Robinson+Cole

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Also admitted in Massachusetts
and New York

October 14, 2021

Via Electronic Mail

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**
32 Valley Street (a/k/a 225 North Main Street), Bristol, Connecticut

Dear Attorney Bachman:

Cellco Partnership d/b/a Verizon Wireless ("Cellco") currently maintains an existing wireless telecommunications facility at the above-referenced property address (the "Property"). The facility consists of antennas and remote radio heads attached to a tower on the roof of the building at the Property and associated equipment inside the building. Cellco's use of the rooftop tower was approved by the Council in July of 1992. A copy of the Council's 1992 Exempt Modification approval is included in Attachment 1.

Cellco now intends to modify its facility by installing three (3) new Samsung MT6407-77A antennas. Cellco also intends to replace twelve (12) remote radio heads ("RRHs") with six (6) new RRHs on Cellco's antenna mounting system. A set of project plans showing Cellco's proposed facility modifications and new antennas and RRHs specifications 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 Bristol's Chief Elected Official and Land Use Officer.

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.

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 Cellco's new antennas and RRHs will not increase radio frequency (RF) emissions at the facility to a level at or above the Federal Communications Commission (FCC) safety standard. A General Power Density Table for the modified facility is included in Attachment 3. The modified facility will be capable of providing Cellco's 5G wireless service.

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

6. According to the two attached Structural Analysis ("SA") Reports (one for the steel framing and the other for the host building, roof-top penthouse and tower) and Mount Analysis ("MA"), the existing building, roof-top penthouse, steel framing and roof-top tower and mounting system can support Cellco's proposed modifications. Copies of the SA's and MA are included in Attachment 4.

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

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

Sincerely,

Kenneth C. Baldwin

Enclosures
Copy to:
Ellen Zappo-Sassu, Bristol Mayor
Robert Flanagan, Bristol City Planner
Carpenter Realty Company
Aleksey Tyurin

ATTACHMENT 1

STATE OF CONNECTICUT

CONNECTICUT SITING COUNCIL

136 Main Street, Suite 401
New Britain, Connecticut 06051
Phone: 827-7682

July 16, 1992

David S. Malko
Manager, Engineering and
Regulatory Service
Bell Atlantic Metro Mobile
20 Alexander Drive
P.O. Box 5029
Wallingford, CT 06492

RE; Bell Atlantic Metro Mobile notice of intent to modify an existing tower structure on top of an existing building at 32 Valley Street Street, Bristol, Connecticut.

Dear Mr. Malko:

At a public meeting held on July 15, 1992, the Connecticut Siting Council (Council) ruled that the proposed facility would not cause a significant change or alteration in the physical and environmental characteristics of the site by the placement of six cellular antennas on an existing non-facility 30-foot high tower structure, and acknowledged your notice of intent to modify this existing non-facility tower and associated equipment located on the roof of an existing building at 32 Valley Street, Bristol, Connecticut, pursuant to section 16-50j-73 of the Regulations of State Agencies (RSA).

The proposed modifications are to be implemented as specified in your notice dated June 26, 1992. As proposed, the modifications are in compliance with the exemption criteria specified in RSA 16-50j-72 as changes to an existing non-facility site that do not increase the tower height, do not extend the boundaries of the tower site, do not increase noise levels at the tower site boundary by six decibels or more, do not add radio frequency sending or receiving capability which increases total frequency electromagnetic radiation power density measured at the tower site boundary to or above the standard adopted by the State of Connecticut, Department of Environmental Protection pursuant to section 22a-162 of the Connecticut General Statutes, and has received all municipal zoning approvals and building permits.

The Council is pleased to note that the use of an existing tower serves the Council's long-term goal of protecting the public interest by avoiding proliferation of additional tower structures.

Please notify the Council upon completion of construction.

Very truly yours,

Mortimer A. Gelston

Mortimer A. Gelston
Chairman

MAG/TEF/cp

cc: William T. Stortz, Mayor, City of Bristol

6248E

ATTACHMENT 2

WIRELESS COMMUNICATIONS FACILITY

SITE NAME:
BRISTOL CT

CARPENTER REALTY CO.
32 VALLEY ST.
BRISTOL, CT 06010

ANTENNA MODIFICATION

PROJECT SUMMARY	
SITE NAME:	BRISTOL CT
SITE ADDRESS:	32 VALLEY ST. BRISTOL, CT 06010
PROPERTY OWNER:	CARPENTER REALTY COMPANY P.O. BOX 176 BRISTOL, CT 06011
PARCEL ID:	26-21B
COORDINATES:	41° 40' 34.3524" N 72° 56' 51.3744" W
VERIZON CONSTRUCTION:	WALTER CHARCZYNSKI (860) 306-1806
VERIZON REAL ESTATE:	ALEX TYURIN (860) 550-3195

AERIAL MAP

SHEET INDEX	
DE-1	TITLE SHEET
DE-2	ROOF PLANS
DE-3	PARTIAL WEST ELEVATION
DE-4	ANTENNA PLANS & ELEVATION
DE-5	RF PLUMBING DIAGRAM & B.O.M.
DE-6	GENERAL CONSTRUCTION NOTES

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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	03.02.21	REVIEW

DRAWN BY:	MF
CHECKED BY:	DW

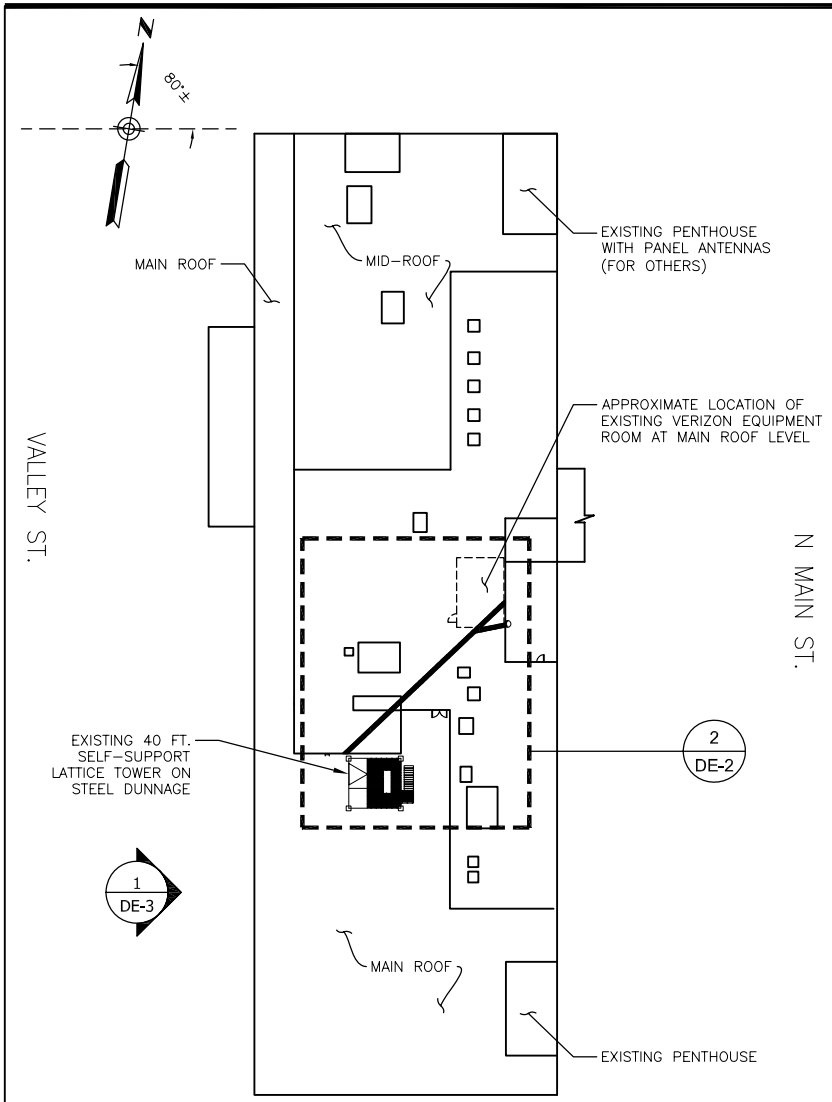
PROJECT NAME:
ANTMO
MT6407
DESIGN EXHIBITS

SITE NAME:
BRISTOL CT

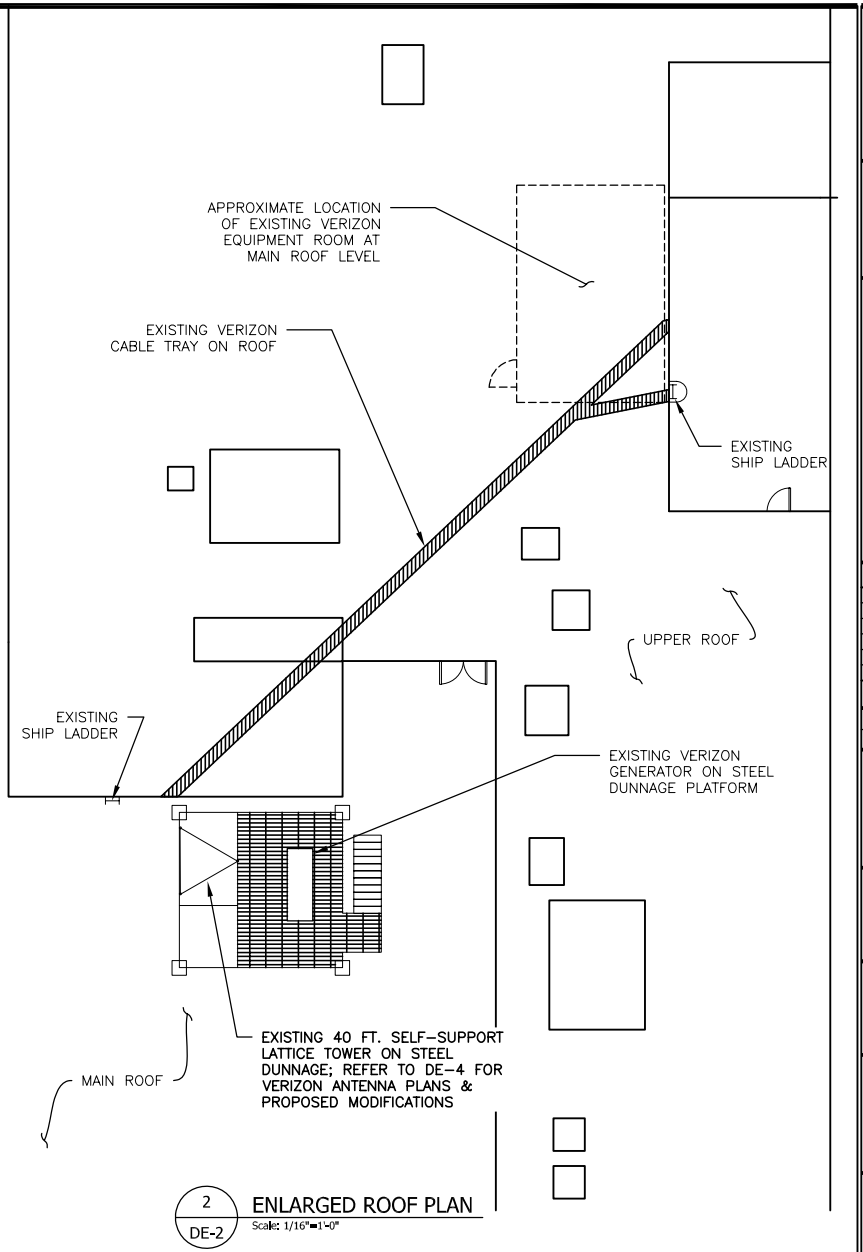
SITE ADDRESS:
CARPENTER REALTY CO.
32 VALLEY ST.
BRISTOL, CT 06010

SHEET TITLE:
TITLE SHEET

SHEET NUMBER:
DE-1



1 DE-2 **OVERALL ROOF PLAN**
Scale: 1"=50'



2 DE-2 **ENLARGED ROOF PLAN**
Scale: 1/16"=1'-0"

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SITE NAME:
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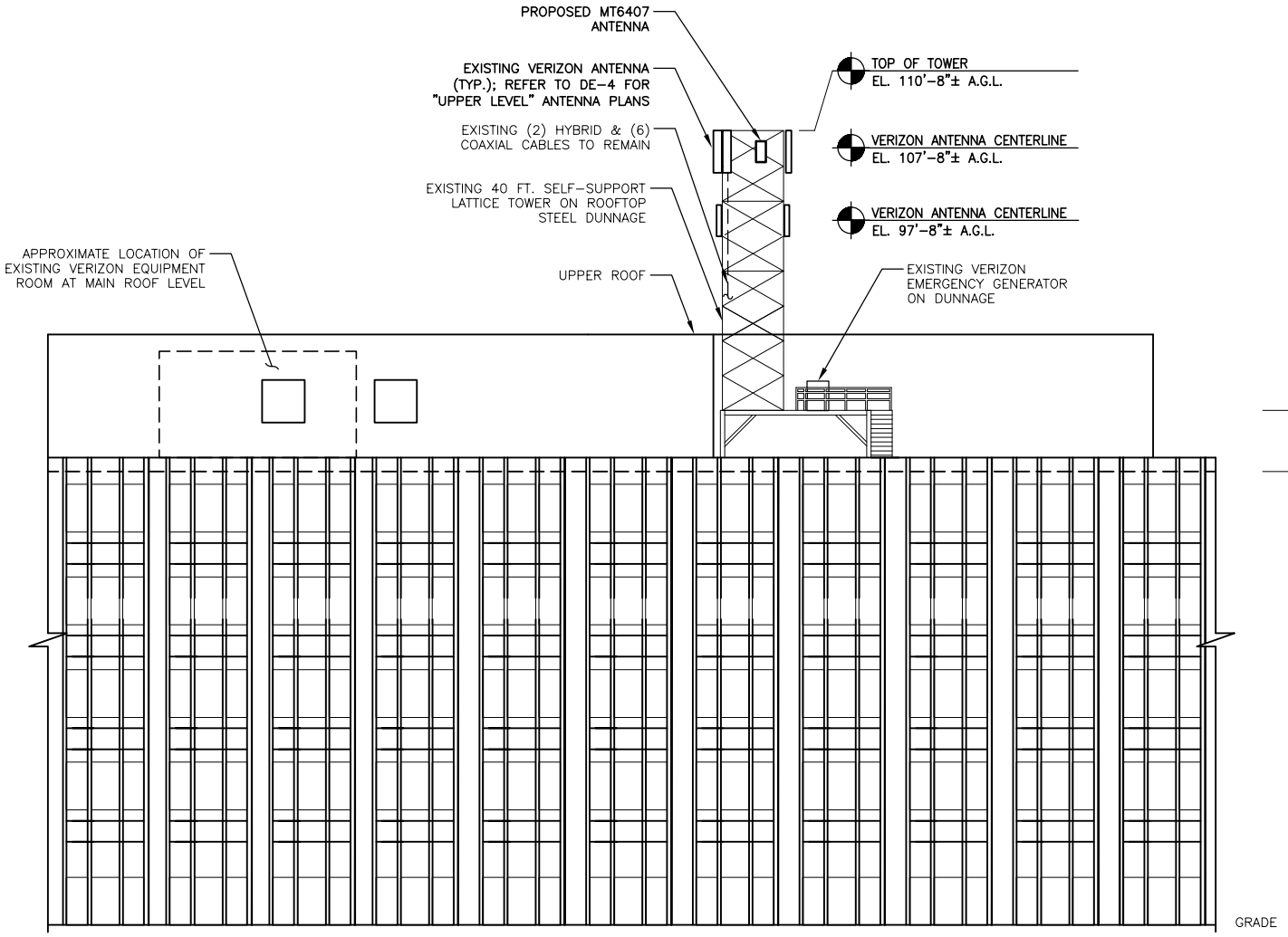
SITE ADDRESS:
CARPENTER REALTY CO.
32 VALLEY ST.
BRISTOL, CT 06010

SHEET TITLE:
ROOF PLANS

SHEET NUMBER:
DE-2



1 / DE-3 PARTIAL WEST ELEVATION
Scale: 1/16"=1'-0"

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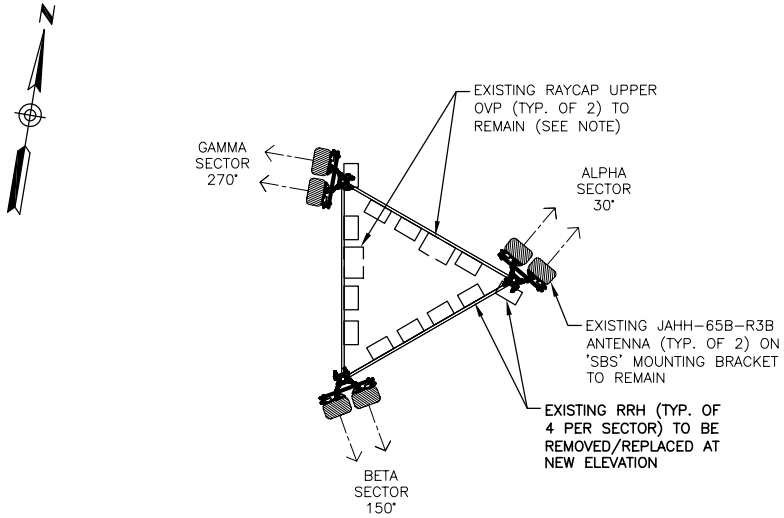
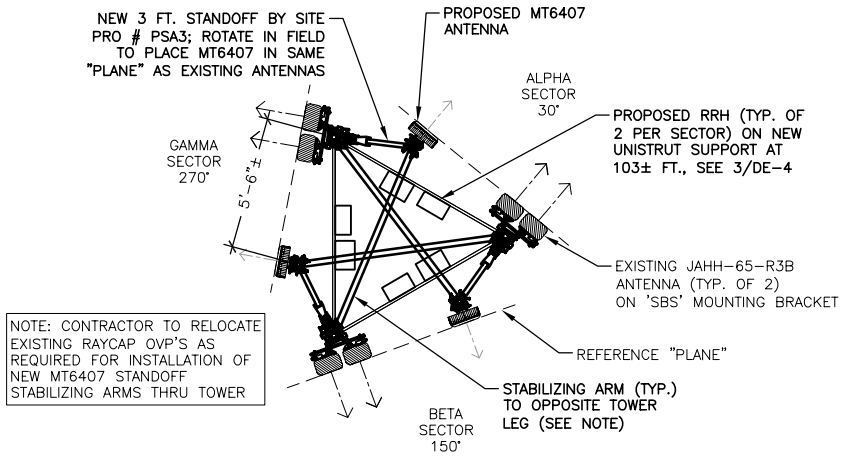
CARPENTER REALTY CO.
32 VALLEY ST.
BRISTOL, CT 06010

SHEET TITLE:
PARTIAL WEST ELEVATION

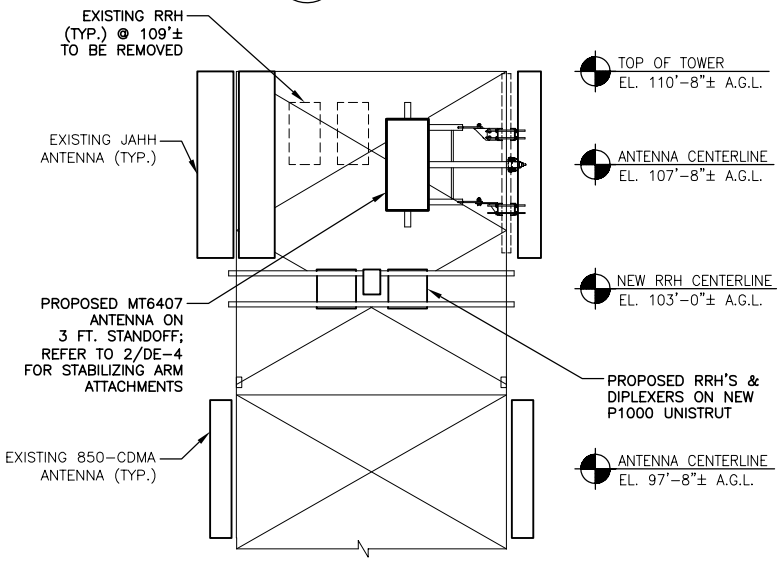
SHEET NUMBER:
DE-3



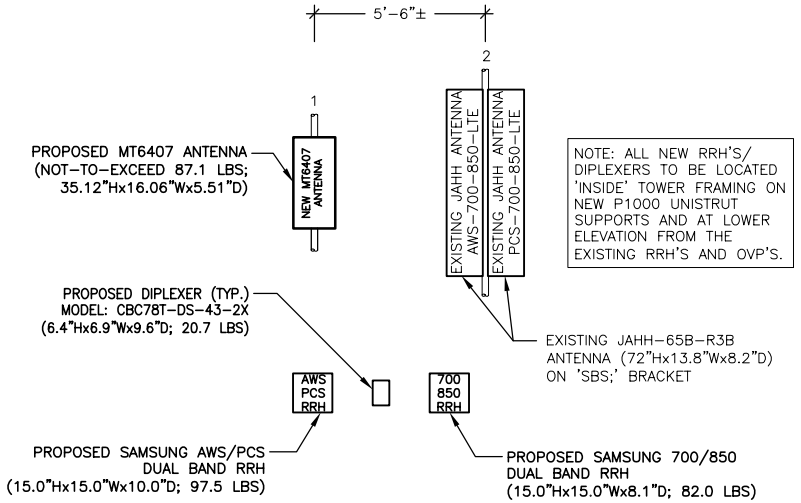
1 DE-4 ANTENNA PLAN @ 107'-8" (EXISTING)
Scale: 1/8"=1'-0"



2 DE-4 ANTENNA PLAN @ 107'-8" (PROPOSED)
Scale: 1/8"=1'-0"



3 DE-4 PARTIAL TOWER ELEVATION
Scale: 1/4"=1'-0"



SECTOR VIEWED FROM THE REAR

4 DE-4 ANTENNA ELEVATION - PROPOSED (TYP. ALL SECTORS)
Scale: 1/4"=1'-0"

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NO	DATE	DESCRIPTION
0	03.02.21	REVIEW

DRAWN BY:	MF
CHECKED BY:	DW

PROJECT NAME:
ANTMO
MT6407
DESIGN EXHIBITS

SITE NAME:
BRISTOL CT

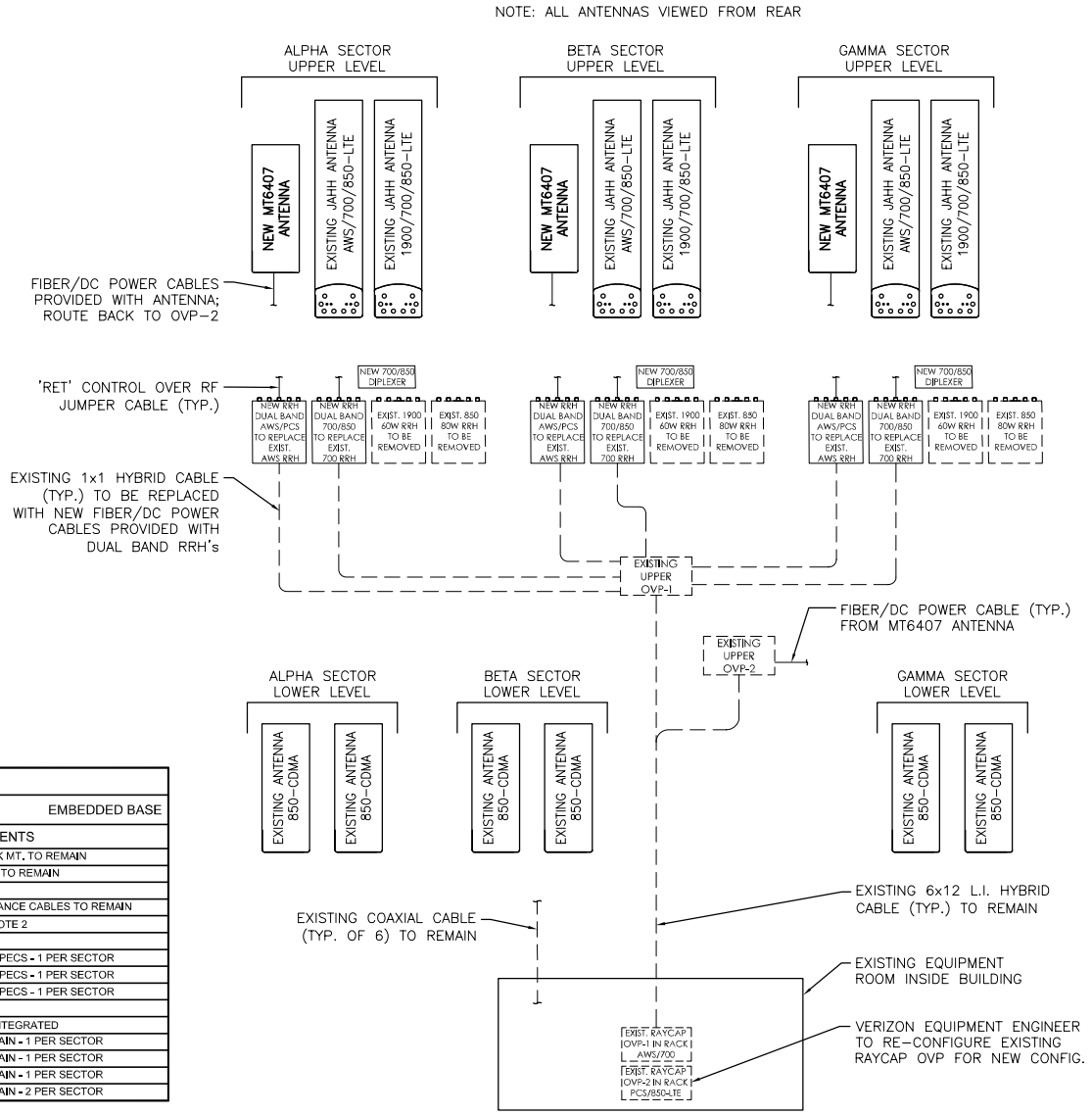
SITE ADDRESS:
CARPENTER REALTY CO.
32 VALLEY ST.
BRISTOL, CT 06010

SHEET TITLE:
ANTENNA PLANS & ELEVATION

SHEET NUMBER:
DE-4

GENERAL NOTES:

1. CONTRACTOR SHALL REFER TO THE LATEST VERIZON WIRELESS RFDS 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 CABLES MAY BE TAPED OR TIE-WRAPPED TO EXISTING SUPPORTS EVERY 4 FT. MAX. FOR HORIZONTAL RUNS. CONTRACTOR MAY USE HOISTING GRIPS AT TOP OF VERTICAL CABLE RUNS WHEN REQUIRED.
3. ALL CABLES SHALL BE ROUTED AND SECURED ON STRUCTURAL MEMBERS ONLY - DO NOT "LOOP" THE CABLES IN MID-AIR BETWEEN ANTENNAS
4. REFER TO RFDS FOR DETAILED PLUMBING DIAGRAM SHOWING ALL JUMPER AND OTHER CABLING CONNECTIONS AT ANTENNAS, RRH's, DIPLEXERS OR OTHER DEVICES.



1 / DE-5 RF PLUMBING DIAGRAM
Scale: N.T.S

BILL OF MATERIALS			
SITE NAME: BRISTOL CT	ANTMO MT6407		EMBEDDED BASE
DESCRIPTION	QTY	LENGTH	COMMENTS
LOWER OVP	-	-	EXISTING (2) RACK MT. TO REMAIN
6-CKT. UPPER OVP	-	-	EXISTING (2) TO REMAIN
6x12 HYBRID CABLE	-	-	EXISTING (2) LOW INDUCTANCE CABLES TO REMAIN
1/2" JUMPER CABLE	-	-	SEE NOTE 2
AWS/PCS DUAL BAND RRH	3	-	REFER TO RFDS FOR SPECS - 1 PER SECTOR
700/850 DUAL BAND RRH	3	-	REFER TO RFDS FOR SPECS - 1 PER SECTOR
700/850 DIPLEXER	3	-	REFER TO RFDS FOR SPECS - 1 PER SECTOR
MT6407 ANTENNA	3	-	SAMSUNG INTEGRATED
JAHH AWS-700-850-LTE ANTENNA	-	-	EXISTING (3) TO REMAIN - 1 PER SECTOR
JAHH PCS-700-850-LTE ANTENNA	-	-	EXISTING (3) TO REMAIN - 1 PER SECTOR
SBS MOUNTING BRACKET	-	-	EXISTING (3) TO REMAIN - 1 PER SECTOR
850-CDMA ANTENNA	-	-	EXISTING (6) TO REMAIN - 2 PER SECTOR

NOTES:
1. ITEMS SHOWN ARE FOR MAJOR DESIGN ELEMENTS ONLY. REFER TO VERIZON WIRELESS RFDS FOR ALL MANUFACTURER PART NUMBERS AND ACCESSORY ITEMS REQUIRED FOR A COMPLETE INSTALLATION.
2. CONTRACTOR SHALL DETERMINE AND PROVIDE ALL REQUIRED PRE-FAB JUMPER QUANTITIES AND LENGTHS, KEEPING ALL LENGTHS TO A MINIMUM.

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ANTMO
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BRISTOL CT

SITE ADDRESS:
CARPENTER REALTY CO.
32 VALLEY ST.
BRISTOL, CT 06010

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

SHEET NUMBER:
DE-5

GENERAL CONSTRUCTION NOTES:

1. CONTRACTOR SHALL NOT COMMENCE ANY WORK UNTIL HE OBTAINS, AT HIS OWN EXPENSE, ALL INSURANCE REQUIRED BY *CELLCO PARTNERSHIP d/b/a VERIZON, THE PRO*PERTY OWNER AND/OR PROPERTY MANAGEMENT COMPANY.

2. ALL WORK SHALL BE DONE IN ACCORDANCE WITH ALL APPLICABLE CODES AND REGULATIONS AND ALL LOCAL LAWS AND REGULATIONS, CURRENT EDITIONS.

