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KENNETH C. BALDWIN

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Also admitted in Massachusetts
and New York

March 2, 2020

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

Re: **Notice of Exempt Modification – Facility Modification**
5 Perryridge Road, Greenwich, Connecticut

Dear Attorney Bachman:

Cellco Partnership d/b/a Verizon Wireless ("Cellco") currently maintains fifteen (15) antennas at the 124-foot level on the existing 164-foot tower on the grounds at Greenwich Hospital, 5 Perryridge Road in Greenwich, Connecticut (the "Property"). The Property and tower are owned by Greenwich Hospital. The Siting Council approved Cellco's Greenwich Hospital facility in 1987 in Docket No. 73, and approved Cellco's shared use of the tower in 2002 (TS-VER-057-020919). A copy of the Council's Docket No. 73 Decision and Order and tower share approval are included in Attachment 1.

Cellco now intends to modify its facility by replacing nine (9) of its existing antennas with nine (9) new antennas, removing twelve (12) remote radio heads ("RRHs") and installing nine (9) newer model RRHs. The existing antenna mounts will be replaced as part of these proposed facility modifications. A set of project plans showing the proposed facility modifications and specifications for Cellco's antennas and RRHs are included in Attachment 2.

Please accept this letter as notification pursuant to R.C.S.A. § 16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to Greenwich's First Selectman, Fred Camillo; Katie DeLuca, Greenwich's Director of Planning and Zoning; and Greenwich Hospital, the tower and Property owner.

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

1. The proposed modifications will not result in an increase in the height of the

existing tower. Cellco's replacement antennas will be installed at the 124-foot level on the 164-foot tower.

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

3. The proposed modifications will not increase noise levels at the facility by six decibels or more, or to levels that exceed state and local criteria.

4. The installation of new antennas will not increase radio frequency (RF) emissions at the facility to a level at or above the Federal Communications Commission (FCC) safety standard. A cumulative General Power Density table for the modified facility is included in Attachment 3.

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

6. The tower, its foundation and new antenna mounts can support Cellco's proposed facility modifications. (*See* Structural Analysis Report included in Attachment 4 and Mount Structural Analysis Report included in Attachment 5).

A copy of the parcel map and Property owner information is included in Attachment 6. A Certificate of Mailing verifying that this filing was sent to municipal officials and the owner of the Property is included in Attachment 7.

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

Sincerely,

Kenneth C. Baldwin

Enclosures
Copy to:
Fred Camillo, Greenwich First Selectman
Katie DeLuca, Greenwich Director of Planning and Zoning
Greenwich Hospital
Tim Parks

ATTACHMENT 1

DOCKET NO. 73

AN APPLICATION OF METRO MOBILE CTS OF FAIRFIELD COUNTY, INC., FOR CERTIFICATES OF ENVIRONMENTAL COMPATIBILITY AND PUBLIC NEED FOR THE CONSTRUCTION, MAINTENANCE, AND OPERATION OF THREE FACILITIES CONSISTING OF TELECOMMUNICATIONS TOWERS AND ASSOCIATED EQUIPMENT FOR THE PURPOSE OF PROVIDING DOMESTIC PUBLIC CELLULAR RADIO TELECOMMUNICATIONS SERVICE IN THE TOWN OF GREENWICH AND IN THE CITIES OF NORWALK AND STAMFORD, CONNECTICUT.	:	CONNECTICUT SITING COUNCIL
	:	April 1, 1987

D E C I S I O N A N D O R D E R

Pursuant to the foregoing opinion, the Connecticut Siting Council (Council) hereby directs that a Certificate of Environmental Compatibility and Public Need, as provided by Section 16-50k of the General Statutes of Connecticut (CGS), be issued to Metro Mobile CTS of Fairfield County, Inc., for the construction, operation, and maintenance of cellular mobile telecommunications equipment in the Town of Greenwich, and the Cities of Norwalk and Stamford, Connecticut.

The facilities shall be constructed, operated, and maintained as specified in the Council's record on this matter, and subject to the following conditions.

1. The Norwalk tower, including antennas, shall be no taller than necessary to provide the proposed service, and in no event shall exceed 193 feet.
2. A fence not lower than eight feet shall surround the Norwalk tower.
3. Unless necessary to comply with condition number four, below, no lights shall be installed on the Norwalk tower.
4. The facilities shall be constructed in accordance with all applicable federal, state, and municipal laws and regulations.

5. The certificate holder shall prepare a development and management (D&M) plan for the Norwalk site in compliance with sections 16-50j-75 through 16-50j-77 of the Regulations of State Agencies. The D&M plan shall provide for evergreen screening around the perimeter of the fence at this site, and for other landscaping to improve the appearance of the facility.
6. The receive antennas at the Greenwich and Stamford sites shall be mounted below the high points of the facades of their respective buildings to minimize their visibility.
7. No construction activities shall take place outside the hours of 7:00 A.M. to 7:00 P.M., Monday through Saturday.
8. The certificate holder or its successor shall notify the Council if and when directional antennas or any equipment other than that listed in this application is added to these facilities.
9. The certificate holder or its successor shall permit public or private entities to share space on the Norwalk tower, for due consideration, or shall provide any requesting entity with specific legal, technical, environmental, or economic reasons precluding such tower sharing.
10. If these facilities do not provide or permanently cease to provide cellular service following completion of construction, this Decision and Order shall be void, and the tower and all associated equipment in this application shall be dismantled and removed or reapplication for any new use shall be made to the Council before any such new use is made.

11. Unless otherwise approved by the Council, this Decision and Order shall be void if all construction authorized herein is not completed within three years of the issuance of this Decision and Order, or within three years of the completion of any appeal taken in this Decision.

12. The certificate holder shall comply with any future radio frequency (RF) standards promulgated by state or federal regulatory agencies. Upon the establishment of any new governmental RF standards, the facilities granted in this Decision shall continue to be in compliance with such standards.

Pursuant to CGS section 16-50p, we hereby direct that a copy of the Decision and Order be served on each person listed below. A notice of the issuance shall be published in the Stamford Advocate, the Greenwich Times, the Norwalk Hour, and the Bridgeport Post.

The parties to the proceeding are:

Mr. Armand Mascioli (Applicant)
General Manager
Metro Mobile CTS of Fairfield
County, Inc.
5 Eversley Avenue
Norwalk, Connecticut 06855

Howard L. Slater, Esquire (its attorney)
Byrne, Slater, Sandler,
Shulman & Rouse, P.C.
330 Main Street
P.O. Box 3216
Hartford, Connecticut 06103

Richard Rubin, Esquire (its attorney)
Fleischman and Walsh, P.C.
1725 N Street, N.W.
Washington, D.C. 20036

Southern New England
Telephone Company

(its attorney)

Mr. Peter J. Tyrrell
Senior Attorney
Southern New England
Telephone Company
227 Church Street
New Haven, Connecticut 06506

C E R T I F I C A T I O N

The undersigned members of the Connecticut Siting Council hereby certify that they have heard this case or read the record thereof, and that we voted as follows:

Dated at New Britain, Connecticut, this 1st day of April, 1987.

Council Members	Vote Cast
Gloria Dibble Pond Chairperson	Yes
Commissioner John Downey Designee: Commissioner Peter G. Boucher	Yes
Acting Commissioner John Anderson Designee: Brian Emerick	Yes
Gwen L. Clark	Yes
Fred J. Doocy	Yes
Mortimer A. Gelston	Yes
James G. Horsfall	Absent
William H. Smith	Absent
Colin C. Tait	Yes

STATE OF CONNECTICUT)
: ss. New Britain, April 1, 1987
COUNTY OF HARTFORD)

I hereby certify that the foregoing is a true and correct copy of the decision and order issued by the Connecticut Siting Council, State of Connecticut.

ATTEST:

John C. Kelly
Executive Director
Connecticut Siting Council

I certify that a copy of the opinion and decision and order have been forwarded by mail to all parties of record on April 3, 1987.

ATTEST:

Robert K. Erling
Siting Analyst
Connecticut Siting Council

STATE OF CONNECTICUT

CONNECTICUT SITING COUNCIL

Ten Franklin Square, New Britain, CT 06051
Phone: (860) 827-2935 Fax: (860) 827-2950
E-Mail: siting.council@po.state.ct.us
Web Site: www.state.ct.us/csc/index.htm

October 8, 2002

Kenneth C. Baldwin
Robinson & Cole
280 Trumbull Street
Hartford, CT 06103-3597

RE: **TS-VER-057-020919** - Cellco Partnership d/b/a Verizon Wireless request for an order to approve tower sharing at a telecommunications facility at the Greenwich Hospital, 5 Perryridge Road, Greenwich, Connecticut.

Dear Attorney Baldwin:

At a public meeting held October 7, 2002, the Connecticut Siting Council (Council) ruled that the shared use of this existing tower site is technically, legally, environmentally, and economically feasible and meets public safety concerns, and therefore, in compliance with General Statutes § 16-50aa, the Council has ordered the shared use of this facility to avoid the unnecessary proliferation of tower structures. This facility has also been carefully modeled to ensure that radio frequency emissions are conservatively below State and federal standards applicable to the frequencies now used on this tower.

This decision is under the exclusive jurisdiction of the Council. Any additional change to this facility may require an explicit request to this agency pursuant to General Statutes § 16-50aa or notice pursuant to Regulations of Connecticut State Agencies Section 16-50j-73, as applicable. Such request or notice shall include all relevant information regarding the proposed change with cumulative worst-case modeling of radio frequency exposure at the closest point uncontrolled access to the tower base, consistent with Federal Communications Commission, Office of Engineering and Technology, Bulletin 65. Any deviation from this format may result in the Council implementing enforcement proceedings pursuant to General Statutes § 16-50u including, without limitation, imposition of expenses resulting from such failure and of civil penalties in an amount not less than one thousand dollars per day for each day of construction or operation in material violation.

This decision applies only to this request for tower sharing and is not applicable to any other request or construction.

The proposed shared use is to be implemented as specified in your letter dated September 19, 2002.

Thank you for your attention and cooperation.

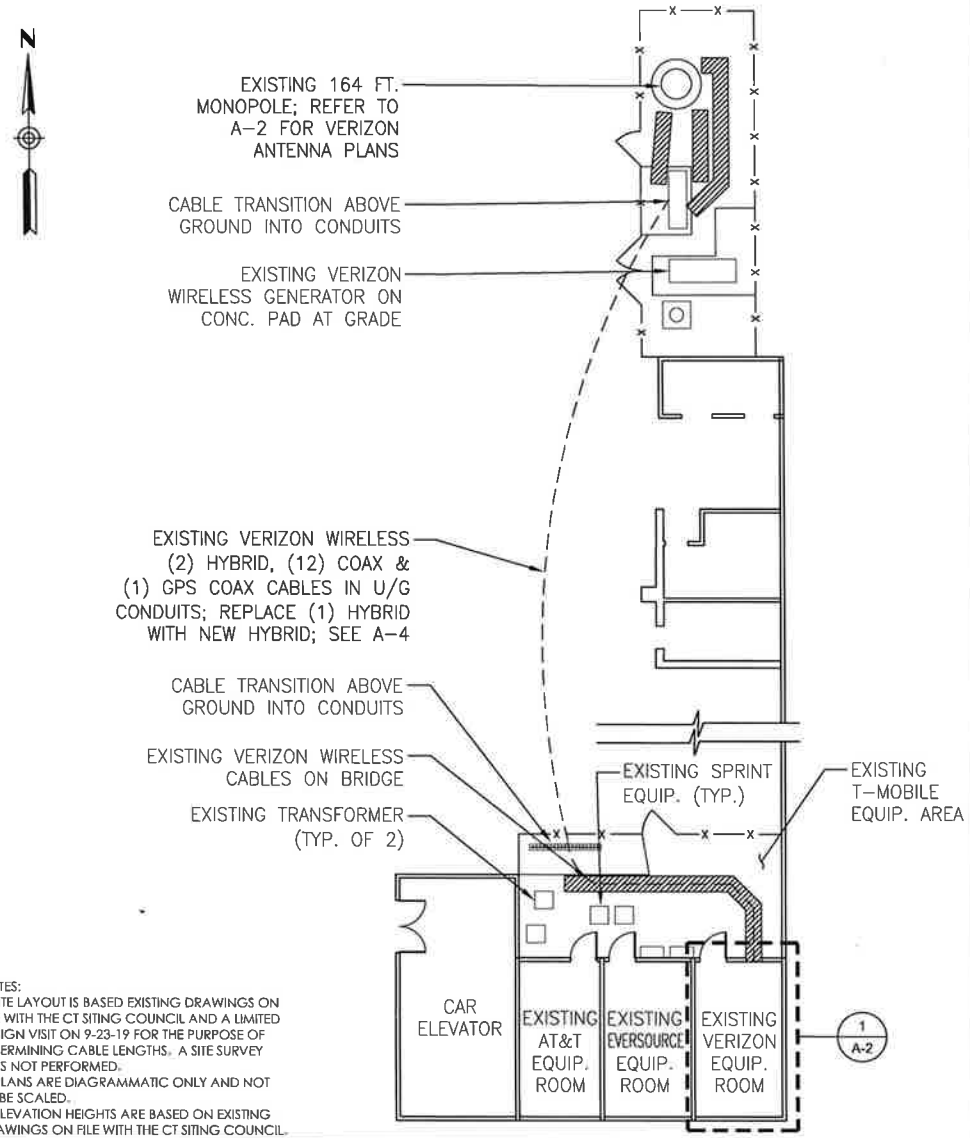
Very truly yours,

Mortimer A. Gelston
Chairman

MAG/laf

c: Honorable Lolly H. Prince, First Selectman, Town of Greenwich
Diane Fox, Town Planner, Town of Greenwich

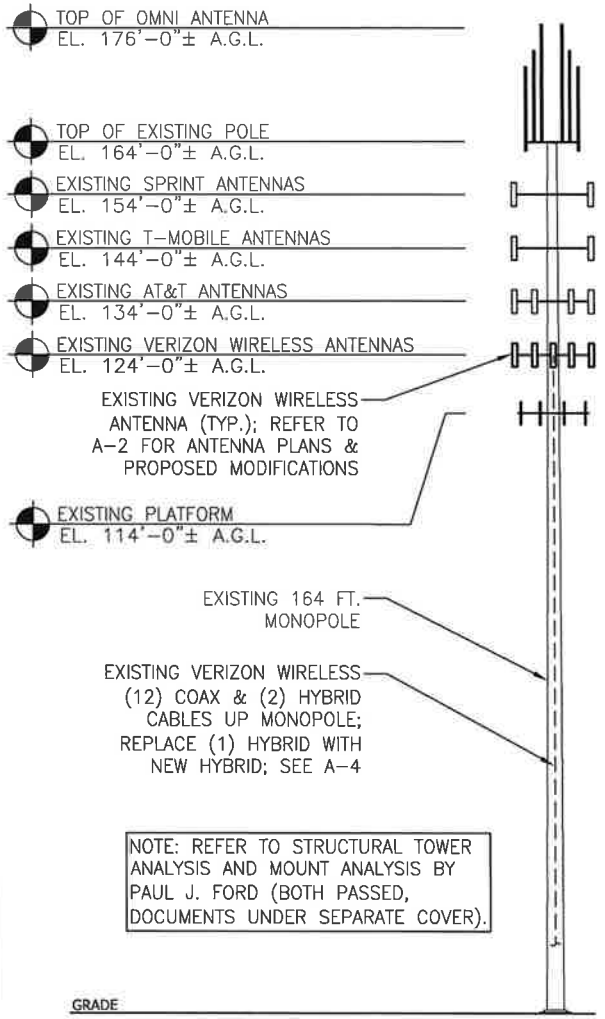
ATTACHMENT 2



NOTES:
1. SITE LAYOUT IS BASED EXISTING DRAWINGS ON FILE WITH THE CT SITING COUNCIL AND A LIMITED DESIGN VISIT ON 9-23-19 FOR THE PURPOSE OF DETERMINING CABLE LENGTHS. A SITE SURVEY WAS NOT PERFORMED.
2. PLANS ARE DIAGRAMMATIC ONLY AND NOT TO BE SCALED.
3. ELEVATION HEIGHTS ARE BASED ON EXISTING DRAWINGS ON FILE WITH THE CT SITING COUNCIL.

1 SITE LAYOUT

Scale: 1/16" = 1'-0"



NOTE: REFER TO STRUCTURAL TOWER ANALYSIS AND MOUNT ANALYSIS BY PAUL J. FORD (BOTH PASSED, DOCUMENTS UNDER SEPARATE COVER).

NOTE: GROUND EQUIPMENT NOT SHOWN FOR CLARITY

2 ELEVATION

Scale: NTS

verizon

WIRELESS COMMUNICATIONS FACILITY

20 ALEXANDER DRIVE
WALLINGFORD, CT 06492

On Air Engineering, LLC
88 Foundry Pond Road
Cold Spring, NY 10516
201-456-4624
onair@optonline.net

LICENSURE

STATE OF CONNECTICUT · DAVID A. WEINPAHL · NO. 22144 · LICENSED PROFESSIONAL ENGINEER

DAVID WEINPAHL, P.E.
CT LIC NO. 22144

SUBMITTALS		
0	10.21.19	REVIEW
1	10.24.19	REVISED PER RF COMMENTS
2	11.08.19	REVISED PER OWNER COMMENTS
3	12.12.19	REVISED PER EQUIP. ENGINEERING
NO.	DATE	DESCRIPTION

DRAWN BY	MF
CHECKED BY	DW

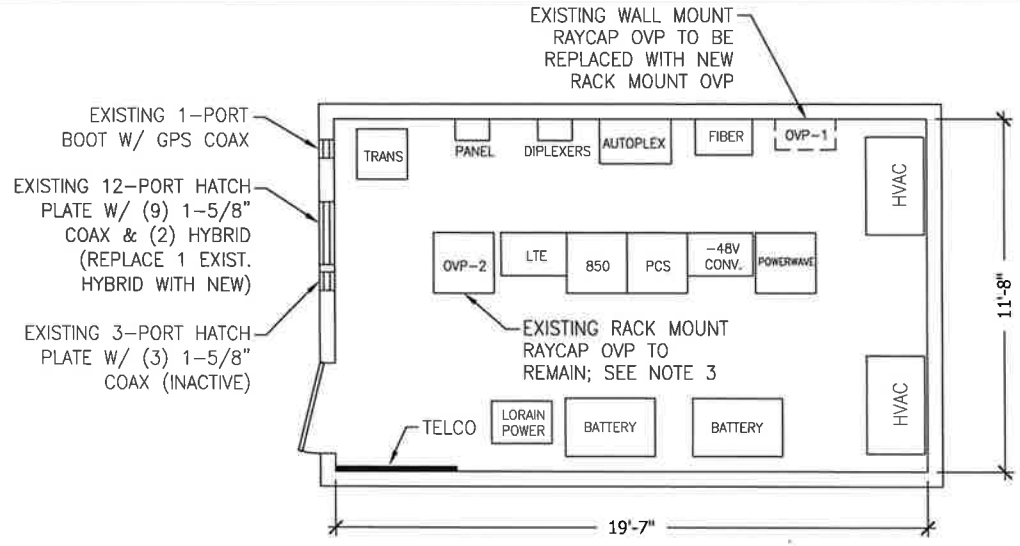
PROJECT NAME:
ANTMO CBRS CARRIER ADD CABLE DRAWINGS

SITE NAME:
GREENWICH CT

SITE ADDRESS:
GREENWICH HOSPITAL
5 PERRYRIDGE RD.
GREENWICH, CT 06830

SHEET TITLE:
SITE LAYOUT & ELEVATION

SHEET NUMBER:
A-1



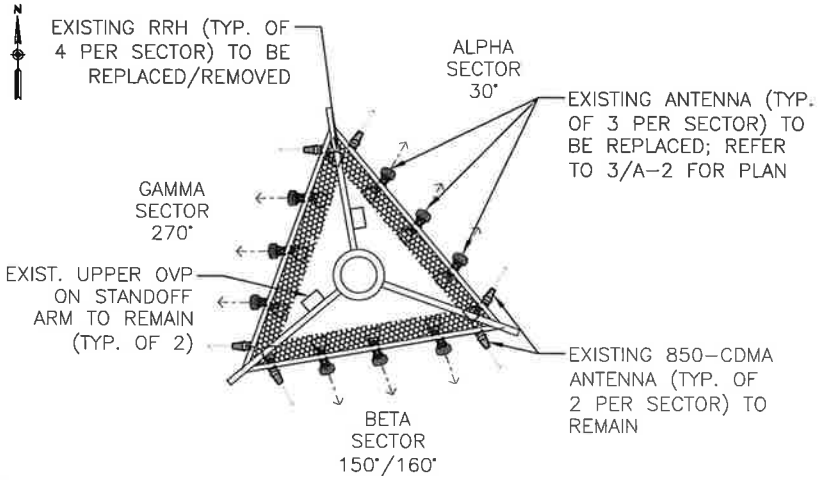
NOTES:
1. CONTRACTOR TO INSTALL NEW AND/OR MODIFY EXISTING CABLE ENTRY PORTS FOR THE PROJECT AS REQUIRED INCLUDING THE REMOVAL OF ANY EXISTING COAXIAL CABLES AS DIRECTED BY VERIZON WIRELESS.

2. EQUIPMENT PLAN IS BASED ON LIMITED MEASUREMENTS FOR A MINOR EQUIPMENT MODIFICATION. A DETAILED EQUIPMENT ROOM SURVEY WAS NOT PERFORMED.

3. NEW RAYCAP OVP TO BE RACK MOUNTED WITH EXISTING; VERIFY WITH EQUIPMENT ENGINEER.

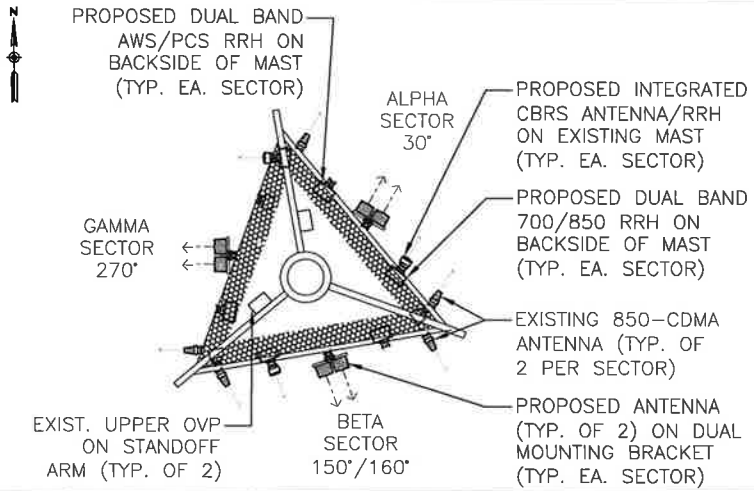
1 EQUIP. ROOM PLAN - GARAGE LEVEL

Scale: 1/4" = 1'-0"



2 ANTENNA PLAN @ 124 FT. - EXISTING

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



3 ANTENNA PLAN @ 124 FT. - PROPOSED

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

verizon
WIRELESS COMMUNICATIONS FACILITY

20 ALEXANDER DRIVE
WALLINGFORD, CT 06492

On Air Engineering, LLC
88 Foundry Pond Road
Cold Spring, NY 10516
201-456-4624
onair@optonline.net

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STATE OF CONNECTICUT · DAVID A. WEINPAHL · NO. 22144 · LICENSED PROFESSIONAL ENGINEER

DAVID A. WEINPAHL, P.E.
CT LIC. NO. 22144

SUBMITTALS

NO.	DATE	DESCRIPTION
0	10.21.19	REVIEW
1	10.24.19	REVISED PER RF COMMENTS
2	01.06.20	REVISED PER CONSTR. COMMENTS
3	01.31.20	REVISED PER EQUIP. ENGINEERING

DRAWN BY	MF
CHECKED BY	DW

PROJECT NAME:
ANTMO CBRS CARRIER ADD CABLE DRAWINGS

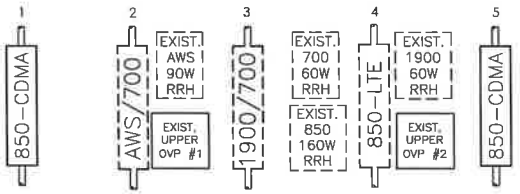
SITE NAME:
GREENWICH CT

SITE ADDRESS:
GREENWICH HOSPITAL
5 PERRYRIDGE RD.
GREENWICH, CT 06830

SHEET TITLE:
EQUIPMENT PLAN & ANTENNA PLANS

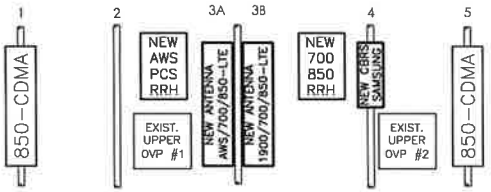
SHEET NUMBER:
A-2

EXISTING - ALPHA



(VIEWED FROM REAR)

PROPOSED - ALPHA



(VIEWED FROM REAR)

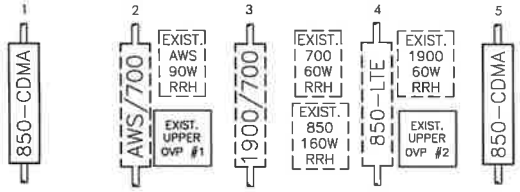
SECTOR: ALPHA				
POSITION	EXISTING ANTENNA	PROPOSED		
		ANTENNA	RRH	OVP
1	850-CDMA	EXISTING TO REMAIN	-	
2	AWS/700	NEW QUINTEL SEE NOTE 1	NEW AWS/PCS SEE NOTE 3	SEE NOTE 4
3	1900/700	NEW QUINTEL SEE NOTE 2	EXIST. 700 RRH TO BE REMOVED	-
4	850-LTE	NEW INTEGRATED SAMSUNG CBRS	NEW 700/850 SEE NOTE 3	SEE NOTE 4
5	850-CDMA	EXISTING TO REMAIN	EXIST. 850 RRH TO BE REMOVED	-

NOTES:
1. NEW QUINTEL AWS-700-850 LTE ANTENNA TO BE LOCATED AT POS. 3 USING DUAL BRACKET; LEAVE POS. 2 MAST SPARE FOR RRH SUPPORT
2. NEW QUINTEL 1900-700-850 LTE ANTENNA ON DUAL BRACKET; DO NOT MOUNT RRH'S ON THIS MAST
3. NEW DUAL BAND RRH TO REPLACE EXISTING RRH ON BACKSIDE OF ANTENNA MAST
4. EXIST. UPPER OVP (TYP. OF 2) TO REMAIN; OVP #1 TO FEED AWS/PCS DUAL BAND RRH'S AND SAMSUNG CBRS(ALL SECTORS); OVP #2 TO FEED 700/850-LTE RRH'S (ALL SECTORS)

1 ANTENNA SECTOR CONFIGURATIONS - ALPHA

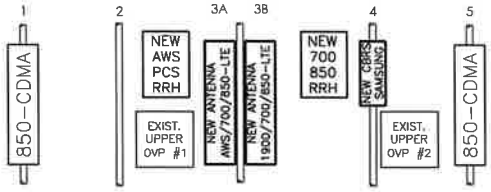
Scale: N.T.S.

EXISTING - BETA



(VIEWED FROM REAR)

PROPOSED - BETA



(VIEWED FROM REAR)

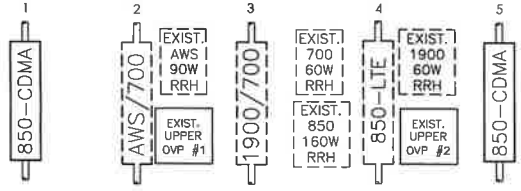
SECTOR: BETA				
POSITION	EXISTING ANTENNA	PROPOSED		
		ANTENNA	RRH	OVP
1	850-CDMA	EXISTING TO REMAIN	-	
2	AWS/700	NEW QUINTEL SEE NOTE 1	NEW AWS/PCS SEE NOTE 3	SEE NOTE 4
3	1900/700	NEW QUINTEL SEE NOTE 2	EXIST. 700 RRH TO BE REMOVED	-
4	850-LTE	NEW INTEGRATED SAMSUNG CBRS	NEW 700/850 SEE NOTE 3	SEE NOTE 4
5	850-CDMA	EXISTING TO REMAIN	EXIST. 850 RRH TO BE REMOVED	-

NOTES:
1. NEW QUINTEL AWS-700-850 LTE ANTENNA TO BE LOCATED AT POS. 3 USING DUAL BRACKET; LEAVE POS. 2 MAST SPARE FOR RRH SUPPORT
2. NEW QUINTEL 1900-700-850 LTE ANTENNA ON DUAL BRACKET; DO NOT MOUNT RRH'S ON THIS MAST
3. NEW DUAL BAND RRH TO REPLACE EXISTING RRH ON BACKSIDE OF ANTENNA MAST
4. EXIST. UPPER OVP (TYP. OF 2) TO REMAIN; OVP #1 TO FEED AWS/PCS DUAL BAND RRH'S AND SAMSUNG CBRS(ALL SECTORS); OVP #2 TO FEED 700/850-LTE RRH'S (ALL SECTORS)

2 ANTENNA SECTOR CONFIGURATIONS - BETA

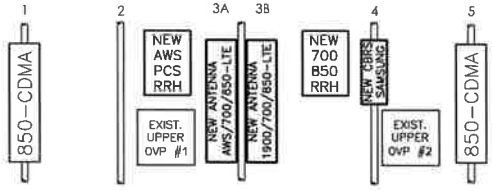
Scale: N.T.S.

