Centerline Communications
Ryan Clark
750 West Center Street, Floor 3
West Bridgewater, MA 02379
203-300-7310
rclark@clinellc.com

July 19, 2019

Members of the Siting Council
Connecticut Siting Council
Ten Franklin Square
New Britain, CT 06051

RE: Notice of Exempt Modification
95 High Street Portland, CT 06480
Latitude: 41.581115
Longitude: -72.622217
T-Mobile Site#: CTHA242A_L600

Dear Ms. Bachman:

T-Mobile currently maintains six (6) antennas at the 110-foot level of the existing 120-foot monopole tower at 95 High Street Portland, CT 06480. The 120-foot tower and property are both owned by the Town of Portland. T-Mobile now intends to add (3) three L1900/L2100 antennas at the 110-foot level and replace (3) three of its existing antennas with three (3) new 600/700 MHz antennas at the 110-foot level on a new mount.

Please note the last CSC submission dated April 30, 2018 (EM-T-MOBILE-113-180503) and subsequent approval listed (1) IBR 1300 microwave dish that was approved but not installed because the equipment was unavailable at the time. The updated equipment list and planned modifications for this site are listed below.

Planned Modifications:

Remove and Replace:

(3) AIR21 B4A/B12P Antennas **(Remove)** - (3) APXVAARR24_43-U-NA20 600/700 MHz Antennas **(Replace)**
(3) RRUS11 B12 radios **(Remove) -** (3) RRU 4449 B71+B12 radios **(Replace)**
(3) existing mounts (**Remove**) - (3) Sabre Sector Mounts C10857007C (**Replace**)

Add:

(3) AIR32 B66A_B2A Antennas 1900 MHz/ 2100 MHz
(3) Hybrid Line

Existing to Remain:

(12) Coax line (6 unconnected)
(1) Hybrid Line
(3) TMA's
(3) AIR21 B2A B4P Antennas 1900 MHz/2100 MHz

This facility was approved for tower sharing by the CT Siting Council filing TS-T-MOBILE-113-060607 on June 29, 2006 without conditions.

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies§ 16- SOj-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.SA. § 16-SOj-73, a copy of this letter is being sent to First Selectman Susan Bransfield, Town of Portland as tower and property owner, and the Town of Portland Planning and Zoning Commission.

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 structure.

2. The proposed modifications will not require the extension of the site boundary.

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

4. The operation of the replacement antennas will not increase radio frequency emissions at the facility to a level at or above the Federal Communications Commission safety standard.

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

6. The existing structure and its foundation can support the proposed loading.

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

Respectfully submitted,

Ryan Clark

Ryan Clark
Mobile: 203-300-7310
Fax: 508-819-3017
Office: 117 Carol Street Danbury, CT 06810
Email: rclark@clinellc.com

Attachments

cc: First Selectman Susan Bransfield – as chief elected official
Town of Portland Planning and Zoning Commission
Town of Portland as property and tower owner

Exhibit A

Original Facility Approval

CT HA-242

STATE OF CONNECTICUT

CONNECTICUT SITING COUNCIL

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

RECEIVED
BY:

June 29, 2006

Karina Fournier
Zoning Department
T-Mobile
30 Cold Spring Road
Rocky Hill, CT 06067

RE: **TS-T-MOBILE-113-060607** - Omnipoint Communications, Inc. request for an order to approve tower sharing at an existing telecommunications facility located at 95 High Street, Portland, Connecticut.

Dear Ms. Fournier:

At a public meeting held June 27, 2006, the Connecticut Siting Council (Council) ruled that the shared use of this existing tower site is technically, legally, environmentally, and economically feasible and meets public safety concerns, and therefore, in compliance with General Statutes § 16-50aa, the Council has ordered the shared use of this facility to avoid the unnecessary proliferation of tower structures. This facility has also been carefully modeled to ensure that radio frequency emissions are conservatively below State and federal standards applicable to the frequencies now used on this tower.

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

This decision applies only to this request for tower sharing and is not applicable to any other request or construction. Please be advised that the validity of this action shall expire one year from the date of this letter.

The proposed shared use is to be implemented as specified in your letter dated June 7, 2006, including the placement of all necessary equipment and shelters within the tower compound.

Thank you for your attention and cooperation.

Very truly yours,

Pamela B. Katz, P.E.
Chairman

PBK/laf

c: The Honorable Susan S. Bransfield, First Selectman, Town of Portland
Nancy Mueller, Town Planner, Town of Portland
Donald Gates, Principal, Portland High School

G:\EMT-MOBILE\Portland\dc062706.DOC

CSC
CONNECTICUT SITING COUNCIL

Exhibit B

Property Card

Portland, CT : Assessor Database

Property Search:

Parcel ID:	Alternate ID:	Owner 1 Name:	Street Number:	Street Name:
			95	HIGH ST

Search Reset

Property Detail:

Parcel ID:	Alternate ID/Map Block Lot:	Card:	Card:	Street Name:	Street Number:	Zoning:	LUC:	Acres:
039-0059	00217600			HIGH ST	95	R15	Communication Towers	15.50

Owner Information:

Owner 1 Name:	PORTLAND TOWN OF
Owner 2 Name:	PORTLAND MIDDLE SCHOOL
Street 1:	PO BOX 71
Street 2:	
City:	PORTLAND
State:	CT
Zip:	06480
Volume:	84
Page:	141

Valuation:

Appraised Land:	$1,536,000.00
Appraised Bldg:	$108,000.00
Appraised Total:	$1,644,000.00
Total Assessment:	$1,150,800.00

Property Images:

Picture:

Sketch:

There is no sketch available.

Out-Buildings:

Code:	Description:	Units:	Year Built:	Size1:	Size2:	Area:	Grade:	Condition:
TT4	TOWER CELLULAR	4	2009	1	120	0	1	

The information delivered through this on-line database is provided in the spirit of open access to government information and is intended as an

enhanced service and convenience for citizens of Portland, CT.
The providers of this database: Tyler CLT, Big Room Studios, and Portland, CT assume no liability for any error or omission in the information provided here.