3. CONTRACTOR SHALL VISIT THE JOB SITE AND FAMILIARIZE HIMSELF WITH ALL CONDITIONS AFFECTING THE PROPOSED WORK AND MAKE PROVISIONS AS TO THE COST THEREOF. CONTRACTOR SHALL BE RESPONSIBLE FOR FAMILIARIZING HIMSELF WITH ALL CONTRACT DOCUMENTS, FIELD CONDITIONS AND DIMENSIONS AND CONFIRMING THAT THE WORK MAY BE ACCOMPLISHED AS SHOWN PRIOR TO PROCEEDING WITH CONSTRUCTION. ANY DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER PRIOR TO THE COMMENCEMENT OF WORK.

4. CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS, ELEVATIONS, ANGLES AND EXISTING CONDITIONS AT THE SITE PRIOR TO FABRICATION AND/OR INSTALLATION OF ANY WORK IN THE CONTRACT AREA AND SUBMIT TO THE ENGINEER ANY DISCREPANCIES FROM THE DRAWINGS.

5. CONTRACTOR IS TO REVIEW ALL DRAWINGS AND SPECIFICATIONS IN THE CONTRACT DOCUMENT SET. CONTRACTOR SHALL COORDINATE ALL WORK SHOWN IN THE SET OF DRAWINGS. CONTRACTOR SHALL PROVIDE A COMPLETE SET OF DRAWINGS TO ALL SUB-CONTRACTORS AND ALL RELATED PARTIES. THE SUB-CONTRACTORS SHALL EXAMINE ALL THE DRAWINGS AND SPECIFICATIONS FOR THE INFORMATION THAT AFFECTS THEIR WORK.

6. CONTRACTOR SHALL PROVIDE A COMPLETE BUILD-OUT WITH ALL FINISHES, STRUCTURAL, MECHANICAL AND ELECTRICAL COMPONENTS AND PROVIDE ALL ITEMS AS SHOWN OR INDICATED ON DRAWINGS OR WRITTEN IN SPECIFICATIONS.

7. CONTRACTOR SHALL FURNISH ALL MATERIAL, LABOR AND EQUIPMENT TO COMPLETE THE WORK AND FURNISH A COMPLETED JOB IN ACCORDANCE WITH LOCAL AND STATE GOVERNING AUTHORITIES AND OTHER AUTHORITIES HAVING LAWFUL JURISDICTION OVER THE WORK.

8. CONTRACTOR SHALL OBTAIN AT HIS OWN EXPENSE ALL PERMITS AND ALL INSPECTIONS REQUIRED FROM FEDERAL AND STATE GOVERNMENTS, COUNTIES, MUNICIPALITIES AND OTHER REGULATORY AGENCIES WHICH MAY BE REQUIRED FOR THE PROJECT.

10. DETAILS ARE INTENDED TO SHOW END RESULT OF DESIGN. MINOR MODIFICATIONS MAY BE REQUIRED TO SUIT JOB DIMENSIONS OR CONDITIONS, AND SUCH MODIFICATIONS SHALL BE INCLUDED AS PART OF THE WORK.

11. ALL MATERIAL PROVIDED BY *CELLCO PARTNERSHIP d/b/a VERIZON IS TO BE* REVIEWED BY CONTRACTOR AND ALL APPLICABLE SUB-CONTRACTOR PRIOR TO INSTALLATION. ANY DEFICIENCIES TO PROVIDED MATERIALS SHALL BE BROUGHT TO THE CONSTRUCTION MANAGERS ATTENTION IMMEDIATELY.

12. THE MATERIALS INSTALLED IN THE WORK SHALL MEET THE REQUIREMENTS OF THE CONTRACT DOCUMENTS. NO SUBSTITUTIONS ARE ALLOWED.

13. CONTRACTOR IS SOLELY RESPONSIBLE FOR THE MEANS AND METHODS OF CONSTRUCTION, FOR SEQUENCES AND PROCEDURES TO BE USED, AND TO ENSURE THE SAFETY OF THE EXISTING BUILDING AND ITS COMPONENT DURING CONSTRUCTION. THIS INCLUDES THE ADDITION OF WHATEVER SHORING, BRACING, UNDERPINNING, ETC. THAT MAY BE NECESSARY.

14. CONTRACTOR SHALL COORDINATE ALL CIVIL, STRUCTURAL AND ELECTRICAL DRAWINGS FOR THE LOCATION OF ALL OPENINGS, RECESSES, BUILT-IN WORK, ETC.

15. CONTRACTOR SHALL RECEIVE CLARIFICATION IN WRITING AND SHALL RECEIVE IN WRITING AUTHORIZATION TO PROCEED BEFORE STARTING WORK ON ANY ITEMS NOT CLEARLY DEFINED OR IDENTIFIED BY THE CONTRACT DOCUMENTS.

16. CONTRACTOR SHALL NOTIFY THE CONSTRUCTION MANAGER OF ALL PRODUCTS OR ITEMS NOTED AS "EXISTING" WHICH ARE NOT FOUND TO BE IN THE FIELD.

17. ERECTION SHALL BE DONE IN A WORKMANLIKE MANNER BY COMPETENT EXPERIENCED WORKMEN IN ACCORDANCE WITH APPLICABLE CODES AND THE BEST-ACCEPTED PRACTICE. ALL MEMBERS SHALL BE LAID PLUMB AND TRUE AS INDICATED ON THE DRAWINGS.

18. CONTRACTOR SHALL BE RESPONSIBLE FOR THE SAFETY OF THE WORK AREA, ADJACENT AREAS, AND BUILDING OCCUPANTS THAT ARE LIKELY TO BE AFFECTED BY THE WORK UNDER THIS CONTRACT. WORK SHALL CONFORM TO ALL O.S.H.A REQUIREMENTS.

19. CONTRACTOR SHALL COORDINATE HIS WORK AND SCHEDULE HIS ACTIVITIES AND WORKING HOURS IN ACCORDANCE WITH THE REQUIREMENTS OF THE PROPERTY OWNER AND/OR PROPERTY MANAGEMENT COMPANY.

20. CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING HIS WORK WITH THE WORK OF OTHERS AS IT MAY RELATE TO RADIO EQUIPMENT, ANTENNAS AND ANY OTHER PORTIONS OF THE WORK.

21. CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY INDICATED OR WHERE LOCAL CODES OR REGULATIONS MAY TAKE PRECEDENCE.

22. CONTRACTOR SHALL MAKE NECESSARY PROVISIONS TO PROTECT EXISTING SURFACES, EQUIPMENT, IMPROVEMENTS, PIPING, ANTENNA AND ANTENNA CABLES AND REPAIR ANY DAMAGE THAT OCCURS DURING CONSTRUCTION.

23. CONTRACTOR SHALL REPAIR ALL EXISTING SURFACES DAMAGED DURING CONSTRUCTION SUCH THAT THEY MATCH AND BLEND WITH ADJACENT SURFACES.

24. CONTRACTOR SHALL KEEP CONTRACT AREA CLEAN, HAZARD FREE AND DISPOSE OF ALL DEBRIS AND RUBBISH. EQUIPMENT NOT SPECIFIED AS REMAINING ON THE PROPERTY OF THE OWNER SHALL BE REMOVED. LEAVE PREMISES IN CLEAN CONDITIONS AND FREE FROM PAINT SPOTS, DUST, OR SMUDGES OF ANY NATURE. CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING ALL ITEMS UNTIL COMPLETION OF CONSTRUCTION.

25. BEFORE FINAL ACCEPTANCE OF THE WORK, CONTRACTOR SHALL REMOVE ALL EQUIPMENT, TEMPORARY WORKS, UNUSED AND USELESS MATERIALS, RUBBISH AND TEMPORARY STRUCTURES.

verizon

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SITE NAME:

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CARPENTER REALTY CO.
32 VALLEY ST.
BRISTOL, CT 06010

SHEET TITLE:

GENERAL CONSTRUCTION NOTES

SHEET NUMBER:

DE-6

SAMSUNG

Dual-Band Radio Unit
700/850MHz (B13/B5)
RFV01U-D2A

Samsung's RFV01U-D2A is a compact remote Radio Unit (RU) designed for deployments that require flexibility in installation and rapid onlining, without compromising on coverage, capacity or operational expenses.

The RFV01U-D2A RU targets dual-band support across Band 13 (700MHz) and Band 5 (850MHz), making it an ideal product for broad coverage footprints across multiple common low-end, long-range frequencies.

The RU handles all Radio Frequency (RF) processing in a single, compact unit, and is designed to interface via CPRI with Samsung's CDU baseband offerings, in both distributed- and central-RAN configurations.

In addition to its minimal footprint and ease of installation, the RU is also designed to reduce cost of ownership through its integrated spectrum analyzer, which allows for remote RF monitoring, greatly reducing the need for on-site maintenance visits.

Features and Benefits

- Dual-band support for broad frequency coverage
- Minimal footprint reduces site costs
- Rapid, easy installation
- Flexibly deployable in any location
- Remote RF monitoring capability
- Convection cooled, silent operation

Key Technical Specifications

Duplex Type: FDD
Operating Frequencies:
B13: DL(746-756MHz)/UL(777-787MHz)
B5: DL(869-894MHz)/UL(824-849MHz)
Instantaneous Bandwidth: 10MHz(B13) + 25MHz(B5)
RF Chain: 4T4R/2T4R/2T2R
Output Power: Total 320W
DU-RU Interface: CPRI (10Gbps)
Dimensions: 380 x 380 x 207mm (29.9L)
Weight: 31.9kg
Input Power: -48V DC
Operating Temp.: -40 - 55°(w/o solar load)
Cooling: Natural convection

SAMSUNG

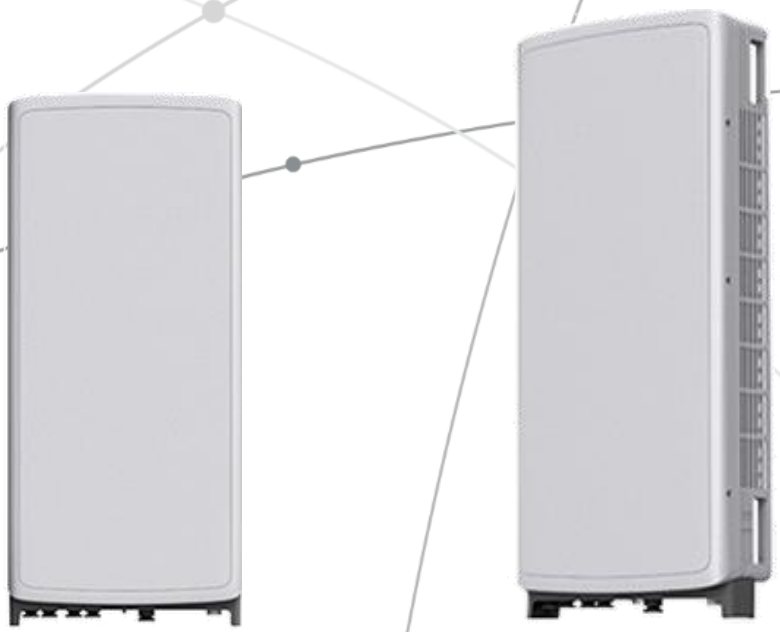
SAMSUNG

C-Band 64T64R Massive MIMO Radio

for High Capacity and Wide Coverage

Samsung C-Band 64T64R Massive MIMO Radio enables mobile operators to increase coverage range, boost data speeds and ultimately offer enriched 5G experiences to users in the U.S..

Model Code : MT6407-77A

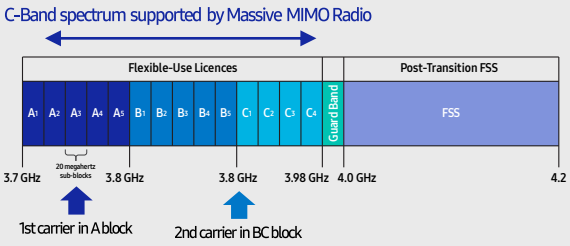


Points of Differentiation

Wide Bandwidth

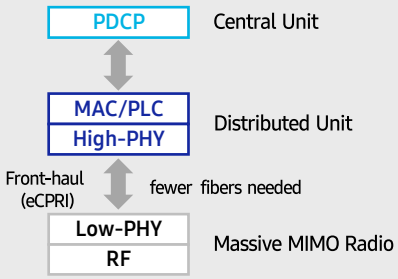
With capability to support up to 2 CC carrier configuration, Samsung C-Band massive MIMO Radio supports 200 MHz bandwidth in the C-Band spectrum.

Samsung C-Band massive MIMO Radio covers the entire C-Band 280 MHz spectrum, so it can meet the operator's needs in current A block and future B/C blocks



Future Proof Product

Samsung C-Band 64T64R Massive MIMO radio supports not only CPRI but also eCPRI as front-haul interface.
It enables operators can cut down on OPEX/CAPEX by reducing front-haul bandwidth through low layer split and using ethernet based higher efficient line.



Enhanced Performance

C-Band massive MIMO Radio creates sharp beams and extends networks' coverage on the critical mid-band spectrum using a large number of antenna elements and high output power to boost data speeds.

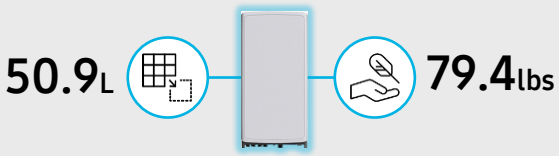
This helps operators reduce their CAPEX as they now need less products to cover the same area than before.

Furthermore, as C-Band massive MIMO Radio supports MU-MIMO(Multi-user MIMO) , it enables to increase user throughput by minimizing interference.

Well Matched Design

Samsung C-Band Massive MIMO radio utilizes 64 antennas, supports up to 280MHz bandwidth, and delivers a 200W output power. despite the above advanced performance, the Radio has a compact size of 50.9L and 79.4lbs. This makes it easy to install the Radio.

It is designed to look solid and compact, with a low profile appearance so that, when installed, harmonizes well with the surrounding environment..



Technical Specifications

Item	Specification
Tech	NR
Band	n77
Frequency Band	3700 - 3980 MHz
EIRP	78.5dBm (53.0 dBm+25.5 dBi)
IBW/OBW	280 MHz / 200 MHz
Installation	Pole/Wall
Size/ Weight	16.06 x 35.06 x 5.51 inch (50.86L)/ 79.4 lbs

SAMSUNG

About Samsung Electronics Co., Ltd.

Samsung inspires the world and shapes the future with transformative ideas and technologies. The company is redefining the worlds of TVs, smartphones, wearable devices, tablets, digital appliances, network systems, and memory, system LSI, foundry and LED solutions.

129 Samsung-ro, Yeongtong-gu, Suwon-si Gyeonggi-do, Korea

SAMSUNG

Dual-Band Radio Unit
AWS/PCS (B66/B2)
RFV01U-D1A

Samsung's RFV01U-D1A is a compact remote Radio Unit (RU) designed for deployments that require flexibility in installation and rapid onlining, without compromising on coverage, capacity or operational expenses.

The RFV01U-D1A RU targets dual-band support across Band 66 (AWS) and Band 2 (PCS), making it an ideal product for broad coverage footprints across multiple common mid-range frequencies.

The RU handles all Radio Frequency (RF) processing in a single, compact unit, and is designed to interface via CPRI with Samsung's CDU baseband offerings, in both distributed- and central-RAN configurations.

In addition to its minimal footprint and ease of installation, the RU is also designed to reduce cost of ownership through its integrated spectrum analyzer, which allows for remote RF monitoring, greatly reducing the need for on-site maintenance visits.

Features and Benefits

- Dual-band support for broad frequency coverage
- Minimal footprint reduces site costs
- Rapid, easy installation
- Flexibly deployable in any location
- Remote RF monitoring capability
- Convection cooled, silent operation
- Built-in Broadcast Auxiliary Services (BAS) filter ensures compliant AWS operation without impacting footprint

Key Technical Specifications

Duplex Type: FDD
Operating Frequencies:
    B66: DL(2,110-2,180MHz)/UL(1,710-1,780MHz)
    B2: DL(1,930-1,990MHz)/UL(1,850-1,910MHz)
Instantaneous Bandwidth:
    70MHz(B66) + 60MHz(B2)
RF Chain: 4T4R/2T4R/2T2R
Output Power: Total 320W
DU-RU Interface: CPRI (10Gbps)
Dimensions: 380 x 380 x 255mm (36.8L)
Weight: 38.3kg
Input Power: -48V DC
Operating Temp.: -40 - 55°(w/o solar load)
Cooling: Natural convection

ATTACHMENT 3

Site Name: ***BRISTOL CT***
Cumulative Power Density

Operator	Operating Frequency	Number of Trans.	ERP Per Trans.	Total ERP	Distance to Target	Calculated Power Density	Maximum Permissible Exposure*	Fraction of MPE
	(MHz)		(watts)	(watts)	(feet)	(mW/cm^2)	(mW/cm^2)	(%)
VZW 700	751	4	628	2511	107.7	0.0078	0.5007	1.55%
VZW CDMA	869	2	394	789	97.7	0.0024	0.5793	0.51%
VZW Cellular	869	4	788	3153	107.7	0.0098	0.5793	1.69%
VZW PCS	1975	4	1525	6100	107.7	0.0189	1.0000	1.89%
VZW AWS	2120	4	1493	5973	107.7	0.0185	1.0000	1.85%
VZW CBAND	3730.08	4	6531	26125	107.7	0.0810	1.0000	8.10%

Total Percentage of Maximum Permissible Exposure 15.60%

*Guidelines adopted by the FCC on August 1, 1996, 47 CFR Part 1 based on NCRP Report 86, 1986 and generally on ANSI/IEEE C95.1-1992
**Calculation includes a -10 dB Off Beam Antenna Pattern Adjustment pursuant to Attachments B and C of the Siting Council's November 10, 2015 Memorandum for Exempt Modification filings

MHz = Megahertz
mW/cm^2 = milliwatts per square centimeter
ERP = Effective Radiated Power

Absolute worst case maximum values used.

ATTACHMENT 4

STUCTURAL ANALYSIS REPORT

For

Site Name: Bristol CT
32 Valley Street
Bristol, CT 06010

PREPARED FOR:

verizon

WIRELESS COMMUNICATIONS FACILITY
20 ALEXANDER DRIVE
WALLINGFORD, CT 06492

On Air Engineering, LLC
88 FOUNDRY POND ROAD
COLD SPRING, NY 10516
ONAIR@OPTONONLINE.NET
201-456-4624

KM CONSULTING ENGINEERS, INC.
262 Upper Ferry Road, Ewing, NJ 08628
Ph: (609) 538-0400 www.kmengr.com

KM Project No. 190109.02 Date: October 12, 2021

Michael L. Bohlinger, PE
Connecticut Professional Engineer
License No. 20405

On Air Engineering, LLC
Bristol CT

TABLE OF CONTENTS

SECTION **PAGE**

Load Case No. 1: Existing self-support tower with existing inventory and proposed Verizon installation.

1.0 EXECUTIVE SUMMARY

Structure

Location: 32 Valley Street
Bristol, CT 06010

Manufacturer: Rohn

Equipment

Existing tower inventory plus the proposed installation are detailed in Section 2.0 "Tower Inventory."

Synopsis

Load Case No. 1: The existing self-support tower with the existing inventory and proposed Verizon installation.

The tower superstructure has sufficient capacity and therefore meets the current ANSI/TIA-222-G standards. The tower superstructure is rated at67.6%.

The tower is attached to steel framing on the top of the existing building. The platform framing supporting the existing tower structure along with the building structure was found to be passing with the full proposed loading installed in a report by Tectonic dated 9/15/21.

2.0 TOWER INVENTORY

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
(2) JAHH-65B-R3B (Verizon)	107.67	AWS/PCS RRH (Verizon)	103
(2) JAHH-65B-R3B (Verizon)	107.67	AWS/PCS RRH (Verizon)	103
(2) JAHH-65B-R3B (Verizon)	107.67	700/850 RRH (Verizon)	103
BSAMNT-SBS-2-3 Mount (Verizon)	107.67	700/850 RRH (Verizon)	103
BSAMNT-SBS-2-3 Mount (Verizon)	107.67	700/850 RRH (Verizon)	103
BSAMNT-SBS-2-3 Mount (Verizon)	107.67	CBC78T-DS-43-2X Diplexer (Verizon)	103
64T64R MMU (Verizon)	107.67	CBC78T-DS-43-2X Diplexer (Verizon)	103
64T64R MMU (Verizon)	107.67	CBC78T-DS-43-2X Diplexer (Verizon)	103
64T64R MMU (Verizon)	107.67	Unistrut Mount (Verizon)	103
PSA3 Stand-off (Verizon)	107.67	Unistrut Mount (Verizon)	103
PSA3 Stand-off (Verizon)	107.67	LPA-80080-4CF (Verizon)	97.67
PSA3 Stand-off (Verizon)	107.67	LPA-80080-4CF (Verizon)	97.67
Raycap Dist. Box. (Verizon)	105	LPA-80063-4CF (Verizon)	97.67
Raycap Dist. Box. (Verizon)	105	LPA-80080-4CF (Verizon)	97.67
Unistrut Mount (Verizon)	103	LPA-80080-4CF (Verizon)	97.67
AWS/PCS RRH (Verizon)	103	LPA-80080-4CF (Verizon)	97.67

Proposed Verizon Loading:

*(3) 64T64R MMU panel antennas @ 107’-8” AGL
*(3) AWS/PCS RRHs @ 103’ AGL
*(3) 700/850 RRHs @ 103’ AGL
*(3) CBC78T-DS-43-2X diplexers @ 103’ AGL
*(3) PSA3 stand-off mounts @ 107’-8” AGL

Existing Verizon Loading to Remain:

*(6) JAHH-65B-R3B panel antennas @ 107’-8” AGL
*(3) BSAMNT pipe mounts @ 107’-8” AGL
*(2) Raycap distribution boxes @ 105’ AGL
*(3) Unistrut mounts @ 103’ AGL
*(2) Hybrid cables

3.0 COMMENTARY

Our scope of work is to determine if the existing structure is capable of withstanding the additional stresses/forces imposed by the installation of the proposed Verizon equipment noted in the tower inventory.

The tower member layout/sizes and previous were obtained from a previous analysis by KMCE dated 8/16/17. The existing loading was updated based on documentation from the client. Proposed Verizon installation was obtained from drawings by On Air Engineering, LLC dated 3/2/21. Platform support framing calculations by Tectonic dated 9/15/21 certify the framing to support the existing tower with all proposed loading and also certify the building structure.

The following report will provide analytical calculations and commentary regarding the capacity of the proposed tower and subsequent recommendations.

4.0 ANALYSIS PROCEDURE

KM Consulting Engineers, Inc. carried out their structural analysis by correlating field inspection and tower member data into proprietary software designed specifically for communication tower analysis.

These programs run in conjunction with the guidelines set down in the ANSI/TIA-222-G (Addendum 4) Dec 2014 Standard entitled "Structural Standards for Antenna Supporting Structures and Antennas."

The existing tower is analyzed by placing wind forces on the structure in 30° positional increments around the tower (i.e. wind pressure directly onto the tower corners, faces and parallel to the faces). This enables the user to "create" a three-dimensional representation, yielding results for worst case scenarios. In effect, the production of these results allows the user to study the structural integrity of the tower when influenced by wind forces from any direction.

The proceeding report includes analysis for the tower with the addition of antennas in the scenarios stated. For clarity, the analysis shall include worst case loadings and a typical elevation view with maximum foundation loads tabulated.

Should the client require to be furnished with a full copy of our analysis, we will gladly do so.

Codes and Standards

CSBC - Connecticut State Building Code 2018

TIA - Telecommunications Industry Association – ANSI/TIA-222-G-4 Structural Standards for Antenna Supporting Structures and Antennas, 2014

AISC - American Institute of Steel Construction - Steel Construction Manual, 15th edition, 2017

ASCE - Minimum Design Loads for Buildings and Other Structures (ASCE 7-10)

5.0 TOWER ANALYSIS RESULTS

The tower was analyzed for the inventory detailed in Section 2.0 “Tower Inventory”.

The basic wind speed of 93mph is taken from Appendix N of the 2018 Connecticut State Building Code for the municipality of Bristol, CT and used as the basic wind speed with no ice per the ANSI/TIA-222-G design standard. The basic wind speed of 50mph concurrent with the design ice thickness of 1” is in accordance with the ANSI/TIA-222-G design standard. Additional criteria include Structure Class II, Exposure Category B, and Topographic Category 1.

Load Case No. 1: Proposed Verizon loading consists of (3) 64T64R MMU panel antennas, (3) CBC78T-DS-43-2X diplexers, (3) AWS/PCS RRH, (3) 700/850 RRH, and (3) PSA3 stand-off mounts.

The tower superstructure has sufficient capacity and therefore meets the current ANSI/TIA-222-G standards. The tower superstructure is rated at67.6%.

The tower is attached to steel framing on the top of the existing building. The platform framing supporting the existing tower structure along with the building structure was found to be passing with the full proposed loading installed in a report by Tectonic dated 9/15/21.

6.0 RECOMMENDATIONS

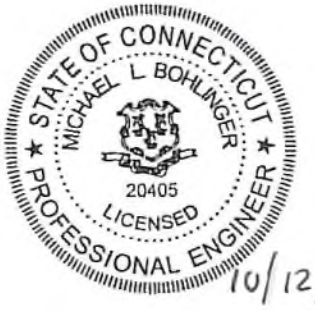
Further to our calculations, we conclude that the tower superstructure has adequate capacity to support the proposed Verizon installation and therefore meets the current ANSI/TIA-222-G design standards.

Please do not hesitate to contact our office with any questions or concerns regarding this report.

Sincerely,
KM CONSULTING ENGINEERS, INC

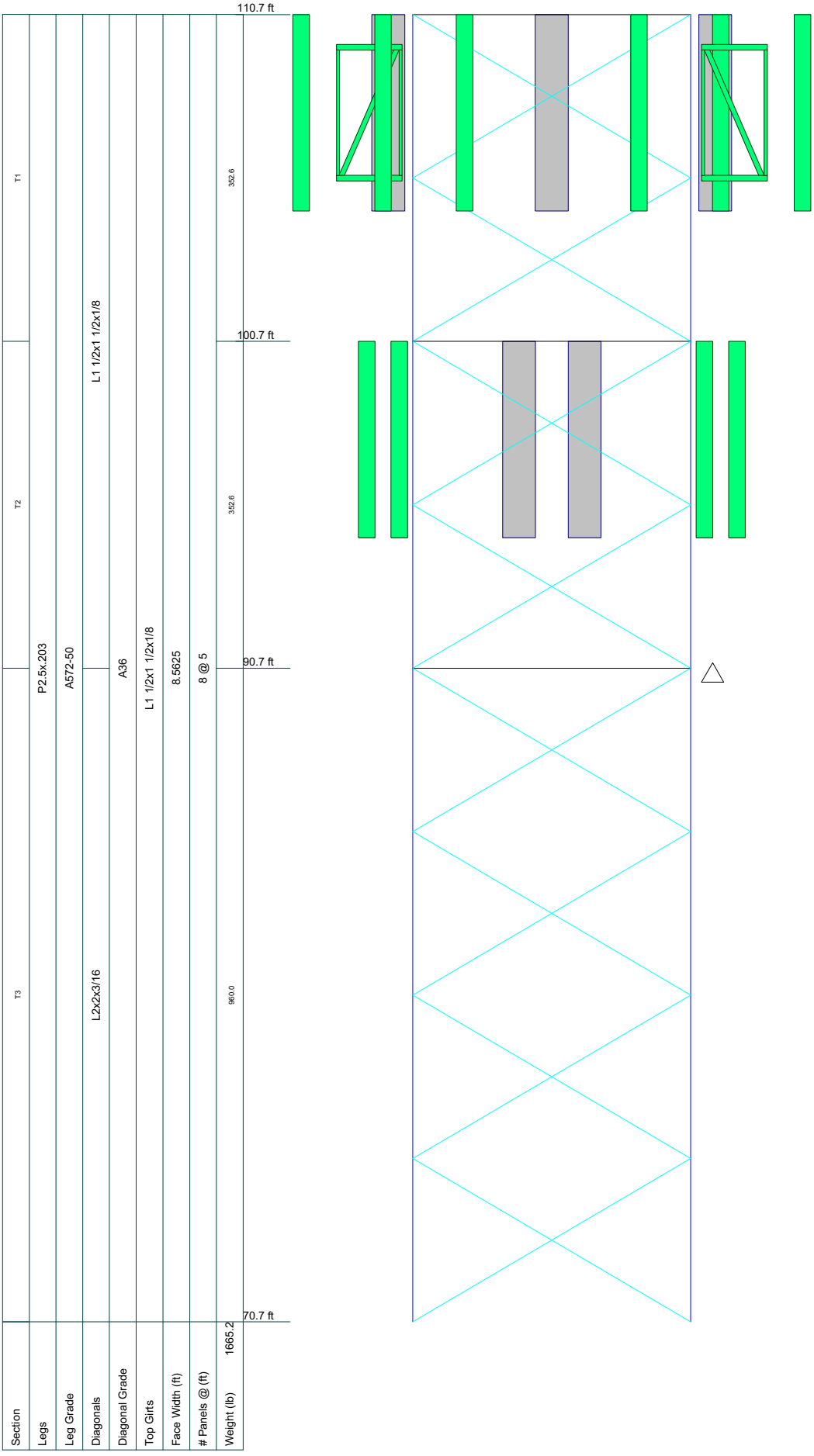
Domenic Aversa, PE
Project Manager

Reviewed and Approved by:



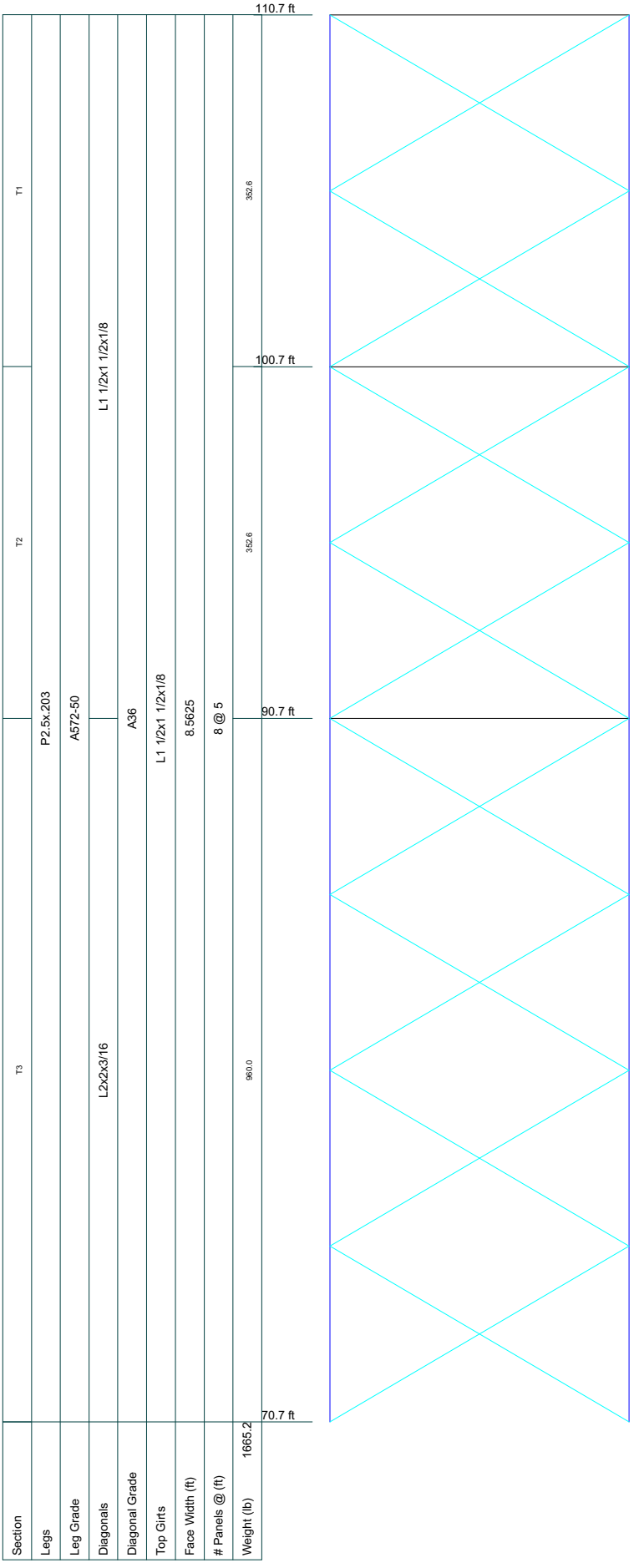
Michael L. Bohlinger, PE
Principal
CT License # 20405

7.0 APPENDIX



KM Consulting Engineers
262 Upper Ferry Road
Ewing, NJ 08525
Phone: (609) 538-0400
FAX:
Consulting Engineers

Job: ***Bristol CT LC1***			
Project: ***40' Self-Support Tower***			
Client: On Air Engineering, LLC	Drawn by: Domenic Aversa	App'd:	
Code: TIA-222-G	Date: 04/21/21	Scale: NTS	
Path: C:\Users\Domenic\Dropbox\Work\On Air\Bristol CT\Engineering\Bristol CT.eri		Dwg No. E-1	



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Raycap Dist. Box. (Verizon)	105	LPA-80080-4CF (Verizon)	97.67
Unistrut Mount (Verizon)	103	LPA-80080-4CF (Verizon)	97.67
AWS/PCS RRH (Verizon)	103	LPA-80080-4CF (Verizon)	97.67

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower is located in Hartford County, Connecticut.
2. Tower designed for Exposure B to the TIA-222-G Standard.
3. Tower designed for a 93 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 50 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Structure Class II.
7. Topographic Category 1 with Crest Height of 0.00 ft
8. Connections use galvanized A325 bolts, nuts and locking devices. Installation per TIA/EIA-222 and AISC Specifications.
9. Tower members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards.
10. Welds are fabricated with ER-70S-6 electrodes.
11. TOWER RATING: 67.6%

ALL REACTIONS ARE FACTORED

MAX. CORNER REACTIONS AT BASE:
DOWN: 22271 lb
SHEAR: 3052 lb

UPLIFT: -18173 lb
SHEAR: 2796 lb

AXIAL
19376 lb

SHEAR
1909 lb

MOMENT
54684 lb-ft

TORQUE 625 lb-ft
50 mph WIND - 1.0000 in ICE

AXIAL
5041 lb

SHEAR
5784 lb

MOMENT
152687 lb-ft

TORQUE 2355 lb-ft
REACTIONS - 93 mph WIND

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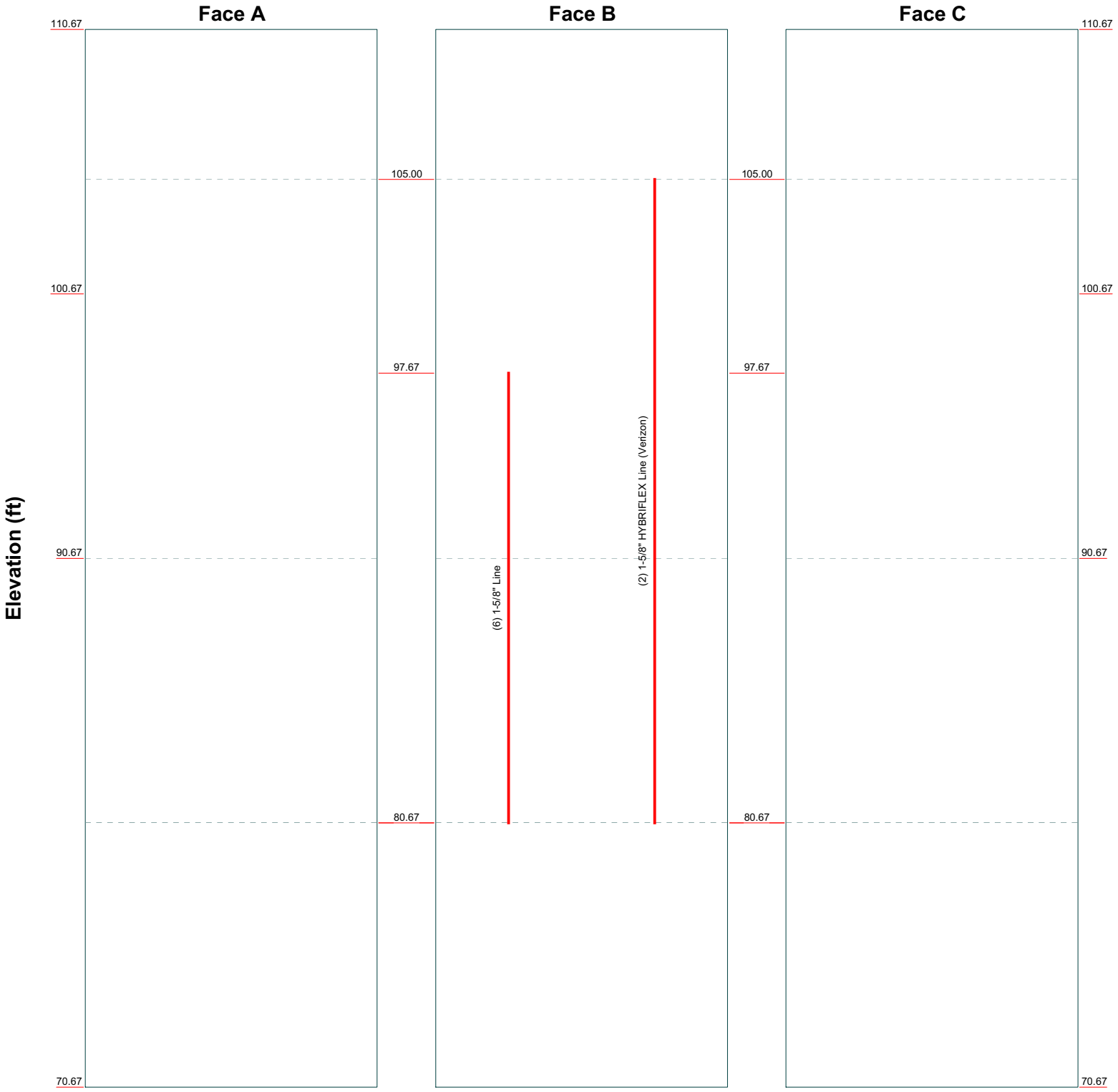
Client: On Air Engineering, LLC	Drawn by: Domenic Aversa	App'd:	
Code: TIA-222-G	Date: 04/21/21	Scale: NTS	
Path: C:\Users\Domenic\Dropbox\Work\On Air\Bristol CT\Engineering\Bristol CT.eri		Dwg No. E-1	

Feed Line Distribution Chart
70'8-1/32" - 110'8-1/32"

Round | Flat | App In Face | App Out Face | Truss Leg



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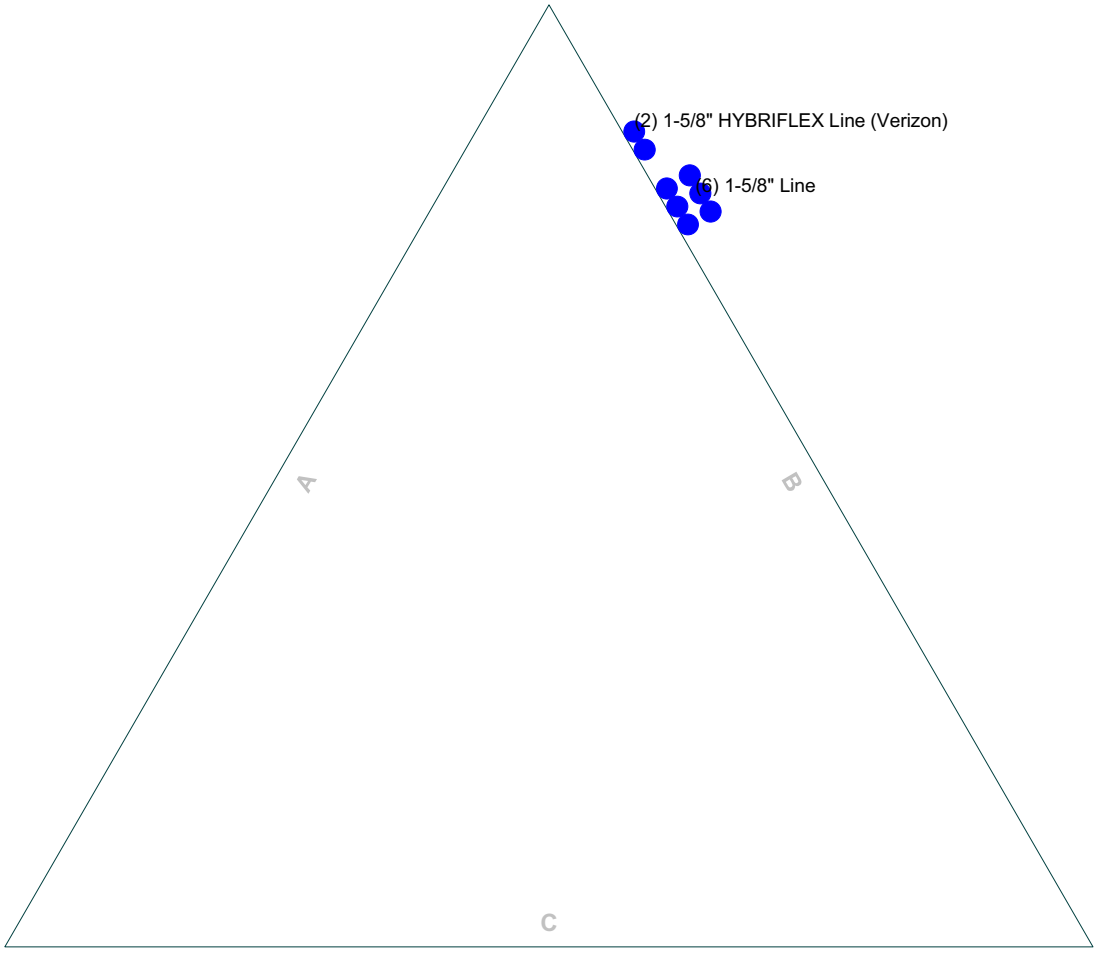
Path: C:\Users\Domenic\Dropbox\Work\On Air\Bristol CT\Engineering\Bristol CT.eri		Dwg No. E-7	

Feed Line Plan

Round Flat App In Face App Out Face



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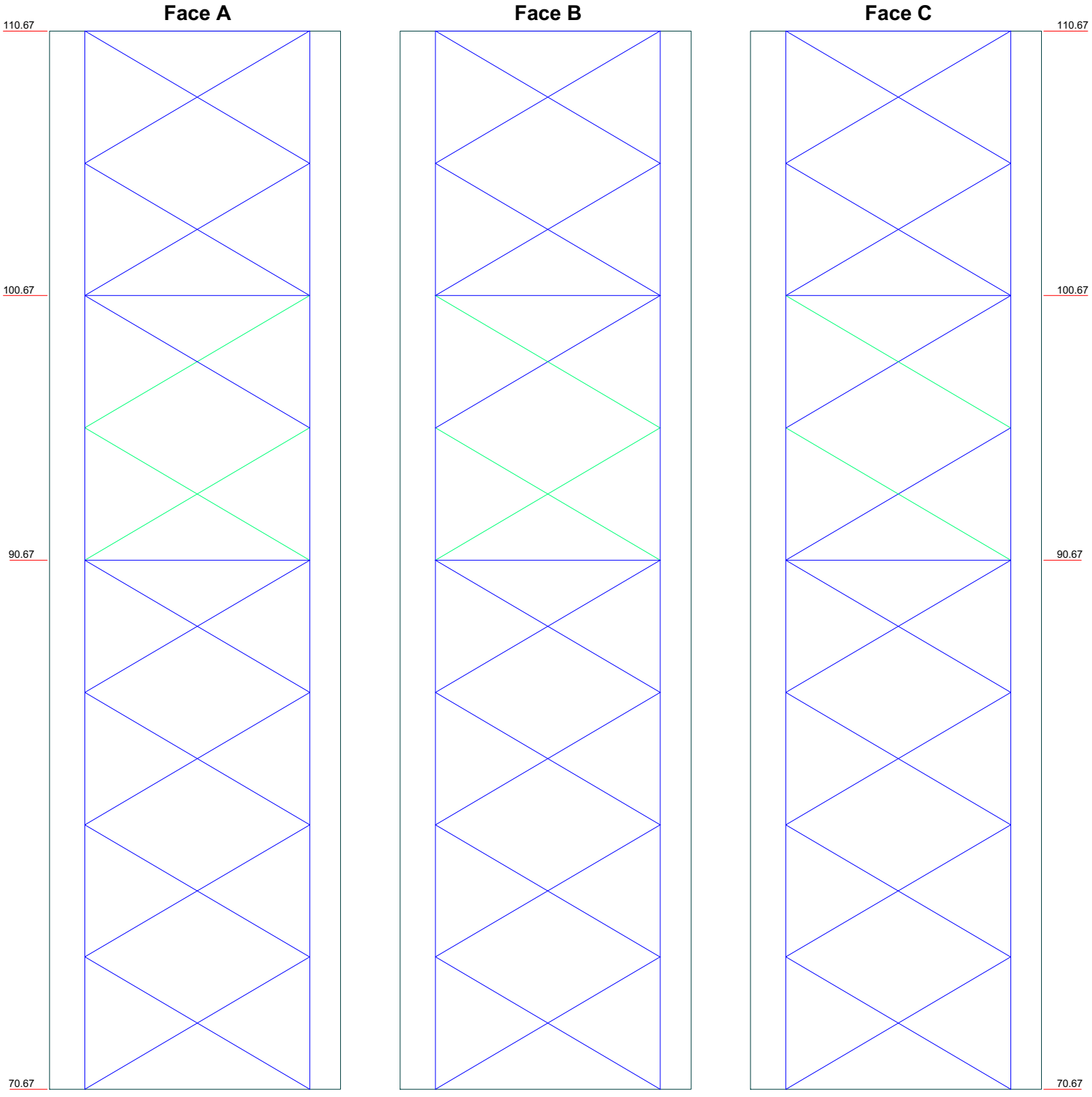
Path: C:\Users\Domenic\Dropbox\Work\On Air\Bristol CT\Engineering\Bristol CT.eri		Dwg No. E-7	

Stress Distribution Chart
70'8-1/32" - 110'8-1/32"

> 100% | 90%-100% | 75%-90% | 50%-75% | < 50% Overstress



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Code: TIA-222-G	Date: 04/21/21	Scale: NTS	
Path: C:\Users\Domenic\Dropbox\Work\On Air\Bristol CT\Engineering\Bristol CT.eri		Dwg No. E-8	

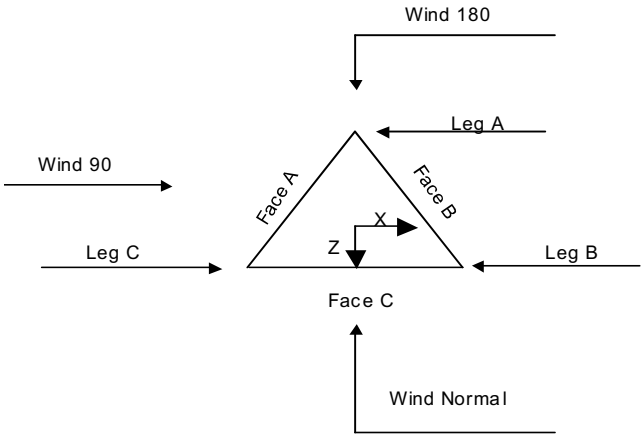
Tower Input Data

The main tower is a 3x free standing tower with an overall height of 110.67 ft above the ground line.
The base of the tower is set at an elevation of 70.67 ft above the ground line.
The face width of the tower is 8.56 ft at the top and 8.56 ft at the base.
This tower is designed using the TIA-222-G standard.
The following design criteria apply:

Tower is located in Hartford County, Connecticut.
Basic wind speed of 93 mph.
Structure Class II.
Exposure Category B.
Topographic Category 1.
Crest Height 0.00 ft.
Nominal ice thickness of 1.0000 in.
Ice thickness is considered to increase with height.
Ice density of 56 pcf.
A wind speed of 50 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 60 mph.
Connections use galvanized A325 bolts, nuts and locking devices. Installation per TIA/EIA-222 and AISC Specifications..
Tower members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards..
Welds are fabricated with ER-70S-6 electrodes..
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in tower member design is 1.
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



Triangular Tower

Tower Section Geometry

Tower Section	Tower Elevation	Assembly Database	Description	Section Width	Number of Sections	Section Length
	ft			ft		ft
T1	110.67-100.67			8.56	1	10.00
T2	100.67-90.67			8.56	1	10.00
T3	90.67-70.67			8.56	1	20.00

Tower Section Geometry *(cont'd)*

Tower Section	Tower Elevation	Diagonal Spacing	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset	Bottom Girt Offset
	ft	ft				in	in
T1	110.67-100.67	5.00	X Brace	No	Yes	0.0000	0.0000
T2	100.67-90.67	5.00	X Brace	No	Yes	0.0000	0.0000
T3	90.67-70.67	5.00	X Brace	No	Yes	0.0000	0.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 110.67-100.67	Pipe	P2.5x.203	A572-50 (50 ksi)	Single Angle	L1 1/2x1 1/2x1/8	A36 (36 ksi)
T2 100.67-90.67	Pipe	P2.5x.203	A572-50 (50 ksi)	Single Angle	L1 1/2x1 1/2x1/8	A36 (36 ksi)
T3 90.67-70.67	Pipe	P2.5x.203	A572-50 (50 ksi)	Single Angle	L2x2x3/16	A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Top Girt Type	Top Girt Size	Top Girt Grade	Bottom Girt Type	Bottom Girt Size	Bottom Girt Grade
T1 110.67-100.67	Single Angle	L1 1/2x1 1/2x1/8	A36 (36 ksi)	Flat Bar		A36 (36 ksi)
T2 100.67-90.67	Single Angle	L1 1/2x1 1/2x1/8	A36 (36 ksi)	Flat Bar		A36 (36 ksi)
T3 90.67-70.67	Single Angle	L1 1/2x1 1/2x1/8	A36 (36 ksi)	Flat Bar		A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Secondary Horizontal Type	Secondary Horizontal Size	Secondary Horizontal Grade	Inner Bracing Type	Inner Bracing Size	Inner Bracing Grade
T1 110.67-100.67	Solid Round		A572-50 (50 ksi)	Equal Angle	L2x2x1/8	A36 (36 ksi)
T2 100.67-90.67	Solid Round		A572-50 (50 ksi)	Equal Angle	L2x2x1/8	A36 (36 ksi)
T3 90.67-70.67	Solid Round		A572-50 (50 ksi)	Equal Angle	L2x2x1/8	A36 (36 ksi)

Tower Section Geometry *(cont'd)*

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
T1 110.67-100.67	0.06	0.2500	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T2 100.67-90.67	0.06	0.2500	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T3 90.67-70.67	0.06	0.2500	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	K Factors[1] Legs	X Brace Diags X Y	K Brace Diags X Y	Single Diags X Y	Girts X Y	Horiz. X Y	Sec. Horiz. X Y	Inner Brace X Y
T1	No	No	1	1	1	1	1	1	1	1
110.67-100.67				1	1	1	1	1	1	1
T2	No	No	1	1	1	1	1	1	1	1
100.67-90.67				1	1	1	1	1	1	1
T3	No	No	1	1	1	1	1	1	1	1
90.67-70.67				1	1	1	1	1	1	1

[1]*Note: K factors are applied to member segment lengths. K-braces without inner supporting members will have the K factor in the out-of-plane direction applied to the overall length.*

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Net Width Deduct in	Leg U	Diagonal Net Width Deduct in	Diagonal U	Top Girt Net Width Deduct in	Top Girt U	Bottom Girt Net Width Deduct in	Bottom Girt U	Mid Girt Net Width Deduct in	Mid Girt U	Long Horizontal Net Width Deduct in	Long Horizontal U	Short Horizontal Net Width Deduct in	Short Horizontal U
T1	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
110.67-100.67														
T2	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
100.67-90.67														
T3 90.67-70.67	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Connection Type	Leg Bolt Size in	Leg No.	Diagonal Bolt Size in	Diagonal No.	Top Girt Bolt Size in	Top Girt No.	Bottom Girt Bolt Size in	Bottom Girt No.	Mid Girt Bolt Size in	Mid Girt No.	Long Horizontal Bolt Size in	Long Horizontal No.	Short Horizontal Bolt Size in	Short Horizontal No.
T1	Flange	0.6250	4	0.5000	1	0.3750	1	0.6250	0	0.6250	0	0.5000	1	0.6250	0
110.67-100.67		A325N		A325N		A325N		A325N		A325N		A325N		A325N	
T2	Flange	0.6250	4	0.5000	1	0.3750	1	0.6250	0	0.6250	0	0.5000	1	0.6250	0
100.67-90.67		A325N		A325N		A325N		A325N		A325N		A325N		A325N	
T3 90.67-70.67	Flange	0.6250	4	0.5000	1	0.3750	1	0.6250	0	0.6250	0	0.5000	1	0.6250	0
		A325N		A325N		A325N		A325N		A325N		A325N		A325N	

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
1-5/8" Line	B	No	No	Ar (CaAa)	97.67 - 80.67	0.0000	-0.28	6	3	0.0000 0.5000	1.9800		1.04
1-5/8" HYBRIFLEX Line (Verizon)	B	No	No	Ar (CaAa)	105.00 - 80.67	0.0000	-0.35	2	2	0.0000 0.5000	1.9800		1.90

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 lb
T1	110.67-100.67	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	1.715	0.000	16.45
		C	0.000	0.000	0.000	0.000	0.00
T2	100.67-90.67	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	12.276	0.000	81.68
		C	0.000	0.000	0.000	0.000	0.00
T3	90.67-70.67	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	15.840	0.000	100.40
		C	0.000	0.000	0.000	0.000	0.00

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 lb
T1	110.67-100.67	A	2.247	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	5.763	0.000	83.09
		C		0.000	0.000	0.000	0.000	0.00
T2	100.67-90.67	A	2.225	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	25.207	0.000	411.02
		C		0.000	0.000	0.000	0.000	0.00
T3	90.67-70.67	A	2.187	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	30.075	0.000	497.48
		C		0.000	0.000	0.000	0.000	0.00

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
T1	110.67-100.67	0.4854	-2.9173	0.5463	-3.0675
T2	100.67-90.67	3.5276	-13.8306	2.4856	-10.3868
T3	90.67-70.67	2.4221	-9.2851	1.7000	-6.8222

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T1	2	1-5/8" HYBRIFLEX Line	100.67 - 105.00	0.8700	0.6100
T2	1	1-5/8" Line	90.67 - 97.67	0.8700	0.6100
T2	2	1-5/8" HYBRIFLEX Line	90.67 - 100.67	0.8700	0.6100
T3	1	1-5/8" Line	80.67 - 90.67	0.8700	0.6100
T3	2	1-5/8" HYBRIFLEX Line	80.67 - 90.67	0.8700	0.6100

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
LPA-80080-4CF	A	From Leg	1.00	0.0000	97.67	No Ice	2.62	4.04	11.00
(Verizon)			-1.00			1/2" Ice	2.92	4.35	37.51
			0.00			1" Ice	3.23	4.67	68.24
LPA-80080-4CF	B	From Leg	1.00	0.0000	97.67	No Ice	2.62	4.04	11.00
(Verizon)			-1.00			1/2" Ice	2.92	4.35	37.51
			0.00			1" Ice	3.23	4.67	68.24
LPA-80063-4CF	C	From Leg	1.00	0.0000	97.67	No Ice	2.87	3.73	30.00
(Verizon)			-1.00			1/2" Ice	3.18	4.10	60.00
			0.00			1" Ice	3.49	4.47	90.00
Raycap Dist. Box.	A	From Leg	0.00	0.0000	105.00	No Ice	2.09	1.37	21.50
(Verizon)			0.00			1/2" Ice	2.35	1.58	26.00
			0.00			1" Ice	2.61	1.79	30.50
Raycap Dist. Box.	B	From Leg	0.00	0.0000	105.00	No Ice	2.09	1.37	21.50
(Verizon)			0.00			1/2" Ice	2.35	1.58	26.00
			0.00			1" Ice	2.61	1.79	30.50
(2) JAHH-65B-R3B	A	From Leg	1.00	30.0000	107.67	No Ice	9.11	4.81	72.00
(Verizon)			0.00			1/2" Ice	9.91	5.67	131.00
			0.00			1" Ice	10.71	6.53	190.00
(2) JAHH-65B-R3B	B	From Leg	1.00	30.0000	107.67	No Ice	9.11	4.81	72.00
(Verizon)			0.00			1/2" Ice	9.91	5.67	131.00
			0.00			1" Ice	10.71	6.53	190.00
(2) JAHH-65B-R3B	C	From Leg	1.00	30.0000	107.67	No Ice	9.11	4.81	72.00
(Verizon)			0.00			1/2" Ice	9.91	5.67	131.00
			0.00			1" Ice	10.71	6.53	190.00
BSAMNT-SBS-2-3 Mount	A	From Leg	0.50	30.0000	107.67	No Ice	1.75	2.05	46.00
(Verizon)			0.00			1/2" Ice	2.29	2.59	67.00
			0.00			1" Ice	2.83	3.13	88.00
BSAMNT-SBS-2-3 Mount	B	From Leg	0.50	30.0000	107.67	No Ice	1.75	2.05	46.00
(Verizon)			0.00			1/2" Ice	2.29	2.59	67.00
			0.00			1" Ice	2.83	3.13	88.00
BSAMNT-SBS-2-3 Mount	C	From Leg	0.50	30.0000	107.67	No Ice	1.75	2.05	46.00
(Verizon)			0.00			1/2" Ice	2.29	2.59	67.00
			0.00			1" Ice	2.83	3.13	88.00
Unistrut Mount	A	From Face	0.00	0.0000	103.00	No Ice	4.50	0.12	90.00

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 lb
(Verizon)			0.00			1/2" Ice	6.07	0.22	141.00
			0.00			1" Ice	7.64	0.32	192.00
Unistrut Mount	B	From Face	0.00	0.0000	103.00	No Ice	4.50	0.12	90.00
(Verizon)			0.00			1/2" Ice	6.07	0.22	141.00
			0.00			1" Ice	7.64	0.32	192.00
Unistrut Mount	C	From Face	0.00	0.0000	103.00	No Ice	4.50	0.12	90.00
(Verizon)			0.00			1/2" Ice	6.07	0.22	141.00
			0.00			1" Ice	7.64	0.32	192.00
64T64R MMU	A	From Leg	1.00	0.0000	107.67	No Ice	4.70	1.84	87.10
(Verizon)			-3.00			1/2" Ice	5.14	2.24	117.00
			0.00			1" Ice	5.58	2.64	146.90
64T64R MMU	B	From Leg	1.00	0.0000	107.67	No Ice	4.70	1.84	87.10
(Verizon)			-3.00			1/2" Ice	5.14	2.24	117.00
			0.00			1" Ice	5.58	2.64	146.90
64T64R MMU	C	From Leg	1.00	0.0000	107.67	No Ice	4.70	1.84	87.10
(Verizon)			-3.00			1/2" Ice	5.14	2.24	117.00
			0.00			1" Ice	5.58	2.64	146.90
AWS/PCS RRH	A	From Leg	0.50	0.0000	103.00	No Ice	1.88	1.25	97.50
(Verizon)			-1.50			1/2" Ice	2.13	1.47	114.90
			0.00			1" Ice	2.38	1.69	132.30
AWS/PCS RRH	B	From Leg	0.50	0.0000	103.00	No Ice	1.88	1.25	97.50
(Verizon)			-1.50			1/2" Ice	2.13	1.47	114.90
			0.00			1" Ice	2.38	1.69	132.30
AWS/PCS RRH	C	From Leg	0.50	0.0000	103.00	No Ice	1.88	1.25	97.50
(Verizon)			-1.50			1/2" Ice	2.13	1.47	114.90
			0.00			1" Ice	2.38	1.69	132.30
700/850 RRH	A	From Leg	0.50	0.0000	103.00	No Ice	1.88	1.01	82.10
(Verizon)			1.50			1/2" Ice	2.13	1.21	98.10
			0.00			1" Ice	2.38	1.41	114.10
700/850 RRH	B	From Leg	0.50	0.0000	103.00	No Ice	1.88	1.01	82.10
(Verizon)			1.50			1/2" Ice	2.13	1.21	98.10
			0.00			1" Ice	2.38	1.41	114.10
700/850 RRH	C	From Leg	0.50	0.0000	103.00	No Ice	1.88	1.01	82.10
(Verizon)			1.50			1/2" Ice	2.13	1.21	98.10
			0.00			1" Ice	2.38	1.41	114.10
CBC78T-DS-43-2X Diplexer	A	From Leg	0.50	0.0000	103.00	No Ice	0.37	0.51	20.70
(Verizon)			0.00			1/2" Ice	0.49	0.65	27.40
			0.00			1" Ice	0.61	0.79	34.10
CBC78T-DS-43-2X Diplexer	B	From Leg	0.50	0.0000	103.00	No Ice	0.37	0.51	20.70
(Verizon)			0.00			1/2" Ice	0.49	0.65	27.40
			0.00			1" Ice	0.61	0.79	34.10
CBC78T-DS-43-2X Diplexer	C	From Leg	0.50	0.0000	103.00	No Ice	0.37	0.51	20.70
(Verizon)			0.00			1/2" Ice	0.49	0.65	27.40
			0.00			1" Ice	0.61	0.79	34.10
PSA3 Stand-off	A	From Leg	1.50	0.0000	107.67	No Ice	6.23	7.12	169.00
(Verizon)			0.00			1/2" Ice	8.24	9.23	205.00
			0.00			1" Ice	10.25	11.34	241.00
PSA3 Stand-off	B	From Leg	1.50	0.0000	107.67	No Ice	6.23	7.12	169.00
(Verizon)			0.00			1/2" Ice	8.24	9.23	205.00
			0.00			1" Ice	10.25	11.34	241.00
PSA3 Stand-off	C	From Leg	1.50	0.0000	107.67	No Ice	6.23	7.12	169.00
(Verizon)			0.00			1/2" Ice	8.24	9.23	205.00
			0.00			1" Ice	10.25	11.34	241.00
LPA-80080-4CF	A	From Leg	1.00	0.0000	97.67	No Ice	2.62	4.04	11.00
(Verizon)			1.00			1/2" Ice	2.92	4.35	37.51
			0.00			1" Ice	3.23	4.67	68.24
LPA-80080-4CF	B	From Leg	1.00	0.0000	97.67	No Ice	2.62	4.04	11.00