EXISTING - GAMMA



(VIEWED FROM REAR)

PROPOSED - GAMMA



(VIEWED FROM REAR)

SECTOR: GAMMA				
POSITION	EXISTING ANTENNA	PROPOSED		
		ANTENNA	RRH	OVP
1	850-CDMA	EXISTING TO REMAIN	-	
2	AWS/700	NEW QUINTEL SEE NOTE 1	NEW AWS/PCS SEE NOTE 3	SEE NOTE 4
3	1900/700	NEW QUINTEL SEE NOTE 2	EXIST. 700 RRH TO BE REMOVED	-
4	850-LTE	NEW INTEGRATED SAMSUNG CBRS	NEW 700/850 SEE NOTE 3	SEE NOTE 4
5	850-CDMA	EXISTING TO REMAIN	EXIST. 850 RRH TO BE REMOVED	-

NOTES:
1. NEW QUINTEL AWS-700-850 LTE ANTENNA TO BE LOCATED AT POS. 3 USING DUAL BRACKET; LEAVE POS. 2 MAST SPARE FOR RRH SUPPORT
2. NEW QUINTEL 1900-700-850 LTE ANTENNA ON DUAL BRACKET; DO NOT MOUNT RRH'S ON THIS MAST
3. NEW DUAL BAND RRH TO REPLACE EXISTING RRH ON BACKSIDE OF ANTENNA MAST
4. EXIST. UPPER OVP (TYP. OF 2) TO REMAIN; OVP #1 TO FEED AWS/PCS DUAL BAND RRH'S AND SAMSUNG CBRS(ALL SECTORS); OVP #2 TO FEED 700/850-LTE RRH'S (ALL SECTORS)

3 ANTENNA SECTOR CONFIGURATIONS - GAMMA

Scale: N.T.S.

verizon

WIRELESS COMMUNICATIONS FACILITY

20 ALEXANDER DRIVE
WALLINGFORD, CT 06492

On Air Engineering, LLC
88 Foundry Pond Road
Cold Spring, NY 10516
201-456-4624
onair@optonline.net

LICENSURE

STATE OF CONNECTICUT
DAVID A. WEINPAHL
NO. 22144
LICENSED
PROFESSIONAL ENGINEER

DAVID WEINPAHL, P.E.
CT LIC. NO. 22144

SUBMITTALS

NO	DATE	DESCRIPTION
0	10.21.19	REVIEW
1	10.24.19	REVISED PER RF COMMENTS
2	11.08.19	REVISED PER OWNER COMMENTS
3	11.21.19	REVISED PER EQUIP. ENGINEERING

DRAWN BY: MF
CHECKED BY: DW

PROJECT NAME:
ANTMO CBRS
CARRIER ADD
CABLE DRAWINGS

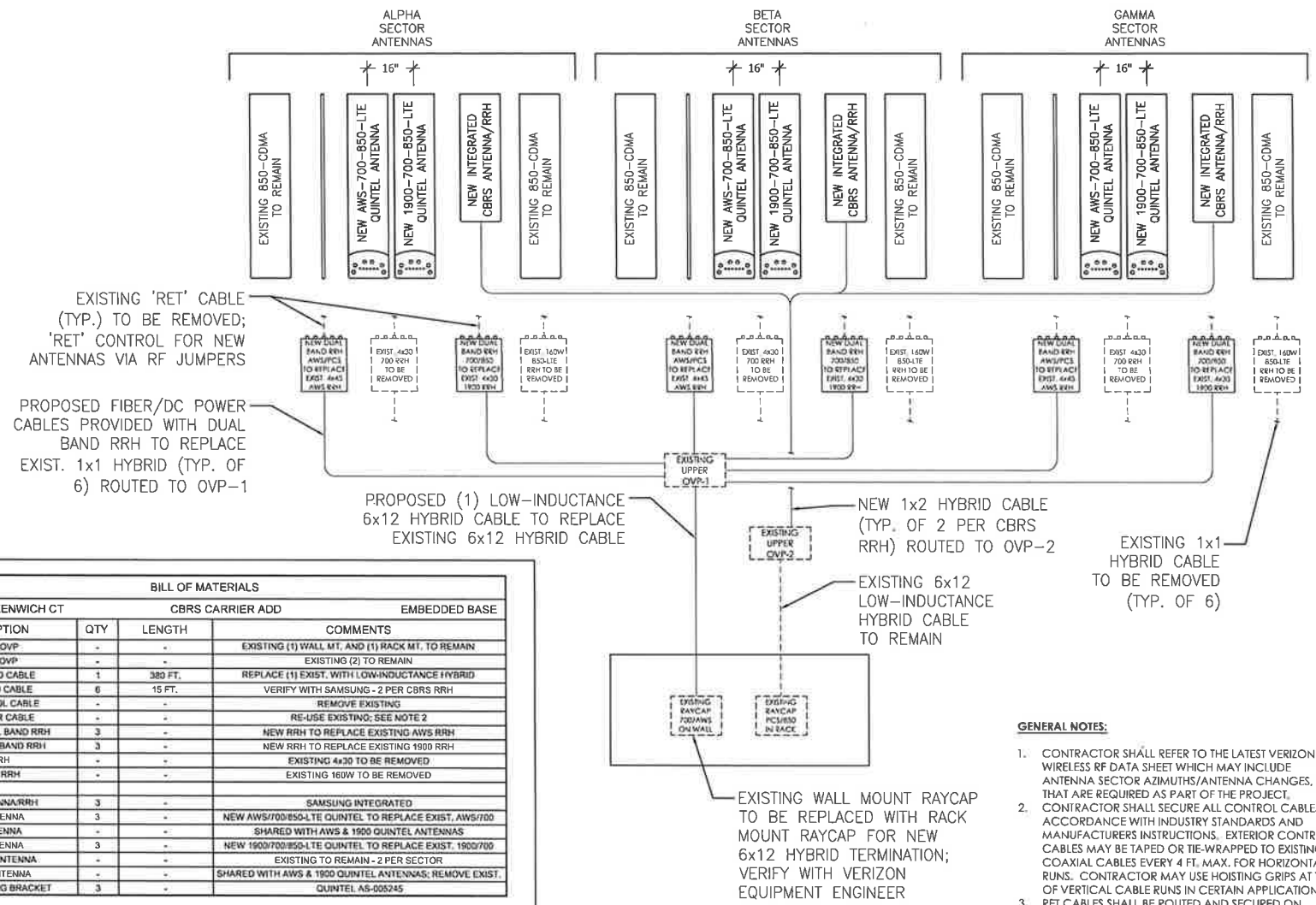
SITE NAME:
GREENWICH CT

SITE ADDRESS:
GREENWICH HOSPITAL
5 PERRYRIDGE RD.
GREENWICH, CT 06830

SHEET TITLE:
ANTENNA SECTOR
CONFIGURATIONS

SHEET NUMBER:
A-3

NOTE: ALL ANTENNAS VIEWED FROM REAR



BILL OF MATERIALS			
SITE NAME: GREENWICH CT	CBRS CARRIER ADD		EMBEDDED BASE
DESCRIPTION	QTY	LENGTH	COMMENTS
LOWER OVP	-	-	EXISTING (1) WALL MT. AND (1) RACK MT. TO REMAIN
UPPER OVP	-	-	EXISTING (2) TO REMAIN
6x12 HYBRID CABLE	1	380 FT.	REPLACE (1) EXIST. WITH LOW-INDUCTANCE HYBRID
1x2 HYBRID CABLE	6	15 FT.	VERIFY WITH SAMSUNG - 2 PER CBRS RRH
RET CONTROL CABLE	-	-	REMOVE EXISTING
1/2" JUMPER CABLE	-	-	RE-USE EXISTING; SEE NOTE 2
AWS/PCS DUAL BAND RRH	3	-	NEW RRH TO REPLACE EXISTING AWS RRH
700/850 DUAL BAND RRH	3	-	NEW RRH TO REPLACE EXISTING 1900 RRH
700 RRH	-	-	EXISTING 4x30 TO BE REMOVED
850-LTE RRH	-	-	EXISTING 160W TO BE REMOVED
CBRS ANTENNA/RRH	3	-	SAMSUNG INTEGRATED
AWS ANTENNA	3	-	NEW AWS/700/850-LTE QUINTEL TO REPLACE EXIST. AWS/700
700 ANTENNA	-	-	SHARED WITH AWS & 1900 QUINTEL ANTENNAS
1900 ANTENNA	3	-	NEW 1900/700/850-LTE QUINTEL TO REPLACE EXIST. 1900/700
850-CDMA ANTENNA	-	-	EXISTING TO REMAIN - 2 PER SECTOR
850-LTE ANTENNA	-	-	SHARED WITH AWS & 1900 QUINTEL ANTENNAS; REMOVE EXIST.
DUAL MOUNTING BRACKET	3	-	QUINTEL AS-005245

NOTES:
1. ITEMS SHOWN ARE FOR MAJOR DESIGN ELEMENTS ONLY. REFER TO VERIZON WIRELESS B.O.M. FOR ALL MANUFACTURER PART NUMBERS AND ACCESSORY ITEMS REQUIRED FOR A COMPLETE INSTALLATION.
2. EXISTING JUMPERS TO BE RE-USED; PROVIDE TERMINATION CAPS ON ALL UN-USED ANTENNA PORTS.

1 BILL OF MATERIALS
Scale: N.T.S.

GENERAL NOTES:

1. CONTRACTOR SHALL REFER TO THE LATEST VERIZON WIRELESS RF DATA SHEET WHICH MAY INCLUDE ANTENNA SECTOR AZIMUTHS/ANTENNA CHANGES, ETC. THAT ARE REQUIRED AS PART OF THE PROJECT.
2. CONTRACTOR SHALL SECURE ALL CONTROL CABLES IN ACCORDANCE WITH INDUSTRY STANDARDS AND MANUFACTURERS INSTRUCTIONS. EXTERIOR CONTROL CABLES MAY BE TAPED OR TIE-WRAPPED TO EXISTING COAXIAL CABLES EVERY 4 FT. MAX. FOR HORIZONTAL RUNS. CONTRACTOR MAY USE HOISTING GRIPS AT TOP OF VERTICAL CABLE RUNS IN CERTAIN APPLICATIONS.
3. RET CABLES SHALL BE ROUTED AND SECURED ON STRUCTURAL MEMBERS ONLY - DO NOT "LOOP" THE CABLES IN MID-AIR BETWEEN ANTENNAS
4. RF JUMPERS AND COAXIAL CABLES NOT SHOWN.

2 RF PLUMBING DIAGRAM
Scale: N.T.S.

verizon
WIRELESS COMMUNICATIONS FACILITY

20 ALEXANDER DRIVE
WALLINGFORD, CT 06492

On Air Engineering, LLC
88 Foundry Pond Road
Cold Spring, NY 10516
201-456-4624
onair@optonline.net

LICENSURE

STATE OF CONNECTICUT · DAVID A. WEINPAHL · NO. 22144 · LICENSED PROFESSIONAL ENGINEER

DAVID WEINPAHL, P.E.
CT LIC. NO. 22144

SUBMITTALS

NO	DATE	DESCRIPTION
0	10.21.19	REVIEW
1	10.24.19	REVISED PER RF COMMENTS
2	01.09.20	REVISED PER CSC/SHPO COMMENTS
3	01.31.20	REVISED PER LIQUIF. ENGINEERING

DRAWN BY:	MF
CHECKED BY:	DW

PROJECT NAME:
ANTMO CBRS CARRIER ADD CABLE DRAWINGS

SITE NAME:
GREENWICH CT

SITE ADDRESS:
GREENWICH HOSPITAL
5 PERRYRIDGE RD.
GREENWICH, CT 06830

SHEET TITLE:
RF PLUMBING DIAGRAM & B.O.M.

SHEET NUMBER:
A-4

Quintel®
New Dimensions in Wireless™

QS6656-5

6ft 65° XXX MultiServ™ 6-Port Antenna

2x698-894MHz / 4x1695-2400MHz

- Provides 6 antenna Ports in a slim-line form factor
- Optimized Azimuth patterns for Min Inter-Sector Interference
- Industry leading Minimal Wind-Load design
- 700, 850, PCS, AWS & WCS bands in one antenna
- AISG & 3GPP compliant internal (RET) with Smart Bias T

The Quintel MultiServ™ Multiband 6 Port Antenna with patented QTilt™ technology uniquely delivers three independent services in a single slim-line antenna. This enables existing antenna network sites to be upgraded constraint free to add new services such as LTE for 700, 850, PCS, AWS and WCS bands with the replacement of one antenna. The QS6656-5 also provides 4x1695-2400MHz ports as two side-by-side (CLA-2X) arrays for connection to 2T4R/4T4R services.

Electrical Characteristics	2x Ports 1&2		4x Ports 3-6			
Operating Frequency (MHz)	698-894		1695-2400			
	698-806	814-894	1695-1780	1850-1990	2110-2180	2300-2400
Azimuth beamwidth[1]	67°	63°	69°	67°	60°	59°
Elevation beamwidth[1]	12.5°	10.5°	6.3°	5.8°	5.2°	4.6°
Gain[1] (dBi)	13.3	13.8	17.3	17.2	18.0	18.0
Polarization	±45°		±45°			
Electrical down-tilt range	2°-10°		2° – 10°			
Upper SLL (20° > mainbeam)[1]	-20dB	-18dB	-15dB	-16dB	-17dB	-16dB
Front to Back Ratio(180°±10°)[1]	≥29dB	≥28dB	≥29dB	≥30dB	≥32dB	≥30dB
Port to Port isolation[1]	≥29dB	≥28dB	≥35dB	≥37dB	≥37dB	≥37dB
Return loss (VSWR)	14dB(1.5)	14dB(1.5)	14dB(1.5)	14dB(1.5)	14dB (1.5)	14dB(1.5)
X Polar Discrimination (at 0°)	>19dB	>17dB	>20dB	>19dB	>20dB	>18dB
Max Power handling (per any port)	500 watts		250 watts			
Total Composite Power (all ports)	1750 watts					
PIM (3rd Order) (2x43dBm)	>153dBc	>153dBc	>153dBc			

[1] *Typical Performance across frequency and Downtilt.*

Mechanical Characteristics	
Dimensions	L 72"(1828mm) x W 12"(304mm) x D 9.6"(245mm)
Weight (excl mounting brackets)	65lbs (29.4kg)
No. of Connectors	6x 7/16 DIN Female Long Neck
Max Wind Speed	150mph (67m/s)
Equivalent Projected Area[2]	Front: 2.6ft² (0.24m²) Side: 5.0ft²(0.46m²)
Wind Load[2] @160km/h (45m/s)	Front: 284.7N (64 lbs), Side: 535.5N (120.4 lbs)
Operating Temperature	-40°C to +65°C

[2] *Equivalent Projected Area and Wind Load derived from windtunnel measurements. Equivalent Projected Area assumed C_d=1*

Fully Integrated RET Characteristics	
AISG Standards	V1.1,V 2.0 and 3GPP
Factory Default	AISG 2.0
Surge immunity	IEC 61000-4-5:2005 4KV(AISG PIN)
Device Type	SRET Type 1
AISG Data rate	9.6 kbps
No of connectors	2in/2out.
Connector type	IEC 60130-9 (Ed 3.0)
MTBF	36,000 Operational moves

All specifications are subject to change without notice. Please contact your Quintel representative for complete information.

Quintel®
New Dimensions in Wireless™

QS6656-5

6ft 65° XXX MultiServ™ 6-Port Antenna

2x698-894MHz / 4x1695-2400MHz

RET Configuration

The Quintel MultiServ™ Multiband 6 Port Antenna has the following Array, RF Port and AISG I/O Configurations.

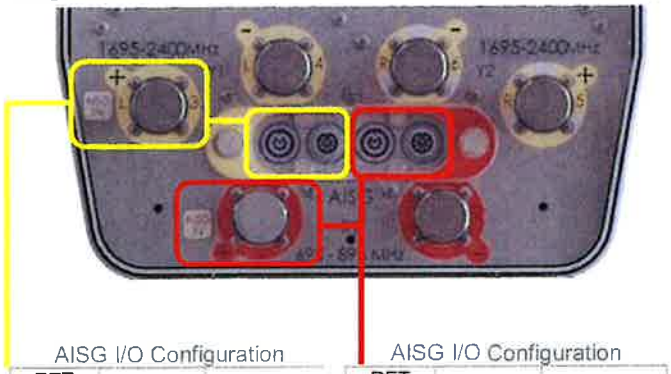
The 6-Port array topology consists of 3 radiating arrays:

R1 – 698-894MHz
Y1 – 1695-2400MHz
Y2 – 1695-2400MHz

RF Connector Port Configuration

	Ports	Freq (MHz)
R1	1-2	698-894
Y1	3-4	1695-2400
Y2	5-6	1695-2400

The RET Devices can be communicated with either via the designated external AISG connector or RF Port as shown below.



AISG I/O Configuration

RET Device	Band	RF Ports
2	1695-2400	3-6

AISG I/O Configuration

RET Device	Band	RF Ports
1	698-894	1-2

Multiband Optimization

The Quintel MultiServ™ Multiband 6 Port Antenna is an ideal solution for independently optimizing multiple services when rapidly introducing new technologies. Technology agnostic, each pair of ports provides flexibility for existing and future technologies such as CDMA/EVDO, GSM/EDGE, UMTS/HSPA, and LTE and advanced 2T4R and 4T4R MIMO implementations at high-bands.

The tilt of each service is controlled independently via internal RET actuators compliant to AISG1.1, AISG2.0 and 3GPP protocols. The QS6656-5 provides a total of 2 independent tilts:

- 1x(698-894MHz)
- 1x Left & Right Array (1695-2400MHz)

Design Optimization

All Quintel antennas use the same mechanical mounting brackets thus making maintenance swaps easy and future proof. All Quintel Antennas also have Azimuth patterns optimized with network design and deployment in mind. The 3dB Azimuth beamwidth is ~65° as with most Antennas, but we have optimized how the pattern rolls-off and where the sidelobes emerge such that there is minimal Inter-Sector Interference when 3x sectors are deployed. For interference limited networks, we can deliver 25% more capacity.

About Quintel

Quintel is a leading innovator in the design, development, and delivery of network-efficient antenna solutions for wireless operators worldwide. The company's products enable global wireless operators to independently deploy and optimize multiple air interfaces or services on a single standard antenna platform. Quintel is the only antenna maker whose products can increase a wireless network's capacity and provide additional services, without increasing the number or size of antennas. Quintel is headquartered in Rochester, New York with additional offices throughout North America and Europe. More information about Quintel is available at www.quintelsolutions.com.

Tel (Americas): +1 (585) 420-8720
info@quintelsolutions.com

[CBRS] Clip-on Antenna Specifications

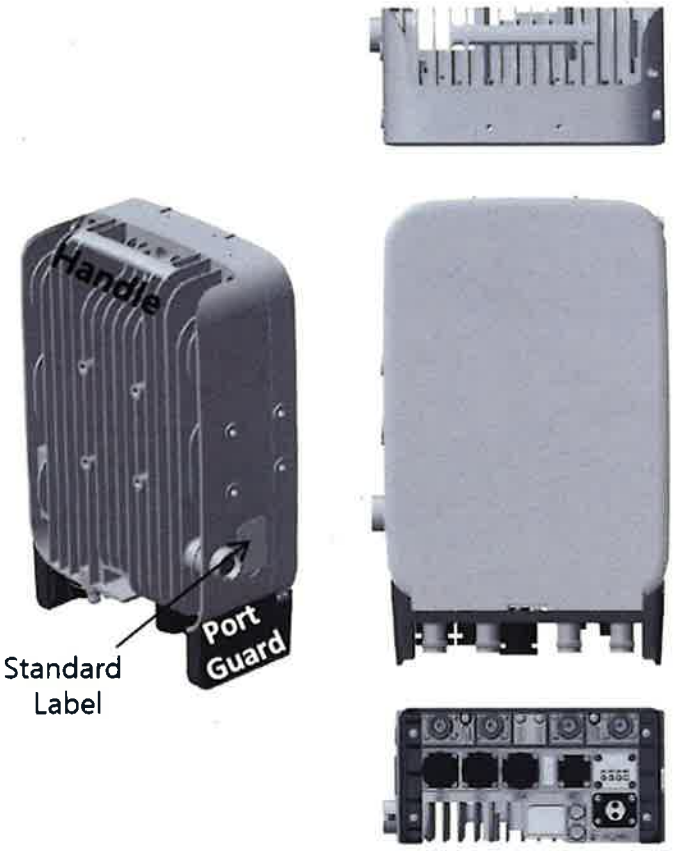
VzW accepted IP45 in FLD, but IP55 is Samsung Spec.

Items	Clip-on Antenna, BASTA**
Antenna Gain	12.5 ± 0.5 dBi (Max 13 dBi)
Horizontal BW (-3dB)	65° ± 5°
Vertical BW (-3dB)	17° ±3°
Electrical Tilt	8° (fixed) ±2°
Front-to-Back Ratio	> 25 dB
Port-to-Port Tracking	< 3 dB
VSWR	< 1.5
Isolation	> 25 dB
Ingress Protection	**IP55**
Size	220(W)×313(H)×34.3(D) mm (*) (8.7 x 12.3 x 1.4 inch.)
Weight	< **2.0** kg [Typ. 1.3 kg]
It is required that the radio should be weatherproofed properly with JMA WPS Boot with external antenna or with Weatherproof Boot for clip-on antennas.	

Antenna includes integrated cable with connector
* Design is subject to minor change

** Ant. spec. follows NGMN recommendations on Base Station Antenna Standards (BASTA). For example, 'mean ± tolerance of 86.6%' is applied to double-sided specification of statistical RF parameters.

[CBRS RRH] Spec.



Current Size: 216 x 307 x 105.5 mm (6.99L)
(8.5 x 12.1 x 4.1 inch., excluding Port Guard)
Design is subject to minor change

Item	Specification
Band	Band 48 (3.5 GHz)
Frequency	3550~3700 MHz
IBW	150 MHz
OBW	80 MHz
# of Carriers	5/10/15/20 MHz x 4 carriers
RF Chain	4TX / 4RX
RF Output Power & EIRP	4 path x 5 W (Total: 20 W = 43 dBm) (EIRP: 47 dBm / 10 MHz)
RX Sensitivity	Typical : -101.5 dBm @ 1 Rx (3GPP 36.104, Wide Area)
Modulation	256-QAM support (1024-QAM with 1~2dB power back-off)
Input Power	-48 VDC (-38 to -57 VDC, 1 SKU), with clip-on AC-DC converter (Option)
Power Consumption	About 160 Watt @ 100% RF load, typical conditions
Volume	Under 7L (w/o Antenna), Under 9.6L (with antenna)
Weight	Under 8.0 kg (18.64 lb) (w/o Antenna), Under 10.5 Kg (with ant.)
Operating Temperature	-40°C (-40°F) ~ 55°C (131°F) (W/o solar load)
Cooling	Natural convection
Unwanted Emission	3GPP 36.104 Category A [B48] : FCC 47 CFR 96.41 e)
Optic Interface	20km, 2 ports (9.8Gbps x 2), SFP, single mode, duplex or Bi-Di
CPRI Cascade	Not supported
# of Antenna Port	4
External Alarm (UDA)	4
RET	AISG 2.2
TMA & built-in Bias-T I//F and PIM cancellation	Not supported
Mounting Options	Pole, wall, tower, back to back, side by side (for external ant), 3 RRH with Clip-on Antenna on the pole
Antenna Type	Integrated (Clip-on) antenna (Option), External antenna (Option)
NB-IoT	Not Supported (HW Resource reserved for 1 Guard Band NB-IoT per LTE carrier)
Spectrum Analyzer	TX/RX Support
External Alarm (UDA)	4
5G NR	Support with S/W upgrade
XRAN	Support with S/W upgrade

ATTACHMENT 3

	General	Power	Density					
Site Name: Greenwich Relo								
Tower Height: 164Ft								
CARRIER	**# OF CHAN.**	**WATTS ERP**	**HEIGHT**	**CALC. POWER DENS**	**FREQ.**	**MAX. PERMISS. EXP.**	**FRACTION MPE**	**Total**
*Eversource	1	250	116.5	937		0.6247	0.11%	
*Eversource	1	250	116.5	154		0.2000	11.55%	
*Eversource	1	250	112	37		0.2000	8.78%	
*AT&T-UMTS	2	414	134	850	0.0182	0.5667	0.32%	
*AT&T-LTE	2	487	134	700	0.0214	0.4667	0.46%	
*AT&T-LTE	2	546	134	850	0.0240	0.5667	0.42%	
*AT&T-PCS-LTE	4	971	134	1900	0.0853	1.0000	0.85%	
*AT&T-WCS-LTE	4	917	134	2300	0.0805	1.0000	0.81%	
*AT&T-LTE	4	736	134	700	0.0646	0.4667	1.38%	
*AT&T-AWS-LTE	4	1181	134	2100	0.1037	1.0000	1.04%	
*AT&T-LTE	2	627	134	700	0.0275	0.4667	0.59%	
*MW to Bruce	1	4878	160	17960	0.0740	1.0000	0.74%	
*MW to PD	1	122	160	18762	0.0018	1.0000	0.02%	
*MW to Putnam	1	4878	160	17500	0.0740	1.0000	0.74%	
*Trunked System	1	148	164	886.7875	0.0021	0.5912	0.04%	
*Trunked System	1	148	164	867.0625	0.0021	0.5780	0.04%	
*Trunked System	1	148	164	868.15	0.0021	0.5788	0.04%	
*Trunked System	1	148	164	868.4	0.0021	0.5789	0.04%	
*Trunked System	1	148	164	868.7	0.0021	0.5791	0.04%	
*Trunked System	1	148	164	868.7	0.0021	0.5791	0.04%	
*Mutual Aid	1	218	155	866.0125	0.0035	0.5773	0.06%	
*Mutual Aid	1	218	155	866.5125	0.0035	0.5777	0.06%	
*CMED	1	150	151	463	0.0026	0.3087	0.08%	
*Fire Paging	1	100	125	164.175	0.0025	0.2000	0.13%	
*SP Hotline	1	100	110	154.175	0.0033	0.2000	0.17%	
*Sprint	3	69	155	1900	0.0034	1.0000	0.03%	
*Sprint	1	39	155	850	0.0006	0.5667	0.01%	
*Sprint	2	69	155	2500	0.0022	1.0000	0.02%	
*Clearwire	2	153	154	2496	0.0050	1.0000	0.05%	
*Clearwire	1	211	154	11 GHz	0.0035	1.0000	0.03%	
*T-Mobile	2	2334	144	2100	0.0881	1.0000	0.88%	
*T-Mobile	2	2334	144	1900	0.0881	1.0000	0.88%	
*T-Mobile	2	1167	144	2100	0.0441	1.0000	0.44%	
*T-Mobile	0	1167	144	1900	0.0000	1.0000	0.00%	
*T-Mobile	2	1167	144	1900	0.0441	1.0000	0.44%	
*T-Mobile	2	592	144	600	0.0224	0.4000	0.56%	
*T-Mobile	2	649	144	700	0.0245	0.4667	0.53%	
*Nextel	12	100	113	851	0.0377	0.5673	0.66%	
*Sprint	3	562	154	2657	0.0277	1.0000	0.28%	
VZW PCS	**1**	**2041**	**124**	**0.0477**	**1970**	**1.0000**	**4.77%**	
VZW Cellular CDMA	**1**	**500**	**124**	**0.0117**	**869**	**0.5793**	**2.02%**	
VZW Cellular LTE	**1**	**500**	**124**	**0.0117**	**880**	**0.5866**	**1.99%**	
VZW AWS	**1**	**2343**	**124**	**0.0548**	**2145**	**1.0000**	**5.48%**	
VZW 700	**1**	**589**	**124**	**0.0138**	**746**	**0.4973**	**2.77%**	
VZW CBRS	**1**	**50**	**124**	**0.0012**	**3550**	**2.3660**	**0.05%**	
								50.43%
* Source: Siting Council								

ATTACHMENT 4

PAUL J. FORD & COMPANY

Report Date:	January 8, 2020
Client:	On Air Engineering, LLC 88 Foundry Pond Road Cold Spring, NY 10516 Attn: David Weinpahl, P.E. 201-456-4624 dweinpahl@onaireng.com
Structure:	Existing 164-ft Monopole
Site Name:	Greenwich CT
Carrier:	Verizon Wireless
Site Address:	5 Perryridge Rd.
City, County, State:	Greenwich, Fairfield County, CT
Latitude, Longitude:	41.034210, -73.630832
PJF Project:	A42919-0012.002.7805 (Revised)

Paul J. Ford and Company is pleased to submit this "**Structural Analysis Report**" to determine the tower stress level.

Analysis Criteria:

Reference Standard:	2018 Connecticut State Building Code and the 2015 International Building Code with the ANSI/TIA-222-G-2005 Standard, "Structural Standard for Antenna Supporting Structures and Antennas", with ANSI/TIA-222-G-1-2007 and ANSI/TIA-222-G-2-2009 Addenda per Exception #5 of Section 1609.1.1.
Ultimate Wind Speed:	130 mph 3-second gust wind speed without ice
Nominal Wind Speed:	101 mph 3-second gust wind speed without ice
Ice Wind Speed:	50 mph 3-second gust wind speed with 0.75" ice
Service Wind Speed:	60 mph (Serviceability) without ice
IBC Site Criteria:	Risk Category III, Topographic Category 1, Exposure Category C

Proposed Appurtenance Loads:

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

Summary of Analysis Results:

Existing Structure:	Pass – 67.1%
Existing Foundation:	Pass – 86.7%

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

Respectfully Submitted by:
Paul J. Ford and Company

Angela Sage, E.I.
Structural Designer
asage@pauljford.com

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

2020.01.08
16:59:04-05'00'

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 162.5 ft Monopole tower designed by EEI.

