu)
φ=0.75, φ*Vn (kips):
38.88

Pole Manufacturer:	Pirod

If No stiffeners, Criteria:	TIA G	<-Only Applcable to Unstiffened Cases

Bolt Data			
Qty:	36		
Diameter (in.):	1	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:	0	<-- Disregard	
N/A:	0	<-- Disregard	
Circle (in.):	51		

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

Stiffener Data (Welding at Both Sides)		
Config:	2	*
Weld Type:	Fillet	
Groove Depth:	0	<-- Disregard
Groove Angle:	0	<-- Disregard
Fillet H. Weld:	0.3125	in
Fillet V. Weld:	0.3125	in
Width:	3	in
Height:	5	in
Thick:	0.625	in
Notch:	0.5	in
Grade:	36	ksi
Weld str.:	70	ksi

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

Flange Bolt Results

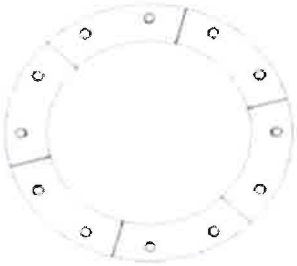
			Rigid
Bolt Tension Capacity, φ*Tn,**B1**:	54.54	kips	φ*Tn
Adjusted φ*Tn (due to Vu=Vu/Qty), **B**:	54.53	kips	φTn[(1-(Vu/φVn)^2]^0.5
Max Bolt directly applied Tu:	52.37	Kips	
Min. PL "tc" for **B** cap. **w/o** Pry:	0.998	in	
Min PL "treq" for actual **T w/ Pry:**	0.937	in	
Min PL "t1" for actual **T w/o Pry:**	0.978	in	
T allowable w/o Prying:	54.54	kips	α'<0 case
Prying Force, q:	0.00	kips	
Total Bolt Tension=Tu+q:	52.37	kips	
Non-Prying Bolt Stress Ratio, Tu/B:	96.0%	Pass	

Exterior Flange Plate Results

			Rigid
	Flexural Check		TIA G
Compression Side Plate Stress:	Rohn/Pirod,	OK	φ*Fy
Allowable Plate Stress:	32.4	ksi	Comp. Y.L. Length:
Compression Plate Stress Ratio:	Rohn/Pirod,	OK	17.23
No Prying			
Tension Side Stress Ratio, (treq/t)^2:	56.2%	Pass	

b/Le>2, Stiffeners are not fully effective

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



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

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

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

Site Data

BU#: *823529*
Site Name: *CT038/EastLyme/I-95/ X7*
App #:

Manufacturer:	Pirod

Reactions		
Moment:	2037.14	ft-kips
Axial:	32.11	kips
Shear:	27.76	kips
Exterior Flange Run, T+q:	52.37	kips

Bolt Threads:
X-Excluded
φVn=φ(0.55*Ab*Fu)
φ=0.75, φ*Vn (kips):
38.88

Elevation: 80 feet

Bolt Data			
Qty:	36		
Diam:	1	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:	0	<-- Disregard	
N/A:	0	<-- Disregard	
Circle:	51	in	

Interior Flange Bolt Results

Maximum Bolt Tension, Tu:	52.4 Kips, Ext. Flange Tu+q
Adjusted φ*Tn (due to Vu=Vu/Qty), I	54.5 Kips
Bolt Stress Ratio:	96.0% Pass

Plate Data		
Plate Outer Diam:	53.25	in
Plate Inner Diam:	48	in (Hole @ Ctr)
Thick:	1.25	in
Grade:	36	ksi
Effective Width:	4.65	in

Interior Flange Plate Results Flexural Check

Controlling Bolt Axial Force:	54.2 Kips, Ext. Cu=Interior Cu
Plate Stress:	Rohn/Pirod OK
Allowable Plate Stress, φ*Fy:	32.4 ksi
Plate Stress Ratio:	Rohn/Pirod OK

Stiffener Data (Welding at Both Sides)		
Config:	2	*
Weld Type:	Fillet	
Groove Depth:	0	<-- Disregard
Groove Angle:	0	<-- Disregard
Fillet H. Weld:	0.3125	in
Fillet V. Weld:	0.3125	in
Width:	2	in
Height:	3.5	in
Thick:	0.625	in
Notch:	0.5	in
Grade:	36	ksi
Weld str.:	70	ksi

b/Le>2, Stiffeners are not fully effective

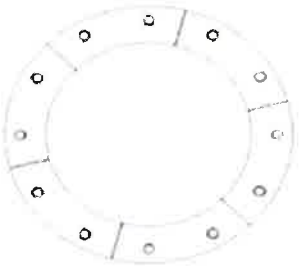
Stiffener Results N/A for Rohn / Pirod

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

Pole Results

Pole Punching Shear Check: N/A

Pole Data		
Pole OuterDiam:	54	in
Thick:	0.375	in
Pole Inner Diam:	53.25	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	63	ksi



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

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

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

Site Data

BU#: *823529*
Site Name: *CT038/EastLyme/I-95/ X7*
App #:

Reactions		
Mu	2620.81	ft-kips
Axial, Pu:	38.55	kips
Shear, Vu:	30.57	kips
Elevation:	60	feet

Bolt Threads:
X-Excluded
φVn=φ(0.55*Ab*Fu)
φ=0.75, φ*Vn (kips):
38.88

Pole Manufacturer:	Pirod

If No stiffeners, Criteria:	TIA G	<-Only Applcable to Unstiffened Cases

Bolt Data			
Qty:	48		
Diameter (in.):	1	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:	0	<-- Disregard	
N/A:	0	<-- Disregard	
Circle (in.):	57		

Plate Data		
Diam:	60	in
Thick, t:	1.25	in
Grade (Fy):	36	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	3.53	in

Stiffener Data (Welding at Both Sides)		
Config:	1	*
Weld Type:	Fillet	
Groove Depth:	0	<-- Disregard
Groove Angle:	0	<-- Disregard
Fillet H. Weld:	0.3125	in
Fillet V. Weld:	0.3125	in
Width:	3	in
Height:	5	in
Thick:	0.625	in
Notch:	0.5	in
Grade:	36	ksi
Weld str.:	70	ksi

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

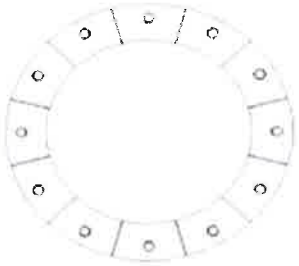
Flange Bolt Results | Stiffened

Bolt Tension Capacity, φ*Tn,**B1**:	54.54	kips	φ*Tn
Adjusted φ*Tn (due to Vu=Vu/Qty), **B**:	54.53	kips	φTn[(1-(Vu/φVn)^2]^0.5
Max Bolt directly applied Tu:	45.18	Kips	
Min. PL "tc" for **B** cap. **w/o** Pry:	Stiffened	in	
Min PL "treq" for actual **T w/ Pry:**	Stiffened	in	
Min PL "t1" for actual **T w/o Pry:**	Stiffened	in	
T allowable	54.54	kips	<-- B, Stiffened
Prying Force, q:	0.00	kips	Stiffened
Total Bolt Tension=Tu+q:	45.18	kips	
Non-Prying Bolt Stress Ratio, Tu/B:	82.8%	Pass	

Exterior Flange Plate Results | Shear Check Only | Stiffened

Compression Side Plate Stress:	Rohn/Pirod, OK	TIA G
Allowable Plate Stress:	19.4 ksi	φ*Fy
Compression Plate Stress Ratio:	Rohn/Pirod, OK	Comp. Y.L. Length:
Stiffened		N/A, Roark
Tension Side Stress Ratio, (treq/t)^2:	N/A	

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



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

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

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

Site Data

BU#: *823529*
Site Name: *CT038/EastLyme/I-95/ X7*
App #:

Manufacturer:	Pirod

Reactions		
Moment:	2620.81	ft-kips
Axial:	38.55	kips
Shear:	30.57	kips
Exterior Flange Run, T+q:	45.18	kips