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 lb
(Verizon)			1.00			1/2" Ice	2.92	4.35	37.51
			0.00			1" Ice	3.23	4.67	68.24
LPA-80080-4CF	C	From Leg	1.00	0.0000	97.67	No Ice	2.62	4.04	11.00
(Verizon)			1.00			1/2" Ice	2.92	4.35	37.51
			0.00			1" Ice	3.23	4.67	68.24

Tower Pressures - No Ice

G_H = 0.850

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg %	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
T1	105.67	1.004	19	88.021	A	5.915	4.792	4.792	44.75	0.000	0.000
110.67-100.67					B	5.915	4.792		44.75	1.715	0.000
					C	5.915	4.792		44.75	0.000	0.000
T2	95.67	0.976	18	88.021	A	5.915	4.792	4.792	44.75	0.000	0.000
100.67-90.67					B	5.915	4.792		44.75	12.276	0.000
					C	5.915	4.792		44.75	0.000	0.000
T3 90.67-70.67	80.67	0.929	17	176.042	A	13.947	9.583	9.583	40.73	0.000	0.000
					B	13.947	9.583		40.73	15.840	0.000
					C	13.947	9.583		40.73	0.000	0.000

Tower Pressure - With Ice

G_H = 0.850

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg %	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
T1	105.67	1.004	5	2.2468	91.766	A	5.915	30.012	12.281	34.18	0.000	0.000
110.67-100.67						B	5.915	30.012		34.18	5.763	0.000
						C	5.915	30.012		34.18	0.000	0.000
T2 100.67-90.67	95.67	0.976	5	2.2246	91.729	A	5.915	29.762	12.207	34.21	0.000	0.000
						B	5.915	29.762		34.21	25.207	0.000
						C	5.915	29.762		34.21	0.000	0.000
T3 90.67-70.67	80.67	0.929	5	2.1870	183.332	A	13.947	55.474	24.163	34.81	0.000	0.000
						B	13.947	55.474		34.81	30.075	0.000
						C	13.947	55.474		34.81	0.000	0.000

Tower Pressure - Service

G_H = 0.850

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
T1	105.67	1.004	8	88.021	A	5.915	4.792	4.792	44.75	0.000	0.000
110.67-100.67					B	5.915	4.792		44.75	1.715	0.000
					C	5.915	4.792		44.75	0.000	0.000
T2	95.67	0.976	8	88.021	A	5.915	4.792	4.792	44.75	0.000	0.000
100.67-90.67					B	5.915	4.792		44.75	12.276	0.000
					C	5.915	4.792		44.75	0.000	0.000
T3 90.67-70.67	80.67	0.929	7	176.042	A	13.947	9.583	9.583	40.73	0.000	0.000
					B	13.947	9.583		40.73	15.840	0.000
					C	13.947	9.583		40.73	0.000	0.000

Tower Forces - No Ice - Wind Normal To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
T1	18.17	350.87	A	0.122	2.879	19	1	1	8.624	422.64	42.26	C
110.67-100.67			B	0.122	2.879		1	1	8.624			
			C	0.122	2.879		1	1	8.624			
T2	83.40	350.87	A	0.122	2.879	18	1	1	8.624	554.24	55.42	C
100.67-90.67			B	0.122	2.879		1	1	8.624			
			C	0.122	2.879		1	1	8.624			
T3	102.12	958.30	A	0.134	2.833	17	1	1	19.372	1020.71	51.04	C
90.67-70.67			B	0.134	2.833		1	1	19.372			
			C	0.134	2.833		1	1	19.372			
Sum Weight:	203.68	1665.20						OTM	38855.67 lb-ft	1997.60		

Tower Forces - No Ice - Wind 60 To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
T1	18.17	350.87	A	0.122	2.879	19	0.8	1	7.441	367.95	36.79	C
110.67-100.67			B	0.122	2.879		0.8	1	7.441			
			C	0.122	2.879		0.8	1	7.441			
T2	83.40	350.87	A	0.122	2.879	18	0.8	1	7.441	501.08	50.11	C
100.67-90.67			B	0.122	2.879		0.8	1	7.441			
			C	0.122	2.879		0.8	1	7.441			
T3	102.12	958.30	A	0.134	2.833	17	0.8	1	16.583	903.24	45.16	C
90.67-70.67			B	0.134	2.833		0.8	1	16.583			
			C	0.134	2.833		0.8	1	16.583			
Sum Weight:	203.68	1665.20						OTM	34437.62 lb-ft	1772.27		

Tower Forces - No Ice - Wind 90 To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F lb	w plf	Ctrl. Face
T1	18.17	350.87	A	0.122	2.879	19	0.85	1	7.737	381.62	38.16	C
110.67-100.67			B	0.122	2.879		0.85	1	7.737			
			C	0.122	2.879		0.85	1	7.737			
T2	83.40	350.87	A	0.122	2.879	18	0.85	1	7.737	514.37	51.44	C
100.67-90.67			B	0.122	2.879		0.85	1	7.737			
			C	0.122	2.879		0.85	1	7.737			
T3	102.12	958.30	A	0.134	2.833	17	0.85	1	17.280	932.61	46.63	C
90.67-70.67			B	0.134	2.833		0.85	1	17.280			
			C	0.134	2.833		0.85	1	17.280			
Sum Weight:	203.68	1665.20						OTM	35542.13 lb-ft	1828.60		

Tower Forces - With Ice - Wind Normal To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F lb	w plf	Ctrl. Face
T1	90.80	2507.41	A	0.392	2.081	5	1	1	24.789	255.80	25.58	C
110.67-100.67			B	0.392	2.081		1	1	24.789			
			C	0.392	2.081		1	1	24.789			
T2	418.64	2475.53	A	0.389	2.086	5	1	1	24.600	300.96	30.10	C
100.67-90.67			B	0.389	2.086		1	1	24.600			
			C	0.389	2.086		1	1	24.600			
T3	504.98	5254.55	A	0.379	2.108	5	1	1	48.636	519.41	25.97	C
90.67-70.67			B	0.379	2.108		1	1	48.636			
			C	0.379	2.108		1	1	48.636			
Sum Weight:	1014.42	10242.63						OTM	21670.90 lb-ft	1076.16		

Tower Forces - With Ice - Wind 60 To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F lb	w plf	Ctrl. Face
T1	90.80	2507.41	A	0.392	2.081	5	0.8	1	23.606	244.37	24.44	C
110.67-100.67			B	0.392	2.081		0.8	1	23.606			
			C	0.392	2.081		0.8	1	23.606			
T2	418.64	2475.53	A	0.389	2.086	5	0.8	1	23.417	289.82	28.98	C
100.67-90.67			B	0.389	2.086		0.8	1	23.417			
			C	0.389	2.086		0.8	1	23.417			
T3	504.98	5254.55	A	0.379	2.108	5	0.8	1	45.847	494.14	24.71	C

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F lb	w plf	Ctrl. Face
90.67-70.67			B	0.379	2.108		0.8	1	45.847			
			C	0.379	2.108		0.8	1	45.847			
Sum Weight:	1014.42	10242.63						OTM	20739.77 lb-ft	1028.33		

Tower Forces - With Ice - Wind 90 To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F lb	w plf	Ctrl. Face
T1	90.80	2507.41	A	0.392	2.081	5	0.85	1	23.902	247.22	24.72	C
110.67-100.67			B	0.392	2.081		0.85	1	23.902			
			C	0.392	2.081		0.85	1	23.902			
T2	418.64	2475.53	A	0.389	2.086	5	0.85	1	23.713	292.61	29.26	C
100.67-90.67			B	0.389	2.086		0.85	1	23.713			
			C	0.389	2.086		0.85	1	23.713			
T3	504.98	5254.55	A	0.379	2.108	5	0.85	1	46.544	500.46	25.02	C
90.67-70.67			B	0.379	2.108		0.85	1	46.544			
			C	0.379	2.108		0.85	1	46.544			
Sum Weight:	1014.42	10242.63						OTM	20972.56 lb-ft	1040.29		

Tower Forces - Service - Wind Normal To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F lb	w plf	Ctrl. Face
T1	18.17	350.87	A	0.122	2.879	8	1	1	8.624	175.92	17.59	C
110.67-100.67			B	0.122	2.879		1	1	8.624			
			C	0.122	2.879		1	1	8.624			
T2	83.40	350.87	A	0.122	2.879	8	1	1	8.624	230.69	23.07	C
100.67-90.67			B	0.122	2.879		1	1	8.624			
			C	0.122	2.879		1	1	8.624			
T3	102.12	958.30	A	0.134	2.833	7	1	1	19.372	424.86	21.24	C
90.67-70.67			B	0.134	2.833		1	1	19.372			
			C	0.134	2.833		1	1	19.372			
Sum Weight:	203.68	1665.20						OTM	16173.02 lb-ft	831.47		

Tower Forces - Service - Wind 60 To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
T1	18.17	350.87	A	0.122	2.879	8	0.8	1	7.441	153.15	15.32	C
110.67-100.67			B	0.122	2.879		0.8	1	7.441			
			C	0.122	2.879		0.8	1	7.441			
T2	83.40	350.87	A	0.122	2.879	8	0.8	1	7.441	208.57	20.86	C
100.67-90.67			B	0.122	2.879		0.8	1	7.441			
			C	0.122	2.879		0.8	1	7.441			
T3	102.12	958.30	A	0.134	2.833	7	0.8	1	16.583	375.96	18.80	C
90.67-70.67			B	0.134	2.833		0.8	1	16.583			
			C	0.134	2.833		0.8	1	16.583			
Sum Weight:	203.68	1665.20						OTM	14334.08 lb-ft	737.68		

Tower Forces - Service - Wind 90 To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
T1	18.17	350.87	A	0.122	2.879	8	0.85	1	7.737	158.84	15.88	C
110.67-100.67			B	0.122	2.879		0.85	1	7.737			
			C	0.122	2.879		0.85	1	7.737			
T2	83.40	350.87	A	0.122	2.879	8	0.85	1	7.737	214.10	21.41	C
100.67-90.67			B	0.122	2.879		0.85	1	7.737			
			C	0.122	2.879		0.85	1	7.737			
T3	102.12	958.30	A	0.134	2.833	7	0.85	1	17.280	388.18	19.41	C
90.67-70.67			B	0.134	2.833		0.85	1	17.280			
			C	0.134	2.833		0.85	1	17.280			
Sum Weight:	203.68	1665.20						OTM	14793.81 lb-ft	761.12		

Discrete Appurtenance Pressures - No Ice $G_H = 0.850$

Description	Aiming Azimuth °	Weight lb	$Offset_x$ ft	$Offset_z$ ft	z ft	K_z	q_z psf	C_AA_C Front ft²	C_AA_C Side ft²
LPA-80080-4CF	0.0000	11.00	-1.00	-5.94	97.67	0.982	18	2.62	4.04
LPA-80080-4CF	120.0000	11.00	5.65	2.11	97.67	0.982	18	2.62	4.04
LPA-80063-4CF	240.0000	30.00	-4.65	3.84	97.67	0.982	18	2.87	3.73
Raycap Dist. Box.	0.0000	21.50	0.00	-4.94	105.00	1.002	19	2.09	1.37
Raycap Dist. Box.	120.0000	21.50	4.28	2.47	105.00	1.002	19	2.09	1.37
JAHH-65B-R3B	30.0000	144.00	0.00	-5.94	107.67	1.009	19	18.22	9.62
JAHH-65B-R3B	150.0000	144.00	5.15	2.97	107.67	1.009	19	18.22	9.62
JAHH-65B-R3B	270.0000	144.00	-5.15	2.97	107.67	1.009	19	18.22	9.62
BSAMNT-SBS-2-3 Mount	30.0000	46.00	0.00	-5.44	107.67	1.009	19	1.75	2.05
BSAMNT-SBS-2-3 Mount	150.0000	46.00	4.71	2.72	107.67	1.009	19	1.75	2.05
BSAMNT-SBS-2-3 Mount	270.0000	46.00	-4.71	2.72	107.67	1.009	19	1.75	2.05

Description	Aiming Azimuth °	Weight lb	$Offset_x$ ft	$Offset_z$ ft	z ft	K_z	q_z psf	C_AA_C Front ft^2	C_AA_C Side ft^2
Unistrut Mount	300.0000	90.00	-2.14	-1.24	103.00	0.997	19	4.50	0.12
Unistrut Mount	60.0000	90.00	2.14	-1.24	103.00	0.997	19	4.50	0.12
Unistrut Mount	180.0000	90.00	0.00	2.47	103.00	0.997	19	4.50	0.12
64T64R MMU	0.0000	87.10	-3.00	-5.94	107.67	1.009	19	4.70	1.84
64T64R MMU	120.0000	87.10	6.65	0.37	107.67	1.009	19	4.70	1.84
64T64R MMU	240.0000	87.10	-3.65	5.57	107.67	1.009	19	4.70	1.84
AWS/PCS RRH	0.0000	97.50	-1.50	-5.44	103.00	0.997	19	1.88	1.25
AWS/PCS RRH	120.0000	97.50	5.46	1.42	103.00	0.997	19	1.88	1.25
AWS/PCS RRH	240.0000	97.50	-3.96	4.02	103.00	0.997	19	1.88	1.25
700/850 RRH	0.0000	82.10	1.50	-5.44	103.00	0.997	19	1.88	1.01
700/850 RRH	120.0000	82.10	3.96	4.02	103.00	0.997	19	1.88	1.01
700/850 RRH	240.0000	82.10	-5.46	1.42	103.00	0.997	19	1.88	1.01
CBC78T-DS-43-2X Diplexer	0.0000	20.70	0.00	-5.44	103.00	0.997	19	0.37	0.51
CBC78T-DS-43-2X Diplexer	120.0000	20.70	4.71	2.72	103.00	0.997	19	0.37	0.51
CBC78T-DS-43-2X Diplexer	240.0000	20.70	-4.71	2.72	103.00	0.997	19	0.37	0.51
PSA3 Stand-off	0.0000	169.00	0.00	-6.44	107.67	1.009	19	6.23	7.12
PSA3 Stand-off	120.0000	169.00	5.58	3.22	107.67	1.009	19	6.23	7.12
PSA3 Stand-off	240.0000	169.00	-5.58	3.22	107.67	1.009	19	6.23	7.12
LPA-80080-4CF	0.0000	11.00	1.00	-5.94	97.67	0.982	18	2.62	4.04
LPA-80080-4CF	120.0000	11.00	4.65	3.84	97.67	0.982	18	2.62	4.04
LPA-80080-4CF	240.0000	11.00	-5.65	2.11	97.67	0.982	18	2.62	4.04
	Sum Weight:	2337.20							

Discrete Appurtenance Pressures - With Ice $G_H = 0.850$

Description	Aiming Azimuth °	Weight lb	$Offset_x$ ft	$Offset_z$ ft	z ft	K_z	q_z psf	C_AA_C Front ft^2	C_AA_C Side ft^2	t_z in
LPA-80080-4CF	0.0000	167.09	-1.00	-5.94	97.67	0.982	5	4.00	5.48	2.2292
LPA-80080-4CF	120.0000	167.09	5.65	2.11	97.67	0.982	5	4.00	5.48	2.2292
LPA-80063-4CF	240.0000	163.75	-4.65	3.84	97.67	0.982	5	4.25	5.38	2.2292
Raycap Dist. Box.	0.0000	41.71	0.00	-4.94	105.00	1.002	5	3.26	2.31	2.2454
Raycap Dist. Box.	120.0000	41.71	4.28	2.47	105.00	1.002	5	3.26	2.31	2.2454
JAHH-65B-R3B	30.0000	675.25	0.00	-5.94	107.67	1.009	5	25.42	17.36	2.2511
JAHH-65B-R3B	150.0000	675.25	5.15	2.97	107.67	1.009	5	25.42	17.36	2.2511
JAHH-65B-R3B	270.0000	675.25	-5.15	2.97	107.67	1.009	5	25.42	17.36	2.2511
BSAMNT-SBS-2-3 Mount	30.0000	140.54	0.00	-5.44	107.67	1.009	5	4.18	4.48	2.2511
BSAMNT-SBS-2-3 Mount	150.0000	140.54	4.71	2.72	107.67	1.009	5	4.18	4.48	2.2511
BSAMNT-SBS-2-3 Mount	270.0000	140.54	-4.71	2.72	107.67	1.009	5	4.18	4.48	2.2511
Unistrut Mount	300.0000	318.59	-2.14	-1.24	103.00	0.997	5	11.54	0.57	2.2411
Unistrut Mount	60.0000	318.59	2.14	-1.24	103.00	0.997	5	11.54	0.57	2.2411
Unistrut Mount	180.0000	318.59	0.00	2.47	103.00	0.997	5	11.54	0.57	2.2411
64T64R MMU	0.0000	221.71	-3.00	-5.94	107.67	1.009	5	6.68	3.64	2.2511
64T64R MMU	120.0000	221.71	6.65	0.37	107.67	1.009	5	6.68	3.64	2.2511
64T64R MMU	240.0000	221.71	-3.65	5.57	107.67	1.009	5	6.68	3.64	2.2511
AWS/PCS RRH	0.0000	175.49	-1.50	-5.44	103.00	0.997	5	3.02	2.24	2.2411
AWS/PCS RRH	120.0000	175.49	5.46	1.42	103.00	0.997	5	3.02	2.24	2.2411
AWS/PCS RRH	240.0000	175.49	-3.96	4.02	103.00	0.997	5	3.02	2.24	2.2411
700/850 RRH	0.0000	153.82	1.50	-5.44	103.00	0.997	5	3.02	1.91	2.2411
700/850 RRH	120.0000	153.82	3.96	4.02	103.00	0.997	5	3.02	1.91	2.2411
700/850 RRH	240.0000	153.82	-5.46	1.42	103.00	0.997	5	3.02	1.91	2.2411

Description	Aiming Azimuth °	Weight lb	$Offset_x$ ft	$Offset_z$ ft	z ft	K_z	q_z psf	C_AA_C Front ft^2	C_AA_C Side ft^2	t_z in
CBC78T-DS-43-2X Diplexer	0.0000	50.73	0.00	-5.44	103.00	0.997	5	0.91	1.14	2.2411
CBC78T-DS-43-2X Diplexer	120.0000	50.73	4.71	2.72	103.00	0.997	5	0.91	1.14	2.2411
CBC78T-DS-43-2X Diplexer	240.0000	50.73	-4.71	2.72	103.00	0.997	5	0.91	1.14	2.2411
PSA3 Stand-off	0.0000	331.08	0.00	-6.44	107.67	1.009	5	15.28	16.62	2.2511
PSA3 Stand-off	120.0000	331.08	5.58	3.22	107.67	1.009	5	15.28	16.62	2.2511
PSA3 Stand-off	240.0000	331.08	-5.58	3.22	107.67	1.009	5	15.28	16.62	2.2511
LPA-80080-4CF	0.0000	167.09	1.00	-5.94	97.67	0.982	5	4.00	5.48	2.2292
LPA-80080-4CF	120.0000	167.09	4.65	3.84	97.67	0.982	5	4.00	5.48	2.2292
LPA-80080-4CF	240.0000	167.09	-5.65	2.11	97.67	0.982	5	4.00	5.48	2.2292
	Sum Weight:	7284.29								

Discrete Appurtenance Pressures - Service $G_H = 0.850$

Description	Aiming Azimuth °	Weight lb	$Offset_x$ ft	$Offset_z$ ft	z ft	K_z	q_z psf	C_AA_C Front ft^2	C_AA_C Side ft^2
LPA-80080-4CF	0.0000	11.00	-1.00	-5.94	97.67	0.982	8	2.62	4.04
LPA-80080-4CF	120.0000	11.00	5.65	2.11	97.67	0.982	8	2.62	4.04
LPA-80063-4CF	240.0000	30.00	-4.65	3.84	97.67	0.982	8	2.87	3.73
Raycap Dist. Box.	0.0000	21.50	0.00	-4.94	105.00	1.002	8	2.09	1.37
Raycap Dist. Box.	120.0000	21.50	4.28	2.47	105.00	1.002	8	2.09	1.37
JAHH-65B-R3B	30.0000	144.00	0.00	-5.94	107.67	1.009	8	18.22	9.62
JAHH-65B-R3B	150.0000	144.00	5.15	2.97	107.67	1.009	8	18.22	9.62
JAHH-65B-R3B	270.0000	144.00	-5.15	2.97	107.67	1.009	8	18.22	9.62
BSAMNT-SBS-2-3 Mount	30.0000	46.00	0.00	-5.44	107.67	1.009	8	1.75	2.05
BSAMNT-SBS-2-3 Mount	150.0000	46.00	4.71	2.72	107.67	1.009	8	1.75	2.05
BSAMNT-SBS-2-3 Mount	270.0000	46.00	-4.71	2.72	107.67	1.009	8	1.75	2.05
Unistrut Mount	300.0000	90.00	-2.14	-1.24	103.00	0.997	8	4.50	0.12
Unistrut Mount	60.0000	90.00	2.14	-1.24	103.00	0.997	8	4.50	0.12
Unistrut Mount	180.0000	90.00	0.00	2.47	103.00	0.997	8	4.50	0.12
64T64R MMU	0.0000	87.10	-3.00	-5.94	107.67	1.009	8	4.70	1.84
64T64R MMU	120.0000	87.10	6.65	0.37	107.67	1.009	8	4.70	1.84
64T64R MMU	240.0000	87.10	-3.65	5.57	107.67	1.009	8	4.70	1.84
AWS/PCS RRH	0.0000	97.50	-1.50	-5.44	103.00	0.997	8	1.88	1.25
AWS/PCS RRH	120.0000	97.50	5.46	1.42	103.00	0.997	8	1.88	1.25
AWS/PCS RRH	240.0000	97.50	-3.96	4.02	103.00	0.997	8	1.88	1.25
700/850 RRH	0.0000	82.10	1.50	-5.44	103.00	0.997	8	1.88	1.01
700/850 RRH	120.0000	82.10	3.96	4.02	103.00	0.997	8	1.88	1.01
700/850 RRH	240.0000	82.10	-5.46	1.42	103.00	0.997	8	1.88	1.01
CBC78T-DS-43-2X Diplexer	0.0000	20.70	0.00	-5.44	103.00	0.997	8	0.37	0.51
CBC78T-DS-43-2X Diplexer	120.0000	20.70	4.71	2.72	103.00	0.997	8	0.37	0.51
CBC78T-DS-43-2X Diplexer	240.0000	20.70	-4.71	2.72	103.00	0.997	8	0.37	0.51
PSA3 Stand-off	0.0000	169.00	0.00	-6.44	107.67	1.009	8	6.23	7.12
PSA3 Stand-off	120.0000	169.00	5.58	3.22	107.67	1.009	8	6.23	7.12
PSA3 Stand-off	240.0000	169.00	-5.58	3.22	107.67	1.009	8	6.23	7.12
LPA-80080-4CF	0.0000	11.00	1.00	-5.94	97.67	0.982	8	2.62	4.04
LPA-80080-4CF	120.0000	11.00	4.65	3.84	97.67	0.982	8	2.62	4.04
LPA-80080-4CF	240.0000	11.00	-5.65	2.11	97.67	0.982	8	2.62	4.04

Description	Aiming Azimuth °	Weight lb	$Offset_x$ ft	$Offset_z$ ft	z ft	K_z	q_z psf	C_AA_C Front ft^2	C_AA_C Side ft^2
	Sum Weight:	2337.20							

Force Totals

Load Case	Vertical Forces lb	Sum of Forces X lb	Sum of Forces Z lb	Sum of Overturning Moments, M_x lb-ft	Sum of Overturning Moments, M_z lb-ft	Sum of Torques lb-ft
Leg Weight695.82						
Bracing Weight	964.23					
Total Member Self-Weight	1660.05			-699.47	-186.71	
Gusset Weight	5.15					
Total Weight4200.93				-699.47	-186.71	
Wind 0 deg - No Ice		-1.74	-3615.19	-95513.12	-103.09	503.23
Wind 90 deg - No Ice		3444.19	1.74	-615.85	-91590.27	-1471.01
Wind 180 deg - No Ice		1.74	3389.86	89696.13	-270.34	-503.23
Member Ice	8577.44					
Gusset Ice	17.68					
Total Weight Ice	18536.20			-3707.03	-1108.93	
Wind 0 deg - Ice		-1.02	-1908.98	-54367.51	-1069.51	188.99
Wind 90 deg - Ice		1871.93	1.02	-3667.61	-51025.55	-623.76
Wind 180 deg - Ice		1.02	1861.15	46022.32	-1148.35	-188.99
Total Weight4200.93				-699.47	-186.71	
Wind 0 deg - Service		-0.72	-1504.76	-39444.81	31.06	209.46
Wind 90 deg - Service		1433.58	0.72	54.58	-38048.93	-612.28
Wind 180 deg - Service		0.72	1410.97	37645.42	-38.55	-209.46

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 90 deg - No Ice
5	0.9 Dead+1.6 Wind 90 deg - No Ice
6	1.2 Dead+1.6 Wind 180 deg - No Ice
7	0.9 Dead+1.6 Wind 180 deg - No Ice
8	1.2 Dead+1.0 Ice+1.0 Temp
9	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
10	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
11	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
12	Dead+Wind 0 deg - Service
13	Dead+Wind 90 deg - Service
14	Dead+Wind 180 deg - Service

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical lb	Horizontal, X lb	Horizontal, Z lb
Leg C	Max. Vert	6	11343.51	940.78	-1272.17
	Max. H_x	6	11343.51	940.78	-1272.17
	Max. H_z	3	-9022.51	-939.68	1324.43
	Min. Vert	5	-15884.99	-2248.53	1017.38
	Min. H_x	5	-15884.99	-2248.53	1017.38
	Min. H_z	6	11343.51	940.78	-1272.17
Leg B	Max. Vert	4	18755.10	-2309.00	-1052.86
	Max. H_x	9	2901.98	918.51	818.67
	Max. H_z	3	-9014.42	887.83	1419.49
	Min. Vert	3	-9014.42	887.83	1419.49
	Min. H_x	4	18755.10	-2309.00	-1052.86
	Min. H_z	6	11427.28	-888.82	-1367.12
Leg A	Max. Vert	2	22271.11	54.67	3051.09
	Max. H_x	2	22271.11	54.67	3051.09
	Max. H_z	2	22271.11	54.67	3051.09
	Min. Vert	7	-18173.40	-54.78	-2795.51
	Min. H_x	4	1775.74	-962.38	38.20
	Min. H_z	7	-18173.40	-54.78	-2795.51

Tower Mast Reaction Summary

Load Combination	Vertical lb	$Shear_x$ lb	$Shear_z$ lb	Overturning Moment, M_x lb-ft	Overturning Moment, M_z lb-ft	Torque lb-ft
Dead Only	4200.93	0.00	-0.00	-699.47	-186.71	0.00
1.2 Dead+1.6 Wind 0 deg - No Ice	5041.12	-2.78	-5784.31	-152687.35	-90.67	805.28
0.9 Dead+1.6 Wind 0 deg - No Ice	3780.84	-2.78	-5784.31	-152440.78	-34.62	805.22
1.2 Dead+1.6 Wind 90 deg - No Ice	5041.12	5510.70	2.78	-707.21	-146610.70	-2354.78
0.9 Dead+1.6 Wind 90 deg - No Ice	3780.84	5510.70	2.78	-497.09	-146519.36	-2354.56
1.2 Dead+1.6 Wind 180 deg - No Ice	5041.12	2.78	5423.78	143932.12	-358.63	-805.57
0.9 Dead+1.6 Wind 180 deg - No Ice	3780.84	2.78	5423.78	144107.39	-302.48	-805.52
1.2 Dead+1.0 Ice+1.0 Temp	19376.39	0.00	-0.00	-3848.97	-1146.90	-0.03
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	19376.39	-1.02	-1908.98	-54672.67	-1110.05	189.31
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	19376.39	1871.93	1.02	-3818.26	-51219.10	-624.94
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	19376.39	1.02	1861.15	46023.69	-1189.27	-189.34
Dead+Wind 0 deg - Service	4200.93	-0.72	-1504.76	-40196.56	-152.04209.47	
Dead+Wind 90 deg - Service	4200.93	1433.58	0.72	-665.19	-38262.76	-612.24
Dead+Wind 180 deg - Service	4200.93	0.72	1410.97	36954.30	-221.81	-209.49