2) ANALYSIS CRITERIA

TIA-222 Revision:	TIA-222-G
Risk Category:	III
Ultimate/Nominal Wind Speed:	130/101 mph
Exposure Category:	C
Topographic Factor:	1
Ice Thickness:	0.75 in
Wind Speed with Ice:	50 mph
Service Wind Speed:	60 mph

Table 1 - Proposed Equipment Configuration

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
124.0	124.0	3	quintel technology	AS-005245 Dual Bracket	---	---	Proposed
		6	quintel technology	QS6656-5D w/ Mount Pipe			
		3	samsung telecommunications	B2/B66A RRH-BR049			
		3	samsung telecommunications	B5/B13 RRH-BR04C			
		3	samsung telecommunications	CBRS RRH			
		3	samsung telecommunications	CBRS Antenna w/ Mount Pipe			
		6	decibel	DB844G65ZAXY w/ Mount Pipe	2 12	Hybrid Coax	Existing
		2	raycap	OVP BOX			
		1	pole mounts	14' Low Profile Platform			

Notes:
1) Proposed Equipment
2) Existing Equipment

Table 2 - Other Considered Equipment

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
164.0	169.0	1	bird technologies group	432E-83I-01-T	2 2 6 7	1/2 7/8 1-1/4 1-5/8	Existing
		4	generic	12' x 3" Dia Omni			
		1	sinclair	SC229-SFXLDF			
		2	sinclair	SC479-HF1LDF			
	166.0	1	generic	Camera			
	164.0	1	tower mounts	Low Profile Platform			
160.0	160.0	1	microwave dishes	2 ft standard	3	1-1/4	Existing
		2	microwave dishes	4 ft standard			
		3	tower mounts	4'x4" Pipe Mount			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
154.0	157.0	1	GPS	GPS	1 6 2 2	1/2 1-5/8 5/8 2" Conduit	Existing
	156.0	2	dragonwave	A-ANT-23G-2-C			
	154.0	3	alcatel lucent	FD RRH 4x45 1900			
		3	alcatel lucent	FD-RRH-2x50-800			
		3	alcatel lucent	TD-RRH8x20-25			
		3	argus technologies	LLPX310R W/ Mount Pipe			
		2	clearwire	Horizon ODU			
		1	powerwave technologies	P40-16-XLPP-RR-A w/ Mount Pipe			
		2	rfs celwave	APXVSPP18-C-A20 w/ Mount Pipe			
		3	rfs celwave	APXVTM14-C-120 w/ Mount Pipe			
		1	tower mounts	Low Profile Platform			
	151.5	3	generic	RRH FD R6			
		1	generic	Valmont Uni-Tri Bracket			
144.0	144.0	3	ericsson	AIR 3246 B66 w/ Mount Pipe	12 4 3	1-5/8 1-5/8 (E) 6x12 (E)	Existing
		3	ericsson	AIR 32 w/ Mount Pipe			
		3	ericsson	RADIO 4449 B12/B71			
		3	generic	TMA (10" x 8" x 3")			
		3	rfs celwave	APXVAARR24_43-U-NA20 w/ Mount Pipe			
		1	tower mounts	Low Profile Platform w/ support rail			
138.0	138.0	3	ericsson	RRUS 11	---	---	Existing
		3	ericsson	RRUS 32			
		1	generic	Valmont Uni-Tri Bracket			
		2	raycap	DC6-48-60-18-8F			
134.0	134.0	3	cci antennas	HPA-65R-BUU-H6 w/ Mount Pipe	12 6 2	1-5/8 AWG Fiber	Existing
		6	cci antennas	TPX-070821			
		6	ericsson	RRUS 32			
		3	ericsson	RRUS 4478 B14			
		3	kathrein	80010965 w/ Mount Pipe			
		1	pole mounts	16' Low Profile Platform			
		3	powerwave technologies	7770.00 w/ Mount Pipe			
		6	powerwave technologies	LGP21401			
		3	quintel technology	QS66512-2 w/ Mount Pipe			
		1	raycap	DC6-48-60-18-8F			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
114.0	116.5	1	decibel	DB586-Y	1 2 2	1/2 7/8 1-5/8	1
		1	telewave	ANT150F2			
	114.0	1	comprod	Comprod 531-70HD			
		1	generic	Tower Top Amplifier			
		1	tower mounts	Low Profile Platform			
	111.5	1	decibel	DB586-Y			
51.5	51.5	3	GPS	GPS	3	7/8 (E)	1

Notes:
1) Existing Equipment
(E) Coax mounted externally and exposed to the wind.

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
Structural Analysis	Centek, 07/05/2018	18058.64	On Air Engineering, LLC

3.1) Analysis Method

tnxTower (version 8.0.5.0), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A.

3.2) Assumptions

1) Tower and structures were built in accordance with the manufacturer's specifications.
2) The tower and structures have been maintained in accordance with the manufacturer's specification.
3) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
4) All coaxial cables are assumed to run internal to the monopole shaft, unless noted otherwise.
5) At the time of analysis, the tower manufacturer drawings, foundation drawings, and site-specific geotechnical report were not available. Therefore, we have assumed the tower geometry, foundation, and geotechnical information based on the referenced Structural Analysis.
6) The monopole manufacturer drawings are not available at the time of this analysis. Therefore, we have assumed the steel yield strength(s) (Fy) based on the referenced Structural Analysis as per the following:
   a) Anchor rods: ASTM A615 (Fu = 100 ksi, Fy = 75 ksi)
   b) Pole Shaft: ASTM A572 Gr 65
   c) Base Plate: ASTM A572 Gr 60
   d) Flange Plate: ASTM A36
   e) Flange Bolts: ASTM A325
7) The foundation drawings were not available at the time of this analysis. Therefore, we have assumed the material yield strengths (F'c and Fy) based on the referenced Structural Analysis as per the following:
   a) Concrete: 3000 PSI
   b) Foundation Reinforcing: ASTM A615 Gr 60
8) A site-specific geotechnical report is not available at the time of this analysis. Geotechnical information has been assumed based on the referenced Structural Analysis.

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

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	164 - 131.5	Pole	TP53.42x47x0.3125	1	-21.799	3227.770	14.5	Pass
L2	131.5 - 119.29	Pole	TP56.15x53.42x0.375	2	-23.852	4269.230	14.9	Pass
L3	119.29 - 78.79	Pole	TP62.97x54.0585x0.4375	3	-45.359	5667.380	36.5	Pass
L4	78.79 - 39.88	Pole	TP69.66x60.4813x0.5625	4	-69.533	8488.930	43.5	Pass
L5	39.88 - 1.5	Pole	TP76x66.7412x0.5625	5	-104.054	9152.010	63.6	Pass
							Summary	
						Pole (L5)	63.6	Pass
						RATING =	**63.6**	**Pass**

Table 5 - Tower Component Stresses vs. Capacity

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Flange Connection	131.5	56.4	Pass
1	Anchor Rods	0	67.1	Pass
1	Base Plate	0	52.7	Pass
1	Base Foundation Structural Steel	0	86.7	Pass
1	Base Foundation Soil Interaction	0	54.5	Pass

Structure Rating (max from all components) =	**86.7%**

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

4.1) Recommendations

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

We recommend a tower mapping, foundation mapping, and a site-specific geotechnical report be obtained.

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

1) Paul J. Ford and Company has not made a field inspection to verify the monopole dimensions or the antenna/coax loading. If the existing conditions are not as represented on these sketches, we should be contacted immediately to reevaluate any conclusions stated in this report.

2) No allowance was made for any damaged, missing, or rusted material. The analysis of this monopole assumes that no physical deterioration has occurred in any of the structural components of the monopole and that all the structural members have the same load carrying capacity as the day the monopole was erected.

3) It is not possible to have all the detailed information to perform a thorough analysis of every structural sub-component of an existing monopole. The structural analysis provided by Paul J. Ford and Company verifies the adequacy of the main structural members of the monopole. Paul J. Ford and Company provides a limited scope of service in that we cannot verify the adequacy of every weld, plate, connection detail, etc.

4) The structural integrity of the existing tower foundation can only be verified if exact foundation sizes and soil conditions are known. Paul J. Ford and Company will not accept any responsibility for the adequacy of the existing foundations unless the foundation sizes and a soils report are provided.

5) The monopole has been analyzed according to the minimum basic design wind velocity recommended by the Telecommunications Industry Association Standard ANSI/TIA-222-G. If the owner or local or state agencies require a higher design wind velocity, Paul J. Ford and Company should be made aware of this requirement.

6) The enclosed sketches are a schematic representation of the monopole we have analyzed. If any material is fabricated from these sketches, the fabricator shall be responsible for field verifying the existing conditions and for proper fit and clearance in the field.

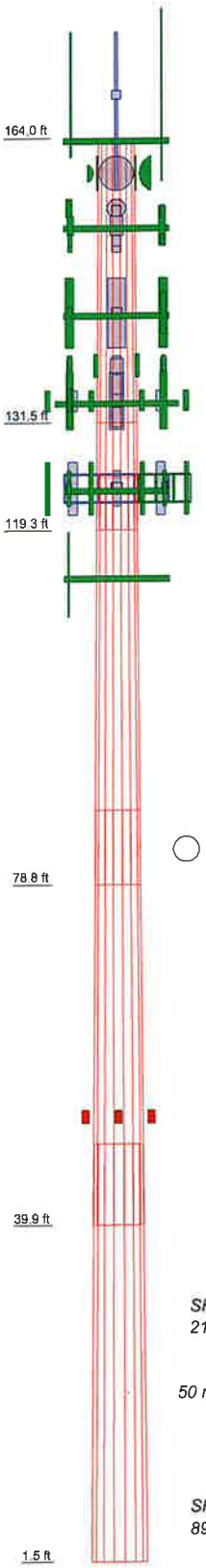
7) Miscellaneous items such as antenna mounts, etc., have not been designed or detailed as part of our work. We recommend that material of adequate size and strength be purchased from a reputable tower manufacturer.

8) Installation of new hand hole ports and/or cable access ports will not reduce the structural capacity of the monopole shaft, if the hand hole frames and/or cable access ports are properly designed and installed in accordance to proper procedures. Paul J. Ford and Company recommends that new hand holes and/or cable access port hole frames be purchased from the original pole manufacturer. The new hand hole and/or cable access frames shall be installed per the original manufacturer's installation procedures. Paul J. Ford and Company will design and provide installation procedures for new hand holes and/or cable access ports if required, as an additional scope of services

APPENDIX A

TNXTOWER OUTPUT

Section	1	2	3	4	5
Length (ft)	32.5000	12.2100	46.5000	47.3300	47.6300
Number of Sides	18	18	18	18	18
Thickness (in)	0.3125	0.3750	0.4375	0.5625	0.5625
Socket Length (ft)		6.0000	8.4200	9.2500	
Top Dia (in)	47.0000	53.4200	54.0585	60.4813	66.7412
Bot Dia (in)	53.4200	56.1500	62.9700	69.6600	76.0000
Grade	A572-65				
Weight (K)	5.5	2.7	12.8	18.5	20.5



ALL REACTIONS ARE FACTORED

AXIAL 180 K
SHEAR 21 K
MOMENT 2313 kip-ft
TORQUE 6 kip-ft
50 mph WIND - 0.7500 in ICE

AXIAL 104 K
SHEAR 89 K
MOMENT 8867 kip-ft
TORQUE 26 kip-ft
REACTIONS - 101 mph WIND

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower is located in Fairfield County, Connecticut.
2. Tower designed for Exposure C to the TIA-222-G Standard.
3. Tower designed for a 101 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 50 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Structure Class III.
7. Topographic Category 1 with Crest Height of 0.0000 ft
8. TOWER RATING: 63.6%

PJFLogo
Paul J. Ford and Company
250 E. Broad St., Ste 600
Columbus, OH 43215
Phone: 614-221-6679
FAX:

Job: *164-Ft Monopole / Greenwich CT*			
Project: *PJF 42919-0012.002.7805*			
Client: On Air Engineering	Drawn by: Angela Sage	App'd:	
Code: TIA-222-G	Date: 01/08/20	Scale: NTS	
Path:		Dwg No. E-1	

Tower Input Data

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

1) Tower is located in Fairfield County, Connecticut.
2) ASCE 7-10 Wind Data is used (wind speeds converted to nominal values).
3) Basic wind speed of 101 mph.
4) Structure Class III.
5) Exposure Category C.
6) Topographic Category 1.
7) Crest Height 0.0000 ft.
8) Nominal ice thickness of 0.7500 in.
9) Ice thickness is considered to increase with height.
10) Ice density of 56.000 pcf.
11) A wind speed of 50 mph is used in combination with ice.
12) Temperature drop of 50 °F.
13) Deflections calculated using a wind speed of 60 mph.
14) A non-linear (P-delta) analysis was used.
15) Pressures are calculated at each section.
16) Stress ratio used in pole design is 1.
17) Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

Consider Moments - Legs	Distribute Leg Loads As Uniform	Use ASCE 10 X-Brace Ly Rules
Consider Moments - Horizontals	Assume Legs Pinned	Calculate Redundant Bracing Forces
Consider Moments - Diagonals	√ Assume Rigid Index Plate	Ignore Redundant Members in FEA
Use Moment Magnification	√ Use Clear Spans For Wind Area	SR Leg Bolts Resist Compression
√ Use Code Stress Ratios	Use Clear Spans For KL/r	All Leg Panels Have Same Allowable
√ Use Code Safety Factors - Guys	Retension Guys To Initial Tension	Offset Girt At Foundation
Escalate Ice	√ Bypass Mast Stability Checks	√ Consider Feed Line Torque
Always Use Max Kz	√ Use Azimuth Dish Coefficients	Include Angle Block Shear Check
Use Special Wind Profile	√ Project Wind Area of Appurt.	Use TIA-222-G Bracing Resist. Exemption
Include Bolts In Member Capacity	Autocalc Torque Arm Areas	Use TIA-222-G Tension Splice Exemption
Leg Bolts Are At Top Of Section	Add IBC .6D+W Combination	Poles
Secondary Horizontal Braces Leg	Sort Capacity Reports By Component	√ Include Shear-Torsion Interaction
Use Diamond Inner Bracing (4 Sided)	Triangulate Diamond Inner Bracing	Always Use Sub-Critical Flow
SR Members Have Cut Ends	Treat Feed Line Bundles As Cylinder	Use Top Mounted Sockets
SR Members Are Concentric	Ignore KL/ry For 60 Deg. Angle Legs	Pole Without Linear Attachments
		Pole With Shroud Or No Appurtenances
		Outside and Inside Corner Radii Are Known

Tapered Pole Section Geometry

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	164.0000-131.5000	32.5000	0.000	18	47.0000	53.4200	0.3125	1.2500	A572-65 (65 ksi)
L2	131.5000-119.2900	12.2100	6.000	18	53.4200	56.1500	0.3750	1.5000	A572-65 (65 ksi)

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L3	119.2900-78.7900	46.5000	8.420	18	54.0585	62.9700	0.4375	1.7500	A572-65 (65 ksi)
L4	78.7900-39.8800	47.3300	9.250	18	60.4813	69.6600	0.5625	2.2500	A572-65 (65 ksi)
L5	39.8800-1.5000	47.6300		18	66.7412	76.0000	0.5625	2.2500	A572-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	47.6768	46.3082	12752.5270	16.5741	23.8760	534.1149	25521.8341	23.1585	7.7220	24.71
	54.1959	52.6760	18769.9004	18.8532	27.1374	691.6627	37564.4987	26.3430	8.8519	28.326
L2	54.1862	63.1368	22444.4518	18.8310	27.1374	827.0684	44918.4365	31.5744	8.7419	23.312
	56.9584	66.3862	26091.2194	19.8001	28.5242	914.7047	52216.7704	33.1994	9.2224	24.593
L3	55.9925	74.4594	27047.4669	19.0354	27.4617	984.9157	54130.5236	37.2368	8.7443	19.987
	63.8739	86.8342	42898.2727	22.1990	31.9888	1341.0421	85852.9920	43.4253	10.3127	23.572
L4	62.9857	106.9776	48524.0652	21.2712	30.7245	1579.3269	97111.9796	53.4990	9.6547	17.164
	70.6478	123.3649	74413.8720	24.5296	35.3873	2102.8424	148925.6597	61.6942	11.2702	20.036
L5	69.5098	118.1537	65376.3617	23.4934	33.9045	1928.2498	130838.7474	59.0881	10.7564	19.123
	77.0856	134.6842	96834.1984	26.7803	38.6080	2508.1382	193795.8137	67.3549	12.3860	22.02

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
L1 164.0000-131.5000				1	1	1			
L2 131.5000-119.2900				1	1	1			
L3 119.2900-78.7900				1	1	1			
L4 78.7900-39.8800				1	1	1			
L5 39.8800-1.5000				1	1	1			

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Sector	Exclude From Torque Calculation	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight klf
LDF7-50A (1 5/8" foam)	C	No	Surface Ar (CaAa)	144.0000 - 1.5000	4	4	0.000 0.000	1.9800		0.001
HCS 6X12 4AWG(1-5/8") ***	C	No	Surface Ar (CaAa)	144.0000 - 1.5000	3	3	0.000 0.000	1.6600		0.002
LDF5-50A (7/8" foam)	C	No	Surface Ar (CaAa)	51.5000 - 1.5000	3	3	0.000 0.000	1.0900		0.000

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight klf
LDF7-50A (1 5/8" foam)	C	No	No	Inside Pole	164.0000 - 1.5000	7	No Ice	0.0000	0.001
							1/2" Ice	0.0000	0.001
							1" Ice	0.0000	0.001
LDF4-50A (1/2" foam)	C	No	No	Inside Pole	164.0000 - 1.5000	2	No Ice	0.0000	0.000
							1/2" Ice	0.0000	0.000
							1" Ice	0.0000	0.000
LDF6-50 (1 1/4" foam)	C	No	No	Inside Pole	164.0000 - 1.5000	6	No Ice	0.0000	0.001
							1/2" Ice	0.0000	0.001
							1" Ice	0.0000	0.001
LDF5-50A (7/8" foam)	C	No	No	Inside Pole	164.0000 - 1.5000	2	No Ice	0.0000	0.000
							1/2" Ice	0.0000	0.000
							1" Ice	0.0000	0.000
***									
LDF4-50A (1/2" foam)	C	No	No	Inside Pole	154.0000 - 1.5000	1	No Ice	0.0000	0.000
							1/2" Ice	0.0000	0.000
							1" Ice	0.0000	0.000
LDF7-50A (1 5/8" foam)	C	No	No	Inside Pole	154.0000 - 1.5000	6	No Ice	0.0000	0.001
							1/2" Ice	0.0000	0.001
							1" Ice	0.0000	0.001
2" (Nominal) Conduit	C	No	No	Inside Pole	154.0000 - 1.5000	2	No Ice	0.0000	0.001
							1/2" Ice	0.0000	0.001
							1" Ice	0.0000	0.001
LDF4.5-50 (5/8" foam)	C	No	No	Inside Pole	154.0000 - 1.5000	2	No Ice	0.0000	0.000
							1/2" Ice	0.0000	0.000
							1" Ice	0.0000	0.000
***									
LDF7-50A (1 5/8" foam)	C	No	No	Inside Pole	144.0000 - 1.5000	12	No Ice	0.0000	0.001
							1/2" Ice	0.0000	0.001
							1" Ice	0.0000	0.001
***									
LDF7-50A (1 5/8" foam)	C	No	No	Inside Pole	134.0000 - 1.5000	12	No Ice	0.0000	0.001
							1/2" Ice	0.0000	0.001
							1" Ice	0.0000	0.001
#8 AWG Copper Wire	C	No	No	Inside Pole	134.0000 - 1.5000	6	No Ice	0.0000	0.000
							1/2" Ice	0.0000	0.000
							1" Ice	0.0000	0.000
1" Fiber	C	No	No	Inside Pole	134.0000 - 1.5000	2	No Ice	0.0000	0.001
							1/2" Ice	0.0000	0.001
							1" Ice	0.0000	0.001
***									
Coax	C	No	No	Inside Pole	124.0000 - 1.5000	12	No Ice	0.0000	0.001
							1/2" Ice	0.0000	0.001
							1" Ice	0.0000	0.001
Hybrid	C	No	No	Inside Pole	124.0000 - 1.5000	2	No Ice	0.0000	0.001
							1/2" Ice	0.0000	0.001
							1" Ice	0.0000	0.001
***									
LDF5-50A (7/8" foam)	C	No	No	Inside Pole	114.0000 - 1.5000	2	No Ice	0.0000	0.000
							1/2" Ice	0.0000	0.000
							1" Ice	0.0000	0.000
LDF7-50A (1 5/8" foam)	C	No	No	Inside Pole	114.0000 - 1.5000	2	No Ice	0.0000	0.001
							1/2" Ice	0.0000	0.001
							1" Ice	0.0000	0.001
LDF4-50A (1/2" foam)	C	No	No	Inside Pole	114.0000 - 1.5000	1	No Ice	0.0000	0.000
							1/2" Ice	0.0000	0.000
							1" Ice	0.0000	0.000

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	164.0000-131.5000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	16.125	0.000	0.844
L2	131.5000-119.2900	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	15.751	0.000	0.724
L3	119.2900-78.7900	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	52.245	0.000	2.815
L4	78.7900-39.8800	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	53.994	0.000	2.730
L5	39.8800-1.5000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	62.060	0.000	2.719

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	164.0000-131.5000	A	2.178	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	33.768	0.000	1.324
L2	131.5000-119.2900	A	2.143	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	32.770	0.000	1.183
L3	119.2900-78.7900	A	2.092	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	108.696	0.000	4.339
L4	78.7900-39.8800	A	1.988	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	114.277	0.000	4.289
L5	39.8800-1.5000	A	1.793	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	134.806	0.000	4.458

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	164.0000-131.5000	0.0000	4.1185	0.0000	3.9189
L2	131.5000-119.2900	0.0000	8.4959	0.0000	7.4529
L3	119.2900-78.7900	0.0000	8.6655	0.0000	7.6904
L4	78.7900-39.8800	0.0000	9.4059	0.0000	8.4977
L5	39.8800-1.5000	0.0000	10.7039	0.0000	9.7442

Note: For pole sections, center of pressure calculations do not consider feed line shielding.

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L1	12	LDF7-50A (1 5/8" foam)	131.50 - 144.00	1.0000	1.0000
L1	13	HCS 6X12 4AWG(1-5/8")	131.50 - 144.00	1.0000	1.0000
L2	12	LDF7-50A (1 5/8" foam)	119.29 - 131.50	1.0000	1.0000
L2	13	HCS 6X12 4AWG(1-5/8")	119.29 - 131.50	1.0000	1.0000
L3	12	LDF7-50A (1 5/8" foam)	78.79 - 119.29	1.0000	1.0000
L3	13	HCS 6X12 4AWG(1-5/8")	78.79 - 119.29	1.0000	1.0000
L3	26	LDF5-50A (7/8" foam)	78.79 - 51.50	1.0000	1.0000
L4	12	LDF7-50A (1 5/8" foam)	39.88 - 78.79	1.0000	1.0000
L4	13	HCS 6X12 4AWG(1-5/8")	39.88 - 78.79	1.0000	1.0000
L4	26	LDF5-50A (7/8" foam)	39.88 - 51.50	1.0000	1.0000

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
4'x4" Pipe Mount	A	From Leg	0.5000 0.000 0.000	0.000	160.0000	No Ice 1/2" Ice 1" Ice	1.0956 1.5766 1.8403	1.0956 1.5766 1.8403	0.044 0.057 0.073
4'x4" Pipe Mount	B	From Leg	0.5000 0.000 0.000	0.000	160.0000	No Ice 1/2" Ice 1" Ice	1.0956 1.5766 1.8403	1.0956 1.5766 1.8403	0.044 0.057 0.073
4'x4" Pipe Mount	C	From Leg	0.5000 0.000 0.000	0.000	160.0000	No Ice 1/2" Ice 1" Ice	1.0956 1.5766 1.8403	1.0956 1.5766 1.8403	0.044 0.057 0.073
12' x 3" Dia Omni	A	From Leg	4.0000 0.000 5.000	0.000	164.0000	No Ice 1/2" Ice 1" Ice	3.6000 4.8300 6.0800	3.6000 4.8300 6.0800	0.040 0.060 0.090
12' x 3" Dia Omni	B	From Leg	4.0000 0.000 5.000	0.000	164.0000	No Ice 1/2" Ice 1" Ice	3.6000 4.8300 6.0800	3.6000 4.8300 6.0800	0.040 0.060 0.090
12' x 3" Dia Omni	C	From Leg	4.0000 0.000 5.000	0.000	164.0000	No Ice 1/2" Ice 1" Ice	3.6000 4.8300 6.0800	3.6000 4.8300 6.0800	0.040 0.060 0.090
12' x 3" Dia Omni	C	From Leg	4.0000 0.000 5.000	0.000	164.0000	No Ice 1/2" Ice 1" Ice	3.6000 4.8300 6.0800	3.6000 4.8300 6.0800	0.040 0.060 0.090
Camera	B	From Leg	4.0000 0.000 2.000	0.000	164.0000	No Ice 1/2" Ice 1" Ice	3.0000 4.0000 5.0000	3.0000 4.0000 5.0000	0.100 0.150 0.200
SC479-HF1LDF	A	From Leg	4.0000 0.000 5.000	0.000	164.0000	No Ice 1/2" Ice 1" Ice	4.6299 6.5062 7.9979	4.6299 6.5062 7.9979	0.034 0.070 0.115
SC229-SFXLDF	B	From Leg	4.0000 0.000 5.000	0.000	164.0000	No Ice 1/2" Ice 1" Ice	5.9500 7.9667 10.0000	5.9500 7.9667 10.0000	0.032 0.075 0.130
SC479-HF1LDF	C	From Leg	4.0000 0.000 5.000	0.000	164.0000	No Ice 1/2" Ice	4.6299 6.5062 7.9979	4.6299 6.5062 7.9979	0.034 0.070 0.115

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						1" Ice			
432E-83I-01-T	A	From Leg	4.0000 0.000 5.000	0.000	164.0000	No Ice 1/2" Ice 1" Ice	1.2000 1.3370 1.4815	0.7500 0.8620 0.9815	0.025 0.037 0.050
Low Profile Platform	C	None		0.000	164.0000	No Ice 1/2" Ice 1" Ice	15.7000 20.1000 24.5000	15.7000 20.1000 24.5000	1.300 1.760 2.220
***									
LLPX310R W/ Mount Pipe	A	From Leg	4.0000 0.000 0.000	0.000	154.0000	No Ice 1/2" Ice 1" Ice	3.8800 4.2900 4.7200	2.3600 2.7300 3.1200	0.057 0.091 0.133
LLPX310R W/ Mount Pipe	B	From Leg	4.0000 0.000 0.000	0.000	154.0000	No Ice 1/2" Ice 1" Ice	3.8800 4.2900 4.7200	2.3600 2.7300 3.1200	0.057 0.091 0.133
LLPX310R W/ Mount Pipe	C	From Leg	4.0000 0.000 0.000	0.000	154.0000	No Ice 1/2" Ice 1" Ice	3.8800 4.2900 4.7200	2.3600 2.7300 3.1200	0.057 0.091 0.133
RRH FD R6	A	From Leg	4.0000 0.000 -2.500	0.000	154.0000	No Ice 1/2" Ice 1" Ice	1.8000 1.9900 2.1800	0.7800 0.9200 1.0700	0.030 0.040 0.060
RRH FD R6	B	From Leg	4.0000 0.000 -2.500	0.000	154.0000	No Ice 1/2" Ice 1" Ice	1.8000 1.9900 2.1800	0.7800 0.9200 1.0700	0.030 0.040 0.060
RRH FD R6	C	From Leg	4.0000 0.000 -2.500	0.000	154.0000	No Ice 1/2" Ice 1" Ice	1.8000 1.9900 2.1800	0.7800 0.9200 1.0700	0.030 0.040 0.060
Clearwire ODU	A	From Leg	4.0000 0.000 0.000	0.000	154.0000	No Ice 1/2" Ice 1" Ice	1.6700 1.8331 2.0037	0.2946 0.4028 0.5140	0.012 0.021 0.032
Clearwire ODU	C	From Leg	4.0000 0.000 0.000	0.000	154.0000	No Ice 1/2" Ice 1" Ice	1.6700 1.8331 2.0037	0.2946 0.4028 0.5140	0.012 0.021 0.032
APXVSPP18-C-A20_TIA w/ Mount Pipe	A	From Leg	4.0000 0.000 0.000	0.000	154.0000	No Ice 1/2" Ice 1" Ice	8.2619 8.8215 9.3462	7.4708 8.6564 9.5559	0.095 0.166 0.244
P40-16-XLPP-RR-A w/ Mount Pipe	B	From Leg	4.0000 0.000 0.000	0.000	154.0000	No Ice 1/2" Ice 1" Ice	8.2425 8.7006 9.1551	4.8250 5.5706 6.2654	0.073 0.136 0.205
APXVSPP18-C-A20_TIA w/ Mount Pipe	C	From Leg	4.0000 0.000 0.000	0.000	154.0000	No Ice 1/2" Ice 1" Ice	8.2619 8.8215 9.3462	7.4708 8.6564 9.5559	0.095 0.166 0.244
FD RRH 4x45 1900	A	From Leg	4.0000 0.000 0.000	0.000	154.0000	No Ice 1/2" Ice 1" Ice	2.3199 2.5246 2.7367	2.2384 2.4409 2.6509	0.060 0.083 0.109
FD RRH 4x45 1900	B	From Leg	4.0000 0.000 0.000	0.000	154.0000	No Ice 1/2" Ice 1" Ice	2.3199 2.5246 2.7367	2.2384 2.4409 2.6509	0.060 0.083 0.109
FD RRH 4x45 1900	C	From Leg	4.0000 0.000 0.000	0.000	154.0000	No Ice 1/2" Ice	2.3199 2.5246 2.7367	2.2384 2.4409 2.6509	0.060 0.083 0.109

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						1" Ice			
FD-RRH-2x50-800	A	From Leg	4.0000 0.000 0.000	0.000	154.0000	No Ice 1/2" Ice 1" Ice	1.3617 1.5187 1.6831	3.0083 3.2231 3.4454	0.053 0.077 0.104
FD-RRH-2x50-800	B	From Leg	4.0000 0.000 0.000	0.000	154.0000	No Ice 1/2" Ice 1" Ice	1.3617 1.5187 1.6831	3.0083 3.2231 3.4454	0.053 0.077 0.104
FD-RRH-2x50-800	C	From Leg	4.0000 0.000 0.000	0.000	154.0000	No Ice 1/2" Ice 1" Ice	1.3617 1.5187 1.6831	3.0083 3.2231 3.4454	0.053 0.077 0.104
GPS	C	From Leg	4.0000 0.000 3.000	0.000	154.0000	No Ice 1/2" Ice 1" Ice	1.0000 1.5000 2.0000	1.0000 1.5000 2.0000	0.010 0.010 0.020
APXVTM14-C-120_TIA w/ Mount Pipe	A	From Leg	4.0000 0.000 0.000	0.000	154.0000	No Ice 1/2" Ice 1" Ice	6.5799 7.0306 7.4733	4.9591 5.7544 6.4723	0.077 0.132 0.193
APXVTM14-C-120_TIA w/ Mount Pipe	B	From Leg	4.0000 0.000 0.000	0.000	154.0000	No Ice 1/2" Ice 1" Ice	6.5799 7.0306 7.4733	4.9591 5.7544 6.4723	0.077 0.132 0.193
APXVTM14-C-120_TIA w/ Mount Pipe	C	From Leg	4.0000 0.000 0.000	0.000	154.0000	No Ice 1/2" Ice 1" Ice	6.5799 7.0306 7.4733	4.9591 5.7544 6.4723	0.077 0.132 0.193
TD-RRH8x20-25	A	From Leg	4.0000 0.000 0.000	0.000	154.0000	No Ice 1/2" Ice 1" Ice	4.0455 4.2975 4.5570	1.5345 1.7142 1.9008	0.070 0.097 0.128
TD-RRH8x20-25	B	From Leg	4.0000 0.000 0.000	0.000	154.0000	No Ice 1/2" Ice 1" Ice	4.0455 4.2975 4.5570	1.5345 1.7142 1.9008	0.070 0.097 0.128
TD-RRH8x20-25	C	From Leg	4.0000 0.000 0.000	0.000	154.0000	No Ice 1/2" Ice 1" Ice	4.0455 4.2975 4.5570	1.5345 1.7142 1.9008	0.070 0.097 0.128
Valmont Uni-Tri Bracket	A	From Leg	4.0000 0.000 -2.500	0.000	154.0000	No Ice 1/2" Ice 1" Ice	1.7500 1.9400 2.1300	1.7500 1.9400 2.1300	0.290 0.310 0.320
Low Profile Platform	C	None		0.000	154.0000	No Ice 1/2" Ice 1" Ice	15.7000 20.1000 24.5000	15.7000 20.1000 24.5000	1.300 1.760 2.220
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AIR 3246 B66 w/ Mount Pipe	A	From Leg	4.0000 0.000 0.000	0.000	144.0000	No Ice 1/2" Ice 1" Ice	8.1769 8.6563 9.1243	6.5590 7.3933 8.1279	0.201 0.272 0.349
AIR 3246 B66 w/ Mount Pipe	B	From Leg	4.0000 0.000 0.000	0.000	144.0000	No Ice 1/2" Ice 1" Ice	8.1769 8.6563 9.1243	6.5590 7.3933 8.1279	0.201 0.272 0.349
AIR 3246 B66 w/ Mount Pipe	C	From Leg	4.0000 0.000 0.000	0.000	144.0000	No Ice 1/2" Ice 1" Ice	8.1769 8.6563 9.1243	6.5590 7.3933 8.1279	0.201 0.272 0.349
AIR 32 w/ Mount Pipe	A	From Leg	4.0000 0.000 0.000	0.000	144.0000	No Ice 1/2" Ice	6.7072 7.1410 7.5737	6.0286 6.7836 7.4874	0.126 0.186 0.254