Bolt Threads:
X-Excluded
φVn=φ(0.55*Ab*Fu)
φ=0.75, φ*Vn (kips):
38.88

Elevation: 60 feet

Bolt Data			
Qty:	48		
Diam:	1	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:	0	<-- Disregard	
N/A:	0	<-- Disregard	
Circle:	57	in	

Interior Flange Bolt Results

Maximum Bolt Tension, Tu:	45.2	Kips, Ext. Flange Tu+q
Adjusted φ*Tn (due to Vu=Vu/Qty), I	54.5	Kips
Bolt Stress Ratio:	82.8%	Pass

Plate Data		
Plate Outer Diam:	59.25	in
Plate Inner Diam:	54	in (Hole @ Ctr)
Thick:	1.25	in
Grade:	36	ksi
Effective Width:	3.88	in

Interior Flange Plate Results Shear Check Only

Controlling Bolt Axial Force:	46.8	Kips, Ext. Cu=Interior Cu
Plate Stress:	Rohn/Pirod	OK
Allowable Plate Stress, φ*Fy:	19.4	ksi
Plate Stress Ratio:	Rohn/Pirod	OK

Stiffener Data (Welding at Both Sides)		
Config:	1	*
Weld Type:	Fillet	
Groove Depth:	0	<-- Disregard
Groove Angle:	0	<-- Disregard
Fillet H. Weld:	0.3125	in
Fillet V. Weld:	0.3125	in
Width:	2	in
Height:	3.5	in
Thick:	0.625	in
Notch:	0.5	in
Grade:	36	ksi
Weld str.:	70	ksi

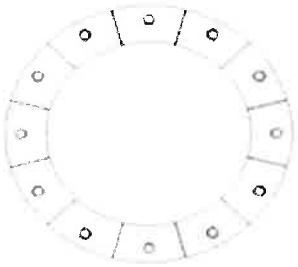
Stiffener Results N/A for Rohn / Pirod

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

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

Pole Results

Pole Punching Shear Check: N/A



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

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

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v4.4 - Effective 7-12-13

Date: 10/28/2016
PJF Project: 37516-3105.004.7805
Client Ref. # BU 823529
Site Name:
Description: Flange @ 40'
Owner: CCI
Engineer: JRJ

Asymmetric Bolt Analysis

Moment =	3258.7	k-ft	TIA Ref.	G	
Axial =	45.6	kips	ASIF =	1.0000	
Shear =	33.2	kips	Max Ratio =	100.0%	
Anchor Qty =	64				

Location = Flange Plate
η = N/A for BP, Rev. G Sect. 4.9.9
Threads = X-Excluded for FP, Rev. G

** For Flange Plates: Prying action is not considered in the bolt loads. **

Item	Nominal Bolt Dia, in	Spec	Fy, ksi	Fu, ksi	Location, degrees	Bolt Circle, in	Area Override, in²	Area, in²	Max Net Compression, kips	Max Net Tension, kips	Load for Capacity Calc, kips	Capacity Override, kips	Capacity, kips	Capacity Ratio
1	1.250	A325	81	105	0.0	47.00	0.00	1.23	46.50	45.07	45.07	0.00	76.31	59.1%
2	1.250	A325	81	105	11.3	47.00	0.00	1.23	46.50	45.07	45.07	0.00	76.31	59.1%
3	1.250	A325	81	105	22.5	47.00	0.00	1.23	46.50	45.07	45.07	0.00	76.31	59.1%
4	1.250	A325	81	105	33.8	47.00	0.00	1.23	46.50	45.07	45.07	0.00	76.31	59.1%
5	1.250	A325	81	105	45.0	47.00	0.00	1.23	46.50	45.07	45.07	0.00	76.31	59.1%
6	1.250	A325	81	105	56.3	47.00	0.00	1.23	46.50	45.07	45.07	0.00	76.31	59.1%
7	1.250	A325	81	105	67.5	47.00	0.00	1.23	46.50	45.07	45.07	0.00	76.31	59.1%
8	1.250	A325	81	105	78.8	47.00	0.00	1.23	46.50	45.07	45.07	0.00	76.31	59.1%
9	1.250	A325	81	105	90.0	47.00	0.00	1.23	46.50	45.07	45.07	0.00	76.31	59.1%
10	1.250	A325	81	105	101.3	47.00	0.00	1.23	46.50	45.07	45.07	0.00	76.31	59.1%
11	1.250	A325	81	105	112.5	47.00	0.00	1.23	46.50	45.07	45.07	0.00	76.31	59.1%
12	1.250	A325	81	105	123.8	47.00	0.00	1.23	46.50	45.07	45.07	0.00	76.31	59.1%
13	1.250	A325	81	105	135.0	47.00	0.00	1.23	46.50	45.07	45.07	0.00	76.31	59.1%
14	1.250	A325	81	105	146.3	47.00	0.00	1.23	46.50	45.07	45.07	0.00	76.31	59.1%
15	1.250	A325	81	105	157.5	47.00	0.00	1.23	46.50	45.07	45.07	0.00	76.31	59.1%
16	1.250	A325	81	105	168.8	47.00	0.00	1.23	46.50	45.07	45.07	0.00	76.31	59.1%
17	1.250	A325	81	105	180.0	47.00	0.00	1.23	46.50	45.07	45.07	0.00	76.31	59.1%
18	1.250	A325	81	105	191.3	47.00	0.00	1.23	46.50	45.07	45.07	0.00	76.31	59.1%
19	1.250	A325	81	105	202.5	47.00	0.00	1.23	46.50	45.07	45.07	0.00	76.31	59.1%
20	1.250	A325	81	105	213.8	47.00	0.00	1.23	46.50	45.07	45.07	0.00	76.31	59.1%
21	1.250	A325	81	105	225.0	47.00	0.00	1.23	46.50	45.07	45.07	0.00	76.31	59.1%
22	1.250	A325	81	105	236.3	47.00	0.00	1.23	46.50	45.07	45.07	0.00	76.31	59.1%
23	1.250	A325	81	105	247.5	47.00	0.00	1.23	46.50	45.07	45.07	0.00	76.31	59.1%
24	1.250	A325	81	105	258.8	47.00	0.00	1.23	46.50	45.07	45.07	0.00	76.31	59.1%
25	1.250	A325	81	105	270.0	47.00	0.00	1.23	46.50	45.07	45.07	0.00	76.31	59.1%
26	1.250	A325	81	105	281.3	47.00	0.00	1.23	46.50	45.07	45.07	0.00	76.31	59.1%
27	1.250	A325	81	105	292.5	47.00	0.00	1.23	46.50	45.07	45.07	0.00	76.31	59.1%
28	1.250	A325	81	105	303.8	47.00	0.00	1.23	46.50	45.07	45.07	0.00	76.31	59.1%
29	1.250	A325	81	105	315.0	47.00	0.00	1.23	46.50	45.07	45.07	0.00	76.31	59.1%
30	1.250	A325	81	105	326.3	47.00	0.00	1.23	46.50	45.07	45.07	0.00	76.31	59.1%
31	1.250	A325	81	105	337.5	47.00	0.00	1.23	46.50	45.07	45.07	0.00	76.31	59.1%
32	1.250	A325	81	105	348.8	47.00	0.00	1.23	46.50	45.07	45.07	0.00	76.31	59.1%
33	1.250	A325	81	105	0.0	53.00	0.00	1.23	52.34	50.91	50.91	0.00	76.31	66.7%
34	1.250	A325	81	105	11.3	53.00	0.00	1.23	52.34	50.91	50.91	0.00	76.31	66.7%
35	1.250	A325	81	105	22.5	53.00	0.00	1.23	52.34	50.91	50.91	0.00	76.31	66.7%
36	1.250	A325	81	105	33.8	53.00	0.00	1.23	52.34	50.91	50.91	0.00	76.31	66.7%
37	1.250	A325	81	105	45.0	53.00	0.00	1.23	52.34	50.91	50.91	0.00	76.31	66.7%
38	1.250	A325	81	105	56.3	53.00	0.00	1.23	52.34	50.91	50.91	0.00	76.31	66.7%
39	1.250	A325	81	105	67.5	53.00	0.00	1.23	52.34	50.91	50.91	0.00	76.31	66.7%
40	1.250	A325	81	105	78.8	53.00	0.00	1.23	52.34	50.91	50.91	0.00	76.31	66.7%
41	1.250	A325	81	105	90.0	53.00	0.00	1.23	52.34	50.91	50.91	0.00	76.31	66.7%
42	1.250	A325	81	105	101.3	53.00	0.00	1.23	52.34	50.91	50.91	0.00	76.31	66.7%
43	1.250	A325	81	105	112.5	53.00	0.00	1.23	52.34	50.91	50.91	0.00	76.31	66.7%
44	1.250	A325	81	105	123.8	53.00	0.00	1.23	52.34	50.91	50.91	0.00	76.31	66.7%
45	1.250	A325	81	105	135.0	53.00	0.00	1.23	52.34	50.91	50.91	0.00	76.31	66.7%
46	1.250	A325	81	105	146.3	53.00	0.00	1.23	52.34	50.91	50.91	0.00	76.31	66.7%
47	1.250	A325	81	105	157.5	53.00	0.00	1.23	52.34	50.91	50.91	0.00	76.31	66.7%
48	1.250	A325	81	105	168.8	53.00	0.00	1.23	52.34	50.91	50.91	0.00	76.31	66.7%
49	1.250	A325	81	105	180.0	53.00	0.00	1.23	52.34	50.91	50.91	0.00	76.31	66.7%
50	1.250	A325	81	105	191.3	53.00	0.00	1.23	52.34	50.91	50.91	0.00	76.31	66.7%
51	1.250	A325	81	105	202.5	53.00	0.00	1.23	52.34	50.91	50.91	0.00	76.31	66.7%
52	1.250	A325	81	105	213.8	53.00	0.00	1.23	52.34	50.91	50.91	0.00	76.31	66.7%
53	1.250	A325	81	105	225.0	53.00	0.00	1.23	52.34	50.91	50.91	0.00	76.31	66.7%
54	1.250	A325	81	105	236.3	53.00	0.00	1.23	52.34	50.91	50.91	0.00	76.31	66.7%
55	1.250	A325	81	105	247.5	53.00	0.00	1.23	52.34	50.91	50.91	0.00	76.31	66.7%
56	1.250	A325	81	105	258.8	53.00	0.00	1.23	52.34	50.91	50.91	0.00	76.31	66.7%
57	1.250	A325	81	105	270.0	53.00	0.00	1.23	52.34	50.91	50.91	0.00	76.31	66.7%
58	1.250	A325	81	105	281.3	53.00	0.00	1.23	52.34	50.91	50.91	0.00	76.31	66.7%
59	1.250	A325	81	105	292.5	53.00	0.00	1.23	52.34	50.91	50.91	0.00	76.31	66.7%
60	1.250	A325	81	105	303.8	53.00	0.00	1.23	52.34	50.91	50.91	0.00	76.31	66.7%
61	1.250	A325	81	105	315.0	53.00	0.00	1.23	52.34	50.91	50.91	0.00	76.31	66.7%
62	1.250	A325	81	105	326.3	53.00	0.00	1.23	52.34	50.91	50.91	0.00	76.31	66.7%
63	1.250	A325	81	105	337.5	53.00	0.00	1.23	52.34	50.91	50.91	0.00	76.31	66.7%

