Robinson+Cole

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Also admitted in Massachusetts

December 24, 2015

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

Re: **Request of Cellco Partnership d/b/a Verizon Wireless for an Order to Approve the Shared Use of an Existing Tower at 21 East Main Street, Clinton, Connecticut**

Dear Ms. Bachman:

Pursuant to Connecticut General Statutes ("C.G.S.") §16-50aa, as amended, Cellco Partnership d/b/a Verizon Wireless ("Cellco") hereby requests an order from the Connecticut Siting Council ("Council") to approve the shared use by Cellco of an existing telecommunications tower at 21 East Main Street in Clinton, Connecticut (the "Property"). The existing 67.5-foot tower and the underlying Property is owned by Comcast of Connecticut f/k/a Storer Communications of Clinton ("Storer"). The Storer tower facility is managed by CTI Tower Assets II, LLC ("CTI"). Cellco requests that the Council find that the proposed shared use of the Storer tower satisfies the criteria of C.G.S § 16-50aa and issue an order approving the proposed shared use. A copy of this filing is being sent to Clinton's First Selectman Bruce N. Farmer and Storer, the owner of the Property.

Background

The existing Storer facility consists of a 67.5-foot self-supporting lattice tower on a 0.28-acre parcel along the north side of East Main Street in Clinton. T-Mobile currently maintains antennas at the 60-foot level on the Storer tower. Equipment associated with T-Mobile's antennas is located on the ground to the north of the tower.

14357176-v1

Cellco is licensed by the Federal Communications Commission ("FCC") to provide wireless services throughout the State of Connecticut. Cellco and Storer have agreed to the proposed shared use of the East Main Street tower pursuant to mutually acceptable terms and conditions. Likewise, Storer and Cellco have agreed to the proposed installation of equipment cabinets on the ground to the west of the tower. Storer, through its facility manager CTI, has authorized Cellco to apply for all necessary permits and approvals that may be required to share the existing tower. (*See* Owner's authorization letters included in Attachment 1).

Cellco proposes to install twelve (12) antennas and nine (9) remote radio heads (RRHs) behind its antennas, at a height of 50 feet above ground level. Cellco will also install two (2) equipment cabinets and a diesel fueled (10 kW) back-up generator within a new 165 square foot gravel compound area to the west of the tower. Included in Attachment 2 are Cellco's project plans showing the location of all proposed site improvements. Attachment 3 contains specifications for Cellco's proposed antennas, RRHs and backup generator.

C.G.S. § 16-50aa(c)(1) provides that, upon written request for approval of a proposed shared use, "if the council finds that the proposed shared use of the facility is technically, legally, environmentally and economically feasible and meets public safety concerns, the council shall issue an order approving such shared use." Cellco respectfully submits that the shared use of the tower satisfies these criteria.

A. Technical Feasibility. The existing Storer tower is structurally capable of supporting Cellco's proposed improvements. The proposed shared use of this tower is, therefore, technically feasible. A Feasibility Structural Analysis Report ("Structural Report") prepared for this project confirms that the tower, with certain structural modifications can support Cellco's proposed loading. A copy of the Structural Report is included in Attachment 4.

B. Legal Feasibility. Under C.G.S. § 16-50aa, the Council has been authorized to issue orders approving the shared use of an existing tower such as the Storer tower. This authority complements the Council's prior-existing authority under C.G.S. § 16-50p to issue orders approving the construction of new towers that are subject to the Council's jurisdiction. In addition, § 16-50x(a) directs the Council to "give such consideration to other state laws and municipal regulations as it shall deem appropriate" in ruling on requests for the shared use of existing tower facilities. Under the statutory authority vested in the Council, an order by the Council approving the requested shared use would permit the Applicant to obtain a building permit for the proposed installations.

C. **Environmental Feasibility.** The proposed shared use of the Storer tower would have a minimal environmental effect, for the following reasons:

1. The proposed installation of twelve (12) antennas and nine (9) remote radio heads behind the antennas at the 50-foot level on the existing 67.5-foot tower would have an insignificant incremental visual impact on the area around the existing tower. Cellco's equipment cabinets and generator would be installed within an expanded facility compound in an area previously developed. Cellco's shared use of this tower would therefore, not cause any significant change or alteration in the physical or environmental characteristics of the existing site.

2. There are no fans, motors or other mechanical devices included as a part of the equipment cabinets. Nonetheless, noise impacts of Cellco's proposed facility were evaluated for compliance with State and/or local noise standards. According to the Noise Evaluation Report included in Attachment 5 ("Study"), noise from the equipment will not exceed State and/or local noise limits. Noise associated with Cellco's emergency back-up generator is exempt from State and local noise standards.

3. Operation of Cellco's antennas at this site would not exceed the RF emissions standards adopted by the Federal Communications Commission ("FCC"). Included in Attachment 6 of this filing are Cellco's Far Field Approximation tables that demonstrate that Cellco's proposed facility will operate well within the FCC RF emissions safety standards.

4. Under ordinary operating conditions, the proposed installation would not require the use of any water or sanitary facilities and would not generate air emissions or discharges to water bodies or sanitary facilities. After construction is complete the proposed installations would not generate any increased traffic to the Storer facility other than periodic (monthly) maintenance visits to the cell site.

The proposed shared use of the Storer tower would, therefore, have a minimal environmental effect, and is environmentally feasible.

D. Economic Feasibility. As previously mentioned, Cellco has entered into an agreement with Storer for the shared use of the existing facility subject to mutually agreeable terms. The proposed tower sharing is, therefore, economically feasible. (*See* Attachment 1).

E. Public Safety Concerns. As discussed above, the tower is structurally capable of supporting Cellco's full array of twelve (12) antennas, nine (9) remote radio heads and all related equipment. Cellco is not aware of any public safety concerns relative to the proposed sharing of the existing Storer tower. In fact, the provision of new and improved wireless service through shared use of the existing tower is expected to enhance the safety and welfare of area residents and members of the general public traveling through Clinton.

Conclusion

For the reasons discussed above, the proposed shared use of the existing Storer tower at 21 East Main Street satisfies the criteria stated in C.G.S. § 16-50aa and advances the General Assembly's and the Council's goal of preventing the unnecessary proliferation of towers in Connecticut. The Applicant, therefore, respectfully requests that the Council issue an order approving the proposed shared use.

Thank you for your consideration of this matter.

Very truly yours,

Kenneth C. Baldwin

Enclosures
Copy to:
Bruce N. Farmer, First Selectman
Storer Communications of Clinton
CTI Tower Assets II, LLC
Tim Parks

ATTACHMENT 1

CTI TOWERS

December 11, 2015

Connecticut Siting Council
c/o Acting Executive Director, Attorney Melanie Bachman
Ten Franklin Square
New Britain, CT 06051

Re: Application for Cellco Partnership, a Delaware general partnership d/b/a Verizon Wireless
Site Address: 21 E Main Street, Clinton, CT
CTI Site ID: 11201 / Clinton

Dear Attorney Bachman:

CTI Towers Assets II, LLC ("CTI") manages the tower facility at 21 E Main Street, Clinton, CT, and identified as Parcel no. 56/60/08 (the "Property") on behalf of Comcast of Connecticut, Inc., successor by merger to Comcast of Clinton CT, LLC, f/k/a Comcast of Clinton CT, Inc., f/k/a Comcast of Clinton CT I, LLC, f/k/a Comcast Cablevision of Clinton, Inc., f/k/a Storer Communications of Clinton, Inc. ("Comcast").

CTI hereby authorizes Cellco Partnership d/b/a Verizon Wireless ("Verizon") to file applications for the sole purpose of gaining any and all permit(s) to install new telecommunications equipment ("Equipment") on an existing self-support tower on the Property.

Verizon shall be not be permitted to install the Equipment on the Property until Verizon provides a copy of its building permit from the City and until Verizon complies with any and all requirements set forth in Verizon's lease with Comcast.

Please contact me at (508) 440-5780 ext. 230 or clarson@ctitowers.com should you have any questions or concerns.

Sincerely,

Carrie L. Larson
General Counsel

ATTACHMENT 2

Cellco Partnership

d.b.a. verizon wireless

WIRELESS COMMUNICATIONS FACILITY

CLINTON 2

21 EAST MAIN STREET

CLINTON, CT 06413

SITE DIRECTIONS

FROM: 99 EAST RIVER DRIVE, EAST HARTFORD, CONNECTICUT **TO:** 21 EAST MAIN STREET, CLINTON, CONNECTICUT

1. Head south on E River Dr. toward Pitkin St.	0.9 mi
2. Merge onto US-5 towards I-91 S	1.4 mi
3. Merge onto I-91 S, exit 86	8.9 mi
4. Take exit 22 S, via CT-9 S	13.9 mi
5. Take exit 9	0.2 mi
6. Turn right onto Killington Rd. Continue to follow CT-81	13.8 mi
7. Turn left onto Hull St.	0.1 mi
8. Take the first left onto W Main St. Destination is on the right	0.1 mi

GENERAL NOTES

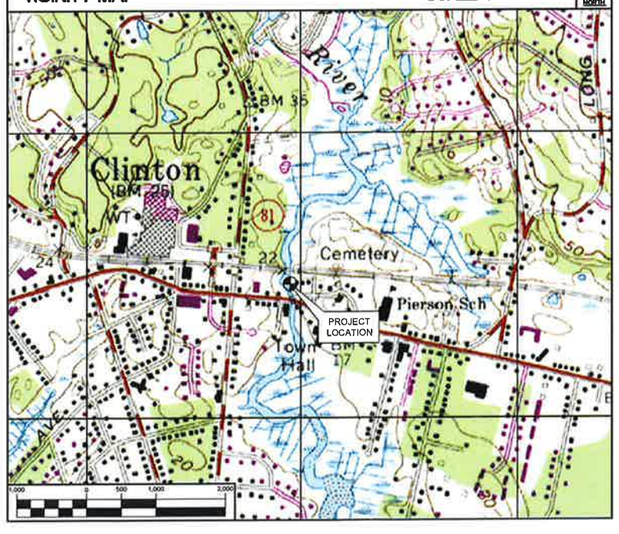
1. PROPOSED ANTENNA LOCATIONS AND HEIGHTS PROVIDED BY CELLCO PARTNERSHIP.

PROJECT SCOPE

1. THE PROPOSED SCOPE OF WORK GENERALLY INCLUDES THE INSTALLATION OF (3) SECTORS WITH (4) ANTENNAS EACH, FOR A TOTAL OF 12 ANTENNAS, (3) SECTORS WITH (3) REMOTE RADIO HEADS EACH, FOR A TOTAL OF 9 REMOTE RADIO HEADS, ASSOCIATED CABLES AND APPURTENANCES MOUNTED TO EXISTING LATTICE TOWER.
2. PROPOSED EQUIPMENT CABINETS (TYP. OF 2) AND EMERGENCY BACKUP POWER GENERATOR WILL BE INSTALLED WITHIN THE PROPOSED EQUIPMENT LEASE AREA.
3. POWER AND TELCO UTILITIES DEPICTED HEREIN ARE TENTATIVE. FINAL ROUTING TO BE DETERMINED DURING THE CONSTRUCTION DOCUMENT PHASE OF PROJECT.
4. THE PROPOSED WIRELESS FACILITY INSTALLATION WILL BE DESIGNED IN ACCORDANCE WITH THE 2003 INTERNATIONAL BUILDING CODE AS MODIFIED BY THE 2009 CONNECTICUT SUPPLEMENT.

VICINITY MAP

SCALE: 1" = 1000'



PROJECT SUMMARY

SITE NAME:	CLINTON 2
SITE ADDRESS:	21 EAST MAIN STREET CLINTON, CONNECTICUT
CELLCO PARTNERSHIP/TENANT:	CELLCO PARTNERSHIP d.b.a. VERIZON WIRELESS 99 EAST RIVER DRIVE EAST HARTFORD, CT 06108
CONTACT PERSON:	ALEKSEY TYURIN CELLCO PARTNERSHIP (860) 803-8213
TOWER COORDINATES:	LATITUDE: 41°-16'-43.73"N LONGITUDE: 72°-31'-33.51"W GROUND ELEVATION: ±25.0' A.M.S.L. COORDINATES AND GROUND ELEVATION REFERENCED FROM CSC WEB LOG.

SHEET INDEX

SHT. NO.	DESCRIPTION	REV. NO.
T-1	TITLE SHEET	1
C-1	ABUTTERS MAP	1
C-2	PARTIAL SITE PLAN, ELEVATION AND ANTENNA CONFIG.	1

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
1	12/10/15	HMR	DMD	ISSUED FOR CSC
0	12/01/15	JTD	DMD	ISSUED FOR CSC-CLIENT REVIEW

PROFESSIONAL ENGINEER SEAL

Cellco Partnership d.b.a. verizon wireless

CENTEK engineering
Centered on Solutions
(203) 488-0580
(203) 488-8587 Fax
63-2 North Branford Road
Branford, CT 06405
www.CentekEng.com

Cellco Partnership d/b/a Verizon Wireless

WIRELESS COMMUNICATIONS FACILITY

CLINTON 2

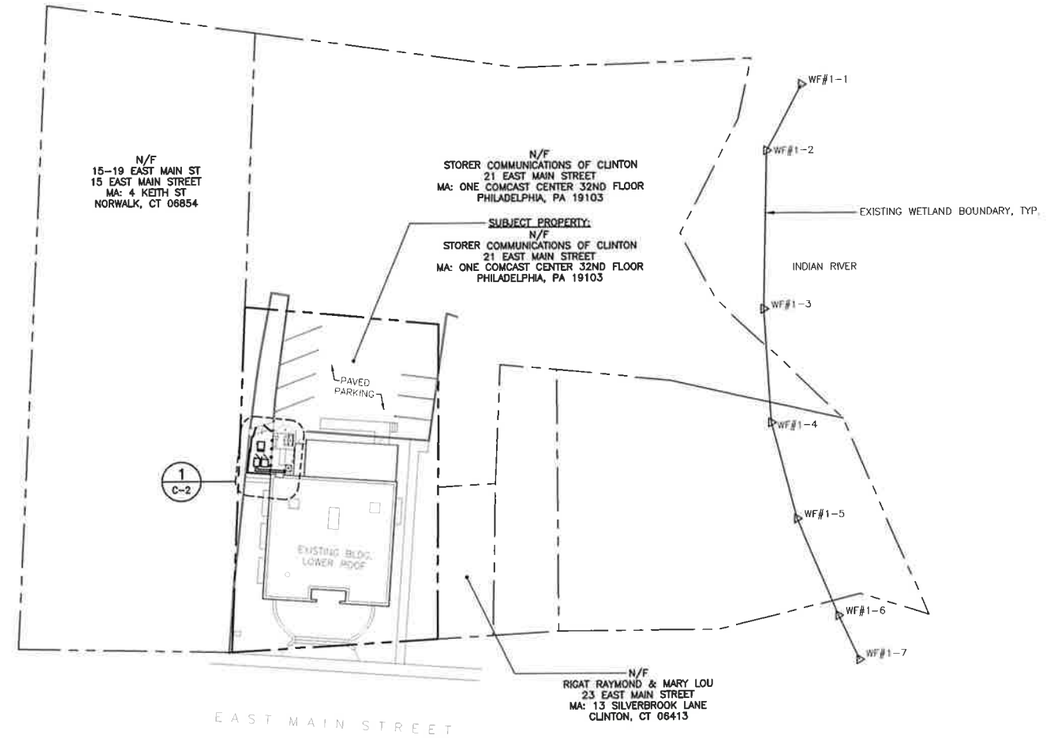
21 EAST MAIN STREET
CLINTON, CT 06413

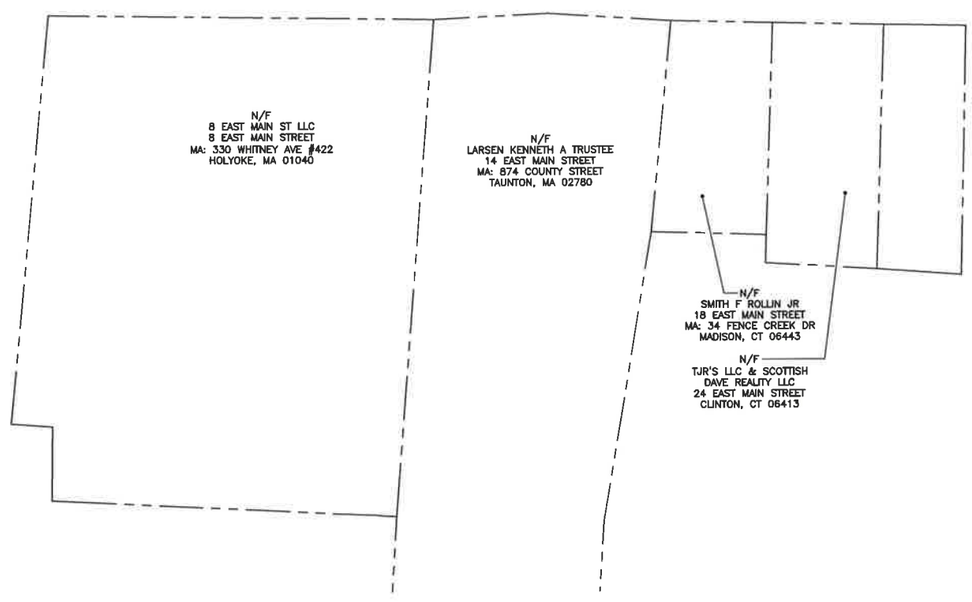
DATE: 11/19/15
SCALE: AS NOTED
JOB NO. 15169.000

TITLE SHEET

T-1

Sheet No. 1 of 3

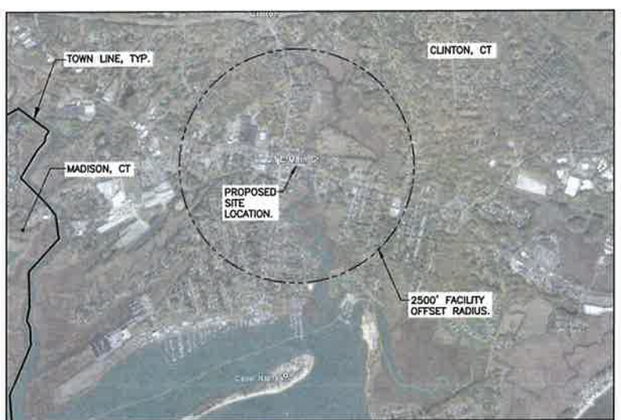




1 / C-1 **ABUTTERS MAP**
SCALE: 1" = 30'

APPROXIMATE NORTH

GRAPHIC SCALE
30 0 15 30 60 120
(IN FEET)
1 inch = 30 ft.



MUNICIPALITY NOTIFICATION LIMIT MAP

MAP REFERENCE NOTE:

PROPERTY LINES AND PROPERTY OWNER INFORMATION SHOWN HEREIN ARE REFERENCED FROM TOWN OF CLINTON ASSESSORS MAPS. SITE FEATURES SHOWN HEREIN ARE REFERENCED FROM A SITE PLAN OBTAINED FROM THE TOWN OF CLINTON TOWN HALL.

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
1	12/10/15	HMR	DMD	ISSUED FOR CSC
0	12/01/15	JTD	DMD	ISSUED FOR CSC-CLIENT REVIEW

PROFESSIONAL ENGINEER SEAL

Cellco Partnership d.b.a. verizonwireless

CENTEK engineering
Centered on Solutions
(203) 488-0580
(203) 488-8587 Fax
63-2 North Branford Road
Branford, CT 06405
www.CentekEng.com

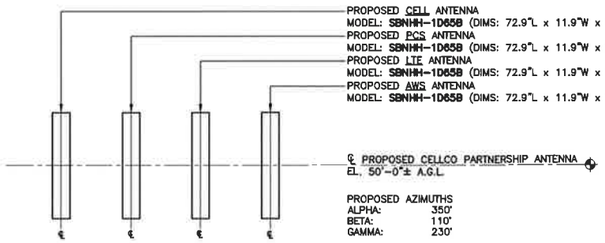
Cellco Partnership d/b/a Verizon Wireless
WIRELESS COMMUNICATIONS FACILITY
CLINTON 2
21 EAST MAIN STREET
CLINTON, CT 06413

DATE: 11/19/15
SCALE: AS NOTED
JOB NO. 15169.000

ABUTTERS MAP

C-1

Sheet No. 2 of 3



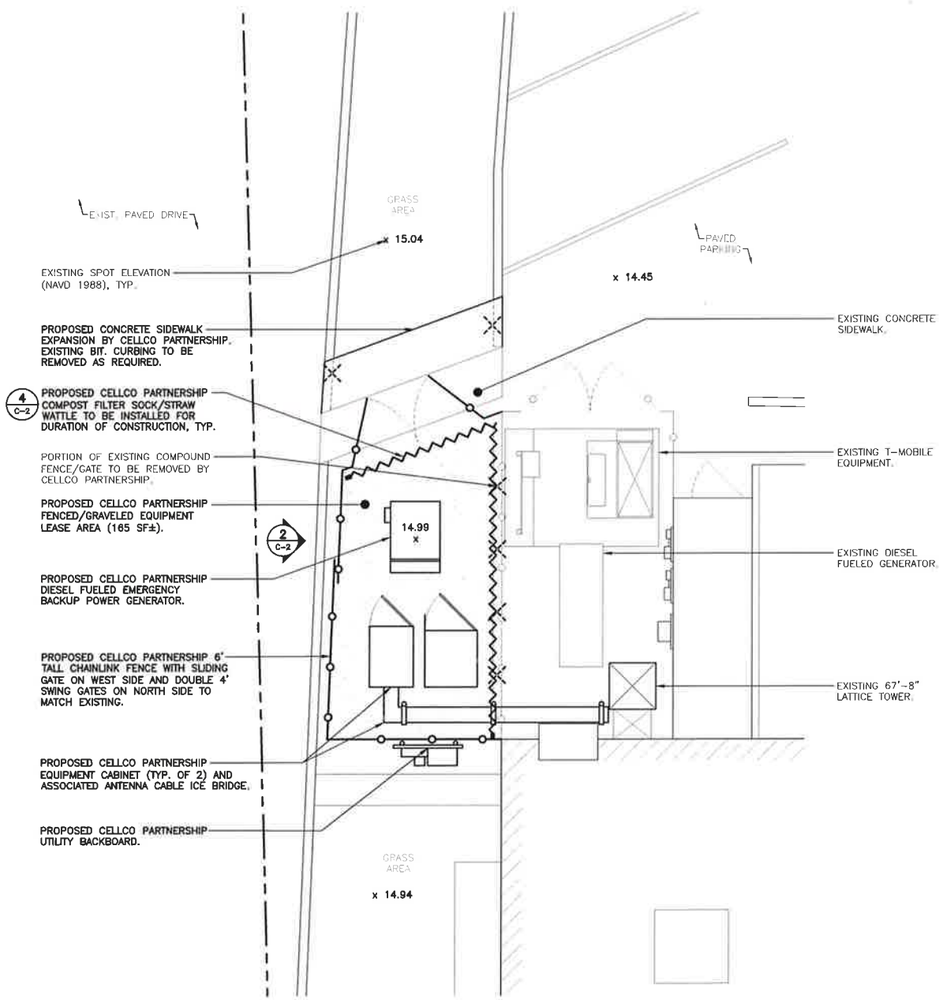
RRH/DISTRIBUTION BOX MOUNTING NOTE

- AWS RRH MODEL: **ALU RRH2x60-AWS** (DIMS: 36.7"L x 10.6"W x 5.8"D) (TYP. OF 3 PER SECTOR)
- LTE RRH MODEL: **ALU RRH2x60-700U** (DIMS: 21.0"L x 12.0"W x 8.0"D) (TYP. OF 3 PER SECTOR)
- PCS RRH MODEL: **ALU RRH2x60-PCS** (DIMS: 21.5"L x 12.0"W x 7.4"D) (TYP. OF 3 PER SECTOR)

ANTENNA AND RRH MOUNTED WITHIN EXISTING MONOPOLE TOWER

3 / C-2 TYP. ANTENNA MOUNTING CONFIGURATION

NOT TO SCALE



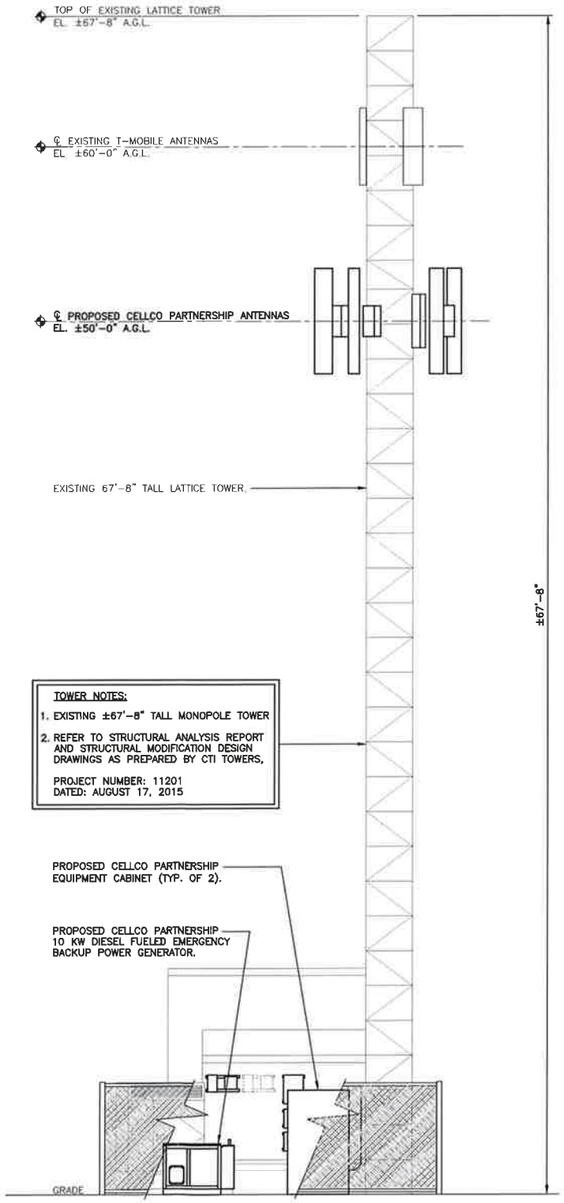
1 / C-2 PARTIAL SITE PLAN

SCALE: 1/4" = 1'

APPROXIMATE NORTH

GRAPHIC SCALE

(IN FEET)
1 inch = 4 ft.

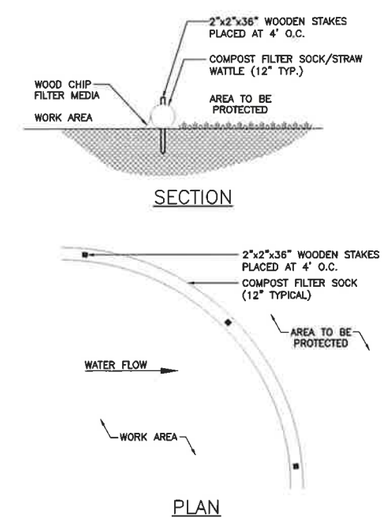


2 / C-2 WEST TOWER ELEVATION

SCALE: 1/4" = 1'

GRAPHIC SCALE

(IN FEET)
1 inch = 4 ft.



4 / C-2 TYP. COMPOST FILTER SOCK/STRAW WATTLE DETAIL

NOT TO SCALE

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
1	12/10/15	HMR	DMD	ISSUED FOR CSC
0	12/01/15	JTD	DMD	ISSUED FOR CSC-CLIENT REVIEW

PROFESSIONAL ENGINEER SEAL

Cellco Partnership d.b.a. verizonwireless

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Cellco Partnership d/b/a Verizon Wireless
WIRELESS COMMUNICATIONS FACILITY
CLINTON 2
21 EAST MAIN STREET
CLINTON, CT 06413

DATE: 11/19/15
SCALE: AS NOTED
JOB NO. 15169.000

PARTIAL SITE PLAN
ELEVATION &
ANTENNA CONFIG.

C-2

Sheet No. 3 of 3

ATTACHMENT 3

Product Specifications

COMMSCOPE®

POWERED BY ANDREW.

SBNHH-1D65B

Andrew® Tri-band 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
CPR at Boresight, dB	20	23	20	20	17	21
CPR at Sector, dB	14	10	12	10	9	1
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
Gain by Beam Tilt, average, dBi	0 ° | 14.6	0 ° | 14.5	0 ° | 17.4	0 ° | 17.8	0 ° | 18.1	0 ° | 18.2
	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.

General Specifications

Antenna Brand	Andrew®
Antenna Type	DualPol® multiband with internal RET
Band	Multiband
Brand	DualPol® | Teletilt®
Operating Frequency Band	1695 – 2360 MHz | 698 – 896 MHz
Performance Note	Outdoor usage

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All specifications are subject to change without notice. See www.commscope.com for the most current information. Revised: October 13, 2015

Product Specifications

COMMSCOPE®

SBNHH-1D65B

POWERED BY ANDREW.

Mechanical Specifications

Color	Light gray
Lightning Protection	dc Ground
Radiator Material	Aluminum | Low loss circuit board
Radome Material	Fiberglass, UV resistant
Reflector Material	Aluminum
RF Connector Interface	7-16 DIN Female
RF Connector Location	Bottom
RF Connector Quantity, total	6
Wind Loading, maximum	617.7 N @ 150 km/h 138.9 lbf @ 150 km/h
Wind Speed, maximum	241 km/h | 150 mph

Dimensions

Depth	180.0 mm | 7.1 in
Length	1851.0 mm | 72.9 in
Width	301.0 mm | 11.9 in
Net Weight	18.4 kg | 40.6 lb

Remote Electrical Tilt (RET) Information

Input Voltage	10–30 Vdc
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
RET System	Teletilt®

Packed Dimensions

Depth	299.0 mm | 11.8 in
Length	1970.0 mm | 77.6 in
Width	409.0 mm | 16.1 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

Included Products

©2015 CommScope, Inc. All rights reserved. All trademarks identified by ® or ™ are registered trademarks, respectively, of CommScope.
All specifications are subject to change without notice. See www.commscope.com for the most current information. Revised: October 13, 2015

Product Specifications

COMMSCOPE®

SBNHH-1D65B

POWERED BY ANDREW.