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
AIR 32 w/ Mount Pipe	B	From Leg	4.0000 0.000 0.000	0.000	144.0000	1" Ice No Ice 1/2" Ice 1" Ice	6.7072 7.1410 7.5737	6.0286 6.7836 7.4874	0.126 0.186 0.254
AIR 32 w/ Mount Pipe	C	From Leg	4.0000 0.000 0.000	0.000	144.0000	1" Ice No Ice 1/2" Ice 1" Ice	6.7072 7.1410 7.5737	6.0286 6.7836 7.4874	0.126 0.186 0.254
APXVAARR24_43-U-NA20_TIA w/ Mount Pipe	A	From Leg	4.0000 0.000 0.000	0.000	144.0000	1" Ice No Ice 1/2" Ice 1" Ice	20.4801 21.2306 21.9900	11.0240 12.5496 14.0992	0.186 0.322 0.469
APXVAARR24_43-U-NA20_TIA w/ Mount Pipe	B	From Leg	4.0000 0.000 0.000	0.000	144.0000	1" Ice No Ice 1/2" Ice 1" Ice	20.4801 21.2306 21.9900	11.0240 12.5496 14.0992	0.186 0.322 0.469
APXVAARR24_43-U-NA20_TIA w/ Mount Pipe	C	From Leg	4.0000 0.000 0.000	0.000	144.0000	1" Ice No Ice 1/2" Ice 1" Ice	20.4801 21.2306 21.9900	11.0240 12.5496 14.0992	0.186 0.322 0.469
RADIO 4449 B12/B71	A	From Leg	4.0000 0.000 0.000	0.000	144.0000	1" Ice No Ice 1/2" Ice 1" Ice	1.6500 1.8104 1.9781	1.1625 1.3012 1.4473	0.074 0.090 0.109
RADIO 4449 B12/B71	B	From Leg	4.0000 0.000 0.000	0.000	144.0000	1" Ice No Ice 1/2" Ice 1" Ice	1.6500 1.8104 1.9781	1.1625 1.3012 1.4473	0.074 0.090 0.109
RADIO 4449 B12/B71	C	From Leg	4.0000 0.000 0.000	0.000	144.0000	1" Ice No Ice 1/2" Ice 1" Ice	1.6500 1.8104 1.9781	1.1625 1.3012 1.4473	0.074 0.090 0.109
TMA (10" x 8" x 3")	A	From Leg	4.0000 0.000 0.000	0.000	144.0000	1" Ice No Ice 1/2" Ice 1" Ice	0.6667 0.7704 0.8815	0.2600 0.3300 0.4100	0.025 0.031 0.038
TMA (10" x 8" x 3")	B	From Leg	4.0000 0.000 0.000	0.000	144.0000	1" Ice No Ice 1/2" Ice 1" Ice	0.6667 0.7704 0.8815	0.2600 0.3300 0.4100	0.025 0.031 0.038
TMA (10" x 8" x 3")	C	From Leg	4.0000 0.000 0.000	0.000	144.0000	1" Ice No Ice 1/2" Ice 1" Ice	0.6667 0.7704 0.8815	0.2600 0.3300 0.4100	0.025 0.031 0.038
Low Profile Platform	C	None		0.000	144.0000	No Ice 1/2" Ice 1" Ice	15.7000 20.1000 24.5000	15.7000 20.1000 24.5000	1.300 1.760 2.220
2.375" OD x 16' Mount Pipe	A	None		0.000	144.0000	No Ice 1/2" Ice 1" Ice	3.8000 5.4281 7.0729	3.8000 5.4281 7.0729	0.058 0.086 0.125
2.375" OD x 16' Mount Pipe	B	None		0.000	144.0000	No Ice 1/2" Ice 1" Ice	3.8000 5.4281 7.0729	3.8000 5.4281 7.0729	0.058 0.086 0.125
2.375" OD x 16' Mount Pipe	C	None		0.000	144.0000	No Ice 1/2" Ice 1" Ice	3.8000 5.4281 7.0729	3.8000 5.4281 7.0729	0.058 0.086 0.125
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RRUS 11	A	From Leg	4.0000 0.000 0.000	0.000	138.0000	No Ice 1/2" Ice	2.7908 2.9984 3.2134	1.1923 1.3395 1.4957	0.051 0.072 0.095

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						1" Ice			
RRUS 11	B	From Leg	4.0000 0.000 0.000	0.000	138.0000	No Ice 1/2" Ice 1" Ice	2.7908 2.9984 3.2134	1.1923 1.3395 1.4957	0.051 0.072 0.095
RRUS 11	C	From Leg	4.0000 0.000 0.000	0.000	138.0000	No Ice 1/2" Ice 1" Ice	2.7908 2.9984 3.2134	1.1923 1.3395 1.4957	0.051 0.072 0.095
RRUS 32	A	From Leg	4.0000 0.000 0.000	0.000	138.0000	No Ice 1/2" Ice 1" Ice	2.8571 3.0830 3.3163	1.7766 1.9677 2.1658	0.055 0.077 0.103
RRUS 32	B	From Leg	4.0000 0.000 0.000	0.000	138.0000	No Ice 1/2" Ice 1" Ice	2.8571 3.0830 3.3163	1.7766 1.9677 2.1658	0.055 0.077 0.103
RRUS 32	C	From Leg	4.0000 0.000 0.000	0.000	138.0000	No Ice 1/2" Ice 1" Ice	2.8571 3.0830 3.3163	1.7766 1.9677 2.1658	0.055 0.077 0.103
DC6-48-60-18-8F	B	From Leg	0.5000 0.000 0.000	0.000	138.0000	No Ice 1/2" Ice 1" Ice	1.2117 1.8924 2.1051	1.2117 1.8924 2.1051	0.033 0.055 0.080
DC6-48-60-18-8F	C	From Leg	0.5000 0.000 0.000	0.000	138.0000	No Ice 1/2" Ice 1" Ice	1.2117 1.8924 2.1051	1.2117 1.8924 2.1051	0.033 0.055 0.080
Valmont Uni-Tri Bracket	C	None		0.000	138.0000	No Ice 1/2" Ice 1" Ice	1.7500 1.9400 2.1300	1.7500 1.9400 2.1300	0.290 0.310 0.320
7770.00 w/ Mount Pipe	A	From Leg	4.0000 0.000 0.000	0.000	134.0000	No Ice 1/2" Ice 1" Ice	5.7460 6.1791 6.6067	4.2543 5.0137 5.7109	0.055 0.103 0.157
7770.00 w/ Mount Pipe	B	From Leg	4.0000 0.000 0.000	0.000	134.0000	No Ice 1/2" Ice 1" Ice	5.7460 6.1791 6.6067	4.2543 5.0137 5.7109	0.055 0.103 0.157
7770.00 w/ Mount Pipe	C	From Leg	4.0000 0.000 0.000	0.000	134.0000	No Ice 1/2" Ice 1" Ice	5.7460 6.1791 6.6067	4.2543 5.0137 5.7109	0.055 0.103 0.157
QS66512-2_TIA w/ Mount Pipe	A	From Leg	4.0000 0.000 0.000	0.000	134.0000	No Ice 1/2" Ice 1" Ice	8.3708 8.9314 9.4571	8.4625 9.6573 10.5478	0.137 0.212 0.296
QS66512-2_TIA w/ Mount Pipe	B	From Leg	4.0000 0.000 0.000	0.000	134.0000	No Ice 1/2" Ice 1" Ice	8.3708 8.9314 9.4571	8.4625 9.6573 10.5478	0.137 0.212 0.296
QS66512-2_TIA w/ Mount Pipe	C	From Leg	4.0000 0.000 0.000	0.000	134.0000	No Ice 1/2" Ice 1" Ice	8.3708 8.9314 9.4571	8.4625 9.6573 10.5478	0.137 0.212 0.296
80010965_TIA w/ Mount Pipe	A	From Leg	4.0000 0.000 0.000	0.000	134.0000	No Ice 1/2" Ice 1" Ice	14.0513 14.6885 15.3033	7.6284 8.9027 9.9625	0.136 0.233 0.338
80010965_TIA w/ Mount Pipe	B	From Leg	4.0000 0.000 0.000	0.000	134.0000	No Ice 1/2" Ice 1" Ice	14.0513 14.6885 15.3033	7.6284 8.9027 9.9625	0.136 0.233 0.338

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
80010965_TIA w/ Mount Pipe	C	From Leg	4.0000 0.000 0.000	0.000	134.0000	No Ice 1/2" Ice 1" Ice	14.0513 14.6885 15.3033	7.6284 8.9027 9.9625	0.136 0.233 0.338
HPA-65R-BUU-H6_TIA w/ Mount Pipe	A	From Leg	4.0000 0.000 0.000	0.000	134.0000	No Ice 1/2" Ice 1" Ice	9.7235 10.2979 10.8378	7.1545 8.3411 9.2445	0.074 0.149 0.233
HPA-65R-BUU-H6_TIA w/ Mount Pipe	B	From Leg	4.0000 0.000 0.000	0.000	134.0000	No Ice 1/2" Ice 1" Ice	9.7235 10.2979 10.8378	7.1545 8.3411 9.2445	0.074 0.149 0.233
HPA-65R-BUU-H6_TIA w/ Mount Pipe	C	From Leg	4.0000 0.000 0.000	0.000	134.0000	No Ice 1/2" Ice 1" Ice	9.7235 10.2979 10.8378	7.1545 8.3411 9.2445	0.074 0.149 0.233
(2) LGP21401	A	From Leg	4.0000 0.000 0.000	0.000	134.0000	No Ice 1/2" Ice 1" Ice	1.1040 1.2388 1.3810	0.3471 0.4422 0.5444	0.014 0.021 0.030
(2) LGP21401	B	From Leg	4.0000 0.000 0.000	0.000	134.0000	No Ice 1/2" Ice 1" Ice	1.1040 1.2388 1.3810	0.3471 0.4422 0.5444	0.014 0.021 0.030
(2) LGP21401	C	From Leg	4.0000 0.000 0.000	0.000	134.0000	No Ice 1/2" Ice 1" Ice	1.1040 1.2388 1.3810	0.3471 0.4422 0.5444	0.014 0.021 0.030
(2) TPX-070821	A	From Leg	4.0000 0.000 0.000	0.000	134.0000	No Ice 1/2" Ice 1" Ice	0.4688 0.5585 0.6556	0.1009 0.1471 0.2020	0.008 0.011 0.016
(2) TPX-070821	B	From Leg	4.0000 0.000 0.000	0.000	134.0000	No Ice 1/2" Ice 1" Ice	0.4688 0.5585 0.6556	0.1009 0.1471 0.2020	0.008 0.011 0.016
(2) TPX-070821	C	From Leg	4.0000 0.000 0.000	0.000	134.0000	No Ice 1/2" Ice 1" Ice	0.4688 0.5585 0.6556	0.1009 0.1471 0.2020	0.008 0.011 0.016
(2) RRUS 32	A	From Leg	4.0000 0.000 0.000	0.000	134.0000	No Ice 1/2" Ice 1" Ice	2.8571 3.0830 3.3163	1.7766 1.9677 2.1658	0.055 0.077 0.103
(2) RRUS 32	B	From Leg	4.0000 0.000 0.000	0.000	134.0000	No Ice 1/2" Ice 1" Ice	2.8571 3.0830 3.3163	1.7766 1.9677 2.1658	0.055 0.077 0.103
(2) RRUS 32	C	From Leg	4.0000 0.000 0.000	0.000	134.0000	No Ice 1/2" Ice 1" Ice	2.8571 3.0830 3.3163	1.7766 1.9677 2.1658	0.055 0.077 0.103
RRUS 4478 B14	A	From Leg	4.0000 0.000 0.000	0.000	134.0000	No Ice 1/2" Ice 1" Ice	2.0212 2.1999 2.3860	1.2459 1.3960 1.5536	0.059 0.077 0.097
RRUS 4478 B14	B	From Leg	4.0000 0.000 0.000	0.000	134.0000	No Ice 1/2" Ice 1" Ice	2.0212 2.1999 2.3860	1.2459 1.3960 1.5536	0.059 0.077 0.097
RRUS 4478 B14	C	From Leg	4.0000 0.000 0.000	0.000	134.0000	No Ice 1/2" Ice 1" Ice	2.0212 2.1999 2.3860	1.2459 1.3960 1.5536	0.059 0.077 0.097
DC6-48-60-18-8F	C	From Leg	4.0000	0.000	134.0000	No Ice	1.2117	1.2117	0.033

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.000 0.000			1/2" Ice 1" Ice	1.8924 2.1051	1.8924 2.1051	0.055 0.080
16' Low Profile Platform	C	None		0.000	134.0000	No Ice 1/2" Ice 1" Ice	40.0000 50.0000 60.0000	40.0000 50.0000 60.0000	1.875 3.000 4.125
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DB844G65ZAXY w/ Mount Pipe	A	From Leg	4.0000 0.000 0.000	0.000	124.0000	No Ice 1/2" Ice 1" Ice	4.5782 4.9555 5.3404	4.8023 5.4160 6.0401	0.034 0.080 0.132
DB844G65ZAXY w/ Mount Pipe	B	From Leg	4.0000 0.000 0.000	0.000	124.0000	No Ice 1/2" Ice 1" Ice	4.5782 4.9555 5.3404	4.8023 5.4160 6.0401	0.034 0.080 0.132
DB844G65ZAXY w/ Mount Pipe	C	From Leg	4.0000 0.000 0.000	0.000	124.0000	No Ice 1/2" Ice 1" Ice	4.5782 4.9555 5.3404	4.8023 5.4160 6.0401	0.034 0.080 0.132
DB844G65ZAXY w/ Mount Pipe	A	From Leg	4.0000 0.000 0.000	0.000	124.0000	No Ice 1/2" Ice 1" Ice	4.5782 4.9555 5.3404	4.8023 5.4160 6.0401	0.034 0.080 0.132
DB844G65ZAXY w/ Mount Pipe	B	From Leg	4.0000 0.000 0.000	0.000	124.0000	No Ice 1/2" Ice 1" Ice	4.5782 4.9555 5.3404	4.8023 5.4160 6.0401	0.034 0.080 0.132
DB844G65ZAXY w/ Mount Pipe	C	From Leg	4.0000 0.000 0.000	0.000	124.0000	No Ice 1/2" Ice 1" Ice	4.5782 4.9555 5.3404	4.8023 5.4160 6.0401	0.034 0.080 0.132
(2) QS6656-5D_TIA w/ Mount Pipe	A	From Leg	4.0000 0.000 0.000	0.000	124.0000	No Ice 1/2" Ice 1" Ice	8.3708 8.9314 9.4571	8.4625 9.6573 10.5478	0.114 0.189 0.273
(2) QS6656-5D_TIA w/ Mount Pipe	B	From Leg	4.0000 0.000 0.000	0.000	124.0000	No Ice 1/2" Ice 1" Ice	8.3708 8.9314 9.4571	8.4625 9.6573 10.5478	0.114 0.189 0.273
(2) QS6656-5D_TIA w/ Mount Pipe	C	From Leg	4.0000 0.000 0.000	0.000	124.0000	No Ice 1/2" Ice 1" Ice	8.3708 8.9314 9.4571	8.4625 9.6573 10.5478	0.114 0.189 0.273
AS-005245 Dual Bracket	A	From Leg	4.0000 0.000 0.000	0.000	124.0000	No Ice 1/2" Ice 1" Ice	0.0000 0.0000 0.0000	0.0000 0.0000 0.0000	0.000 0.000 0.000
AS-005245 Dual Bracket	B	From Leg	4.0000 0.000 0.000	0.000	124.0000	No Ice 1/2" Ice 1" Ice	0.0000 0.0000 0.0000	0.0000 0.0000 0.0000	0.000 0.000 0.000
AS-005245 Dual Bracket	C	From Leg	4.0000 0.000 0.000	0.000	124.0000	No Ice 1/2" Ice 1" Ice	0.0000 0.0000 0.0000	0.0000 0.0000 0.0000	0.000 0.000 0.000
CBRS w/ Mount Pipe	A	From Leg	4.0000 0.000 0.000	0.000	124.0000	No Ice 1/2" Ice 1" Ice	1.7135 1.9342 2.1662	1.1683 1.4373 1.7226	0.032 0.050 0.072
CBRS w/ Mount Pipe	B	From Leg	4.0000 0.000 0.000	0.000	124.0000	No Ice 1/2" Ice 1" Ice	1.7135 1.9342 2.1662	1.1683 1.4373 1.7226	0.032 0.050 0.072
CBRS w/ Mount Pipe	C	From Leg	4.0000	0.000	124.0000	No Ice	1.7135	1.1683	0.032

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.000			1/2" Ice	1.9342	1.4373	0.050
			0.000			1" Ice	2.1662	1.7226	0.072
B2/B66A RRH-BR049	A	From Leg	4.0000	0.000	124.0000	No Ice	1.8750	1.0125	0.070
			0.000			1/2" Ice	2.0454	1.1445	0.087
			0.000			1" Ice	2.2231	1.2840	0.106
B2/B66A RRH-BR049	B	From Leg	4.0000	0.000	124.0000	No Ice	1.8750	1.0125	0.070
			0.000			1/2" Ice	2.0454	1.1445	0.087
			0.000			1" Ice	2.2231	1.2840	0.106
B2/B66A RRH-BR049	C	From Leg	4.0000	0.000	124.0000	No Ice	1.8750	1.0125	0.070
			0.000			1/2" Ice	2.0454	1.1445	0.087
			0.000			1" Ice	2.2231	1.2840	0.106
B5/B13 RRH-BR04C	A	From Leg	4.0000	0.000	124.0000	No Ice	1.8750	1.0125	0.070
			0.000			1/2" Ice	2.0454	1.1445	0.087
			0.000			1" Ice	2.2231	1.2840	0.106
B5/B13 RRH-BR04C	B	From Leg	4.0000	0.000	124.0000	No Ice	1.8750	1.0125	0.070
			0.000			1/2" Ice	2.0454	1.1445	0.087
			0.000			1" Ice	2.2231	1.2840	0.106
B5/B13 RRH-BR04C	C	From Leg	4.0000	0.000	124.0000	No Ice	1.8750	1.0125	0.070
			0.000			1/2" Ice	2.0454	1.1445	0.087
			0.000			1" Ice	2.2231	1.2840	0.106
CBRS	A	From Leg	4.0000	0.000	124.0000	No Ice	1.5339	0.7466	0.023
			0.000			1/2" Ice	1.6906	0.8657	0.035
			0.000			1" Ice	1.8548	0.9917	0.049
CBRS	B	From Leg	4.0000	0.000	124.0000	No Ice	1.5339	0.7466	0.023
			0.000			1/2" Ice	1.6906	0.8657	0.035
			0.000			1" Ice	1.8548	0.9917	0.049
CBRS	C	From Leg	4.0000	0.000	124.0000	No Ice	1.5339	0.7466	0.023
			0.000			1/2" Ice	1.6906	0.8657	0.035
			0.000			1" Ice	1.8548	0.9917	0.049
OVP BOX	A	From Leg	4.0000	0.000	124.0000	No Ice	4.0498	2.9585	0.032
			0.000			1/2" Ice	4.3079	3.1916	0.068
			0.000			1" Ice	4.5735	3.4322	0.107
OVP BOX	B	From Leg	4.0000	0.000	124.0000	No Ice	4.0498	2.9585	0.032
			0.000			1/2" Ice	4.3079	3.1916	0.068
			0.000			1" Ice	4.5735	3.4322	0.107
14' Low Profile Platform	C	None		0.000	124.0000	No Ice	35.0000	35.0000	1.300
						1/2" Ice	40.0000	40.0000	2.100
						1" Ice	45.0000	45.0000	2.900
***									
DB586-Y	C	From Leg	4.0000	0.000	114.0000	No Ice	1.0144	1.0144	0.008
			0.000			1/2" Ice	1.2816	1.2816	0.017
			-2.500			1" Ice	1.5582	1.5582	0.028
DB586-Y	C	From Leg	4.0000	0.000	114.0000	No Ice	1.0144	1.0144	0.008
			0.000			1/2" Ice	1.2816	1.2816	0.017
			2.500			1" Ice	1.5582	1.5582	0.028
Comprod 531-70HD	C	From Leg	4.0000	0.000	114.0000	No Ice	4.9800	4.9800	0.037
			0.000			1/2" Ice	6.2250	6.2250	0.046
			0.000			1" Ice	7.4700	7.4700	0.055
ANT150F2	C	From Leg	4.0000	0.000	114.0000	No Ice	1.2940	1.2940	0.013

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
			0.000 2.500			1/2" Ice 1" Ice	1.5980 1.9112	1.5980 1.9112	0.023 0.037
Tower Top Amplifier	C	From Leg	4.0000 0.000 0.000	0.000	114.0000	No Ice 1/2" Ice 1" Ice	0.0000 0.0000 0.0000	0.0000 0.0000 0.0000	0.000 0.000 0.000
Low Profile Platform	C	None		0.000	114.0000	No Ice 1/2" Ice 1" Ice	15.7000 20.1000 24.5000	15.7000 20.1000 24.5000	1.300 1.760 2.220
***									
GPS	A	From Leg	1.5000 0.000 0.000	0.000	51.5000	No Ice 1/2" Ice 1" Ice	1.0000 1.5000 2.0000	1.0000 1.5000 2.0000	0.010 0.010 0.020
GPS	B	From Leg	1.5000 0.000 0.000	0.000	51.5000	No Ice 1/2" Ice 1" Ice	1.0000 1.5000 2.0000	1.0000 1.5000 2.0000	0.010 0.010 0.020
GPS	C	From Leg	1.5000 0.000 0.000	0.000	51.5000	No Ice 1/2" Ice 1" Ice	1.0000 1.5000 2.0000	1.0000 1.5000 2.0000	0.010 0.010 0.020

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
4 ft standard	A	Paraboloid w/o Radome	From Leg	1.0000 0.000 0.000	0.000		160.0000	4.0000	No Ice 1/2" Ice 1" Ice	12.5700 13.1000 13.6200	0.100 0.180 0.250
4 ft standard	B	Paraboloid w/o Radome	From Leg	1.0000 0.000 0.000	0.000		160.0000	4.0000	No Ice 1/2" Ice 1" Ice	12.5700 13.1000 13.6200	0.100 0.180 0.250
2 ft standard	C	Paraboloid w/o Radome	From Leg	1.0000 0.000 0.000	0.000		160.0000	2.0000	No Ice 1/2" Ice 1" Ice	3.1400 3.4100 3.6800	0.014 0.058 0.102
***											
A-ANT-23G-2-C	A	Paraboloid w/o Radome	From Leg	3.1000 0.000 2.000	0.000		154.0000	2.1750	No Ice 1/2" Ice 1" Ice	3.7200 4.0100 4.3000	0.010 0.020 0.030
A-ANT-23G-2-C	C	Paraboloid w/o Radome	From Leg	3.8000 0.000 2.000	0.000		154.0000	2.1750	No Ice 1/2" Ice 1" Ice	3.7200 4.0100 4.3000	0.010 0.020 0.030

Tower Pressures - No Ice

$G_H = 1.100$

Section Elevation ft	z ft	K_Z	q_z ksf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1 164.0000-131.5000	147.4975	1.374	0.034	137.953	A	0.000	137.953	137.953	100.00	0.000	0.000
					B	0.000	137.953		100.00	0.000	0.000
					C	0.000	137.953		100.00	16.125	0.000
L2 131.5000-119.2900	125.3443	1.327	0.033	56.545	A	0.000	56.545	56.545	100.00	0.000	0.000
					B	0.000	56.545		100.00	0.000	0.000
					C	0.000	56.545		100.00	15.751	0.000
L3 119.2900-78.7900	98.8148	1.262	0.031	202.275	A	0.000	202.275	202.275	100.00	0.000	0.000
					B	0.000	202.275		100.00	0.000	0.000
					C	0.000	202.275		100.00	52.245	0.000
L4 78.7900-39.8800	59.3022	1.134	0.028	216.653	A	0.000	216.653	216.653	100.00	0.000	0.000
					B	0.000	216.653		100.00	0.000	0.000
					C	0.000	216.653		100.00	53.994	0.000
L5 39.8800-1.5000	21.0594	0.912	0.023	234.431	A	0.000	234.431	234.431	100.00	0.000	0.000
					B	0.000	234.431		100.00	0.000	0.000
					C	0.000	234.431		100.00	62.060	0.000

Tower Pressure - With Ice

G_H = 1.100

Section Elevation ft	z ft	K_Z	q_z ksf	t_Z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1 164.0000-131.5000	147.4975	1.374	0.008	2.1779	149.749	A	0.000	149.749	149.749	100.00	0.000	0.000
						B	0.000	149.749		100.00	0.000	0.000
						C	0.000	149.749		100.00	33.768	0.000
L2 131.5000-119.2900	125.3443	1.327	0.008	2.1427	60.905	A	0.000	60.905	60.905	100.00	0.000	0.000
						B	0.000	60.905		100.00	0.000	0.000
						C	0.000	60.905		100.00	32.770	0.000
L3 119.2900-78.7900	98.8148	1.262	0.008	2.0923	216.738	A	0.000	216.738	216.738	100.00	0.000	0.000
						B	0.000	216.738		100.00	0.000	0.000
						C	0.000	216.738		100.00	108.696	0.000
L4 78.7900-39.8800	59.3022	1.134	0.007	1.9882	230.222	A	0.000	230.222	230.222	100.00	0.000	0.000
						B	0.000	230.222		100.00	0.000	0.000
						C	0.000	230.222		100.00	114.277	0.000
L5 39.8800-1.5000	21.0594	0.912	0.006	1.7926	247.148	A	0.000	247.148	247.148	100.00	0.000	0.000
						B	0.000	247.148		100.00	0.000	0.000
						C	0.000	247.148		100.00	134.806	0.000

Tower Pressure - Service

G_H = 1.100

Section Elevation ft	z ft	K_Z	q_z ksf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1 164.0000-131.5000	147.4975	1.374	0.011	137.953	A	0.000	137.953	137.953	100.00	0.000	0.000
					B	0.000	137.953		100.00	0.000	0.000
					C	0.000	137.953		100.00	16.125	0.000
L2 131.5000-119.2900	125.3443	1.327	0.010	56.545	A	0.000	56.545	56.545	100.00	0.000	0.000
					B	0.000	56.545		100.00	0.000	0.000
					C	0.000	56.545		100.00	15.751	0.000
L3 119.2900-78.7900	98.8148	1.262	0.010	202.275	A	0.000	202.275	202.275	100.00	0.000	0.000
					B	0.000	202.275		100.00	0.000	0.000
					C	0.000	202.275		100.00	52.245	0.000
L4 78.7900-39.8800	59.3022	1.134	0.009	216.653	A	0.000	216.653	216.653	100.00	0.000	0.000
					B	0.000	216.653		100.00	0.000	0.000
					C	0.000	216.653		100.00	53.994	0.000

Section Elevation ft	z ft	K_z	q_z ksf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L5 39.8800-1.5000	21.0594	0.912	0.007	234.431	A	0.000	234.431	234.431	100.00	0.000	0.000
					B	0.000	234.431		100.00	0.000	0.000
					C	0.000	234.431		100.00	62.060	0.000

Load Combinations

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

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	164 - 131.5	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-58.014	0.346	-0.325
			Max. Mx	20	-21.669	470.259	19.563
			Max. My	2	-21.799	14.864	485.425
			Max. Vy	20	-31.080	470.259	19.563
			Max. Vx	14	31.529	-2.525	-482.640
			Max. Torque	16			1.917
L2	131.5 - 119.29	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-61.247	0.346	-1.067
			Max. Mx	20	-23.664	670.961	23.411
			Max. My	2	-23.852	17.940	684.432
			Max. Vy	20	-33.573	670.961	23.411
			Max. Vx	14	32.650	-3.059	-682.077
			Max. Torque	9			-1.276
L3	119.29 - 78.79	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-102.623	0.817	-6.183
			Max. Mx	20	-45.359	2532.676	47.750
			Max. My	14	-45.845	-6.987	-2348.550
			Max. Vy	20	-57.209	2532.676	47.750
			Max. Vx	14	47.792	-6.987	-2348.550
			Max. Torque	8			-8.857
L4	78.79 - 39.88	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-135.731	0.817	-11.750
			Max. Mx	20	-69.533	5005.856	72.057
			Max. My	14	-70.039	-11.145	-4302.142
			Max. Vy	20	-72.524	5005.856	72.057
			Max. Vx	14	54.658	-11.145	-4302.142
			Max. Torque	8			-16.141
L5	39.88 - 1.5	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-180.415	0.817	-20.190
			Max. Mx	20	-104.054	8865.983	101.850
			Max. My	14	-104.072	-16.299	-7079.716
			Max. Vy	20	-88.686	8865.983	101.850
			Max. Vx	14	61.365	-16.299	-7079.716
			Max. Torque	8			-25.572