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v4.4 - Effective 7-12-13

Date: 10/28/2016
PJF Project: 37516-3105.004.7805
Client Ref. # BU 823529
Site Name:
Description: Flange @ 40'
Owner: CCI
Engineer: JRJ

Asymmetric Bolt Analysis

Moment =	3258.7	k-ft	TIA Ref.	G	Location =	Flange Plate		
Axial =	45.6	kips	ASIF =	1.0000	η =	N/A	for BP, Rev. G Sect. 4.9.9	
Shear =	33.2	kips	Max Ratio =	100.0%	Threads =	X-Excluded	for FP, Rev. G	
Anchor Qty =	64							

** For Flange Plates: Prying action is not considered in the bolt loads. **

64	1.250	A325	81	105	348.8	53.00	0.00	1.23	52.34	50.91	50.91	0.00	76.31	66.7%
								78.54						

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

Site Data

BU#: *823529*
Site Name: *CT038/EastLyme/I-95/ X7*
App #:

Manufacturer:	Pirod

Reactions		
Moment:	3258.68	ft-kips
Axial:	45.6	kips
Shear:	33.18	kips
Exterior Flange Run, T+q:		kips

Bolt Threads:
X-Excluded
φVn=φ(0.55*Ab*Fu)
φ=0.75, φ*Vn (kips):
53.15

Elevation: 40 feet

Bolt Data			
Qty:	32		
Diam:	1.25	Bolt Fu:	105
Bolt Material:	A325	Bolt Fy:	81
N/A:	0	<-- Disregard	
N/A:	0	<-- Disregard	
Circle:	50.18	in	

See "Asymmetric Bolt Analysis for bolt capacities

Plate Data		
Plate Outer Diam:	59.25	in
Plate Inner Diam:	54	in (Hole @ Ctr)
Thick:	1.25	in
Grade:	36	ksi
Effective Width:	5.82	in

Stiffener Data (Welding at Both Sides)		
Config:	1	*
Weld Type:	Fillet	
Groove Depth:	0	<-- Disregard
Groove Angle:	0	<-- Disregard
Fillet H. Weld:	0.375	in
Fillet V. Weld:	0.375	in
Width:	7	in
Height:	10	in
Thick:	0.625	in
Notch:	0.5	in
Grade:	36	ksi
Weld str.:	70	ksi

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

Interior Flange Plate Results Flexural Check

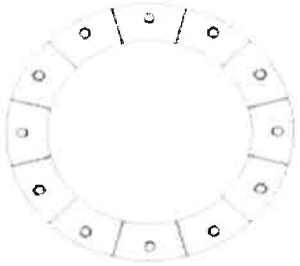
Controlling Bolt Axial Force:	98.8 Kips, Ext. Cu=Interior Cu
Plate Stress:	Rohn/Pirod OK
Allowable Plate Stress, φ*Fy:	32.4 ksi
Plate Stress Ratio:	Rohn/Pirod OK

Stiffener Results N/A for Rohn / Pirod

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

Pole Results

Pole Punching Shear Check: N/A



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

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

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

Site Data

BU#: *823529*
Site Name: *CT038/EastLyme/I-95/ X7*
App #:

Manufacturer:	Pirod

Reactions		
Moment:	3258.68	ft-kips
Axial:	45.6	kips
Shear:	33.18	kips
Exterior Flange Run, T+q:	0	kips

Bolt Threads:
X-Excluded
φVn=φ(0.55*Ab*Fu)
φ=0.75, φ*Vn (kips):
53.15

Elevation: 40 feet

Bolt Data			
Qty:	32		
Diam:	1.25	Bolt Fu:	105
Bolt Material:	A325	Bolt Fy:	81
N/A:	0	<-- Disregard	
N/A:	0	<-- Disregard	
Circle:	50.18	in	

See "Asymmetric Bolt Analysis for bolt capacities

Plate Data		
Plate Outer Diam:	59	in
Plate Inner Diam:	54	in (Hole @ Ctr)
Thick:	1.25	in
Grade:	35	ksi
Effective Width:	5.79	in

Stiffener Data (Welding at Both Sides)		
Config:	1	*
Weld Type:	Fillet	
Groove Depth:	0	<-- Disregard
Groove Angle:	0	<-- Disregard
Fillet H. Weld:	0.375	in
Fillet V. Weld:	0.375	in
Width:	7	in
Height:	10	in
Thick:	0.625	in
Notch:	0.5	in
Grade:	36	ksi
Weld str.:	70	ksi