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

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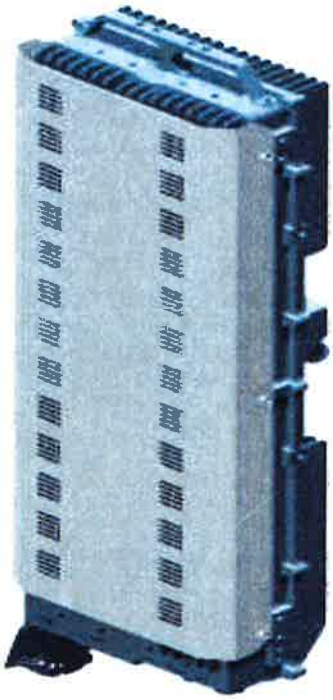
All specifications are subject to change without notice. See www.commscope.com for the most current information. Revised: October 13, 2015

ALCATEL-LUCENT
WIRELESS PRODUCT DATASHEET
RRH2X60-AWS FOR BAND 4 APPLICATIONS

The Alcatel-Lucent RRH2x60-AWS is a high power, small form factor Remote Radio Head operating in the AWS frequency band (3GPP Band 4) for LTE technology. It is designed with an eco-efficient approach, providing operators with the means to achieve high quality and high capacity coverage with minimum site requirements and efficient operation.



A distributed Node B expands the deployment options by using two components, a Base Band Unit (BBU) containing the digital assets and a separate RRH containing the radio-frequency (RF) elements. This modular design optimizes available space and allows the main components of a Node B to be installed separately, within the same site or several kilometers apart.

The Alcatel-Lucent RRH2x60-AWS is linked to the BBU by an optical-fiber connection carrying downlink and uplink digital radio signals along with operations, administration and maintenance (OA&M) information.

SUPERIOR RF PERFORMANCE

The Alcatel-Lucent RRH2x60-AWS integrates all the latest technologies. This allows to offer best-in-class characteristics.

It delivers an outstanding 120 watts of total RF power thanks to its two transmit RF paths of 60 W each.

It is ideally suited to support multiple-input multiple-output (MIMO) 2x2 operation.

It includes four RF receivers to natively support 4-way uplink reception diversity. This improves the radio uplink coverage and this can be used to extend the cell radius commensurate with 2x2MIMO 2x60 W for the downlink.

It supports multiple discontinuous LTE carriers within an instantaneous bandwidth of 45 MHz corresponding to the entire AWS B4 spectrum.

The latest generation power amplifiers (PA) used in this product achieve high efficiency (>40%), resulting in improved power consumption figures.

OPTIMIZED TCO

The Alcatel-Lucent RRH2x60-AWS is designed to make available all the benefits of a distributed Node B, with excellent RF characteristics, with low capital expenditures (CAPEX) and low operating expenditures (OPEX).

The Alcatel-Lucent RRH2x60-AWS is a very cost-effective solution to deploy LTE MIMO.

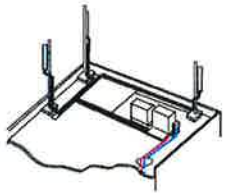
EASY INSTALLATION

The RRH2x60-AWS includes a reversible mounting bracket which allows for ease of installation behind an antenna, or on a rooftop knee wall while providing easy access to the mid body RF connectors.

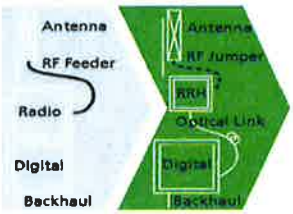
The limited space available in some sites may prevent the installation of traditional single-cabinet BTS equipment. However, many of these sites can host an Alcatel-Lucent RRH2x60-AWS installation, providing more flexible site selection and improved network quality along with greatly reduced installation time and costs.

The Alcatel-Lucent RRH2x60-AWS is a zero-footprint solution and is convection cooled without fans for silent operation, simplifying negotiations with site property owners and minimizing environmental impacts.

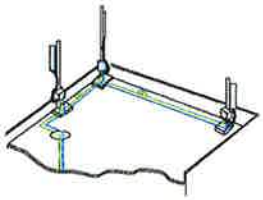
Installation can easily be done by a single person as the Alcatel–Lucent RRH2x60-AWS is compact and weighs about 20 kg, eliminating the need for a crane to hoist the BTS cabinet to the rooftop. A site can be in operation in less than one day.



Macro



RRH for space-constrained cell sites



Distributed

FEATURES

- RRH2x60-AWS integrates two power amplifiers of 60W rating (at each antenna connector)
- Support multiple carriers over the entire 3GPP band 4
- RRH2x60-AWS is optimized for LTE operation
- RRH2x60-AWS is a very compact and lightweight product
- Advanced power management techniques are embedded to provide power savings, such as PA bias control

BENEFITS

- MIMO LTE operation with only one single unit per sector
- Improved uplink coverage with built-in 4-way receive diversity capability
- RRH can be mounted close to the antenna, eliminating nearly all losses in RF cables and thus reducing power consumption by 50% compared to conventional solutions
- Distributed configurations provide easily deployable and cost-effective solutions, near zero footprint and silent solutions, with minimum impact on the neighborhood, which ease the deployment
- RETA and TMA support without additional hardware thanks to the AISG v2.0 port and the integrated Bias-Tees. Bias-Tees support AISG DC supply and signaling.

TECHNICAL SPECIFICATIONS

Specifications listed are hardware capabilities. Some capabilities depend on support in a specific software release or future release.

Dimensions and weights

- HxWxD : 510x285x186mm (27 l with solar shield)
- Weight : 20 kg (44 lbs)

Electrical Data

- Power Supply : -48V DC (-40.5 to -57V)
- Power Consumption (ETSI average traffic load reference) : 250W @2x60W

RF Characteristics

- Frequency band: 1710-1755, UL / 2110-2155 MHz, DL (3GPP band 4)
- Output power: 2x60W at antenna connectors
- Technology supported: LTE
- Instantaneous bandwidth: 45 MHz
- Rx diversity: 2-way and 4-way uplink reception
- Typical sensitivity without Rx diversity: -105 dBm for LTE

Connectivity

- Two CPRI optical ports for daisychaining and up to six RRHs per fiber
- Type of optical fiber: Single-Mode (SM) and Multi-Mode (MM) SFPs
- Optical fiber length: up to 500m using MM fiber, up to 20km using SM fiber
- TMA/RETA : AISG 2.0 (RS485 connector and internal Bias-Tee)
- Six external alarms
- Surge protection for all external ports (DC and RF)

Environmental specifications

- Operating temperature: -40°C to 55°C including solar load
- Operating relative humidity: 8% to 100%
- Environmental Conditions : ETS 300 019-1-4 class 4.1E
- Ingress Protection : IEC 60529 IP65
- Acoustic Noise : Noiseless (natural convection cooling)

Safety and Regulatory Data

- EMC : 3GPP 25113, EN 301 489-1, EN 301 489-23, GR 1089, GR 3108, OET-65
- Safety : IEC60950-1, EN 60825-1, UL, ANSI/NFPA 70, CAN/CSA-C22.2
- Regulatory : FCC Part 15 Class B, CE Mark – European Directive : 2002/95/EC (ROHS); 2002/96/EC (WEEE); 1999/5/EC (R&TTE)
- Health : EN 50385

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Alcatel·Lucent

AT THE SPEED OF IDEAS™

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.

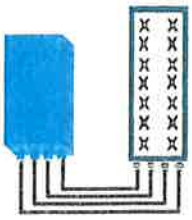
Its compactness and slim design makes the Alcatel-Lucent B13 RRH4x30-4R easy to install close to the antenna: operators can therefore locate this Remote Radio Head where RF design conditions are deemed ideal, minimizing trade-offs between available sites and RF optimum sites, together with reducing the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

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

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PCS RF MODULES

RRH1900 2X60 - HW CHARACTERISTICS

LA6.0.1/13.3

		RRH2x60
RF Output Power		2x60W
Instantaneous Bandwidth		20MHz
Transmitter		2 TX
Receiver	1900 HW version 1900A HW version	2 Branch RX – LA6.0.1 4 Branch RX – LR13.3
Features		AISG 2.0 for RET/TMA
		Internal Smart Bias-T
Power		-48VDC
CPRI Ports		2 CPRI Rate 3 Ports
External Alarms		4 External User Alarms
Monitor Ports		TX
Environmental		GR487 Compliance
RF Connectors		7/16 DIN (top mounted)

** Not a Verizon Wireless deployed product

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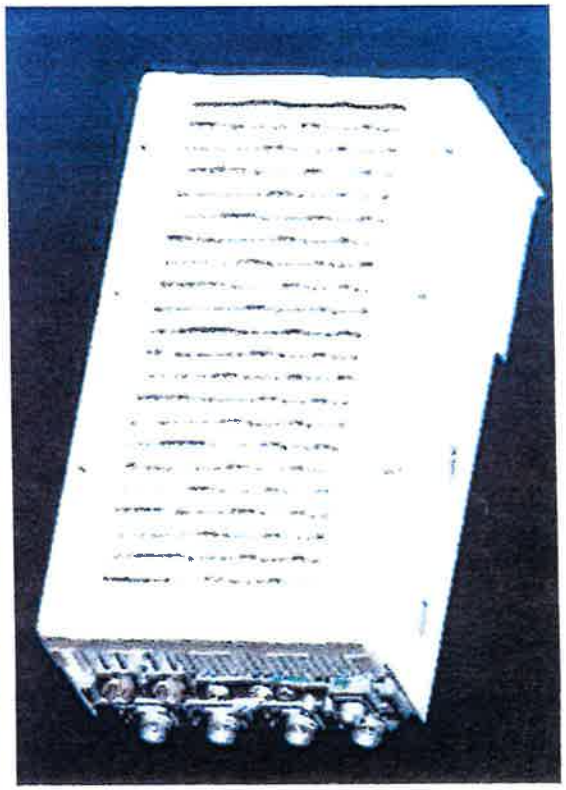
Alcatel·Lucent

NEW PCS RF MODULES FOR VZW

RRH2X60 - HW CHARACTERISTICS

LR14.3

	RRH2x60
RF Output Power	2x60W (4x30W HW Ready)
Instantaneous Bandwidth	60MHz
Target Reliability (Annual Return Rate)	<2%
Receiver	4 Branch Rx
Features	AISG 2.0 for RET/TMA
Power	-48VDC
	Internal Smart Bias-T
CPRI Ports	2 CPRI Rate 5 Ports
External Alarms	4 External User Alarms
Monitor Ports	TX, RX
Environmental	GR487 Compliance
RF Connectors	7/16 DIN (downward facing)
Dimensions	22"(h) x 12"(w)x 9.4" (d)**
Weight	55lb**



**- Includes solar shield but not mounting brackets (8 lbs.)

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8220K-972

with vertical enclosure

The most efficient Power Solution for Telecom Backup using Propane or Natural Gas

The Polar solution was engineered to meet the unique power quality and monitoring requirements of the telecommunications industry. Our DC generator solutions have become the preferred choice for installations with small AC loads. Since 1994 Polar Power Inc. has been the leader in DC power and cooling solutions.

- Maximum output is 10 kW
- DC output (+24 or -48)
- Variable speed
- Generator service life 20+ years
- Very fuel efficient
- Operating range -40°C to +65°C
- Quiet
- Compact
- Lightweight

Description

Combining our lightweight 8220 alternator with the heavy duty Kubota 972 water cooled engine delivers a perfect DC power solution. It offers significant advantages over other manufacturers' DC generators and AC generators with battery chargers.

The Kubota 972 engine can provide between 30,000 to 40,000 hours of operational life depending on the quality of maintenance. The service life of the controller, wire harness, and alternator is well over 100,000 hours.

The enclosure is constructed with aluminum and stainless steel fastners, then powder coated. We feature sound attenuation, with ratings at 61 dba.

Our exclusive Supra Digital Controller features fully automatic voltage and current sensing, protective engine shutdown, exercise schedule, remote monitoring, and control. Extensive alarm options are available.

The automatic voltage and current regulation optimally powers radio equipment and recharges batteries without overloading the generator or overcharging the battery.

Able to operate on very low natural gas line pressure without boosting pumps.

Very fuel efficient on LPG (propane). Small tanks provide long reserve.

It is compact facilitating installation, especially at sites with restrictive space and weight limitations.

A supercapacitor replaces the starting battery for high reliability.

ETL listed per UL 2200 by Interek Testing Labs.

Visit our web site for prime power, lithium-ion batteries, and solar hybrid systems.

Polar Power Inc.
249 E. Gardena Blvd
Gardena, CA 90748 USA
Tel: (310) 830 - 9153
Sales@polarpowerinc.com

www.polarpower.com

8220I-3CA1

with vertical enclosure

The most efficient Power Solution for Telecom Backup using Diesel

The Polar solution was engineered to meet the unique power quality and monitoring requirements of the telecommunications industry. Our DC generator solutions have become the preferred choice for installations with small AC loads. Since 1994 Polar Power Inc. has been the leader in DC power and cooling solutions.

- Maximum output is 10 kW
- DC output (+24 or -48)
- Variable speed
- Generator service life 20+ years
- Very fuel efficient
- Operating range -40°C to +65°C
- Quiet
- Compact
- 72 hour backup

Description

Combining our lightweight 8220 alternator with the heavy duty Isuzu 3CA1 water cooled engine delivers a perfect DC power solution. It offers significant advantages over other manufacturers' DC generators and AC generators with battery chargers.

The Isuzu model 3CA1 is manufactured by Yanmar and is identical to their model 3TNV70.

The Isuzu 3CA1 engine can provide between 10,000 to 16,000 hours of operational life depending on the quality of maintenance. The service life of the controller, wire harness, and alternator is well over 100,000 hours.

The enclosure is constructed with aluminum and stainless steel fastners, then powder coated. We feature sound attenuation.

Our exclusive Supra Digital Controller features fully automatic voltage and current sensing, protective engine shutdown, exercise schedule, remote monitoring, and control. Extensive alarm options are available.

The automatic voltage and current regulation optimally powers radio equipment and recharges batteries without overloading the generator or overcharging the battery.

204 L (54 gallon) double wall UL listed fuel tank.

Very light weight and compact facilitating installation; especially at sites with restrictive space and weight limitations.

A supercapacitor replaces the starting battery for high reliability.

ETL listed per UL 2200 by Interek Testing Labs.

Visit our web site for prime power, lithium-ion batteries, and solar hybrid systems.

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Gardena, CA 90748 USA
Tel: (310) 830 - 9153
Sales@polarpowerinc.com

www.polarpower.com

ATTACHMENT 4

CTI TOWERS
CTI Towers, Inc.
38 Pond Street, Suite 305
Franklin, MA 02038
(508) 440-5780

GPD Engineering and Architecture
Professional Corporation
Chris Scheks
520 South Main Street, Suite 2531
Akron, OH 44311
(614) 588-8973
cscheks@gpdgroup.com

GPD# 2015703.20
August 17, 2015

FEASIBILITY STRUCTURAL ANALYSIS REPORT

CTI DESIGNATION:	**Site #:**	**11201**
	Site Name:	**Clinton**
	Customer #:	**Clinton SC 2**
ANALYSIS CRITERIA:	**Codes:**	**TIA/EIA-222-F & 2005 CT State Building Code** **85-mph (fastest-mile) with 0" ice** **37-mph (fastest-mile) with 0.75" ice**
SITE DATA:		**21 E Main St, Clinton, CT 06413, Middlesex County** **Latitude 41° 16' 43.87" N, Longitude 72° 31' 33.52" W** **67.5' Self Support Tower**

Ms. Christine Cooper,

GPD is pleased to submit this Feasibility Structural Analysis Report to determine the structural integrity of the aforementioned tower. The purpose of the analysis is to determine the suitability of the tower with the existing and proposed loading configuration detailed in the analysis report.

Analysis Results

Tower Stress Level with Proposed Equipment: >200% Fail

We at GPD appreciate the opportunity of providing our continuing professional services to you and CTI Towers, Inc. If you have any questions or need further assistance on this or any other projects please do not hesitate to call.

Respectfully submitted,

STATE OF CONNECTICUT
CHRISTOPHER J. SCHEKS
No. 30026
LICENSED
PROFESSIONAL ENGINEER

Christopher J. Scheks, P.E.
Connecticut #: 0030026

SUMMARY & RESULTS

The purpose of this feasibility analysis was to verify whether the existing structure is capable of carrying the proposed loading configuration as specified by Verizon to CTI Towers, Inc. This report was commissioned by Ms. Christine Cooper of CTI Towers, Inc.

No geotechnical or foundation information was available or provided for this report. Therefore, the in place capacity of the foundation could not be verified. GPD strongly recommends a more thorough and accurate assessment of the foundation capacity which will require a site specific geotechnical report and foundation information.

The proposed coax shall be installed on tower Face B in a single row in order for the analysis results to be valid. See Appendix C for the proposed coax layout.

TOWER SUMMARY AND RESULTS

Member	Capacity	Results
Leg	78.0%	Pass
Diagonal	**141.0%**	**Fail**
Horizontal	44.0%	Pass
Inner Bracing	77.0%	Pass
Bolt Checks	14.8%	Pass
Tower-Building Connection	**>200%**	**Fail**
Foundation	Not Verified	N/A

RECOMMENDATIONS

GPD recommends reinforcing the tower to building connection at 25′ and reinforcing the diagonal members from 25′ to 27.5′ and 55′ to 62.5′. Also, we recommend obtaining foundation information and a site specific geotechnical report in order to complete a full analysis of the foundation. All modifications must be engineered and are beyond the scope of this report.

ANALYSIS METHOD

tnxTower (Version 6.1.4.1) and RISA-3D (Verizon 12.0.0), commercially available software programs, were used to create a three-dimensional model of the tower and calculate primary member stresses for various dead, live, wind, and ice load cases. Selected output from the analysis is included in Appendix B. The following table details the information provided to complete this structural analysis. This analysis is solely based on this information and is being completed without the benefit of a detailed GPD site visit.

DOCUMENTS PROVIDED

Document	Remarks	Source
Site Lease Application	Verizon Site Lease Application, dated 7/24/2015	CTI
Tower Design	Not Provided	N/A
Foundation Design	Not Provided	N/A
Geotechnical Report	Not Provided	N/A
Previous Structural Analysis	Not Provided	N/A
Tower Mapping	FDH Job #: 1424V21500, dated 4/4/2014	CTI

ASSUMPTIONS

This feasibility structural analysis is based on the theoretical capacity of the members and is not a condition assessment of the tower. This analysis is from information supplied, and therefore, its results are based on and are as accurate as that supplied data. GPD has made no independent determination, nor is it required to, of its accuracy. The following assumptions were made for this structural analysis.

1. The tower member sizes and shapes are considered accurate as supplied. The material grade is as per data supplied and/or as assumed and as stated in the materials section.
2. The antenna configuration is as supplied and/or as modeled in the analysis. It is assumed to be complete and accurate. All antennas, mounts, coax and waveguides are assumed to be properly installed and supported as per manufacturer requirements.
3. Some assumptions are made regarding antennas and mount sizes and their projected areas based on best interpretation of data supplied and of best knowledge of antenna type and industry practice.
4. All mounts, if applicable, are considered adequate to support the loading. No actual analysis of the mount(s) is performed. This analysis is limited to analyzing the tower only.
5. The soil parameters are as per data supplied or as assumed and stated in the calculations.
6. Foundations are properly designed and constructed to resist the original design loads indicated in the documents provided.
7. The tower and structures have been properly maintained in accordance with TIA Standards and/or with manufacturer's specifications.
8. All welds and connections are assumed to develop at least the member capacity unless determined otherwise and explicitly stated in this report.
9. All prior structural modifications are assumed to be as per data supplied/available and to have been properly installed.
10. Loading interpreted from photos is accurate to $\pm 5'$ AGL, antenna size accurate to ± 3.3 sf, and coax equal to the number of existing antennas without reserve.
11. All existing loading was obtained from the tower mapping by FDH (Job #: 1424V21500, dated 4/4/2014) and is assumed to be accurate.
12. The propsoed coax shall be installed on tower Face B in a single row in order for the analysis results to be valid. See Appendix C for the proposed coax layout.
13. Tower Leg A was found to be at 315 degrees based on the provided tower mapping and satellite imagery.

If any of these assumptions are not valid or have been made in error, this analysis may be affected, and GPD should be allowed to review any new information to determine its effect on the structural integrity of the tower.

DISCLAIMER OF WARRANTIES

GPD has not performed a site visit to the tower to verify the member sizes or antenna/coax loading. If the existing conditions are not as represented on the tower elevation contained in this report, we should be contacted immediately to evaluate the significance of the discrepancy. This is not a condition assessment of the tower or foundation. This report does not replace a full tower inspection. The tower and foundations are assumed to have been properly fabricated, erected, maintained, in good condition, twist free, and plumb.

The engineering services rendered by GPD in connection with this Feasibility Structural Analysis are limited to a computer analysis of the tower structure and theoretical capacity of its main structural members. No allowance was made for any damaged, bent, missing, loose, or rusted members (above and below ground). No allowance was made for loose bolts or cracked welds.

This analysis is limited to the designated maximum wind and seismic conditions per the governing tower standards and code. Wind forces resulting in tower vibrations near the structure's resonant frequencies were not considered in this analysis and are outside the scope of this analysis. Lateral loading from any dynamic response was not evaluated under a time-domain based fatigue analysis.

GPD does not analyze the fabrication of the structure (including welding). It is not possible to have all the very detailed information needed to perform a thorough analysis of every structural sub-component and connection of an existing tower. GPD provides a limited scope of service in that we cannot verify the adequacy of every weld, plate connection detail, etc. The purpose of this report is to assess the capability of adding appurtenances usually accompanied by transmission lines to the structure.

It is the owner's responsibility to determine the amount of ice accumulation in excess of the code specified amount, if any, that should be considered in the structural analysis.

The attached sketches are a schematic representation of the analyzed tower. If any material is fabricated from these sketches, the contractor shall be responsible for field verifying the existing conditions, proper fit, and clearance in the field. Any mentions of structural modifications are reasonable estimates and should not be used as a precise construction document. Precise modification drawings are obtainable from GPD, but are beyond the scope of this report.

Miscellaneous items such as antenna mounts, etc., have not been designed or detailed as a part of our work. We recommend that material of adequate size and strength be purchased from a reputable tower manufacturer.

Towers are designed to carry gravity, wind, and ice loads. All members, legs, diagonals, struts, and redundant members provide structural stability to the tower with little redundancy. Absence or removal of a member can trigger catastrophic failure unless a substitute is provided before any removal. Legs carry axial loads and derive their strength from shorter unbraced lengths by the presence of redundant members and their connection to the diagonals with bolts or welds. If the bolts or welds are removed without providing any substitute to the frame, the leg is subjected to a higher unbraced length that immediately reduces its load carrying capacity. If a diagonal is also removed in addition to the connection, the unbraced length of the leg is greatly increased, jeopardizing its load carrying capacity. Failure of one leg can result in a tower collapse because there is no redundancy. Redundant members and diagonals are critical to the stability of the tower.

GPD makes no warranties, expressed and/or implied, in connection with this report and disclaims any liability arising from material, fabrication, and erection of this tower. GPD will not be responsible whatsoever for, or on account of, consequential or incidental damages sustained by any person, firm, or organization as a result of any data or conclusions contained in this report. The maximum liability of GPD pursuant to this report will be limited to the total fee received for preparation of this report.

APPENDIX A

Tower Analysis Summary Form

Tower Analysis Summary Form

General Info

Site Name	Clinton
Site Number	11201
Customer #:	Clinton SC 2
Date of Analysis	8/17/2015
Company Performing Analysis	GPD

The information contained in this summary report is not to be used independently from the PE stamped tower analysis.

Tower Info	Description	Date
Tower Type (G, SST, MP)	SST	
Tower Height (top of steel AGL)	67.5'	
Tower Manufacturer	n/a	
Tower Model	n/a	
Tower Design	n/a	
Foundation Design	n/a	
Geotech Report	n/a	
Tower Mapping	FDH Job #: 1424V21500	4/4/2014
Previous Structural Analysis	n/a	
Foundation Mapping	n/a	

Design Parameters

Design Code Used	TIA/EIA-222-F 2005 CT State Building Code
Location of Tower (County, State)	Middlesex, CT
Basic Wind Speed (mph)	85 (fastest-mile)
Ice Thickness (in)	0.75
Structure Classification (I, II, III)	
Exposure Category (B, C, D)	
Topographic Category (1 to 5)	

Analysis Results (% Maximum Usage)

Existing/Reserved + Proposed Condition	
Tower (%)	>200%
Anchor Rods (%)	14.8%
Foundation (%)	Not Verified
Foundation Adequate?	N/A

Steel Yield Strength (ksi)

Legs	50
Diagonals	36
Bolts	A325N
Anchor Rods	A325N

GPD recommends reinforcing the tower to building connection at 25' and reinforcing the diagonal members from 25' to 27.5' and 55' to 62.5'. Also, we recommend obtaining foundation information and a site specific geotechnical report in order to complete a full analysis of the foundation. All modifications must be engineered and are beyond the scope of this report.

Existing / Reserved Loading

Antenna								Mount			Transmission Line			
Antenna Owner	Mount Height (ft)	Antenna CL (ft)	Quantity	Type	Manufacturer	Model	Azimuth	Quantity	Manufacturer	Type	Quantity	Model	Size	Attachment Face/Leg
Unknown	60	60	3	Panel	RFS Celwave	APX16DWV-16DWVS	45/135/225	3	Unknown	Pipe Mounts	12	Unknown	7/8"	Face B
Unknown	60	60	6	TMA	Ericsson	KRY 112 76/1				on the same mounts	1	RET Cable	1/4"	Face B
Unknown	60	60	6	RET	RFS Celwave	ACU-A20-N				on the same mounts				

Proposed Loading

Antenna								Mount			Transmission Line			
Antenna Owner	Mount Height (ft)	Antenna CL (ft)	Quantity	Type	Manufacturer	Model	Azimuth	Quantity	Manufacturer	Type	Quantity	Model	Size	Attachment Face/Leg
Verizon	67	70	6	Panel	Commscope	SBNHH-1D65B	110/230/350	3	WiMax	CWT01 4' T-Arms	2	Hybrid	1-5/8"	Face B
Verizon	67	70	3	RRH	Alcatel Lucent	ALU 2X60 PCS				on the same mounts				
Verizon	67	70	3	RRH	Alcatel Lucent	ALU 2X60 LTE				on the same mounts				
Verizon	67	70	3	RRH	Alcatel Lucent	ALU 2X60 AWS				on the same mounts				
Verizon	67	70	2	Distribution Box	RFS Celwave	DB-T1-6Z-8AB-0Z				on the same mounts				

Note: The proposed coax shall be installed on tower Face B in a single row in order for the analysis results to be valid. See Appendix C for the proposed coax layout.