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	26	180.415	0.000	-0.000
	Max. H_x	21	78.071	88.638	0.656
	Max. H_z	3	78.071	0.505	61.320
	Max. M_x	2	7071.427	0.505	61.319
	Max. M_z	8	8838.888	-88.475	0.262
	Max. Torsion	20	25.075	88.638	0.656
	Min. Vert	15	78.071	-0.107	-61.324
	Min. H_x	9	78.071	-88.475	0.262
	Min. H_z	14	104.095	-0.107	-61.327
	Min. M_x	14	-7079.716	-0.107	-61.327
	Min. M_z	20	-8865.983	88.638	0.656
	Min. Torsion	8	-25.572	-88.475	0.262

Tower Mast Reaction Summary

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
Dead Only	86.746	0.000	0.000	2.953	0.124	0.000
1.2 Dead+1.6 Wind 0 deg - No Ice	104.095	-0.505	-61.319	-7071.427	82.197	-2.494
0.9 Dead+1.6 Wind 0 deg - No Ice	78.071	-0.505	-61.320	-7037.211	81.694	-2.494
1.2 Dead+1.6 Wind 30 deg - No Ice	104.095	30.567	-52.418	-6013.230	-3522.822	-1.792
0.9 Dead+1.6 Wind 30 deg - No Ice	78.071	30.567	-52.418	-5984.306	-3505.359	-1.791
1.2 Dead+1.6 Wind 60 deg - No Ice	104.095	52.587	-30.388	-3490.635	-6044.153	-0.518
0.9 Dead+1.6 Wind 60 deg - No Ice	78.071	52.587	-30.388	-3474.203	-6014.205	-0.519
1.2 Dead+1.6 Wind 90 deg - No Ice	104.095	88.475	-0.262	-39.118	-8838.888	25.572
0.9 Dead+1.6 Wind 90 deg - No Ice	78.071	88.475	-0.262	-39.777	-8797.394	25.571
1.2 Dead+1.6 Wind 120 deg - No Ice	104.095	52.729	31.350	3652.187	-6066.207	2.341
0.9 Dead+1.6 Wind 120 deg - No Ice	78.071	52.729	31.350	3633.073	-6036.138	2.340
1.2 Dead+1.6 Wind 150 deg - No Ice	104.095	29.955	53.388	6176.173	-3423.430	2.618
0.9 Dead+1.6 Wind 150 deg - No Ice	78.071	29.955	53.388	6144.558	-3406.530	2.617
1.2 Dead+1.6 Wind 180 deg - No Ice	104.095	0.107	61.327	7079.716	-16.299	1.910
0.9 Dead+1.6 Wind 180 deg - No Ice	78.071	0.107	61.324	7043.315	-16.245	1.909
1.2 Dead+1.6 Wind 210 deg - No Ice	104.095	-29.762	53.192	6145.109	3393.924	0.729
0.9 Dead+1.6 Wind 210 deg - No Ice	78.071	-29.762	53.192	6113.668	3377.112	0.729
1.2 Dead+1.6 Wind 240 deg - No Ice	104.095	-52.903	30.868	3574.637	6096.283	0.153
0.9 Dead+1.6 Wind 240 deg - No Ice	78.071	-52.903	30.868	3555.959	6065.963	0.154
1.2 Dead+1.6 Wind 270 deg - No Ice	104.095	-88.638	-0.656	-101.853	8865.983	-25.075
0.9 Dead+1.6 Wind 270 deg - No Ice	78.071	-88.638	-0.656	-102.160	8824.259	-25.074
1.2 Dead+1.6 Wind 300 deg - No Ice	104.095	-52.886	-30.684	-3537.444	6092.629	-1.391
0.9 Dead+1.6 Wind 300 deg - No Ice	78.071	-52.886	-30.684	-3520.750	6062.332	-1.390
1.2 Dead+1.6 Wind 330 deg - No Ice	104.095	-31.063	-52.627	-6046.416	3602.859	-2.052
0.9 Dead+1.6 Wind 330 deg - No Ice	78.071	-31.063	-52.627	-6017.305	3584.871	-2.051
1.2 Dead+1.0 Ice+1.0 Temp	180.415	-0.000	0.000	20.190	0.817	0.000
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	180.415	-0.081	-18.065	-2103.230	14.301	-1.069
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	180.415	9.021	-15.521	-1798.127	-1059.454	-0.574
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	180.415	15.556	-8.984	-1033.150	-1824.146	0.084
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	180.415	20.933	-0.050	12.666	-2307.066	5.970
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	180.415	15.585	9.152	1102.798	-1828.793	1.223
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	180.415	8.907	15.694	1868.729	-1040.372	1.303
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	180.415	0.021	18.065	2145.254	-2.369	0.978
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	180.415	-8.870	15.660	1863.217	1036.298	0.396
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	180.415	-15.607	9.071	1089.566	1834.476	-0.154
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	180.415	-20.958	-0.118	1.551	2312.975	-5.901
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	180.415	-15.605	-9.036	-1041.609	1834.060	-1.062
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	180.415	-9.104	-15.557	-1803.971	1074.770	-1.193
Dead+Wind 0 deg - Service	86.746	-0.100	-12.101	-1388.846	16.261	-0.494
Dead+Wind 30 deg - Service	86.746	6.031	-10.342	-1180.364	-692.744	-0.354
Dead+Wind 60 deg - Service	86.746	10.375	-5.995	-684.235	-1188.626	-0.102
Dead+Wind 90 deg - Service	86.746	17.460	-0.052	-5.409	-1739.118	5.052
Dead+Wind 120 deg - Service	86.746	10.405	6.187	720.735	-1193.260	0.463
Dead+Wind 150 deg - Service	86.746	5.910	10.533	1216.963	-673.210	0.517
Dead+Wind 180 deg - Service	86.746	0.021	12.102	1395.037	-3.108	0.377
Dead+Wind 210 deg - Service	86.746	-5.872	10.495	1210.852	667.601	0.144
Dead+Wind 240 deg - Service	86.746	-10.440	6.091	705.484	1199.366	0.031
Dead+Wind 270 deg - Service	86.746	-17.492	-0.130	-17.747	1744.644	-4.953
Dead+Wind 300 deg - Service	86.746	-10.434	-6.054	-693.440	1198.355	-0.275
Dead+Wind 330 deg - Service	86.746	-6.129	-10.383	-1186.893	708.676	-0.406

Solution Summary

Load Comb.	Sum of Applied Forces PX	PY	PZ	Sum of Reactions PX	PY	PZ	% Error
	K	K	K	K	K	K	
1	0.000	-86.746	0.000	0.000	86.746	-0.000	0.000%
2	-0.505	-104.095	-61.320	0.505	104.095	61.319	0.001%
3	-0.505	-78.071	-61.320	0.505	78.071	61.320	0.001%
4	30.567	-104.095	-52.418	-30.567	104.095	52.418	0.000%
5	30.567	-78.071	-52.418	-30.567	78.071	52.418	0.000%
6	52.587	-104.095	-30.388	-52.587	104.095	30.388	0.000%
7	52.587	-78.071	-30.388	-52.587	78.071	30.388	0.000%
8	88.475	-104.095	-0.262	-88.475	104.095	0.262	0.000%
9	88.475	-78.071	-0.262	-88.475	78.071	0.262	0.000%
10	52.729	-104.095	31.350	-52.729	104.095	-31.350	0.000%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
11	52.729	-78.071	31.350	-52.729	78.071	-31.350	0.000%
12	29.955	-104.095	53.388	-29.955	104.095	-53.388	0.000%
13	29.955	-78.071	53.388	-29.955	78.071	-53.388	0.000%
14	0.107	-104.095	61.328	-0.107	104.095	-61.327	0.001%
15	0.107	-78.071	61.328	-0.107	78.071	-61.324	0.003%
16	-29.762	-104.095	53.192	29.762	104.095	-53.192	0.000%
17	-29.762	-78.071	53.192	29.762	78.071	-53.192	0.000%
18	-52.903	-104.095	30.868	52.903	104.095	-30.868	0.000%
19	-52.903	-78.071	30.868	52.903	78.071	-30.868	0.000%
20	-88.638	-104.095	-0.656	88.638	104.095	0.656	0.000%
21	-88.638	-78.071	-0.656	88.638	78.071	0.656	0.000%
22	-52.886	-104.095	-30.684	52.886	104.095	30.684	0.000%
23	-52.886	-78.071	-30.684	52.886	78.071	30.684	0.000%
24	-31.063	-104.095	-52.627	31.063	104.095	52.627	0.000%
25	-31.063	-78.071	-52.627	31.063	78.071	52.627	0.000%
26	0.000	-180.415	0.000	0.000	180.415	-0.000	0.000%
27	-0.081	-180.415	-18.065	0.081	180.415	18.065	0.000%
28	9.021	-180.415	-15.521	-9.021	180.415	15.521	0.000%
29	15.556	-180.415	-8.984	-15.556	180.415	8.984	0.000%
30	20.933	-180.415	-0.050	-20.933	180.415	0.050	0.000%
31	15.585	-180.415	9.152	-15.585	180.415	-9.152	0.000%
32	8.907	-180.415	15.694	-8.907	180.415	-15.694	0.000%
33	0.021	-180.415	18.065	-0.021	180.415	-18.065	0.000%
34	-8.870	-180.415	15.660	8.870	180.415	-15.660	0.000%
35	-15.607	-180.415	9.071	15.607	180.415	-9.071	0.000%
36	-20.958	-180.415	-0.118	20.958	180.415	0.118	0.000%
37	-15.605	-180.415	-9.036	15.605	180.415	9.036	0.000%
38	-9.104	-180.415	-15.557	9.104	180.415	15.557	0.000%
39	-0.100	-86.746	-12.101	0.100	86.746	12.101	0.001%
40	6.032	-86.746	-10.345	-6.031	86.746	10.342	0.004%
41	10.378	-86.746	-5.997	-10.375	86.746	5.995	0.004%
42	17.460	-86.746	-0.052	-17.460	86.746	0.052	0.001%
43	10.406	-86.746	6.187	-10.405	86.746	-6.187	0.001%
44	5.912	-86.746	10.536	-5.910	86.746	-10.533	0.004%
45	0.021	-86.746	12.103	-0.021	86.746	-12.102	0.001%
46	-5.874	-86.746	10.497	5.872	86.746	-10.495	0.004%
47	-10.440	-86.746	6.092	10.440	86.746	-6.091	0.001%
48	-17.493	-86.746	-0.130	17.492	86.746	0.130	0.001%
49	-10.437	-86.746	-6.055	10.434	86.746	6.054	0.004%
50	-6.130	-86.746	-10.386	6.129	86.746	10.383	0.004%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	6	0.00000001	0.00000001
2	Yes	10	0.00000001	0.00009453
3	Yes	10	0.00000001	0.00008033
4	Yes	12	0.00000001	0.00004996
5	Yes	12	0.00000001	0.00003994
6	Yes	12	0.00000001	0.00005150
7	Yes	12	0.00000001	0.00004122
8	Yes	11	0.00000001	0.00008594
9	Yes	11	0.00000001	0.00006910
10	Yes	12	0.00000001	0.00005624
11	Yes	12	0.00000001	0.00004494
12	Yes	12	0.00000001	0.00004977
13	Yes	12	0.00000001	0.00003972
14	Yes	10	0.00000001	0.00004620
15	Yes	9	0.00005299	0.00014383
16	Yes	12	0.00000001	0.00005113
17	Yes	12	0.00000001	0.00004089
18	Yes	12	0.00000001	0.00005340
19	Yes	12	0.00000001	0.00004264
20	Yes	11	0.00000001	0.00007608
21	Yes	11	0.00000001	0.00006120
22	Yes	12	0.00000001	0.00005191
23	Yes	12	0.00000001	0.00004146
24	Yes	12	0.00000001	0.00005472
25	Yes	12	0.00000001	0.00004376
26	Yes	6	0.00000001	0.00000001
27	Yes	11	0.00000001	0.00012276
28	Yes	11	0.00000001	0.00013069
29	Yes	11	0.00000001	0.00013106
30	Yes	11	0.00000001	0.00013122
31	Yes	11	0.00000001	0.00013488
32	Yes	11	0.00000001	0.00013381
33	Yes	11	0.00000001	0.00012507
34	Yes	11	0.00000001	0.00013349
35	Yes	11	0.00000001	0.00013437
36	Yes	11	0.00000001	0.00013162
37	Yes	11	0.00000001	0.00013209
38	Yes	11	0.00000001	0.00013222
39	Yes	9	0.00000001	0.00002583
40	Yes	8	0.00000001	0.00009049
41	Yes	8	0.00000001	0.00009639
42	Yes	9	0.00000001	0.00006364
43	Yes	9	0.00000001	0.00003738
44	Yes	8	0.00000001	0.00009122
45	Yes	9	0.00000001	0.00002464
46	Yes	8	0.00000001	0.00009769
47	Yes	9	0.00000001	0.00003226
48	Yes	9	0.00000001	0.00006089
49	Yes	8	0.00000001	0.00009304
50	Yes	8	0.00000001	0.00010251

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	164 - 131.5	9.965	48	0.448	0.002
L2	131.5 - 119.29	6.955	48	0.430	0.002
L3	125.29 - 78.79	6.401	48	0.421	0.002
L4	87.21 - 39.88	3.340	48	0.329	0.001
L5	49.13 - 1.5	1.143	48	0.206	0.001

Critical Deflections and Radius of Curvature - Service Wind

Elevation	Appurtenance	Gov. Load Comb.	Deflection	Tilt	Twist	Radius of Curvature
ft			in	°	°	ft
164.0000	12' x 3" Dia Omni	48	9.965	0.448	0.002	299310
160.0000	4 ft standard	48	9.589	0.447	0.002	299310
156.0000	A-ANT-23G-2-C	48	9.214	0.445	0.002	187069
154.0000	LLPX310R W/ Mount Pipe	48	9.027	0.445	0.002	149655
144.0000	AIR 3246 B66 w/ Mount Pipe	48	8.096	0.440	0.002	74827
138.0000	RRUS 11	48	7.544	0.436	0.002	57559
134.0000	7770.00 w/ Mount Pipe	48	7.180	0.432	0.002	49779
124.0000	DB844G65ZAXY w/ Mount Pipe	48	6.288	0.419	0.002	34869
114.0000	DB586-Y	48	5.429	0.400	0.002	29960
51.5000	GPS	48	1.243	0.214	0.001	11742

Maximum Tower Deflections - Design Wind

Section No.	Elevation	Horz. Deflection	Gov. Load Comb.	Tilt	Twist
	ft	in		°	°
L1	164 - 131.5	50.664	20	2.277	0.009
L2	131.5 - 119.29	35.358	20	2.185	0.009
L3	125.29 - 78.79	32.544	20	2.142	0.009
L4	87.21 - 39.88	16.979	20	1.672	0.007
L5	49.13 - 1.5	5.810	20	1.046	0.004

Critical Deflections and Radius of Curvature - Design Wind

Elevation	Appurtenance	Gov. Load Comb.	Deflection	Tilt	Twist	Radius of Curvature
ft			in	°	°	ft
164.0000	12' x 3" Dia Omni	20	50.664	2.277	0.009	60114
160.0000	4 ft standard	20	48.754	2.271	0.009	60114
156.0000	A-ANT-23G-2-C	20	46.846	2.266	0.009	37571
154.0000	LLPX310R W/ Mount Pipe	20	45.894	2.263	0.009	30057
144.0000	AIR 3246 B66 w/ Mount Pipe	20	41.161	2.240	0.009	15028
138.0000	RRUS 11	20	38.356	2.218	0.009	11559
134.0000	7770.00 w/ Mount Pipe	20	36.505	2.199	0.009	9993
124.0000	DB844G65ZAXY w/ Mount Pipe	20	31.967	2.131	0.009	6887
114.0000	DB586-Y	20	27.600	2.033	0.009	5903
51.5000	GPS	20	6.316	1.090	0.004	2310

Compression Checks

Pole Design Data

Section No.	Elevation	Size	L	L_u	Kl/r	A	P_u	ϕP_n	Ratio $\frac{P_u}{\phi P_n}$
	ft		ft	ft		in^2	K	K	
L1	164 - 131.5 (1)	TP53.42x47x0.3125	32.5000	0.0000	0.0	52.6760	-21.799	3227.770	0.007
L2	131.5 - 119.29 (2)	TP56.15x53.42x0.375	12.2100	0.0000	0.0	64.7894	-23.852	4269.230	0.006
L3	119.29 - 78.79 (3)	TP62.97x54.0585x0.4375	46.5000	0.0000	0.0	84.5934	-45.359	5667.380	0.008
L4	78.79 - 39.88 (4)	TP69.66x60.4813x0.5625	47.3300	0.0000	0.0	120.1620	-69.533	8488.930	0.008
L5	39.88 - 1.5 (5)	TP76x66.7412x0.5625	47.6300	0.0000	0.0	134.6840	-104.054	9152.010	0.011

Pole Bending Design Data

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L1	164 - 131.5 (1)	TP53.42x47x0.3125	485.652	3531.850	0.138	0.000	3531.850	0.000
L2	131.5 - 119.29 (2)	TP56.15x53.42x0.375	684.668	4783.283	0.143	0.000	4783.283	0.000
L3	119.29 - 78.79 (3)	TP62.97x54.0585x0.4375	2533.125	7104.258	0.357	0.000	7104.258	0.000
L4	78.79 - 39.88 (4)	TP69.66x60.4813x0.5625	5006.375	11742.749	0.426	0.000	11742.749	0.000
L5	39.88 - 1.5 (5)	TP76x66.7412x0.5625	8866.583	14202.667	0.624	0.000	14202.667	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	164 - 131.5 (1)	TP53.42x47x0.3125	31.526	1613.880	0.020	1.157	7078.633	0.000
L2	131.5 - 119.29 (2)	TP56.15x53.42x0.375	32.646	2134.620	0.015	1.157	9588.250	0.000
L3	119.29 - 78.79 (3)	TP62.97x54.0585x0.4375	57.213	2833.690	0.020	8.360	14241.333	0.001
L4	78.79 - 39.88 (4)	TP69.66x60.4813x0.5625	72.527	4244.460	0.017	15.644	23543.832	0.001
L5	39.88 - 1.5 (5)	TP76x66.7412x0.5625	88.688	4576.000	0.019	25.075	28472.083	0.001

Pole Interaction Design Data

Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	164 - 131.5 (1)	0.007	0.138	0.000	0.020	0.000	0.145	1.000	4.8.2
L2	131.5 - 119.29 (2)	0.006	0.143	0.000	0.015	0.000	0.149	1.000	4.8.2
L3	119.29 - 78.79 (3)	0.008	0.357	0.000	0.020	0.001	0.365	1.000	4.8.2
L4	78.79 - 39.88 (4)	0.008	0.426	0.000	0.017	0.001	0.435	1.000	4.8.2
L5	39.88 - 1.5 (5)	0.011	0.624	0.000	0.019	0.001	0.636	1.000	4.8.2

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L1	164 - 131.5	Pole	TP53.42x47x0.3125	1	-21.799	3227.770	14.5	Pass
L2	131.5 - 119.29	Pole	TP56.15x53.42x0.375	2	-23.852	4269.230	14.9	Pass
L3	119.29 - 78.79	Pole	TP62.97x54.0585x0.4375	3	-45.359	5667.380	36.5	Pass
L4	78.79 - 39.88	Pole	TP69.66x60.4813x0.5625	4	-69.533	8488.930	43.5	Pass
L5	39.88 - 1.5	Pole	TP76x66.7412x0.5625	5	-104.054	9152.010	63.6	Pass
							Summary	
						Pole (L5)	63.6	Pass
						RATING =	**63.6**	**Pass**

APPENDIX B

ADDITIONAL CALCULATIONS

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

Site Data	
BU#:	
Site Name:	
App #:	

Reactions		
Mu	485.7	ft-kips
Axial, Pu:	21.8	kips
Shear, Vu:	31.5	kips
Elevation:	131.5	feet

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

Pole Manufacturer:	Other

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

Bolt Data			
Qty:	12		
Diameter (in.):	1	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:	75	<-- Disregard	
N/A:	55	<-- Disregard	
Circle (in.):	58		

Plate Data		
Diam:	61	in
Thick, t:	1	in
Grade (Fy):	36	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	10.16	in

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

Pole Data		
Diam:	53.42	in
Thick:	0.3125	in
Grade:	65	ksi
# of Sides:	18	"0" IF Round
Fu	80	ksi
Reinf. Fillet Weld	0	"0" if None

Flange Bolt Results

Bolt Tension Capacity, φ*Tn, **B1**:	54.54	kips	Rigid
Adjusted φ*Tn (due to Vu=Vu/Qty), **B**:	54.42	kips	φTn[(1-(Vu/φVn)^2]^0.5
Max Bolt directly applied Tu:	31.68	Kips	
Min. PL "tc" for **B** cap. **w/o** Pry:	0.857	in	
Min PL "treq" for actual **T w/ Pry:**	0.475	in	
Min PL "t1" for actual **T w/o Pry:**	0.654	in	
T allowable w/o Prying:	54.54	kips	α'<0 case
Prying Force, q:	0.00	kips	
Total Bolt Tension=Tu+q:	31.68	kips	
Non-Prying Bolt Stress Ratio, Tu/B:	58.2%	**Pass**	

Exterior Flange Plate Results Flexural Check

Compression Side Plate Stress:	15.8	ksi	Rigid
Allowable Plate Stress:	32.4	ksi	TIA G
Compression Plate Stress Ratio:	48.6%	**Pass**	φ*Fy
No Prying			Comp. Y.L. Length: 22.59
Tension Side Stress Ratio, (treq/t)^2:	22.5%	**Pass**	

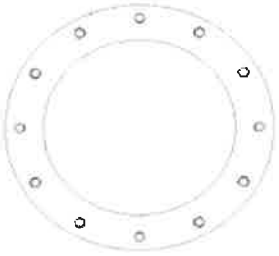
n/a

Stiffener Results

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

Pole Results

Pole Punching Shear Check: n/a



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

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

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

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

Site Data

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

Reactions		
Mu:	8867	ft-kips
Axial, Pu:	104	kips
Shear, Vu:	89	kips
Eta Factor, η	0.5	TIA G (Fig. 4-4)

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

Anchor Rod Data		
Qty:	30	
Diam:	2.25	in
Rod Material:	A615-J	
Strength (Fu):	100	ksi
Yield (Fy):	75	ksi
Bolt Circle:	86	in

Anchor Rod Results

Max Rod (Cu+ Vu/ή):	174.4 Kips	Rigid
Allowable Axial, Φ*Fu*Anet:	260.0 Kips	AISC LRFD
Anchor Rod Stress Ratio:	67.1% **Pass**	φ*Tn

Plate Data		
Diam:	92	in
Thick:	3	in
Grade:	60	ksi
Single-Rod B-eff:	8.04	in

Base Plate Results Flexural Check

Base Plate Stress:	28.4 ksi	Rigid
Allowable Plate Stress:	54.0 ksi	AISC LRFD
Base Plate Stress Ratio:	52.7% **Pass**	φ*Fy
		Y.L. Length: 40.25

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

n/a

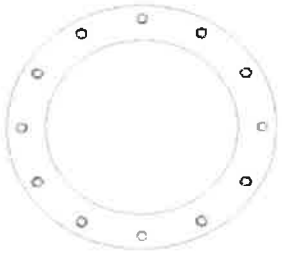
Stiffener Results

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

Pole Data		
Diam:	76	in
Thick:	0.5625	in
Grade:	65	ksi
# of Sides:	18	"0" IF Round
Fu	80	ksi
Reinf. Fillet Weld	0	"0" if None

Pole Results

Pole Punching Shear Check: n/a



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

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

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Phone 614.221.6679 www.pauljford.com

Job Number: 42919-0012.002.7805
Site Number: XXXXXX
Site Name: Greenwich CT

By: NCM
Date: 1/8/2020

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

Factored Base Reactions from RISA

	Comp. (+)	Tension (-)	
Moment, Mu =	8867.0		k-ft
Shear, Vu =	89.0		kips
Axial Load, Pu1 =	104.0		kips (from 1.2D + 1.6W)*
Axial Load, Pu2 =	78.0	0.0	kips (from 0.9D + 1.6W)**
OTMu =	8956.0	0.0	k-ft @ Ground

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

Drilled Pier Parameters

Diameter =	9	ft
Height Above Grade =	1	ft
Depth Below Grade =	27	ft
fc' =	3	ksi
εc =	0.003	in/in
L / D Ratio =	3.11	
Mat Ftdn. Cap Width =		ft
Mat Ftdn. Cap Length =		ft
Depth Below Grade =		ft

Steel Parameters

Number of Bars =	33	
Rebar Size =	#11	
Rebar Fy =	60	ksi
Rebar MOE =	29000	ksi
Tie Size =	#4	
Side Clear Cover to Ties =	3	in

Direct Embed Pole Shaft Parameters

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

Safety Factors / Load Factors / Φ Factors

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

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

Load Combinations Checked per TIA-222-G

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

Soil Parameters

Water Table Depth =	99.00	ft
Depth to Ignore Soil =	4.50	ft
Depth to Full Cohesion =	0	ft
Full Cohesion Starts at?*	Ground	

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

Maximum Capacity Ratios

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

*Note: The drilled pier foundation was analyzed using the methodology in the software 'PLS-Caisson' (Version 8.10, or newer, by Power Line Systems, Inc.). Per the methods in PLS-Caisson, the soil reactions of cohesive soils are calculated using 8CD independent of the depth of the soil layer. The depth of soil to be ignored at the top of the drilled pier is based the recommendations of the site specific geotechnical report. In the absence of any recommendations, the frost depth at the site or one half of the drilled pier diameter (whichever is greater) shall be ignored.

Define Soil Layers

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

Layer	Thickness ft	Unit Weight pcf	Cohesion psf	Friction Angle degrees	Soil Type	Ultimate End Bearing psf	Comp. Ult. Skin Friction psf	Tension Ult. Skin Friction psf	Depth ft
1	1	100	0	0					1
2	3	120	0	20	Sand				4
3	2	120	0	30	Sand				6
4	5	120	0	35	Sand				11
5	19	130	0	42	Sand	6000			30
6									
7									
8									
9									
10									
11									
12									

Soil Results: Overturning

Depth to COR =	20.18	ft, from Grade
Bending Moment, Mu =	10752.27	k-ft, from COR
Resisting Moment, ΦMn =	19734.80	k-ft, from COR

MOMENT RATIO = 54.5% OK

Shear, Vu =	89.00	kips
Resisting Shear, ΦVn =	163.35	kips

SHEAR RATIO = 54.5% OK

Soil Results: Uplift

Uplift, Tu =	0.00	kips
Uplift Capacity, ΦTn =	240.47	kips

UPLIFT RATIO = 0.0% OK

Soil Results: Compression

Compression, Cu =	104.00	kips
Comp. Capacity, ΦCn =	223.68	kips

COMPRESSION RATIO = 46.5% OK

Steel Results (ACI 318-08):

Minimum Steel Area =	30.54	sq in
Actual Steel Area =	51.48	sq in
Axial, ΦPn (min) =	-2779.92	kips, Where ΦMn = 0 k-ft
Axial, ΦPn (max) =	13685.25	kips, Where ΦMn = 0 k-ft

Axial Load, Pu =	146.71	kips @ 7.00 ft Below Grade
Moment, Mu =	9512.05	k-ft @ 7.00 ft Below Grade
Moment, ΦMn =	10975.16	k-ft

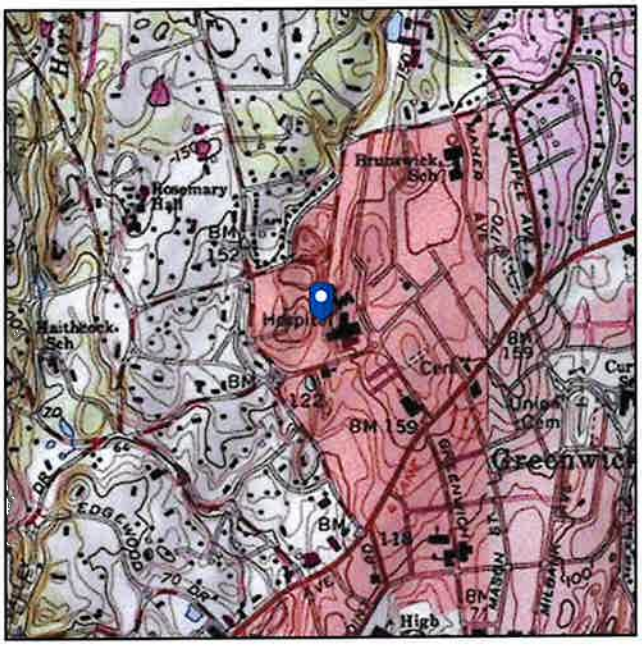
MOMENT RATIO = 86.7% OK

ASCE 7 Hazards Report

Address:
No Address at This Location

Standard: ASCE/SEI 7-10
Risk Category: III
Soil Class: D - Stiff Soil

Elevation: 142.08 ft (NAVD 88)
Latitude: 41.033936
Longitude: -73.630832



Wind

Results:

Wind Speed:	125 Vmph ← Jurisdiction requires 130 mph ultimate wind speed (101 mph nominal wind speed)
10-year MRI	76 Vmph
25-year MRI	85 Vmph
50-year MRI	90 Vmph
100-year MRI	97 Vmph

Data Source: ASCE/SEI 7-10, Fig. 26.5-1B and Figs. CC-1–CC-4, incorporating errata of March 12, 2014

Date Accessed: Wed Jan 08 2020

Value provided is 3-second gust wind speeds at 33 ft above ground for Exposure C Category, based on linear interpolation between contours. Wind speeds are interpolated in accordance with the 7-10 Standard. Wind speeds correspond to approximately a 3% probability of exceedance in 50 years (annual exceedance probability = 0.000588, MRI = 1,700 years).

Site is in a hurricane-prone region as defined in ASCE/SEI 7-10 Section 26.2. Glazed openings need not be protected against wind-borne debris.

Mountainous terrain, gorges, ocean promontories, and special wind regions should be examined for unusual wind conditions.

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Seismic

Site Soil Class: D - Stiff Soil

Results:

S_S :	0.259	S_{DS} :	0.275
S_1 :	0.07	S_{D1} :	0.112
F_a :	1.593	T_L :	6
F_v :	2.4	PGA :	0.153
S_{MS} :	0.412	PGA_M :	0.228
S_{M1} :	0.169	F_{PGA} :	1.495
		I_e :	1.25

Seismic Design Category B

Data Accessed: Wed Jan 08 2020

Date Source: USGS Seismic Design Maps based on ASCE/SEI 7-10, incorporating Supplement 1 and errata of March 31, 2013, and ASCE/SEI 7-10 Table 1.5-2. Additional data for site-specific ground motion procedures in accordance with ASCE/SEI 7-10 Ch. 21 are available from USGS.