Pole Data		
Pole OuterDiam:	60	in
Thick:	0.5	in
Pole Inner Diam:	59	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	63	ksi

Interior Flange Plate Results Flexural Check

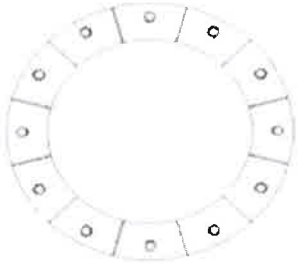
Controlling Bolt Axial Force:	98.8 Kips, Ext. Cu=Interior Cu
Plate Stress:	Rohn/Pirod OK
Allowable Plate Stress, φ*Fy:	31.5 ksi
Plate Stress Ratio:	Rohn/Pirod OK

Stiffener Results N/A for Rohn / Pirod

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

Pole Results

Pole Punching Shear Check: N/A



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

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

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v4.4 - Effective 7-12-13

Date: 10/28/2016
PJF Project: 37516-3105.004.7805
Client Ref. # BU 823529
Site Name:
Description: Flange @ 20'
Owner: CCI
Engineer: JRJ

Asymmetric Bolt Analysis

Moment =	3943	k-ft
Axial =	54.6	kips
Shear =	35.2	kips
Anchor Qty =	64	

TIA Ref.	G
ASIF =	1.0000
Max Ratio =	100.0%

Location = Flange Plate
η = N/A for BP, Rev. G Sect. 4.9.9
Threads = X-Excluded for FP, Rev. G

** For Flange Plates: Prying action is not considered in the bolt loads. **

Item	Nominal Bolt Dia, in	Spec	Fy, ksi	Fu, ksi	Location, degrees	Bolt Circle, in	Area Override, in²	Area, in²	Max Net Compression, kips	Max Net Tension, kips	Load for Capacity Calc, kips	Capacity Override, kips	Capacity, kips	Capacity Ratio
1	1.250	A325	81	105	0.0	47.00	0.00	1.23	56.25	54.54	54.54	0.00	76.31	71.5%
2	1.250	A325	81	105	11.3	47.00	0.00	1.23	56.25	54.54	54.54	0.00	76.31	71.5%
3	1.250	A325	81	105	22.5	47.00	0.00	1.23	56.25	54.54	54.54	0.00	76.31	71.5%
4	1.250	A325	81	105	33.8	47.00	0.00	1.23	56.25	54.54	54.54	0.00	76.31	71.5%
5	1.250	A325	81	105	45.0	47.00	0.00	1.23	56.25	54.54	54.54	0.00	76.31	71.5%
6	1.250	A325	81	105	56.3	47.00	0.00	1.23	56.25	54.54	54.54	0.00	76.31	71.5%
7	1.250	A325	81	105	67.5	47.00	0.00	1.23	56.25	54.54	54.54	0.00	76.31	71.5%
8	1.250	A325	81	105	78.8	47.00	0.00	1.23	56.25	54.54	54.54	0.00	76.31	71.5%
9	1.250	A325	81	105	90.0	47.00	0.00	1.23	56.25	54.54	54.54	0.00	76.31	71.5%
10	1.250	A325	81	105	101.3	47.00	0.00	1.23	56.25	54.54	54.54	0.00	76.31	71.5%
11	1.250	A325	81	105	112.5	47.00	0.00	1.23	56.25	54.54	54.54	0.00	76.31	71.5%
12	1.250	A325	81	105	123.8	47.00	0.00	1.23	56.25	54.54	54.54	0.00	76.31	71.5%
13	1.250	A325	81	105	135.0	47.00	0.00	1.23	56.25	54.54	54.54	0.00	76.31	71.5%
14	1.250	A325	81	105	146.3	47.00	0.00	1.23	56.25	54.54	54.54	0.00	76.31	71.5%
15	1.250	A325	81	105	157.5	47.00	0.00	1.23	56.25	54.54	54.54	0.00	76.31	71.5%
16	1.250	A325	81	105	168.8	47.00	0.00	1.23	56.25	54.54	54.54	0.00	76.31	71.5%
17	1.250	A325	81	105	180.0	47.00	0.00	1.23	56.25	54.54	54.54	0.00	76.31	71.5%
18	1.250	A325	81	105	191.3	47.00	0.00	1.23	56.25	54.54	54.54	0.00	76.31	71.5%
19	1.250	A325	81	105	202.5	47.00	0.00	1.23	56.25	54.54	54.54	0.00	76.31	71.5%
20	1.250	A325	81	105	213.8	47.00	0.00	1.23	56.25	54.54	54.54	0.00	76.31	71.5%
21	1.250	A325	81	105	225.0	47.00	0.00	1.23	56.25	54.54	54.54	0.00	76.31	71.5%
22	1.250	A325	81	105	236.3	47.00	0.00	1.23	56.25	54.54	54.54	0.00	76.31	71.5%
23	1.250	A325	81	105	247.5	47.00	0.00	1.23	56.25	54.54	54.54	0.00	76.31	71.5%
24	1.250	A325	81	105	258.8	47.00	0.00	1.23	56.25	54.54	54.54	0.00	76.31	71.5%
25	1.250	A325	81	105	270.0	47.00	0.00	1.23	56.25	54.54	54.54	0.00	76.31	71.5%
26	1.250	A325	81	105	281.3	47.00	0.00	1.23	56.25	54.54	54.54	0.00	76.31	71.5%
27	1.250	A325	81	105	292.5	47.00	0.00	1.23	56.25	54.54	54.54	0.00	76.31	71.5%
28	1.250	A325	81	105	303.8	47.00	0.00	1.23	56.25	54.54	54.54	0.00	76.31	71.5%
29	1.250	A325	81	105	315.0	47.00	0.00	1.23	56.25	54.54	54.54	0.00	76.31	71.5%
30	1.250	A325	81	105	326.3	47.00	0.00	1.23	56.25	54.54	54.54	0.00	76.31	71.5%
31	1.250	A325	81	105	337.5	47.00	0.00	1.23	56.25	54.54	54.54	0.00	76.31	71.5%
32	1.250	A325	81	105	348.8	47.00	0.00	1.23	56.25	54.54	54.54	0.00	76.31	71.5%
33	1.250	A325	81	105	0.0	53.00	0.00	1.23	63.32	61.61	61.61	0.00	76.31	80.7%
34	1.250	A325	81	105	11.3	53.00	0.00	1.23	63.32	61.61	61.61	0.00	76.31	80.7%
35	1.250	A325	81	105	22.5	53.00	0.00	1.23	63.32	61.61	61.61	0.00	76.31	80.7%
36	1.250	A325	81	105	33.8	53.00	0.00	1.23	63.32	61.61	61.61	0.00	76.31	80.7%
37	1.250	A325	81	105	45.0	53.00	0.00	1.23	63.32	61.61	61.61	0.00	76.31	80.7%
38	1.250	A325	81	105	56.3	53.00	0.00	1.23	63.32	61.61	61.61	0.00	76.31	80.7%
39	1.250	A325	81	105	67.5	53.00	0.00	1.23	63.32	61.61	61.61	0.00	76.31	80.7%
40	1.250	A325	81	105	78.8	53.00	0.00	1.23	63.32	61.61	61.61	0.00	76.31	80.7%
41	1.250	A325	81	105	90.0	53.00	0.00	1.23	63.32	61.61	61.61	0.00	76.31	80.7%
42	1.250	A325	81	105	101.3	53.00	0.00	1.23	63.32	61.61	61.61	0.00	76.31	80.7%
43	1.250	A325	81	105	112.5	53.00	0.00	1.23	63.32	61.61	61.61	0.00	76.31	80.7%
44	1.250	A325	81	105	123.8	53.00	0.00	1.23	63.32	61.61	61.61	0.00	76.31	80.7%
45	1.250	A325	81	105	135.0	53.00	0.00	1.23	63.32	61.61	61.61	0.00	76.31	80.7%
46	1.250	A325	81	105	146.3	53.00	0.00	1.23	63.32	61.61	61.61	0.00	76.31	80.7%
47	1.250	A325	81	105	157.5	53.00	0.00	1.23	63.32	61.61	61.61	0.00	76.31	80.7%
48	1.250	A325	81	105	168.8	53.00	0.00	1.23	63.32	61.61	61.61	0.00	76.31	80.7%
49	1.250	A325	81	105	180.0	53.00	0.00	1.23	63.32	61.61	61.61	0.00	76.31	80.7%
50	1.250	A325	81	105	191.3	53.00	0.00	1.23	63.32	61.61	61.61	0.00	76.31	80.7%
51	1.250	A325	81	105	202.5	53.00	0.00	1.23	63.32	61.61	61.61	0.00	76.31	80.7%
52	1.250	A325	81	105	213.8	53.00	0.00	1.23	63.32	61.61	61.61	0.00	76.31	80.7%
53	1.250	A325	81	105	225.0	53.00	0.00	1.23	63.32	61.61	61.61	0.00	76.31	80.7%
54	1.250	A325	81	105	236.3	53.00	0.00	1.23	63.32	61.61	61.61	0.00	76.31	80.7%
55	1.250	A325	81	105	247.5	53.00	0.00	1.23	63.32	61.61	61.61	0.00	76.31	80.7%
56	1.250	A325	81	105	258.8	53.00	0.00	1.23	63.32	61.61	61.61	0.00	76.31	80.7%
57	1.250	A325	81	105	270.0	53.00	0.00	1.23	63.32	61.61	61.61	0.00	76.31	80.7%
58	1.250	A325	81	105	281.3	53.00	0.00	1.23	63.32	61.61	61.61	0.00	76.31	80.7%
59	1.250	A325	81	105	292.5	53.00	0.00	1.23	63.32	61.61	61.61	0.00	76.31	80.7%
60	1.250	A325	81	105	303.8	53.00	0.00	1.23	63.32	61.61	61.61	0.00	76.31	80.7%
61	1.250	A325	81	105	315.0	53.00	0.00	1.23	63.32	61.61	61.61	0.00	76.31	80.7%
62	1.250	A325	81	105	326.3	53.00	0.00	1.23	63.32	61.61	61.61	0.00	76.31	80.7%
63	1.250	A325	81	105	337.5	53.00	0.00	1.23	63.32	61.61	61.61	0.00	76.31	80.7%