Comments regarding this service should be directed to: assessor@portlandct.org

Tue. June 4, 2019 : 09:21 AM : 0.08s : 10mb

95 High Street Portland, CT- CTHA242A

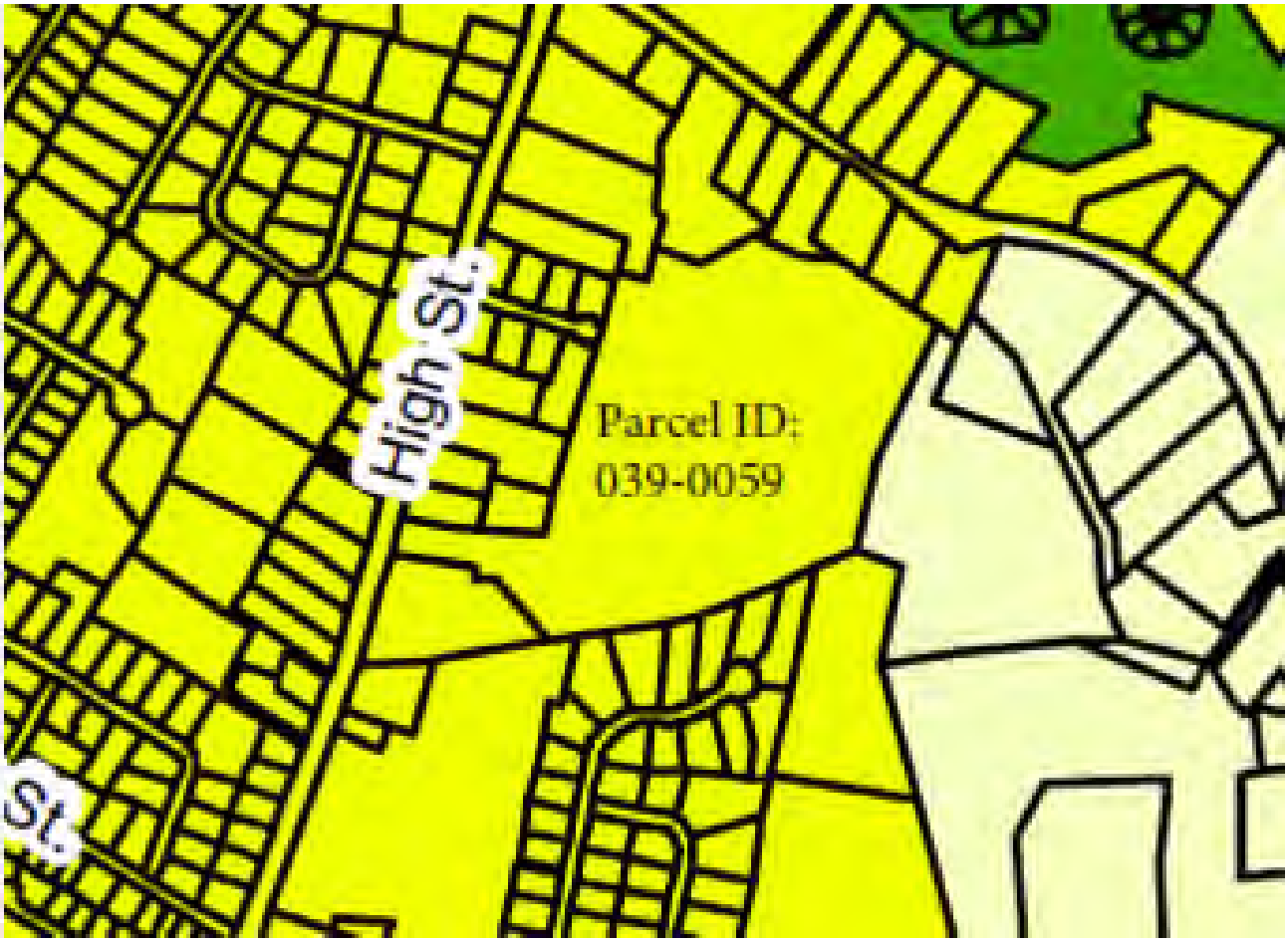


Exhibit C

Construction Drawings

T···Mobile

SITE NAME:	**HA242 / PORTLAND HS_SST**
SITE NUMBER:	**CTHA242A**
SITE TYPE:	**SELF-SUPPORT TOWER**
PROJECT TYPE:	**L600**
JURISDICTION:	**CITY OF PORTLAND**
SITE ADDRESS:	**95 HIGH ST PORTLAND, CT 06480**

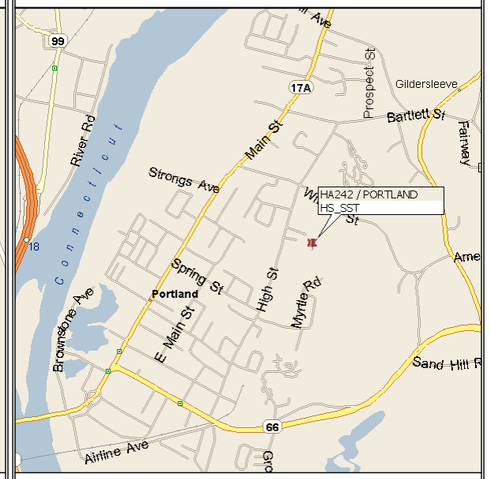
PROJECT SUMMARY

SITE NAME:	HA242 / PORTLAND HS_SST
SITE NUMBER:	CTHA242A
SITE ADDRESS:	95 HIGH ST PORTLAND, CT 06480
COUNTY:	MIDDLESEX COUNTY
JURISDICTION:	CITY OF PORTLAND
NAD83	
LATITUDE:	41.581115° N
LONGITUDE:	72.622217° W
GROUND ELEVATION:	347' AMSL
CUSTOMER/APPLICANT:	T-MOBILE 35 GRIFFIN ROAD SOUTH BLOOMFIELD, CT 06002 (913) 402-6500
OCCUPANCY TYPE:	UNMANNED
A.D.A. COMPLIANCE:	FACILITY IS UNMANNED AND NOT FOR HUMAN HABITATION

AREA MAP

NO SCALE

LOCATION MAP



NO SCALE

DRAWING INDEX

SHEET #	SHEET DESCRIPTION	REV. #
T-1	TITLE SHEET	1
SP-1	SPECIFICATIONS	1
SP-2	SPECIFICATIONS	1
A-1	OVERALL SITE PLAN	1
A-2	ENLARGED SITE PLANS	1
A-3	TOWER ELEVATIONS	1
A-4	ANTENNA LAYOUTS	1
A-5	ANTENNA DETAILS AND SPECIFICATIONS	1
A-5.1	MOUNTING DETAIL	1
A-6	ANTENNA & RRU CONFIGURATION KEYS	1
E-1	PANEL SCHEDULE & ONE-LINE DIAGRAM	1
G-1	GROUNDING RISER DIAGRAM AND DETAILS	1

CONTACT INFORMATION

A&E FIRM:	B&T ENGINEERING, INC. 1717 S. BOULDER, STE. 300 TULSA, OK 74119	CONSTR. MANAGER:	T-MOBILE BRIAN PAUL brian.paul14@T-Mobile.com (860) 550-5971
CONTACT:	MIKE OAKES	PROJECT MANAGER:	T-MOBILE MARK RICHARD mark.richard64@t-mobile.com (860) 648-1116
PHONE:	(918) 587-4630		