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Ice

Results:

Ice Thickness:	0.75 in.
Concurrent Temperature:	15 F
Gust Speed:	50 mph
Data Source:	Standard ASCE/SEI 7-10, Figs. 10-2 through 10-8
Date Accessed:	Wed Jan 08 2020

Ice thicknesses on structures in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

Values provided are equivalent radial ice thicknesses due to freezing rain with concurrent 3-second gust speeds, for a 50-year mean recurrence interval, and temperatures concurrent with ice thicknesses due to freezing rain. Thicknesses for ice accretions caused by other sources shall be obtained from local meteorological studies. Ice thicknesses in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

ATTACHMENT 5

PAUL J. FORD & COMPANY

Report Date:	January 8, 2020
Client:	On Air Engineering, LLC 88 Foundry Pond Road Cold Spring, NY 10516 Attn: David Weinpahl, P.E. (201) 456-4624
Structure:	Existing 164-ft Monopole
Carrier:	Verizon Wireless
Carrier Site Name:	Greenwich CT
Mount Type:	(1) 14 Foot Platform
Site Address:	5 Perryridge Rd.
City, County, State:	Greenwich, Fairfield County, CT
Latitude, Longitude:	41.034210, -73.630832
PJF Project:	A42919-0012.001.7190 (Revised)

Paul J. Ford and Company is pleased to submit this "**Mount Structural Analysis Report**". The purpose of this analysis is to determine if the mount has sufficient capacity to support the equipment described herein. Analysis of the existing supporting tower structure is to be completed by others and therefore is not part of this analysis. Analysis of the antenna mounting system as a tie-off point is not part of this document.

Analysis Criteria:

Reference Standard:	2018 CSBC and 2015 IBC with the ANSI/TIA-222-G-2005 Standard, "Structural Standard for Antenna Supporting Structures and Antennas", with ANSI/TIA-222-G-1-2007 and ANSI/TIA-222-G-2-2009 Addenda per Exception #5 of Section 1609.1.1.
Ultimate Wind Speed:	130 mph 3-second gust wind speed without ice
Nominal Wind Speed:	101 mph 3-second gust wind speed without ice
Ice Wind Speed:	50 mph 3-second gust wind speed with 0.75" ice
IBC Site Criteria:	Risk Category III, Topographic Category 1, Exposure Category C

Summary of Analysis Results:

Antenna Mount:	**93.3%**	**SUFFICIENT**

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

Respectfully Submitted by:
Paul J. Ford and Company

Angela Sage, E.I.
Structural Designer
asage@pauljford.com ADP

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

2020.01.08 15:14:42-05'00'

TABLE OF CONTENTS

1) INTRODUCTION

The existing mount under consideration is (1) 14' Platform installed at the 124' elevation on a 164' Monopole tower. The existing mount considered in this analysis is identified as a EEI K10994 based on photos.

2) ANALYSIS CRITERIA

This analysis has been performed in accordance with the 2018 CSBC and 2015 International Building Code based upon an ultimate 3-second gust wind speed of 130 mph converted to a nominal 3-second gust wind speed of 101 mph per section 1609.3.1 as required for use in the ANSI/TIA-222-G-2005 Standard, "Structural Standard for Antenna Supporting Structures and Antennas", with ANSI/TIA-222-G-1-2007 and ANSI/TIA-222-G-2-2009 Addenda per Exception #5 of Section 1609.1.1. and 50 mph with 0.75 inch ice thickness. Risk Category III, Exposure Category C and Topographic Category 1 with a maximum Topographic Factor, Kzt, of 1 were used in this analysis.

In addition, the mount has been analyzed for various live loading conditions consisting of a 250-pound man live load applied individually at the midpoint and cantilevered ends of horizontal members as well as a 250-pound man live load applied individually at mount pipe locations using a 3-second wind speed of 30 mph.

Table 1 – Equipment Configuration

Mounting Level (feet)	Center Line Elevation (feet)	Quantity	Manufacturer	Model	Status	Mount Type
124.0	124.0	6	QUINTEL	QS6656-5D	Proposed	(1) 14' Platform
		3	QUINTEL	AS-005245 DUAL BRACKET		
		3	SAMSUNG	CBRS ANTENNA		
		3	SAMSUNG	B2/B66A RRH-BR049		
		3	SAMSUNG	B5/B13 RRH-BR04C		
		3	SAMSUNG	CBRS RRH		
		6	DBP	DB844G65A-XY	Existing	
		2	RAYCAP	OVP BOX		

3) ANALYSIS PROCEDURE

Table 2 – Documents Provided

Document	Remarks	Reference	Source
Mount Manufacturer Drawings	EEI, 8/30/2001	K10994 Rev 4	On Air Engineering
Site Photos	-	-	On Air Engineering
Construction Drawings	On Air Engineering, 10/21/2019	Greenwich CT	On Air Engineering
Radio Frequency Data Sheet	Verizon, 10/22/2019	1548251	On Air Engineering

3.1) Analysis Method

RISA-3D (version 17.0.3), a commercially available analysis software package, was used to create a three-dimensional model of the mount and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix C.

3.2) Assumptions

1) *The analysis of the existing monopole tower or the effect of the mount attachment to the tower is not within the current scope of work.*
2) *The antenna mounting system was properly fabricated, installed and maintained in good condition, twist free and plumb in accordance with its original design and manufacturer's specifications and all bolts are tightened as specified by the manufacturer and AISC requirements.*
3) *The configuration of antennas, mounts, and other appurtenances are as specified in Table 1.*
4) *All member connections have been designed to meet or exceed the load carrying capacity of the connected member unless otherwise specified in this report. All U-Bolt connections have been properly tightened. This analysis will be required to be revised if the existing conditions in the field differ from those shown in the above referenced documents or assumed in this analysis. No allowance was made for any damaged, missing, or rusted members.*
5) *Steel grades have been assumed as follows:*
   - *a) Channel, Solid Round, Angle, Plate, Unistrut* — *ASTM A36 (GR 36)*
   - *b) Pipe* — *ASTM A53 (GR 35)*
   - *c) HSS (Rectangular)* — *ASTM 500 (GR B-46)*
   - *d) HSS (Round)* — *ASTM 500 (GR B-42)*
   - *e) Connection Bolts* — *ASTM A325*
   - *f) Threaded Rods* — *ASTM F1554 (GR 36)*
   - *g) U-Bolts* — *SAE J429 (GR2)*
6) *Proposed equipment is to be installed in the locations specified in Appendix A. Any changes to the proposed equipment locations will render this report invalid.*
7) *Mount has been modeled based on the photographs referenced in Table 2, indicating a match to the EEI K10994. Member information and dimensions not provided have been assumed to match those specified in the manufacturer drawings referenced in Table 2. No guarantee can be made as to the accuracy of these assumptions without a complete mount mapping.*

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

4) ANALYSIS RESULTS

Table 3 – Mount Component Capacity

Notes	Component	% Capacity	Pass / Fail
1	Mount Pipes	75.6	Pass
1	Face Horizontal	32.0	Pass
1	Standoff Members	63.2	Pass
1	Mount to Tower Connection (bolts/welds)	93.3	Pass

Mount Rating (max from all components) =	93.3%

Notes:
1. See additional documentation in "Appendix C – Software analysis Output" for calculations supporting the % capacity consumed.

4.1) Recommendations

The mount has sufficient capacity to carry the proposed loading configuration. No modifications are required at this time.

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

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

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

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

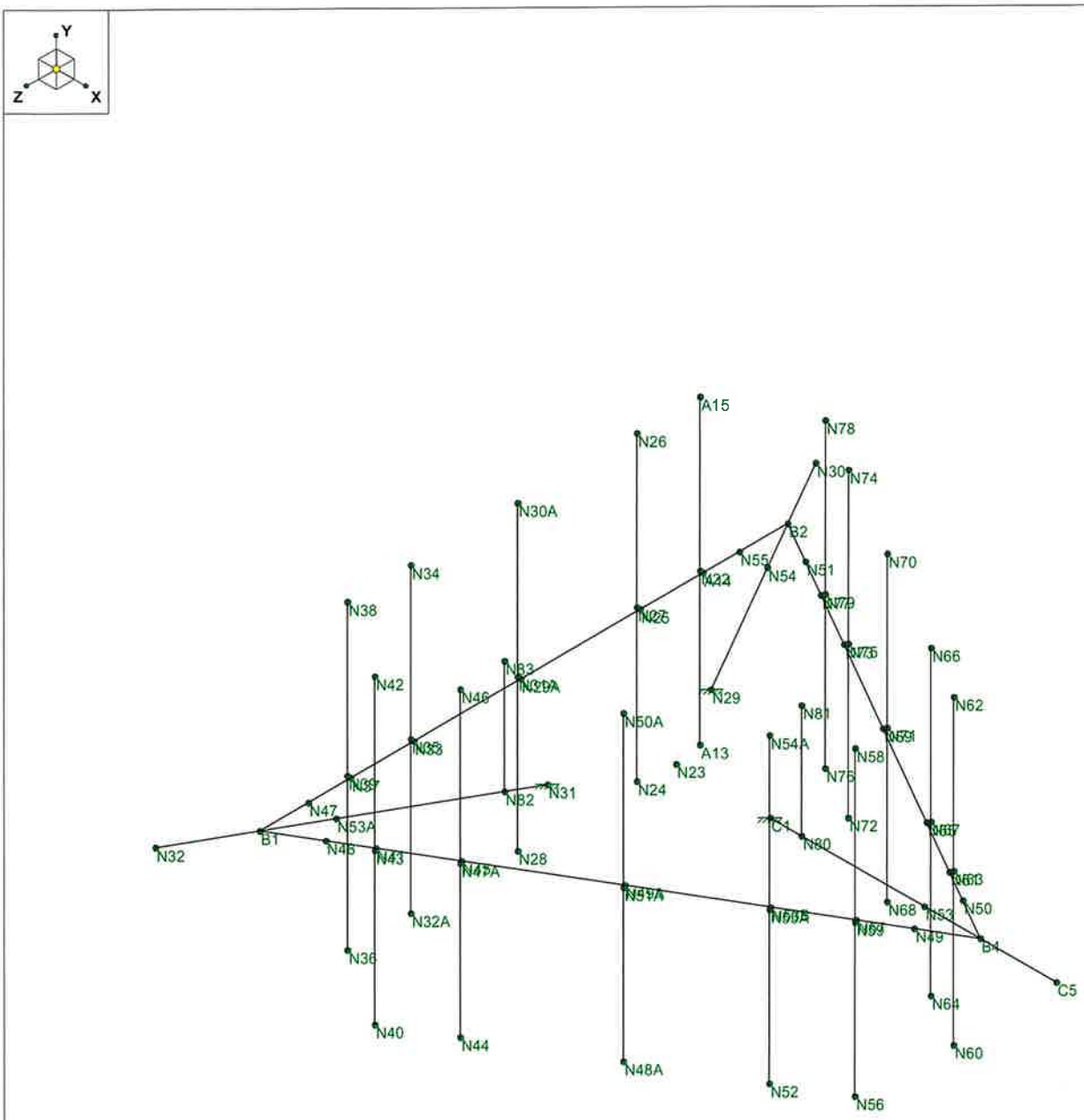
4) The standard of care for all Professional Engineering Services performed or furnished by Paul J. Ford and Company under this project will be the skill and care used by members of the Consultant's profession practicing under similar circumstances at the same time and in the same locality.

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

****

APPENDIX A

WIRE FRAME AND RENDERED MODELS



Envelope Only Solution

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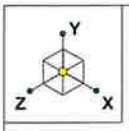
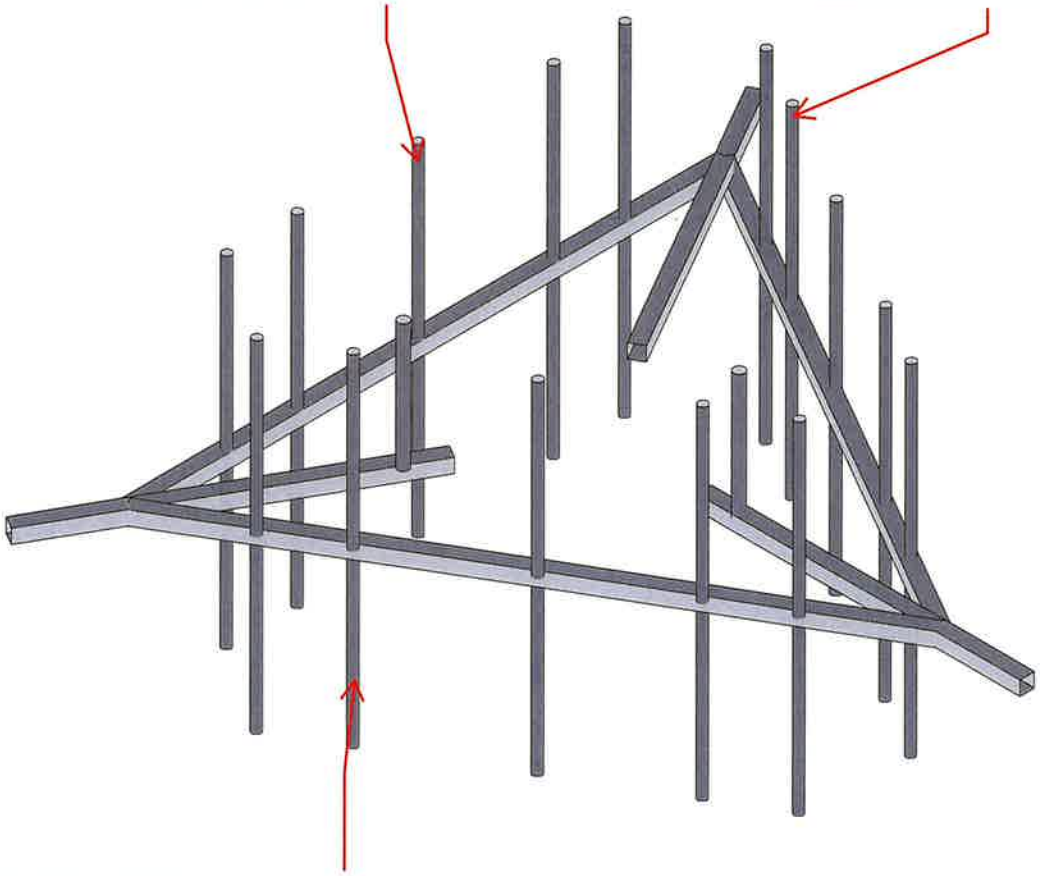


PROPOSED: (TYP)
(2) QUINTEL QS6656-5D
(1) QUINTEL AS-005245 DUAL BRACKET

PROPOSED: (TYP)
(1) SAMSUNG TELECOMMUNICATIONS B2/B66A RRH-BR049



PROPOSED: (TYP)
(1) SAMSUNG TELECOMMUNICATIONS CBRS ANTENNA
(1) SAMSUNG TELECOMMUNICATIONS CBRS RRH
(1) SAMSUNG TELECOMMUNICATIONS B5-B13 RRH-BR04C

Envelope Only Solution

Paul J. Ford and Company	Greenwich	SK - 2
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APPENDIX B

SOFTWARE INPUT CALCULATIONS

PAUL J. FORD & COMPANY
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Phone 614.221.6679 www.pauljford.com

Project # 42919-0012.002.7190
By AMS

Analysis 30 degrees

Mount Loading per TIA-222-G-2

Structure & Wind Speed

Structure Type =	Mount	
Mount Type =	3 Sectors	
Mount Centerline, z =	124	ft
Centerline Y Coordinate =	0	in
Wind Speed =	101	mph
Service Wind Speed =	30	mph
Const. Duration =		
Non-Op Wind Speed =	#N/A	mph
Op Wind Speed =	30	mph
Ice Wind Speed =	50	mph
Ice Thickness =	0.75	in

Topo

Exposure Cat =	C	
Structure Class =	III	
Topographic Cat =	1	
Crest Height =	0	ft

Velocity Pressure Coefficients

z_g =	900	ft	
a =	9.50		
K_{zmin} =	0.85		
K_z =	1.32		Calculated Value
K_z =	1.32		Section 2.6.5.2
K_{zt} =	1.00		Section 2.6.6.4
Gh =	1.00		Section 2.6.7
K_d =	0.95		Table 2-2
I =	1.15		Table 2-3
q_z=	37.78	psf	Section 2.6.9.6

Ice Loading

Ii =	1.25	
Iwi =	1.00	
q_z=	8.05	psf
K_{iz} =	1.14	
T_{iz} =	2.14	in
h =	1.00	in
W_i =	14.66	psf

Wind Pressures

Pressure =	37.781
Ice Pressure =	8.051

Antennas

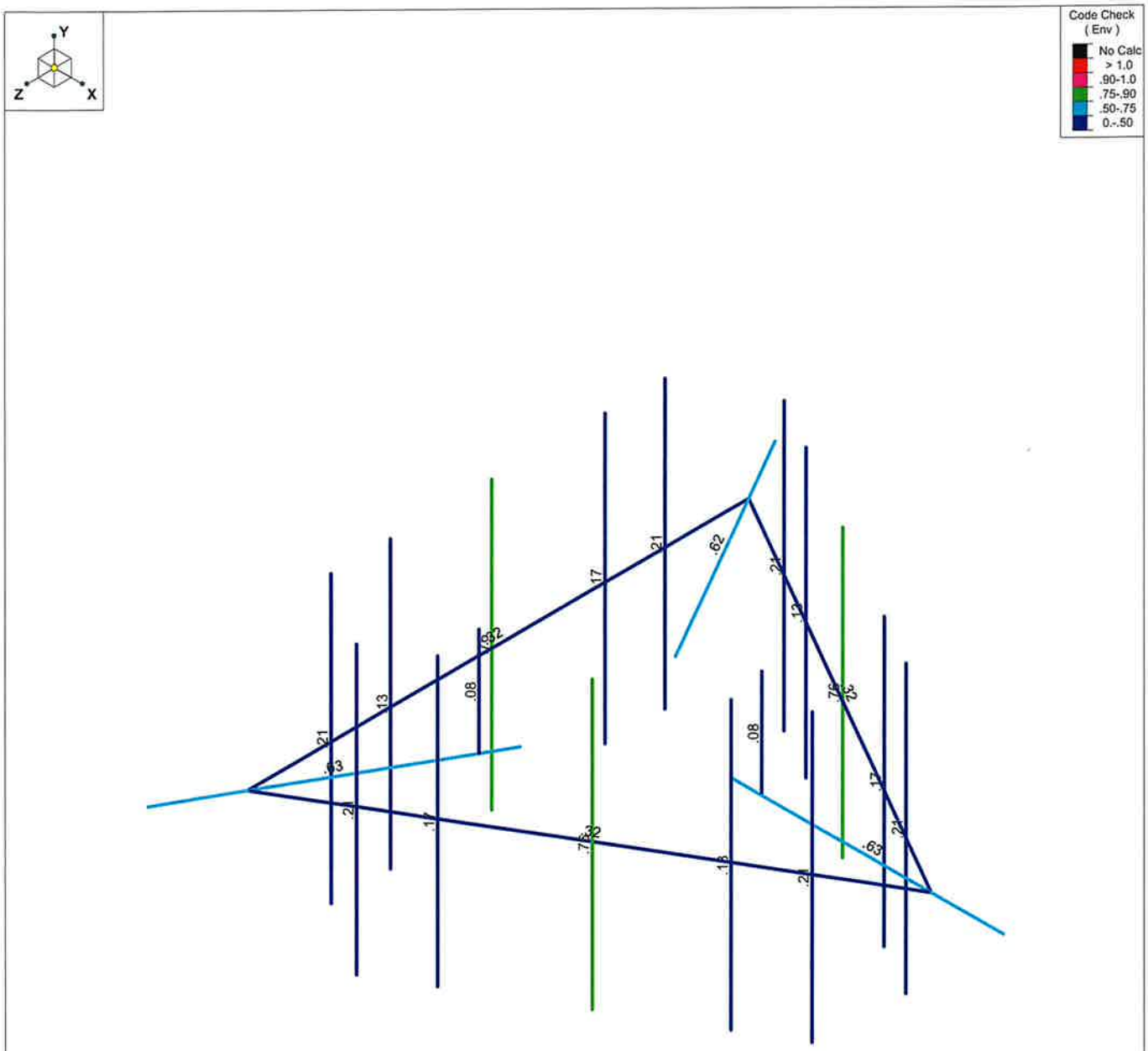
Item	Status	Manufacturer	Antenna	Height (in)	Width (in)	Depth (in)	Flat or Round	Weight (lbs)	Sector / Face	Position	Top/Bottom Mounting Point Spacing	Override Spacing (in)	Max Antenna C/L (ft)	Min Antenna C/L (ft)	Antenna C/L (ft)	Antenna Top Mount Location from Mount Pipe Bottom (in)	Antenna Bottom Mount Location from Mount Pipe Bottom (in)
1	P	QUINTEL TECHNOLOGY	(2) QS6656-5D W/ AS-005245 DUAL BRACKET	72	24	9.6	Flat	241.5	A	3	66.00		125.25	122.75	124	81.00	15.00
2	P	QUINTEL TECHNOLOGY	(2) QS6656-5D W/ AS-005245 DUAL BRACKET	72	24	9.6	Flat	241.5	B	3	66.00		125.25	122.75	124	81.00	15.00
3	P	QUINTEL TECHNOLOGY	(2) QS6656-5D W/ AS-005245 DUAL BRACKET	72	24	9.6	Flat	241.5	C	3	66.00		125.25	122.75	124	81.00	15.00
4	P	SAMSUNG TELECOMMUNICATIONS	CBRS Antenna	12.3	8.7	1.4	Flat	3	A	4	6.30		127.74	120.26	124	51.15	44.85
5	P	SAMSUNG TELECOMMUNICATIONS	CBRS Antenna	12.3	8.7	1.4	Flat	3	B	4	6.30		127.74	120.26	124	51.15	44.85
6	P	SAMSUNG TELECOMMUNICATIONS	CBRS Antenna	12.3	8.7	1.4	Flat	3	C	4	6.30		127.74	120.26	124	51.15	44.85
7	I	DECIBEL	DB844G65ZAXY	48	10	8	Flat	16	A	1	42.00		126.25	121.75	124	69.00	27.00
8	I	DECIBEL	DB844G65ZAXY	48	10	8	Flat	16	A	5	42.00		126.25	121.75	124	69.00	27.00
9	I	DECIBEL	DB844G65ZAXY	48	10	8	Flat	16	B	1	42.00		126.25	121.75	124	69.00	27.00
10	I	DECIBEL	DB844G65ZAXY	48	10	8	Flat	16	B	5	42.00		126.25	121.75	124	69.00	27.00
11	I	DECIBEL	DB844G65ZAXY	48	10	8	Flat	16	C	1	42.00		126.25	121.75	124	69.00	27.00
12	I	DECIBEL	DB844G65ZAXY	48	10	8	Flat	16	C	5	42.00		126.25	121.75	124	69.00	27.00
13	P	SAMSUNG TELECOMMUNICATIONS	B2/B66A RRH-BR049	15	15	8.1	Flat	70.3	A	2	9.00		127.63	120.38	125	64.50	55.50
14	P	SAMSUNG TELECOMMUNICATIONS	B2/B66A RRH-BR049	15	15	8.1	Flat	70.3	B	2	9.00		127.63	120.38	125	64.50	55.50
15	P	SAMSUNG TELECOMMUNICATIONS	B2/B66A RRH-BR049	15	15	8.1	Flat	70.3	C	2	9.00		127.63	120.38	125	64.50	55.50
16	P	SAMSUNG TELECOMMUNICATIONS	B5/B13 RRH-BR04C	15	15	8.1	Flat	70.3	A	4	9.00		127.63	120.38	125	64.50	55.50
17	P	SAMSUNG TELECOMMUNICATIONS	B5/B13 RRH-BR04C	15	15	8.1	Flat	70.3	B	4	9.00		127.63	120.38	125	64.50	55.50
18	P	SAMSUNG TELECOMMUNICATIONS	B5/B13 RRH-BR04C	15	15	8.1	Flat	70.3	C	4	9.00		127.63	120.38	125	64.50	55.50
19	P	SAMSUNG TELECOMMUNICATIONS	CBRS RRH	12.1	8.5	4.1	Flat	18.64	A	4	6.10		127.75	120.25	125	63.05	56.95
20	P	SAMSUNG TELECOMMUNICATIONS	CBRS RRH	12.1	8.5	4.1	Flat	18.64	B	4	6.10		127.75	120.25	125	63.05	56.95
21	P	SAMSUNG TELECOMMUNICATIONS	CBRS RRH	12.1	8.5	4.1	Flat	18.64	C	4	6.10		127.75	120.25	125	63.05	56.95
22	I	MISCL	OVP	15.95	10.15	8.15	Flat	50	A	6	9.95		126.59	124.41	126	28.98	19.03
23	I	MISCL	OVP	15.95	10.15	8.15	Flat	50	B	6	9.95		126.59	124.41	126	28.98	19.03

Dishes

Item	Status	Manufacturer	Microwave Dish	Dia (in)	Dish Type	Weight (lbs)	Sector / Face	Position	Top/Bottom Mounting Point Spacing	Override Spacing (in)	Max Antenna C/L (ft)	Min Antenna C/L (ft)	Antenna C/L (ft)	Antenna Top Mount Location from Mount Pipe Bottom (in)	Antenna Bottom Mount Location from Mount Pipe Bottom (in)

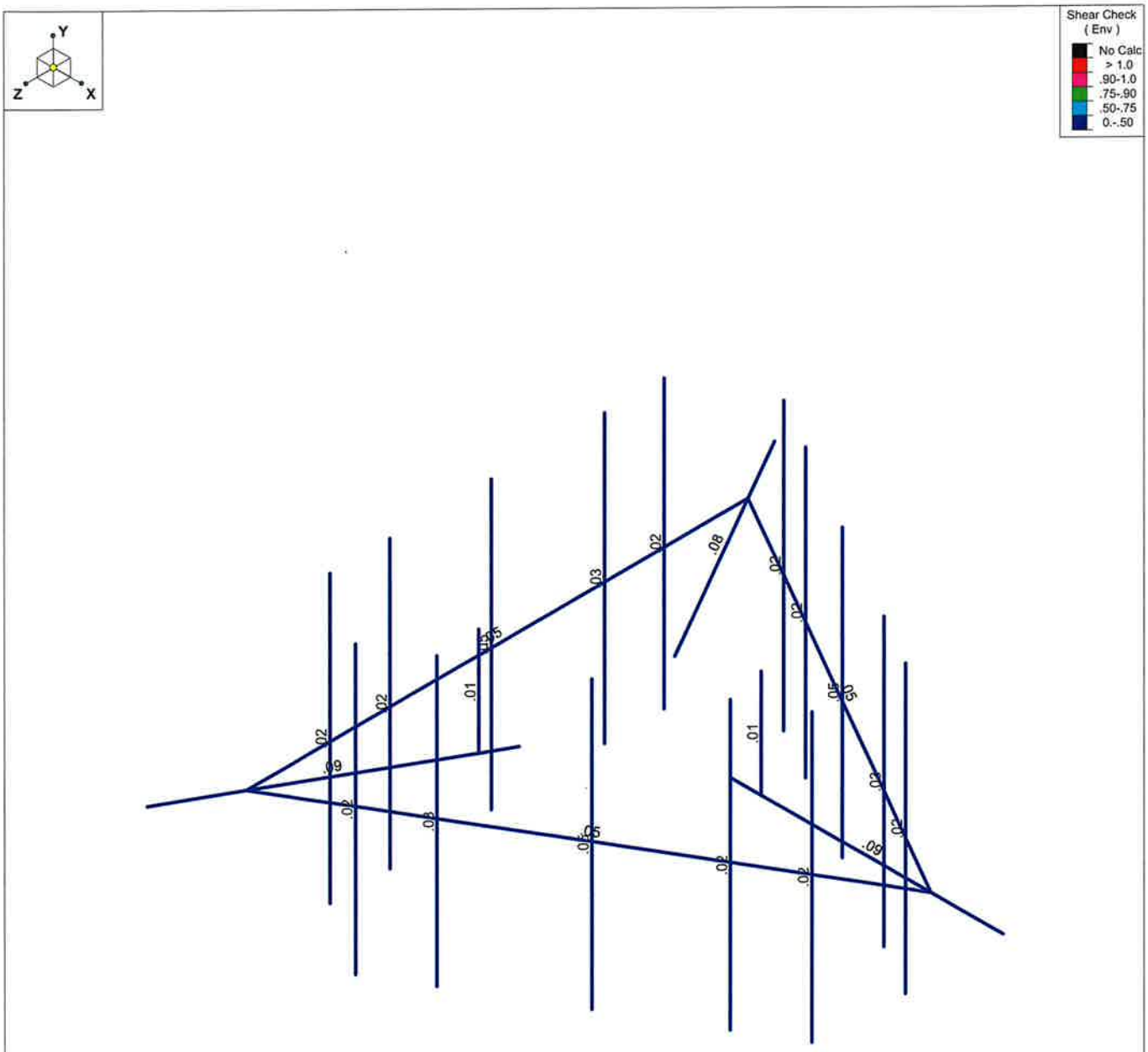
APPENDIX C

SOFTWARE ANALYSIS OUTPUT



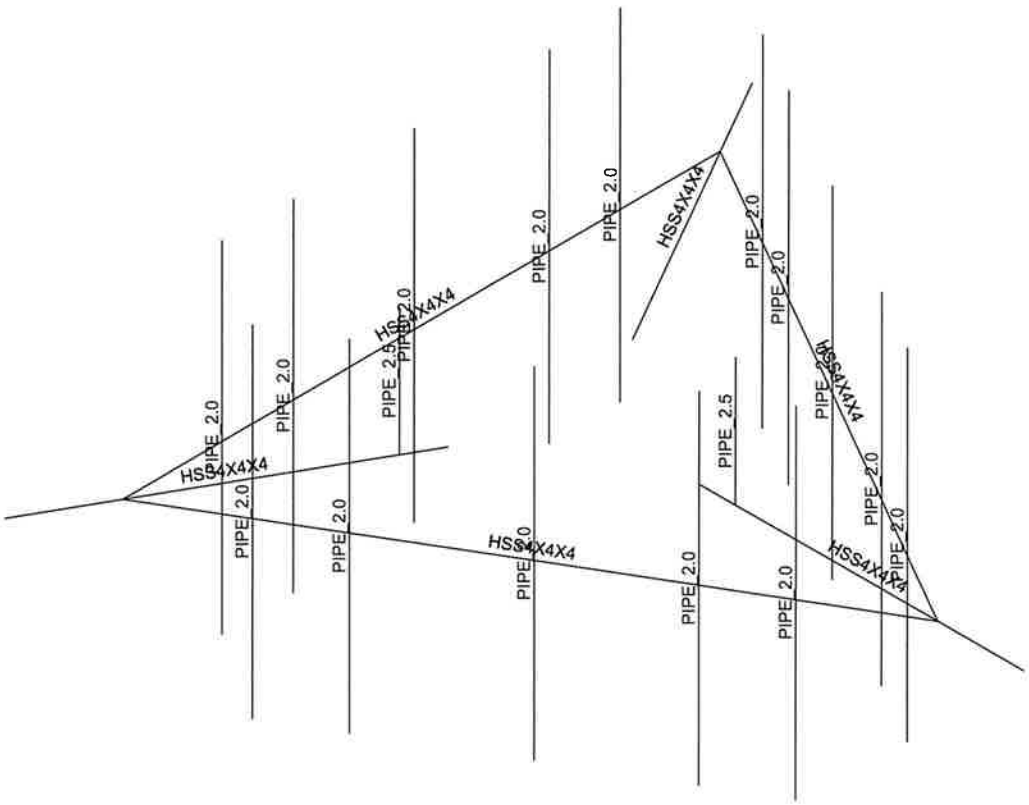
Member Code Checks Displayed (Enveloped)
Envelope Only Solution