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v4.4 - Effective 7-12-13

Date: 10/28/2016
PJF Project: 37516-3105.004.7805
Client Ref. # BU 823529
Site Name:
Description: Flange @ 20'
Owner: CCI
Engineer: JRJ

Asymmetric Bolt Analysis

Moment =	3943	k-ft	TIA Ref.	G	Location =	Flange Plate	
Axial =	54.6	kips	ASIF =	1.0000	η =	N/A	for BP, Rev. G Sect. 4.9.9
Shear =	35.2	kips	Max Ratio =	100.0%	Threads =	X-Excluded	for FP, Rev. G
Anchor Qty =	64						

** For Flange Plates: Prying action is not considered in the bolt loads. **

64	1.250	A325	81	105	348.8	53.00	0.00	1.23	63.32	61.61	61.61	0.00	76.31	80.7%
								78.54						

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

Site Data

BU#: *823529*
Site Name: *CT038/EastLyme/I-95/ X7*
App #:

Manufacturer:	Pirod

Reactions		
Moment:	3942.93	ft-kips
Axial:	54.58	kips
Shear:	35.2	kips
Exterior Flange Run, T+q:		kips

Bolt Threads:
X-Excluded
φVn=φ(0.55*Ab*Fu)
φ=0.75, φ*Vn (kips):
53.15

Elevation: 20 feet

Bolt Data			
Qty:	32		
Diam:	1.25	Bolt Fu:	105
Bolt Material:	A325	Bolt Fy:	81
N/A:	0	<-- Disregard	
N/A:	0	<-- Disregard	
Circle:	50.18	in	

See "Asymmetric Bolt Analysis for bolt capacities

Plate Data		
Plate Outer Diam:	59	in
Plate Inner Diam:	54	in (Hole @ Ctr)
Thick:	1.25	in
Grade:	36	ksi
Effective Width:	5.79	in

Stiffener Data (Welding at Both Sides)		
Config:	1	*
Weld Type:	Fillet	
Groove Depth:	0	<-- Disregard
Groove Angle:	0	<-- Disregard
Fillet H. Weld:	0.375	in
Fillet V. Weld:	0.375	in
Width:	7	in
Height:	10	in
Thick:	0.625	in
Notch:	0.5	in
Grade:	36	ksi
Weld str.:	70	ksi

Pole Data		
Pole OuterDiam:	60	in
Thick:	0.5	in
Pole Inner Diam:	59	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	63	ksi

Interior Flange Plate Results Flexural Check

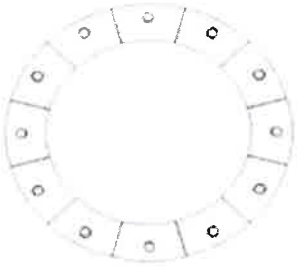
Controlling Bolt Axial Force:	119.6 Kips, Ext. Cu=Interior Cu
Plate Stress:	Rohn/Pirod OK
Allowable Plate Stress, φ*Fy:	32.4 ksi
Plate Stress Ratio:	Rohn/Pirod OK

Stiffener Results N/A for Rohn / Pirod

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

Pole Results

Pole Punching Shear Check: N/A



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

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

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

Site Data

BU#: *823529*
Site Name: *CT038/EastLyme/I-95/ X7*
App #:

Reactions		
Moment:	3942.93	ft-kips
Axial:	54.58	kips
Shear:	35.2	kips
Exterior Flange Run, T+q:	0	kips

Bolt Threads:
X-Excluded
φVn=φ(0.55*Ab*Fu)
φ=0.75, φ*Vn (kips):
53.15

Elevation: 20 feet

Manufacturer:	Pirod

Bolt Data			
Qty:	32		
Diam:	1.25	Bolt Fu:	105
Bolt Material:	A325	Bolt Fy:	81
N/A:	0	<-- Disregard	
N/A:	0	<-- Disregard	
Circle:	50.18	in	

See "Asymmetric Bolt Analysis for bolt capacities

Plate Data		
Plate Outer Diam:	58.75	in
Plate Inner Diam:	54	in (Hole @ Ctr)
Thick:	1.25	in
Grade:	35	ksi
Effective Width:	5.77	in

Stiffener Data (Welding at Both Sides)		
Config:	1	*
Weld Type:	Fillet	
Groove Depth:	0	<-- Disregard
Groove Angle:	0	<-- Disregard
Fillet H. Weld:	0.375	in
Fillet V. Weld:	0.375	in
Width:	7	in
Height:	10	in
Thick:	0.625	in
Notch:	0.5	in
Grade:	36	ksi
Weld str.:	70	ksi

Pole Data		
Pole OuterDiam:	60	in
Thick:	0.625	in
Pole Inner Diam:	58.75	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	63	ksi

Interior Flange Plate Results Flexural Check

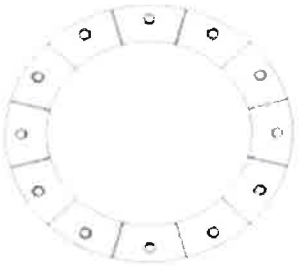
Controlling Bolt Axial Force:	119.6 Kips, Ext. Cu=Interior Cu
Plate Stress:	Rohn/Pirod OK
Allowable Plate Stress, φ*Fy:	31.5 ksi
Plate Stress Ratio:	Rohn/Pirod OK

Stiffener Results N/A for Rohn / Pirod

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

Pole Results

Pole Punching Shear Check: N/A



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

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

Stiffened or Unstiffened, 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#: *823529*
Site Name: *CT038/EastLyme/ I-95/ X72*
App #:
Pole Manufacturer: *Pirod*