DRIVING DIRECTIONS

DEPART BRADLEY INTERNATIONAL AIRPORT ON CT-75 [TURNPIKE RD]. BEAR RIGHT ONTO CT-75 [POQUONOCK AVE]. TAKE RAMP ONTO CT-20 [BRADLEY FIELD CONNECTOR]. TAKE RAMP ONTO I-91 [RICHARD P HORAN MEMORIAL HWY]. AT EXIT 22S, TAKE RAMP (LEFT) ONTO CT-9. TURN RIGHT ONTO CT-17 [ST JOHNS SQ]. TAKE LOCAL ROAD(S) (RIGHT) ONTO CT-17 [CT-66]. TURN LEFT ONTO HIGH ST. TURN RIGHT ONTO BUTLER LN. BEAR RIGHT ONTO ACCESS ROAD. AND ARRIVE AT HA242 / PORTLAND HS_SST.

A/E DOCUMENT REVIEW STATUS

TITLE	SIGNATURE	DATE
T-MOBILE R.E. MGR.:		
T-MOBILE R.F. MGR.:		
T-MOBILE NetOps:		
T-MOBILE CONST. MGR.:		
INTERCONNECT:		
T-MOBILE SITE DEV. MGR.:		
PROPERTY OWNER:		
PLANNING:		

1		ACCEPTED: WITH OR NO COMMENTS, CONSTRUCTION MAY PROCEED
2		NOT ACCEPTED: RESOLVE COMMENTS AND RESUBMIT

ACCEPTANCE DOES NOT CONSTITUTE APPROVAL OF DESIGN, CALCULATIONS, ANALYSIS, TEST METHODS OF MATERIALS DEVELOPED OR SELECTED BY THE SUBCONTRACTOR AND DOES NOT RELIEVE SUBCONTRACTOR FROM FULL COMPLIANCE WITH CONTRACTUAL OBLIGATIONS.

CODE COMPLIANCE

ALL WORK SHALL BE PERFORMED AND MATERIALS INSTALLED IN ACCORDANCE WITH THE CURRENT EDITIONS OF THE FOLLOWING CODES AS ADOPTED BY THE LOCAL GOVERNING AUTHORITIES. NOTHING IN THESE PLANS IS TO BE CONSTRUED TO PERMIT WORK NOT CONFORMING TO THESE CODES:

CODE TYPE	CODE
BUILDING/DWELLING	2018 CONNECTICUT STATE BUILDING CODE
STRUCTURAL	2018 CONNECTICUT STATE BUILDING CODE
MECHANICAL	2018 CONNECTICUT STATE BUILDING CODE
ELECTRICAL	NEC 2017

PROJECT DESCRIPTION

THE PROPOSED PROJECT INCLUDES:

- RELOCATE (3) EXISTING ANTENNAS TO NEW SECTOR MOUNTS
- RELOCATE (3) EXISTING TMAS TO NEW SECTOR MOUNTS
- REMOVE (3) EXISTING ANTENNAS
- REMOVE (3) EXISTING SECTOR MOUNTS
- REPLACE (1) (E) DUS41 & (1) XMU WITH(1) NEW BB 6630 IN (E) 6102 CABINET
- INSTALL (1) NEW BB 6630 IN (E) RBS 6102 CABINET
- INSTALL (3) NEW SECTOR MOUNTS
- INSTALL (6) NEW PANEL ANTENNAS
- INSTALL (3) NEW REMOTE RADIO HEADS
- INSTALL (3) NEW 6x12 HCS

DO NOT SCALE DRAWINGS

ALL DRAWINGS CONTAINED HEREIN ARE FORMATTED FOR 11X17.
CONTRACTOR SHALL VERIFY ALL PLANS AND EXISTING DIMENSIONS AND CONDITIONS ON THE JOB SITE AND SHALL IMMEDIATELY NOTIFY THE ENGINEER IN WRITING OF ANY DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME.

SEE SHEETS SP-1 & SP-2 FOR ADDITIONAL CONSTRUCTION NOTES

CALL CONNECTICUT ONE CALL
(800) 922-4455
CALL 3 WORKING DAYS
BEFORE YOU DIG!

B+T GRP

T···Mobile

CENTERLINE COMMUNICATIONS

SITE NUMBER:
CTHA242A

SITE NAME:
HA242 / PORTLAND
HS_SST

SITE ADDRESS:
95 HIGH ST
PORTLAND, CT 06480

PROJECT NO:	135665.003.01
CHECKED BY:	MDW

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION
A	7/1/19	JCO	PRELIMINARY REVIEW
0	7/17/19	RMC	CONSTRUCTION
1	7/19/19	JJD	CONSTRUCTION

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/20

STATE OF CONNECTICUT
31627
LICENSED
PROFESSIONAL ENGINEER
7/19/19

IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS DOCUMENT.

SHEET NUMBER:	REVISION:
T-1	1

GENERAL REQUIREMENTS SECTION 01 10 00:

PART 1 GENERAL

1.1 INTENT:

A. THESE SPECIFICATIONS AND CONSTRUCTION DRAWINGS DESCRIBE THE WORK TO BE DONE AND THE MATERIALS TO BE FURNISHED FOR CONSTRUCTION. PLANS ARE NOT TO BE SCALED.

B. THE DRAWINGS AND SPECIFICATIONS ARE INTENDED TO BE FULLY EXPLANATORY AND SUPPLEMENTARY, HOWEVER, SHOULD ANYTHING BE SHOWN, INDICATED OR SPECIFIED ON ONE AND NOT THE OTHER, IT SHALL BE DONE THE SAME AS IF SHOWN, INDICATED OR SPECIFIED IN BOTH.

C. THE INTENTION OF DOCUMENTS IS TO INCLUDE ALL LABOR AND MATERIALS REASONABLY NECESSARY FOR THE PROPER EXECUTION AND COMPLETION OF THE WORK AS STIPULATED IN THE CONTRACT.

D. CONFLICTS: THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFICATION OF ALL MEASUREMENTS AT THE SITE BEFORE ORDERING MATERIAL OR DOING ANY WORK. NO COMPENSATION SHALL BE ALLOWED DUE TO DIFFERENCE BETWEEN ACTUAL DIMENSIONS AND THOSE ON THE DOCUMENTS. ANY DISCREPANCY SHALL BE REPORTED TO THE OWNER OR HIS AGENT FOR CONSIDERATION.