Paul J. Ford and Company	Greenwich	SK - 3
AMS		Jan 8, 2020 at 12:41 PM
42919-0012.001.7190		42919-0012.001.7190_Wind.r3d



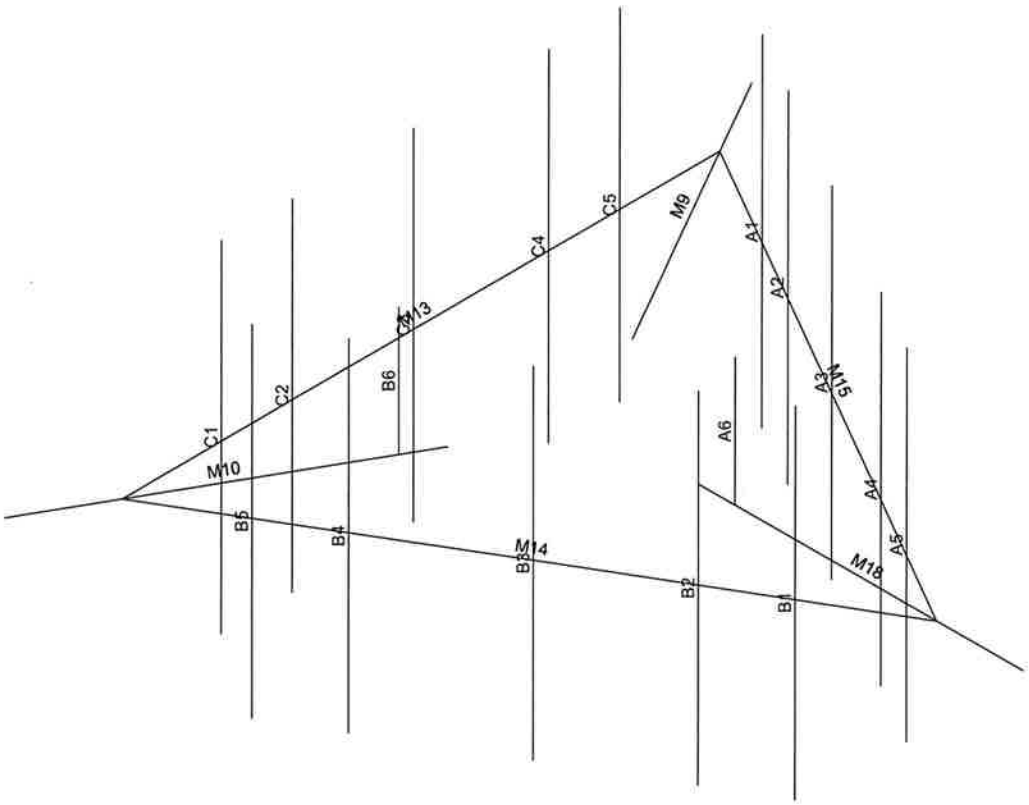
Member Shear Checks Displayed (Enveloped)
Envelope Only Solution

Paul J. Ford and Company	Greenwich	SK - 4
AMS		Jan 8, 2020 at 12:42 PM
42919-0012.001.7190		42919-0012.001.7190_Wind.r3d



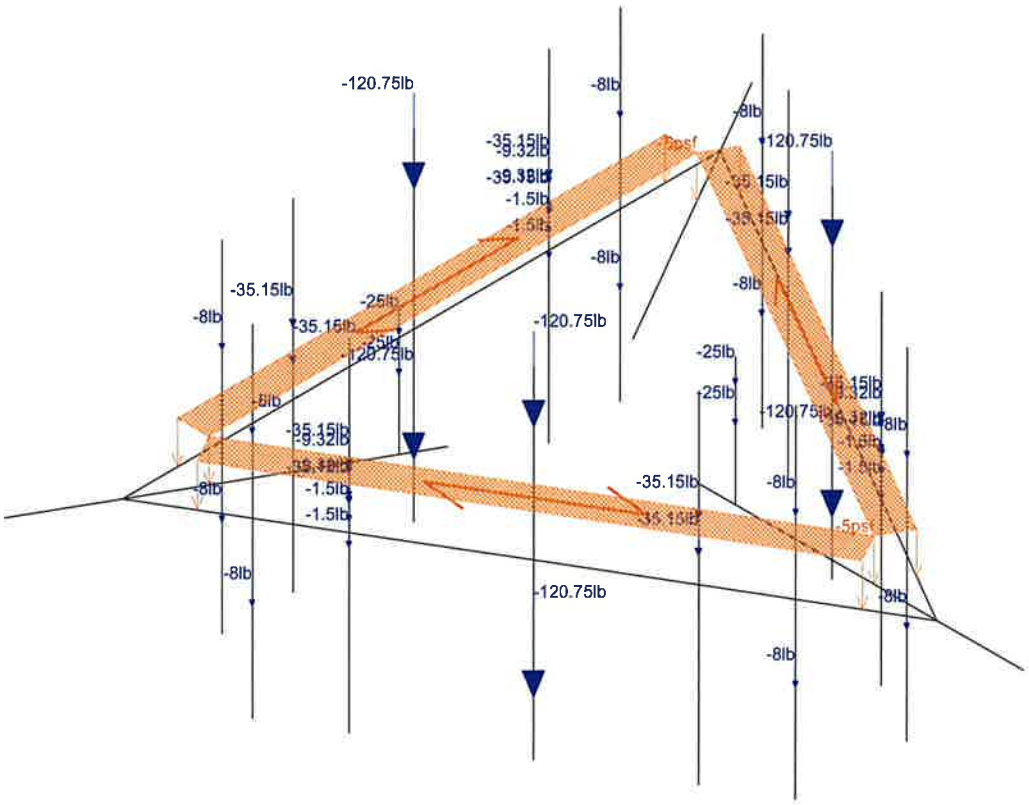
Envelope Only Solution

Paul J. Ford and Company	Greenwich	SK - 5
AMS		Oct 23, 2019 at 12:57 PM
42919-0012.001.7190		42919-0012.001.7190_Wind.r3d



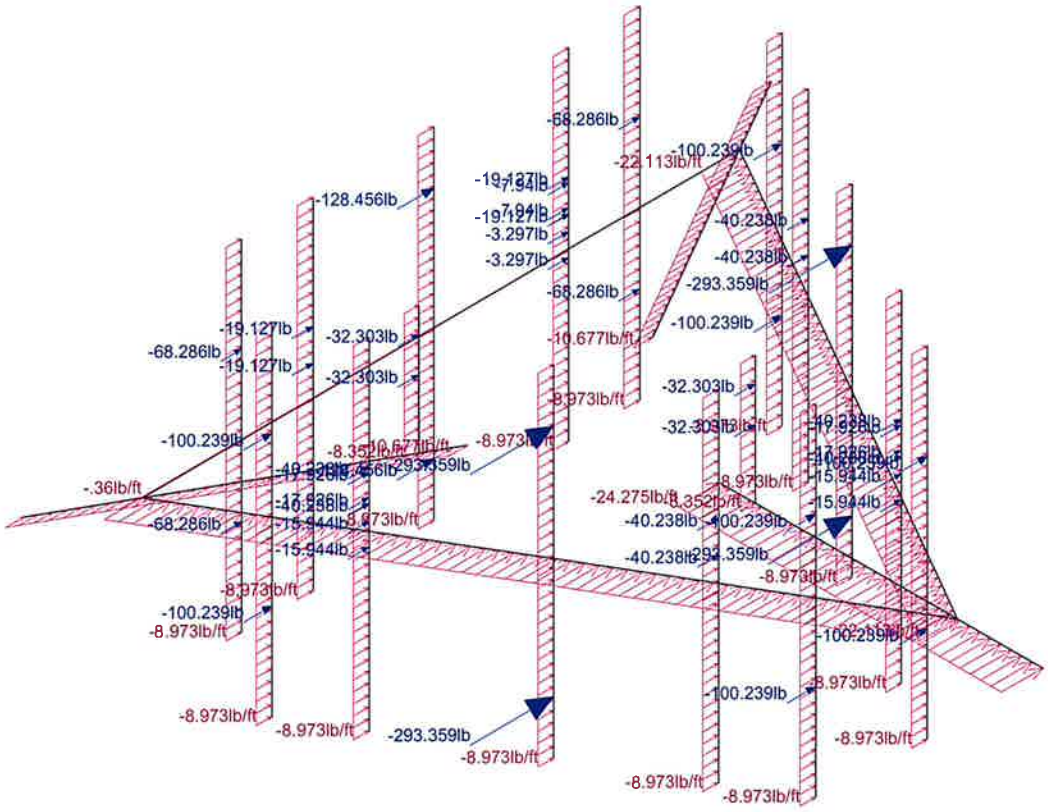
Envelope Only Solution

Paul J. Ford and Company	Greenwich	SK - 6
AMS		Oct 23, 2019 at 12:58 PM
42919-0012.001.7190		42919-0012.001.7190_Wind.r3d



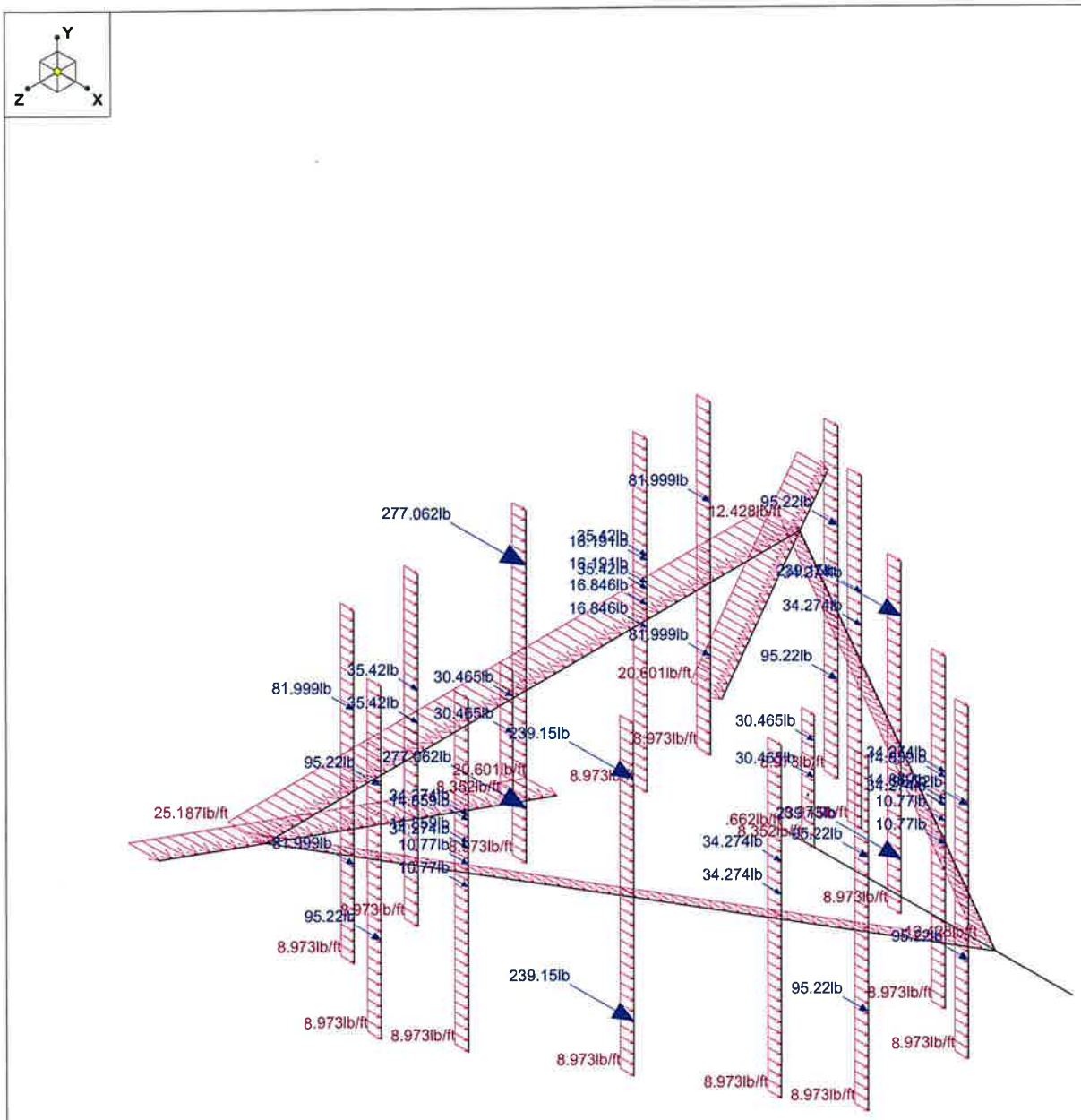
Loads: BLC 1, Dead
Envelope Only Solution

Paul J. Ford and Company	Greenwich	SK - 7
AMS		Jan 8, 2020 at 12:42 PM
42919-0012.001.7190		42919-0012.001.7190_Wind.r3d



Loads: BLC 3, Wind 0
Envelope Only Solution

Paul J. Ford and Company	Greenwich	SK - 8
AMS		Jan 8, 2020 at 12:42 PM
42919-0012.001.7190		42919-0012.001.7190_Wind.r3d



Loads: BLC 6, Wind 90
Envelope Only Solution

Paul J. Ford and Company	Greenwich	SK - 9
AMS		Jan 8, 2020 at 12:42 PM
42919-0012.001.7190		42919-0012.001.7190_Wind.r3d

(Global) Model Settings

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

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

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

(Global) Model Settings, Continued

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

Hot Rolled Steel Properties

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

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rules
1	M13	B1	B2			HSS4X4X4	None	None	A500 Gr. B (46..	Typical
2	M14	B4	B1			HSS4X4X4	None	None	A500 Gr. B (46..	Typical
3	M15	B2	B4			HSS4X4X4	None	None	A500 Gr. B (46..	Typical
4	M18	C1	C5			HSS4X4X4	None	None	A500 Gr. B (46..	Typical
5	M9	N29	N30			HSS4X4X4	None	None	A500 Gr. B (46..	Typical
6	M10	N31	N32			HSS4X4X4	None	None	A500 Gr. B (46..	Typical
7	M8	A14	N22			RIGID	None	None	RIGID	Typical
8	M10A	N25	N27			RIGID	None	None	RIGID	Typical
9	M12	N29A	N31A			RIGID	None	None	RIGID	Typical
10	M14A	N33	N35			RIGID	None	None	RIGID	Typical
11	M16	N37	N39			RIGID	None	None	RIGID	Typical
12	M18A	N41	N43			RIGID	None	None	RIGID	Typical
13	M20	N45	N47A			RIGID	None	None	RIGID	Typical
14	M22	N49A	N51A			RIGID	None	None	RIGID	Typical
15	M24	N53B	N55A			RIGID	None	None	RIGID	Typical
16	M26	N57	N59			RIGID	None	None	RIGID	Typical
17	M28	N61	N63			RIGID	None	None	RIGID	Typical
18	M30	N65	N67			RIGID	None	None	RIGID	Typical
19	M32	N69	N71			RIGID	None	None	RIGID	Typical
20	M34	N73	N75			RIGID	None	None	RIGID	Typical
21	M36	N77	N79			RIGID	None	None	RIGID	Typical
22	A6	N80	N81			PIPE_2.5	None	None	A53 Gr. B (35 ...	Typical
23	B6	N82	N83			PIPE_2.5	None	None	A53 Gr. B (35 ...	Typical

Member Primary Data (Continued)

	Label	I Joint	J Joint	K Joint	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rules
24	C1	N36	N38			PIPE_2.0	None	None	A53 Gr. B (35 ...	Typical
25	C2	N32A	N34			PIPE_2.0	None	None	A53 Gr. B (35 ...	Typical
26	C3	N28	N30A			PIPE_2.0	None	None	A53 Gr. B (35 ...	Typical
27	C4	N24	N26			PIPE_2.0	None	None	A53 Gr. B (35 ...	Typical
28	C5	A13	A15			PIPE_2.0	None	None	A53 Gr. B (35 ...	Typical
29	B1	N56	N58			PIPE_2.0	None	None	A53 Gr. B (35 ...	Typical
30	B2	N52	N54A			PIPE_2.0	None	None	A53 Gr. B (35 ...	Typical
31	B3	N48A	N50A			PIPE_2.0	None	None	A53 Gr. B (35 ...	Typical
32	B4	N44	N46			PIPE_2.0	None	None	A53 Gr. B (35 ...	Typical
33	B5	N40	N42			PIPE_2.0	None	None	A53 Gr. B (35 ...	Typical
34	A5	N60	N62			PIPE_2.0	None	None	A53 Gr. B (35 ...	Typical
35	A4	N64	N66			PIPE_2.0	None	None	A53 Gr. B (35 ...	Typical
36	A3	N68	N70			PIPE_2.0	None	None	A53 Gr. B (35 ...	Typical
37	A2	N72	N74			PIPE_2.0	None	None	A53 Gr. B (35 ...	Typical
38	A1	N76	N78			PIPE_2.0	None	None	A53 Gr. B (35 ...	Typical

Member Advanced Data

	Label	I Release	J Release	I Offset[in]	J Offset[in]	T/C Only	Physical	Defl Rat..	Analysis ...	Inactive	Seismic...
1	M13						Yes	** NA **			None
2	M14						Yes	** NA **			None
3	M15						Yes	** NA **			None
4	M18						Yes	** NA **			None
5	M9						Yes	** NA **			None
6	M10						Yes	** NA **			None
7	M8						Yes	** NA **			None
8	M10A						Yes	** NA **			None
9	M12						Yes	** NA **			None
10	M14A						Yes	** NA **			None
11	M16						Yes	** NA **			None
12	M18A						Yes	** NA **			None
13	M20						Yes	** NA **			None
14	M22						Yes	** NA **			None
15	M24						Yes	** NA **			None
16	M26						Yes	** NA **			None
17	M28						Yes	** NA **			None
18	M30						Yes	** NA **			None
19	M32						Yes	** NA **			None
20	M34						Yes	** NA **			None
21	M36						Yes	** NA **			None
22	A6						Yes	** NA **			None
23	B6						Yes	** NA **			None
24	C1						Yes	** NA **			None
25	C2						Yes	** NA **			None
26	C3						Yes	** NA **			None
27	C4						Yes	** NA **			None
28	C5						Yes	** NA **			None
29	B1						Yes	** NA **			None
30	B2						Yes	** NA **			None
31	B3						Yes	** NA **			None
32	B4						Yes	** NA **			None
33	B5						Yes	** NA **			None
34	A5						Yes	** NA **			None
35	A4						Yes	** NA **			None
36	A3						Yes	** NA **			None
37	A2						Yes	** NA **			None

Member Advanced Data (Continued)

	Label	I Release	J Release	I Offset[in]	J Offset[in]	T/C Only	Physical	Defl Rat...	Analysis ...	Inactive	Seismic...
38	A1						Yes	** NA **			None

Hot Rolled Steel Design Parameters

	Label	Shape	Length[in]	Lbyy[in]	Lbzz[in]	Lcomp top[in]	Lcomp bot[in]	L-torqu...	Kyy	Kzz	Cb	Function
1	M13	HSS4X4X4	168			Lbyy						Lateral
2	M14	HSS4X4X4	168			Lbyy						Lateral
3	M15	HSS4X4X4	168			Lbyy						Lateral
4	M18	HSS4X4X4	91.302			Lbyy						Lateral
5	M9	HSS4X4X4	91.302			Lbyy						Lateral
6	M10	HSS4X4X4	91.302			Lbyy						Lateral
7	A6	PIPE_2.5	36									Lateral
8	B6	PIPE_2.5	36									Lateral
9	C1	PIPE_2.0	96									Lateral
10	C2	PIPE_2.0	96									Lateral
11	C3	PIPE_2.0	96									Lateral
12	C4	PIPE_2.0	96									Lateral
13	C5	PIPE_2.0	96									Lateral
14	B1	PIPE_2.0	96									Lateral
15	B2	PIPE_2.0	96									Lateral
16	B3	PIPE_2.0	96									Lateral
17	B4	PIPE_2.0	96									Lateral
18	B5	PIPE_2.0	96									Lateral
19	A5	PIPE_2.0	96									Lateral
20	A4	PIPE_2.0	96									Lateral
21	A3	PIPE_2.0	96									Lateral
22	A2	PIPE_2.0	96									Lateral
23	A1	PIPE_2.0	96									Lateral

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distribut...	Area(Me...	Surface(...
1	Dead	None		-1.1			46		3	
2	Live	None								
3	Wind 0	None					92	46		
4	Wind 30	None					92	46		
5	Wind 60	None					92	46		
6	Wind 90	None					92	46		
7	Wind 120	None					92	46		
8	Wind 150	None					92	46		
9	Ice Load	None					46	23	3	
10	Ice 0	None					92	46		
11	Ice 30	None					92	46		
12	Ice 60	None					92	46		
13	Ice 90	None					92	46		
14	Ice 120	None					92	46		
15	Ice 150	None					92	46		
16	Lm	None				1				
17	Lv	None				1				
18	BLC 1 Transient Area Loads	None						3		
19	BLC 9 Transient Area Loads	None						3		

Load Combinations

	Description	S...	P...	S...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
1	1.4 D	Yes	Y		1	1.4																				
2	1.2 D + 1.6 L	Yes	Y		1	1.2	2	1.6																		
3	1.2 D + 1.6 Wo @ 0	Yes	Y		1	1.2	3	1.6																		
4	1.2 D + 1.6 Wo @ 30	Yes	Y		1	1.2	4	1.6																		
5	1.2 D + 1.6 Wo @ 60	Yes	Y		1	1.2	5	1.6																		
6	1.2 D + 1.6 Wo @ 90	Yes	Y		1	1.2	6	1.6																		
7	1.2 D + 1.6 Wo @ 120	Yes	Y		1	1.2	7	1.6																		
8	1.2 D + 1.6 Wo @ 150	Yes	Y		1	1.2	8	1.6																		
9	1.2 D + 1.6 Wo @ 180	Yes	Y		1	1.2	3	-1.6																		
10	1.2 D + 1.6 Wo @ 210	Yes	Y		1	1.2	4	-1.6																		
11	1.2 D + 1.6 Wo @ 240	Yes	Y		1	1.2	5	-1.6																		
12	1.2 D + 1.6 Wo @ 270	Yes	Y		1	1.2	6	-1.6																		
13	1.2 D + 1.6 Wo @ 300	Yes	Y		1	1.2	7	-1.6																		
14	1.2 D + 1.6 Wo @ 330	Yes	Y		1	1.2	8	-1.6																		
15	1.2 D + 1.0 Di + 1.0 Wi @ 0	Yes	Y		1	1.2	9	1	10	1																
16	1.2 D + 1.0 Di + 1.0 Wi @ 30	Yes	Y		1	1.2	9	1	11	1																
17	1.2 D + 1.0 Di + 1.0 Wi @ 60	Yes	Y		1	1.2	9	1	12	1																
18	1.2 D + 1.0 Di + 1.0 Wi @ 90	Yes	Y		1	1.2	9	1	13	1																
19	1.2 D + 1.0 Di + 1.0 Wi @ ...	Yes	Y		1	1.2	9	1	14	1																
20	1.2 D + 1.0 Di + 1.0 Wi @ ...	Yes	Y		1	1.2	9	1	15	1																
21	1.2 D + 1.0 Di + 1.0 Wi @ ...	Yes	Y		1	1.2	9	1	10	-1																
22	1.2 D + 1.0 Di + 1.0 Wi @ ...	Yes	Y		1	1.2	9	1	11	-1																
23	1.2 D + 1.0 Di + 1.0 Wi @ ...	Yes	Y		1	1.2	9	1	12	-1																
24	1.2 D + 1.0 Di + 1.0 Wi @ ...	Yes	Y		1	1.2	9	1	13	-1																
25	1.2 D + 1.0 Di + 1.0 Wi @ ...	Yes	Y		1	1.2	9	1	14	-1																
26	1.2 D + 1.0 Di + 1.0 Wi @ ...	Yes	Y		1	1.2	9	1	15	-1																
27	1.2 D + 1.5 Lm + 1.0 Wm ...	Yes	Y		1	1.2	3	.088	16	1.5																
28	1.2 D + 1.5 Lm + 1.0 Wm ...	Yes	Y		1	1.2	4	.088	16	1.5																
29	1.2 D + 1.5 Lm + 1.0 Wm ...	Yes	Y		1	1.2	5	.088	16	1.5																
30	1.2 D + 1.5 Lm + 1.0 Wm ...	Yes	Y		1	1.2	6	.088	16	1.5																
31	1.2 D + 1.5 Lm + 1.0 Wm ...	Yes	Y		1	1.2	7	.088	16	1.5																
32	1.2 D + 1.5 Lm + 1.0 Wm ...	Yes	Y		1	1.2	8	.088	16	1.5																
33	1.2 D + 1.5 Lm + 1.0 Wm ...	Yes	Y		1	1.2	3	-.088	16	1.5																
34	1.2 D + 1.5 Lm + 1.0 Wm ...	Yes	Y		1	1.2	4	-.088	16	1.5																
35	1.2 D + 1.5 Lm + 1.0 Wm ...	Yes	Y		1	1.2	5	-.088	16	1.5																
36	1.2 D + 1.5 Lm + 1.0 Wm ...	Yes	Y		1	1.2	6	-.088	16	1.5																
37	1.2 D + 1.5 Lm + 1.0 Wm ...	Yes	Y		1	1.2	7	-.088	16	1.5																
38	1.2 D + 1.5 Lm + 1.0 Wm ...	Yes	Y		1	1.2	8	-.088	16	1.5																
39	1.2 D + 1.5 Lv	Yes	Y		1	1.2	17	1.5																		

Envelope Joint Reactions

	Joint		X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [k-in]	LC	MY [k-in]	LC	MZ [k-in]	LC
1	C1	max	4474.2	12	3249.206	18	1813.931	3	4.506	3	45.968	9	113.773	18
2		min	-4485.263	6	1097.603	12	-1813.659	9	-4.443	9	-45.981	3	33.949	12
3	N29	max	2181.277	14	3075.672	26	3770.234	14	96.344	15	44.734	5	-17.564	7
4		min	-2175.722	8	1014.757	8	-3760.588	8	31.159	8	-44.734	11	-55.912	24
5	N31	max	2240.632	10	3249.098	22	3875.286	4	-28.955	3	45.996	13	-15.214	6
6		min	-2234.979	4	1097.812	4	-3884.803	10	-98.753	21	-45.982	7	-57.271	24
7	Totals:	max	8724.417	12	9523.712	26	8462.591	3						
8		min	-8724.418	6	3416.007	8	-8462.593	9						

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

	Member	Shape	Code C...	Loc[in]	LC	Shear ...	Loc[in]	Dir	LC	phi*Pnc [lb]	phi*Pnt [lb]	phi*Mn y-...	phi*Mn z-...	Cb	Eqn
1	B3	PIPE_2.0	.756	48	9	.055	48		9	14916.096	32130	22.459	22.459	1....	H1-1b
2	A3	PIPE_2.0	.756	48	5	.055	48		5	14916.096	32130	22.459	22.459	1....	H1-1b
3	C3	PIPE_2.0	.756	48	13	.055	48		13	14916.096	32130	22.459	22.459	1....	H1-1b
4	M18	HSS4X4X4	.632	0	21	.092	0	y	15	109499.8...	139518	194.166	194.166	2....	H1-1b
5	M10	HSS4X4X4	.632	0	25	.092	0	y	19	109499.8...	139518	194.166	194.166	2....	H1-1b
6	M9	HSS4X4X4	.621	0	17	.083	0	y	23	109499.8...	139518	194.166	194.166	2....	H1-1b
7	M13	HSS4X4X4	.320	168	13	.053	168	z	12	61430.995	139518	194.166	194.166	2....	H1-1b
8	M14	HSS4X4X4	.320	168	9	.052	168	z	8	61430.995	139518	194.166	194.166	2....	H1-1b
9	M15	HSS4X4X4	.320	168	5	.052	168	z	4	61430.995	139518	194.166	194.166	2....	H1-1b
10	B5	PIPE_2.0	.212	48	7	.023	48		7	14916.096	32130	22.459	22.459	1....	H1-1b
11	A5	PIPE_2.0	.212	48	3	.023	48		3	14916.096	32130	22.459	22.459	1	H1-1b
12	B1	PIPE_2.0	.212	48	9	.023	48		9	14916.096	32130	22.459	22.459	1	H1-1b
13	C5	PIPE_2.0	.212	48	11	.023	48		11	14916.096	32130	22.459	22.459	1....	H1-1b
14	C1	PIPE_2.0	.212	48	13	.023	48		13	14916.096	32130	22.459	22.459	1....	H1-1b
15	A1	PIPE_2.0	.212	48	5	.023	48		5	14916.096	32130	22.459	22.459	1....	H1-1b
16	B4	PIPE_2.0	.169	48	7	.028	48		7	14916.096	32130	22.459	22.459	1....	H1-1b
17	A4	PIPE_2.0	.169	48	3	.028	48		3	14916.096	32130	22.459	22.459	1	H1-1b
18	C4	PIPE_2.0	.169	48	11	.028	48		11	14916.096	32130	22.459	22.459	1....	H1-1b
19	B2	PIPE_2.0	.134	48	9	.019	48		9	14916.096	32130	22.459	22.459	1	H1-1b
20	C2	PIPE_2.0	.134	48	13	.019	48		13	14916.096	32130	22.459	22.459	1....	H1-1b
21	A2	PIPE_2.0	.134	48	5	.019	48		5	14916.096	32130	22.459	22.459	1....	H1-1b
22	B6	PIPE_2.5	.075	0	9	.009	0		9	47114.007	50715	43.155	43.155	1....	H1-1b
23	A6	PIPE_2.5	.075	0	5	.009	0		5	47114.007	50715	43.155	43.155	2....	H1-1b