APPENDIX B

tnxTower Output File

Tower Input Data

The main tower is a 4x free standing tower with an overall height of 67.50 ft above the ground line.
The base of the tower is set at an elevation of 0.00 ft above the ground line.
The face width of the tower is 2.40 ft at the top and 2.40 ft at the base.
This tower is designed using the TIA/EIA-222-F standard.
The following design criteria apply:

Tower is located in Middlesex County, Connecticut.
Basic wind speed of 85 mph.
Nominal ice thickness of 0.7500 in.
Ice thickness is considered to increase with height.
Ice density of 56 pcf.
A wind speed of 37 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 50 mph.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in tower member design is 1.333.
Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
Safety Line 3/8	A	Yes	Ar (CfAe)	67.50 - 0.00	0.0000	0	1	1	0.3750	0.3750		0.22
Climbing Ladder (Af)	A	Yes	Af (CfAe)	3.00 - 0.00	0.0000	0	1	1	3.8400	3.8400	15.3600	4.81
Climbing Ladder (Af)	A	Yes	Af (CfAe)	67.50 - 63.00	0.0000	0	1	1	3.8400	3.8400	15.3600	4.81
Coax Waveguide (9"x3")	B	Yes	Af (CfAe)	60.00 - 4.00	2.0000	0.45	1	1	0.2612	0.2612	1.0447	1.07
L1-1/2x1-1/2x 1/4 Secondary Horizontals (11201)	A	Yes	Af (CfAe)	35.00 - 0.00	0.0000	0	1	1	0.7500	0.7500	3.0000	3.06
L1-1/2x1-1/2x 1/4 Secondary Horizontals (11201)	B	Yes	Af (CfAe)	35.00 - 0.00	0.0000	0	1	1	0.7500	0.7500	3.0000	3.06
L1-1/2x1-1/2x 1/4 Secondary Horizontals (11201)	C	Yes	Af (CfAe)	35.00 - 0.00	0.0000	0	1	1	0.7500	0.7500	3.0000	3.06
L1-1/2x1-1/2x 1/4 Secondary Horizontals (11201)	D	Yes	Af (CfAe)	35.00 - 0.00	0.0000	0	1	1	0.7500	0.7500	3.0000	3.06
LDF5-50A (7/8 FOAM)	B	Yes	Ar (CfAe)	60.00 - 4.00	0.0000	0.5	4	1	1.0000	1.0900		0.33
LDF5-50A (7/8 FOAM)	B	Yes	Ar (CfAe)	60.00 - 4.00	0.0000	0.35	4	4	0.5000	1.0900		0.33
LDF5-50A (7/8 FOAM)	B	Yes	Ar (CfAe)	60.00 - 4.00	3.0000	0.35	4	4	0.5000	1.0900		0.33
LDF1-50A	B	Yes	Ar (CfAe)	60.00 - 4.00	0.0000	0.3	1	1	0.3500	0.3500		0.06

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
(1/4 FOAM) 1-5/8" Fiber Cable	B	Yes	Ar (CfAe)	67.00 - 4.00	0.0000	0	2	2	1.0000	1.9800		0.82

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
APX16DWV-16DWVS-C w/ 5' x 2" Mount Pipe	B	From Leg	1.00 0.00 0.00	0.0000	60.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.31 7.78 8.27 9.26 11.36	3.34 3.99 4.64 6.01 9.00	0.059 0.106 0.159 0.287 0.659
APX16DWV-16DWVS-C w/ 5' x 2" Mount Pipe	C	From Leg	1.00 0.00 0.00	0.0000	60.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.31 7.78 8.27 9.26 11.36	3.34 3.99 4.64 6.01 9.00	0.059 0.106 0.159 0.287 0.659
APX16DWV-16DWVS-C w/ 5' x 2" Mount Pipe	D	From Leg	1.00 0.00 0.00	0.0000	60.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.31 7.78 8.27 9.26 11.36	3.34 3.99 4.64 6.01 9.00	0.059 0.106 0.159 0.287 0.659
(2) KRY 112 76/1	B	From Leg	0.50 0.00 0.00	0.0000	60.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.71 0.83 0.96 1.24 1.90	0.31 0.39 0.47 0.67 1.18	0.015 0.021 0.028 0.049 0.117
(2) KRY 112 76/1	C	From Leg	0.50 0.00 0.00	0.0000	60.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.71 0.83 0.96 1.24 1.90	0.31 0.39 0.47 0.67 1.18	0.015 0.021 0.028 0.049 0.117
(2) KRY 112 76/1	D	From Leg	0.50 0.00 0.00	0.0000	60.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.71 0.83 0.96 1.24 1.90	0.31 0.39 0.47 0.67 1.18	0.015 0.021 0.028 0.049 0.117
(2) ACU-A20-N	B	From Leg	1.00 0.00 0.00	0.0000	60.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.08 0.12 0.17 0.30 0.67	0.14 0.19 0.25 0.40 0.80	0.001 0.002 0.004 0.012 0.045
(2) ACU-A20-N	C	From Leg	1.00 0.00 0.00	0.0000	60.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.08 0.12 0.17 0.30 0.67	0.14 0.19 0.25 0.40 0.80	0.001 0.002 0.004 0.012 0.045
(2) ACU-A20-N	D	From Leg	1.00 0.00 0.00	0.0000	60.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.08 0.12 0.17 0.30 0.67	0.14 0.19 0.25 0.40 0.80	0.001 0.002 0.004 0.012 0.045
(2) Pipe Mount 4'x4.5"	B	From Face	1.00	0.0000	65.00	No Ice	1.32	1.32	0.043

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00			1/2" Ice	1.58	1.58	0.056
			0.00			1" Ice	1.84	1.84	0.072
						2" Ice	2.46	2.46	0.114
						4" Ice	3.89	3.89	0.241
CWT01 4' T-Arm	A	From Leg	0.50	0.0000	67.00	No Ice	2.87	0.82	0.084
			0.00			1/2" Ice	3.33	1.02	0.109
			0.00			1" Ice	3.80	1.22	0.134
						2" Ice	4.74	1.63	0.184
						4" Ice	6.61	2.45	0.284
CWT01 4' T-Arm	C	From Leg	0.50	0.0000	67.00	No Ice	2.87	0.82	0.084
			0.00			1/2" Ice	3.33	1.02	0.109
			0.00			1" Ice	3.80	1.22	0.134
						2" Ice	4.74	1.63	0.184
						4" Ice	6.61	2.45	0.284
CWT01 4' T-Arm	D	From Leg	0.50	0.0000	67.00	No Ice	2.87	0.82	0.084
			0.00			1/2" Ice	3.33	1.02	0.109
			0.00			1" Ice	3.80	1.22	0.134
						2" Ice	4.74	1.63	0.184
						4" Ice	6.61	2.45	0.284
(2) SBNHH-1D65B w/ Mount Pipe	A	From Leg	1.00	0.0000	67.00	No Ice	8.77	7.24	0.086
			0.00			1/2" Ice	9.52	8.52	0.157
			3.00			1" Ice	10.25	9.66	0.237
						2" Ice	11.64	11.59	0.423
						4" Ice	14.54	15.85	0.949
(2) SBNHH-1D65B w/ Mount Pipe	C	From Leg	1.00	0.0000	67.00	No Ice	8.77	7.24	0.086
			0.00			1/2" Ice	9.52	8.52	0.157
			3.00			1" Ice	10.25	9.66	0.237
						2" Ice	11.64	11.59	0.423
						4" Ice	14.54	15.85	0.949
(2) SBNHH-1D65B w/ Mount Pipe	D	From Leg	1.00	0.0000	67.00	No Ice	8.77	7.24	0.086
			0.00			1/2" Ice	9.52	8.52	0.157
			3.00			1" Ice	10.25	9.66	0.237
						2" Ice	11.64	11.59	0.423
						4" Ice	14.54	15.85	0.949
(3) ALU 2X60 AWS	A	From Leg	1.00	0.0000	67.00	No Ice	2.19	1.43	0.044
			0.00			1/2" Ice	2.40	1.61	0.060
			3.00			1" Ice	2.62	1.80	0.079
						2" Ice	3.07	2.21	0.125
						4" Ice	4.09	3.13	0.259
(3) ALU 2X60 LTE	C	From Leg	1.00	0.0000	67.00	No Ice	2.57	2.03	0.060
			0.00			1/2" Ice	2.79	2.24	0.080
			3.00			1" Ice	3.02	2.46	0.104
						2" Ice	3.52	2.92	0.161
						4" Ice	4.61	3.94	0.319
(3) ALU 2X60 PCS	D	From Leg	1.00	0.0000	67.00	No Ice	2.15	1.57	0.046
			0.00			1/2" Ice	2.35	1.76	0.063
			3.00			1" Ice	2.57	1.95	0.082
						2" Ice	3.02	2.36	0.130
						4" Ice	4.03	3.29	0.267
(2) DB-T1-6Z-8AB-0Z	C	From Leg	1.00	0.0000	67.00	No Ice	5.60	2.33	0.044
			0.00			1/2" Ice	5.92	2.56	0.080
			3.00			1" Ice	6.24	2.79	0.120
						2" Ice	6.91	3.28	0.213
						4" Ice	8.37	4.37	0.455

Bolt Design Data

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt K	Allowable Load K	Ratio Load / Allowable	Allowable Ratio	Criteria
T4	27.5	Leg	A325N	0.7500	4	3.833	19.438	**0.197**	1.333	Bolt Tension

Global

Display Sections for Member Calcs	5
Max Internal Sections for Member Calcs	97
Include Shear Deformation?	Yes
Include Warping?	Yes
Trans Load Btwn Intersecting Wood Wall?	Yes
Increase Nailing Capacity for Wind?	Yes
Area Load Mesh (in^2)	144
Merge Tolerance (in)	.12
P-Delta Analysis Tolerance	0.50%
Include P-Delta for Walls?	Yes
Automaticly Iterate Stiffness for Walls?	No
Maximum Iteration Number for Wall Stiffness	3
Gravity Acceleration (ft/sec^2)	32.2
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 13th(360-05): ASD
Adjust Stiffness?	Yes(Iterative)
RISAConnection Code	AISC 14th(360-10): ASD
Cold Formed Steel Code	None
Wood Code	None
Wood Temperature	< 100F
Concrete Code	None
Masonry Code	ACI 530-11: ASD
Aluminum Code	AA ADM1-10: ASD - 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, Continued

Seismic Code	ASCE 7-10
Seismic Base Elevation (ft)	Not Entered
Add Base Weight?	Yes
Ct Z	.02
Ct X	.02
T Z (sec)	Not Entered
T X (sec)	Not Entered
R Z	3
R X	3
Ct Exp. Z	.75
Ct Exp. X	.75
SD1	1
SDS	1
S1	1
TL (sec)	5
Risk Cat	I or II
Seismic Detailing Code	ASCE 7-05
Om Z	1
Om X	1
Rho Z	1
Rho X	1

Hot Rolled Steel Design Parameters

	Label	Shape	Length[ft]	Lbyy[ft]	Lbzz[ft]	Lcomp top[ft]	Lcomp bot[ft]	L-torqu...	Kyy	Kzz	Cb	Function
1	M1	TWR_LEG_...	12.5	2.5	2.5	2.5	2.5	2.5	1	1		Lateral
2	M2	TWR_LEG_...	12.5	2.5	2.5	2.5	2.5	2.5	1	1		Lateral
3	M3	TWR_LEG_...	12.5	2.5	2.5	2.5	2.5	2.5	1	1		Lateral
4	M4	TWR_LEG_...	12.5	2.5	2.5	2.5	2.5	2.5	1	1		Lateral
5	M5	TWR_INNE...	3.394	3.394	3.394	3.394	3.394	3.394	1	1		Lateral
6	M6	TWR_INNE...	3.394	3.394	3.394	3.394	3.394	3.394	1	1		Lateral
7	M7	TWR_TOP...	2.4	2.4	2.4	2.4	2.4	2.4	1	1		Lateral
8	M8	TWR_TOP...	2.4	2.4	2.4	2.4	2.4	2.4	1	1		Lateral
9	M9	TWR_TOP...	2.4	2.4	2.4	2.4	2.4	2.4	1	1		Lateral
10	M10	TWR_TOP...	2.4	2.4	2.4	2.4	2.4	2.4	1	1		Lateral
11	M11	TWR_DIAG...	3.466	3.466	3.466	3.466	3.466	3.466	1	1		Lateral
12	M12	TWR_DIAG...	3.466	3.466	3.466	3.466	3.466	3.466	1	1		Lateral
13	M13	TWR_DIAG...	3.466	3.466	3.466	3.466	3.466	3.466	1	1		Lateral
14	M14	TWR_DIAG...	3.466	3.466	3.466	3.466	3.466	3.466	1	1		Lateral
15	M15	TWR_HOR...	2.4	2.4	2.4	2.4	2.4	2.4	1	1		Lateral
16	M16	TWR_HOR...	2.4	2.4	2.4	2.4	2.4	2.4	1	1		Lateral
17	M17	TWR_HOR...	2.4	2.4	2.4	2.4	2.4	2.4	1	1		Lateral
18	M18	TWR_HOR...	2.4	2.4	2.4	2.4	2.4	2.4	1	1		Lateral
19	M19	TWR_DIAG...	3.466	3.466	3.466	3.466	3.466	3.466	1	1		Lateral
20	M20	TWR_DIAG...	3.466	3.466	3.466	3.466	3.466	3.466	1	1		Lateral
21	M21	TWR_DIAG...	3.466	3.466	3.466	3.466	3.466	3.466	1	1		Lateral
22	M22	TWR_DIAG...	3.466	3.466	3.466	3.466	3.466	3.466	1	1		Lateral
23	M23	TWR_HOR...	2.4	2.4	2.4	2.4	2.4	2.4	1	1		Lateral
24	M24	TWR_HOR...	2.4	2.4	2.4	2.4	2.4	2.4	1	1		Lateral
25	M25	TWR_HOR...	2.4	2.4	2.4	2.4	2.4	2.4	1	1		Lateral
26	M26	TWR_HOR...	2.4	2.4	2.4	2.4	2.4	2.4	1	1		Lateral
27	M27	TWR_DIAG...	3.466	3.466	3.466	3.466	3.466	3.466	1	1		Lateral
28	M28	TWR_DIAG...	3.466	3.466	3.466	3.466	3.466	3.466	1	1		Lateral
29	M29	TWR_DIAG...	3.466	3.466	3.466	3.466	3.466	3.466	1	1		Lateral
30	M30	TWR_DIAG...	3.466	3.466	3.466	3.466	3.466	3.466	1	1		Lateral
31	M31	TWR_HOR...	2.4	2.4	2.4	2.4	2.4	2.4	1	1		Lateral
32	M32	TWR_HOR...	2.4	2.4	2.4	2.4	2.4	2.4	1	1		Lateral

Hot Rolled Steel Design Parameters (Continued)

	Label	Shape	Length[ft]	Lbyy[ft]	Lbzz[ft]	Lcomp top[ft]	Lcomp bot[ft]	L-torqu...	Kyy	Kzz	Cb	Function
33	M33	TWR_HOR...	2.4	2.4	2.4	2.4	2.4	2.4	1	1		Lateral
34	M34	TWR_HOR...	2.4	2.4	2.4	2.4	2.4	2.4	1	1		Lateral
35	M35	TWR_DIAG...	3.466	3.466	3.466	3.466	3.466	3.466	1	1		Lateral
36	M36	TWR_DIAG...	3.466	3.466	3.466	3.466	3.466	3.466	1	1		Lateral
37	M37	TWR_DIAG...	3.466	3.466	3.466	3.466	3.466	3.466	1	1		Lateral
38	M38	TWR_DIAG...	3.466	3.466	3.466	3.466	3.466	3.466	1	1		Lateral
39	M39	TWR_HOR...	2.4	2.4	2.4	2.4	2.4	2.4	1	1		Lateral
40	M40	TWR_HOR...	2.4	2.4	2.4	2.4	2.4	2.4	1	1		Lateral
41	M41	TWR_HOR...	2.4	2.4	2.4	2.4	2.4	2.4	1	1		Lateral
42	M42	TWR_HOR...	2.4	2.4	2.4	2.4	2.4	2.4	1	1		Lateral
43	M43	TWR_DIAG...	3.466	3.466	3.466	3.466	3.466	3.466	1	1		Lateral
44	M44	TWR_DIAG...	3.466	3.466	3.466	3.466	3.466	3.466	1	1		Lateral
45	M45	TWR_DIAG...	3.466	3.466	3.466	3.466	3.466	3.466	1	1		Lateral
46	M46	TWR_DIAG...	3.466	3.466	3.466	3.466	3.466	3.466	1	1		Lateral
47	M47	TWR_LEG_...	7.5	2.5	2.5	2.5	2.5	2.5	1	1		Lateral
48	M48	TWR_LEG_...	7.5	1.25	1.25	1.25	1.25	1.25	1	1		Lateral
49	M49	TWR_LEG_...	7.5	2.5	2.5	2.5	2.5	2.5	1	1		Lateral
50	M50	TWR_LEG_...	7.5	2.5	2.5	2.5	2.5	2.5	1	1		Lateral
51	M51	TWR_HOR...	2.4	1.2	1.2	1.2	1.2	1.2	1	1		Lateral
52	M52	TWR_HOR...	2.4	1.2	1.2	1.2	1.2	1.2	1	1		Lateral
53	M53	TWR_HOR...	2.4	1.2	1.2	1.2	1.2	1.2	1	1		Lateral
54	M54	TWR_HOR...	2.4	1.2	1.2	1.2	1.2	1.2	1	1		Lateral
55	M59	TWR_DIAG...	3.466	3.466	3.466	3.466	3.466	3.466	1	1		Lateral
56	M60	TWR_DIAG...	3.466	3.466	3.466	3.466	3.466	3.466	1	1		Lateral
57	M61	TWR_DIAG...	3.466	3.466	3.466	3.466	3.466	3.466	1	1		Lateral
58	M62	TWR_DIAG...	3.466	3.466	3.466	3.466	3.466	3.466	1	1		Lateral
59	M63	TWR_STE...	1.2	1.2	1.2	1.2	1.2	1.2	1	1		Lateral
60	M64	TWR_HOR...	2.4	2.4	2.4	2.4	2.4	2.4	1	1		Lateral
61	M65	TWR_HOR...	2.4	2.4	2.4	2.4	2.4	2.4	1	1		Lateral
62	M66	TWR_HOR...	2.4	2.4	2.4	2.4	2.4	2.4	1	1		Lateral
63	M67	TWR_HOR...	2.4	2.4	2.4	2.4	2.4	2.4	1	1		Lateral
64	M68	TWR_DIAG...	3.466	3.466	3.466	3.466	3.466	3.466	1	1		Lateral
65	M69	TWR_DIAG...	3.466	3.466	3.466	3.466	3.466	3.466	1	1		Lateral
66	M70	TWR_DIAG...	3.466	3.466	3.466	3.466	3.466	3.466	1	1		Lateral
67	M71	TWR_DIAG...	3.466	3.466	3.466	3.466	3.466	3.466	1	1		Lateral
68	M72	TWR_STE...	1.2	1.2	1.2	1.2	1.2	1.2	1	1		Lateral
69	M73	TWR_HOR...	2.4	2.4	2.4	2.4	2.4	2.4	1	1		Lateral
70	M74	TWR_HOR...	2.4	2.4	2.4	2.4	2.4	2.4	1	1		Lateral
71	M75	TWR_HOR...	2.4	2.4	2.4	2.4	2.4	2.4	1	1		Lateral
72	M76	TWR_HOR...	2.4	2.4	2.4	2.4	2.4	2.4	1	1		Lateral
73	M77	TWR_DIAG...	3.466	3.466	3.466	3.466	3.466	3.466	1	1		Lateral
74	M78	TWR_DIAG...	3.466	3.466	3.466	3.466	3.466	3.466	1	1		Lateral
75	M79	TWR_DIAG...	3.466	3.466	3.466	3.466	3.466	3.466	1	1		Lateral
76	M80	TWR_DIAG...	3.466	3.466	3.466	3.466	3.466	3.466	1	1		Lateral
77	M81	TWR_STE...	1.2	1.2	1.2	1.2	1.2	1.2	1	1		Lateral
78	M82	TWR_LEG_...	20	2.5	2.5	2.5	2.5	2.5	1	1		Lateral
79	M83	TWR_LEG_...	20	1.25	1.25	1.25	1.25	1.25	1	1		Lateral
80	M84	TWR_LEG_...	20	2.5	2.5	2.5	2.5	2.5	1	1		Lateral
81	M85	TWR_LEG_...	20	2.5	2.5	2.5	2.5	2.5	1	1		Lateral
82	M86	TWR_HOR...	2.4	1.2	1.2	1.2	1.2	1.2	1	1		Lateral
83	M87	TWR_HOR...	2.4	1.2	1.2	1.2	1.2	1.2	1	1		Lateral
84	M88	TWR_HOR...	2.4	1.2	1.2	1.2	1.2	1.2	1	1		Lateral
85	M89	TWR_HOR...	2.4	1.2	1.2	1.2	1.2	1.2	1	1		Lateral
86	M94	TWR_DIAG...	3.466	3.466	3.466	3.466	3.466	3.466	1	1		Lateral
87	M95	TWR_DIAG...	3.466	3.466	3.466	3.466	3.466	3.466	1	1		Lateral
88	M96	TWR_DIAG...	3.466	3.466	3.466	3.466	3.466	3.466	1	1		Lateral
89	M97	TWR_DIAG...	3.466	3.466	3.466	3.466	3.466	3.466	1	1		Lateral

Hot Rolled Steel Design Parameters (Continued)

	Label	Shape	Length[ft]	Lbyy[ft]	Lbzz[ft]	Lcomp top[ft]	Lcomp bot[ft]	L-torqu...	Kyy	Kzz	Cb	Function
90	M98	TWR_STE...	1.2	1.2	1.2	1.2	1.2	1.2	1	1		Lateral
91	M99	TWR_HOR...	2.4	2.4	2.4	2.4	2.4	2.4	1	1		Lateral
92	M100	TWR_HOR...	2.4	2.4	2.4	2.4	2.4	2.4	1	1		Lateral
93	M101	TWR_HOR...	2.4	2.4	2.4	2.4	2.4	2.4	1	1		Lateral
94	M102	TWR_HOR...	2.4	2.4	2.4	2.4	2.4	2.4	1	1		Lateral
95	M103	TWR_DIAG...	3.466	3.466	3.466	3.466	3.466	3.466	1	1		Lateral
96	M104	TWR_DIAG...	3.466	3.466	3.466	3.466	3.466	3.466	1	1		Lateral
97	M105	TWR_DIAG...	3.466	3.466	3.466	3.466	3.466	3.466	1	1		Lateral
98	M106	TWR_DIAG...	3.466	3.466	3.466	3.466	3.466	3.466	1	1		Lateral
99	M107	TWR_STE...	1.2	1.2	1.2	1.2	1.2	1.2	1	1		Lateral
100	M108	TWR_HOR...	2.4	2.4	2.4	2.4	2.4	2.4	1	1		Lateral
101	M109	TWR_HOR...	2.4	2.4	2.4	2.4	2.4	2.4	1	1		Lateral
102	M110	TWR_HOR...	2.4	2.4	2.4	2.4	2.4	2.4	1	1		Lateral
103	M111	TWR_HOR...	2.4	2.4	2.4	2.4	2.4	2.4	1	1		Lateral
104	M112	TWR_DIAG...	3.466	3.466	3.466	3.466	3.466	3.466	1	1		Lateral
105	M113	TWR_DIAG...	3.466	3.466	3.466	3.466	3.466	3.466	1	1		Lateral
106	M114	TWR_DIAG...	3.466	3.466	3.466	3.466	3.466	3.466	1	1		Lateral
107	M115	TWR_DIAG...	3.466	3.466	3.466	3.466	3.466	3.466	1	1		Lateral
108	M116	TWR_STE...	1.2	1.2	1.2	1.2	1.2	1.2	1	1		Lateral
109	M117	TWR_HOR...	2.4	2.4	2.4	2.4	2.4	2.4	1	1		Lateral
110	M118	TWR_HOR...	2.4	2.4	2.4	2.4	2.4	2.4	1	1		Lateral
111	M119	TWR_HOR...	2.4	2.4	2.4	2.4	2.4	2.4	1	1		Lateral
112	M120	TWR_HOR...	2.4	2.4	2.4	2.4	2.4	2.4	1	1		Lateral
113	M121	TWR_DIAG...	3.466	3.466	3.466	3.466	3.466	3.466	1	1		Lateral
114	M122	TWR_DIAG...	3.466	3.466	3.466	3.466	3.466	3.466	1	1		Lateral
115	M123	TWR_DIAG...	3.466	3.466	3.466	3.466	3.466	3.466	1	1		Lateral
116	M124	TWR_DIAG...	3.466	3.466	3.466	3.466	3.466	3.466	1	1		Lateral
117	M125	TWR_STE...	1.2	1.2	1.2	1.2	1.2	1.2	1	1		Lateral
118	M126	TWR_HOR...	2.4	2.4	2.4	2.4	2.4	2.4	1	1		Lateral
119	M127	TWR_HOR...	2.4	2.4	2.4	2.4	2.4	2.4	1	1		Lateral
120	M128	TWR_HOR...	2.4	2.4	2.4	2.4	2.4	2.4	1	1		Lateral
121	M129	TWR_HOR...	2.4	2.4	2.4	2.4	2.4	2.4	1	1		Lateral
122	M130	TWR_DIAG...	3.466	3.466	3.466	3.466	3.466	3.466	1	1		Lateral
123	M131	TWR_DIAG...	3.466	3.466	3.466	3.466	3.466	3.466	1	1		Lateral
124	M132	TWR_DIAG...	3.466	3.466	3.466	3.466	3.466	3.466	1	1		Lateral
125	M133	TWR_DIAG...	3.466	3.466	3.466	3.466	3.466	3.466	1	1		Lateral
126	M134	TWR_STE...	1.2	1.2	1.2	1.2	1.2	1.2	1	1		Lateral
127	M135	TWR_HOR...	2.4	2.4	2.4	2.4	2.4	2.4	1	1		Lateral
128	M136	TWR_HOR...	2.4	2.4	2.4	2.4	2.4	2.4	1	1		Lateral
129	M137	TWR_HOR...	2.4	2.4	2.4	2.4	2.4	2.4	1	1		Lateral
130	M138	TWR_HOR...	2.4	2.4	2.4	2.4	2.4	2.4	1	1		Lateral
131	M139	TWR_DIAG...	3.466	3.466	3.466	3.466	3.466	3.466	1	1		Lateral
132	M140	TWR_DIAG...	3.466	3.466	3.466	3.466	3.466	3.466	1	1		Lateral
133	M141	TWR_DIAG...	3.466	3.466	3.466	3.466	3.466	3.466	1	1		Lateral
134	M142	TWR_DIAG...	3.466	3.466	3.466	3.466	3.466	3.466	1	1		Lateral
135	M143	TWR_STE...	1.2	1.2	1.2	1.2	1.2	1.2	1	1		Lateral
136	M144	TWR_HOR...	2.4	2.4	2.4	2.4	2.4	2.4	1	1		Lateral
137	M145	TWR_HOR...	2.4	2.4	2.4	2.4	2.4	2.4	1	1		Lateral
138	M146	TWR_HOR...	2.4	2.4	2.4	2.4	2.4	2.4	1	1		Lateral
139	M147	TWR_HOR...	2.4	2.4	2.4	2.4	2.4	2.4	1	1		Lateral
140	M148	TWR_DIAG...	3.466	3.466	3.466	3.466	3.466	3.466	1	1		Lateral
141	M149	TWR_DIAG...	3.466	3.466	3.466	3.466	3.466	3.466	1	1		Lateral
142	M150	TWR_DIAG...	3.466	3.466	3.466	3.466	3.466	3.466	1	1		Lateral
143	M151	TWR_DIAG...	3.466	3.466	3.466	3.466	3.466	3.466	1	1		Lateral
144	M152	TWR_STE...	1.2	1.2	1.2	1.2	1.2	1.2	1	1		Lateral
145	M153	TWR_HOR...	2.4	2.4	2.4	2.4	2.4	2.4	1	1		Lateral
146	M154	TWR_HOR...	2.4	2.4	2.4	2.4	2.4	2.4	1	1		Lateral

Hot Rolled Steel Design Parameters (Continued)

	Label	Shape	Length[ft]	Lbyy[ft]	Lbzz[ft]	Lcomp top[ft]	Lcomp bot[ft]	L-torqu...	Kyy	Kzz	Cb	Function
147	M155	TWR_HOR...	2.4	2.4	2.4	2.4	2.4	2.4	1	1		Lateral
148	M156	TWR_HOR...	2.4	2.4	2.4	2.4	2.4	2.4	1	1		Lateral
149	M157	TWR_DIAG...	3.466	3.466	3.466	3.466	3.466	3.466	1	1		Lateral
150	M158	TWR_DIAG...	3.466	3.466	3.466	3.466	3.466	3.466	1	1		Lateral
151	M159	TWR_DIAG...	3.466	3.466	3.466	3.466	3.466	3.466	1	1		Lateral
152	M160	TWR_DIAG...	3.466	3.466	3.466	3.466	3.466	3.466	1	1		Lateral
153	M161	TWR_STE...	1.2	1.2	1.2	1.2	1.2	1.2	1	1		Lateral
154	M162	TWR_LEG_...	27.5	2.5	2.5	2.5	2.5	2.5	1	1		Lateral
155	M163	TWR_LEG_...	27.5	1.25	1.25	1.25	1.25	1.25	1	1		Lateral
156	M164	TWR_LEG_...	27.5	2.5	2.5	2.5	2.5	2.5	1	1		Lateral
157	M165	TWR_LEG_...	27.5	2.5	2.5	2.5	2.5	2.5	1	1		Lateral
158	M166	TWR_HOR...	2.4	1.2	1.2	1.2	1.2	1.2	1	1		Lateral
159	M167	TWR_HOR...	2.4	1.2	1.2	1.2	1.2	1.2	1	1		Lateral
160	M168	TWR_HOR...	2.4	1.2	1.2	1.2	1.2	1.2	1	1		Lateral
161	M169	TWR_HOR...	2.4	1.2	1.2	1.2	1.2	1.2	1	1		Lateral
162	M176	TWR_BOT...	2.4	2.4	2.4	2.4	2.4	2.4	1	1		Lateral
163	M177	TWR_BOT...	2.4	2.4	2.4	2.4	2.4	2.4	1	1		Lateral
164	M178	TWR_BOT...	2.4	2.4	2.4	2.4	2.4	2.4	1	1		Lateral
165	M179	TWR_BOT...	2.4	2.4	2.4	2.4	2.4	2.4	1	1		Lateral
166	M180	TWR_DIAG...	3.466	3.466	3.466	3.466	3.466	3.466	1	1		Lateral
167	M181	TWR_DIAG...	3.466	3.466	3.466	3.466	3.466	3.466	1	1		Lateral
168	M182	TWR_DIAG...	3.466	3.466	3.466	3.466	3.466	3.466	1	1		Lateral
169	M183	TWR_DIAG...	3.466	3.466	3.466	3.466	3.466	3.466	1	1		Lateral
170	M184	TWR_STE...	1.2	1.2	1.2	1.2	1.2	1.2	1	1		Lateral
171	M185	TWR_HOR...	2.4	2.4	2.4	2.4	2.4	2.4	1	1		Lateral
172	M186	TWR_HOR...	2.4	2.4	2.4	2.4	2.4	2.4	1	1		Lateral
173	M187	TWR_HOR...	2.4	2.4	2.4	2.4	2.4	2.4	1	1		Lateral
174	M188	TWR_HOR...	2.4	2.4	2.4	2.4	2.4	2.4	1	1		Lateral
175	M189	TWR_DIAG...	3.466	3.466	3.466	3.466	3.466	3.466	1	1		Lateral
176	M190	TWR_DIAG...	3.466	3.466	3.466	3.466	3.466	3.466	1	1		Lateral
177	M191	TWR_DIAG...	3.466	3.466	3.466	3.466	3.466	3.466	1	1		Lateral
178	M192	TWR_DIAG...	3.466	3.466	3.466	3.466	3.466	3.466	1	1		Lateral
179	M193	TWR_STE...	1.2	1.2	1.2	1.2	1.2	1.2	1	1		Lateral
180	M194	TWR_HOR...	2.4	2.4	2.4	2.4	2.4	2.4	1	1		Lateral
181	M195	TWR_HOR...	2.4	2.4	2.4	2.4	2.4	2.4	1	1		Lateral
182	M196	TWR_HOR...	2.4	2.4	2.4	2.4	2.4	2.4	1	1		Lateral
183	M197	TWR_HOR...	2.4	2.4	2.4	2.4	2.4	2.4	1	1		Lateral
184	M198	TWR_DIAG...	3.466	3.466	3.466	3.466	3.466	3.466	1	1		Lateral
185	M199	TWR_DIAG...	3.466	3.466	3.466	3.466	3.466	3.466	1	1		Lateral
186	M200	TWR_DIAG...	3.466	3.466	3.466	3.466	3.466	3.466	1	1		Lateral
187	M201	TWR_DIAG...	3.466	3.466	3.466	3.466	3.466	3.466	1	1		Lateral
188	M202	TWR_STE...	1.2	1.2	1.2	1.2	1.2	1.2	1	1		Lateral
189	M203	TWR_HOR...	2.4	2.4	2.4	2.4	2.4	2.4	1	1		Lateral
190	M204	TWR_HOR...	2.4	2.4	2.4	2.4	2.4	2.4	1	1		Lateral
191	M205	TWR_HOR...	2.4	2.4	2.4	2.4	2.4	2.4	1	1		Lateral
192	M206	TWR_HOR...	2.4	2.4	2.4	2.4	2.4	2.4	1	1		Lateral
193	M207	TWR_DIAG...	3.466	3.466	3.466	3.466	3.466	3.466	1	1		Lateral
194	M208	TWR_DIAG...	3.466	3.466	3.466	3.466	3.466	3.466	1	1		Lateral
195	M209	TWR_DIAG...	3.466	3.466	3.466	3.466	3.466	3.466	1	1		Lateral
196	M210	TWR_DIAG...	3.466	3.466	3.466	3.466	3.466	3.466	1	1		Lateral
197	M211	TWR_STE...	1.2	1.2	1.2	1.2	1.2	1.2	1	1		Lateral
198	M212	TWR_HOR...	2.4	2.4	2.4	2.4	2.4	2.4	1	1		Lateral
199	M213	TWR_HOR...	2.4	2.4	2.4	2.4	2.4	2.4	1	1		Lateral
200	M214	TWR_HOR...	2.4	2.4	2.4	2.4	2.4	2.4	1	1		Lateral
201	M215	TWR_HOR...	2.4	2.4	2.4	2.4	2.4	2.4	1	1		Lateral
202	M216	TWR_DIAG...	3.466	3.466	3.466	3.466	3.466	3.466	1	1		Lateral
203	M217	TWR_DIAG...	3.466	3.466	3.466	3.466	3.466	3.466	1	1		Lateral