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX lb	PY lb	PZ lb	PX lb	PY lb	PZ lb	% Error
1	0.00	-4200.93	-0.00	-0.00	4200.93	0.00	0.000%

Load Comb.	Sum of Applied Forces PX lb	PY lb	PZ lb	Sum of Reactions PX lb	PY lb	PZ lb	% Error
2	-2.78	-5041.12	-5784.31	2.78	5041.12	5784.31	0.000%
3	-2.78	-3780.84	-5784.31	2.78	3780.84	5784.31	0.000%
4	5510.70	-5041.12	2.78	-5510.70	5041.12	-2.78	0.000%
5	5510.70	-3780.84	2.78	-5510.70	3780.84	-2.78	0.000%
6	2.78	-5041.12	5423.78	-2.78	5041.12	-5423.78	0.000%
7	2.78	-3780.84	5423.78	-2.78	3780.84	-5423.78	0.000%
8	0.00	-19376.39	-0.00	-0.00	19376.39	0.00	0.000%
9	-1.02	-19376.39	-1908.98	1.02	19376.39	1908.98	0.000%
10	1871.93	-19376.39	1.02	-1871.93	19376.39	-1.02	0.000%
11	1.02	-19376.39	1861.15	-1.02	19376.39	-1861.15	0.000%
12	-0.72	-4200.93	-1504.76	0.72	4200.93	1504.76	0.000%
13	1433.58	-4200.93	0.72	-1433.58	4200.93	-0.72	0.000%
14	0.72	-4200.93	1410.97	-0.72	4200.93	-1410.97	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	4	0.00000001	0.00000001
3	Yes	4	0.00000001	0.00000001
4	Yes	4	0.00000001	0.00000001
5	Yes	4	0.00000001	0.00000001
6	Yes	4	0.00000001	0.00000001
7	Yes	4	0.00000001	0.00000001
8	Yes	4	0.00000001	0.00000001
9	Yes	4	0.00000001	0.00000001
10	Yes	4	0.00000001	0.00000001
11	Yes	4	0.00000001	0.00000001
12	Yes	4	0.00000001	0.00000001
13	Yes	4	0.00000001	0.00000001
14	Yes	4	0.00000001	0.00000001

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	110.67 - 100.67	0.147	12	0.0199	0.0027
T2	100.67 - 90.67	0.101	12	0.0194	0.0026
T3	90.67 - 70.67	0.054	12	0.0167	0.0019

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
107.67	(2) JAHH-65B-R3B	12	0.134	0.0198	0.0027	282218

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
105.00	Raycap Dist. Box.	12	0.122	0.0198	0.0027	249278
103.00	Unistrut Mount	12	0.112	0.0197	0.0027	199230
97.67	LPA-80080-4CF	12	0.086	0.0190	0.0024	Inf

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	110.67 - 100.67	0.559	2	0.0753	0.0104
T2	100.67 - 90.67	0.385	2	0.0737	0.0100
T3	90.67 - 70.67	0.204	2	0.0632	0.0072

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
107.67	(2) JAHH-65B-R3B	2	0.508	0.0752	0.0104	73192
105.00	Raycap Dist. Box.	2	0.462	0.0750	0.0104	64648
103.00	Unistrut Mount	2	0.427	0.0745	0.0103	51631
97.67	LPA-80080-4CF	2	0.329	0.0720	0.0094	358493

Bolt Design Data

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt lb	Allowable Load per Bolt lb	Ratio Load / Allowable	Allowable Ratio	Criteria
T1	110.67	Leg	A325N	0.6250	4	158.16	20708.70	0.008 ✔	1	Bolt Tension
		Diagonal	A325N	0.5000	1	979.13	4132.50	0.237 ✔	1	Member Bearing
		Top Girt	A325N	0.3750	1	102.31	4473.09	0.023 ✔	1	Bolt Shear
T2	100.67	Leg	A325N	0.6250	4	589.00	20708.70	0.028 ✔	1	Bolt Tension
		Diagonal	A325N	0.5000	1	1417.06	4132.50	0.343 ✔	1	Member Bearing
		Top Girt	A325N	0.3750	1	111.14	3045.00	0.036 ✔	1	Member Bearing
T3	90.67	Leg	A325N	0.6250	4	1802.84	20708.70	0.087 ✔	1	Bolt Tension
		Diagonal	A325N	0.5000	1	1921.03	6198.75	0.310 ✔	1	Member Bearing
		Top Girt	A325N	0.3750	1	332.79	3045.00	0.109 ✔	1	Member Bearing

Compression Checks

Leg Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	P_n lb	Ratio $\frac{P_u}{P_n}$
T1	110.67 - 100.67	P2.5x.203	10.00	5.00	63.3 K=1.00	1.7040	-3448.35	57192.30	0.060 [1] ✔
T2	100.67 - 90.67	P2.5x.203	10.00	5.00	63.3 K=1.00	1.7040	-6938.96	57192.30	0.121 [1] ✔
T3	90.67 - 70.67	P2.5x.203	20.00	5.00	63.3 K=1.00	1.7040	-20229.70	57192.30	0.354 [1] ✔

[1] P_u / P_n controls

Diagonal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	P_n lb	Ratio $\frac{P_u}{P_n}$
T1	110.67 - 100.67	L1 1/2x1 1/2x1/8	9.92	4.82	195.2 K=1.00	0.3594	-1023.22	2129.82	0.480 [1] ✔
T2	100.67 - 90.67	L1 1/2x1 1/2x1/8	9.92	4.82	195.2 K=1.00	0.3594	-1438.80	2129.82	0.676 [1] ✔
T3	90.67 - 70.67	L2x2x3/16	9.92	4.82	146.8 K=1.00	0.7150	-2069.86	7498.25	0.276 [1] ✔

[1] P_u / P_n controls

Top Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	P_n lb	Ratio $\frac{P_u}{P_n}$
T1	110.67 - 100.67	L1 1/2x1 1/2x1/8 KL/R > 200 (C) - 4	8.56	8.32	337.2 K=1.00	0.3594	-102.31	714.02	0.143 [1] ✔
T2	100.67 - 90.67	L1 1/2x1 1/2x1/8 KL/R > 200 (C) - 22	8.56	8.32	337.2 K=1.00	0.3594	-95.33	714.02	0.134 [1] ✔
T3	90.67 - 70.67	L1 1/2x1 1/2x1/8 KL/R > 200 (C) - 40	8.56	8.32	337.2 K=1.00	0.3594	-39.87	714.02	0.056 [1] ✔

[1] P_u / P_n controls

Tension Checks

Leg Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	P_n lb	Ratio $\frac{P_u}{P_n}$
T1	110.67 - 100.67	P2.5x.203	10.00	5.00	63.3	1.7040	711.33	76682.30	0.009 [1] ✔
T2	100.67 - 90.67	P2.5x.203	10.00	5.00	63.3	1.7040	4560.12	76682.30	0.059 [1] ✔
T3	90.67 - 70.67	P2.5x.203	20.00	5.00	63.3	1.7040	16375.40	76682.30	0.214 [1] ✔

[1] P_u / P_n controls

Diagonal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	P_n lb	Ratio $\frac{P_u}{P_n}$
T1	110.67 - 100.67	L1 1/2x1 1/2x1/8	9.92	4.82	124.3	0.2109	979.13	9175.78	0.107 [1] ✔
T2	100.67 - 90.67	L1 1/2x1 1/2x1/8	9.92	4.82	124.3	0.2109	1417.06	9175.78	0.154 [1] ✔
T3	90.67 - 70.67	L2x2x3/16	9.92	4.82	93.7	0.4484	1921.03	19503.60	0.098 [1] ✔

[1] P_u / P_n controls

Top Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	P_n lb	Ratio $\frac{P_u}{P_n}$
T1	110.67 - 100.67	L1 1/2x1 1/2x1/8	8.56	8.32	214.7	0.2227	40.92	9685.55	0.004 [1] ✔
T2	100.67 - 90.67	L1 1/2x1 1/2x1/8	8.56	8.32	214.7	0.2227	111.14	9685.55	0.011 [1] ✔
T3	90.67 - 70.67	L1 1/2x1 1/2x1/8	8.56	8.32	214.7	0.2227	332.79	9685.55	0.034 [1] ✔

[1] P_u / P_n controls

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	ϕP_{allow} lb	% Capacity	Pass Fail
T1	110.67 - 100.67	Leg	P2.5x.203	3	-3448.35	57192.30	6.0	Pass
		Diagonal	L1 1/2x1 1/2x1/8	10	-1023.22	2129.82	48.0	Pass
		Top Girt	L1 1/2x1 1/2x1/8	4	-102.31	714.02	14.3	Pass
T2	100.67 - 90.67	Leg	P2.5x.203	21	-6938.96	57192.30	12.1	Pass
		Diagonal	L1 1/2x1 1/2x1/8	28	-1438.80	2129.82	67.6	Pass
		Top Girt	L1 1/2x1 1/2x1/8	22	-95.33	714.02	13.4	Pass
T3	90.67 - 70.67	Leg	P2.5x.203	39	-20229.70	57192.30	35.4	Pass
		Diagonal	L2x2x3/16	46	-2069.86	7498.25	27.6 31.0 (b)	Pass
		Top Girt	L1 1/2x1 1/2x1/8	40	-39.87	714.02	5.6 10.9 (b)	Pass
						Summary		
						Leg (T3)	35.4	Pass
						Diagonal (T2)	67.6	Pass
						Top Girt (T1)	14.3	Pass
						Bolt Checks	34.3	Pass
						RATING =	**67.6**	**Pass**

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Date: September 15, 2021

Structural Analysis Report

Project Information:

Client:	On-Air Engineering
Carrier:	Verizon Wireless
Site Name:	Bristol CT
Site Address:	32 Valley Street, Bristol, CT 06010
Site Type:	Lattice Tower/Generator Support Steel Platform

Tectonic Project Number: 10816.02

Tectonic Engineering & Surveying Consultants P.C. is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above-mentioned rooftop telecommunication site.

The purpose of the analysis is to determine the acceptability of the existing rooftop steel dunnage platform and building structure to support Verizon's antennas, self-support lattice tower, and generator loading. Based on our analysis we have determined the stress level to be as follows:

Steel Platform: **Sufficient, 80% Stressed**

This analysis has been performed in accordance with the 2018 Connecticut State Building Code based upon an ultimate 3-second gust wind speed of 120 mph converted to a nominal 3-second gust wind speed of 93 mph per Section 1609.3 and Appendix N as required for use in the TIA-222-G Standard per Exception #5 of Section 1609.1.1. Exposure Category B with a maximum topographic factor, Kzt, of 1.0 and Structure Class II were used in this analysis.

We appreciate the opportunity of providing our continuing professional services to you. If you have any questions or need further assistance on this or any other projects please give us a call.

Structural analysis prepared by/reviewed by: John-Fritz Julien / Ian Marinaccio

Respectfully submitted by:
Tectonic Engineering & Surveying Consultants P.C.

Edward N. Iamiceli, P.E.
Managing Director - Structural

Project Contact Info

1279 Route 300 | Newburgh, NY 12550
845.567.6656 Tel | 845.567.8703 Fax

tectonicengineering.com
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TABLE OF CONTENTS

1) INTRODUCTION/PURPOSE

Analysis of the existing elevated steel platform, connections and supporting structure due to the loading of the proposed loads imposed by the tower.

2) ANALYSIS CRITERIA

TIA Revision:	TIA-222-G
Risk Category:	II
Wind Speed:	93 mph
Exposure Category:	B
Topographic Factor:	1.0
Ice Thickness:	1.00 in
Wind Speed with Ice:	50 mph
Service Wind Speed:	60 mph

Table 1 - Future Equipment Loading Information

Mounting Level (ft)	Carrier Designation	Quantity	Equipment Manufacturer	Equipment Model	Note
80	Verizon Wireless	1	Generac	100kW Gaseous Generator (SG100)	1

Notes:
1) To be mounted on existing platform. (proposed to replace the existing under separate contract)

3) ANALYSIS PROCEDURE

Table 2 - Documents Provided

Document	Prepared By	Dated
Tower Structural Analysis Report Rev F	Centek Engineering	06/07/12
Previous Structural Analysis Report	Tectonic	03/14/19
Field Notes	Tectonic	02/13/20
Tower Structural Analysis Report Rev G	KM Consulting Engineers, Inc.	04/21/21

3.1) Analysis Method

RISA-3D, a commercially available analysis software package, was used to check the supporting building framing and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix C.

A tool internally developed, using Microsoft Excel, was used to calculate wind loading on all appurtenances and mount members for various load cases. Selected output from the analysis is included in Appendix A.

3.2) Assumptions

1) All platform elements were properly fabricated, installed, and maintained in good condition in accordance with its original design, ASCE Standards, and/or manufacturer s specifications.
2) The configuration of equipment and other appurtenances are as specified in Table 1.
3) All member connections are assumed to have been designed to meet or exceed the load carrying capacity of the connected member unless otherwise specified in this report.
4) Steel grades have been assumed as follows, unless noted otherwise:

Wide Flange	ASTM A992
Channel, Solid Round, Angle, Plate	ASTM A36 (GR 36)
HSS (Rectangular)	ASTM 500 (GR B-46)
Pipe	ASTM A53 (GR 35)
Connection Bolts	ASTM A325

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

4) ANALYSIS RESULTS

Table 3 - Platform Stresses/Adequacy

Notes	Component	Mounting Level (ft)	Maximum % Capacity	Pass / Fail
1	Column	80	44	Pass
	Beam		80	Pass
	Brace		40	Pass
2	Supporting Structure		-	Pass

Structure Rating (max from all components) =	80%

Note:
1) See additional documentation in Appendix C for analysis output calculations supporting the % capacity utilized.
2) See additional documentation in Appendix D for analysis output calculations supporting the % capacity utilized.

4.1) Results/Conclusions

The existing platform and supporting structure are adequate to support the existing tower and future installation as detailed in the following report.

Contractor shall field verify existing conditions and recommendations as noted on the construction drawings and notify the design engineer of any discrepancies prior to construction. Any further changes to the equipment and/or appurtenance configuration should be reviewed with respect to their effect on structural loads prior to implementation.

APPENDIX A

SOFTWARE INPUT CALCULATIONS

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Job No. 10816.02 Bristol
Sheet No. of
Calculated By IM Date : 09/14/21
Checked By Date :

Design Loads for Generator Platform

1 - Dead Load

Number of Units	Cabinet Type	Length (in.)	Width (in.)	Height (in.)	Weight (lbs)	Total Weight	
1	SG100 Generator	111.8	40.5	68.6	3022	3022	lbs
						3022	lbs

Length on Loading Strip = 7.33 ft
Support Beam Spacing = 2.83 ft
Uniform Distributed Load = **207** **lbs/ft**

For Grating, use **10 psf**

2 - Live Load

Per the Connecticut 2018 supplement, the live load for elevated platforms is **60 psf.**

3- Snow Load

Per the Connecticut 2018 supplement and ASCE 7-10

$P_f=0.7C_eC_tIP_g$

P_f= 29.4 psf

But not less than (30 psf)

P_f= 30 psf **GOVERNS**

C_e = 1.0 [Table 7-2]
C_t = 1.2 [Table 7-3]
I = 1.0 [Table 7-4]
P_g = 35 psf [CBC 2018 Supplement] Appendix N

4- Wind Load

Per ASCE 7-10 Chapters 26 & 29

z= 80 FT (Approx. T/Generator)
V= 93 mph 3 Second Gust [CBC 2018 Supplement Appendix N]
Exposure: B
α= 7 Table 26.91
Z_g= 1200 ft Table 26.91
K_z= 0.928 Table 29.3-1
K_{zt}= 1.00 Section 26.8.2
K_d= 0.90 Section 26.6
q_z= 18.49 psf Section 29.3.2

Per on ASCE7-10 Section 29.5 (Other Structures)

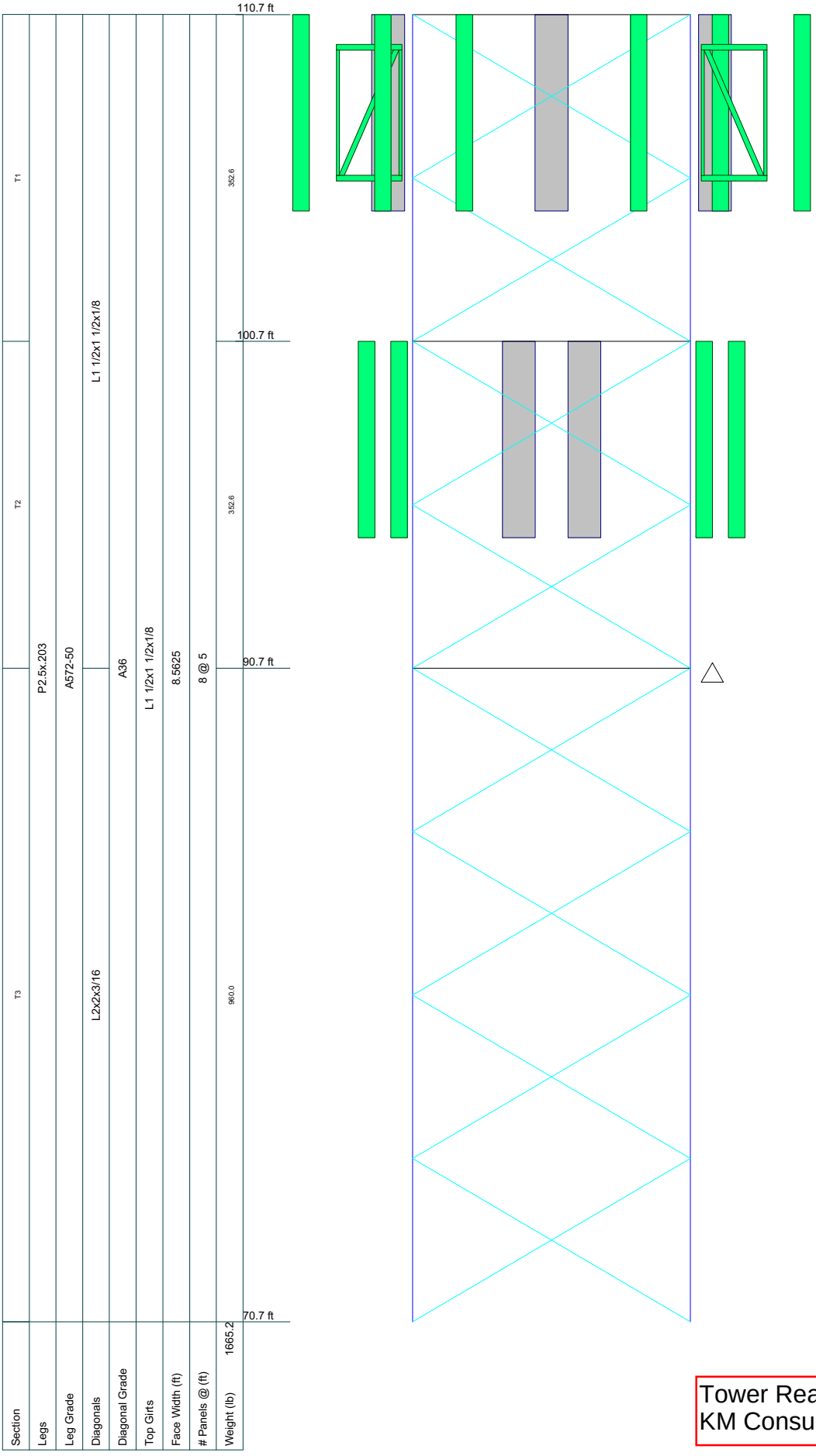
G= 0.85 Section 26.9
C_f= 2.0 Figure 29.5-1 through 29.5-3
F= 32 psf

Wind Pressure= **32** psf

Uplift Force Per Support Beam= 370 lbs/ft
Wind Force Per Support Beam= 92 lbs/ft

Lateral force in other direction= 309 lbs

Wind Load on Members		
W6	16	lbs/ft
W8	21	lbs/ft
W12	32	lbs/ft



Tower Reactions from Structural Analysis by KM Consulting Engineers, Inc. dated 04/21/21

KM Consulting Engineers
262 Upper Ferry Road
Ewing, NJ 08525
Phone: (609) 538-0400
FAX:
Consulting Engineers

Job: ***Bristol CT LC1***			
Project: ***40' Self-Support Tower***			
Client: On Air Engineering, LLC	Drawn by: Domenic Aversa	App'd:	
Code: TIA-222-G	Date: 04/21/21	Scale: NTS	
Path: C:\Users\Domenic\Dropbox\Work\On Air\Bristol CT\Engineering\Bristol CT.eri		Dwg No. E-1	

Description	Aiming Azimuth °	Weight lb	$Offset_x$ ft	$Offset_z$ ft	z ft	K_z	q_z psf	C_AA_C Front ft^2	C_AA_C Side ft^2
	Sum Weight:	2337.20							

Force Totals

Load Case	Vertical Forces lb	Sum of Forces X lb	Sum of Forces Z lb	Sum of Overturning Moments, M_x lb-ft	Sum of Overturning Moments, M_z lb-ft	Sum of Torques lb-ft
Leg Weight695.82						
Bracing Weight	964.23					
Total Member Self-Weight	1660.05			-699.47	-186.71	
Gusset Weight	5.15					
Total Weight4200.93				-699.47	-186.71	
Wind 0 deg - No Ice		-1.74	-3615.19	-95513.12	-103.09	503.23
Wind 90 deg - No Ice		3444.19	1.74	-615.85	-91590.27	-1471.01
Wind 180 deg - No Ice		1.74	3389.86	89696.13	-270.34	-503.23
Member Ice	8577.44					
Gusset Ice	17.68					
Total Weight Ice	18536.20			-3707.03	-1108.93	
Wind 0 deg - Ice		-1.02	-1908.98	-54367.51	-1069.51	188.99
Wind 90 deg - Ice		1871.93	1.02	-3667.61	-51025.55	-623.76
Wind 180 deg - Ice		1.02	1861.15	46022.32	-1148.35	-188.99
Total Weight4200.93				-699.47	-186.71	
Wind 0 deg - Service		-0.72	-1504.76	-39444.81	31.06	209.46
Wind 90 deg - Service		1433.58	0.72	54.58	-38048.93	-612.28
Wind 180 deg - Service		0.72	1410.97	37645.42	-38.55	-209.46

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 90 deg - No Ice
5	0.9 Dead+1.6 Wind 90 deg - No Ice
6	1.2 Dead+1.6 Wind 180 deg - No Ice
7	0.9 Dead+1.6 Wind 180 deg - No Ice
8	1.2 Dead+1.0 Ice+1.0 Temp
9	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
10	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
11	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
12	Dead+Wind 0 deg - Service
13	Dead+Wind 90 deg - Service
14	Dead+Wind 180 deg - Service

REV G - LRFD
LOAD COMBINATIONS

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical lb	Horizontal, X lb	Horizontal, Z lb
Leg C	Max. Vert	6	11343.51	940.78	-1272.17
	Max. H_x	6	11343.51	940.78	-1272.17
	Max. H_z	3	-9022.51	-939.68	1324.43
	Min. Vert	5	-15884.99	-2248.53	1017.38
	Min. H_x	5	-15884.99	-2248.53	1017.38
	Min. H_z	6	11343.51	940.78	-1272.17
Leg B	Max. Vert	4	18755.10	-2309.00	-1052.86
	Max. H_x	9	2901.98	918.51	818.67
	Max. H_z	3	-9014.42	887.83	1419.49
	Min. Vert	3	-9014.42	887.83	1419.49
	Min. H_x	4	18755.10	-2309.00	-1052.86
	Min. H_z	6	11427.28	-888.82	-1367.12
Leg A	Max. Vert	2	22271.11	54.67	3051.09
	Max. H_x	2	22271.11	54.67	3051.09
	Max. H_z	2	22271.11	54.67	3051.09
	Min. Vert	7	-18173.40	-54.78	-2795.51
	Min. H_x	4	1775.74	-962.38	38.20
	Min. H_z	7	-18173.40	-54.78	-2795.51

Tower Mast Reaction Summary

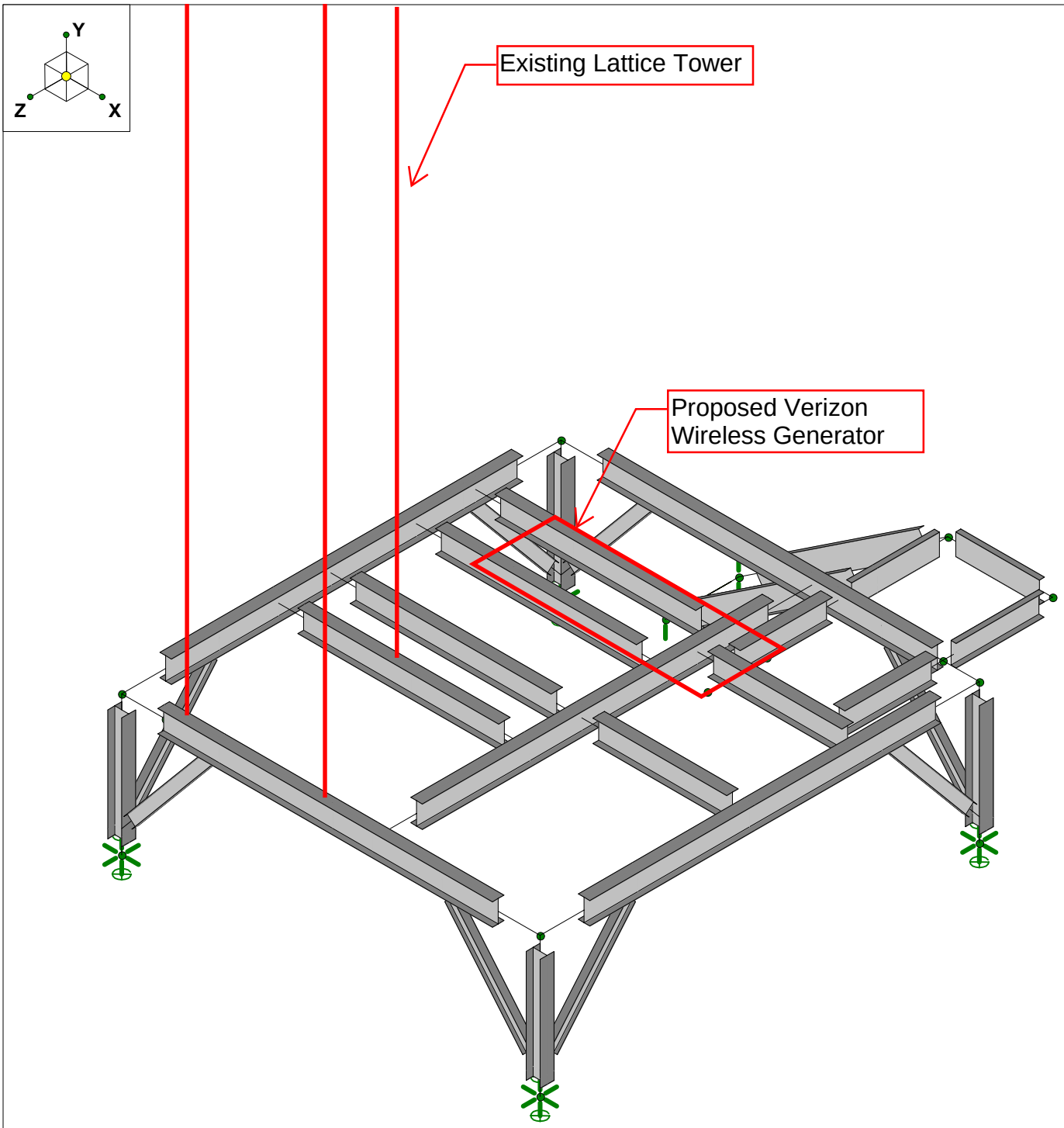
Load Combination	Vertical lb	$Shear_x$ lb	$Shear_z$ lb	Overturning Moment, M_x lb-ft	Overturning Moment, M_z lb-ft	Torque lb-ft
Dead Only	4200.93	0.00	-0.00	-699.47	-186.71	0.00
1.2 Dead+1.6 Wind 0 deg - No Ice	5041.12	-2.78	-5784.31	-152687.35	-90.67	805.28
0.9 Dead+1.6 Wind 0 deg - No Ice	3780.84	-2.78	-5784.31	-152440.78	-34.62	805.22
1.2 Dead+1.6 Wind 90 deg - No Ice	5041.12	5510.70	2.78	-707.21	-146610.70	-2354.78
0.9 Dead+1.6 Wind 90 deg - No Ice	3780.84	5510.70	2.78	-497.09	-146519.36	-2354.56
1.2 Dead+1.6 Wind 180 deg - No Ice	5041.12	2.78	5423.78	143932.12	-358.63	-805.57
0.9 Dead+1.6 Wind 180 deg - No Ice	3780.84	2.78	5423.78	144107.39	-302.48	-805.52
1.2 Dead+1.0 Ice+1.0 Temp	19376.39	0.00	-0.00	-3848.97	-1146.90	-0.03
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	19376.39	-1.02	-1908.98	-54672.67	-1110.05	189.31
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	19376.39	1871.93	1.02	-3818.26	-51219.10	-624.94
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	19376.39	1.02	1861.15	46023.69	-1189.27	-189.34
Dead+Wind 0 deg - Service	4200.93	-0.72	-1504.76	-40196.56	-152.04209.47	
Dead+Wind 90 deg - Service	4200.93	1433.58	0.72	-665.19	-38262.76	-612.24
Dead+Wind 180 deg - Service	4200.93	0.72	1410.97	36954.30	-221.81	-209.49

Solution Summary

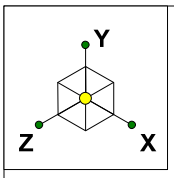
	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX lb	PY lb	PZ lb	PX lb	PY lb	PZ lb	% Error
1	0.00	-4200.93	-0.00	-0.00	4200.93	0.00	0.000%