1.2 LICENSING REQUIREMENTS:

THE CONTRACTOR IS RESPONSIBLE FOR PROCUREMENT AND MAINTAINING OF ALL APPLICABLE LICENSES AND BONDS.

1.3 STORAGE:

ALL MATERIALS MUST BE STORED IN A LEVEL AND DRY FASHION THAT DOES NOT OBSTRUCT THE FLOW OF OTHER WORK. ANY STORAGE METHOD MUST MEET ALL RECOMMENDATIONS OF THE ASSOCIATED MANUFACTURER.

1.4 CLEAN UP:

THE CONTRACTOR SHALL KEEP THE SITE FREE FROM ACCUMULATION OF WASTE MATERIALS OR RUBBISH AT ALL TIMES. TRASH MUST BE REMOVED DAILY.

1.5 QUALITY ASSURANCE:

ALL WORK SHALL BE IN ACCORDANCE WITH APPLICABLE LOCAL, STATE AND FEDERAL REGULATIONS.

PART 2 PRODUCTS – NOT APPLICABLE TO THIS SECTION

PART 3 EXECUTION – NOT APPLICABLE TO THIS SECTION

ELECTRICAL SECTION 16000:

PART 1 GENERAL

1.1 GENERAL CONDITIONS:

A. THE CONTRACTOR SHALL INSPECT THE SITE WHERE THIS WORK IS TO BE PERFORMED AND FULLY FAMILIARIZE HIMSELF WITH ALL CONDITIONS RELATED TO THIS PROJECT.

B. THE CONTRACTOR SHALL OBTAIN AND PAY FOR ALL PERMITS AND LICENSES AND SHALL MAKE ALL DEPOSITS AND PAY ALL FEES REQUIRED FOR THE PERFORMANCE OF WORK UNDER THIS SECTION.

C. DRAWINGS SHOW THE GENERAL ARRANGEMENT OF ALL SYSTEMS AND COMPONENTS COVERED UNDER THIS SECTION. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS. DRAWINGS SHALL NOT BE SCALED TO DETERMINE DIMENSIONS.

1.2 LAWS, REGULATIONS, ORDINANCES, STATUTES AND CODES

A. ALL WORK SHALL BE INSTALLED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE, AND ALL APPLICABLE LOCAL LAWS, REGULATIONS, ORDINANCES, STATUTES AND CODES.

1.3 REFERENCES:

A. THE PUBLICATIONS LISTED BELOW FORM PART OF THIS SPECIFICATION. EACH PUBLICATION SHALL BE THE LATEST REVISION AND ADDENDUM IN EFFECT ON THE DATE OF THIS SPECIFICATION IS ISSUED FOR CONSTRUCTION UNLESS OTHERWISE NOTED. EXCEPT AS MODIFIED BY THE REQUIREMENTS SPECIFIED HEREIN OR THE DETAILS OF THE DRAWINGS, WORK INCLUDED IN THIS SPECIFICATION SHALL CONFIRM TO THE APPLICABLE PROVISIONS OF THESE PUBLICATIONS.

1. ANSI/IEEE (AMERICAN NATIONAL STANDARDS INSTITUTE)
2. IEEE (INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS)
3. ASTM (AMERICAN SOCIETY FOR TESTING AND MATERIALS)
4. ICEA (INSULATED CABLE ENGINEERS ASSOCIATION)
5. NEMA (NATIONAL ELECTRICAL MANUFACTURER'S ASSOCIATION)
6. NFPA (NATIONAL FIRE PROTECTION ASSOCIATION)
7. OSHA (OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION)
8. UL (UNDERWRITERS LABORATORIES, INC.)

1.4 SCOPE OF WORK:

A. WORK UNDER THIS SECTION SHALL CONSIST OF FURNISHING ALL LABOR, MATERIAL AND ASSOCIATED SERVICES REQUIRED TO COMPLETELY CONSTRUCT AND LEAVE READY FOR OPERATION SYSTEMS AS SHOWN ON THE DRAWINGS AND HEREIN DESCRIBED.

B. ALL ELECTRICAL EQUIPMENT UNDER THIS CONTRACT SHALL BE PROPERLY TESTED, ADJUSTED AND ALIGNED BY THE CONTRACTOR.

C. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL EXCAVATING, DRAINING, TRENCHES, BACKFILLING, AND REMOVAL AND EXCESS DIRT.

D. THE CONTRACTOR SHALL FURNISH TO THE OWNER, CERTIFICATES OF FINAL INSPECTION AND APPROVAL FROM THE INSPECTION AUTHORITIES HAVING JURISDICTION.

PART 2 PRODUCTS

2.1 GENERAL:

A. ALL ITEMS OF MATERIALS AND EQUIPMENT SHALL BE NEW, FREE FROM DEFECTS AND OF THE BEST QUALITY NORMALLY USED FOR THE PURPOSE IN GOOD COMMERCIAL PRACTICE.

B. ALL MATERIALS AND EQUIPMENT SHALL BE ACCEPTABLE TO THE AUTHORITY HAVING JURISDICTION AS SUITABLE FOR THE USE INTENDED.

C. ALL EQUIPMENT SHALL BEAR THE UNDERWRITERS LABORATORIES LABEL OF APPROVAL, AND SHALL CONFORM TO THE REQUIREMENTS OF THE NATIONAL ELECTRICAL CODE.

D. ALL OVERCURRENT DEVICES SHALL HAVE AN INTERRUPTING RATING EQUAL TO OR GREATER THAN THE SHORT CIRCUIT CURRENT TO WHICH THEY ARE SUBJECTED, 10,000 AIC MINIMUM. VERIFY AVAILABLE SHORT CIRCUIT CURRENT DOES NOT EXCEED THE RATING OF ELECTRICAL EQUIPMENT.

2.2 MATERIALS AND EQUIPMENT:

A. CONDUIT:

1. RIGID GALVANIZED STEEL CONDUIT (RGS) SHALL BE HOT-DIP GALVANIZED INSIDE AND OUTSIDE INCLUDING ENDS AND THREADS AND ENAMELED OR LACQUERED INSIDE IN ADDITION TO GALVANIZING.
2. FLEXIBLE METAL CONDUIT SHALL BE GALVANIZED, ZINC-COATED STEEL, PVC COATED FOR OUTDOOR APPLICATIONS.
3. CONDUIT CLAMPS, STRAPS AND SUPPORTS SHALL BE STEEL OR MALLEABLE IRON. ALL FITTINGS SHALL BE COMPRESSION TYPE AND WATERTIGHT.
4. NON-METALLIC CONDUIT FITTINGS SHALL BE SCHEDULE 40 PVC, HEAVY-WALL RIGID WITH SOLVENT-CEMENT-TYPE JOINTS AS RECOMMENDED BY THE MANUFACTURER.