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

Plate Data		
Diam:	70	in
Thick:	1.25	in
Grade:	36	ksi
Single-Rod B-eff:	3.62	in

Stiffener Data (Welding at both sides)		
Config:	1	*
Weld Type:	Fillet	
Groove Depth:		<-- Disregard
Groove Angle:		<-- Disregard
Fillet H. Weld:	0.375	in
Fillet V. Weld:	0.375	in
Width:	4.5	in
Height:	8	in
Thick:	0.625	in
Notch:	0.5	in
Grade:	36	ksi
Weld str.:	70	ksi

Pole Data		
Diam:	60	in
Thick:	0.625	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	63	ksi
Reinf. Fillet Weld	0	"0" if None

Reactions		
Mu:	4665	ft-kips
Axial, Pu:	65	kips
Shear, Vu:	37	kips
Eta Factor, η	0.5	TIA G (Fig. 4-4)

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

Anchor Rod Results

		Stiffened
Max Rod (Cu+ Vu/ή):	66.9 Kips	AISC LRFD
Allowable Axial, Φ*Fu*Anet:	116.3 Kips	φ*Tn
Anchor Rod Stress Ratio:	57.6% Pass	

Base Plate Results Shear Check Only

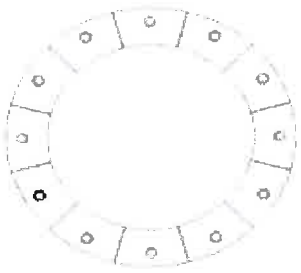
		Stiffened
Base Plate Stress:	Rohn/Pirod, OK	AISC LRFD
Allowable Plate Stress:	19.4 ksi	φ*Fy
Base Plate Stress Ratio:	Rohn/Pirod, OK	Y.L. Length: N/A, Roark

Stiffener Results N/A for Rohn / Pirod

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

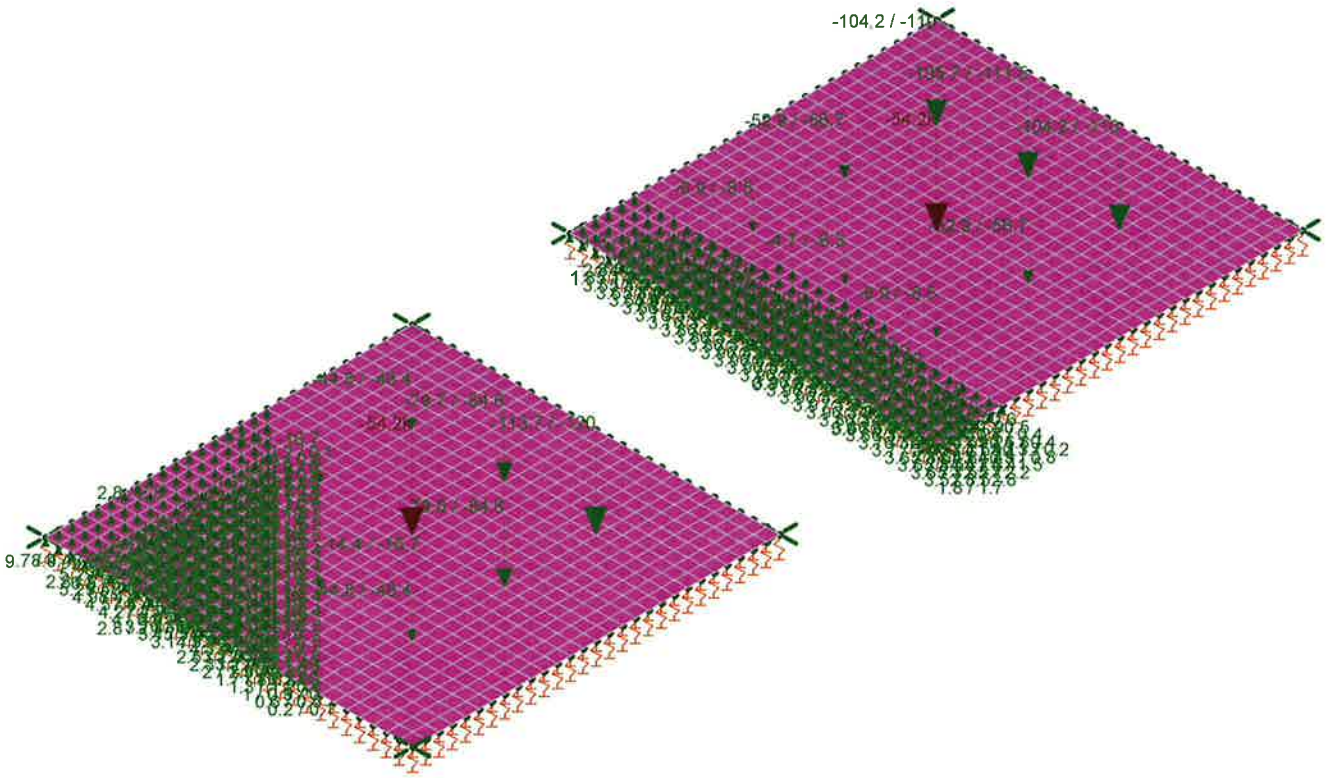
Pole Results

Pole Punching Shear Check: N/A



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

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



2" Williams (Ag=2.896in2, An = 2.427in2, Fy=91ksi, Fu=124ksi)
Capacity = 0.8*Fu*An = 240.8kips

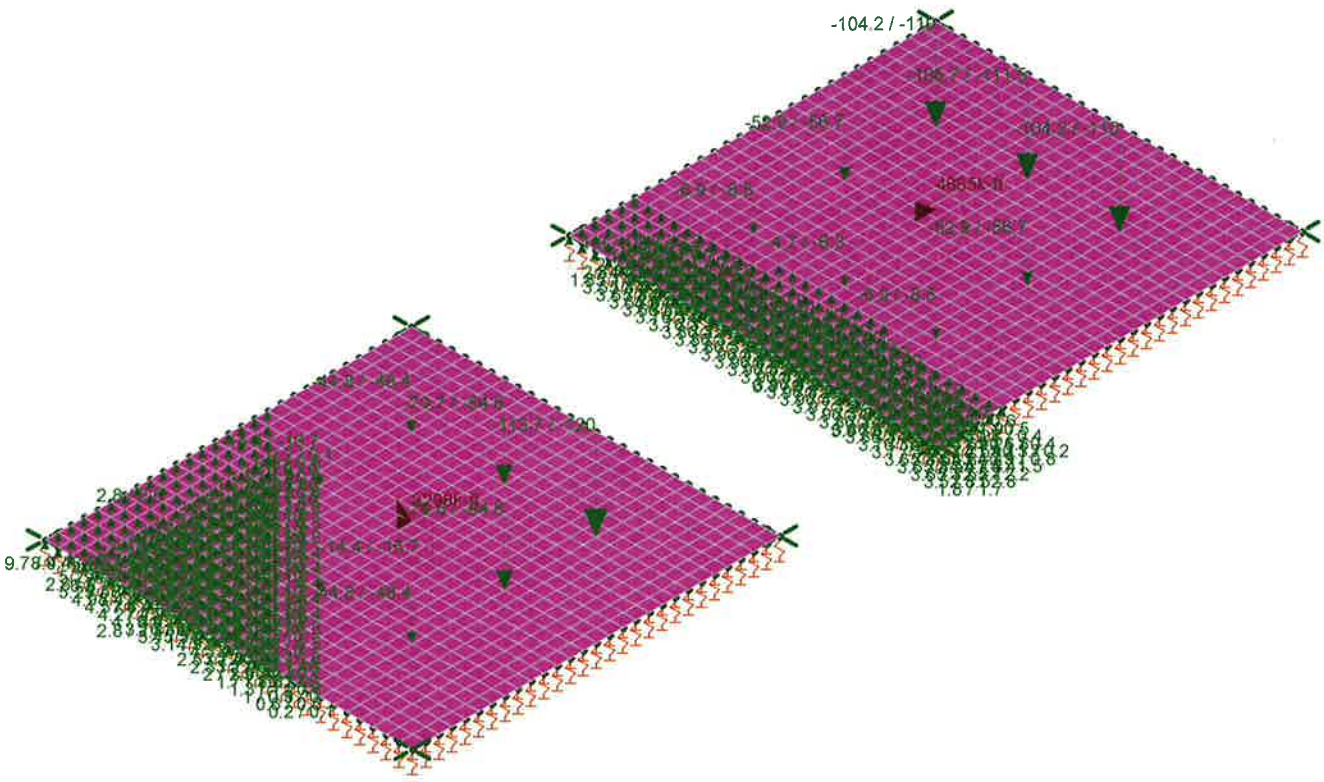
Capacity = 120.0/240.8 = 49.8%

Rock Anchor Spring Constant

k = An*E/10-ft =
(2.427*29000)/(10-ft*12in/ft)
= 587 k/in

Loads: BLC 1, Dead
Envelope Only Solution
Y-direction Reaction Units are k and k-ft (Enveloped)

Paul J. Ford and Company	BU 823529	SK - 1
JRJ		Oct 28, 2016 at 4:02 PM
37516-3105.004.7805		37516-3105.004.7805_MAT Analy...