Hot Rolled Steel Design Parameters (Continued)

	Label	Shape	Length[ft]	Lbyy[ft]	Lbzz[ft]	Lcomp top[ft]	Lcomp bot[ft]	L-torqu...	Kyy	Kzz	Cb	Function
204	M218	TWR_DIAG...	3.466	3.466	3.466	3.466	3.466	3.466	1	1		Lateral
205	M219	TWR_DIAG...	3.466	3.466	3.466	3.466	3.466	3.466	1	1		Lateral
206	M220	TWR_STE...	1.2	1.2	1.2	1.2	1.2	1.2	1	1		Lateral
207	M221	TWR_HOR...	2.4	2.4	2.4	2.4	2.4	2.4	1	1		Lateral
208	M222	TWR_HOR...	2.4	2.4	2.4	2.4	2.4	2.4	1	1		Lateral
209	M223	TWR_HOR...	2.4	2.4	2.4	2.4	2.4	2.4	1	1		Lateral
210	M224	TWR_HOR...	2.4	2.4	2.4	2.4	2.4	2.4	1	1		Lateral
211	M225	TWR_DIAG...	3.466	3.466	3.466	3.466	3.466	3.466	1	1		Lateral
212	M226	TWR_DIAG...	3.466	3.466	3.466	3.466	3.466	3.466	1	1		Lateral
213	M227	TWR_DIAG...	3.466	3.466	3.466	3.466	3.466	3.466	1	1		Lateral
214	M228	TWR_DIAG...	3.466	3.466	3.466	3.466	3.466	3.466	1	1		Lateral
215	M229	TWR_STE...	1.2	1.2	1.2	1.2	1.2	1.2	1	1		Lateral
216	M230	TWR_HOR...	2.4	2.4	2.4	2.4	2.4	2.4	1	1		Lateral
217	M231	TWR_HOR...	2.4	2.4	2.4	2.4	2.4	2.4	1	1		Lateral
218	M232	TWR_HOR...	2.4	2.4	2.4	2.4	2.4	2.4	1	1		Lateral
219	M233	TWR_HOR...	2.4	2.4	2.4	2.4	2.4	2.4	1	1		Lateral
220	M234	TWR_DIAG...	3.466	3.466	3.466	3.466	3.466	3.466	1	1		Lateral
221	M235	TWR_DIAG...	3.466	3.466	3.466	3.466	3.466	3.466	1	1		Lateral
222	M236	TWR_DIAG...	3.466	3.466	3.466	3.466	3.466	3.466	1	1		Lateral
223	M237	TWR_DIAG...	3.466	3.466	3.466	3.466	3.466	3.466	1	1		Lateral
224	M238	TWR_STE...	1.2	1.2	1.2	1.2	1.2	1.2	1	1		Lateral
225	M239	TWR_HOR...	2.4	2.4	2.4	2.4	2.4	2.4	1	1		Lateral
226	M240	TWR_HOR...	2.4	2.4	2.4	2.4	2.4	2.4	1	1		Lateral
227	M241	TWR_HOR...	2.4	2.4	2.4	2.4	2.4	2.4	1	1		Lateral
228	M242	TWR_HOR...	2.4	2.4	2.4	2.4	2.4	2.4	1	1		Lateral
229	M243	TWR_DIAG...	3.466	3.466	3.466	3.466	3.466	3.466	1	1		Lateral
230	M244	TWR_DIAG...	3.466	3.466	3.466	3.466	3.466	3.466	1	1		Lateral
231	M245	TWR_DIAG...	3.466	3.466	3.466	3.466	3.466	3.466	1	1		Lateral
232	M246	TWR_DIAG...	3.466	3.466	3.466	3.466	3.466	3.466	1	1		Lateral
233	M247	TWR_STE...	1.2	1.2	1.2	1.2	1.2	1.2	1	1		Lateral
234	M248	TWR_HOR...	2.4	2.4	2.4	2.4	2.4	2.4	1	1		Lateral
235	M249	TWR_HOR...	2.4	2.4	2.4	2.4	2.4	2.4	1	1		Lateral
236	M250	TWR_HOR...	2.4	2.4	2.4	2.4	2.4	2.4	1	1		Lateral
237	M251	TWR_HOR...	2.4	2.4	2.4	2.4	2.4	2.4	1	1		Lateral
238	M252	TWR_DIAG...	3.466	3.466	3.466	3.466	3.466	3.466	1	1		Lateral
239	M253	TWR_DIAG...	3.466	3.466	3.466	3.466	3.466	3.466	1	1		Lateral
240	M254	TWR_DIAG...	3.466	3.466	3.466	3.466	3.466	3.466	1	1		Lateral
241	M255	TWR_DIAG...	3.466	3.466	3.466	3.466	3.466	3.466	1	1		Lateral
242	M256	TWR_STE...	1.2	1.2	1.2	1.2	1.2	1.2	1	1		Lateral
243	M257	TWR_HOR...	2.4	2.4	2.4	2.4	2.4	2.4	1	1		Lateral
244	M258	TWR_HOR...	2.4	2.4	2.4	2.4	2.4	2.4	1	1		Lateral
245	M259	TWR_HOR...	2.4	2.4	2.4	2.4	2.4	2.4	1	1		Lateral
246	M260	TWR_HOR...	2.4	2.4	2.4	2.4	2.4	2.4	1	1		Lateral
247	M261	TWR_DIAG...	3.466	3.466	3.466	3.466	3.466	3.466	1	1		Lateral
248	M261A	TWR_INNE...	3.394	3.394	3.394	3.394	3.394	3.394	1	1		Lateral
249	M262	TWR_DIAG...	3.466	3.466	3.466	3.466	3.466	3.466	1	1		Lateral
250	M262A	TWR_INNE...	3.394	3.394	3.394	3.394	3.394	3.394	1	1		Lateral
251	M263	TWR_DIAG...	3.466	3.466	3.466	3.466	3.466	3.466	1	1		Lateral
252	M263A	TWR_STE...	1.2	1.2	1.2	1.2	1.2	1.2	1	1		Lateral
253	M264	TWR_DIAG...	3.466	3.466	3.466	3.466	3.466	3.466	1	1		Lateral
254	M264A	TWR_STE...	1.2	1.2	1.2	1.2	1.2	1.2	1	1		Lateral
255	M265	TWR_STE...	1.2	1.2	1.2	1.2	1.2	1.2	1	1		Lateral
256	M265A	TWR_STE...	1.2	1.2	1.2	1.2	1.2	1.2	1	1		Lateral
257	M266	TWR_HOR...	2.4	2.4	2.4	2.4	2.4	2.4	1	1		Lateral
258	M266A	TWR_STE...	1.2	1.2	1.2	1.2	1.2	1.2	1	1		Lateral
259	M267	TWR_HOR...	2.4	2.4	2.4	2.4	2.4	2.4	1	1		Lateral
260	M267A	TWR_STE...	1.2	1.2	1.2	1.2	1.2	1.2	1	1		Lateral

Hot Rolled Steel Design Parameters (Continued)

	Label	Shape	Length[ft]	Lbyy[ft]	Lbzz[ft]	Lcomp top[ft]	Lcomp bot[ft]	L-torqu...	Kyy	Kzz	Cb	Function
261	M268	TWR_HOR...	2.4	2.4	2.4	2.4	2.4	2.4	1	1		Lateral
262	M268A	TWR_STE...	1.2	1.2	1.2	1.2	1.2	1.2	1	1		Lateral
263	M269	TWR_HOR...	2.4	2.4	2.4	2.4	2.4	2.4	1	1		Lateral
264	M269A	TWR_STE...	1.2	1.2	1.2	1.2	1.2	1.2	1	1		Lateral
265	M270	TWR_DIAG...	3.466	3.466	3.466	3.466	3.466	3.466	1	1		Lateral
266	M270A	TWR_STE...	1.2	1.2	1.2	1.2	1.2	1.2	1	1		Lateral
267	M271	TWR_DIAG...	3.466	3.466	3.466	3.466	3.466	3.466	1	1		Lateral
268	M271A	TWR_STE...	1.2	1.2	1.2	1.2	1.2	1.2	1	1		Lateral
269	M272	TWR_DIAG...	3.466	3.466	3.466	3.466	3.466	3.466	1	1		Lateral
270	M272A	TWR_STE...	1.2	1.2	1.2	1.2	1.2	1.2	1	1		Lateral
271	M273	TWR_DIAG...	3.466	3.466	3.466	3.466	3.466	3.466	1	1		Lateral
272	M273A	TWR_STE...	1.2	1.2	1.2	1.2	1.2	1.2	1	1		Lateral
273	M274	TWR_STE...	1.2	1.2	1.2	1.2	1.2	1.2	1	1		Lateral
274	M274A	TWR_STE...	1.2	1.2	1.2	1.2	1.2	1.2	1	1		Lateral
275	M275	TWR_STE...	1.2	1.2	1.2	1.2	1.2	1.2	1	1		Lateral
276	M276	TWR_STE...	1.2	1.2	1.2	1.2	1.2	1.2	1	1		Lateral
277	M277	TWR_STE...	1.2	1.2	1.2	1.2	1.2	1.2	1	1		Lateral
278	M278	TWR_STE...	1.2	1.2	1.2	1.2	1.2	1.2	1	1		Lateral
279	M279	TWR_STE...	1.2	1.2	1.2	1.2	1.2	1.2	1	1		Lateral
280	M280	TWR_STE...	1.2	1.2	1.2	1.2	1.2	1.2	1	1		Lateral
281	M281	TWR_STE...	1.2	1.2	1.2	1.2	1.2	1.2	1	1		Lateral
282	M282	TWR_STE...	1.2	1.2	1.2	1.2	1.2	1.2	1	1		Lateral
283	M284	L4x3x4	2.4	2.4	2.4	2.4	2.4	2.4	1	1		Lateral
284	M285	L2.5x1.5x4	4.5									Lateral
285	M286	L2.5x1.5x4	4.5									Lateral
286	M287	L1-1/2x1-1/...	3.466									Lateral
287	M288	L1-1/2x1-1/...	3.124									Lateral
288	M289	L1-1/2x1-1/...	3.466									Lateral
289	M290	L1-1/2x1-1/...	3.124									Lateral
290	M290A	L4x3x4	2.4	2.4	2.4	2.4	2.4	2.4	1	1		Lateral
291	M291	L2.5x1.5x4	4.5									Lateral
292	M292	L2.5x1.5x4	4.5									Lateral
293	M293	L1-1/2x1-1/...	3.466									Lateral
294	M294	L1-1/2x1-1/...	3.124									Lateral
295	M295	L1-1/2x1-1/...	3.466									Lateral
296	M296	L1-1/2x1-1/...	3.124									Lateral
297	M297	L4x3x4	2.4	2.4	2.4	2.4	2.4	2.4	1	1		Lateral
298	M298	L2.5x1.5x4	4.5									Lateral
299	M299	L2.5x1.5x4	4.5									Lateral
300	M300	L1-1/2x1-1/...	3.466									Lateral
301	M301	L1-1/2x1-1/...	3.124									Lateral
302	M302	L1-1/2x1-1/...	3.466									Lateral
303	M303	L1-1/2x1-1/...	3.124									Lateral
304	M304	L2.5x1.5x4	5.148									Lateral
305	M305	L2.5x1.5x4	5.148									Lateral
306	M306	L1-1/2x1-1/...	5.68									Lateral
307	M307	L1-1/2x1-1/...	5.68									Lateral
308	M308	TWR_INNE...	3.394	3.394	3.394	3.394	3.394	3.394	1	1		Lateral
309	M309	TWR_INNE...	3.394	3.394	3.394	3.394	3.394	3.394	1	1		Lateral
310	M310	TWR_INNE...	3.394	3.394	3.394	3.394	3.394	3.394	1	1		Lateral
311	M311	TWR_INNE...	3.394	3.394	3.394	3.394	3.394	3.394	1	1		Lateral
312	M312	TWR_INNE...	3.394	3.394	3.394	3.394	3.394	3.394	1	1		Lateral
313	M313	TWR_INNE...	3.394	3.394	3.394	3.394	3.394	3.394	1	1		Lateral
314	M314	TWR_INNE...	3.394	3.394	3.394	3.394	3.394	3.394	1	1		Lateral
315	M315	TWR_INNE...	3.394	3.394	3.394	3.394	3.394	3.394	1	1		Lateral

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distributed	Area(Me...	Surface(P...
1	Dead	None		-1		128	80	16		
2	No Ice Wind 0 deg	None				128	172	48		
3	No Ice Wind 45 deg	None				256	174	64		
4	No Ice Wind 90 deg	None				128	176	48		
5	No Ice Wind 135 deg	None				256	174	64		
6	No Ice Wind 180 deg	None				128	172	48		
7	No Ice Wind 225 deg	None				256	174	64		
8	No Ice Wind 270 deg	None				128	176	48		
9	No Ice Wind 315 deg	None				256	174	64		
10	Ice	None				128	80	277		
11	Temperature Drop	None						260		
12	Ice Wind 0 deg	None				128	178	40		
13	Ice Wind 45 deg	None				256	174	64		
14	Ice Wind 90 deg	None				128	182	48		
15	Ice Wind 135 deg	None				256	174	64		
16	Ice Wind 180 deg	None				128	178	40		
17	Ice Wind 225 deg	None				256	174	64		
18	Ice Wind 270 deg	None				128	182	48		
19	Ice Wind 315 deg	None				256	174	64		
20	Service Wind 0 deg	None				128	172	48		
21	Service Wind 45 deg	None				256	174	64		
22	Service Wind 90 deg	None				128	176	48		
23	Service Wind 135 deg	None				256	174	64		
24	Service Wind 180 deg	None				256	172	48		
25	Service Wind 225 deg	None				256	174	64		
26	Service Wind 270 deg	None				128	176	48		
27	Service Wind 315 deg	None				256	174	64		

Load Combinations

	Description	Solve	PD...	SR...	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor
1	Dead Only	Yes	Y		1	1	28	1	29	1	0		0		0		0		0	
2	Dead+Wind ...	Yes	Y		1	1	2	1	28	1	29	1	0		0		0		0	
3	Dead+Wind ...	Yes	Y		1	1	3	1	28	1	29	1	0		0		0		0	
4	Dead+Wind ...	Yes	Y		1	1	4	1	28	1	29	1	0		0		0		0	
5	Dead+Wind ...	Yes	Y		1	1	5	1	28	1	29	1	0		0		0		0	
6	Dead+Wind ...	Yes	Y		1	1	6	1	28	1	29	1	0		0		0		0	
7	Dead+Wind ...	Yes	Y		1	1	7	1	28	1	29	1	0		0		0		0	
8	Dead+Wind ...	Yes	Y		1	1	8	1	28	1	29	1	0		0		0		0	
9	Dead+Wind ...	Yes	Y		1	1	9	1	28	1	29	1	0		0		0		0	
10	Dead+Ice+T...	Yes	Y		1	1	10	1	11	1	28	1	29	1	0		0		0	
11	Dead+Wind ...	Yes	Y		1	1	12	1	10	1	11	1	28	1	29	1	0		0	
12	Dead+Wind ...	Yes	Y		1	1	13	1	10	1	11	1	28	1	29	1	0		0	
13	Dead+Wind ...	Yes	Y		1	1	14	1	10	1	11	1	28	1	29	1	0		0	
14	Dead+Wind ...	Yes	Y		1	1	15	1	10	1	11	1	28	1	29	1	0		0	
15	Dead+Wind ...	Yes	Y		1	1	16	1	10	1	11	1	28	1	29	1	0		0	
16	Dead+Wind ...	Yes	Y		1	1	17	1	10	1	11	1	28	1	29	1	0		0	
17	Dead+Wind ...	Yes	Y		1	1	18	1	10	1	11	1	28	1	29	1	0		0	
18	Dead+Wind ...	Yes	Y		1	1	19	1	10	1	11	1	28	1	29	1	0		0	
19	Dead+Wind ...	Yes	Y		1	1	20	1	28	1	29	1	0		0		0		0	
20	Dead+Wind ...	Yes	Y		1	1	21	1	28	1	29	1	0		0		0		0	
21	Dead+Wind ...	Yes	Y		1	1	22	1	28	1	29	1	0		0		0		0	
22	Dead+Wind ...	Yes	Y		1	1	23	1	28	1	29	1	0		0		0		0	
23	Dead+Wind ...	Yes	Y		1	1	24	1	28	1	29	1	0		0		0		0	
24	Dead+Wind ...	Yes	Y		1	1	25	1	28	1	29	1	0		0		0		0	

Load Combinations (Continued)

	Description	Solve	PD...	SR...	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor
25	Dead+Wind ...	Yes	Y		1	1	26	1	28	1	29	1	0		0		0		0	
26	Dead+Wind ...	Yes	Y		1	1	27	1	28	1	29	1	0		0		0		0	

Envelope Joint Reactions

	Joint		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	N99	max	.19	7	3.915	9	11.214	12	0	1	0	6	0	1
2		min	-11.567	12	-1.339	5	-.028	7	0	1	0	2	0	1
3	N100	max	11.216	16	3.81	9	11.418	14	0	1	0	9	0	1
4		min	-.018	3	-1.195	5	-.076	2	0	1	0	14	0	1
5	N101	max	11.293	18	3.252	7	.033	9	0	1	0	6	0	1
6		min	-.192	5	-.657	3	-11.215	14	0	1	0	2	0	1
7	N102	max	.035	8	3.257	7	.321	6	0	1	0	6	0	1
8		min	-11.215	13	-.696	3	-11.416	11	0	1	0	2	0	1
9	N217	max	1.078	6	.022	15	.272	15	.003	6	0	6	0	5
10		min	-1.109	2	.022	9	-.232	2	.003	11	0	2	0	18
11	N218	max	1.14	2	.022	9	.212	6	-.003	15	0	6	0	4
12		min	-1.145	6	.022	15	-.37	11	-.003	2	0	2	0	17
13	N223	max	4.966	5	.024	7	1.364	6	.003	5	0	6	0	5
14		min	-5.189	9	.017	18	-1.374	2	.002	18	0	2	0	17
15	N224	max	4.943	2	.024	9	1.229	6	-.002	15	0	6	0	4
16		min	-5.042	6	.016	15	-1.249	2	-.003	2	0	2	0	17
17	N227	max	24.426	2	10.796	5	5.827	2	.005	2	0	6	0	3
18		min	-24.275	6	-10.355	9	-5.84	6	0	6	0	2	0	15
19	N228	max	24.447	6	9.874	3	5.222	2	0	2	0	6	0	5
20		min	-24.307	2	-9.391	7	-5.163	6	-.005	6	0	2	0	18
21	Totals:	max	7.642	8	12.406	18	7.644	2						
22		min	-7.642	4	5.704	6	-7.644	6						

Envelope AISC 13th(360-05): ASD Steel Code Checks

	Member	Shape	Code Check	Loc...	L...	Shea...	Loc.....	...	L...	Pnc/o...	Pnt/om [k]	Mnyy/...	Mnzz/...	...	Eqn
1	M306	L1-1/2x1-1/2x1/4	4.716	5.68	5	.008	5.68	y	6	1.897	14.82	.108	.5	1...	H2-1
2	M307	L1-1/2x1-1/2x1/4	4.562	0	3	.009	0	y	9	1.897	14.82	.108	.5	1...	H2-1
3	M305	L2.5x1.5x4	3.677	2.52	5	.010	5.148	y	2	3.844	20.414	.307	.864	1...	H2-1
4	M304	L2.5x1.5x4	3.255	2.628	3	.010	5.148	y	2	3.844	20.414	.307	.864	1...	H2-1
5	M299	L2.5x1.5x4	1.533	2.531	9	.007	4.5	y	2	5.03	28.353	.426	1.17	1...	H2-1
6	M270	L1-1/2x1-1/2x1/4	1.405	0	4	.001	0	z	10	5.095	14.82	.108	.535	1	H2-1
7	M28	L1-1/2x1-1/2x1/4	1.244	0	2	.001	3.466	z	12	5.095	14.82	.108	.535	1	H2-1
8	M20	L1-1/2x1-1/2x1/4	1.212	0	6	.001	3.466	z	18	5.095	14.82	.108	.535	1	H2-1
9	M19	L1-1/2x1-1/2x1/4	1.167	0	8	.001	0	z	17	5.095	14.82	.108	.535	1	H2-1
10	M30	L1-1/2x1-1/2x1/4	1.115	0	6	.001	3.466	z	15	5.095	14.82	.108	.535	1	H2-1
11	M27	L1-1/2x1-1/2x1/4	1.088	0	4	.001	0	z	17	5.095	14.82	.108	.535	1	H2-1
12	M272	L1-1/2x1-1/2x1/4	1.051	0	8	.001	3.466	z	11	5.095	14.82	.108	.535	1	H2-1
13	M29	L1-1/2x1-1/2x1/4	1.017	0	8	.001	3.466	z	16	5.095	14.82	.108	.535	1	H2-1
14	M12	L1-1/2x1-1/2x1/4	1.008	0	2	.001	3.466	z	15	5.095	14.82	.108	.535	1	H2-1
15	M298	L2.5x1.5x4	1.004	2.531	6	.007	4.5	y	6	5.03	28.353	.426	1.169	1...	H2-1
16	M314	L1-1/2x1-1/2x1/4	.992	1.414	12	.004	0	z	5	5.312	14.82	.108	.537	1	H2-1
17	M11	L1-1/2x1-1/2x1/4	.971	0	3	.001	3.466	z	18	5.095	14.82	.108	.535	1	H2-1
18	M315	L1-1/2x1-1/2x1/4	.927	2.086	15	.003	3.394	z	14	5.312	14.82	.108	.537	1	H2-1
19	M95	L1-1/2x1-1/2x1/4	.923	0	2	.001	0	z	10	5.095	14.82	.108	.535	1	H2-1
20	M104	L1-1/2x1-1/2x1/4	.908	0	6	.001	3.466	z	10	5.095	14.82	.108	.535	1	H2-1
21	M291	L2.5x1.5x4	.877	2.531	9	.001	4.5	y	2	5.03	28.353	.426	1.159	1...	H2-1
22	M113	L1-1/2x1-1/2x1/4	.873	0	2	.001	0	z	10	5.095	14.82	.108	.535	1	H2-1
23	M22	L1-1/2x1-1/2x1/4	.865	0	2	.001	3.466	z	14	5.095	14.82	.108	.535	1	H2-1
24	M103	L1-1/2x1-1/2x1/4	.852	0	8	.001	0	z	14	5.095	14.82	.108	.535	1	H2-1

Envelope AISC 13th(360-05): ASD Steel Code Checks (Continued)

	Member	Shape	Code Check	Loc...	L...	Shea...	Loc.....		L...	Pnc/o...	Pnt/om [k]	Mnyy/...	Mnzz/...	...	Eqn
25	M122	L1-1/2x1-1/2x1/4	.846	0	6	.001	3.466	z	14	5.095	14.82	.108	.535	1	H2-1
26	M253	L1-1/2x1-1/2x1/4	.839	0	2	.001	0	z	10	5.095	14.82	.108	.535	1	H2-1
27	M94	L1-1/2x1-1/2x1/4	.839	0	4	.001	3.466	z	14	5.095	14.82	.108	.535	1	H2-1
28	M292	L2.5x1.5x4	.831	2.531	7	.001	4.5	y	9	5.03	28.353	.426	1.159	1...	H2-1
29	M112	L1-1/2x1-1/2x1/4	.830	0	4	.001	3.466	z	18	5.095	14.82	.108	.535	1	H2-1
30	M262	L1-1/2x1-1/2x1/4	.828	0	6	.001	3.466	z	12	5.095	14.82	.108	.535	1	H2-1
31	M131	L1-1/2x1-1/2x1/4	.813	0	2	.001	3.466	z	12	5.095	14.82	.108	.535	1	H2-1
32	M244	L1-1/2x1-1/2x1/4	.795	0	6	.001	3.466	z	13	5.095	14.82	.108	.535	1	H2-1
33	M121	L1-1/2x1-1/2x1/4	.793	0	8	.001	0	z	18	5.095	14.82	.108	.535	1	H2-1
34	M140	L1-1/2x1-1/2x1/4	.785	0	6	.001	3.466	z	14	5.095	14.82	.108	.535	1	H2-1
35	M130	L1-1/2x1-1/2x1/4	.783	0	4	.001	0	z	13	5.095	14.82	.108	.535	1	H2-1
36	M85	L2-1/2x2-1/2x1/4	.780	2.5	9	.011	2.5	y	9	27.075	35.554	.426	2.244	1	H2-1
37	M235	L1-1/2x1-1/2x1/4	.776	0	2	.001	3.466	z	17	5.095	14.82	.108	.535	1	H2-1
38	M21	L1-1/2x1-1/2x1/4	.775	0	4	.001	3.466	z	17	5.095	14.82	.108	.535	1	H2-1
39	M84	L2-1/2x2-1/2x1/4	.772	2.5	3	.014	0	y	3	27.075	35.554	.426	2.244	1	H2-1
40	M310	L1-1/2x1-1/2x1/4	.766	2.263	15	.002	0	z	2	5.312	14.82	.108	.537	1	H2-1
41	M162	L2-1/2x2-1/2x1/4	.766	25....	7	.014	27.5	y	7	27.075	35.554	.426	2.244	1	H2-1
42	M68	L1-1/2x1-1/2x1/4	.762	0	8	.001	3.466	z	10	5.095	14.82	.108	.535	1	H2-1
43	M69	L1-1/2x1-1/2x1/4	.762	0	6	.001	0	z	15	5.095	14.82	.108	.535	1	H2-1
44	M149	L1-1/2x1-1/2x1/4	.751	0	2	.001	3.466	z	11	5.095	14.82	.108	.535	1	H2-1
45	M36	L1-1/2x1-1/2x1/4	.750	0	6	.001	0	z	15	5.095	14.82	.108	.535	1	H2-1
46	M38	L1-1/2x1-1/2x1/4	.748	0	2	.001	3.466	z	13	5.095	14.82	.108	.535	1	H2-1
47	M48	L2-1/2x2-1/2x1/4	.747	6.172	7	.222	6.25	y	2	33.213	35.554	.426	2.37	1	H2-1
48	M139	L1-1/2x1-1/2x1/4	.746	0	8	.001	0	z	17	5.095	14.82	.108	.535	1	H2-1
49	M311	L1-1/2x1-1/2x1/4	.745	1.167	18	.002	0	z	9	5.312	14.82	.108	.537	1	H2-1
50	M83	L2-1/2x2-1/2x1/4	.738	2.5	5	.022	1.25	z	7	33.213	35.554	.426	2.37	1	H2-1
51	M148	L1-1/2x1-1/2x1/4	.735	0	4	.001	0	z	16	5.095	14.82	.108	.535	1	H2-1
52	M164	L2-1/2x2-1/2x1/4	.732	25....	3	.017	27.5	y	3	27.075	35.554	.426	2.244	1	H2-1
53	M82	L2-1/2x2-1/2x1/4	.729	2.5	7	.013	0	y	7	27.075	35.554	.426	2.244	1	H2-1
54	M158	L1-1/2x1-1/2x1/4	.727	0	6	.001	3.466	z	18	5.095	14.82	.108	.535	1	H2-1
55	M312	L1-1/2x1-1/2x1/4	.726	.566	14	.001	0	z	2	5.312	14.82	.108	.537	1	H2-1
56	M262A	L1-1/2x1-1/2x1/4	.725	1.45	17	.006	3.394	z	5	5.312	14.82	.108	.537	1	H2-1
57	M261A	L1-1/2x1-1/2x1/4	.724	2.051	14	.005	3.394	z	6	5.312	14.82	.108	.537	1	H2-1
58	M37	L1-1/2x1-1/2x1/4	.716	0	4	.001	0	z	17	5.095	14.82	.108	.535	1	H2-1
59	M157	L1-1/2x1-1/2x1/4	.707	0	8	.001	3.466	z	17	5.095	14.82	.108	.535	1	H2-1
60	M313	L1-1/2x1-1/2x1/4	.697	2.828	11	.001	0	z	11	5.312	14.82	.108	.537	1	H2-1
61	M165	L2-1/2x2-1/2x1/4	.680	25....	9	.010	24....	z	9	27.075	35.554	.426	2.244	1	H2-1
62	M96	L1-1/2x1-1/2x1/4	.676	0	8	.001	0	z	11	5.095	14.82	.108	.535	1	H2-1
63	M105	L1-1/2x1-1/2x1/4	.675	0	4	.001	0	z	17	5.095	14.82	.108	.535	1	H2-1
64	M59	L1-1/2x1-1/2x1/4	.670	0	4	.001	3.466	z	16	5.095	14.82	.108	.535	1	H2-1
65	M309	L1-1/2x1-1/2x1/4	.668	1.768	15	.003	3.394	z	5	5.312	14.82	.108	.537	1	H2-1
66	M60	L1-1/2x1-1/2x1/4	.665	0	2	.001	3.466	z	18	5.095	14.82	.108	.535	1	H2-1
67	M3	L2-1/2x2-1/2x1/4	.662	.26	7	.147	11....	z	2	27.075	35.554	.426	2.244	1	H2-1
68	M47	L2-1/2x2-1/2x1/4	.662	5.703	3	.023	5	z	9	27.075	35.554	.426	2.244	1	H2-1
69	M97	L1-1/2x1-1/2x1/4	.645	0	6	.001	0	z	14	5.095	14.82	.108	.535	1	H2-1
70	M114	L1-1/2x1-1/2x1/4	.645	0	8	.001	0	z	12	5.095	14.82	.108	.535	1	H2-1
71	M106	L1-1/2x1-1/2x1/4	.639	0	2	.001	3.466	z	15	5.095	14.82	.108	.535	1	H2-1
72	M261	L1-1/2x1-1/2x1/4	.637	0	7	.001	0	z	16	5.095	14.82	.108	.535	1	H2-1
73	M2	L2-1/2x2-1/2x1/4	.628	1.042	2	.140	11....	z	8	27.075	35.554	.426	2.244	1	H2-1
74	M35	L1-1/2x1-1/2x1/4	.627	0	8	.001	3.466	z	10	5.095	14.82	.108	.535	1	H2-1
75	M308	L1-1/2x1-1/2x1/4	.621	1.414	18	.003	3.394	z	8	5.312	14.82	.108	.537	1	H2-1
76	M302	L1-1/2x1-1/2x1/4	.617	0	2	.004	0	y	14	5.095	20.584	.15	.717	1...	H2-1
77	M254	L1-1/2x1-1/2x1/4	.616	0	8	.001	3.466	z	14	5.095	14.82	.108	.535	1	H2-1
78	M115	L1-1/2x1-1/2x1/4	.609	0	6	.001	3.466	z	11	5.095	14.82	.108	.535	1	H2-1
79	M123	L1-1/2x1-1/2x1/4	.602	0	4	.001	3.466	z	18	5.095	14.82	.108	.535	1	H2-1
80	M243	L1-1/2x1-1/2x1/4	.591	0	7	.001	3.466	z	11	5.095	14.82	.108	.535	1	H2-1
81	M124	L1-1/2x1-1/2x1/4	.588	0	2	.001	0	z	10	5.095	14.82	.108	.535	1	H2-1