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

Project # 42919-0012.001.7190
By AMS
Date: 01/08/20
v0.1, Effective 07/10/18

MOUNT TO TOWER CONNECTION CHECKS

REACTIONS

Px=	1.814	Kip
Py=	3.249	Kip
(Axial)Pz=	4.485	Kip
Mx=	113.773	Kip-in
My=	45.981	Kip-in
(Torque)Mz=	4.506	Kip-in

Number of Bolts	=	4	
Plate Size	b=	6	in
	d=	10	in
Edge distance for Bolts	=	1.5	in
Bolt group centroid y-coordinate, Yc		5	in
Bolt group centroid x-coordinate, Xc		3	in
Load eccentricity in x-direction, ex		0	in
Load eccentricity in y-direction, ey		0	in
Total Moment including load eccentricity ΣMx=		113.77	Kips-in
Total Moment including load eccentricity ΣMy=		45.981	Kips-in
Total Moment including load eccentricity ΣMz=		4.506	Kips-in

WELD CHECKS

Standoff Member Type		Square	
Width	=	4	in
Depth (only for square members)	=	4	in
Weld Size	=	0.3750	
Total Forces in X direction =		0.332	kips
Total Forces in Y direction =		0.512	kips
Total Forces in Z direction =		7.77	kips
Resultant	=	7.79	kips
Φ*Fw (Kip/in)/16" weld =		1.392	
Capacity used		93.30%	

BOLT CHECKS

Tension Reaction	22.49	kip
Shear Reaction	1.18	kip
Bolt Type	A325N	
Bolt Diameter	0.75	in
Tensile Strength	29.8	kips
Shear Strength	17.9	kips
Reduced Tensile Strength	-	kips
Tensile Capacity Used	75.4%	
Shear Capacity Used	6.6%	

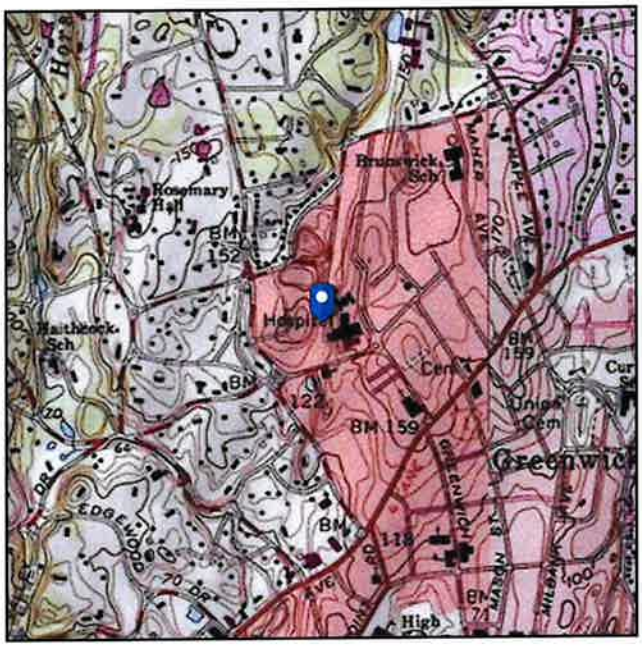
Note: Tension reduction not required if tension or shear capacity < 30%

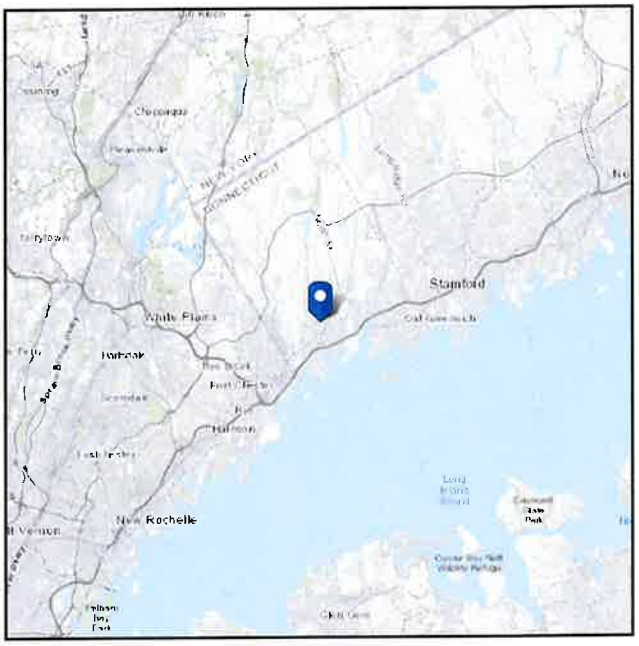
ASCE 7 Hazards Report

Address:
No Address at This Location

Standard: ASCE/SEI 7-10
Risk Category: III
Soil Class: D - Stiff Soil

Elevation: 142.08 ft (NAVD 88)
Latitude: 41.033936
Longitude: -73.630832





Wind

Results:

Wind Speed:	125 Vmph ← Jurisdiction requires nominal wind speed of 101 mph
10-year MRI	76 Vmph
25-year MRI	85 Vmph
50-year MRI	90 Vmph
100-year MRI	97 Vmph
Data Source:	ASCE/SEI 7-10, Fig. 26.5-1B and Figs. CC-1–CC-4, incorporating errata of March 12, 2014
Date Accessed:	Wed Jan 08 2020

Value provided is 3-second gust wind speeds at 33 ft above ground for Exposure C Category, based on linear interpolation between contours. Wind speeds are interpolated in accordance with the 7-10 Standard. Wind speeds correspond to approximately a 3% probability of exceedance in 50 years (annual exceedance probability = 0.000588, MRI = 1,700 years).

Site is in a hurricane-prone region as defined in ASCE/SEI 7-10 Section 26.2. Glazed openings need not be protected against wind-borne debris.

Mountainous terrain, gorges, ocean promontories, and special wind regions should be examined for unusual wind conditions.

ASCE
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Seismic

Site Soil Class: D - Stiff Soil

Results:

S_S :	0.259	S_{DS} :	0.275
S_1 :	0.07	S_{D1} :	0.112
F_a :	1.593	T_L :	6
F_v :	2.4	PGA :	0.153
S_{MS} :	0.412	PGA_M :	0.228
S_{M1} :	0.169	F_{PGA} :	1.495
		I_e :	1.25

Seismic Design Category B

Data Accessed: Wed Jan 08 2020

Date Source: USGS Seismic Design Maps based on ASCE/SEI 7-10, incorporating Supplement 1 and errata of March 31, 2013, and ASCE/SEI 7-10 Table 1.5-2. Additional data for site-specific ground motion procedures in accordance with ASCE/SEI 7-10 Ch. 21 are available from USGS.

ASCE
AMERICAN SOCIETY OF CIVIL ENGINEERS

Ice

Results:

Ice Thickness:	0.75 in.
Concurrent Temperature:	15 F
Gust Speed:	50 mph
Data Source:	Standard ASCE/SEI 7-10, Figs. 10-2 through 10-8
Date Accessed:	Wed Jan 08 2020

Ice thicknesses on structures in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

Values provided are equivalent radial ice thicknesses due to freezing rain with concurrent 3-second gust speeds, for a 50-year mean recurrence interval, and temperatures concurrent with ice thicknesses due to freezing rain. Thicknesses for ice accretions caused by other sources shall be obtained from local meteorological studies. Ice thicknesses in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

APPENDIX D

POST MODIFICATION INSPECTION (PMI) REQUIREMENTS FOR DESKTOP REVIEW

Post Modification Inspection (PMI) Report Requirements

Documents & Photos Required from Contractor

Purpose – to provide PJF the proper documentation in order to complete the required Mount Desktop review of the Post Modification Inspection Report.

- Contractor is responsible for making certain the photos provided as noted below provide confirmation that the modification was completed in accordance with the modification drawings.
- Contractor shall relay any data that can impact the performance of the mount or the mount modification, this includes safety issues.

Base Requirements:

- Provide "as built drawings" showing contractor's name, preparer's signature, and date. Any deviations from the drawing (proposed modification) must be shown.
- Notation that all hardware was properly installed, and the existing hardware was inspected for any issues.
- Verification that loading is as communicated in the modification drawings. NOTE if loading is different than what is conveyed in the modification drawing contact PJF immediately.
- Each photo should be time and date stamped.
- Photos should be high resolution and submitted in a Zip File and should be organized in the file structure as depicted in Schedule A attached.
- Any special photos outside of the standard requirements will be indicated on the drawings.
- Contractor shall ensure that the safety climb wire rope is supported and not adversely impacted by the install of the modification components. This may involve the install of wire rope guides, or other items to protect the wire rope.
- The photos in the file structure should be uploaded to **pjfmount@pauljford.com** as depicted on the drawings.

Photo Requirements:

- *Base and "During Installation Photos"*
  - Base pictures include
    - Photo of Gate Signs showing the tower owner, site name, and number.
    - Photo of carrier shelter showing the carrier site name and number if available.
    - Photos of the galvanizing compound and/or paint used (if applicable), clearly showing the label and name.
  - "During Installation" Photos if provided – must be placed only in this folder
- *Photos taken at ground level*
  - Overall tower structure before and after installation of the modifications
  - Photos of the appropriate mount before and after installation of the modifications; if the mounts are at different rad elevations, pictures must be provided for all elevations that the modifications were installed.
- *Photos taken at Mount Elevation*
  - Photos showing each individual sector before and after installation of modifications. Each entire sector must be in one photo to show in the inter-connection of members.
  - Close-up photos of each installed modification per the modification drawings; pictures should also include connection hardware (U-bolts, bolts, nuts, all-threaded rods, etc.)

- Photos showing the measurements of the installed modification member sizes (i.e. lengths, widths, depths, diameters, thicknesses).
- Photos showing the elevation or distances of the installed modifications from the appropriate reference locations shown in the modification drawings.
- Photos showing the installed modifications onto the tower with tape drop measurements (if applicable) (i.e. ring/collar mounts, tie-backs, V-bracing kits, etc.); if the existing mount elevations needs to be changed according to the modification drawings, a tape drop measurement shall be provided before the elevation change.
- Photos showing the safety climb wire rope above and below the mount prior to modification.
- Photos showing the safety climb wire rope above and below the mount post modification.

Antenna and equipment placement and Geometry Certification:

- The contractor must certify that the antenna and equipment placement and geometry is in accordance with the antenna placement diagrams as included in this mount analysis.

☐ The contractor certifies per photos that the equipment on the mount is as depicted on the antenna placement diagrams as included in this mount analysis.

☐ The contractor notes that the equipment on the mount is not in accordance with the antenna placement diagrams and has accordingly marked up the diagrams or provided a diagram outlining the differences.

Certifying Individual: Company _____

Name _____

Signature _____

Schedule A – Photo & Document File Structure

- VzW Site Number / Name
  - Base & "During Installation" Photos
  - Pre-Installation Photos
    - Alpha
    - Beta
    - Gamma
    - Ground Level
    - Tape Drop
  - Post-Installation Photos
    - Alpha
    - Beta
    - Gamma
    - Ground Level
    - Tape Drop
  - Material Certification – Submission of this document including executed certification on Page 2
  - Specific Required Additional Photos
  - Required Additional Photos

Special Instructions / Validation as required from the MA or any other information the contractor deems necessary to share that was identified:

Issue: _____

_____

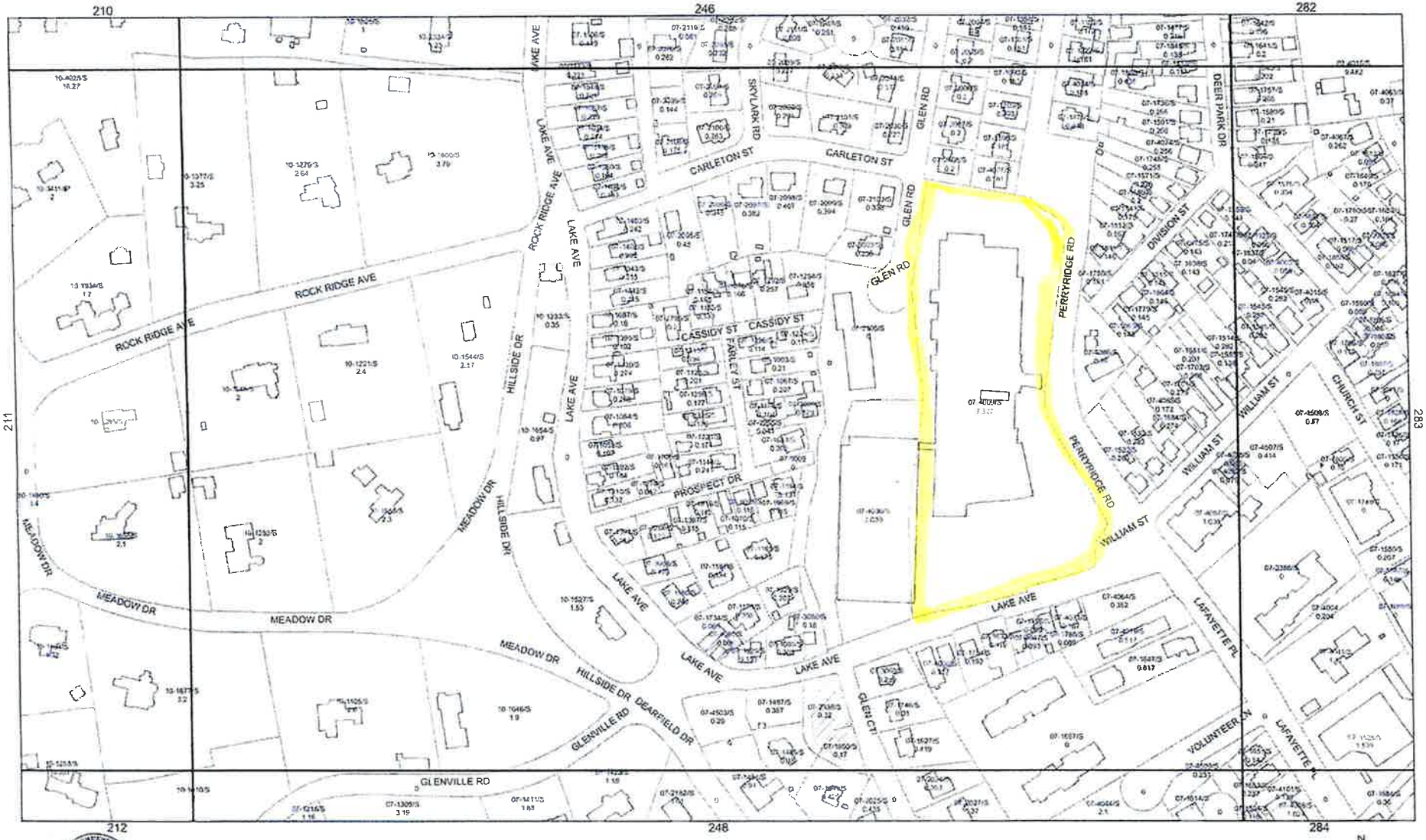
_____

Response: _____

_____

_____

ATTACHMENT 6



TOWN OF GREENWICH TAX MAP 247 VOL 3

200 100 0 200 Feet

N W E S

Tax ID 247/113 Printed 07/18/2018 Card No. 1 of 2

ADMINISTRATIVE INFORMATION

PARCEL NUMBER
07-4009/S

Parent Parcel Number

Property Address
PERRYRIDGE ROAD 0005

Neighborhood
2200 WEST PUTNAM

Property Class
299 Exempt Commercial

TAXING DISTRICT INFORMATION

Jurisdiction	57	Greenwich, CT
Area	001	
Corporation	057	
District	07	
Section & Plat	167	
Routing Number	6578W0001	

Site Description

Topography:

Public Utilities:
Sewer, Electric

Street or Road:

Neighborhood:

Zoning:
H-1 Hospital Zone

Legal Acres:
7.3274

OWNERSHIP

GREENWICH HOSPITAL
C/O NANCYE FRITZ FACILITIES MGMT
5 PERRYRIDGE ROAD
GREENWICH, CT 06830

LOT NO 1 2 3 4 PERRYRIDE RD & LAKE AVE W1 1A

TRANSFER OF OWNERSHIP

Date			
01/06/2012	GREENWICH HOSPITAL ASSOCIATION THE	$0	Bk/Pg: 6265, 4
07/03/1990	NA	$0	Bk/Pg: 2051, 54

EXEMPT

VALUATION RECORD

Assessment Year		10/01/2006	10/01/2007	10/01/2010	10/01/2015	10/01/2015	10/01/2016	10/01/2017
Reason for Change		2006 List	2007 List	2010 Reval	2015 Prelim	2015 Final	2016 List	2017 List
VALUATION	L	11876300	11876300	11846300	13938000	13938000	13938000	13938000
Market	B	255669200	257342000	276895100	355986700	355986700	355986700	355986700
	T	267545500	269218300	288741400	369924700	369924700	369924700	369924700
VALUATION	L	8313410	8313410	8292410	9756600	9756600	9756600	9756600
70% Assessed	B	178968440	180139400	193826570	249190690	249190690	249190690	249190690
	T	187281850	188452810	202118980	258947290	258947290	258947290	258947290

LAND DATA AND CALCULATIONS

Land Type	Rating Soil ID -or- Actual Frontage	Measured Acreage -or- Effective Frontage	Table Effective Depth	Prod. Factor -or- Depth Factor -or- Square Feet	Base Rate	Adjusted Rate	Extended Value	Influence Factor	Value
1 Primary Commercial				319181.38	58.22	58.22	18584000 C	-25%	13938000

BP10: 9-2198 (Hlmsly) Cnvrt lounge to CT/xray rm cmplt; 9-3185 (Wtsn) cnvrt med spc for use as hyperbaric center cmplt; 10-0173 (Hlmsly) create injctn suite for MRI/CT cmplt; 10-0281 (Hmsly/Wtsn) Installation of 22 patient ceil lifts cmplt; 10-0449 Minor int partng cmplt. 10-1908 Minor int alt nvc.
BP11: 10-2842 Clinical sim rm cmplt (Helmsley 2nd flr); 10-3186,10-3677 int alt (Watson 1st & 2nd flr) cmplt; 10-4136 elct eqmnt cmplt
PP. 11-0668 Minor alt Emerg Dept access cmplt. 11-1627 3rd flr Helmsley reconfig of 1800 sf spc w/ consolid. of nursing stations. 11-1765 Rplc frnt entry w/ revolv. door. 11-2990 2nd flr Helmsley consolid mult. strg rms into one--not started.
BP12: Helmsley Wing: 11-1627 3rd flr reconfig of 1800 sf for exp of maternity suite, nursing station & parenatology cmplt nvc.
11-2990 2nd flr cnvrt rooms for equip storage area cmplt nvc.
Watson Wing: 3rd flr 11-3059 cnvrt corridor to PT/exrcs area

Permit Number Type	FilingDate	Est. Cost Field Visit Est. SqFt

Supplemental Cards

TRUE TAX VALUE 13938000

Supplemental Cards
TOTAL LAND VALUE 13938000

IMPROVEMENT DATA

PHYSICAL CHARACTERISTICS

ROOFING

Built-up

WALLS

	B	1	2	U
Frame				
Brick	Yes	Yes	Yes	Yes
Metal				
Guard				

FRAMING

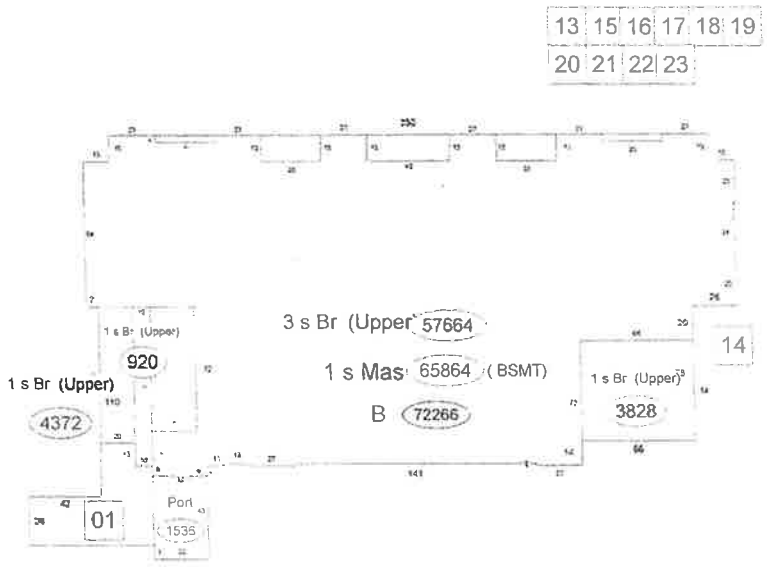
	B	1	2	U
R Conc	72266	65864	0	0
F Prf	0	0	65864	116248

FINISH

	UF	SF	FD	FD
B	72266	0	0	0
1	31346	0	0	34518
2	0	0	0	65864
U	0	0	0	116248
Total	103612	0	0	216630

HEATING AND AIR CONDITIONING

	B	1	2	U
Heat	72266	34518	65864	116248
Sprink	72266	31346	65864	116248



Helmsley Wing

(LCM: 150.00)

SPECIAL FEATURES

Description	Value
C : Remod 2013	

SUMMARY OF IMPROVEMENTS

ID	Use	Stry Hgt	Const Type	Grade	Year Const	Eff Year	Cond	Base Rate	Feat-ures	Adj Rate	Size or Area	Computed Value	Phys Depr	Obsol Depr	Market Adj	% Comp	Value
C	HOSPITAL	0.00		Exe	1999	2005	EX	0.00	N	0.00	132648	0	0	0	150	100	174540100
01	PAVING	0.00	6	Gd-	1996	1996	AV	6.30	N	15.62	2816	43980	9	0	100	100	40000
13	RTWCONC	12.00	6B	Exe	1999	2000	VG	26.00	N	93.60	12x280	26210	0	0	100	100	26200
14	BusShelt	0.00		Good	2001	2001	GD	0.00	N	0.00	0	16000	0	SV	100	100	16000
15	MEZZFO	1.00		Exe	2004	2005	EX	66.10	N	245.16	12x 22	63250	0	0	100	100	63300
16	ELEVCOM	3.00	2E	Exe	1999	2005	EX	169000	N	608400	2@ 0	1216800	0	0	100	100	1216800
17	ELEVCOM	2.00	2H	Exe	1999	2005	EX	169000	N	608400	2@ 0	1216800	0	0	100	100	1216800
18	ELEVCOM	5.00	2E	Exe	1999	2005	EX	169000	N	608400	2@ 0	1216800	0	0	100	100	1216800
19	ELEVCOM	4.00	2E	Exe	1999	2005	EX	169000	N	608400	5@ 0	3042000	0	0	100	100	3042000
20	LOADDOCK	3.00	6	Good	2006	2006	GD	22.10	N	49.73	6x 43	12680	0	0	100	100	12700
21	LOADDOCK	3.00	6	Good	2006	2006	GD	22.10	N	49.73	6x 29	8500	0	0	100	100	8500
22	COMCNPYG	0.00		Good	2006	2006	GD	50.00	N	112.50	15x 46	75040	0	0	100	100	75000
23	COMCNPYG	0.00		Good	2006	2006	GD	50.00	N	112.50	15x 32	52200	0	0	100	100	52200

Data Collector/Date	Appraiser/Date	Neighborhood	Supplemental Cards TOTAL IMPROVEMENT VALUE	181526400
bd 07/22/2013	TOG 10/01/2015	Neigh 2200 AV		

ADMINISTRATIVE INFORMATION OWNERSHIP Tax ID 247/113 Printed 07/18/2018 Card No. 2 of 2

TRANSFER OF OWNERSHIP

Date

VALUATION RECORD

Assessment Year

Reason for Change

VALUATION

Site Description

LAND DATA AND CALCULATIONS

Land Type	Rating Soil ID -or- Actual Frontage	Measured Acreage -or- Effective Frontage	Table Effective Depth	Prod. Factor -or- Depth Factor -or- Square Feet	Base Rate	Adjusted Rate	Extended Value	Influence Factor	Value

BP12: Helmsley Wing: 11-1627 3rd flr reconfig of 1800 sf for exp of cmplt nvc. 11-4380 install wiring for patient monitoring syst PP 12-1445 Rmv/Rplc walls for rmvl/rplcmnt of MRI 1st flr Helmsley. 12-2952 Minor int alt/partitions creating ofc from exstg fin area in Watson. 12-3318 Minor int alt for swtch in use.
BP13: 12-3090, 12-4509 elec upgrds/maint and instltn of recept., outlets, cabling, etc for BMDI (Biomedical Device Integration) for remote monitors cmplt. 12-3318 (Helmsley-3rd flr) Create strg rm and gen ofc frm one rm cmplt nvc. 13-5349 Add door beween Nursery and NICU, NVC
BP14: 14-2040, NCV
BP17: Building Permits for 2017
BP 15-2229: Emergency Rm Ren. NVC TD
DBA: Greenwich Hospital
GEN: C02: Helmsley Wing; C03: Voided w/ demo cmplt 4/06 (Original South Wing); C04: Watson Wing; C03 had 2 bsmt lvls,

Supplemental Cards
TOTAL LAND VALUE

IMPROVEMENT DATA

PHYSICAL CHARACTERISTICS

ROOFING

Built-up

WALLS

	B	1	2	U
Frame		Yes		
Brick	Yes		Yes	Yes
Metal				
Guard				

FRAMING

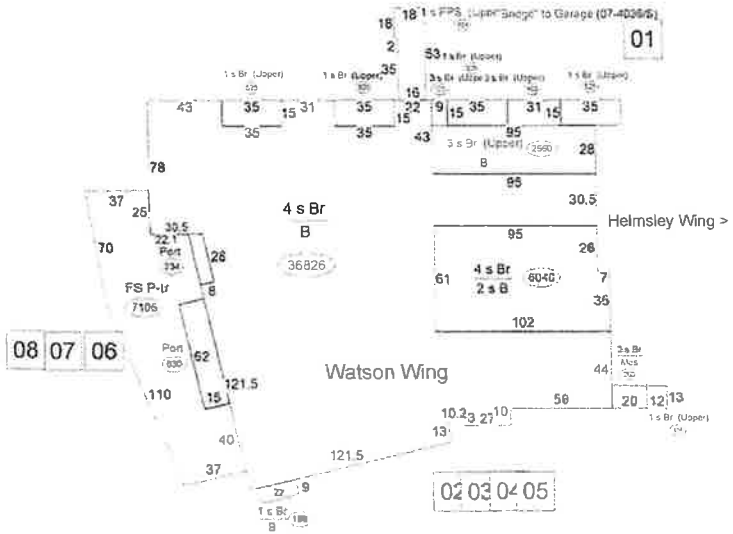
	B	1	2	U
R Conc	51764	0	0	0
F Prf	0	44208	48486	92928

FINISH

	CF	SF	FD	ED
B	51764	0	0	0
1	0	0	0	44208
2	0	0	0	48486
U	0	0	0	92928
Total	51764	0	0	185622

HEATING AND AIR CONDITIONING

	B	1	2	U
Heat	11486	44208	48486	92928
Sprink	51764	44208	48486	92928




07-4009/S Watson East Elev. Looking NW

(LCM: 150.00)

SPECIAL FEATURES

Description	Value
C : Remod 2012	

SUMMARY OF IMPROVEMENTS

ID	Use	Stry Hgt	Const Type	Grade	Year Const	Eff Year	Cond	Base Rate	Feat-ures	Adj Rate	Size or Area	Computed Value	Phys Depr	Obsol Depr	Market Adj	% Comp	Value
C	HOSPITAL	0.00		Exe	2005	2007	EX	0.00	N	0.00	49724	0	0	0	150	100	169931100
01	TOWER	164.00	5FF	Exe	2003	2003	VG	0.00	N	0.00	164	450000	0	SV	100	100	450000
02	ELEVCOM	6.00	2E	Exe	2005	2005	EX	169000	N	608400	3@	1825200	0	0	100	100	1825200
03	ELEVCOM	5.00	2E	Exe	2005	2005	EX	169000	N	608400	2@	1216800	0	0	100	100	1216800
04	ELEVFRT	5.00	2E	Exe	2005	2005	EX	98500	N	354600	1@	354600	0	0	100	100	354600
05	ELEVFRT	6.00	2E	Exe	2005	2005	EX	98500	N	354600	1@	354600	0	0	100	100	354600
06	Pat.Rail	0.00		Exe	2006	2006	EX	0.00	N	0.00		3500	0	SV	100	100	3500
07	RTWCONC	10.00	6D	Exe	2006	2006	EX	26.00	N	93.60	10x510	47740	0	0	100	100	47700
08	WALKPAT	0.00	7	Good	2006	2006	GD	15.00	N	33.75	8200	276750	0	0	100	100	276800

Data Collector/Date	Appraiser/Date	Neighborhood	Supplemental Cards TOTAL IMPROVEMENT VALUE	174460300
bd 07/22/2013	TOG 10/01/2015	Neigh 2200 AV		

ATTACHMENT 7

UNITED STATES POSTAL SERVICE®

Certificate of Mailing — Firm

Name and Address of Sender	TOTAL NO. of Pieces Listed by Sender	TOTAL NO. of Pieces Received at Post Office™	Affix Stamp Here *Postmark with Date of Receipt.*
Kenneth C. Baldwin, Esq. Robinson & Cole LLP 280 Trumbull Street Hartford, CT 06103		3	neopost 03/02/2020 US POSTAGE $002.84⁰ ZIP 06103 041L12203937
	Postmaster, per *(name of receiving employee)*		

USPS® Tracking Number / Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Special Handling	Parcel Airlift
1.	Fred Camillo, First Selectman Town of Greenwich 101 Field Point Road Greenwich, CT 06830				
2.	Katie DeLuca, Director of Planning and Zoning Town of Greenwich 101 Field Point Road Greenwich, CT 06830				
3.	Greenwich Hospital 5 Perryridge Road Greenwich, CT 06830				
4.					
5.					
6.					

OLD STATE HOUSE STATION 06103 MAR 2 2020 USPS

PS Form **3665**, January 2017 (Page 1 of 1) PSN 7530-17-000-5549

Verizon/Greenwich

See Reverse for Instructions