B. WIRE AND CABLE:

1. WIRE AND CABLE SHALL BE FLAME-RETARDANT, MOISTURE AND HEAT RESISTANT THERMOPLASTIC, SINGLE CONDUCTOR, COPPER, TYPE THHN/THWN, 600 VOLT, SIZES AS INDICATED, #12 AWG MINIMUM.
2. #10 AWG AND SMALLER CONDUCTORS SHALL BE SOLID AND #8 AWG AND LARGER CONDUCTORS SHALL BE STRANDED.
3. SOLDERLESS, PRESSURE-TYPE CONNECTORS CONSTRUCTED OF HIGH-STRENGTH, NON-CORRODIBLE, TIN-PLATED COPPER DESIGNED TO FURNISH HIGH-PULLOUT STRENGTH AND HIGH CONDUCTIVITY JOINTS SHALL BE USED.
4. SUPPORT GRIPS SHALL BE SINGLE WEAVE, CLOSED MESH, HIGH-GRADE, NON-MAGNETIC, TIN-COATED BRONZE, CAPABLE OF SUPPORTING TEN TIMES THE CABLE DEAD WEIGHT, HUBBELL KELLEMS OR APPROVED EQUAL.

C. DISCONNECT SWITCHES:

1. DISCONNECT SWITCHES SHALL BE HEAVY DUTY, DEAD-FRONT, QUICK-MAKE, QUICK-BREAK, EXTERNALLY OPERABLE, HANDLE LOCKABLE AND INTERLOCKED WITH COVER IN CLOSED POSITION, RATING AS INDICATED, UL LABELED FURNISHED IN NEMA 3R ENCLOSURE, SQUARE D CLASS 3110 OR APPROVED EQUAL.

D. SYSTEM GROUNDING:

1. GROUNDING CONDUCTOR SHALL BE BARE, SOLID TINNED COPPER, SIZE AS INDICATED, EXCEPT ABOVE GROUND GROUNDING CONDUCTORS SHALL BE INSULATED.
2. GROUND BUSSES SHALL BE BARE ANNEALED COPPER BARS OF RECTANGULAR CROSS SECTION.
3. CONNECTORS SHALL BE HIGH-CONDUCTIVITY, HEAVY DUTY, LISTED AND LABELED AS GROUNDING CONNECTORS FOR THE MATERIALS USED. USE TWO-HOLE COMPRESSION LUGS WITH HEAT SHRINK FOR MECHANICAL CONNECTIONS.
4. EXOTHERMIC WELDED CONNECTIONS SHALL BE PROVIDED IN KIT FORM AND SELECTED FOR THE SPECIFIC TYPES, SIZES, AND COMBINATIONS OF CONDUCTORS AND OTHER ITEMS TO BE CONNECTED.
5. GROUND RODS SHALL BE COPPER-CLAD STEEL WITH HIGH-STRENGTH STEEL CORE AND ELECTROLYTIC-GRADE COPPER OUTER SHEATH, MOLTEN WELDED TO CORE, 3/4"x10'-0".

E. OTHER MATERIALS:

1. THE CONTRACTOR SHALL PROVIDE OTHER MATERIALS, THOUGH NOT SPECIFICALLY DESCRIBED, WHICH ARE REQUIRED FOR A COMPLETELY OPERATIONAL SYSTEM AND PROPER INSTALLATION OF THE WORK.

B+T GRP

T···Mobile

CENTERLINE COMMUNICATIONS

SITE NUMBER:
CTHA242A

SITE NAME:
HA242 / PORTLAND
HS_SST

SITE ADDRESS:
95 HIGH ST
PORTLAND, CT 06480

PROJECT NO:	135665.003.01
CHECKED BY:	MDW

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION
A	7/1/19	JCO	PRELIMINARY REVIEW
0	7/17/19	RMC	CONSTRUCTION
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B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/20

STATE OF CONNECTICUT
31627
LICENSED
PROFESSIONAL ENGINEER
7/19/19

SHEET NUMBER: SP-1

REVISION: 1

PART 3 EXECUTION

3.1 GENERAL:

A. ALL MATERIALS AND EQUIPMENT SHALL BE INSTALLED IN STRICT ACCORDANCE W/ THE MANUFACTURER'S RECOMMENDATION

B. EQUIPMENT SHALL BE TIGHTLY COVER AND PROTECTED AGAINST DIRT OR WATER, AND AGAINST CHEMICAL OR MECHANICAL INJURY DURING INSTALLATION AND CONSTRUCTION PERIODS.

3.2 LABOR AND WORK:

A. ALL LABOR FOR THE INSTALLATION OF MATERIALS AND EQUIPMENT FURNISHED FOR THE ELECTRICAL SYSTEM SHALL BE DONE BY EXPERIENCED MECHANICS OF THE PROPER TRADES.

B. ALL ELECTRICAL EQUIPMENT FURNISHED SHALL BE ADJUSTED, ALIGNED AND TESTED BY THE CONTRACTOR AS REQUIRED TO PRODUCE THE INTENDED PERFORMANCE.

C. UPON COMPLETION OF THE WORK, THE CONTRACTOR SHALL THOROUGHLY CLEAN ALL EXPOSED EQUIPMENT, REMOVE ALL LABELS AND ANY DEBRIS, CRATING OR CARTONS AND LEAVE THE INSTALLATION FINISHED AND READY FOR OPERATION.

3.3 COORDINATION:

A. THE CONTRACTOR SHALL COORDINATE THE INSTALLATION OF ELECTRICAL ITEMS WITH THE OWNER–FURNISHED EQUIPMENT DELIVERY SCHEDULE TO PREVENT UNNECESSARY DELAYS IN THE TOTAL WORK.