Envelope AISC 13th(360-05): ASD Steel Code Checks (Continued)

	Member	Shape	Code Check	Loc...	L...	Shea...	Loc.....		L...	Pnc/o...	Pnt/om [k]	Mnyy/...	Mnzz/...	...	Eqn
82	M263	L1-1/2x1-1/2x1/4	.588	0	4	.001	0	z	10	5.095	14.82	.108	.535	1	H2-1
83	M50	L2-1/2x2-1/2x1/4	.586	5.547	5	.020	7.5	z	8	27.075	35.554	.426	2.244	1	H2-1
84	M132	L1-1/2x1-1/2x1/4	.584	0	8	.001	0	z	17	5.095	14.82	.108	.535	1	H2-1
85	M49	L2-1/2x2-1/2x1/4	.582	6.172	7	.015	7.5	z	9	27.075	35.554	.426	2.244	1	H2-1
86	M300	L1-1/2x1-1/2x1/4	.567	0	6	.004	3.466	y	12	5.095	20.584	.15	.717	1...	H2-1
87	M264	L1-1/2x1-1/2x1/4	.565	0	2	.001	3.466	z	10	5.095	14.82	.108	.535	1	H2-1
88	M133	L1-1/2x1-1/2x1/4	.561	0	6	.001	0	z	15	5.095	14.82	.108	.535	1	H2-1
89	M236	L1-1/2x1-1/2x1/4	.560	0	8	.001	3.466	z	18	5.095	14.82	.108	.535	1	H2-1
90	M255	L1-1/2x1-1/2x1/4	.543	0	6	.001	3.466	z	17	5.095	14.82	.108	.535	1	H2-1
91	M141	L1-1/2x1-1/2x1/4	.538	0	4	.001	3.466	z	15	5.095	14.82	.108	.535	1	H2-1
92	M142	L1-1/2x1-1/2x1/4	.538	0	2	.001	3.466	z	11	5.095	14.82	.108	.535	1	H2-1
93	M252	L1-1/2x1-1/2x1/4	.527	0	4	.001	0	z	14	5.095	14.82	.108	.535	1	H2-1
94	M246	L1-1/2x1-1/2x1/4	.522	0	2	.001	3.466	z	18	5.095	14.82	.108	.535	1	H2-1
95	M150	L1-1/2x1-1/2x1/4	.520	0	8	.001	0	z	16	5.095	14.82	.108	.535	1	H2-1
96	M245	L1-1/2x1-1/2x1/4	.517	0	4	.001	3.466	z	14	5.095	14.82	.108	.535	1	H2-1
97	M151	L1-1/2x1-1/2x1/4	.512	0	6	.001	3.466	z	14	5.095	14.82	.108	.535	1	H2-1
98	M237	L1-1/2x1-1/2x1/4	.497	0	6	.001	3.466	z	16	5.095	14.82	.108	.535	1	H2-1
99	M266	L1-1/2x1-1/2x1/4	.489	0	14	.001	2.4	z	13	8.881	14.82	.108	.555	1	H2-1
100	M160	L1-1/2x1-1/2x1/4	.487	0	2	.001	0	z	11	5.095	14.82	.108	.535	1	H2-1
101	M80	L1-1/2x1-1/2x1/4	.483	0	6	.001	0	z	12	5.095	14.82	.108	.535	1	H2-1
102	M234	L1-1/2x1-1/2x1/4	.481	0	4	.001	0	z	13	5.095	14.82	.108	.535	1	H2-1
103	M4	L2-1/2x2-1/2x1/4	.479	1.953	6	.151	2.474	z	4	27.075	35.554	.426	2.244	1	H2-1
104	M159	L1-1/2x1-1/2x1/4	.475	0	4	.001	3.466	z	15	5.095	14.82	.108	.535	1	H2-1
105	M168	L1-1/2x1-1/2x1/4	.473	0	4	.002	2.4	z	13	13.039	14.82	.108	.555	1	H2-1
106	M303	L1-1/2x1-1/2x1/4	.469	0	6	.006	0	y	16	6.27	20.584	.15	.731	1...	H2-1
107	M62	L1-1/2x1-1/2x1/4	.466	0	6	.001	3.466	z	18	5.095	14.82	.108	.535	1	H2-1
108	M61	L1-1/2x1-1/2x1/4	.457	0	8	.001	3.466	z	18	5.095	14.82	.108	.535	1	H2-1
109	M79	L1-1/2x1-1/2x1/4	.445	0	8	.001	3.466	z	17	5.095	14.82	.108	.535	1	H2-1
110	M176	L2-1/2x2-1/2x1/4	.437	0	10	.001	2.4	z	10	21.365	25.599	.307	1.706	1	H2-1
111	M177	L2-1/2x2-1/2x1/4	.437	0	10	.001	2.4	z	10	21.365	25.599	.307	1.706	1	H2-1
112	M178	L2-1/2x2-1/2x1/4	.437	0	10	.001	2.4	z	10	21.365	25.599	.307	1.706	1	H2-1
113	M179	L2-1/2x2-1/2x1/4	.437	0	10	.001	2.4	z	10	21.365	25.599	.307	1.706	1	H2-1
114	M163	L2-1/2x2-1/2x1/4	.428	25....	5	.031	27.5	z	12	33.213	35.554	.426	2.37	1	H2-1
115	M1	L2-1/2x2-1/2x1/4	.427	4.818	3	.170	2.474	z	2	27.075	35.554	.426	2.244	1	H2-1
116	M71	L1-1/2x1-1/2x1/4	.418	0	2	.001	3.466	z	12	5.095	14.82	.108	.535	1	H2-1
117	M301	L1-1/2x1-1/2x1/4	.413	0	2	.007	3.124	y	11	6.27	20.584	.15	.731	1...	H2-1
118	M70	L1-1/2x1-1/2x1/4	.393	0	4	.001	0	z	13	5.095	14.82	.108	.535	1	H2-1
119	M295	L1-1/2x1-1/2x1/4	.385	0	6	.004	3.466	y	17	5.095	20.584	.15	.717	1...	H2-1
120	M293	L1-1/2x1-1/2x1/4	.354	0	2	.004	0	y	17	5.095	20.584	.15	.717	1...	H2-1
121	M40	L1-1/2x1-1/2x1/4	.311	0	2	.001	2.4	z	11	8.881	14.82	.108	.555	1	H2-1
122	M74	L1-1/2x1-1/2x1/4	.303	0	3	.001	2.4	z	12	8.881	14.82	.108	.555	1	H2-1
123	M42	L1-1/2x1-1/2x1/4	.303	0	6	.001	2.4	z	14	8.881	14.82	.108	.555	1	H2-1
124	M39	L1-1/2x1-1/2x1/4	.294	0	4	.001	2.4	z	12	8.881	14.82	.108	.555	1	H2-1
125	M228	L1-1/2x1-1/2x1/4	.288	0	2	.001	3.466	z	18	5.095	14.82	.108	.535	1	H2-1
126	M296	L1-1/2x1-1/2x1/4	.285	0	2	.005	3.124	y	17	6.27	20.584	.15	.731	1...	H2-1
127	M167	L1-1/2x1-1/2x1/4	.284	0	12	.001	2.4	z	16	13.039	14.82	.108	.555	1	H2-1
128	M273	L1-1/2x1-1/2x1/4	.276	0	7	.001	3.466	z	14	5.095	14.82	.108	.535	1	H2-1
129	M51	L1-1/2x1-1/2x1/4	.269	0	8	.001	2.4	z	17	13.039	14.82	.108	.555	1	H2-1
130	M41	L1-1/2x1-1/2x1/4	.264	0	8	.001	2.4	z	16	8.881	14.82	.108	.555	1	H2-1
131	M219	L1-1/2x1-1/2x1/4	.261	0	6	.001	3.466	z	17	5.095	14.82	.108	.535	1	H2-1
132	M278	L1-1/2x1-1/2x1/4	.260	0	6	.011	0	z	8	13.039	14.82	.108	.555	1	H2-1
133	M294	L1-1/2x1-1/2x1/4	.256	0	6	.005	3.124	y	17	6.27	20.584	.15	.731	1...	H2-1
134	M210	L1-1/2x1-1/2x1/4	.244	0	2	.001	3.466	z	18	5.095	14.82	.108	.535	1	H2-1
135	M166	L1-1/2x1-1/2x1/4	.239	2.4	11	.001	2.4	z	16	13.039	14.82	.108	.555	1	H2-1
136	M273A	L1-1/2x1-1/2x1/4	.235	0	8	.016	0	z	8	13.039	14.82	.108	.555	1	H2-1
137	M169	L1-1/2x1-1/2x1/4	.232	0	15	.001	2.4	z	11	13.039	14.82	.108	.555	1	H2-1
138	M231	L1-1/2x1-1/2x1/4	.217	0	11	.001	2.4	z	10	8.881	14.82	.108	.555	1	H2-1

Envelope AISC 13th(360-05): ASD Steel Code Checks (Continued)

	Member	Shape	Code Check	Loc...	L...	Shea...	Loc.....	...	L...	Pnc/o...	Pnt/om [k]	Mnyy/...	Mnzz/...	...	Eqn
139	M201	L1-1/2x1-1/2x1/4	.216	0	6	.001	3.466	z	17	5.095	14.82	.108	.535	1	H2-1
140	M226	L1-1/2x1-1/2x1/4	.215	0	6	.001	3.466	z	10	5.095	14.82	.108	.535	1	H2-1
141	M286	L2.5x1.5x4	.209	2.531	5	.001	4.5	y	6	5.03	28.353	.426	1.158	1...	H2-1
142	M282	L1-1/2x1-1/2x1/4	.207	0	2	.007	0	z	7	13.039	14.82	.108	.555	1	H2-1
143	M272A	L1-1/2x1-1/2x1/4	.205	0	6	.010	0	z	8	13.039	14.82	.108	.555	1	H2-1
144	M267A	L1-1/2x1-1/2x1/4	.204	0	8	.000	1.2	z	5	13.039	14.82	.108	.555	1	H2-1
145	M195	L1-1/2x1-1/2x1/4	.202	0	11	.001	2.4	z	10	8.881	14.82	.108	.555	1	H2-1
146	M285	L2.5x1.5x4	.200	2.531	2	.001	4.5	y	2	5.03	28.353	.426	1.158	1...	H2-1
147	M233	L1-1/2x1-1/2x1/4	.194	0	15	.001	2.4	z	10	8.881	14.82	.108	.555	1	H2-1
148	M194	L1-1/2x1-1/2x1/4	.193	0	16	.001	2.4	z	10	8.881	14.82	.108	.555	1	H2-1
149	M232	L1-1/2x1-1/2x1/4	.187	0	18	.001	2.4	z	10	8.881	14.82	.108	.555	1	H2-1
150	M217	L1-1/2x1-1/2x1/4	.185	0	2	.001	3.466	z	11	5.095	14.82	.108	.535	1	H2-1
151	M197	L1-1/2x1-1/2x1/4	.181	0	15	.001	2.4	z	10	8.881	14.82	.108	.555	1	H2-1
152	M32	L1-1/2x1-1/2x1/4	.181	0	18	.001	2.4	z	11	8.881	14.82	.108	.555	1	H2-1
153	M31	L1-1/2x1-1/2x1/4	.180	0	14	.001	2.4	z	13	8.881	14.82	.108	.555	1	H2-1
154	M33	L1-1/2x1-1/2x1/4	.180	0	14	.001	2.4	z	17	8.881	14.82	.108	.555	1	H2-1
155	M34	L1-1/2x1-1/2x1/4	.179	0	18	.001	2.4	z	14	8.881	14.82	.108	.555	1	H2-1
156	M277	L1-1/2x1-1/2x1/4	.177	0	4	.019	1.2	z	3	13.039	14.82	.108	.555	1	H2-1
157	M78	L1-1/2x1-1/2x1/4	.175	0	8	.001	0	z	11	5.095	14.82	.108	.535	1	H2-1
158	M271A	L1-1/2x1-1/2x1/4	.174	0	6	.022	1.2	z	5	13.039	14.82	.108	.555	1	H2-1
159	M196	L1-1/2x1-1/2x1/4	.174	0	18	.001	2.4	z	10	8.881	14.82	.108	.555	1	H2-1
160	M268	L1-1/2x1-1/2x1/4	.173	0	16	.001	2.4	z	15	8.881	14.82	.108	.555	1	H2-1
161	M266A	L1-1/2x1-1/2x1/4	.168	0	8	.031	0	z	3	13.039	14.82	.108	.555	1	H2-1
162	M281	L1-1/2x1-1/2x1/4	.162	0	2	.024	0	z	5	13.039	14.82	.108	.555	1	H2-1
163	M230	L1-1/2x1-1/2x1/4	.162	0	8	.001	2.4	z	10	8.881	14.82	.108	.555	1	H2-1
164	M77	L1-1/2x1-1/2x1/4	.161	0	5	.001	0	z	14	5.095	14.82	.108	.535	1	H2-1
165	M208	L1-1/2x1-1/2x1/4	.156	0	6	.001	3.466	z	16	5.095	14.82	.108	.535	1	H2-1
166	M267	L1-1/2x1-1/2x1/4	.155	0	15	.001	2.4	z	11	8.881	14.82	.108	.555	1	H2-1
167	M263A	L1-1/2x1-1/2x1/4	.154	0	5	.025	0	z	8	13.039	14.82	.108	.555	1	H2-1
168	M269	L1-1/2x1-1/2x1/4	.154	0	18	.001	2.4	z	15	8.881	14.82	.108	.555	1	H2-1
169	M45	L1-1/2x1-1/2x1/4	.147	0	9	.001	0	z	14	5.095	14.82	.108	.535	1	H2-1
170	M276	L1-1/2x1-1/2x1/4	.137	0	4	.031	1.2	z	7	13.039	14.82	.108	.555	1	H2-1
171	M199	L1-1/2x1-1/2x1/4	.136	0	2	.001	3.466	z	10	5.095	14.82	.108	.535	1	H2-1
172	M268A	L1-1/2x1-1/2x1/4	.127	0	9	.007	0	z	3	13.039	14.82	.108	.555	1	H2-1
173	M54	L1-1/2x1-1/2x1/4	.126	2.4	9	.001	2.4	z	11	13.039	14.82	.108	.555	1	H2-1
174	M192	L1-1/2x1-1/2x1/4	.126	0	2	.001	3.466	z	11	5.095	14.82	.108	.535	1	H2-1
175	M279	L1-1/2x1-1/2x1/4	.124	0	6	.024	1.2	z	5	13.039	14.82	.108	.555	1	H2-1
176	M53	L1-1/2x1-1/2x1/4	.111	2.4	4	.001	2.4	z	13	13.039	14.82	.108	.555	1	H2-1
177	M274A	L1-1/2x1-1/2x1/4	.111	0	8	.026	1.2	z	7	13.039	14.82	.108	.555	1	H2-1
178	M287	L1-1/2x1-1/2x1/4	.106	0	11	.002	0	y	16	5.095	20.584	.15	.717	1...	H2-1
179	M183	L1-1/2x1-1/2x1/4	.099	0	6	.001	3.466	z	13	5.095	14.82	.108	.535	1	H2-1
180	M43	L1-1/2x1-1/2x1/4	.091	0	9	.001	3.466	z	18	5.095	14.82	.108	.535	1	H2-1
181	M265A	L1-1/2x1-1/2x1/4	.084	0	8	.033	1.2	z	7	13.039	14.82	.108	.555	1	H2-1
182	M46	L1-1/2x1-1/2x1/4	.083	0	5	.001	3.466	z	12	5.095	14.82	.108	.535	1	H2-1
183	M189	L1-1/2x1-1/2x1/4	.082	0	11	.001	0	z	17	5.095	14.82	.108	.535	1	H2-1
184	M225	L1-1/2x1-1/2x1/4	.080	0	8	.001	0	z	12	5.095	14.82	.108	.535	1	H2-1
185	M270A	L1-1/2x1-1/2x1/4	.080	0	6	.024	0	z	9	13.039	14.82	.108	.555	1	H2-1
186	M289	L1-1/2x1-1/2x1/4	.077	0	15	.002	3.466	y	18	5.095	20.584	.15	.717	1...	H2-1
187	M271	L1-1/2x1-1/2x1/4	.075	3.466	16	.001	3.466	z	17	5.095	14.82	.108	.535	1	H2-1
188	M227	L1-1/2x1-1/2x1/4	.071	0	3	.001	3.466	z	12	5.095	14.82	.108	.535	1	H2-1
189	M26	L1-1/2x1-1/2x1/4	.068	0	2	.001	2.4	z	14	8.881	14.82	.108	.555	1	H2-1
190	M16	L1-1/2x1-1/2x1/4	.067	0	6	.001	2.4	z	11	8.881	14.82	.108	.555	1	H2-1
191	M13	L1-1/2x1-1/2x1/4	.066	0	7	.001	3.466	z	16	5.095	14.82	.108	.535	1	H2-1
192	M52	L1-1/2x1-1/2x1/4	.065	2.4	9	.001	2.4	z	14	13.039	14.82	.108	.555	1	H2-1
193	M200	L1-1/2x1-1/2x1/4	.064	0	5	.001	0	z	18	5.095	14.82	.108	.535	1	H2-1
194	M218	L1-1/2x1-1/2x1/4	.060	0	7	.001	3.466	z	16	5.095	14.82	.108	.535	1	H2-1
195	M25	L1-1/2x1-1/2x1/4	.060	0	4	.001	2.4	z	17	8.881	14.82	.108	.555	1	H2-1

Envelope AISC 13th(360-05): ASD Steel Code Checks (Continued)

	Member	Shape	Code Check	Loc...	L...	Shea...	Loc.....	...	L...	Pnc/o...	Pnt/om [k]	Mnyy/...	Mnzz/...	...	Eqn
196	M209	L1-1/2x1-1/2x1/4	.060	0	9	.001	3.466	z	18	5.095	14.82	.108	.535	1	H2-1
197	M23	L1-1/2x1-1/2x1/4	.057	0	4	.001	2.4	z	12	8.881	14.82	.108	.555	1	H2-1
198	M24	L1-1/2x1-1/2x1/4	.057	0	3	.001	2.4	z	11	8.881	14.82	.108	.555	1	H2-1
199	M14	L1-1/2x1-1/2x1/4	.056	0	6	.001	3.466	z	12	5.095	14.82	.108	.535	1	H2-1
200	M190	L1-1/2x1-1/2x1/4	.055	0	15	.001	3.466	z	12	5.095	14.82	.108	.535	1	H2-1
201	M180	L1-1/2x1-1/2x1/4	.053	0	7	.001	3.466	z	15	5.095	14.82	.108	.535	1	H2-1
202	M64	L1-1/2x1-1/2x1/4	.052	0	4	.001	2.4	z	12	8.881	14.82	.108	.555	1	H2-1
203	M198	L1-1/2x1-1/2x1/4	.050	0	7	.001	3.466	z	10	5.095	14.82	.108	.535	1	H2-1
204	M207	L1-1/2x1-1/2x1/4	.050	0	9	.001	0	z	11	5.095	14.82	.108	.535	1	H2-1
205	M182	L1-1/2x1-1/2x1/4	.049	0	5	.001	3.466	z	11	5.095	14.82	.108	.535	1	H2-1
206	M290	L1-1/2x1-1/2x1/4	.048	0	2	.002	3.124	y	18	6.27	20.584	.15	.731	1...	H2-1
207	M216	L1-1/2x1-1/2x1/4	.046	0	5	.001	3.466	z	13	5.095	14.82	.108	.535	1	H2-1
208	M269A	L1-1/2x1-1/2x1/4	.045	0	9	.015	0	z	8	13.039	14.82	.108	.555	1	H2-1
209	M288	L1-1/2x1-1/2x1/4	.045	0	6	.002	3.124	y	17	6.27	20.584	.15	.731	1...	H2-1
210	M44	L1-1/2x1-1/2x1/4	.041	0	9	.001	3.466	z	15	5.095	14.82	.108	.535	1	H2-1
211	M280	L1-1/2x1-1/2x1/4	.038	0	6	.029	0	z	9	13.039	14.82	.108	.555	1	H2-1
212	M191	L1-1/2x1-1/2x1/4	.037	0	9	.001	3.466	z	18	5.095	14.82	.108	.535	1	H2-1
213	M6	L1-1/2x1-1/2x1/4	.036	1.732	5	.017	3.394	z	8	5.312	14.82	.108	.537	1	H2-1
214	M264A	L1-1/2x1-1/2x1/4	.034	0	6	.029	0	z	7	13.039	14.82	.108	.555	1	H2-1
215	M275	L1-1/2x1-1/2x1/4	.034	0	8	.032	1.2	z	3	13.039	14.82	.108	.555	1	H2-1
216	M181	L1-1/2x1-1/2x1/4	.032	0	9	.001	3.466	z	12	5.095	14.82	.108	.535	1	H2-1
217	M7	L2-1/2x2-1/2x1/4	.028	0	4	.001	2.4	z	12	21.365	25.599	.307	1.706	1	H2-1
218	M102	L1-1/2x1-1/2x1/4	.026	0	3	.001	2.4	z	15	8.881	14.82	.108	.555	1	H2-1
219	M100	L1-1/2x1-1/2x1/4	.026	0	7	.001	2.4	z	11	8.881	14.82	.108	.555	1	H2-1
220	M18	L1-1/2x1-1/2x1/4	.026	0	9	.001	2.4	z	14	8.881	14.82	.108	.555	1	H2-1
221	M101	L1-1/2x1-1/2x1/4	.024	0	5	.001	2.4	z	17	8.881	14.82	.108	.555	1	H2-1
222	M257	L1-1/2x1-1/2x1/4	.024	0	3	.001	2.4	z	12	8.881	14.82	.108	.555	1	H2-1
223	M109	L1-1/2x1-1/2x1/4	.022	0	9	.001	2.4	z	11	8.881	14.82	.108	.555	1	H2-1
224	M110	L1-1/2x1-1/2x1/4	.022	0	7	.001	2.4	z	17	8.881	14.82	.108	.555	1	H2-1
225	M111	L1-1/2x1-1/2x1/4	.021	0	5	.001	2.4	z	15	8.881	14.82	.108	.555	1	H2-1
226	M8	L2-1/2x2-1/2x1/4	.021	0	2	.001	2.4	z	11	21.365	25.599	.307	1.706	1	H2-1
227	M99	L1-1/2x1-1/2x1/4	.021	0	9	.001	2.4	z	13	8.881	14.82	.108	.555	1	H2-1
228	M259	L1-1/2x1-1/2x1/4	.021	0	7	.001	2.4	z	16	8.881	14.82	.108	.555	1	H2-1
229	M108	L1-1/2x1-1/2x1/4	.020	0	3	.001	2.4	z	13	8.881	14.82	.108	.555	1	H2-1
230	M260	L1-1/2x1-1/2x1/4	.019	0	5	.001	2.4	z	15	8.881	14.82	.108	.555	1	H2-1
231	M250	L1-1/2x1-1/2x1/4	.019	0	5	.001	2.4	z	15	8.881	14.82	.108	.555	1	H2-1
232	M10	L2-1/2x2-1/2x1/4	.018	0	6	.001	2.4	z	14	21.365	25.599	.307	1.706	1	H2-1
233	M73	L1-1/2x1-1/2x1/4	.017	0	7	.001	2.4	z	12	8.881	14.82	.108	.555	1	H2-1
234	M258	L1-1/2x1-1/2x1/4	.017	0	11	.001	2.4	z	11	8.881	14.82	.108	.555	1	H2-1
235	M17	L1-1/2x1-1/2x1/4	.017	0	3	.001	2.4	z	18	8.881	14.82	.108	.555	1	H2-1
236	M119	L1-1/2x1-1/2x1/4	.017	0	5	.001	2.4	z	17	8.881	14.82	.108	.555	1	H2-1
237	M251	L1-1/2x1-1/2x1/4	.016	0	3	.001	2.4	z	14	8.881	14.82	.108	.555	1	H2-1
238	M15	L1-1/2x1-1/2x1/4	.016	0	6	.001	2.4	z	12	8.881	14.82	.108	.555	1	H2-1
239	M117	L1-1/2x1-1/2x1/4	.015	0	9	.001	2.4	z	13	8.881	14.82	.108	.555	1	H2-1
240	M75	L1-1/2x1-1/2x1/4	.015	0	2	.001	2.4	z	18	8.881	14.82	.108	.555	1	H2-1
241	M120	L1-1/2x1-1/2x1/4	.014	0	3	.001	2.4	z	15	8.881	14.82	.108	.555	1	H2-1
242	M67	L1-1/2x1-1/2x1/4	.014	0	9	.001	2.4	z	14	8.881	14.82	.108	.555	1	H2-1
243	M239	L1-1/2x1-1/2x1/4	.014	0	3	.001	2.4	z	10	8.881	14.82	.108	.555	1	H2-1
244	M66	L1-1/2x1-1/2x1/4	.014	0	3	.001	2.4	z	18	8.881	14.82	.108	.555	1	H2-1
245	M118	L1-1/2x1-1/2x1/4	.013	0	7	.001	2.4	z	11	8.881	14.82	.108	.555	1	H2-1
246	M76	L1-1/2x1-1/2x1/4	.013	0	8	.001	2.4	z	14	8.881	14.82	.108	.555	1	H2-1
247	M65	L1-1/2x1-1/2x1/4	.013	0	5	.001	2.4	z	11	8.881	14.82	.108	.555	1	H2-1
248	M248	L1-1/2x1-1/2x1/4	.013	0	11	.001	2.4	z	10	8.881	14.82	.108	.555	1	H2-1
249	M9	L2-1/2x2-1/2x1/4	.013	0	8	.001	2.4	z	17	21.365	25.599	.307	1.706	1	H2-1
250	M87	L1-1/2x1-1/2x1/4	.012	0	7	.001	2.4	z	12	13.039	14.82	.108	.555	1	H2-1
251	M242	L1-1/2x1-1/2x1/4	.011	0	5	.001	2.4	z	15	8.881	14.82	.108	.555	1	H2-1
252	M127	L1-1/2x1-1/2x1/4	.011	0	9	.001	2.4	z	11	8.881	14.82	.108	.555	1	H2-1