Loads: BLC 2, MOment + Shear
Envelope Only Solution
Y-direction Reaction Units are k and k-ft (Enveloped)

Paul J. Ford and Company	BU 823529	SK - 2
JRJ		Oct 28, 2016 at 4:02 PM
37516-3105.004.7805		37516-3105.004.7805_MAT Analy...

(Global) Model Settings

Display Sections for Member Calcs	5
Max Internal Sections for Member Calcs	97
Include Shear Deformation?	Yes
Increase Nailing Capacity for Wind?	Yes
Include Warping?	Yes
Trans Load Btwn Intersecting Wood Wall?	Yes
Area Load Mesh (in^2)	144
Merge Tolerance (in)	.12
P-Delta Analysis Tolerance	0.50%
Include P-Delta for Walls?	Yes
Automatically Iterate Stiffness for Walls?	Yes
Max Iterations for Wall Stiffness	3
Gravity Acceleration (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	ACI 318-08
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 7-10
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
Risk Cat	I or II
Om Z	1
Om X	1
Rho Z	1
Rho X	1

Concrete Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (\...	Density[...	f'c[ksi]	Lambda	Flex Steel[ksi]	Shear Steel[ksi]
1	Conc3000NW	3156	1372	.15	.6	.145	3	1	60	60
2	Conc3500NW	3409	1482	.15	.6	.145	3.5	1	60	60
3	Conc4000NW	3644	1584	.15	.6	.145	4	1	60	60
4	Conc3000LW	2085	907	.15	.6	.11	3	.75	60	60
5	Conc3500LW	2252	979	.15	.6	.11	3.5	.75	60	60
6	Conc4000LW	2408	1047	.15	.6	.11	4	.75	60	60

Load Combinations

	Description	S...	PDelta	S...	BLC	Factor	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
1	1.2Axial	Yes	Y		1	1.2	2	1																		
2	0.9 Axial	Yes	Y		1	.9	2	1																		

Plate Forces (Mx) taken at face of pole from RISA-3D:

Compression (1.2)	Compression (0.9)	Tension (0.9)
-6.623	-6.594	-3.157
-6.673	-6.644	-3.161
-6.81	-6.78	-3.085
-7.035	-7.003	-2.924
-7.36	-7.325	-2.651
-7.816	-7.775	-2.203
-8.466	-8.419	-1.553
-9.429	-9.379	-0.674
-10.903	-10.851	0.638
-13.245	-13.193	2.837
-16.899	-16.847	6.419
-21.938	-21.889	11.44
-27.341	-27.295	16.898
-30.982	-30.938	20.614
-30.982	-30.938	20.614
-27.341	-27.295	16.898
-21.938	-21.889	11.44
-16.899	-16.847	6.419
-13.245	-13.193	2.837
-10.903	-10.851	0.638
-9.429	-9.379	-0.674
-8.466	-8.419	-1.553
-7.816	-7.775	-2.203
-7.36	-7.325	-2.651
-7.035	-7.003	-2.924
-6.81	-6.78	-3.085
-6.673	-6.644	-3.161
-6.623	-6.594	-3.157
-363.04	-361.864	78.876 k-ft
-2178.24	**-2171.184**	**473.256** k-ft

Multiply by 6 since drawn in inches and as a 6 inch plate

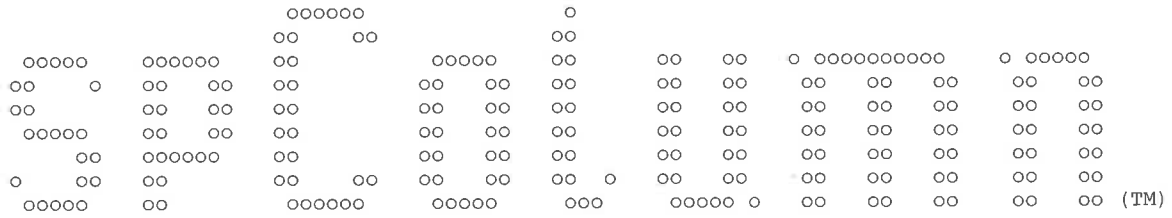
Tension from Anchors

110 kips
111.5 kips
110 kips

Distance anchors to Center of pole = 42 inches
Pole Diameter = 60 inches

Moment Arm = 42 - 60 / 2 = 12 inches

Bending Moment = 3978 k-in
Bending Moment (Tension) = 331.5 k-ft



spColumn v5.00 (TM)
Computer program for the Strength Design of Reinforced Concrete Sections

General Information:
====================
File Name: G:\TOWER\375_Crown_Castle\2016\37516-3105_823529_C...\37516-3105.004.7805_Mat Bending.col
Project: 37516-3105.002.7700
Column: 823529 Engineer: KAT
Code: ACI 318-11 Units: English

Run Option: Investigation Slenderness: Not considered
Run Axis: X-axis Column Type: Architectural

Material Properties:
====================
Concrete: Standard Steel: Standard
f'c = 3 ksi fy = 60 ksi
Ec = 3122.02 ksi Es = 29000 ksi
fc = 2.55 ksi Eps_yt = 0.00206897 in/in
Eps_u = 0.003 in/in
Beta1 = 0.85

Section:
========
Rectangular: Width = 168 in Depth = 45 in

Gross section area, Ag = 7560 in^2
Ix = 1.27575e+006 in^4 Iy = 1.77811e+007 in^4
rx = 12.9904 in ry = 48.4974 in
Xo = 0 in Yo = 0 in

Reinforcement:
==============
Bar Set: ASTM A615

Size	Diam (in)	Area (in^2)	Size	Diam (in)	Area (in^2)	Size	Diam (in)	Area (in^2)
# 3	0.38	0.11	# 4	0.50	0.20	# 5	0.63	0.31
# 6	0.75	0.44	# 7	0.88	0.60	# 8	1.00	0.79
# 9	1.13	1.00	# 10	1.27	1.27	# 11	1.41	1.56
# 14	1.69	2.25	# 18	2.26	4.00			

Confinement: Tied; #4 ties with #10 bars, #4 with larger bars.
phi(a) = 0.8, phi(b) = 0.9, phi(c) = 0.65

Layout: Rectangular
Pattern: Sides Different (Cover to transverse reinforcement)
Total steel area: As = 30.02 in^2 at rho = 0.40% (Note: rho < 0.50%)
Minimum clear spacing = 7.89 in