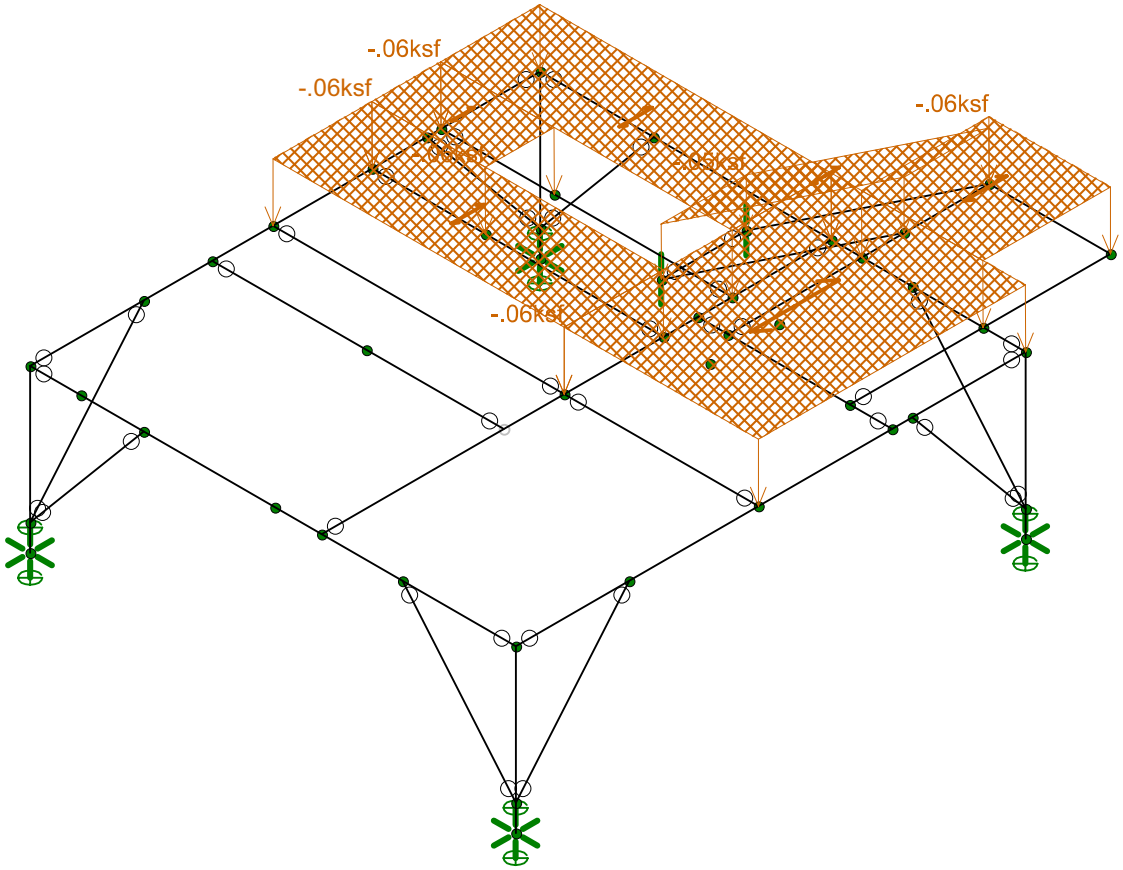
APPENDIX B

WIRE FRAME AND RENDERED MODELS

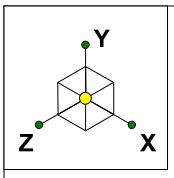


Envelope Only Solution

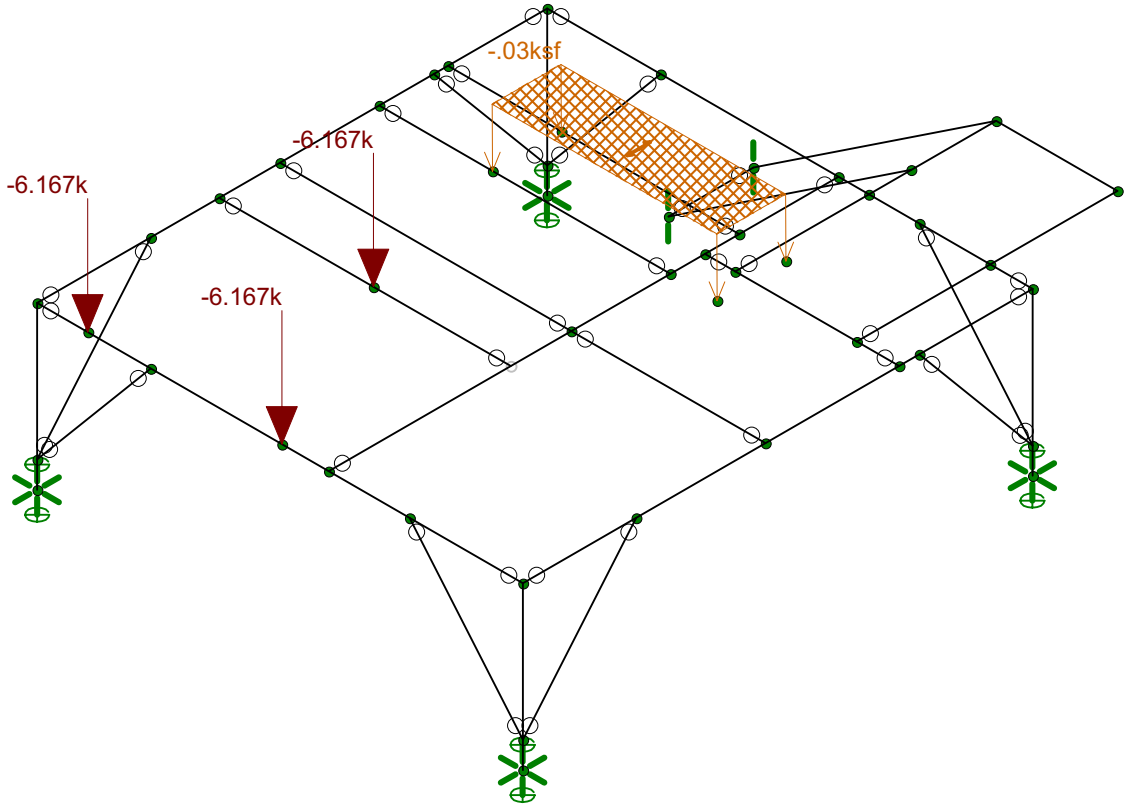




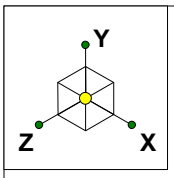
Loads: BLC 2, LL
Envelope Only Solution

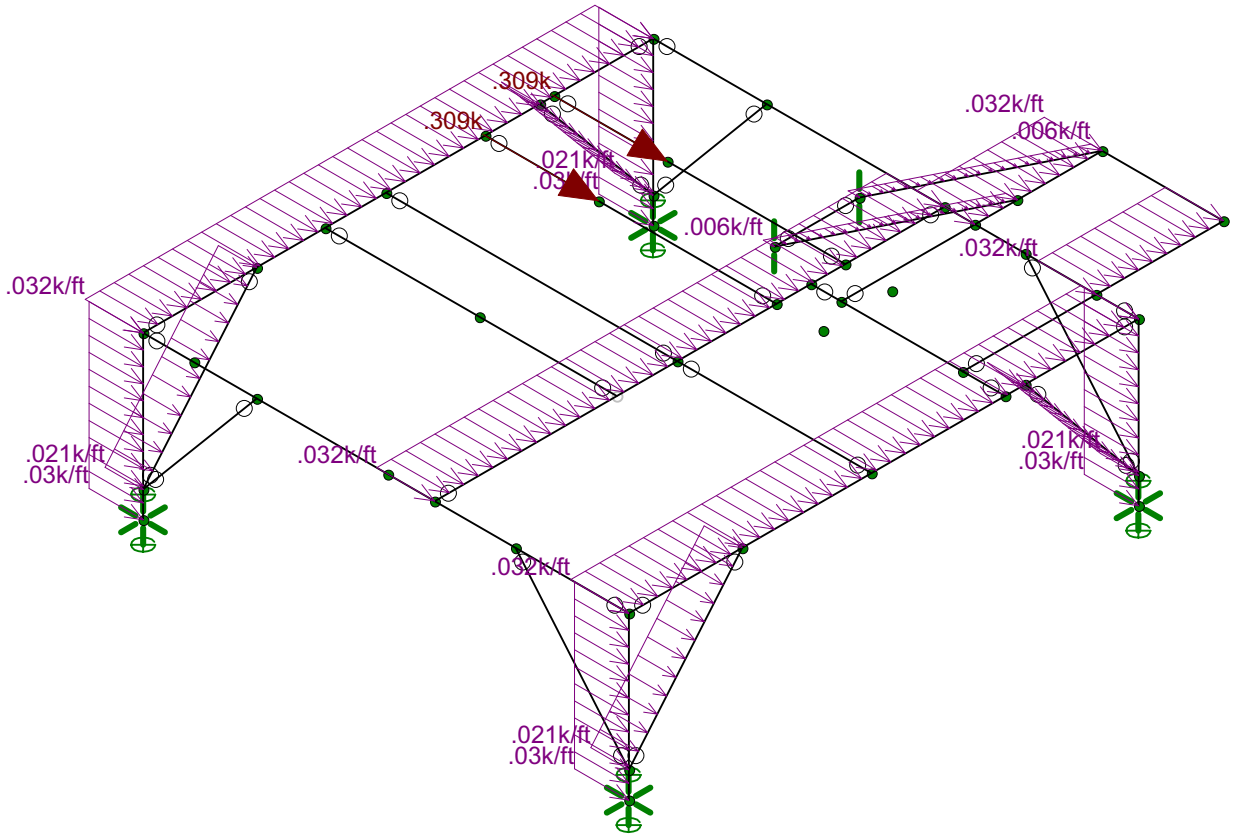


Tower Reactions from Structural Analysis by
KM Consulting Engineers, Inc. dated 04/21/21

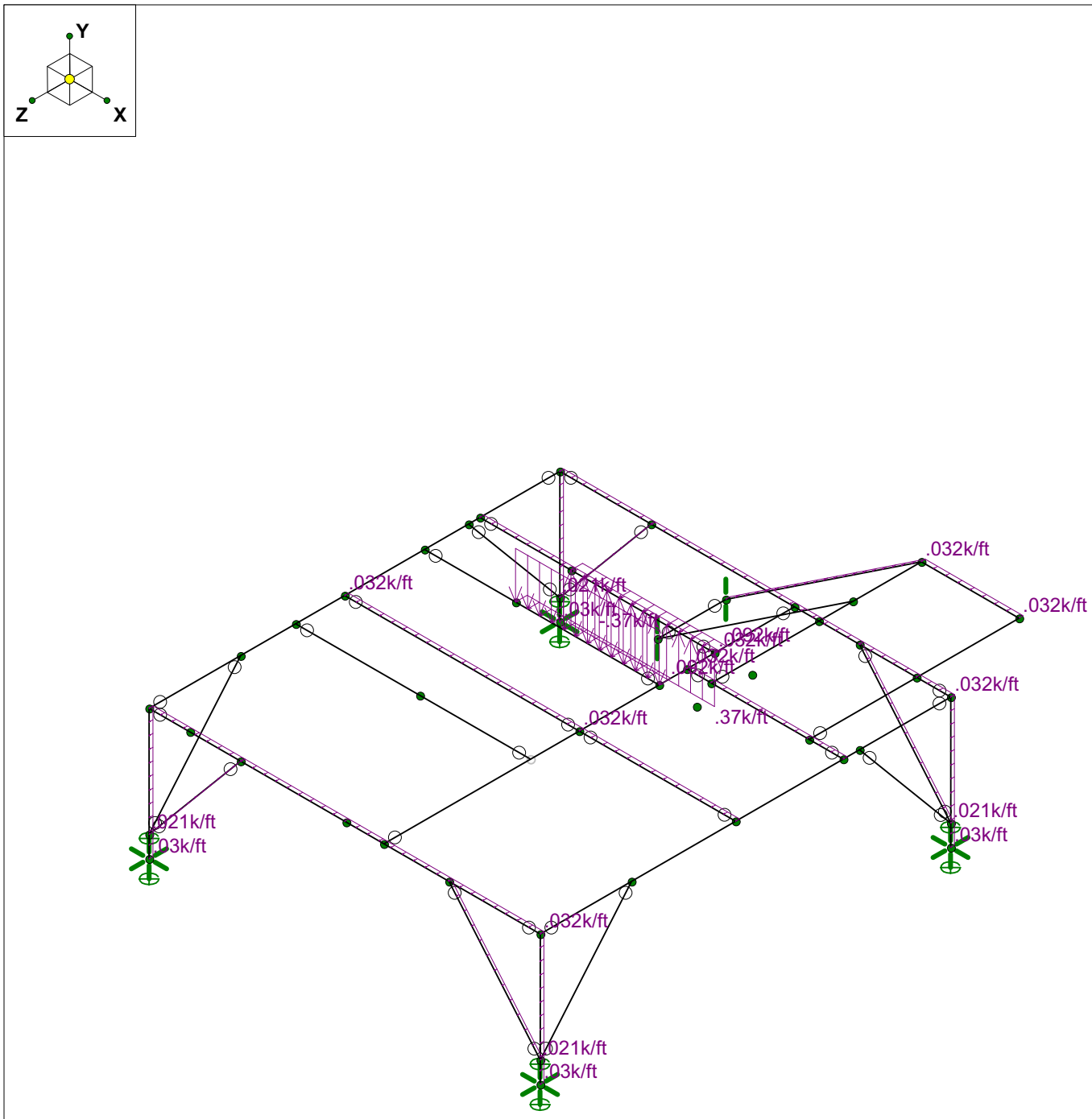


Loads: BLC 3, SL
Envelope Only Solution

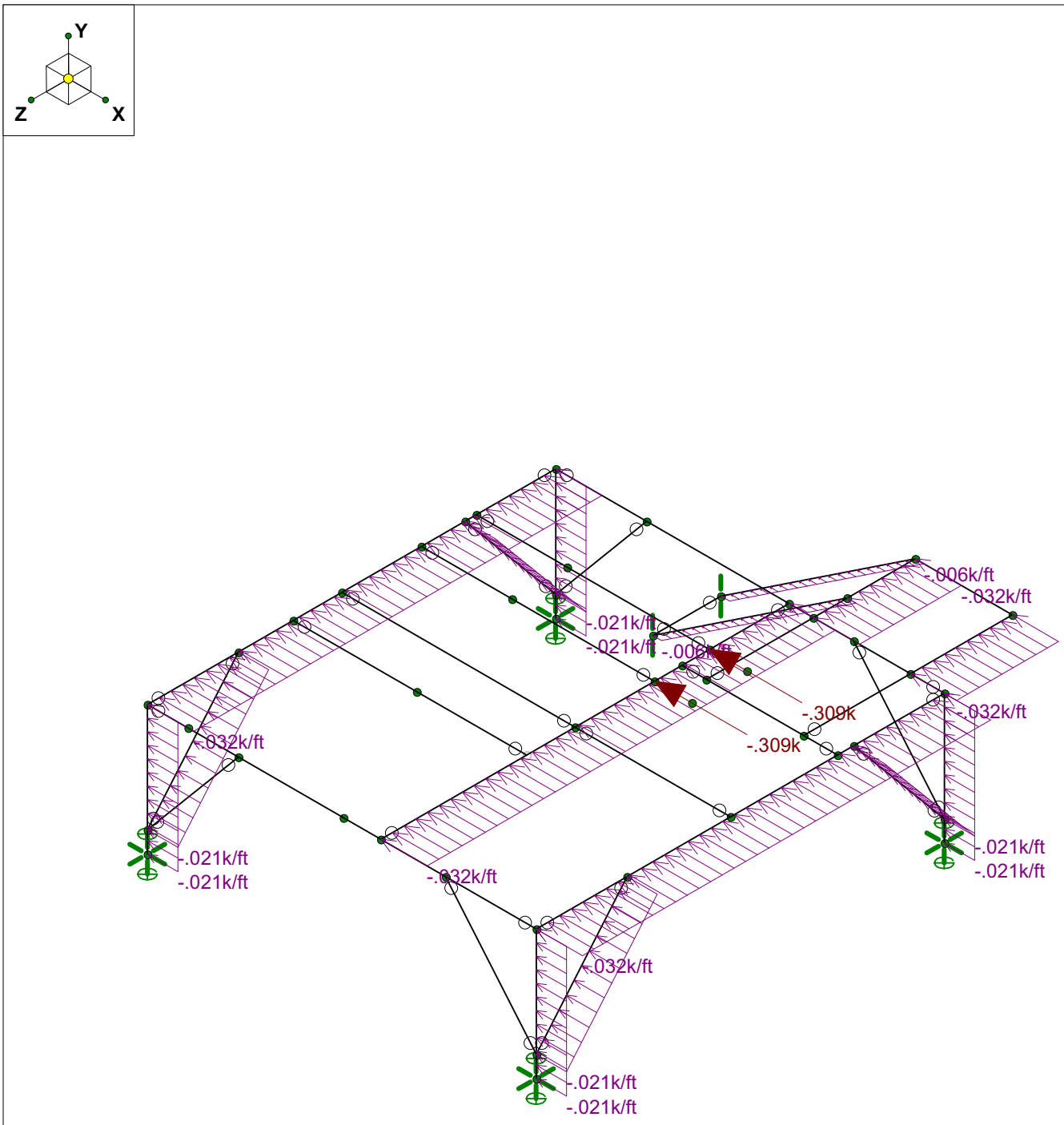




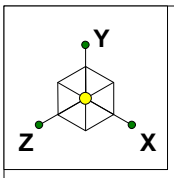
Loads: BLC 4, WLX
Envelope Only Solution

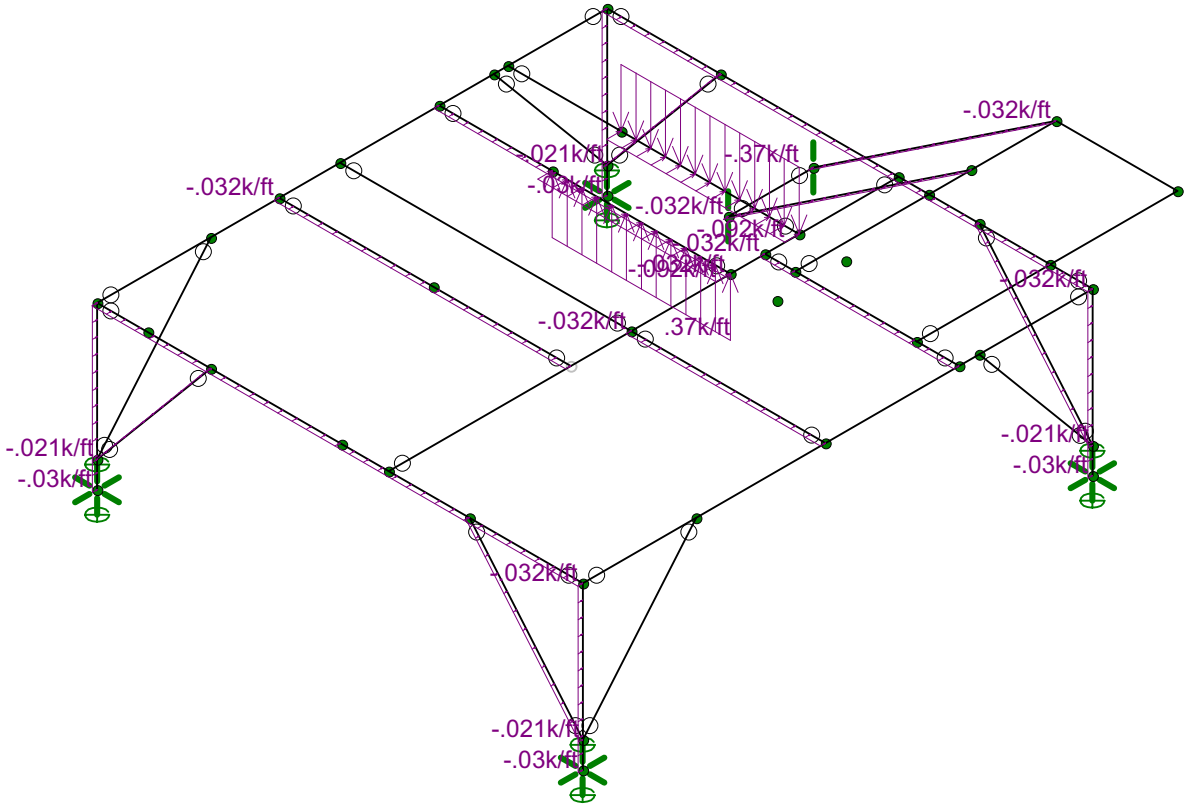


Loads: BLC 5, WLZ
Envelope Only Solution

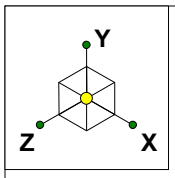


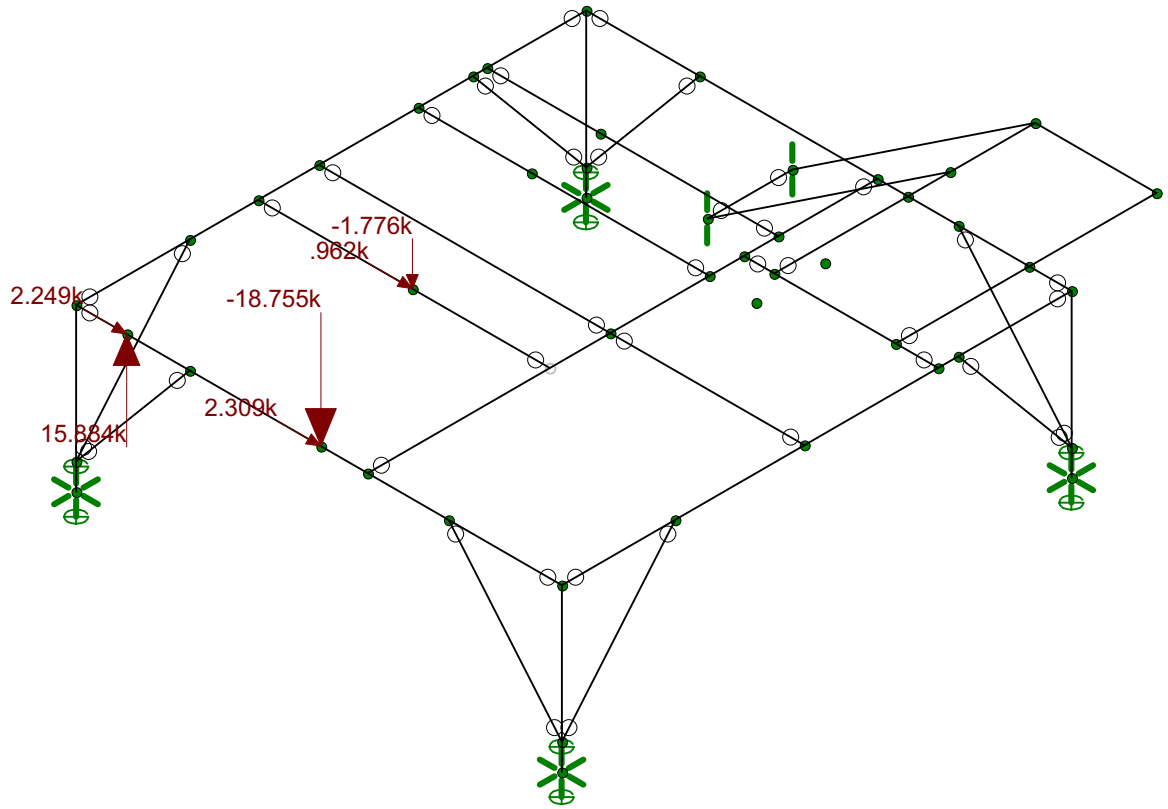
Loads: BLC 6, WL-X
Envelope Only Solution



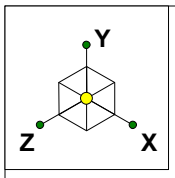


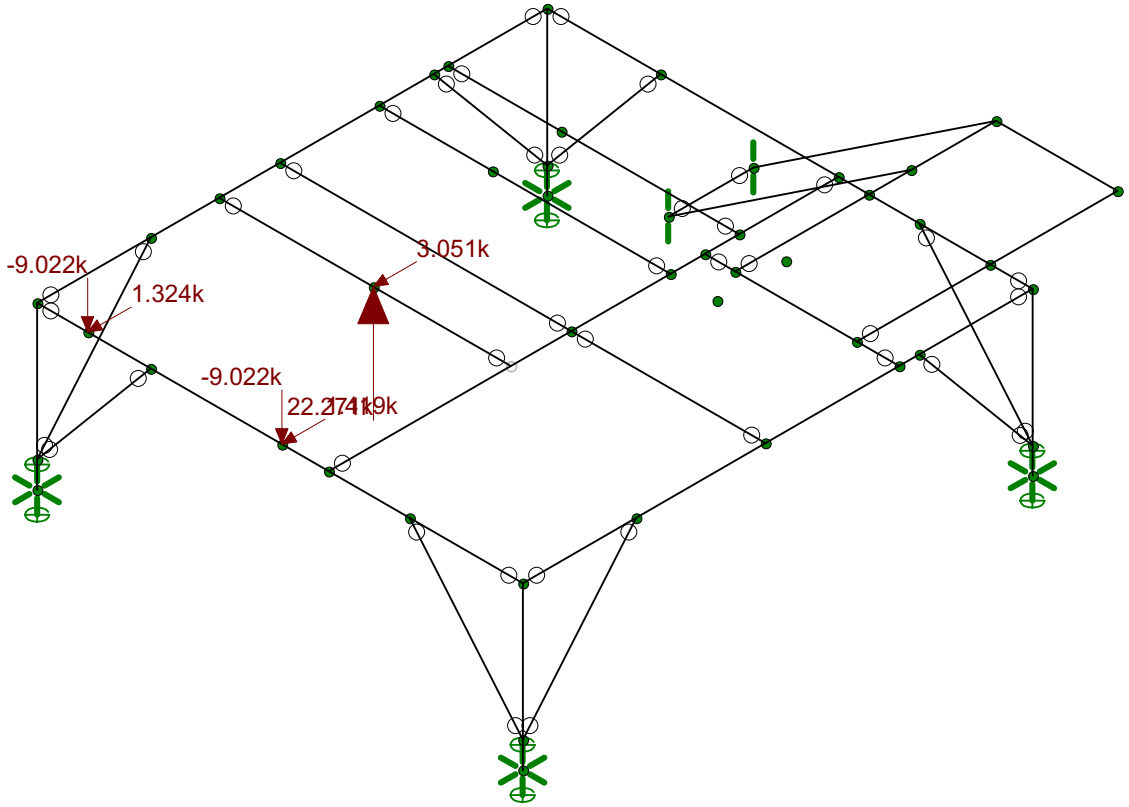
Loads: BLC 7, WL-Z
Envelope Only Solution



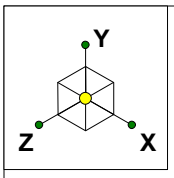


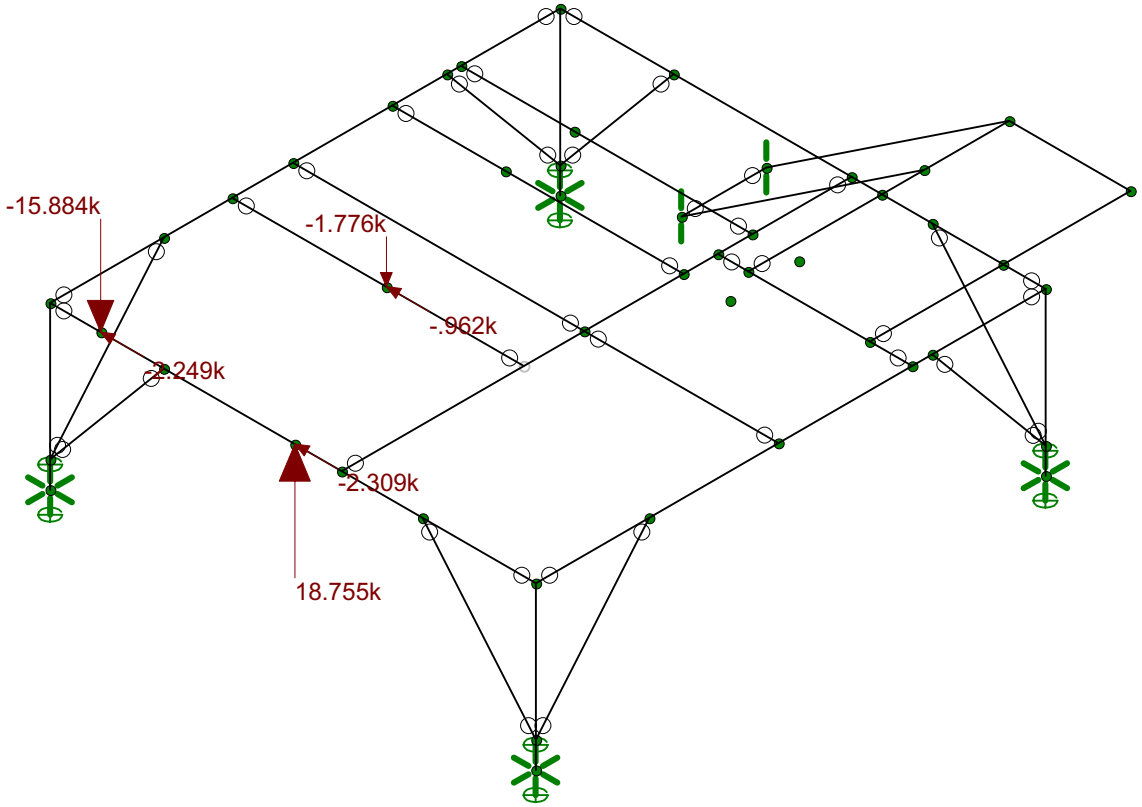
Loads: BLC 9, Tower WLX
Envelope Only Solution