Envelope AISC 13th(360-05): ASD Steel Code Checks (Continued)

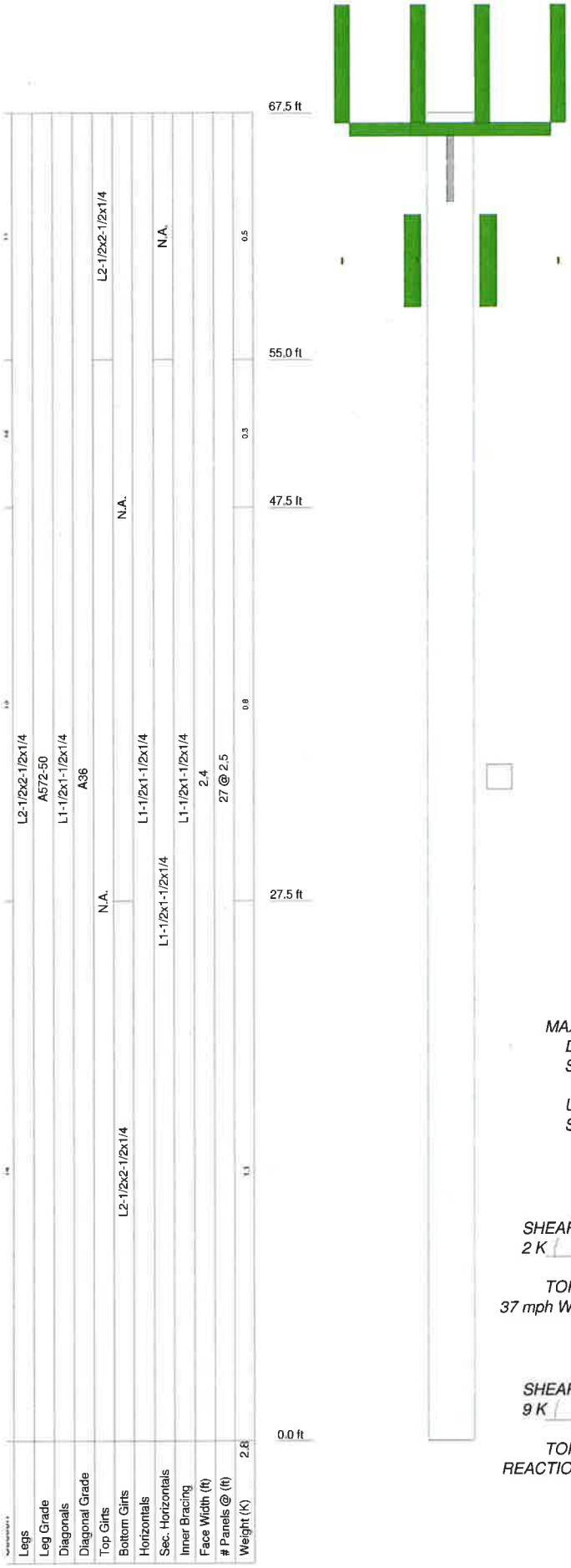
	Member	Shape	Code Check	Loc...	L...	Shea...	Loc.....		L...	Pnc/o...	Pnt/om [k]	Mnyy/...	Mnzz/...	...	Eqn
253	M249	L1-1/2x1-1/2x1/4	.011	0	6	.001	2.4	z	11	8.881	14.82	.108	.555	1	H2-1
254	M129	L1-1/2x1-1/2x1/4	.010	0	5	.001	2.4	z	15	8.881	14.82	.108	.555	1	H2-1
255	M240	L1-1/2x1-1/2x1/4	.009	0	2	.001	2.4	z	11	8.881	14.82	.108	.555	1	H2-1
256	M128	L1-1/2x1-1/2x1/4	.008	0	7	.001	2.4	z	17	8.881	14.82	.108	.555	1	H2-1
257	M222	L1-1/2x1-1/2x1/4	.008	0	3	.001	2.4	z	11	8.881	14.82	.108	.555	1	H2-1
258	M241	L1-1/2x1-1/2x1/4	.008	0	16	.001	2.4	z	10	8.881	14.82	.108	.555	1	H2-1
259	M221	L1-1/2x1-1/2x1/4	.008	0	8	.001	2.4	z	10	8.881	14.82	.108	.555	1	H2-1
260	M5	L1-1/2x1-1/2x1/4	.008	1.909	8	.020	3.394	z	9	5.312	14.82	.108	.537	1	H2-1
261	M126	L1-1/2x1-1/2x1/4	.008	0	3	.001	2.4	z	13	8.881	14.82	.108	.555	1	H2-1
262	M214	L1-1/2x1-1/2x1/4	.007	0	9	.001	2.4	z	10	8.881	14.82	.108	.555	1	H2-1
263	M86	L1-1/2x1-1/2x1/4	.007	0	2	.001	0	z	15	13.039	14.82	.108	.555	1	H2-1
264	M88	L1-1/2x1-1/2x1/4	.007	0	5	.001	0	z	11	13.039	14.82	.108	.555	1	H2-1
265	M213	L1-1/2x1-1/2x1/4	.007	0	9	.001	2.4	z	10	8.881	14.82	.108	.555	1	H2-1
266	M203	L1-1/2x1-1/2x1/4	.007	0	8	.001	2.4	z	10	8.881	14.82	.108	.555	1	H2-1
267	M137	L1-1/2x1-1/2x1/4	.007	0	4	.001	2.4	z	17	8.881	14.82	.108	.555	1	H2-1
268	M155	L1-1/2x1-1/2x1/4	.007	0	3	.001	2.4	z	18	8.881	14.82	.108	.555	1	H2-1
269	M224	L1-1/2x1-1/2x1/4	.006	0	9	.001	2.4	z	18	8.881	14.82	.108	.555	1	H2-1
270	M89	L1-1/2x1-1/2x1/4	.006	2.4	4	.001	2.4	z	17	13.039	14.82	.108	.555	1	H2-1
271	M215	L1-1/2x1-1/2x1/4	.006	0	7	.001	2.4	z	11	8.881	14.82	.108	.555	1	H2-1
272	M206	L1-1/2x1-1/2x1/4	.006	0	9	.001	2.4	z	10	8.881	14.82	.108	.555	1	H2-1
273	M204	L1-1/2x1-1/2x1/4	.006	0	7	.001	2.4	z	10	8.881	14.82	.108	.555	1	H2-1
274	M153	L1-1/2x1-1/2x1/4	.006	0	2	.001	2.4	z	12	8.881	14.82	.108	.555	1	H2-1
275	M146	L1-1/2x1-1/2x1/4	.006	0	5	.001	2.4	z	17	8.881	14.82	.108	.555	1	H2-1
276	M185	L1-1/2x1-1/2x1/4	.005	0	13	.001	2.4	z	17	8.881	14.82	.108	.555	1	H2-1
277	M223	L1-1/2x1-1/2x1/4	.005	0	16	.001	2.4	z	10	8.881	14.82	.108	.555	1	H2-1
278	M135	L1-1/2x1-1/2x1/4	.005	0	4	.001	2.4	z	13	8.881	14.82	.108	.555	1	H2-1
279	M154	L1-1/2x1-1/2x1/4	.005	0	5	.001	2.4	z	11	8.881	14.82	.108	.555	1	H2-1
280	M186	L1-1/2x1-1/2x1/4	.005	0	12	.001	2.4	z	17	8.881	14.82	.108	.555	1	H2-1
281	M188	L1-1/2x1-1/2x1/4	.005	0	14	.001	2.4	z	17	8.881	14.82	.108	.555	1	H2-1
282	M136	L1-1/2x1-1/2x1/4	.004	0	2	.001	2.4	z	11	8.881	14.82	.108	.555	1	H2-1
283	M138	L1-1/2x1-1/2x1/4	.004	0	7	.001	2.4	z	15	8.881	14.82	.108	.555	1	H2-1
284	M145	L1-1/2x1-1/2x1/4	.004	0	6	.001	2.4	z	11	8.881	14.82	.108	.555	1	H2-1
285	M156	L1-1/2x1-1/2x1/4	.004	0	17	.001	2.4	z	14	8.881	14.82	.108	.555	1	H2-1
286	M187	L1-1/2x1-1/2x1/4	.004	0	17	.001	2.4	z	10	8.881	14.82	.108	.555	1	H2-1
287	M212	L1-1/2x1-1/2x1/4	.004	0	12	.001	2.4	z	10	8.881	14.82	.108	.555	1	H2-1
288	M147	L1-1/2x1-1/2x1/4	.004	0	16	.001	2.4	z	14	8.881	14.82	.108	.555	1	H2-1
289	M144	L1-1/2x1-1/2x1/4	.004	0	9	.001	2.4	z	12	8.881	14.82	.108	.555	1	H2-1
290	M205	L1-1/2x1-1/2x1/4	.004	0	16	.001	2.4	z	10	8.881	14.82	.108	.555	1	H2-1
291	M297	L4x3x4	.002	2.4	2	.001	2.4	z	2	30.125	36.431	1.227	3.284	1	H2-1
292	M290A	L4x3x4	.002	2.4	6	.001	2.4	z	6	30.125	36.431	1.227	3.284	1	H2-1
293	M284	L4x3x4	.002	2.4	6	.001	2.4	z	6	30.125	36.431	1.227	3.284	1	H2-1
294	M72	L1-1/2x1-1/2x1/4	.001	.05	23	.020	1.2	z	4	13.039	14.82	.108	.555	1	H2-1
295	M98	L1-1/2x1-1/2x1/4	.001	.738	12	.021	0	z	8	13.039	14.82	.108	.555	1	H2-1
296	M238	L1-1/2x1-1/2x1/4	.000	.05	22	.005	1.2	z	7	13.039	14.82	.108	.555	1	H2-1
297	M247	L1-1/2x1-1/2x1/4	.000	.163	13	.002	0	z	5	13.039	14.82	.108	.555	1	H2-1
298	M116	L1-1/2x1-1/2x1/4	.000	.2	19	.030	0	z	8	13.039	14.82	.108	.555	1	H2-1
299	M229	L1-1/2x1-1/2x1/4	.000	.45	19	.002	0	z	7	13.039	14.82	.108	.555	1	H2-1
300	M220	L1-1/2x1-1/2x1/4	.000	.238	18	.002	1.2	z	7	13.039	14.82	.108	.555	1	H2-1
301	M134	L1-1/2x1-1/2x1/4	.000	.475	6	.034	0	z	8	13.039	14.82	.108	.555	1	H2-1
302	M256	L1-1/2x1-1/2x1/4	.000	.788	4	.004	1.2	z	6	13.039	14.82	.108	.555	1	H2-1
303	M202	L1-1/2x1-1/2x1/4	.000	.113	3	.002	0	z	13	13.039	14.82	.108	.555	1	H2-1
304	M81	L1-1/2x1-1/2x1/4	.000	.413	15	.016	0	z	8	13.039	14.82	.108	.555	1	H2-1
305	M193	L1-1/2x1-1/2x1/4	.000	.925	6	.002	1.2	z	13	13.039	14.82	.108	.555	1	H2-1
306	M265	L1-1/2x1-1/2x1/4	.000	.35	18	.006	0	z	7	13.039	14.82	.108	.555	1	H2-1
307	M211	L1-1/2x1-1/2x1/4	.000	.925	2	.001	1.2	z	13	13.039	14.82	.108	.555	1	H2-1
308	M184	L1-1/2x1-1/2x1/4	.000	.913	4	.003	0	z	14	13.039	14.82	.108	.555	1	H2-1
309	M107	L1-1/2x1-1/2x1/4	.000	.988	1	.025	0	z	8	13.039	14.82	.108	.555	1	H2-1

Envelope AISC 13th(360-05): ASD Steel Code Checks (Continued)

	Member	Shape	Code Check	Loc...	L...	Shea...	Loc.....		L...	Pnc/o...	Pnt/om [k]	Mnyy/...	Mnzz/...	...	Eqn
310	M63	L1-1/2x1-1/2x1/4	.000	1.2	1	.031	0	z	8	13.039	14.82	.108	.555	1	H1-1a
311	M125	L1-1/2x1-1/2x1/4	.000	1.2	1	.032	0	z	8	13.039	14.82	.108	.555	1	H1-1a
312	M143	L1-1/2x1-1/2x1/4	.000	1.2	1	.034	0	z	8	13.039	14.82	.108	.555	1	H1-1a
313	M152	L1-1/2x1-1/2x1/4	.000	1.2	1	.034	0	z	8	13.039	14.82	.108	.555	1	H1-1a
314	M161	L1-1/2x1-1/2x1/4	.000	1.2	1	.032	1.2	z	4	13.039	14.82	.108	.555	1	H1-1a
315	M274	L1-1/2x1-1/2x1/4	.000	1.2	1	.015	0	z	17	13.039	14.82	.108	.555	1	H1-1a

APPENDIX C

Tower Elevation Drawing



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
CWT01 4' T-Arm	67	APX16DWV-16DWVS-C w/ 5' x 2" Mount Pipe	60
CWT01 4' T-Arm	67	(2) KRY 112 76/1	60
CWT01 4' T-Arm	67	(2) KRY 112 76/1	60
(2) SBNHH-1D65B w/ Mount Pipe	67	(2) KRY 112 76/1	60
(2) SBNHH-1D65B w/ Mount Pipe	67	(2) ACU-A20-N	60
(2) SBNHH-1D65B w/ Mount Pipe	67	(2) ACU-A20-N	60
(3) ALU 2X60 AWS	67	(2) ACU-A20-N	60
(3) ALU 2X60 LTE	67	APX16DWV-16DWVS-C w/ 5' x 2" Mount Pipe	60
(3) ALU 2X60 PCS	67		
(2) DB-T1-6Z-8AB-0Z	67		
(2) Pipe Mount 4'x4.5"	65		
APX16DWV-16DWVS-C w/ 5' x 2" Mount Pipe	60		

MATERIAL STRENGTH

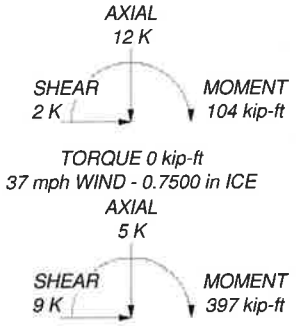
GRADE	Fy	Fu	GRADE	Fy	Fu
A572-50	50 ksi	65 ksi	A36	36 ksi	58 ksi

TOWER DESIGN NOTES

1. Tower is located in Middlesex County, Connecticut.
2. Tower designed for a 85 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 37 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 309.4%

MAX. CORNER REACTIONS AT BASE:
DOWN: 112 K
SHEAR: 2 K

UPLIFT: -122 K
SHEAR: 5 K



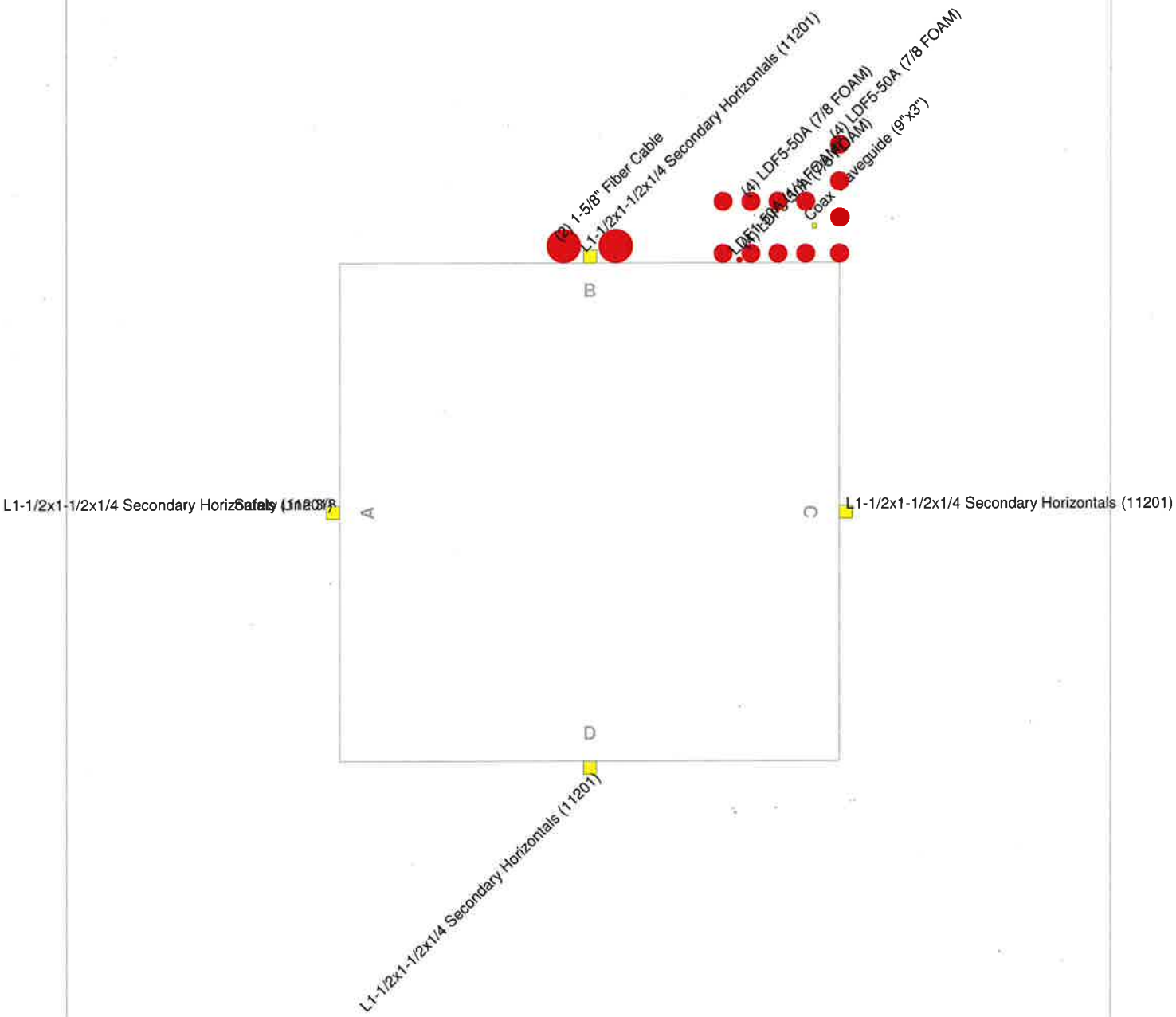
GPD
520 South Main St, Suite 2531
Akron, OH 44311
Phone: (330) 572-2100
FAX: (330) 572-2101

Job: 11201 Clinton			
Project: 2015703.20			
Client: CTI Tower Assets II, LLC	Drawn by: kliccar	App'd:	
Code: TIA/EIA-222-F	Date: 08/17/15	Scale: N	
Path: T:\CTI Towers\02 2015703.20 11201 E Main St, Clinton\tnx\11201 CLINTON TNX.eri		Dwg No.	

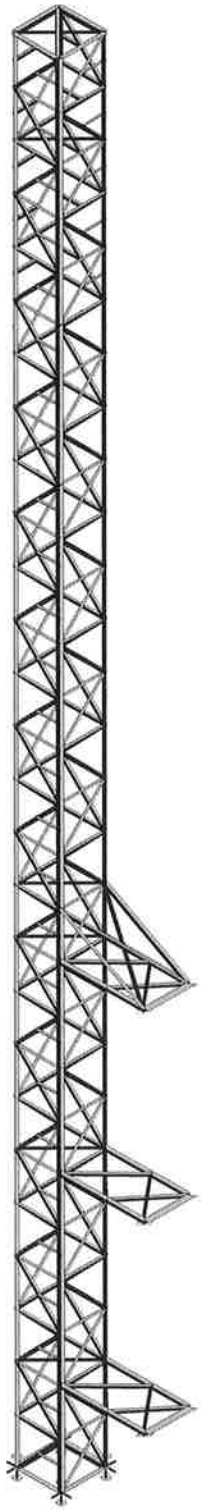
27'6"

Round Flat App In Face App Out Face

Section @ 27'6"



GPD 520 South Main St, Suite 2531 Akron, OH 44311 Phone: (330) 572-2100 FAX: (330) 572-2101	Job: ***11201 Clinton***		
	Project: ***2015703.20***		
	Client: CTI Tower Assets II, LLC	Drawn by: kliccar	App'd:
	Code: TIA/EIA-222-F	Date: 08/17/15	Scale: N
	Path: 1:\CTI Towers\02 2015703.20 11201 E Main St, Clinton\tnx\11201 CLINTON.TNX.er		Dwg No.



Envelope Only Solution

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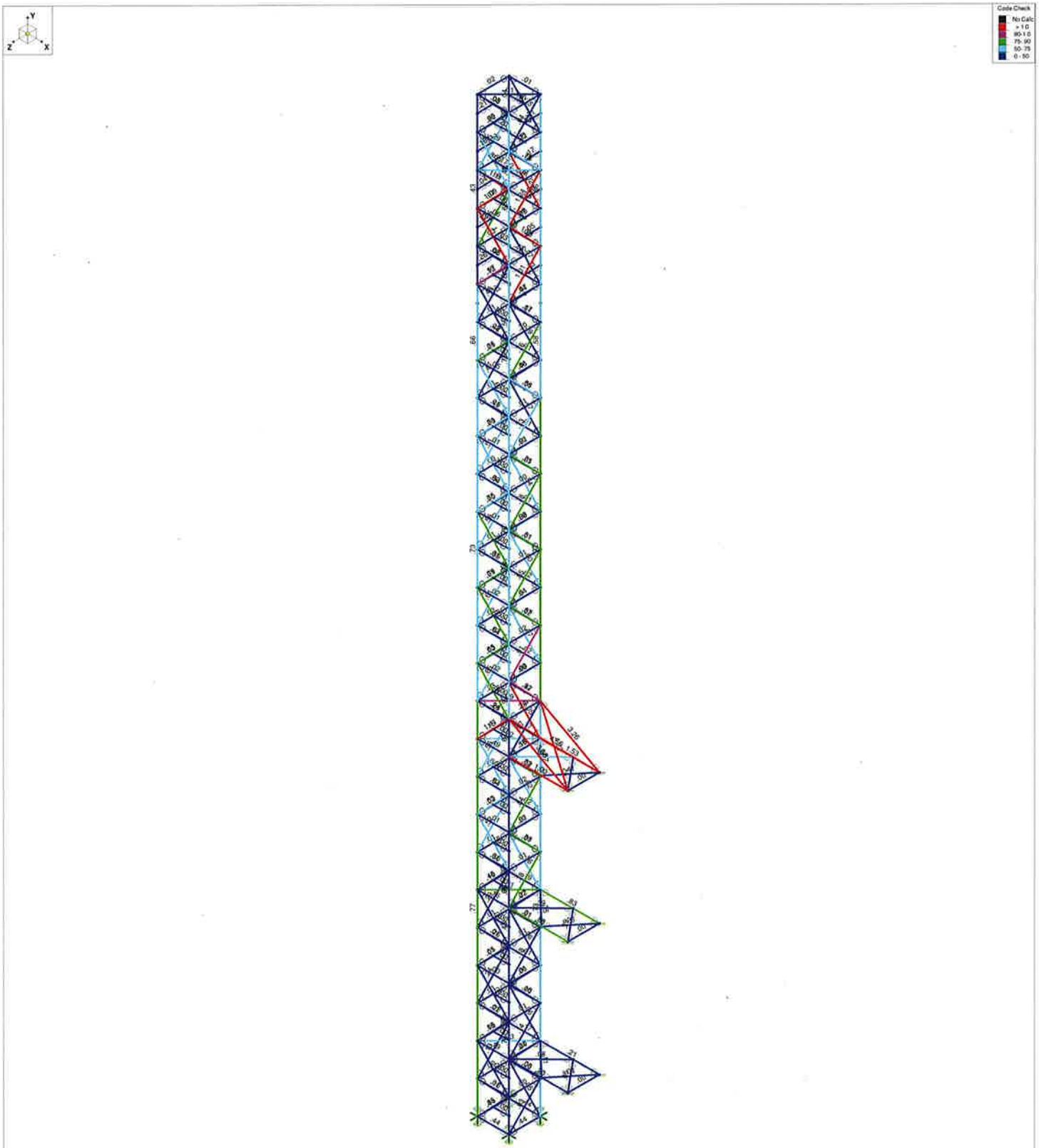
kliccar		Aug 17, 2015 at 2:53 PM
2015703.20		11201 CLINTON TNX.rt3



GPD	11201 Clinton	SK - 2
kliccar		Aug 17, 2015 at 2:53 PM
2015703.20		11201 CLINTON TNX.rt3

CLINTON

SITE #: 11201

CTI TOWERS

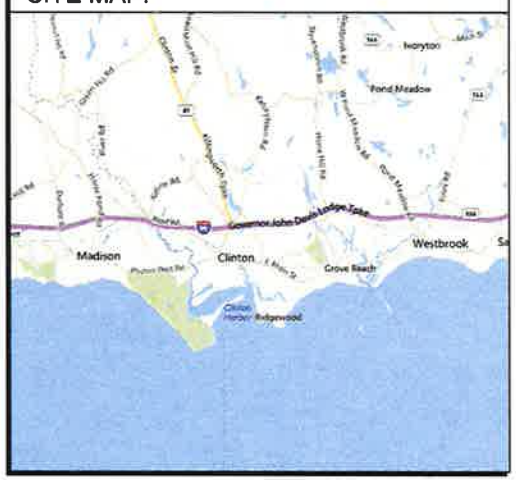
TOWER INFORMATION:

TOWER DOCUMENTS:	FDH/JOB #: 1424V21500
TOWER HEIGHT/TYPE:	67.5' SELF SUPPORT TOWER
TOWER LOCATION:	
LAT.:	41° 16' 43.87"
LONG.:	-72° 31' 33.52"
STREET ADDRESS:	21 E MAIN STREET
CITY, STATE ZIP:	CLINTON, CT 06413
COUNTY:	MIDDLESEX
REFERENCED ANALYSIS:	GPD/PROJ. #: 2015703.20
ANALYSIS DATE:	08/17/15

CODE COMPLIANCE:

GOVERNING CODES:	TIA/EIA-222-F & 2005 CT STATE BUILDING CODE
WIND SPEEDS:	85 MPH FASTEST MILE WIND SPEED 37 MPH FASTEST MILE WIND SPEED (W/ ICE)
ICE THICKNESS:	3/4"

SITE MAP:



CLIENT CONTACT:

MS. CHRISTINE COOPER
38 POND STREET, SUITE 305
FRANKLIN, MA 02038
(508) 440-5780

GPD CONTACT:

520 SOUTH MAIN STREET, SUITE 2531
AKRON, OH 44311
FOR QUESTIONS PLEASE EMAIL:
GPDMODS@GPDGROUP.COM

STATE OF CONNECTICUT
CHRISTOPHER J. SCHEKS
PROFESSIONAL ENGINEER

10/8/15

SHEET INDEX:

T-01:	TITLE SHEET
N-01:	PROJECT NOTES
S-01:	TOWER ELEVATION & MODIFICATION SCHEDULE
S-02:	MODIFICATION DETAILS & SECTIONS
S-03:	ADDITIONAL DETAILS
MI-01:	MODIFICATION INSPECTION CHECKLIST

GPD Engineering and Architecture Professional Corporation

CTI TOWERS
CLINTON
SITE #: 11201
DESIGN DRAWINGS PREPARED FOR:

REV.	DATE	DESCRIPTION

CLINTON
21 E MAIN STREET
CLINTON, CT 06413

TITLE SHEET

ISSUED FOR	
PERMIT	10/8/2015
BID	-
CONSTRUCTION	-
RECORD	-

ENGINEER	DESIGNER
NM	RR
PROJECT MANAGER	APPROVED BY
BPS	CJS

JOB NO
2015783.11201.0

T-01

GENERAL NOTES

1. THESE MODIFICATIONS HAVE BEEN DESIGNED IN ACCORDANCE WITH THE GOVERNING PROVISIONS OF TIA/EIA-222, AWS, TIA-1019-A, AND AISC. MATERIALS, FABRICATION, INSTALLATION, AND ALL OTHER SERVICES PROVIDED BY THE CONTRACTOR SHALL CONFORM TO THE ABOVE MENTIONED CODES AND THE CONTRACT SPECIFICATIONS.

2. THIS DESIGN ASSUMES THE TOWER AND FOUNDATIONS HAVE BEEN WELL MAINTAINED, IN GOOD CONDITION, AND ARE WITHOUT DEFECT. BENT MEMBERS, CORRODED MEMBERS, LOOSE BOLTS, CRACKED WELDS AND OTHER MEMBER DEFECTS HAVE NOT BEEN CONSIDERED. THE TOWER IS ASSUMED TO BE PLUMB AND THE SITE IS ASSUMED TO BE LEVEL. THIS DESIGN IS BEING PROVIDED WITHOUT THE BENEFIT OF A CONDITION ASSESSMENT BY GPD GROUP. CONTRACTOR SHALL COMMISSION A COMPLETE CONDITION ASSESSMENT PRIOR TO ORDERING ANY REINFORCING MATERIALS AND SUPPLY CONDITION ASSESSMENT TO ENGINEER FOR REVIEW. SEE CONTRACTOR NOTES.

3. THE CONTRACTOR SHALL VISIT THE SITE PRIOR TO BIDDING. ANY PROBLEMS WITH ACCESS, INTERFERENCE, ETC. SHALL BE RESOLVED PRIOR TO MOBILIZATION. CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS AND NOTE ANY EXISTING CONDITIONS THAT ARE NOT REPRESENTED ON THESE DRAWINGS OR THAT INTERFERE WITH THE CONTINUOUS INSTALLATION OF THE MODIFICATIONS. CONTRACTOR SHALL NOTE ALL ATTACHMENT POINTS, ANTENNAS, MOUNTS, COAX, LIGHTING, CLIMBING SUPPORTS, STEP BOLTS, PORT HOLES, AND ANY OTHER TOWER APPURTENANCES IN THE REGION OF THE MODIFICATIONS. GPD GROUP SHALL BE CONTACTED IMMEDIATELY TO EVALUATE THE SIGNIFICANCE OF ANY DEVIATION PRIOR TO ORDERING MATERIAL.