3.4 INSTALLATION:

A. CONDUIT

1. ALL ELECTRICAL WIRING SHALL BE INSTALLED IN CONDUIT AS HEREIN SPECIFIED. NO CONDUIT OR TUBING OF LESS THAN 3/4 INCH NOMINAL SIZE SHALL BE USED.
2. PROVIDE RGS CONDUIT FOR ALL EXPOSED, EXTERIOR CONDUIT.
3. PROVIDE SCHEDULE 40 PVC OR RGS CONDUIT BELOW GRADE, 1" MINIMUM, UNLESS NOTED OTHERWISE. ALL 90 DEGREE BENDS TO ABOVE GRADE SHALL BE RGS, MINIMUM BURIAL DEPTH SHALL BE 30" CLEAR TO TOP OF CONDUIT, UNLESS NOTED OTHERWISE.
4. USE GALVANIZED FLEXIBLE STEEL CONDUIT WHERE DIRECT CONNECTION IS NOT DESIRABLE FOR REASONS EQUIPMENT MOVEMENT, VIBRATION OR FOR EASE OF MAINTENANCE. USE LIQUIDTIGHT, PVC COATED FLEXIBLE METAL CONDUIT FOR OUTDOOR APPLICATIONS.
5. INSTALL GALVANIZED FLEXIBLE STEEL CONDUIT AT ALL POINTS OF CONNECTION TO EQUIPMENT MOUNTED ON SUPPORTS TO ALLOW FOR EXPANSION AND CONTRACTION.
6. A RUN OF CONDUIT BETWEEN BOXES OR FITTINGS SHALL NOT CONTAIN MORE THE EQUIVALENT OF FOUR QURATER–BENDS INCLUDING THOSE BENDS LOCATED IMMEDIATELY AT THE BOX OR FITTING. THE RADIUS OF BENDS SHALL NEVER BE SHORTER THAN THAT OF THE CORRESPONDING TRADE ELBOW.
7. WHERE CONDUIT HAS TO BE CUT IN THE FIELD, IT SHALL BE CUT SQUARE WITH A PIPE CUTTER USING CUTTING KNIVES.
8. ALL CONDUITS SHALL BE SWABBED CLEAN BY PULLING AN APPROPRIATE SIZE MANDREL THROUGH THE CONDUIT BEFORE INSTALLATION OF WIRE OR CABLE. CLEAR ALL BLOCKAGES AND REMOVE BURRS, DIRT AND DEBRIS.
9. INSTALL MULE TAPE IN ALL EMPTY CONDUIT IDENTIFY PULL STRINGS AT EACH END WITH ITS DESTINATION.
10. PROVIDE INSULATED GROUNDING BUSHINGS OR ALL CONDUITS STUBBED INTO EQUIPMENT ENCLOSURES OR STUBBED OUT FOR FUTURE USE BY OTHERS.
11. CONTRACTOR IS RESPONSIBLE FOR PROTECTING ALL CONDUITS DURING CONSTRUCTION. TEMPORARY OPENINGS IN THE CONDUIT SYSTEM SHALL BE PLUGGED OR CAPPED TO PREVENT ENTRANCE OF MOISTURE OR FOREIGN MATTER. CONTRACTOR SHALL REPLACE ANY CONDUIT CONTAINING FOREIGN MATERIALS THAT CANNOT BE REMOVED.
12. INSTALL 3" RED METALLIC LOCATOR TAPE 12" ABOVE ALL UNDERGROUND CONDUIT AND WIRE.
13. CONDUITS SHALL BE INSTALLED IN SUCH A MANNER AS TO INSURE AGAINST COLLECTION OF TRAPPED CONDENSATION.

B. WIRE AND CABLE:

1. ALL POWER WIRING SHALL BE COLOR CODED AS FOLLOWS

DESCRIPTION	120/270V	208Y/120V	480Y/277V
PHASE A	BLACK	BLACK	BROWN
PHASE B	RED	RED	ORANGE
PHASE C		BLUE	YELLOW
NEUTRAL	WHITE	WHITE	GRAY
GROUND	GREEN	GREEN	GREEN

2. SPLICES SHALL BE MADE ONLY AT OUTLETS, JUNCTION BOXES OR ACCESSIBLE RACEWAYS WITH PRESSURE–TYPE CONNECTORS.
3. PULLING LUBRICANT SHALL BE SOAPSTONE POWDER, POWDERED TALC OR A COMMERCIAL PULLING COMPOUND. NO SOAP SUDS, SOAP FLAKES, OIL OR GREASE SHALL BE USED, AS THESE MAY BE HARMFUL TO CABLE INSULATION. CONTRACTOR SHALL USE NYLON OR HEMP ROPE FOR PULLING CABLE TO AVOID SCORING THE CONDUIT.
4. CABLES SHALL BE NEATLY TRAINED, WITHOUT INTERLACING, AND BE OF SUFFICIENT LENGTH IN ALL BOXES, EQUIPMENT. ETC. TO PERMIT MAKING A NEAT ARRANGEMENT. CABLES SHALL BE SECURED IN A MANNER TO AVOID TENSION ON CONDUCTORS OR TERMINALS AND SHALL BE PROTECTED FROM MECHANICAL INJURY AND FROM MOISTURE. SHARP BENDS OVER CONDUIT BUSHINGS ARE PROHIBITED. DAMAGED CABLES SHALL BE REMOVED AND REPLACE AT THE CONTRACTOR'S EXPENSE.

C. DISCONNECT SWITCHES:

1. INSTALL DISCONNECT SWITCHED LEVEL AND PLUMB. CONNECT TO WIRING SYSTEM AND GROUND AS INDICATED.

D. GROUNDING:

1. ALL METALLIC PARTS OF ELECTRICAL EQUIPMENT WHICH DO NOT CARRY CURRENT SHALL BE GROUNDED IN ACCORDANCE WITH THE REQUIREMENTS OF ARTICLE 250 OF THE NATIONAL ELECTRIC CODE.
2. PROVIDE ELECTRICAL GROUNDING AND BONDING SYSTEMS INDICATED WITH ASSEMBLY OF MATERIALS, INCLUDING GROUNDING ELECTRODES, BONDING JUMPERS AND ADDITIONAL ACCESSORIES AS REQUIRED FOR A COMPLETE INSTALLATION.
3. ROUTE GROUNDING CONNECTIONS AND CONDUCTORS TO GROUND IN THE SHORTEST AND STRAIGHTEST PATHS POSSIBLE TO MINIMIZE TRANSIENT VOLTAGE RISES.
4. TIGHTEN GROUNDING AND BONDING CONNECTORS, INCLUDING SCREWS AND BOLTS, IN ACCORDANCE WITH MANUFACTURER'S PUBLISHED TORQUE TIGHTENING VALUES FOR CONNECTORS AND BOLTS. WHERE MANUFACTURE'S TORQUING REQUIREMENTS ARE NOT AVAILABLE, TIGHTEN CONNECTIONS TO COMPLY WITH TIGHTENING TORQUE VALUES SPECIFIED IN UL 486A TO ASSURE PERMANENT AND EFFECTIVE GROUNDING.
5. ALL UNDERGROUND GROUNDING CONNECTIONS SHALL BE MADE BY THE EXOTHERMIC WELD PROCESS AND INSTALL IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTION.
6. ALL GROUND CONNECTIONS SHALL BE INSPECTED FOR TIGHTNESS. EXOTHERMIC–WELDED CONNECTIONS SHALL BE APPROVED BY THE CONSTRUCTION INSPECTOR BEFORE BEING PERMANENTLY CONCEALED.
7. APPLY CORROSION–RESISTANT FINISH TO FIELD CONNECTION AND PLACES WHERE FACTORY APPLIED PROTECTIVE COATING HAVE BEEN DESTROYED. USE COPPER–BASED "NO–OX" OR APPROVED EQUAL.
8. A SEPARATE, CONTINUOUS, INSULATED EQUIPMENT GROUNDING CONDUCTOR SHALL BE INSTALLED IN ALL FEEDER AND BRACH CIRCUITS.
9. BOND ALL INSULATED GROUNDING BUSHINGS WITH A BARE #6 AWG GROUNDING CONDUCTOR TO A GROUND BUS OR GROUNDING LUG IN ENCLOSURE.
10. DIRECT BURIED GROUND CONDUCTORS SHALL BE INSTALLED AT A NOMINAL DEPTH OF 30" BELOW GRADE, UNLESS NOTED OTHERWISE.
11. ALL GROUNDING CONDUCTORS EMBEDDED IN OR PENETRATING CONCRETE SHALL BE INSULATED OR INSTALLED IN PVC CONDUIT.
12. INSTALL ELECTROLYTIC GROUNDING SYSTEM IN STRICT ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS. REMOVE SEALING TAPE FROM LEACHING AND BREATHER HOLES, INSTALL PROTECTIVE BOX FLUSH WITH GRADE.
13. DRIVE GROUND RODS UNTIL TOPS ARE 30" BELOW FINAL GRADE.
14. GROUNDING CONDUCTOR TO EQUIP[MENT GROUND LUGS:
    1) BOLTED TO EQUIPMENT HOUSING WITH STAINLESS STEEL BOLTS AND LOCK WASHERS.
    2) ALL EQUIPMENT TO BE GROUNDED SHALL BE FREE OF PAINT OR ANY OTHER MATERIAL COVERING BARE METAL AT THE POINT OF CONNECTION.