	Top	Bottom	Left	Right
Bars	19 # 8	19 # 8	0 # 3	0 # 3
Cover(in)	12	3	3	3

Factored Loads and Moments with Corresponding Capacities:
==

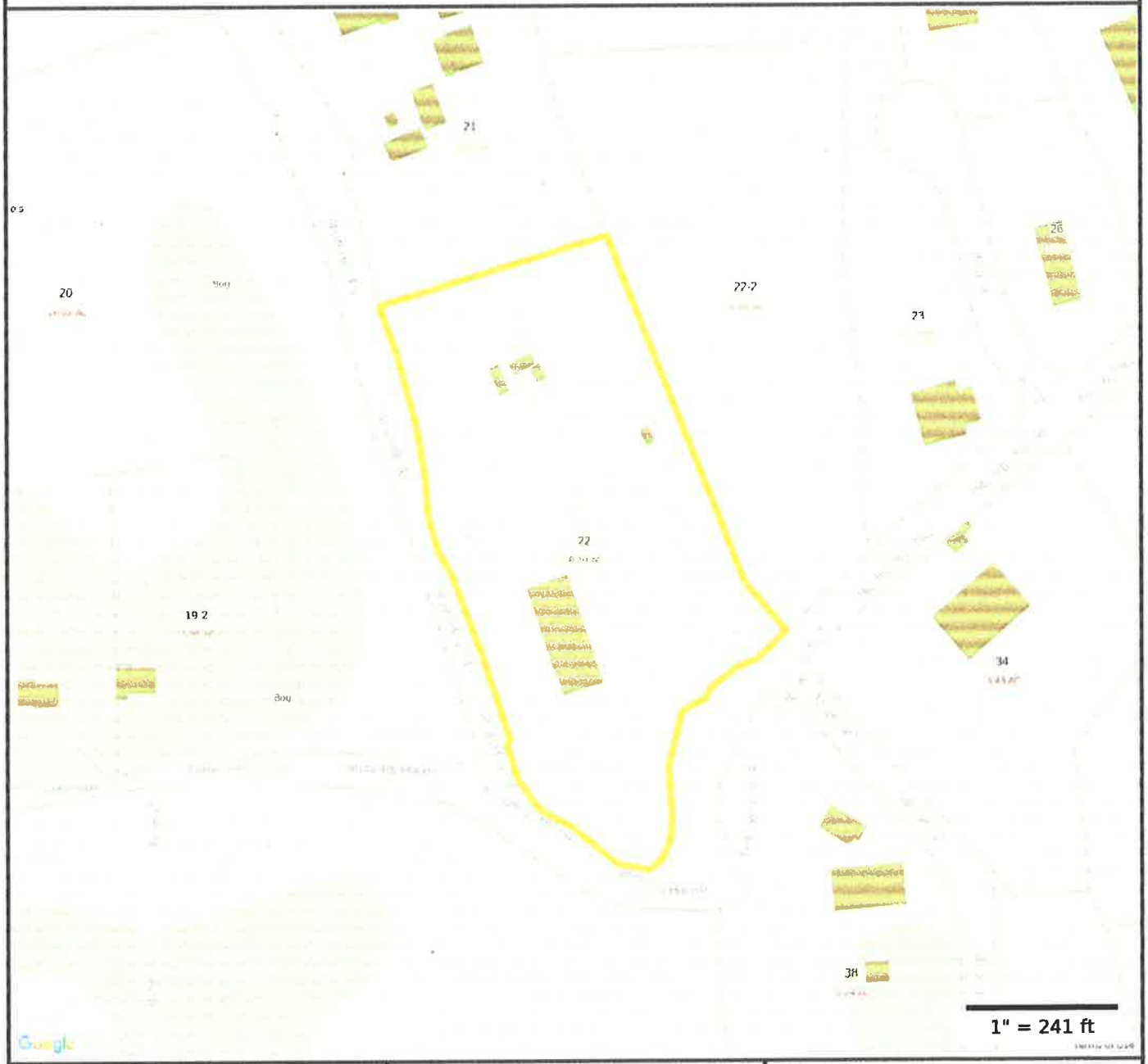
No.	Pu kip	Mux k-ft	PhiMnx k-ft	PhiMn/Mu	NA depth in	Dt depth in	eps_t	Phi
1	0.00	473.30	1993.28	4.211	4.81	41.00	0.01695	0.900
2	0.00	-2178.20	-2815.88	1.293	9.52	41.00	0.00991	0.900

*** End of output ***

ATTACHMENT 4

Town of Old Lyme, CT

February 9, 2017



Property Information

Property ID	19-22
Location	36 HATCHETTS HILL RD
Owner	HATCHETTS HILL LLC

MAP FOR REFERENCE ONLY
NOT A LEGAL DOCUMENT

Town of Old Lyme, CT makes no claims and no warranties, expressed or implied, concerning the validity or accuracy of the GIS data presented on this map.

Parcels updated 2/1/2016
Properties updated 02/09/2017

36 HATCHETTS HILL RD

Location	36 HATCHETTS HILL RD	**Mblu**	19/ / 22/ /
Acct#	00080000	**Owner**	HATCHETTS HILL LLC
Assessment	$649,300	**Appraisal**	$927,700
PID	890	**Building Count**	1

Current Value

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2014	$388,400	$539,300	$927,700
Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2014	$271,800	$377,500	$649,300

Owner of Record

Owner	HATCHETTS HILL LLC	**Sale Price**	$0
Co-Owner		**Certificate**	
Address	38 HATCHETTS HILL RD OLD LYME, CT 06371	**Book & Page**	220/ 677
		Sale Date	08/02/1994

Ownership History

Ownership History				
Owner	**Sale Price**	**Certificate**	**Book & Page**	**Sale Date**
HATCHETTS HILL LLC	$0		220/ 677	08/02/1994

Building Information

Building 1 : Section 1

Year Built:	1994
Living Area:	12,060
Replacement Cost:	$544,796
Building Percent Good:	67
Replacement Cost Less Depreciation:	$365,000

Building Attributes	
[illegible]	[illegible]

STYLE	Garage
MODEL	Ind/Comm
Grade	Above Ave
Stories:	2
Occupancy	1
Exterior Wall 1	Concr/Cinder
Exterior Wall 2	Vinyl Siding
Roof Structure	Gable/Hip
Roof Cover	Asph/F Gls/Cmp
Interior Wall 1	Minim/Masonry
Interior Wall 2	Drywall/Sheet
Interior Floor 1	Concr-Finished
Interior Floor 2	Carpet
Heating Fuel	Oil
Heating Type	Radiant
AC Type	None
Bldg Use	IND WHSES
Total Rooms	
Total Bedrms	00
Total Baths	0
1st Floor Use:	316I
Heat/AC	NONE
Frame Type	MASONRY
Baths/Plumbing	AVERAGE
Ceiling/Wall	SUS-CEIL & WL
Rooms/Prtns	AVERAGE
Wall Height	16
% Comn Wall	0

Building Photo

(http://images.vgsi.com/photos/OldLymeCTPhotos//\00\00\55/

Building Layout

Building Sub-Areas (sq ft)			Legend
Code	Description	Gross Area	Living Area
BAS	First Floor	8,580	8,580
AOF	Office, (Average)	3,480	3,480
		12,060	12,060

Extra Features

Extra Features				Legend
Code	Description	Size	Value	Bldg #
GEN	GENERATOR	1 UNITS	$0	1

Land

Land Use

Use Code 4010

Land Line Valuation

Size (Acres) 8.20

Neighborhood	IND	**Assessed Value**	$377,500
Alt Land Appr	No	**Appraised Value**	$539,300
Category			

Outbuildings

Outbuildings						Legend
Code	**Description**	**Sub Code**	**Sub Description**	**Size**	**Value**	**Bldg #**
PAV2	PAVING-CONC			1296 S.F.	$2,300	1
PAV1	PAVING-ASPHALT			8600 S.F.	$8,600	1
PLT1	PLTRY HSE 1 ST			192 S.F.	$600	1
SHP1	WORK SHOP AVE			140 S.F.	$2,000	1
SHP1	WORK SHOP AVE			280 S.F.	$3,900	1
TNK3	GT-10,000			12000 GALS	$6,000	1

Valuation History

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2011	$393,500	$469,000	$862,500
2010	$393,500	$469,000	$862,500
2009	$393,500	$469,000	$862,500

Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2011	$275,400	$328,300	$603,700
2010	$275,400	$328,300	$603,700
2009	$275,400	$328,300	$603,700