4. ALL EXISTING PAINTED/GALVANIZED SURFACES DAMAGED DURING REHAB SHALL BE WIRE BRUSHED CLEAN, REPAIRED BY COLD GALVANIZING BRUSH APPLIED PAINT (ZRC OR EQUAL), AND REPAINTED TO MATCH THE EXISTING FINISH (IF APPLICABLE).

5. ALL MATERIAL SPECIFIED FOR THIS PROJECT MUST BE NEW AND FREE OF ANY DEFECTS. ANY MATERIAL SUBSTITUTIONS, INCLUDING BUT NOT LIMITED TO ALTERED SIZES AND/OR STRENGTHS, MUST BE APPROVED BY THE OWNER AND ENGINEER IN WRITING. CONTRACTOR SHALL PROVIDE DOCUMENTATION TO ENGINEER FOR DETERMINING IF SUBSTITUTE IS SUITABLE FOR USE AND MEETS THE ORIGINAL DESIGN CRITERIA. DIFFERENCES FROM THE ORIGINAL DESIGN, INCLUDING MAINTENANCE, REPAIR AND REPLACEMENT, SHALL BE NOTED. ESTIMATES OF COSTS/CREDITS ASSOCIATED WITH THE SUBSTITUTION (INCLUDING RE-DESIGN COSTS AND COSTS TO SUB-CONTRACTORS) SHALL BE PROVIDED TO THE ENGINEER.

6. THE ENGINEER (GPD GROUP) SHALL MAKE POST INSTALLATION OBSERVATION FOR TOWER. CONTRACTOR SHALL COORDINATE WIENGINEER (GPD GROUP) WITHIN 72 HOURS AFTER 100% COMPLETION OF THE TOWER MODIFICATION INSTALLATION. INSTALLATION OF PROPOSED LOADING WITHOUT ENGINEER APPROVAL IS PROHIBITED. INSTALLATION OF THE PROPOSED LOADING IS BY OTHERS, AND IS BEYOND THE SCOPE OF THESE DRAWINGS.

7. ALL CONTRACTORS AND LOWER TIER CONTRACTORS MUST ACKNOWLEDGE IN WRITING TO TOWER OWNER AND GPD GROUP THAT THEY HAVE OBTAINED, UNDERSTAND, AND WILL FOLLOW TOWER OWNER STANDARDS OF PRACTICE, CONSTRUCTION GUIDELINES, ALL SITE AND TOWER SAFETY PROCEDURES, ALL PRODUCT LIMITATIONS AND INSTALLATION PROCEDURES USED ON SITE, AND PROPOSED MODIFICATIONS DESCRIBED. RECEIPT OF ACKNOWLEDGMENT MUST OCCUR PRIOR TO BEGINNING CONSTRUCTION OR CLIMBING. IT IS THE RESPONSIBILITY OF THE GENERAL CONTRACTOR TO PROVIDE THIS DOCUMENTATION FOR TOWER OWNER AND GPD GROUP ON COMPANY LETTERHEAD AND THE RESPONSIBILITY OF THE GENERAL CONTRACTOR TO OBTAIN THIS DOCUMENTATION FROM LOWER TIER SUBCONTRACTORS (ON SUBCONTRACTOR LETTERHEAD) AND DELIVER IT TO TOWER OWNER AND GPD GROUP.

8. IT IS ASSUMED THAT ANY STRUCTURAL MODIFICATION WORK SPECIFIED ON THESE PLANS WILL BE ACCOMPLISHED BY KNOWLEDGEABLE WORKMEN WITH TOWER CONSTRUCTION EXPERIENCE. THIS INCLUDES PROVIDING THE NECESSARY CERTIFICATIONS TO THE TOWER OWNER AND ENGINEER.

9. THESE DRAWINGS DO NOT INDICATE THE METHOD OF CONSTRUCTION. THE CONTRACTOR SHALL SUPERVISE AND DIRECT THE WORK AND SHALL BE SOLELY RESPONSIBLE FOR ALL CONSTRUCTION METHODS, MEANS, TECHNIQUES, SEQUENCES, AND PROCEDURES.

10. CONSTRUCTION WORK PRESENTS UNIQUE THREATS TO HEALTH AND SAFETY. THE CONTRACTOR IS RESPONSIBLE TO EDUCATE THEIR WORK FORCE OF THESE DANGERS AND LIMIT THEIR EXPOSURE TO HAZARDS. THIS EDUCATION SHALL INCLUDE BUT NOT BE LIMITED TO APPLICABLE TRAINING COURSES AND CERTIFICATIONS, PROPER PERSONAL PROTECTIVE EQUIPMENT USAGE, DAILY TAILGATE MEETINGS AND ANY OTHER PREVENTATIVE MEASURES WHICH MAY BE REASONABLY EXPECTED. THE CONTRACTOR AND ALL SUB-CONTRACTORS SHALL BE RESPONSIBLE FOR THE SAFETY OF THE WORK AREA, ADJACENT AREAS AND ANY PROPERTY OCCUPANTS WHO MAY BE AFFECTED BY THE WORK UNDER CONTRACT. THE CONTRACTOR SHALL REVIEW ALL LANDOWNER, PRIME CONTRACTOR, CARRIER, OSHA AND LOCAL SAFETY GUIDELINES AND AT ALL TIMES SHALL CONFORM TO THE MOST RESTRICTIVE OF THESE STANDARDS TO ENSURE A SAFE WORKPLACE.

11. TOWER WORK PRESENTS ADDITIONAL THREATS TO HEALTH AND SAFETY. ALL TOWER WORKERS WORKING ON A TOWER MUST BE ADEQUATELY TRAINED AND MONITORED TO ENSURE THAT SAFE WORK PRACTICES ARE LEARNED AND FOLLOWED, AS REQUIRED BY OSHA. WHEN WORKING ON EXISTING COMMUNICATION TOWERS, EMPLOYEES MUST BE PROVIDED WITH APPROPRIATE FALL PROTECTION, TRAINED TO USE THIS FALL PROTECTION PROPERLY, AND THE USE OF FALL PROTECTION MUST BE CONSISTENTLY SUPERVISED AND ENFORCED BY THE CONTRACTOR.

12. ALL SAFETY EQUIPMENT SHALL BE INSPECTED ACCORDING TO ALL OSHA AND INDUSTRY SCHEDULED INTERVALS AND ALL INSPECTIONS SHALL BE DOCUMENTED PER APPLICABLE CODES AND STANDARDS.

13. CONTRACTOR IS RESPONSIBLE FOR TEMPORARILY REMOVING ALL COAX, T-BRACKETS, ANTENNA MOUNTS, AND ANY OTHER TOWER APPURTENANCE THAT MAY INTERFERE WITH THE TOWER MODIFICATIONS. ALL TOWER APPURTENANCES MUST BE REPLACED AND/OR RESTORED TO ITS ORIGINAL LOCATION. SOME ATTACHMENTS MAY REQUIRE CUSTOM MODIFICATIONS TO PROPERLY FIT THE MODIFIED REGION OF THE STRUCTURE. THESE CUSTOMIZATIONS ARE DESIGNED BY OTHERS AND MUST BE APPROVED BY THE ENGINEER PRIOR TO REMOVING SUCH ATTACHMENTS. ANY CARRIER DOWNTIME MUST BE COORDINATED WITH THE TOWER OWNER IN WRITING.

14. CONTRACTOR SHALL ONLY WORK WITHIN THE LIMITS OF THE TOWER OWNER'S PROPERTY OR LEASE AREA AND APPROVED EASEMENTS. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY WORK IS WITHIN THESE BOUNDARIES. CONTRACTOR SHALL EMPLOY A SURVEYOR AS REQUIRED. ANY WORK OUTSIDE THESE BOUNDARIES SHALL BE APPROVED IN WRITING BY THE LAND OWNER PRIOR TO MOBILIZATION. CONSTRUCTION STAKING AND BOUNDARY MARKING IS THE RESPONSIBILITY OF THE CONTRACTOR.

GENERAL NOTES CONTINUED

15. TOWERS ARE DESIGNED TO CARRY GRAVITY, WIND, AND ICE LOADS. ALL MEMBERS, LEGS, DIAGONALS, STRUTS, AND REDUNDANT MEMBERS PROVIDE STRUCTURAL STABILITY TO THE TOWER WITH LITTLE REDUNDANCY. ABSENCE OR REMOVAL OF A MEMBER CAN TRIGGER CATASTROPHIC FAILURE UNLESS A SUBSTITUTE IS PROVIDED BEFORE ANY REMOVAL. LEGS CARRY AXIAL LOADS AND DERIVE THEIR STRENGTH FROM SHORTER UN-BRACED LENGTHS BY THE PRESENCE OF REDUNDANT MEMBERS AND THEIR CONNECTION TO THE DIAGONALS WITH BOLTS OR WELDS. IF THE BOLTS OR WELDS ARE REMOVED WITHOUT PROVIDING ANY SUBSTITUTE TO THE FRAME, THE LEG IS SUBJECTED TO A HIGHER UN-BRACED LENGTH THAT IMMEDIATELY REDUCES ITS LOAD CARRYING CAPACITY. IF A DIAGONAL IS ALSO REMOVED IN ADDITION TO THE CONNECTION, THE UN-BRACED LENGTH OF THE LEG IS GREATLY INCREASED, JEOPARDIZING ITS LOAD CARRYING CAPACITY. FAILURE OF ONE LEG CAN RESULT IN A TOWER COLLAPSE BECAUSE THERE IS NO REDUNDANCY. REDUNDANT MEMBERS AND DIAGONALS ARE CRITICAL TO THE STABILITY OF THE TOWER.

16. WORK SHALL ONLY BE PERFORMED DURING CALM DRY DAYS (WINDS LESS THAN 10-MPH). CONTRACTOR IS RESPONSIBLE FOR ALL TEMPORARY LOCAL TOWER SHORING, TEMPORARY GLOBAL TOWER SHORING, AND ALL SHORING OF SURROUNDING BUILDINGS, PADS, AND OTHER OUTDOOR SITE OBSTRUCTIONS. ALL SHORING, TEMPORARY BRACING, AND TEMPORARY SUPPORTS ARE THE RESPONSIBILITY OF THE CONTRACTOR.

17. MODIFICATIONS SHOWN SHALL BE INSTALLED ON ALL THREE (3) TOWER LEGS/FACES.

18. FAA/FCC FILING AND LIGHTING MAY BE REQUIRED. ALL GOVERNMENTAL REGULATORY DETERMINATIONS AND FILINGS BY OTHERS, NOT GPD.

19. VERIFY IF THIS STRUCTURE IS AN FM TOWER AND TAKE NECESSARY ACTIONS TO PROVIDE SAFE WORKING CONDITIONS INCLUDING, BUT NOT LIMITED TO, HAVING FM SIGNAL TURNED OFF. CONTRACTOR SHALL HAVE PROPER RADMAN FOR NOTIFICATION OF EXCESSIVE RF EXPOSURE FOR ALL INDIVIDUALS WORKING ON SITE IF FM ANTENNAS ARE PRESENT.

20. ALL MANUFACTURERS HARDWARE AND ASSEMBLY INSTRUCTIONS SHALL BE FOLLOWED EXACTLY. DEVIATION FROM THE INSTRUCTIONS IS UNACCEPTABLE AND REQUIRES WRITTEN APPROVAL FROM ENGINEER.

21. DO NOT SCALE DRAWINGS.

22. THE CLIMBING FACILITIES, SAFETY CLIMB AND ALL ASSOCIATED HARDWARE SHALL NOT BE IMPEDED OR MODIFIED WITHOUT THE WRITTEN CONSENT OF THE GPD GROUP.

STRUCTURAL STEEL NOTES

1. ALL NEW STEEL SHALL BE HOT-DIPPED GALVANIZED PER ASTM A123, ASTM A153/A153M, OR ASTM A653 G90, AS APPLICABLE FOR FULL WEATHER PROTECTION. FOR HIGH STRENGTH STEEL FASTENERS WHERE HOT-DIPPED GALVANIZING IS NOT PERMITTED DACROMET F1136 GRADE 3 COATING (OR ENGINEER APPROVED EQUIVALENT) SHALL BE USED. IN ADDITION ALL NEW STEEL SHALL BE PAINTED TO MATCH EXISTING TOWER STEEL. CONTRACTOR SHALL OBTAIN WRITTEN PERMISSION TO PROTECT STEEL BY ANY OTHER MEANS.

2. ALL EXISTING PAINTED/GALVANIZED SURFACES DAMAGED DURING REHAB SHALL BE WIRE BRUSHED CLEAN, REPAIRED BY COLD GALVANIZING BRUSH APPLIED PAINT (ZRC OR EQUAL), AND REPAINTED TO MATCH THE EXISTING FINISH (IF APPLICABLE).

3. CAULKING SHALL BE PROVIDED AROUND PERIMETER OF ANY AND ALL MODIFICATION MEMBERS TO ENSURE COMPLETE SEAL BETWEEN EXISTING STRUCTURE AND REINFORCING MEMBERS IN FULL CONTACT WITH EXISTING STEEL. SEALANT IS TO BE EXTERIOR GRADE, PAINTABLE SILICONE CAULKING AS MANUFACTURED BY DOW AND ACCEPTABLE TO GPD.

4. ALL STRUCTURAL STEEL SHALL CONFORM TO THE LISTED REQUIREMENTS U.N.O. IN THESE DRAWINGS:

ANGLE	ASTM A36 (GR 36)
PLATE	ASTM A572 (GR 50)
BOLTS	ASTM A325
NUTS	ASTM A563 (GR DH)
WASHERS	ASTM F436

5. ALL BOLT ASSEMBLIES FOR STRUCTURAL MEMBERS REPRESENTED IN THIS DRAWING REQUIRE LOCKING DEVICES TO BE INSTALLED IN ACCORDANCE WITH THE GOVERNING PROVISIONS OF TIA/EIA-222 REQUIREMENTS.

6. ALL SUBSTITUTES PROPOSED BY THE CONTRACTOR SHALL BE APPROVED IN WRITING BY THE ENGINEER. CONTRACTOR SHALL PROVIDE DOCUMENTATION TO ENGINEER FOR DETERMINING IF SUBSTITUTE IS SUITABLE FOR USE AND MEETS THE ORIGINAL DESIGN CRITERIA. DIFFERENCES FROM THE ORIGINAL DESIGN, INCLUDING MAINTENANCE, REPAIR AND REPLACEMENT, SHALL BE NOTED. ESTIMATES OF COSTS/CREDITS ASSOCIATED WITH THE SUBSTITUTION (INCLUDING RE-DESIGN COSTS AND COSTS TO SUB-CONTRACTORS) SHALL BE PROVIDED TO THE ENGINEER. CONTRACTOR SHALL PROVIDE ADDITIONAL DOCUMENTATION AND/OR SPECIFICATIONS TO THE ENGINEER AS REQUESTED.

7. STRUCTURAL STEEL SHOP DRAWINGS SHALL BE PROVIDED TO ENGINEER FOR APPROVAL PRIOR TO FABRICATION.

8. UNLESS NOTED OTHERWISE, ALL NEW MEMBERS SHALL MAINTAIN THE EXISTING MEMBER WORK LINES AND NOT INTRODUCE ECCENTRICITIES INTO THE STRUCTURE.

9. FOR ALL SHOP WELDING, USE E70XX ELECTRODES FOR SMAW PROCESS AND E7XT-XX ELECTRODES FOR FCAW PROCESS, UNO.

WELD NOTES

1. ALL WELDING SHALL BE DONE IN ACCORDANCE WITH AWS D1.1/D1.1M, "STRUCTURAL WELDING CODE-STEEL" (LATEST EDITION).

2. CONTRACTOR IS RESPONSIBLE FOR COMMISSIONING A THIRD PARTY CERTIFIED WELD INSPECTOR (CWI) THROUGHOUT THE ENTIRETY OF THE PROJECT. A PASSING CWI REPORT SHALL BE PROVIDED TO THE ENGINEER UPON COMPLETION OF THE PROJECT.

3. WELDING CERTIFICATES MUST BE PROVIDED TO CWI AND GPD GROUP PRIOR TO WELDING. CONTRACTOR BEGINNING WORK ON SITE CERTIFICATE WILL BE ASKED FOR AS PART OF INSPECTION PROCESS. ALL WELDING SHOULD BE PERFORMED BY AN AWS QUALIFIED WELDER WHO HAS EXPERIENCE WITH GALVANIZED SURFACES AND IN ACCORDANCE WITH ANSI/AWS D1.1 AND ANSI Z 49.1 OR LATEST EDITIONS.

4. FOR ALL WELDING, USE E70XX ELECTRODES FOR SMAW PROCESS AND E7XT-XX ELECTRODES FOR FCAW PROCESS, UNO.

5. OXY FUEL GAS WELDING OR BRAZING IS STRICTLY PROHIBITED. SPECIFICALLY, NO TORCH CUTTING IS PERMITTED ON SITE. ALL HOLES SHALL BE CUT WITH A GRINDER.

6. INSTALL 3000° (NFPA 701) FIRE BLANKET AROUND ALL COAX AT AND BELOW EACH WELDING PROCEDURE AND ELEVATION. COAX IS FLAMMABLE AND CAN CATCH FIRE IF PROPER PRECAUTIONS ARE NOT MADE TO SHIELD COAX FROM ALL WELDING PROCEDURES. IN ADDITION, COAX SHALL BE PUSHED AWAY FROM TOWER FACE WHERE WELDING IS BEING PERFORMED.

7. CONTRACTOR SHALL EXERCISE CAUTION WHEN WELDING ON A GALVANIZED SURFACE. ADDITIONAL SPLATTER AND SPARKS SHALL BE ANTICIPATED GIVEN THE PREVIOUSLY GALV. SURFACE. IF THE WELD MATERIAL IS CONTAMINATED WITH ZINC IT DOES NOT PROVIDE A STRUCTURAL WELD. FUMES CREATED FROM WELDING ON A PREVIOUSLY GALV. SURFACE CAN BE HAZARDOUS. PRIOR TO WELDING, ALL SURFACES SHALL BE PROPERLY GROUND TO REMOVE GALVANIZING, SCALE, SLAG, RUST OR ANY OTHER MATERIAL TO PREVENT PROPER WELDING.

8. ALL FIELD WELDS SHALL BE TOUCHED UP WITH TWO COATS OF COLD GALVANIZED PAINT (ZRC OR APPROVED EQUIVALENT), INCLUDING THE INTERIOR OF MONOPOLE SHAFTS. WHERE ACCESS PERMITS, IN ANY AREAS AFFECTED BY ANY WELDING. PHOTO DOCUMENTATION IS REQUIRED TO BE SUBMITTED TO THE PM INSPECTOR.

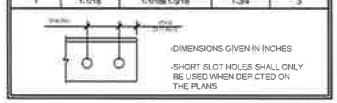
9. WATER SHALL BE ON SITE, OF ADEQUATE AMOUNT, AND AVAILABLE AT SHORT NOTICE AT ALL TIMES DURING WELDING ACTIVITY. A MINIMUM OF 500 GAL. OF WATER SHALL BE PROVIDED. WATER SHALL BE CAPABLE OF REACHING HEIGHT WHERE WELDING IS BEING PERFORMED. IN ADDITION, A MINIMUM OF SIX (6) 1D LB. CLASS ABC MULTIPURPOSE FIRE EXTINGUISHERS FULLY CHARGED AND CAPABLE OF DISCHARGE WITHIN 30 SECONDS OF DETECTING A FIRE SHALL BE PROVIDED. FIRE EXTINGUISHERS SHALL BE STRATEGICALLY LOCATED AROUND COMPOUND AND IN THE AIR (I.E. ON THE MAN LIFT WHERE WELDING IS BEING PERFORMED).

10. CLEAN OUT ALL DEBRIS THROUGHOUT TOWER AND STRUCTURE BASE PRIOR TO WELDING.

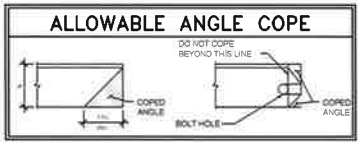
11. THE CONTRACTOR SHALL TAKE COOLING EFFECTS OF THE WELDED MATERIAL INTO CONSIDERATION (I.E. EXPANSION OF HOT MATERIAL AND CONTRACTION OF COOLED MATERIAL).

BOLT SCHEDULE

BOLT DIAMETER	STANDARD HOLE	SHORT SLOT	MIN. EDGE DISTANCE	SPACING
1/2	9/16	9/16x11/16	7/8	1-1/2
5/8	11/16	11/16x15/16	1-1/8	1-7/8
3/4	13/16	13/16x1	1-1/4	2-1/4
7/8	15/16	15/16x1-1/8	1-1/2	2-5/8
1	1-1/16	1-1/16x1-5/16	1-3/4	3



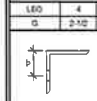
ALLOWABLE ANGLE COPE



1. ALL DIMENSIONS REPRESENTED IN THE ABOVE TABLES ARE AISC MINIMUM REQUIREMENTS. CONTRACTOR SHALL VERIFY EXISTING CONDITIONS IN FIELD AND NOTIFY ENGINEER IF DISTANCES ARE LESS THAN THOSE PROVIDED.
2. THE DIMENSIONS PROVIDED ARE MINIMUM REQUIREMENTS. ACTUAL DIMENSIONS OF PROPOSED MEMBERS WITHIN THESE DRAWINGS MAY VARY FROM THE AISC MINIMUM REQUIREMENTS.

WORKABLE GAGES

LEG	4	3-1/2	3	2-1/2	2	1-3/4
G	2-1/2	2	1-3/4	1-3/8	1-1/8	1



-DIMENSIONS GIVEN IN INCHES
-MATCH EXISTING WHEN APPLICABLE

REGISTERED PROFESSIONAL ENGINEER
JOHN N. KABAK
STATE OF CALIFORNIA
10/8/15

GPD Engineering and Architecture Professional Corporation
170 South Main Street
Akron, Ohio 44311
330.572.7100 Fax 330.572.2020

CTI TOWERS
CLINTON
SITE #: 11201
DESIGN DRAWINGS PREPARED FOR:

REV	DATE	DESCRIPTION

CLINTON
21 E MAIN STREET
CLINTON, CT 06413

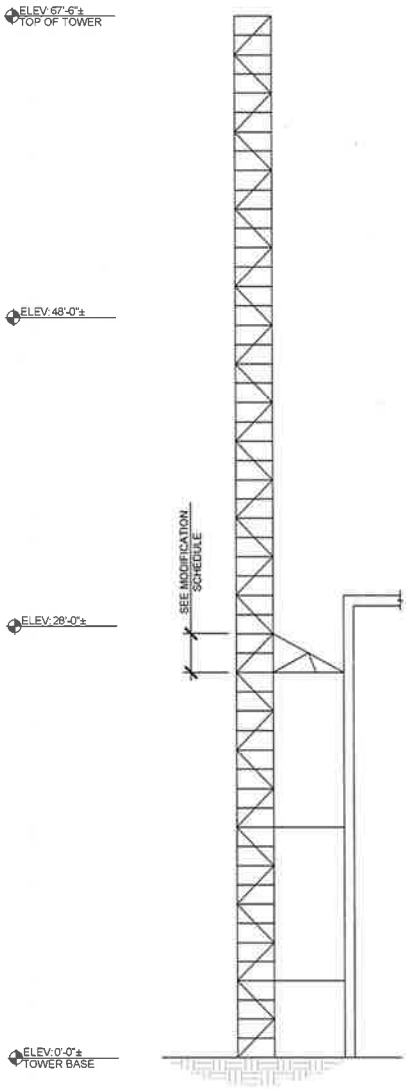
PROJECT NOTES

ISSUED FOR:	
PERMIT	10/8/2015
BID	-
CONSTRUCTION	-
RECORD	-

ENGINEER	DESIGNER
MM	RR
PROJECT MANAGER	APPROVED BY
BPS	CJS

JOB NO. 2015783.11201.0

N-01



TOWER ELEVATION

N.T.S

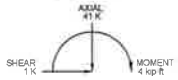
ELEV: 67'-0"±
SECTOR LOADING

ELEV: 60'-0"±
PIPE MOUNT

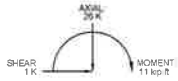
NOTE: FOR FULL ANTENNA CONFIGURATION SEE ASSOCIATED PASSING ANALYSIS.

MAX. CORNER REACTIONS AT BASE

DOWN	8 K
SHEAR	2 K
UPLIFT	-12 K
SHEAR	3 K



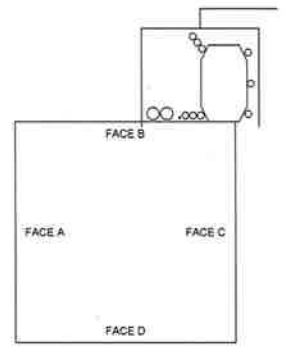
TORQUE = 2 kip-ft
37 MPH WIND - 0.750 IN. ICE



TORQUE = 3 kip-ft
REACTIONS - 85 mph WIND

MODIFICATION SCHEDULE

MEMBER TYPE	ELEVATION	EXISTING MEMBER	NEW MEMBER	REFERENCE DETAIL	NOTES
DIAGONALS	25'-0" ± TO 27'-6" ±	L1-1/2x1/2x1/8	L2x2x1/8	1/S-02	REMOVE EXISTING DIAGONAL MEMBER AND REPLACE WITH NEW LARGER SIZE MEMBER
WALL MOUNT BRACING	25'-0" ± TO 27'-6" ±	VARIES	L2x2x1/4	1/S-02	INSTALL NEW BRACING TO THE EXISTING WALL MOUNT
WALL MOUNT BRACING STITCH BOLTS	25'-0" ±	VARIES	1/2"Ø A325 BOLTS	6/S-02	INSTALL NEW STITCH BOLTS TO THE EXISTING WALL MOUNT HORIZONTAL BRACING



TILTON

COAX LAYOUT

N.T.S

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CTI TOWERS

CLINTON
SITE #: 11201

DESIGN DRAWINGS PREPARED FOR:

REV.	DATE	DESCRIPTION

CLINTON
21 E MAIN STREET
CLINTON, CT 06413

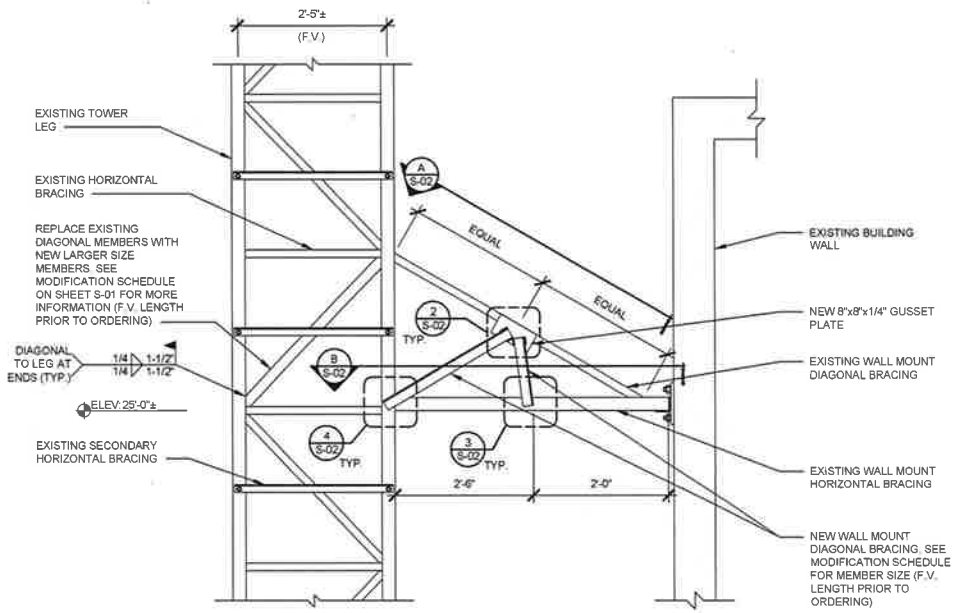
TOWER ELEVATION & MODIFICATION SCHEDULE

ISSUED FOR:	
PERMIT	10/8/2015
BID	-
CONSTRUCTION	-
RECORD	-

ENGINEER	DESIGNER
MM	RR
PROJECT MANAGER	APPROVED BY
BPS	CJS

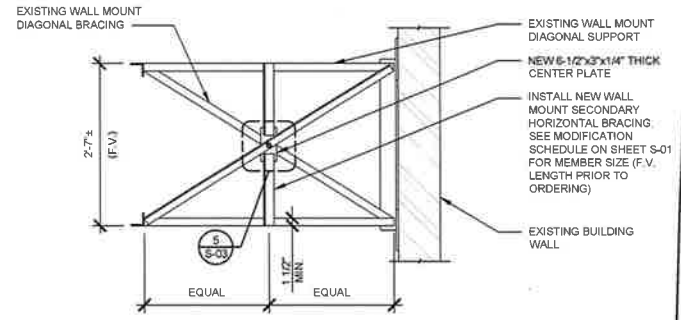
JOB NO
2015783.11201.01

S-01

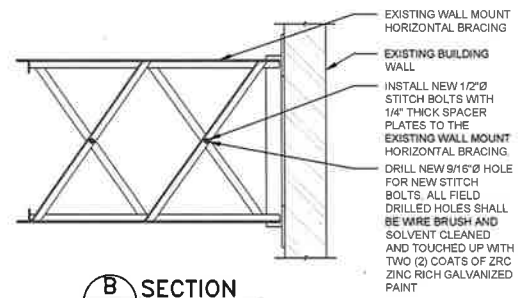


1 ELEVATION
S-02 SCALE: 1/2"=1'-0"

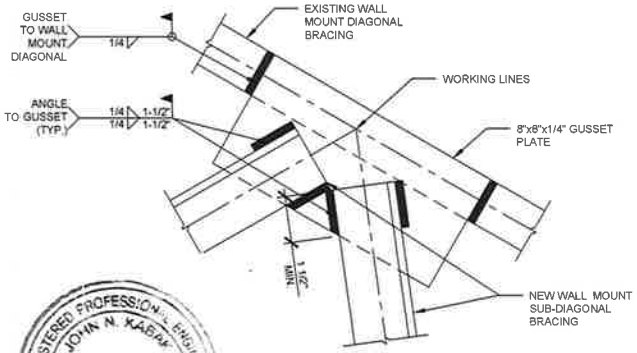
NOTES:
1. CONTRACTOR SHALL TAKE CARE NOT TO DAMAGE TOWER LEG DURING REMOVAL OF EXISTING DIAGONAL MEMBER.