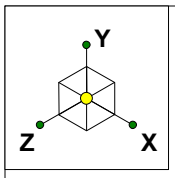


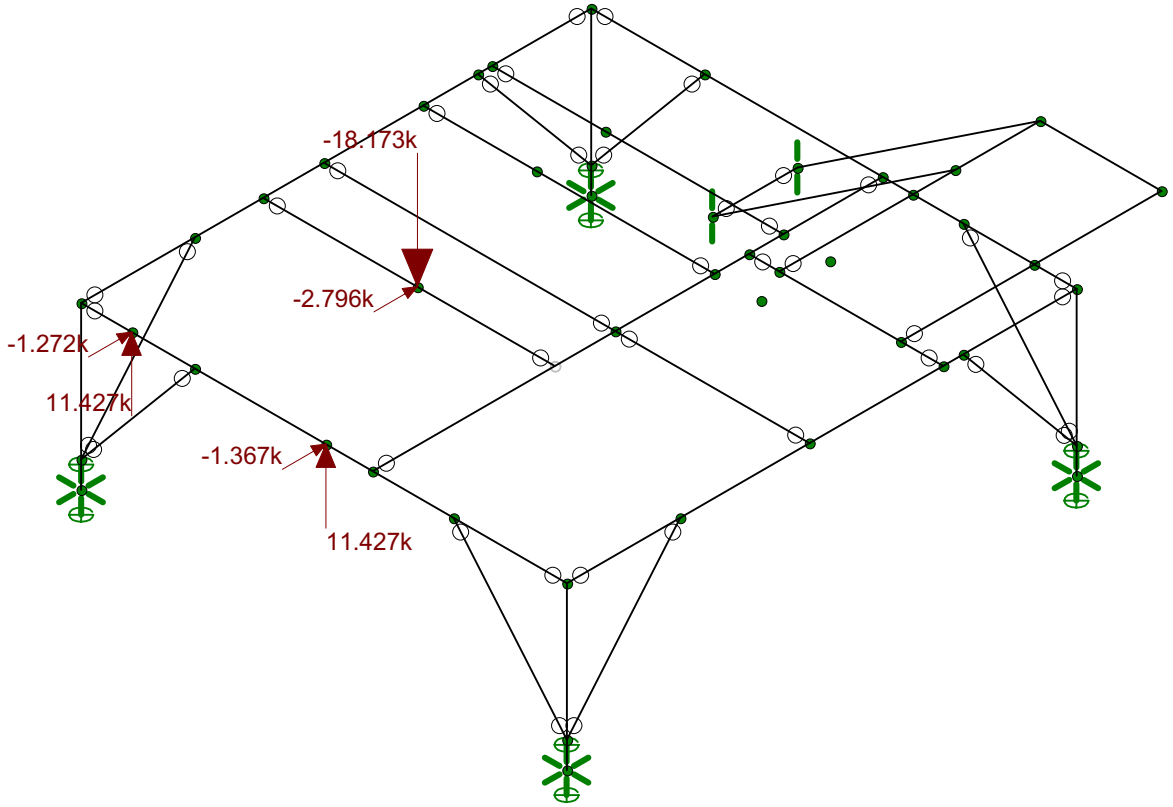
Loads: BLC 10, Tower WLZ
Envelope Only Solution





Loads: BLC 11, Tower WL-X
Envelope Only Solution

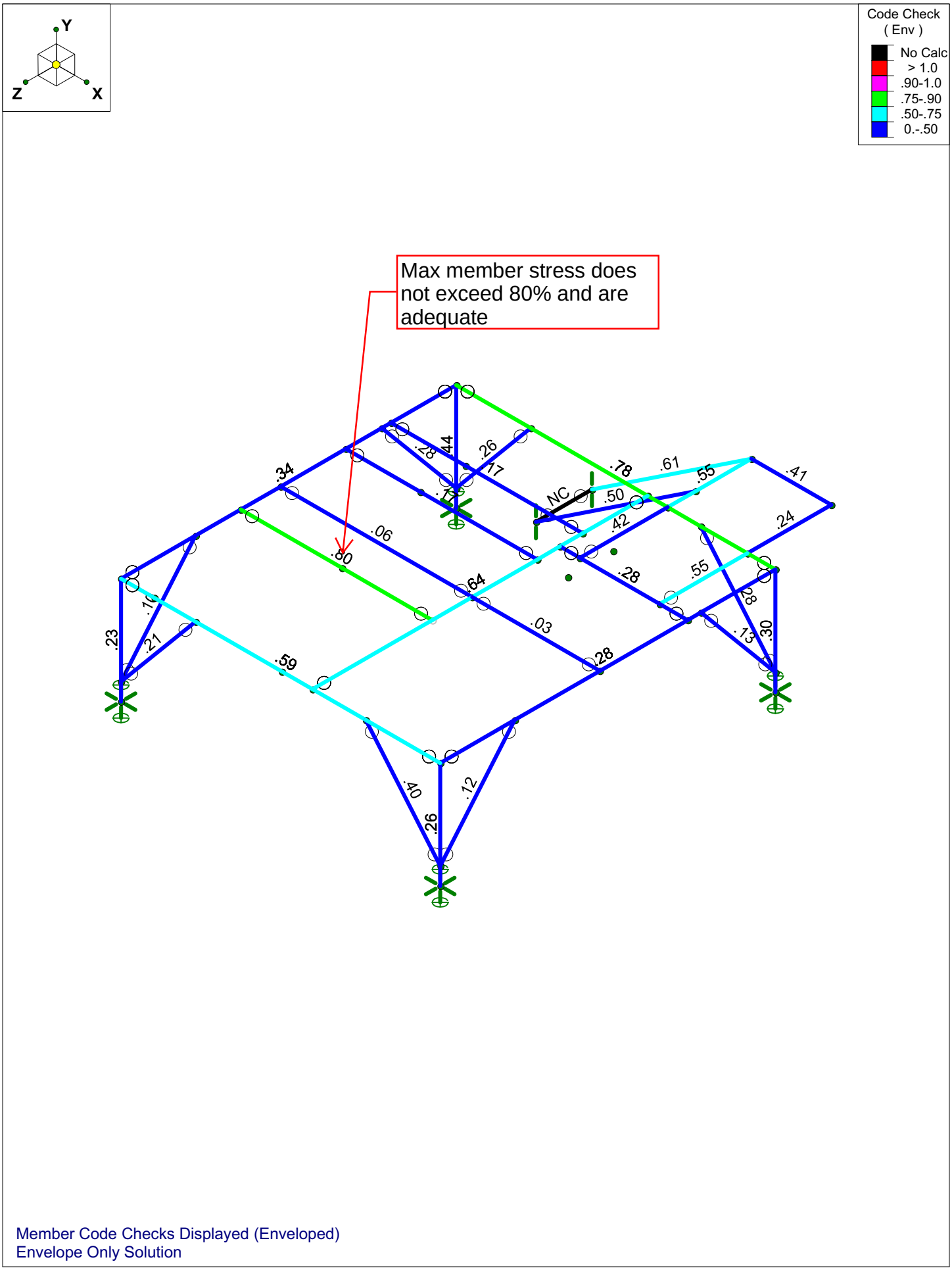




Loads: BLC 12, Tower WL-Z
Envelope Only Solution

APPENDIX C

SOFTWARE ANALYSIS OUTPUT



Member Code Checks Displayed (Enveloped)
Envelope Only Solution

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (\1E5 F)	Density[k/...	Yield[ksi]	Ry	Fu[ksi]	Rt
1	A36	29000	11154	.3	.65	.49	36	1.5	58	1.2
2	A572Grade50	29000	11154	.3	.65	.49	50	1.5	58	1.2
3	A992	29000	11154	.3	.65	.49	50	1.5	58	1.2
4	A500_42	29000	11154	.3	.65	.49	42	1.5	58	1.2
5	A500_46	29000	11154	.3	.65	.49	46	1.5	58	1.2

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design...	A [in2]	Iyy [in...	Izz [in...	J [in4]
1	W12x35	W12X35	Beam	Wide Flange	A36	Typical	10.3	24.5	285	.741
2	W8x31	W8X31	Beam	Wide Flange	A36	Typical	9.13	37.1	110	.536
3	W6x12	W6X12	Beam	Wide Flange	A36	Typical	3.55	2.99	22.1	.09
4	C12x20.7	C12X20.7	Beam	Channel	A36	Typical	6.08	3.86	129	.369

Basic Load Cases

	BLC Description	Category	X Grav...	Y Grav...	Z Gravity	Joint	Point	Distrib...	Area(Memb...	Surface(...
1	DL	DL		-1.05		3		2	6	
2	LL	LL							6	
3	SL	SL				3			1	
4	WLX	WLX				2		15		
5	WLZ	WLZ						20		
6	WL-X	WL-X				2		15		
7	WL-Z	WL-Z						20		
9	Tower WLX	None				6				
10	Tower WLZ	None				6				
11	Tower WL-X	None				6				
12	Tower WL-Z	None				6				
13	BLC 1 Transient Area Loa...	None						25		
14	BLC 2 Transient Area Loa...	None						25		
15	BLC 3 Transient Area Loa...	None						15		

Load Combinations

	Description	So...	PDelta	SRSS	B...	Fa...	B...	Factor	B...	Factor	B...	Fact..	B...	Fa..	B...	Fa...
1	1.4DL	Yes	Y		1	1.4										
2	1.2DL +1.2LL + .5SL	Yes	Y		1	1.2	2	1.2	3	.5	8	1				
3	1.2DL + 1.6(Wx) + 1.0LL + .5SL (90 deg)	Yes	Y		1	1.2	2	1	3	.5	4	1.6	9	1		
4	1.2DL + 1.6(Wz) + 1.0LL + .5SL (0 deg)	Yes	Y		1	1.2	2	1	3	.5	5	1.6	10	1		
5	1.2DL + 1.6(Wx) + 1.0LL + .5SL (270 deg)	Yes	Y		1	1.2	2	1	3	.5	6	1.6	11	1		
6	1.2DL + 1.6(Wz) + 1.0LL + .5SL (180 deg)	Yes	Y		1	1.2	2	1	3	.5	7	1.6	12	1		
7	0.9DL + 1.6(Wx) (90 deg)	Yes	Y		1	.9					4	1.6	9	1		
8	0.9DL + 1.6(Wz) (0 deg)	Yes	Y		1	.9					5	1.6	10	1		
9	0.9DL + 1.6(Wx) (270 deg)	Yes	Y		1	.9					6	1.6	11	1		
10	0.9DL + 1.6(Wz) (180 deg)	Yes	Y		1	.9					7	1.6	12	1		

Envelope AISC 15th(360-16): LRFD Steel Code Checks

	Member	Shape	Code Ch...	Loc[ft]	LC	Shear C...	Loc[...	Dir	LC	phi*Pnc [k]	phi*Pnt ...	phi*Mn y-y [k...	phi*M.....		Eqn
1	M12	W12X35	.797	6.375	6	.161	12	y	6	293.673	333.72	31.05	138.24	1	H1-1b
2	M2	W12X35	.783	8.125	6	.183	4.792	y	6	210.897	333.72	31.05	118.5...	1	H1-1b
3	M9	W12X35	.643	7.656	6	.127	0	y	6	295.74	333.72	31.05	138.24	...	H1-1b
4	M25	C12X20.7	.608	0	6	.028	0	y	6	41.924	196.992	7.438	69.12	...	H1-1b
5	M1	W12X35	.588	10	4	.204	4.792	y	3	272.144	333.72	31.05	132.6...	1	H1-1b

Envelope AISC 15th(360-16): LRFD Steel Code Checks (Continued)

	Member	Shape	Code Ch..	Loc[ft]	LC	Shear C...	Loc[...	Dir	LC	phi*Pnc [k]	phi*Pnt ...	phi*Mn y-y [k..	phi*M.....		Eqn
6	M28	C12X20.7	.552	3.5	6	.089	5.25	y	6	141.747	196.992	7.438	69.12	...	H1-1b
7	M31	W12X35	.545	5.5	6	.048	0	z	6	303.049	333.72	31.05	138.24	...	H1-1b
8	M24	C12X20.7	.496	12.019	10	.017	0	y	6	41.924	196.992	7.438	69.12	...	H1-1b
9	M8	W8X31	.439	1.042	6	.191	0	y	5	272.274	295.812	38.07	82.08	...	H1-1b
10	M30	W12X35	.417	5.5	6	.074	5.5	y	6	303.049	333.72	31.05	138.24	...	H1-1b
11	M27	C12X20.7	.405	5	6	.036	4.323	y	6	146.152	196.992	7.438	69.12	...	H1-1b
12	M18	W6X12	.402	3.184	3	.024	0	z	4	71.415	115.02	6.264	22.371	...	H1-1a
13	M3	W12X35	.338	16.188	6	.102	16.4...	y	6	278.95	333.72	31.05	134.4...	1	H1-1b
14	M7	W8X31	.302	1.042	6	.197	1.042	y	6	272.274	295.812	38.07	82.08	...	H1-1b
15	M21	W6X12	.284	3.638	6	.032	0	z	6	71.415	115.02	6.264	22.371	...	H1-1a
16	M4	W12X35	.280	15.531	4	.057	16.1...	y	6	242.645	333.72	31.05	125.6...	1	H1-1b
17	M10	W12X35	.279	1.25	6	.068	0	z	6	272.144	333.72	31.05	138.24	...	H1-1b
18	M22	W6X12	.278	3.184	6	.011	0	z	5	71.415	115.02	6.264	22.371	...	H1-1a
19	M6	W8X31	.263	1.042	3	.317	0	y	3	272.274	295.812	38.07	82.08	...	H1-1b
20	M23	W6X12	.259	3.638	6	.031	0	z	6	71.415	115.02	6.264	22.371	...	H1-1a
21	M26	C12X20.7	.243	0	10	.027	5.25	y	6	141.747	196.992	7.438	69.12	...	H1-1b
22	M5	W8X31	.234	1.111	3	.162	1.042	y	3	272.274	295.812	38.07	82.08	...	H1-1b
23	M16	W6X12	.214	3.184	3	.023	0	z	4	71.415	115.02	6.264	22.371	...	H1-1a
24	M15	W12X35	.172	5.25	6	.083	0	y	6	210.897	333.72	31.05	138.24	...	H1-1b
25	M14	W12X35	.171	5.25	4	.070	0	y	4	210.897	333.72	31.05	138.24	...	H1-1b
26	M20	W6X12	.134	0	6	.011	0	z	3	71.415	115.02	6.264	22.371	...	H1-...
27	M19	W6X12	.122	0	4	.012	0	z	3	71.415	115.02	6.264	22.371	...	H1-...
28	M17	W6X12	.104	0	3	.010	0	z	5	71.415	115.02	6.264	22.371	...	H1-...
29	M13	W12X35	.055	6	4	.017	12	y	6	210.897	333.72	31.05	134.7...	...	H1-1b
30	M11	W12X35	.027	4	4	.016	8	y	2	272.144	333.72	31.05	138.24	...	H1-1b

Envelope Joint Reactions

	Joint		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	N6	max	12.346	4	31.085	4	-1.861	7	0	8	.017	4	0	8
2		min	2.792	1	-3.355	7	-4.058	4	0	1	0	1	0	1
3	N5	max	7.216	2	12.783	2	3.265	2	0	8	.01	8	0	8
4		min	-.668	7	-6.509	8	-10.346	8	0	1	-.003	3	0	1
5	N8	max	-2.788	1	20.421	3	-.201	7	0	8	.003	7	0	8
6		min	-18.355	3	4.806	1	-6.546	4	0	1	-.008	4	0	1
7	N7	max	1.847	8	15.414	3	1.627	3	0	8	0	2	0	8
8		min	-10.213	3	-3.108	8	-5.714	8	0	1	-.021	4	0	1
9	N43	max	0	8	1.129	2	0	8	0	8	0	8	0	8
10		min	0	1	-.076	8	0	1	0	1	0	1	0	1
11	N42	max	0	8	1.444	4	0	8	0	8	0	8	0	8
12		min	0	1	-.223	7	0	1	0	1	0	1	0	1
13	Totals:	max	0	8	57.387	4	0	7						
14		min	-19.84	3	23.51	7	-24.001	8						

Existing reactions from Rev F tower report by Centek Engineering converted for use in Rev G and comparison

Envelope Joint Reactions

	Joint		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	N6	max	7.89	3	18.443	4	-.794	8	0	8	.01	4	0	8
2		min	2.792	1	-1.853	7	-3.95	3	0	1	0	1	0	1
3	N5	max	7.424	2	13.259	2	3.616	2	0	8	.006	8	0	8
4		min	.108	8	-3.79	8	-6.945	8	0	1	-.002	3	0	1
5	N8	max	-2.788	1	18.437	3	-.307	7	0	8	.002	7	0	8
6		min	-15.564	3	4.806	1	-4.764	4	0	1	-.005	4	0	1
7	N7	max	.918	8	15.075	3	1.564	3	0	8	0	2	0	8
8		min	-9.635	3	-.905	8	-3.53	8	0	1	-.013	8	0	1
9	N43	max	0	8	1.159	2	0	8	0	8	0	8	0	8
10		min	0	1	-.021	8	0	1	0	1	0	1	0	1
11	N42	max	0	8	1.192	4	0	8	0	8	0	8	0	8
12		min	0	1	-.208	7	0	1	0	1	0	1	0	1
13	Totals:	max	0	8	52.634	3	0	7						
14		min	-12.765	3	12.809	8	-15.178	4						

Current Rev G reactions for proposed installation using tower reactions by KM Consulting Engineers

APPENDIX D

ADDITIONAL CALCULATIONS

Tectonic
PRACTICAL SOLUTIONS. EXCEPTIONAL SERVICE.

Job No. 10816.02

Calculated By IM Date : 09/14/21

Generator Platform Reaction Comparison

Existing Reactions

Node (Label)	X (kips)	Y (kips)	Z (kips)
N6	12.346	31.085	-1.861
N6	2.792	-3.355	-4.058
N5	7.216	12.783	3.265
N5	-0.688	-6.509	-10.346
N8	-2.788	20.421	-0.201
N8	-18.355	4.806	-6.546
N7	1.847	15.414	1.627
N7	-10.213	-3.108	-5.714
N43	0.000	1.129	0.000
N43	0.000	-0.076	0.000
N42	0.000	1.444	0.000
N42	0.000	-0.223	0.000

Proposed Reactions

Node (Label)	X (kips)	Y (kips)	Z (kips)
N6	7.890	18.443	-0.794
N6	2.792	-1.853	-3.950
N5	7.424	13.259	3.616
N5	0.108	-3.790	-6.945
N8	-2.788	18.437	-0.307
N8	-15.564	4.806	-4.764
N7	0.918	15.075	1.564
N7	-9.635	-0.905	-3.530
N43	0.000	1.159	0.000
N43	0.000	-0.021	0.000
N42	0.000	1.192	0.000
N42	0.000	-0.208	0.000

Increase in Load

Node (Label)	X (kips)	Y (kips)	Z (kips)
N6	0.000	0.000	0.000
N6	0.000	0.000	0.000
N5	0.208	0.476	0.351
N5	0.000	0.000	0.000
N8	0.000	0.000	0.106
N8	0.000	0.000	0.000
N7	0.000	0.000	0.000
N7	0.000	0.000	0.000
N43	0.000	0.030	0.000
N43	0.000	0.000	0.000
N42	0.000	0.000	0.000
N42	0.000	0.000	0.000

The maximum increase in load does not exceed 500 lbs which is relatively small in comparison to the existing reactions. Therefore, we believe the existing platform connections and building supporting elements are adequate to support the proposed Verizon Wireless installation.

MOUNT ANALYSIS REPORT

For

Site Name: Bristol CT
32 Valley Street
Bristol, CT 06010

PREPARED FOR:

verizon

WIRELESS COMMUNICATIONS FACILITY
20 ALEXANDER DRIVE
WALLINGFORD, CT 06492

On Air Engineering, LLC
88 FOUNDRY POND ROAD
COLD SPRING, NY 10516
ONAIR@OPTONONLINE.NET
201-456-4624

KM CONSULTING ENGINEERS, INC.
262 Upper Ferry Road, Ewing, NJ 08628
Ph: (609) 538-0400 www.kmengr.com

KM Project No. 190109.02 Date: April 21, 2021

Michael L. Bohlinger, PE
Connecticut Professional Engineer
License No. 20405

On Air Engineering, LLC
Bristol CT

TABLE OF CONTENTS

SECTION **PAGE**

1.0 EXECUTIVE SUMMARY

Structure

Location: 32 Valley Street
Bristol, CT 06010

Equipment

The proposed installation is detailed below.

Proposed Verizon Installation:

(1) 64T64R MMU panel antenna on a new PSA3 stand-off frame (3 each)
(3) AWS/PCS RRHs on unistrut frame
(3) 700/850 RRHs on unistrut frame
(3) CBC78T-DS-43-2X diplexers on unistrut frame

Site Design Parameters

The basic wind speed of 93mph is taken from Appendix N of the 2018 Connecticut State Building Code for the municipality of Bristol, CT and used as the basic wind speed with no ice per the ANSI/TIA-222-G design standard. The basic wind speed of 50mph concurrent with the design ice thickness of 1" is in accordance with the ANSI/TIA-222-G design standard. Additional criteria include Structure Class II, Exposure Category B, and Topographic Category 1.

Synopsis

The proposed Verizon antenna will be installed on the a new SitePro1 PSA3 stand-off mount. The RRHs and diplexers will be installed on a proposed P1000 unistrut frame. The loads were calculated and the mounts analyzed for the highest loaded mount. Both mounts were found to have sufficient capacity for the proposed Verizon loading and therefore meet the current ANSI/TIA-222-G standards.

2.0 ANALYSIS PROCEDURE

Our scope of work is to determine if the existing and proposed mounts are capable of withstanding the additional stresses/forces imposed by the installation of the proposed Verizon equipment noted in the tower inventory.

The existing loading was updated based on documentation from the client. Proposed Verizon installation was obtained from drawings by On Air Engineering, LLC dated 3/2/21. SitePro1 PSA3 mount specifications were obtained from documentation from the manufacturer.

Codes and Standards

CSBC - Connecticut State Building Code 2018

TIA - Telecommunications Industry Association – ANSI/TIA-222-G-4 Structural Standards for Antenna Supporting Structures and Antennas, 2014

AISC - American Institute of Steel Construction - Steel Construction Manual, 15th edition, 2017

ASCE - Minimum Design Loads for Buildings and Other Structures (ASCE 7-10)

3.0 ANALYSIS RESULTS

The site was analyzed for the proposed Verizon inventory and site design parameters detailed in Section 1.0 and checked using the appropriate design codes and standards given in Section 2.0.

Further to our calculations, the existing and proposed mounts have sufficient capacity for the proposed Verizon loading and therefore meet the current ANSI/TIA-222-G standards.

Please do not hesitate to contact our office with any questions or concerns regarding this report.

Sincerely,
KM CONSULTING ENGINEERS, INC

Domenic Aversa, PE
Project Manager

Reviewed and Approved by:

Michael L. Bohlinger, PE
Principal
CT License # 20405

7.0 APPENDIX

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Email: info@kmengr.com

Bristol CT

Index

Design Criteria: 2018 CSBC
ANSI/TIA-222-G
AISC Steel Construction Manual

Assumptions: Proposed Verizon installation was obtained from preliminary drawings by On Air Engineering, LLC dated 1/21/21. Mount details were original SitePro1 specs. All members are assumed to be in good working condition.

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Site Details:

Wind Speed: $:= 93\ \text{mph}$ (nominal wind speed as per 2018 CSBC)

$:= 50\ \text{mph}$

Centerline Height: $:= 107.7\ \text{ft}$

Exposure B: $:= 1200\ \text{ft}$ $\alpha := 7.0$

Structure Class II: $:= 1.0$ $:= 1.00$

Ice Thickness: $:= 1.0\ \text{in}$

Wind Pressure Calculation

$= 0.00256 \cdot K_z \cdot K_{zt} \cdot K_d \cdot V^2 \cdot I$

$= G_h \left(EPA_A\right)$

$:= 2.01 \left(\frac{}{}\right)^{\frac{2}{\alpha}} \quad 1.0$

$:= 1.35$

1.0

1.0

$:= 0.95$

$:= 1$

No Ice: $:= 0.00256 \cdot \cdot \cdot \cdot \cdot \cdot \frac{\text{lbf}}{\text{ft}^2 \cdot \text{mph}^2} \quad 21.2\ \frac{\text{lbf}}{\text{ft}^2}$

With Ice: $:= 0.00256 \cdot \cdot \cdot \cdot \cdot \cdot \frac{\text{lbf}}{\text{ft}^2 \cdot \text{mph}^2} \quad 6.1\ \frac{\text{lbf}}{\text{ft}^2}$

By: Domenic Aversa, PE
Approved by: Michael Bohlinger, PE

Bristol CT
On Air Engineering, LLC
KM #190109.02

KM Consulting Engineers, Inc.
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Antenna/Mount Details:

Weight:

VZS01 panel antenna:

$_1 := 35.12$ in
$_1 := 16.06$ in
$_1 := 5.51$ in

$_1 := 87.1$ lbf
$_1 := {}_1 + 30.0$ lbf 117.1 lbf

AWS/PCS RRH:

$_2 := 15.0$ in
$_2 := 15.0$ in
$_2 := 10.0$ in

$_2 := 97.5$ lbf
$_2 := {}_2 + 18.8$ lbf 116.3 lbf

700/850 RRH:

$_3 := 15.0$ in
$_3 := 15.0$ in
$_3 := 8.1$ in

$_3 := 82.0$ lbf
$_3 := {}_3 + 16.8$ lbf 98.8 lbf

CBC78T-DS-43-2X:

$_4 := 6.4$ in
$_4 := 6.9$ in
$_4 := 9.6$ in

$_4 := 20.8$ lbf
$_4 := {}_4 + 6.5$ lbf

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Antenna Wind Force Calculation (no ice)

VZS01 panel antenna:

$_1 := \ _1 \cdot \ _1$ 3.92 ft^2 $\quad$ $_1 := \ _1 \cdot \ _1$ 1.34 ft^2

$_1 := 1.20$ $\quad$ $_1 := 1.37$

$_1 := \ \cdot \ \cdot (\ _1) \cdot \ _1$ 134.7 lbf $\quad$ $_1 := \ \cdot \ \cdot (\ _1) \cdot \ _1$ 52.8 lbf

AWS/PCS RRH:

$_2 := \ _2 \cdot \ _2$ 1.56 ft^2 $\quad$ $_2 := \ _2 \cdot \ _2$ 1.04 ft^2

$_2 := 1.20$ $\quad$ $_2 := 1.20$

$_2 := \ \cdot \ \cdot (\ _2) \cdot \ _2$ 53.7 lbf $\quad$ $_2 := \ \cdot \ \cdot (\ _2) \cdot \ _2$ 35.8 lbf

700/850 RRH:

$_3 := \ _3 \cdot \ _3$ 1.56 ft^2 $\quad$ $_3 := \ _3 \cdot \ _3$ 0.84 ft^2

$_3 := 1.20$ $\quad$ $_3 := 1.20$

$_3 := \ \cdot \ \cdot (\ _3) \cdot \ _3$ 53.7 lbf $\quad$ $_3 := \ \cdot \ \cdot (\ _3) \cdot \ _3$ 29.0 lbf

CBC78T-DS-43-2X:

$_4 := \ _4 \cdot \ _4$ 0.31 ft^2 $\quad$ $_4 := \ _4 \cdot \ _4$ 0.43 ft^2

$_4 := 1.20$ $\quad$ $_4 := 1.20$

$_4 := \ \cdot \ \cdot (\ _4) \cdot \ _4$ 10.5 lbf $\quad$ $_4 := \ \cdot \ \cdot (\ _4) \cdot \ _4$ 14.7 lbf

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Antenna Force Calculation (with ice)

VZS01 panel antenna:

$_1 := (\ _1 + 2 \cdot\ ) \cdot (\ _1 + 2 \cdot\ )$

$_1$ 1.20

$_1 :=$ $\cdot$ $\cdot (\ _1) \cdot\ _1$ 46.3 lbf

$_1 := (\ _1 + 2 \cdot\ ) \cdot (\ _1 + 2 \cdot\ )$

$_1$ 1.37

$_1 :=$ $\cdot$ $\cdot (\ _1) \cdot\ _1$ 22.0 lbf

AWS/PCS RRH:

$_2 := (\ _2 + 2 \cdot\ ) \cdot (\ _2 + 2 \cdot\ )$

$_2$ 1.20

$_2 :=$ $\cdot$ $\cdot (\ _2) \cdot\ _2$ 20.0 lbf

$_2 := (\ _2 + 2 \cdot\ ) \cdot (\ _2 + 2 \cdot\ )$

$_2$ 1.20

$_2 :=$ $\cdot$ $\cdot (\ _2) \cdot\ _2$ 14.1 lbf

700/850 RRH:

$_3 := (\ _3 + 2 \cdot\ ) \cdot (\ _3 + 2 \cdot\ )$

$_3$ 1.20

$_3 :=$ $\cdot$ $\cdot (\ _3) \cdot\ _3$ 20.0 lbf

$_3 := (\ _3 + 2 \cdot\ ) \cdot (\ _3 + 2 \cdot\ )$

$_3$ 1.20

$_3 :=$ $\cdot$ $\cdot (\ _3) \cdot\ _3$ 11.9 lbf

CBC78T-DS-43-2X:

$_4 := (\ _4 + 2 \cdot t) \cdot (\ _4 + 2 \cdot t)$

$_4$ 1.20

$_4 :=$ $\cdot$ $\cdot (\ _4) \cdot\ _4$ 5.2 lbf

$_4 := (\ _4 + 2 \cdot t) \cdot (\ _4 + 2 \cdot t)$

$_4$ 1.20

$_4 :=$ $\cdot$ $\cdot (\ _4) \cdot\ _4$ 6.7 lbf

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Summary (no ice)

	Front Wind Force:	Side Wind Force:	Weight:
VZS01 panel antenna:	$_1$ 134.7 lbf	$_1$ 52.8 lbf	$_1$ 87.1 lbf
AWS/PCS RRH:	$_2$ 53.7 lbf	$_2$ 35.8 lbf	$_2$ 97.5 lbf
700/850 RRH:	$_3$ 53.7 lbf	$_3$ 29.0 lbf	$_3$ 82.0 lbf
CBC78T-DS-43-2X:	$_4$ 10.5 lbf	$_4$ 14.7 lbf	$_4$ 20.8 lbf