3.5 ACCEPTANCE TESTING:

1. PROVIDE PERSONNEL AND EQUIPMENT, MAKE REQUIRED TESTS AND SUBMIT TEST REPORTS UPON COMPLETE OF TESTS.
2. WHEN MATERIAL AND/OR WORKMANSHIP IS FOUND NOT TO COMPLY WITH THE SPECIFIED REQUIREMENTS, THE NON–COMPLYING ITEMS SHALL BE REMOVED FROM THE JOBSITE AND REPLACED WITH THE ITEMS COMPLYING WITH THE SPECIFIED REQUIREMENTS PROMPTLY AFTER RECEIPT OF NOTICE OF SUCH NON–COMPLIANCE.

A. TEST PROCEDURES:

1. ALL FEEDERS SHALL HAVE THEIR INSULATION TESTED AFTER INSTALLATION, BUT BEFORE CONNECTION TO DEVICES. THE CONDUCTORS SHALL TEST FREE FROM SHORT CIRCUITS AND GROUNDS. TESTING SHALL BE FOR ONE MINUTE, USING 1000V DC. INVESTIGATE ANY VALUES LESS THAN 50 MEGOHMS.
2. PRIOR TO ENERGIZING CIRCUITRY, TEST WIRING DEVICES FOR ELECTRICAL CONTINUITY AND PROPER POLARITY CONNECTIONS.
3. MEASURE AND RECORD VOLTAGES BETWEEN PHASES AN BETWEEN PHASE WIRE AND NEUTRALS. SUBMIT A REPORT OF MAXIMUM AND MINIMUM VOLTAGES.
4. PERFORM GROUND TEST TO MEASURE GROUND RESISTANCE OF GROUNDING SYSTEM USING THE IEEE STANDARD 3–POINT "FALL–OF–POTENTIAL" METHOD. PROVIDE PLOTTED TEST VALUES AND LOCATION SKETCH. NOTIFY THE ENGINEER IMMEDIATELY IF MEASURED VALUE IS OVER 5 OHMS.

END OF SECTION

END OF SPECIFICATION

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CENTERLINE COMMUNICATIONS

SITE NUMBER:
CTHA242A

SITE NAME:
HA242 / PORTLAND
HS_SST

SITE ADDRESS:
95 HIGH ST
PORTLAND, CT 06480

PROJECT NO:	135665.003.01
CHECKED BY:	MDW

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION
A	7/1/19	JCO	PRELIMINARY REVIEW
0	7/17/19	RMC	CONSTRUCTION
1	7/19/19	JJD	CONSTRUCTION

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/20

STATE OF CONNECTICUT
31627
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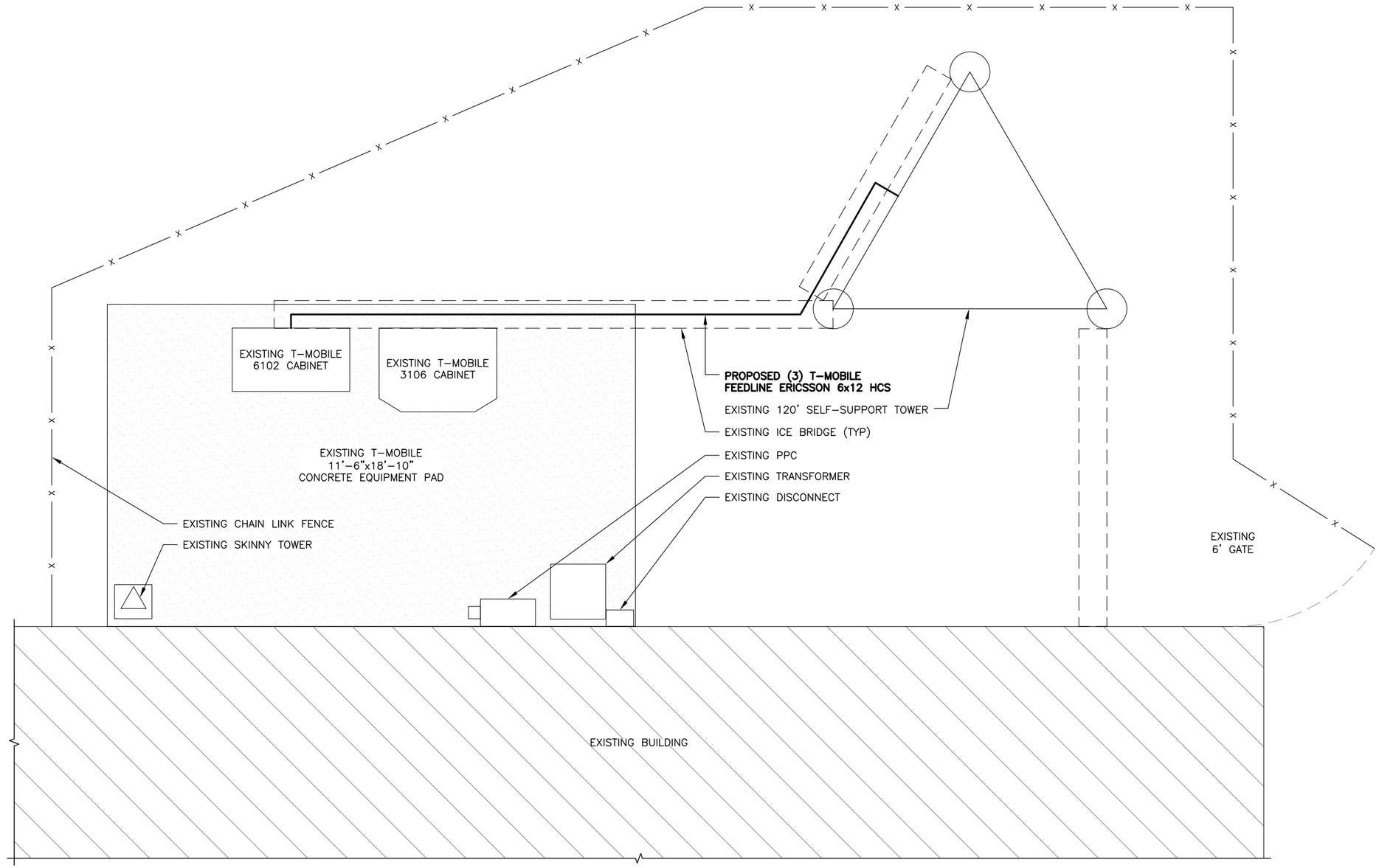
PROFESSIONAL ENGINEER