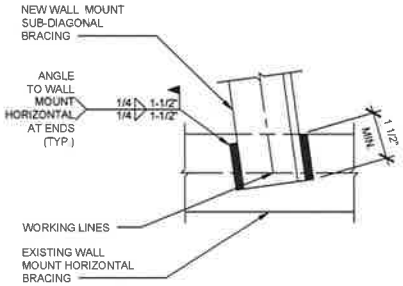
A SECTION
S-02 SCALE: 1/2"=1'-0"



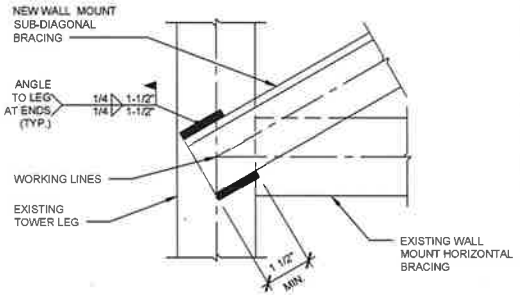
B SECTION
S-02 SCALE: 1/2"=1'-0"



2 DETAIL
S-02 SCALE: 3"=1'-0"



3 DETAIL
S-02 SCALE: 3"=1'-0"



4 DETAIL
S-02 SCALE: 3"=1'-0"

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CTI TOWERS
CLINTON
SITE #: 11201
DESIGN DRAWINGS PREPARED FOR:

REV	DATE	DESCRIPTION

CLINTON
21 E MAIN STREET
CLINTON, CT 06413

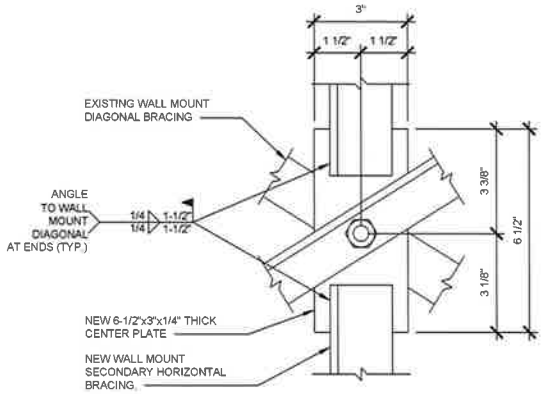
MODIFICATION DETAILS & SECTIONS

ISSUED FOR	
PERMIT	10/8/2015
BID	-
CONSTRUCTION	-
RECORD	-

ENGINEER	DESIGNER
MM	RR
PROJECT MANAGER	APPROVED BY
SPS	CJS

JOB NO.
2015783.11201.01

S-02



5 / S-03 **DETAIL**

SCALE: 3"=1'-0"

GPD Engineering and Architecture Professional Corporation

CTI TOWERS

CLINTON
SITE #: 11201

DESIGN DRAWINGS PREPARED FOR:

REV	DATE	DESCRIPTION

CLINTON
21 E MAIN STREET
CLINTON, CT 06413

ADDITIONAL DETAILS

ISSUED FOR:	
PERMIT	10/8/2015
BID	-
CONSTRUCTION	-
RECORD	-

ENGINEER	DESIGNER
MM	RR
PROJECT MANAGER	APPROVED BY
BFS	CJS

JOB NO
2015783.11201.01

S-03

NOTE: X DENOTES A DOCUMENT NEEDED FOR THE MODIFICATION INSPECTION REPORT
- DENOTES A DOCUMENT THAT IS NOT REQUIRED FOR THE MODIFICATION INSPECTION REPORT

STANDARD MODIFICATION DOCUMENTATION REQUIREMENTS

CONSTRUCTION PROCESS			REPORT ITEM	STAMPED REPORT REQUIRED
BEFORE	DURING	AFTER		
X	-	-	• SHOP DRAWINGS	
X	-	-	• MATERIAL TEST REPORT (ALL MODIFICATION MATERIALS)	
X	-	-	• PACKING SLIPS	
			• PHOTOS:	
X	-	-	• PRE-CONSTRUCTION PHOTOS (COMPOUND, ACCESS DRIVE, ROAD ENTRANCE, TOWER)	
-	X	-	• DURING CONSTRUCTION	
-	-	X	• POST CONSTRUCTION	
-	-	-	• BASE PLATE GROUT VERIFICATION	
-	-	X	• ON SITE COLD GALVANIZING VERIFICATION	
-	-	X	• GC AS-BUILT DRAWINGS	
-	-	X	• LIEN RELEASE (GPD SERVICES ONLY)	

WELDING REQUIREMENTS: FABRICATION & ONSITE

CONSTRUCTION PROCESS			REPORT ITEM	STAMPED REPORT REQUIRED
BEFORE	DURING	AFTER		
-	X	-	• NDT - ALL FULL PEN OR WELDS >5/16"	AWS
-	-	X	• VISUAL INSPECTION IN ACCORDANCE WITH ANSI/AWS D1.1	AWS
X	-	-	• FABRICATOR CERTIFIED WELD INSPECTION	
-	-	-	• NDT - MONOPOLE EXISTING PERIMETER BASE WELD	AWS
X	X	X	• ELECTRODE VERIFICATION - ONSITE PHOTO OF ELECTRODE STRENGTH	
X	-	-	• WELDER'S CERTIFICATIONS	
-	-	X	• 3RD PARTY CERTIFIED WELD INSPECTORS REPORT	AWS

MODIFICATION INSPECTION NOTES:

GENERAL NOTES

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

2. THE MODIFICATION INSPECTION IS TO CONFIRM INSTALLATION CONFIGURATION AND WORKMANSHIP ONLY AND IS NOT A REVIEW OF THE MODIFICATION DESIGN ITSELF, NOR DOES THE MODIFICATION INSPECTOR TAKE OWNERSHIP OF THE MODIFICATION DESIGN. OWNERSHIP OF THE STRUCTURAL MODIFICATION DESIGN EFFECTIVENESS AND INTENT RESIDES WITH THE ENGINEER OF RECORD AT ALL TIMES.

3. TO ENSURE THAT THE REQUIREMENTS OF THE MODIFICATION INSPECTION ARE MET, IT IS **VITAL THAT THE GENERAL CONTRACTOR** (GC) AND THE MODIFICATION INSPECTOR BEGIN **COMMUNICATING AND COORDINATING AS** SOON AS A PO OR PAYMENT IS RECEIVED. IT IS EXPECTED THAT EACH PARTY WILL BE PROACTIVE IN REACHING OUT TO THE OTHER PARTY. CONTACT LISTED ON THE TITLE SHEET SHALL BE CONTACTED IF SPECIFIC INSPECTOR CONTACT INFORMATION IS NOT KNOWN.

MODIFICATION INSPECTOR

1. THE MODIFICATION INSPECTOR IS REQUIRED TO CONTACT THE GC AS SOON AS RECEIVING A PO OR PAYMENT FOR THE MODIFICATION INSPECTION TO:

   - REVIEW THE REQUIREMENTS OF THE MODIFICATION INSPECTION CHECKLIST
   - WORK WITH THE GC TO DEVELOP A SCHEDULE TO CONDUCT ON-SITE INSPECTIONS, INCLUDING FOUNDATION INSPECTIONS
   - DISCUSS ANY SITE SPECIFIC INSPECTIONS OR CONCERNS

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

GENERAL CONTRACTOR

1. THE GC IS REQUIRED TO CONTACT THE MODIFICATION INSPECTOR AS SOON AS RECEIVING A PO OR PAYMENT FOR THE MODIFICATION INSTALLATION OR TURNKEY PROJECT TO:

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

2. **THE GC SHALL PERFORM AND RECORD THE TEST AND INSPECTION RESULTS IN** ACCORDANCE WITH THE REQUIREMENTS OF THE MODIFICATION INSPECTION CHECKLIST.

RECOMMENDATIONS

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

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

CANCELLATION OR DELAYS

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

FAILING INSPECTION CORRECTIONS

1. IF THE MODIFICATION INSTALLATION WOULD FAIL THE MODIFICATION INSPECTION ("FAILED MODIFICATION INSPECTION"), THE GC SHALL WORK WITH MODIFICATION INSPECTOR TO **COORDINATE A REMEDIATION PLAN IN ONE OF TWO WAYS:**

   - CORRECT FAILING ISSUES TO COMPLY WITH THE SPECIFICATIONS CONTAINED IN THE ORIGINAL CONTRACT DOCUMENTS AND COORDINATE A SUPPLEMENT MODIFICATION INSPECTION.
   - OR, WITH TOWER OWNER'S APPROVAL, THE GC MAY WORK WITH THE ENGINEER OF RECORD TO RE-ANALYZE THE **MODIFICATION/REINFORCEMENT USING THE** AS-BUILT CONDITION.

VERIFICATION INSPECTIONS

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

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

REQUIRED PHOTOS

1. BETWEEN THE GC AND THE MI INSPECTOR THE FOLLOWING PHOTOGRAPHS ARE TO BE TAKEN AND INCLUDED IN THE MODIFICATION INSPECTION REPORT:

   - PRE-CONSTRUCTION GENERAL SITE CONDITION
   - PHOTOGRAPHS DURING THE REINFORCEMENT MODIFICATION CONSTRUCTION/ERECTION AND INSPECTION:
     - RAW MATERIALS
     - PHOTOS OF ALL CRITICAL DETAILS
     - FOUNDATION MODIFICATIONS
     - WELD PREPARATION
     - BOLT INSTALLATION AND TORQUE
     - **FINAL INSTALLED CONDITION**
     - SURFACE COATING REPAIR
   - POST CONSTRUCTION PHOTOGRAPHS:
     - **FINAL INFIELD CONDITION**
   - ANY OTHER PHOTOS DEEMED RELEVANT TO SHOW COMPLETE DETAILS OF MODIFICATIONS.

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

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10/8/15

GPD Engineering and Architecture Professional Corporation

CTI TOWERS

CLINTON
SITE #: 11201

DESIGN DRAWINGS PREPARED FOR:

REV	DATE	DESCRIPTION

CLINTON
21 E MAIN STREET
CLINTON, CT 06413

MODIFICATION INSPECTION CHECKLIST

ISSUED FOR:	
PERMIT	10/8/2015
BID	-
CONSTRUCTION	-
RECORD	-

ENGINEER	DESIGNER
MM	RR
PROJECT MANAGER	APPROVED BY
BPS	CJE

JOB NO.
2015783.11201.01

MI-01

ATTACHMENT 5

HMB

HMB Acoustics LLC 3 Cherry Tree Lane, Avon, CT 06001 860-677-5955

Noise Evaluation Report

Verizon Wireless Communications Facility
Clinton 2
21 East Main Street
Clinton, CT

December 14, 2015

Prepared For:
Harry M. Rocheville, EIT
Civil Engineer
Centek Engineering Inc.
63-2 North Branford Road
Branford, CT

Prepared By:
Allan Smardin
HMB Acoustics LLC
3 Cherry Tree Lane
Avon, CT

Introduction

Verizon Wireless has proposed a wireless communications facility to be located at 21 East Main Street, Clinton, CT. The proposed site will include a ground level 10 kw emergency generator in a weather protective enclosure. The area abutting the proposed generator location is in a Commercial (Business) zone. There are residences to the West and a river and wetlands to the East. There are railroad tracks to the North. The purpose of the evaluation is to determine whether the generator will comply with the allowable noise levels set forth in the State of CT Noise Regulations.

It is important to note that the emergency generator operates for approximately 15-20 minutes each week for testing. All testing is done during the daytime hours. Other than these testing periods, the generator runs only in times of emergency, when commercial power to the facility is interrupted.

This report and the State of CT Noise Regulations utilize a dBA scale. This scale is used because it closely approximates the response characteristic of the hunan ear to loudness, and is the scale most commonly used in the measurement of community noise.

Noise Regulations

The State of CT has enacted regulations which limits the amount of noise which may be transferred from one property to another. In pertinent part, the Regulations provide as follows:

Daytime hours: The hours between 7 a.m. and 10 p.m., local time.

Nighttime hours: The hours between 10 p.m. and 7 a.m., local time.

Noise Level Standards

No person in a Commercial (Business) Noise Zone shall emit noise beyond the property lines of his / her premises exceeding the levels stated herein:

Emitter Zone	Allowable Noise Levels (dBA) At a Resential Receptor Zone	
Commercial (Business)	Daytime	Nighttime
	55	45

Emitter Zone	Allowable Noise Levels (dBA) At a Commercial (Business) Receptor Zone	
Commercial (Business)	Daytime	Nighttime
	62	62

Noise Evaluation Results

Nearest Property Line

North = 44 dBA (railroad tracks)

South = 39 dBA (commercial / business)

East = 45 dBA (commercial / business and the river and wetlands)

West = 43 dBA (residences and commercial / business)

The dBA levels take into account the effect of acoustical shielding provided by other structures on the premises. The calculated noise data demonstrates that the noise levels, from the proposed emergency generator, meet the conditions for compliance as

set forth in the State of CT Noise Regulations when projected to the nearest residential and commercial property lines.

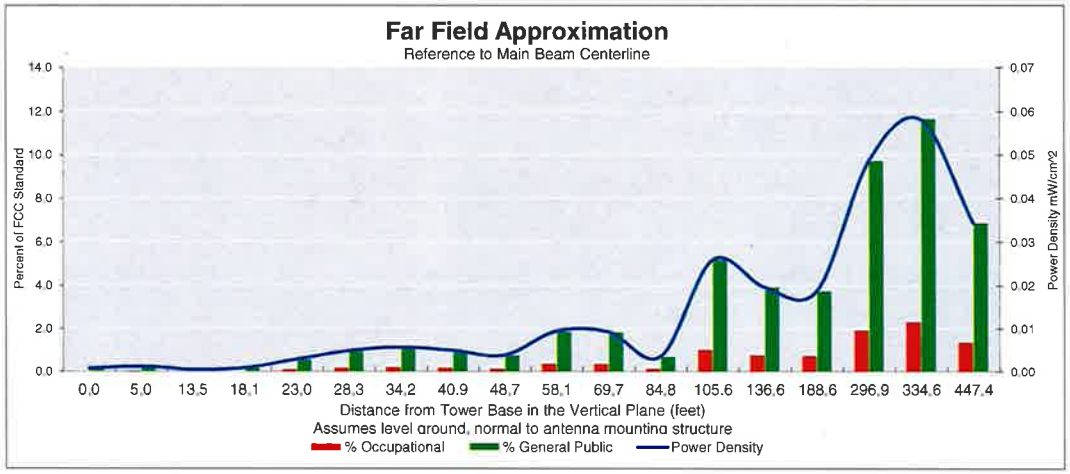
ATTACHMENT 6

Far Field Approximation
with downtilt variation

Estimated Radiated Emission
Single Emitter Far Field Model
Dipole/Wire/Yagi Antenna Types

Location:	**CLINTON 2 CT**
Site #:	2-0541
Date:	11/16/15
Name:	Jaime Laredo
File Name:	CLINTON 2 CT - FF POWER (LTE-700).xlsx

Operating Freq. (MHz):	**746.0**
Antenna Height (ft):	**50.0**
Antenna Gain (dBi):	**14.8**
Antenna Size (in.):	**72.0**
Downtilt (degrees):	**4.0**
Feedline Loss (dB):	**0.0**
ERP (W):	**1047.8**
No. of Channels:	**1**



Calc Angle	90.0	84.0	74.0	69.0	64.0	59.0	54.0	49.0	44.0	39.0	34.0	29.0	24.0	19.0	14.0	9.0	8.0	6.0
Solve for r, dx to antenna	47.0	47.3	48.9	50.4	52.3	54.8	58.1	62.3	67.7	74.7	84.1	97.0	115.6	144.4	194.4	300.6	337.9	449.9
Distance from Antenna Structure Base in Horizontal plane	0.0	5.0	13.5	18.1	23.0	28.3	34.2	40.9	48.7	58.1	69.7	84.8	105.6	136.6	188.6	296.9	334.6	447.4
Angle from Main Beam (reference to horizontal plane)	90	80	70	65	60	55	50	45	40	35	30	25	20	15	10	5	4	2
dB down from centerline (referenced to centerline)	36.76	34.35	38.52	35.34	29.54	26.8	25.59	25.63	25.99	21.21	20.29	23.24	13.03	12.3	9.92	2	0.2	0
Reflection Coefficient (1 to 4, 2.56 typical)	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56
Power Density (mW/cm^2)	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.01	0.01	0.00	0.03	0.02	0.02	0.05	0.06	0.03
Percent of Occupational Standard	0.0	0.0	0.0	0.0	0.1	0.2	0.2	0.2	0.2	0.4	0.4	0.1	1.0	0.8	0.8	1.9	2.3	1.4
Percent of General Population Standard	0.1	0.2	0.1	0.2	0.6	1.0	1.1	1.0	0.8	1.9	1.8	0.7	5.2	3.9	3.8	9.7	11.7	6.9

Antenna Type: **SBNHH-1D65B**

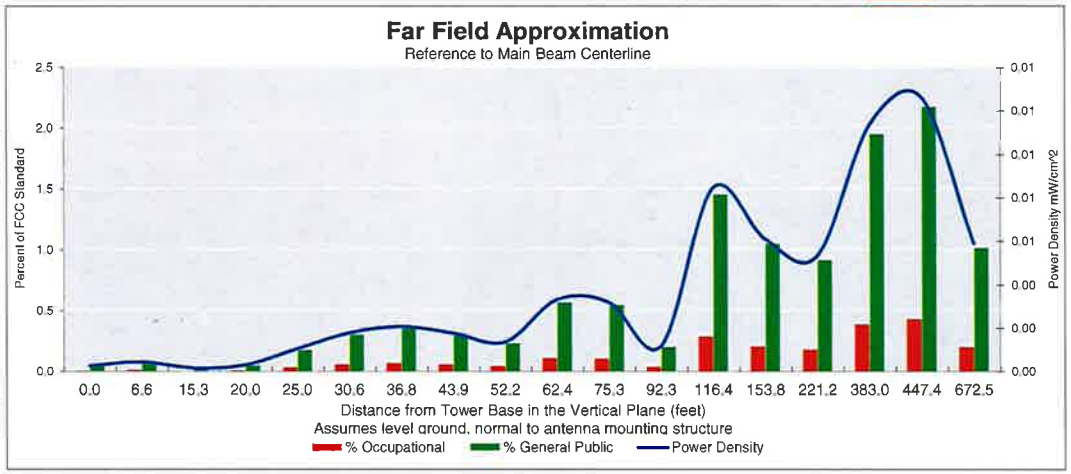
Max%: **11.68%**

Far Field Approximation
with downtilt variation

Estimated Radiated Emission
Single Emitter Far Field Model
Dipole/Wire/Yagi Antenna Types

Location:	**CLINTON 2 CT**
Site #:	2-0541
Date:	11/16/15
Name:	Jaime Laredo
File Name:	CLINTON 2 CT - FF POWER (Cellular).xlsx

Operating Freq. (MHz):	**869.0**
Antenna Height (ft):	**50.0**
Antenna Gain (dBi):	**15.5**
Antenna Size (in.):	**72.0**
Downtilt (degrees):	**2.0**
Feedline Loss (dB):	**0.0**
ERP (W):	**342.6**
No. of Channels:	**9**



Calc Angle	90.0	82.0	72.0	67.0	62.0	57.0	52.0	47.0	42.0	37.0	32.0	27.0	22.0	17.0	12.0	7.0	6.0	4.0
Solve for r, dx to antenna	47.0	47.5	49.4	51.1	53.2	56.1	59.7	64.3	70.3	78.1	88.7	103.6	125.5	160.8	226.2	385.9	449.9	674.1
Distance from Antenna Structure Base in Horizontal plane	0.0	6.6	15.3	20.0	25.0	30.6	36.8	43.9	52.2	62.4	75.3	92.3	116.4	153.8	221.2	383.0	447.4	672.5
Angle from Main Beam (reference to horizontal plane)	90	80	70	65	60	55	50	45	40	35	30	25	20	15	10	5	4	2
dB down from centerline (referenced to centerline)	36.76	34.35	38.52	35.34	29.54	26.8	25.59	25.63	25.99	21.21	20.29	23.24	13.03	12.3	9.92	2	0.2	0
Reflection Coefficient (1 to 4, 2.56 typical)	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56
Power Density (mW/cm^2)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01
Percent of Occupational Standard	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.1	0.1	0.0	0.3	0.2	0.2	0.4	0.4	0.2
Percent of General Population Standard	0.0	0.1	0.0	0.1	0.2	0.3	0.4	0.3	0.2	0.6	0.5	0.2	1.5	1.1	0.9	2.0	2.2	1.0

Antenna Type: **SBNHH-1D65B**

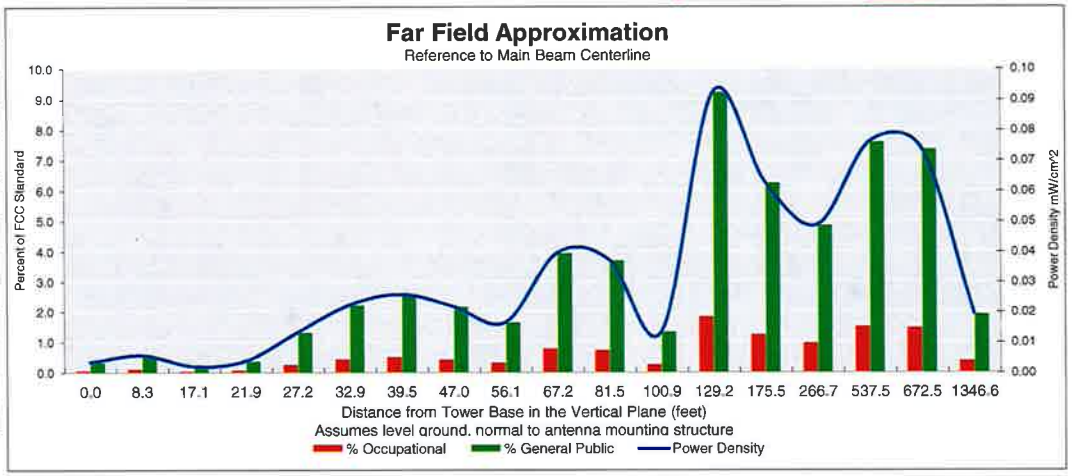
Max%: **2.18%**

Far Field Approximation
with downtilt variation

Estimated Radiated Emission
Single Emitter Far Field Model
Dipole/Wire/Yagi Antenna Types

Location:	**CLINTON 2 CT**
Site #:	2-0541
Date:	11/16/15
Name:	Jaime Laredo
File Name:	CLINTON 2 CT - FF POWER (PCS).xlsx

Operating Freq. (MHz):	**1970.0**
Antenna Height (ft):	**50.0**
Antenna Gain (dBi):	**18.4**
Antenna Size (in.):	**72.0**
Downtilt (degrees):	**0.0**
Feedline Loss (dB):	**0.0**
ERP (W):	**2333.2**
No. of Channels:	**1**



Calc Angle	90.0	80.0	70.0	65.0	60.0	55.0	50.0	45.0	40.0	35.0	30.0	25.0	20.0	15.0	10.0	5.0	4.0	2.0
Solve for r, dx to antenna	47.0	47.7	50.0	51.9	54.3	57.4	61.4	66.5	73.1	82.0	94.0	111.3	137.5	181.7	270.8	539.5	674.1	1347.4
Distance from Antenna Structure Base in Horizontal plane	0.0	8.3	17.1	21.9	27.2	32.9	39.5	47.0	56.1	67.2	81.5	100.9	129.2	175.5	266.7	537.5	672.5	1346.6
Angle from Main Beam (reference to horizontal plane)	90	80	70	65	60	55	50	45	40	35	30	25	20	15	10	5	4	2
dB down from centerline (referenced to centerline)	36.76	34.35	38.52	35.34	29.54	26.8	25.59	25.63	25.99	21.21	20.29	23.24	13.03	12.3	9.92	2	0.2	0
Reflection Coefficient (1 to 4, 2.56 typical)	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56
Power Density (mW/cm^2)	0.00	0.01	0.00	0.00	0.01	0.02	0.03	0.02	0.02	0.04	0.04	0.01	0.09	0.06	0.05	0.08	0.07	0.02
Percent of Occupational Standard	0.1	0.1	0.0	0.1	0.3	0.4	0.5	0.4	0.3	0.8	0.7	0.3	1.8	1.3	1.0	1.5	1.5	0.4
Percent of General Population Standard	0.3	0.6	0.2	0.4	1.3	2.2	2.6	2.2	1.7	4.0	3.7	1.3	9.2	6.3	4.9	7.6	7.4	1.9

Antenna Type: **SBNHH-1D65B**

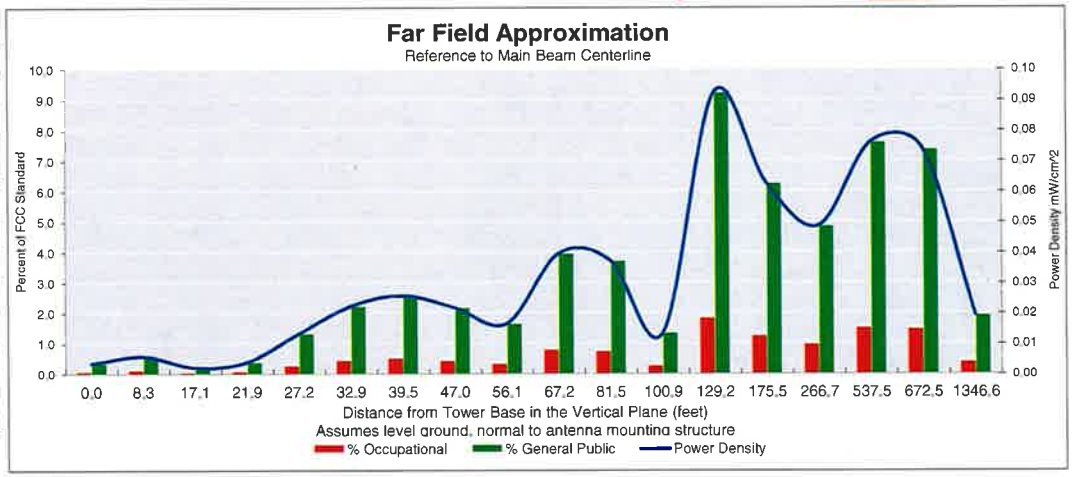
Max%: **9.24%**

Far Field Approximation
with downtilt variation

Estimated Radiated Emission
Single Emitter Far Field Model
Dipole/Wire/Yagi Antenna Types

Location:	CLINTON 2 CT
Site #:	2-0541
Date:	11/16/15
Name:	Jaime Laredo
File Name:	CLINTON 2 CT - FF POWER (LTE-AWS).xlsx

Operating Freq. (MHz):	**2145.0**
Antenna Height (ft):	**50.0**
Antenna Gain (dBi):	**18.4**
Antenna Size (in.):	**72.0**
Downtilt (degrees):	**0.0**
Feedline Loss (dB):	**0.0**
ERP (W):	**2333.2**
No. of Channels:	**1**



Calc Angle	90.0	80.0	70.0	65.0	60.0	55.0	50.0	45.0	40.0	35.0	30.0	25.0	20.0	15.0	10.0	5.0	4.0	2.0
Solve for r, dx to antenna	47.0	47.7	50.0	51.9	54.3	57.4	61.4	66.5	73.1	82.0	94.0	111.3	137.5	181.7	270.8	539.5	674.1	1347.4
Distance from Antenna Structure Base in Horizontal plane	0.0	8.3	17.1	21.9	27.2	32.9	39.5	47.0	56.1	67.2	81.5	100.9	129.2	175.5	266.7	537.5	672.5	1346.6
Angle from Main Beam (reference to horizontal plane)	90	80	70	65	60	55	50	45	40	35	30	25	20	15	10	5	4	2
dB down from centerline (referenced to centerline)	36.76	34.35	38.52	35.34	29.54	26.8	25.59	25.63	25.99	21.21	20.29	23.24	13.03	12.3	9.92	2	0.2	0
Reflection Coefficient (1 to 4, 2.56 typical)	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56
Power Density (mW/cm^2)	0.00	0.01	0.00	0.00	0.01	0.02	0.03	0.02	0.02	0.04	0.04	0.01	0.09	0.06	0.05	0.08	0.07	0.02
Percent of Occupational Standard	0.1	0.1	0.0	0.1	0.3	0.4	0.5	0.4	0.3	0.8	0.7	0.3	1.8	1.3	1.0	1.5	1.5	0.4
Percent of General Population Standard	0.3	0.6	0.2	0.4	1.3	2.2	2.6	2.2	1.7	4.0	3.7	1.3	9.2	6.3	4.9	7.6	7.4	1.9

Antenna Type: **SBNHH-1D65B**

Max%: **9.24%**