Summary (with ice)

	Front Wind Force:	Side Wind Force:	Weight:
VZS01 panel antenna:	$_1$ 46.3 lbf	$_1$ 22.0 lbf	$_1$ 117.1 lbf
AWS/PCS RRH:	$_2$ 20.0 lbf	$_2$ 14.1 lbf	$_2$ 116.3 lbf
700/850 RRH:	$_3$ 20.0 lbf	$_3$ 11.9 lbf	$_3$ 98.8 lbf
CBC78T-DS-43-2X:	$_4$ 5.2 lbf	$_4$ 6.7 lbf	$_4$ 27.3 lbf

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SitePro1 PSA3 Verification

Max load from proposed antenna:

$:= {}_1 \quad 134.7\ \text{lbf}$

$:= \sqrt{{}_1{}^2 + {}_1{}^2} \quad 101.8\ \text{lbf}$

$:= {}_1 \quad 87.1\ \text{lbf}$

Allowable load as per SitePro1 mount certification dated 6/5/20:

$:= 1200\ \text{lbf}$

$:= 1200\ \text{lbf}$

$:= 600\ \text{lbf}$

The proposed mount is acceptable to support the proposed Verizon installation

Unistrut Frame Calculations

P1000 - BEAM LOADING

Span In	Max. Allowable Uniform Load Lbs	Defl. at Uniform Load In	Uniform Loading at Deflection Span/180 Lbs	Span/240 Lbs	Span/360 Lbs
24	1,690	0.06	1,690	1,690	1,690
36	1,130	0.13	1,130	1,130	900
48	850	0.22	850	760	500
60	680	0.35	650	480	320
72	560	0.50	450	340	220
84	480	0.68	330	250	160
96	420	0.89	250	190	130
108	380	1.14	200	150	100
120	340	1.40	160	120	80
144	280	2.00	110	80	60
168	240	2.72	80	60	40
192	210	3.55	60	50	NR
216	190	4.58	50	40	NR
240	170	5.62	40	NR	NR

Unistrut span is ~102"

Max allowable load for two channels:

$:= 380\ \text{lbf} \cdot 2 \quad 760.0\ \text{lbf}$

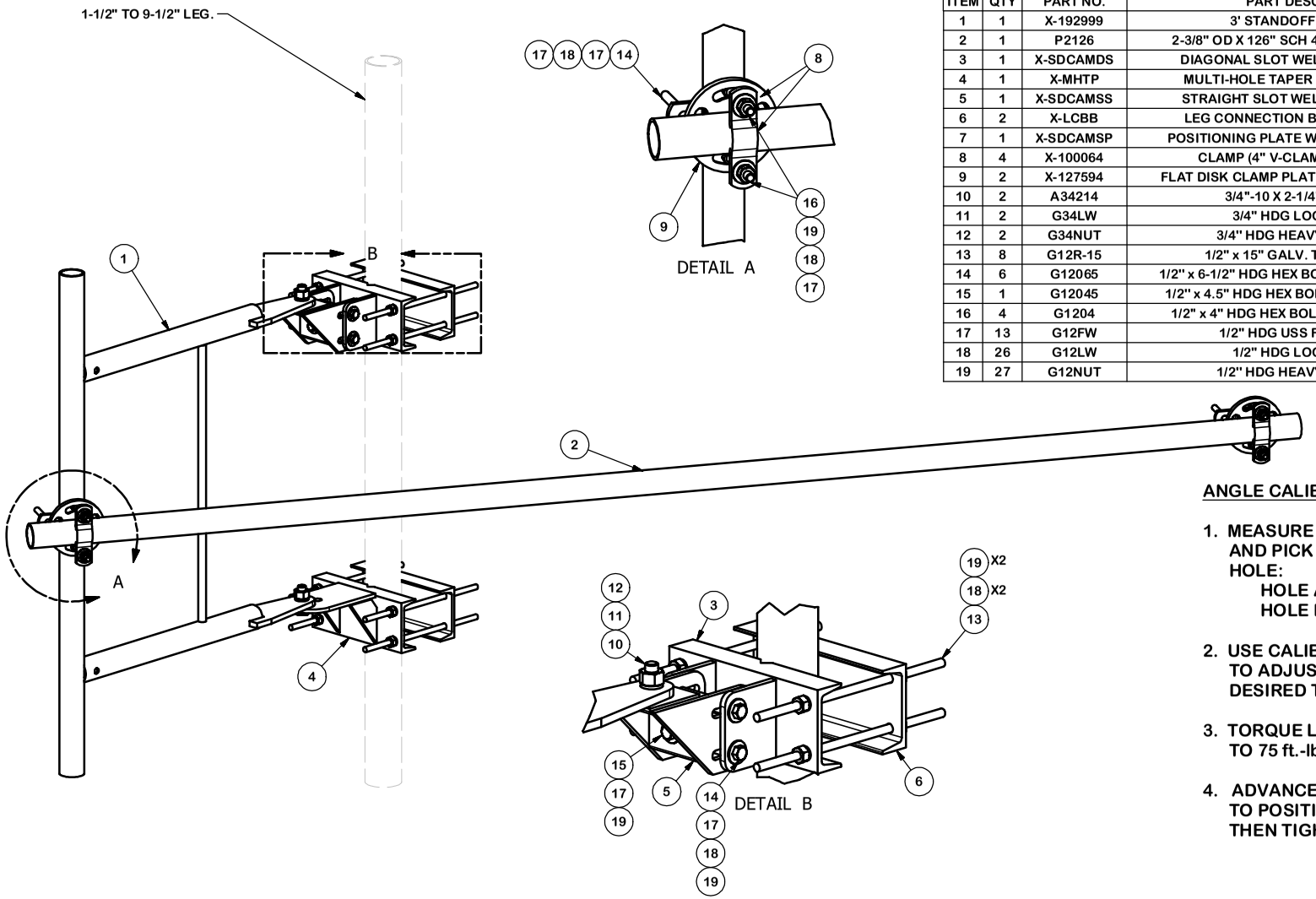
Total load of equipment:

$:= {}_2 + {}_3 + {}_4 \quad 200.3\ \text{lbf}$

$:= {}_2 + {}_3 + {}_4 \quad 118.0\ \text{lbf}$

$:= \sqrt{{}^2 + {}^2} \quad 232.5\ \text{lbf}$

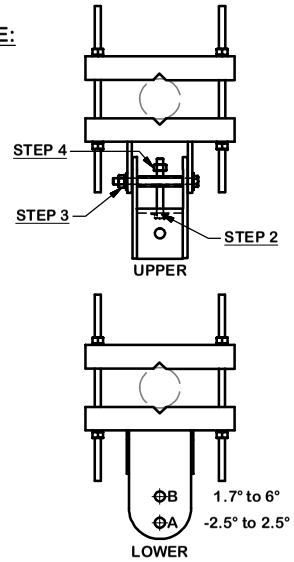
The proposed unistrut frame is acceptable to support the proposed installation.



PARTS LIST						
ITEM	QTY	PART NO.	PART DESCRIPTION	LENGTH	UNIT WT.	NET WT.
1	1	X-192999	3' STANDOFF PIVOT ARM		43.65	43.65
2	1	P2126	2-3/8" OD X 126" SCH 40 GALVANIZED PIPE	126 in	40.75	40.75
3	1	X-SDCAMDS	DIAGONAL SLOT WELDMENT FOR BCAM		13.57	13.57
4	1	X-MHTP	MULTI-HOLE TAPER PLATE WELDMENT		13.17	13.17
5	1	X-SDCAMSS	STRAIGHT SLOT WELDMENT FOR BCAM		8.48	8.48
6	2	X-LCBB	LEG CONNECTION BACKING BRACKET	12 in	7.56	15.11
7	1	X-SDCAMSP	POSITIONING PLATE WELDMENT FOR BCAM		1.43	1.43
8	4	X-100064	CLAMP (4" V-CLAMP) GALVANIZED		0.91	3.65
9	2	X-127594	FLAT DISK CLAMP PLATE 4" CENTERS (GALV.)		2.51	5.01
10	2	A34214	3/4"-10 X 2-1/4" A325 BOLT	2 1/4 in	0.47	0.95
11	2	G34LW	3/4" HDG LOCKWASHER		0.04	0.09
12	2	G34NUT	3/4" HDG HEAVY 2H HEX NUT		0.21	0.42
13	8	G12R-15	1/2" x 15" GALV. THREADED ROD		0.84	6.69
14	6	G12065	1/2" x 6-1/2" HDG HEX BOLT GR5 FULL THREAD	6 1/2 in	0.41	2.46
15	1	G12045	1/2" x 4.5" HDG HEX BOLT GR5 FULL THREAD	4 1/2 in	0.30	0.30
16	4	G1204	1/2" x 4" HDG HEX BOLT GR5 FULL THREAD	4 in	0.27	1.08
17	13	G12FW	1/2" HDG USS FLATWASHER	3/32 in	0.03	0.44
18	26	G12LW	1/2" HDG LOCKWASHER	1/8 in	0.01	0.36
19	27	G12NUT	1/2" HDG HEAVY 2H HEX NUT		0.07	1.93
					TOTAL WT. #	169.12

ANGLE CALIBRATING PROCEDURE:

1. MEASURE TOWER TAPER AND PICK LOWER BRACKET HOLE:
   HOLE A = -2.5° TO 2.5°
   HOLE B = 1.7° TO 6°
2. USE CALIBRATING BOLT TO ADJUST FRAME TO DESIRED TAPER
3. TORQUE LOCKING BOLTS TO 75 ft.-lbs.
4. ADVANCE LOCKING NUT TO POSITIONING PLATE, THEN TIGHTEN.



REV	DESCRIPTION OF REVISIONS	CPD	BY	DATE
B	CHANGED SIDEARM LEG CONNECTION		CEK	6/8/2017
A	P1126 CHANGED TO P2126	4749	CEK	11/13/2015

REVISION HISTORY

TOLERANCE NOTES

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

DESCRIPTION: 3' SIDE ARM (PSA3)

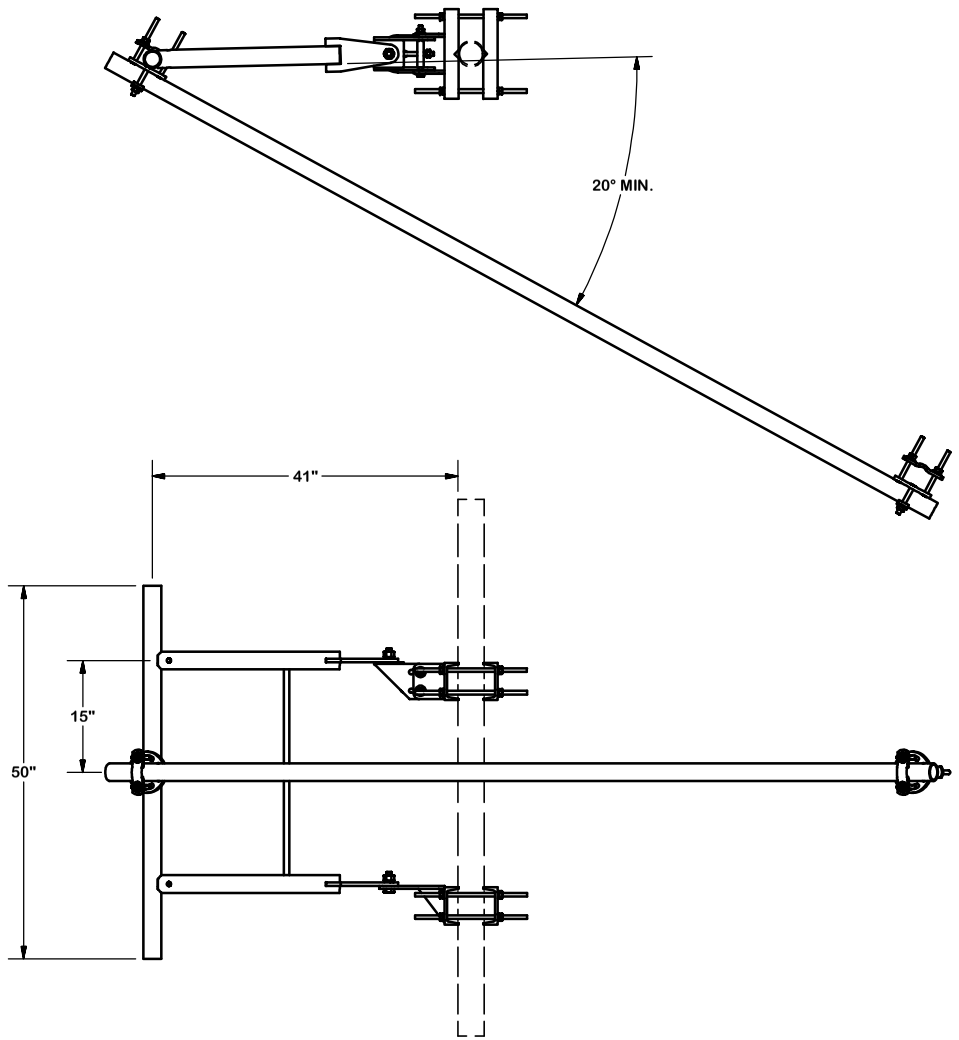
SITE PRO 1 — A valmont COMPANY

Engineering Support Team: 1-888-753-7446

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

CPD NO.	DRAWN BY	ENG. APPROVAL	PART NO.
4749	CEK 8/31/2010		PSA3

CLASS	SUB	DRAWING USAGE	CHECKED BY	DWG. NO.
		CUSTOMER	BMC 7/6/2017	PSA3



TOLERANCE NOTES

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

REV	DESCRIPTION OF REVISIONS	CPD	BY	DATE
B	CHANGED SIDEARM LEG CONNECTION		CEK	6/8/2017
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REVISION HISTORY

DESCRIPTION: 3' SIDE ARM (PSA3)

CPD NO.	DRAWN BY	ENG. APPROVAL	PART NO.
4749	CEK 8/31/2010		PSA3

CLASS	SUB	DRAWING USAGE	CHECKED BY	DWG. NO.
		CUSTOMER	BMC 7/6/2017	PSA3

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

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1545 Pidco Drive
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Fax: 574.936.8925
Email: SP1Engineering@valmont.com
www.sitepro1.com

June 5, 2020

Site Pro 1 / Valmont Mounting System:

Part Number
Part Description = 3 Ft Medium Duty Stand-off Arm Mount

Mount EPA (No antenna pipes):

	= 6.23 sq-Ft	$_{N\ (0.5''\ Ice)}$	= 8.24 sq-Ft	$_{N\ (1''\ Ice)}$	= 10.32 sq-Ft
	= 7.12 sq-Ft	$_{(0.5''\ Ice)}$	= 9.32 sq-Ft	$_{T(1''\ Ice)}$	= 11.59 sq-Ft
Weight	= 169 lb	Weight $_{0.5''\ Ice)}$	= 205 lb	Weight $_{(1''\ Ice)}$	= 257 lb

Classification Rating:

Design Standards

International Building Code 2018

Analysis and Modeling Technique

An elastic, three-dimensional, frame, truss model was developed to examine the structural behavior of the mount. All orientations in the engineering model correspond with the assembly drawing constraints. The mount was analyzed with a six (6) inch eccentric offset in the vertical direction. Factored loads (wind, ice, and weight) were applied on the mast pipe. Wind directions considered were perpendicular (normal) to the face of the frame and at 30 degree increments up to 90 degrees (tangential) to the face of the frame.

The Mount was also analyzed for a whip antenna load, attached at two points (15" separation on the vertical face pipe), centered on the centerline of the mount (i.e. no vertical eccentricity). The maximum allowable moment force is 2000 ft-lbs. The weight of the antenna was considered to be a maximum of 50 lbs. This condition assumes one (1) tie-back attached to the center of the vertical pipe and positioned 45 deg. from the frame. Self-weight of the mount was also considered.

SITE PRO 1
A valmont COMPANY
1545 Pidco Drive
Plymouth, IN 46563
Phone: 574.936.4221
Fax: 574.936.8925
Email: SP1Engineering@valmont.com
www.sitepro1.com

Modeling Software

Autodesk Inventor

Analysis Design Criteria

Maximum Mount Height	400'
Maximum Ultimate Wind Speed, no Ice	180 mph 3 sec gust
Maximum Design Wind Speed, no Ice	140 mph 3 sec gust
Maximum Design Wind Speed on Ice	60 mph 3 sec gust
Structure Class	I or II
Exposure Category	B or C
Topographic Category	I
Maximum Design Ice Thickness, t_i	1" (2.75" factored ice)
Wind Direction Probability Factor, K_d	0.95
Gust Effect Factor, G_h	1.0

Capacity Results

The following factored loads at each weldment represent the capacity of the mount based on the criteria and modeling technique described above.

Normal Wind Load (no ice), F_{no}	.....1200 lb	[750 lb Non-Factored]
Tangential Wind Load (no ice), F_{to}	.....1200 lb	[750 lb Non-Factored]
Vertical (Dead) Load, F_{zo}	.....600 lb	[500 lb Non-Factored]
Normal Wind on Ice, F_{ni}	.....200 lb	
Tangential Wind on Ice, F_{ti}	.....200 lb	
Vertical (Dead + Ice) Load, F_{zi}	.....800 lb	
Normal Maintenance Wind Load, F_{nm}	.....120 lb	
Tangential Maintenance Wind Load, F_{tm}	.....120 lb	
Vertical Dead Load, F_{zm}	.....600 lb	[500 lb Non-Factored]
Vertical Live Load, L_M*	.....500 lb	[375 lb Non-Factored]

* In addition to a nominal Live Load of one (1) 250 lb concentrated on the end of mount to provide access for climbers.

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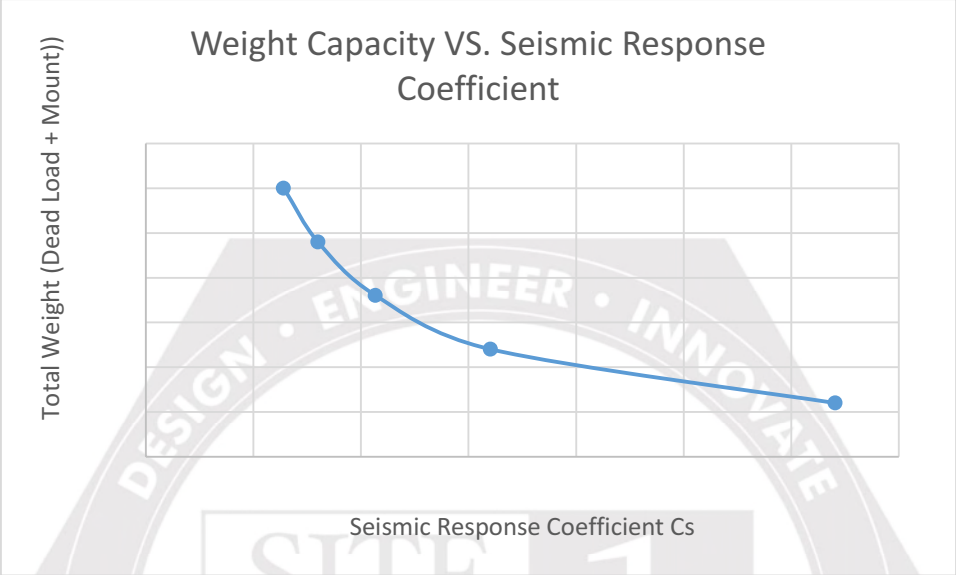
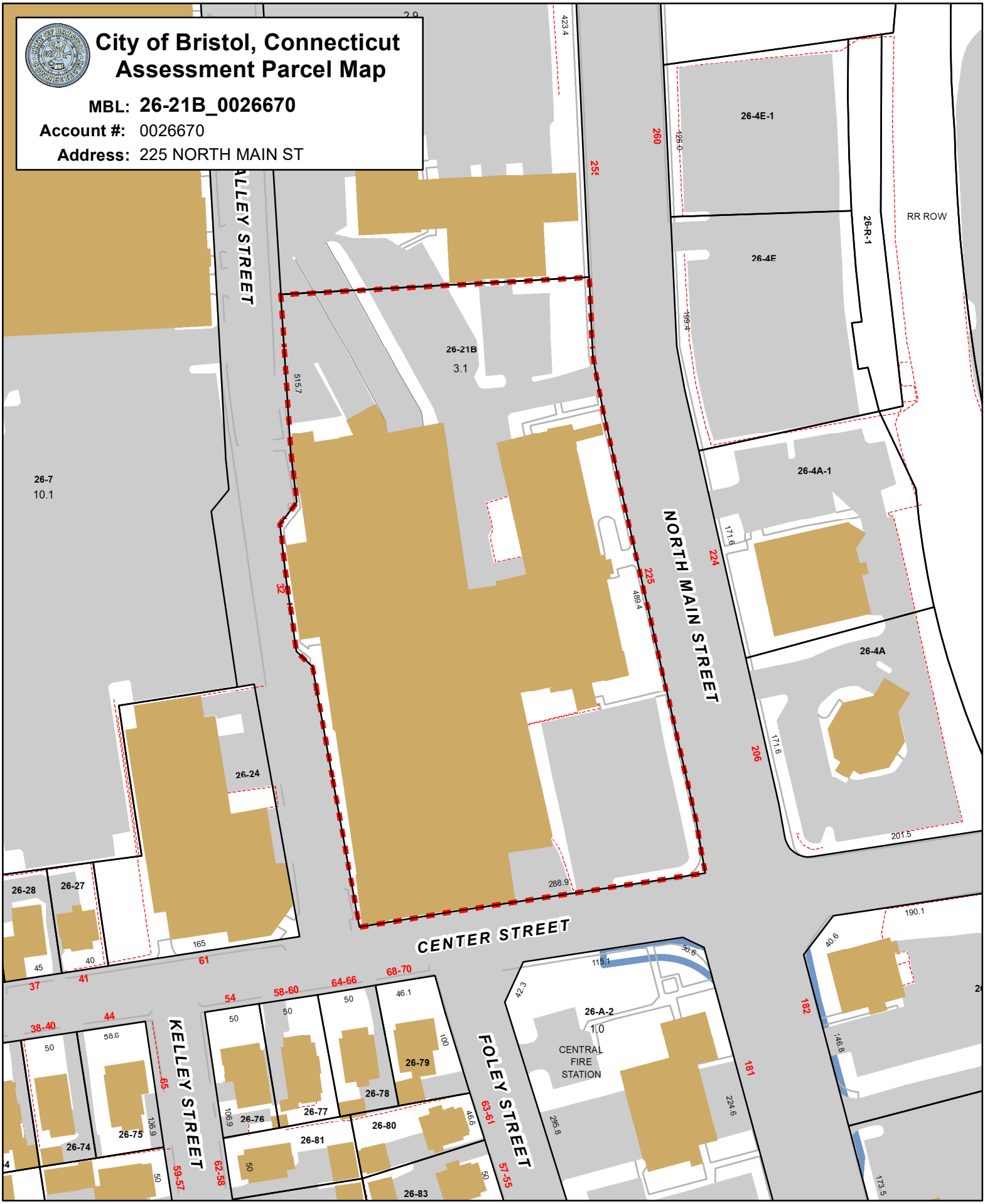
Seismic Results

The following Seismic Response Coefficient chart below represent the allowable weight capacity of the bracket based on the criteria and modeling technique described in TIA-222-H Section 2.7.7.1.1. Total allowable seismic shear must be less than or equal to the Capacity Results (F_{no}) stated above.



ATTACHMENT 5



Approximate Scale: 1 inch = 100 feet

Map Produced February 2020

Disclaimer: This map is for informational purposes only. All information is subject to verification by any user. The City of Bristol and its mapping contractors assume no legal responsibility for the information contained herein.

City of Bristol, CT

Property Listing Report

Map Block Lot	26-21B	Building #	1	PID	1588	Account	0026670

Property Information

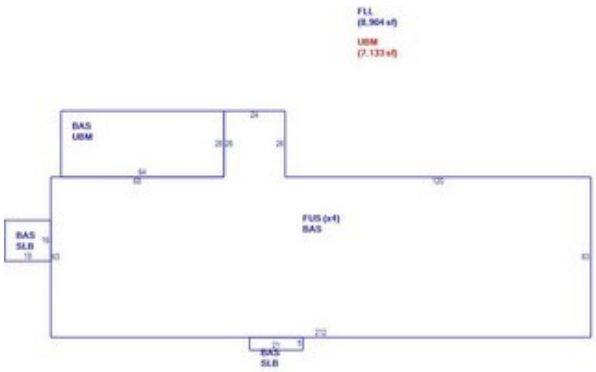
Property Location	225 NORTH MAIN ST
Owner	CARPENTER REALTY COMPANY
Co-Owner	
Mailing Address	PO BOX 176 BRISTOL CT 06011
Land Use	340 Off Bldg
Land Class	C
Zoning Code	BD-1
Census Tract	04061

Neighborhood	
Acreage	3.19
Utilities	All Public
Lot Setting/Desc	Level
Book / Page	0692/0054
Additional Info	

Photo

0026670 03/15/2016

Sketch



Primary Construction Details

Year Built	1912
Building Desc.	Off Bldg
Building Style	Office Bldg
Building Grade	NA
Stories	5
Occupancy	28.00
Exterior Walls	Brick/Masonry
Exterior Walls 2	NA
Roof Style	Flat
Roof Cover	T+G/Rubber
Interior Walls	Drywall/Sheetr
Interior Walls 2	NA
Interior Floors 1	Carpet
Interior Floors 2	

Heating Fuel	Propane Gas
Heating Type	Forced Air-Duc
AC Type	03
Bedrooms	0
Full Bathrooms	0
Half Bathrooms	0
Extra Fixtures	0
Total Rooms	0
Bath Style	NA
Kitchen Style	NA
Fin Bsmt Area	0
Fin Bsmt Quality	0
Bsmt Gar	0
Fireplaces	0

(*Industrial / Commercial Details)

Building Use	Comm/Ind
Building Condition	A
Sprinkler %	NA
Heat / AC	Heat/AC Pkgs
Frame Type	Masonry
Baths / Plumbing	Average
Ceiling / Wall	Sus-Ceil & WL
Rooms / Prtns	Average
Wall Height	12.00
First Floor Use	NA
Foundation	NA

Report Created On 10/12/2021

City of Bristol, CT

Property Listing Report

Map Block Lot	26-21B	Building #	1	PID	1588	Account	0026670

Valuation Summary

(Assessed value = 70% of Appraised Value)

Item	Appraised	Assessed
Buildings	4991600	3494120
Extras	52100	36470
Improvements		
Outbuildings	324500	227150
Land	263700	184590
Total	5631900	3942330

Outbuilding and Extra Features

Type	Description
Elevator	6 Units
Elevator	6 Units
Paving Asph.	9000 S.F.
Sprinklers	87601 S.F.
Cell Tower/Site	3 UNITS
Elevator	5 Units
Elevator	5 Units
Elevator	5 Units
Elevator	5 Units
Elevator	5 Units

Sub Areas

Subarea Type	Gross Area (sq ft)	Living Area (sq ft)
First Floor	16037	16037
Finished Lower Level	8904	8904
Upper Story, Finished	55920	55920
Slab	393	0
Basement, Unfinished	8797	0
Total Area	90051	80861

Sales History

Owner of Record	Book/ Page	Sale Date	Sale Price
CARPENTER REALTY COMPANY	0692/0054	1978-10-04	0

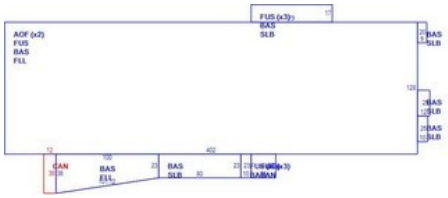
Report Created On 10/12/2021

City of Bristol, CT

Property Listing Report | Map Block Lot **26-21B** | Building # **2** | PID **1588** | Account **0026670**

Photo

Sketch



Primary Construction Details

Year Built	1930
Building Desc.	Comm/Ind
Building Style	Mill Building
Building Grade	NA
Stories	4
Occupancy	7.00
Exterior Walls	Brick/Masonry
Exterior Walls 2	NA
Roof Style	Flat
Roof Cover	T+G/Rubber
Interior Walls	Drywall/Sheetr
Interior Walls 2	NA
Interior Floors 1	Carpet
Interior Floors 2	

Heating Fuel	Propane Gas
Heating Type	Forced Air-Duc
AC Type	03
Bedrooms	0
Full Bathrooms	0
Half Bathrooms	0
Extra Fixtures	0
Total Rooms	0
Bath Style	NA
Kitchen Style	NA
Fin Bsmt Area	0
Fin Bsmt Quality	0
Bsmt Gar	0
Fireplaces	0

(*Industrial / Commercial Details)

Building Use	Off Bldg
Building Condition	A
Sprinkler %	NA
Heat / AC	Heat/AC Pkgs
Frame Type	Masonry
Baths / Plumbing	Average
Ceiling / Wall	Sus-Ceil & WL
Rooms / Prtns	Average
Wall Height	12.00
First Floor Use	NA
Foundation	NA

Sub Areas

Subarea Type	Gross Area (sq ft)	Living Area (sq ft)
Office	102912	102912
First Floor	58649	58649
Canopy	1008	0
Finished Lower Level	54506	54506
Upper Story, Finished	57831	57831
Slab	3913	0

Subarea Type	Gross Area (sq ft)	Living Area (sq ft)
Total Area	278819	273898

Report Created On **10/12/2021**

ATTACHMENT 6

UNITED STATES POSTAL SERVICE®

BRISTOL

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	3	neopost 10/14/2021 US POSTAGE $002.99 ZIP 06103 041L1220037
	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.	Ellen Zappo-Sassu, Mayor City of Bristol 111 North Main Street Bristol, CT 06010				
2.	Robert Flanagan, City Planner City of Bristol 111 North Main Street Bristol, CT 06010				
3.	Carpenter Realty Company P.O. Box 176 Bristol, CT 06011				
4.					
5.					
6.					

OLD STATE HOUSE STATION 06103
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See Reverse for Instructions