7/19/19

SHEET NUMBER:	REVISION:
SP-2	1



1 OVERALL SITE PLAN

SCALE: 0' 1' 2' 4' 10'

N

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CTHA242A

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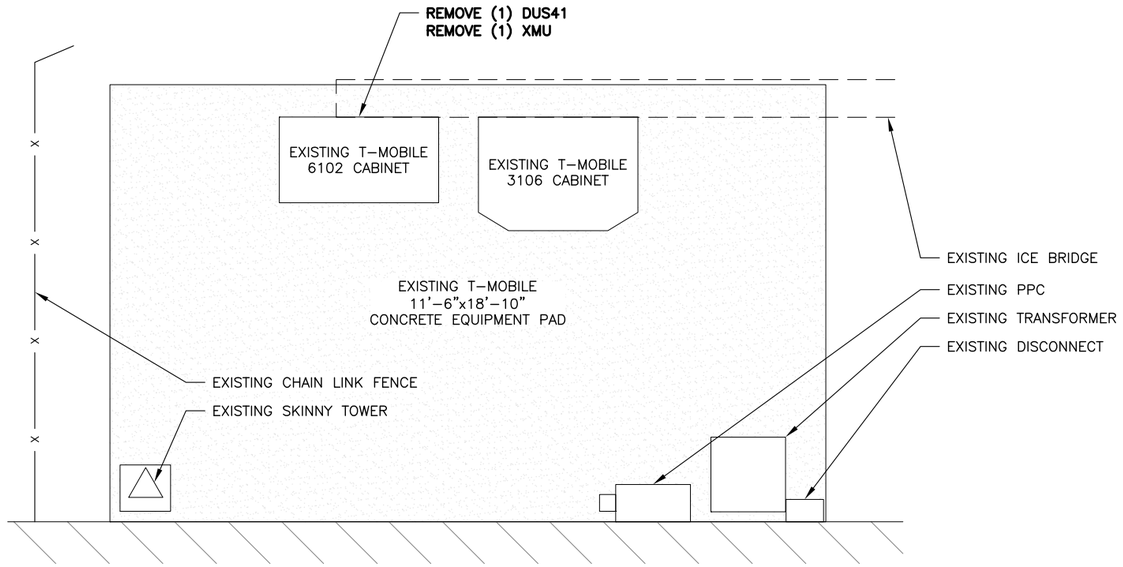
SHEET NUMBER: A-1

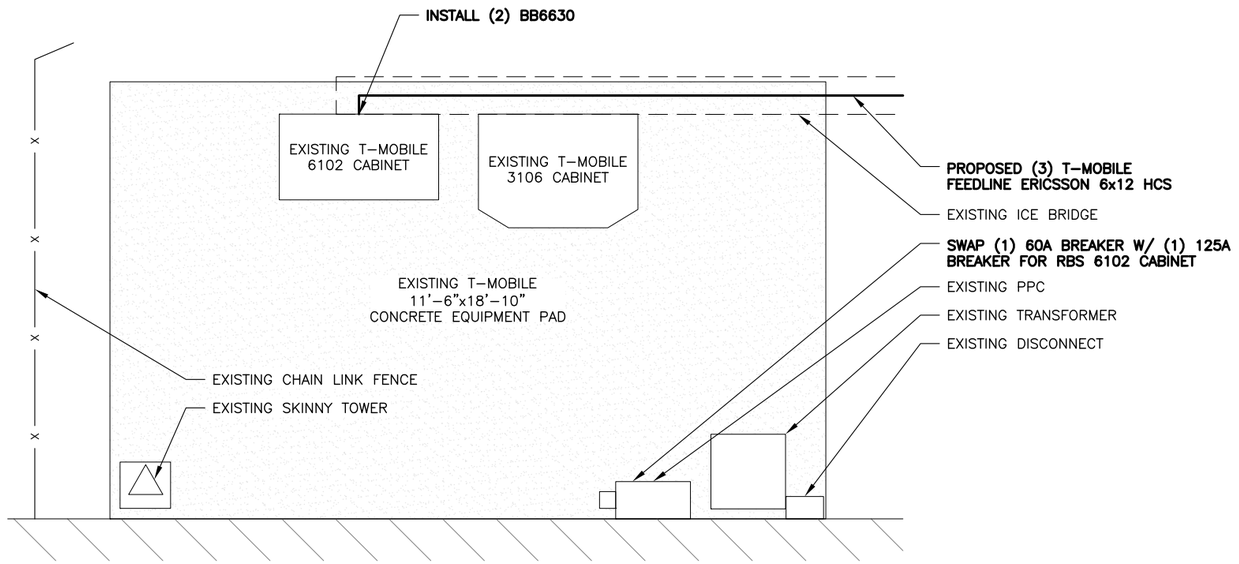
REVISION: 1



1 EXISTING ENLARGED SITE PLAN

SCALE: 0' 1' 2' 4' 10'

N



2 PROPOSED ENLARGED SITE PLAN

SCALE: 0' 1' 2' 4' 10'

N

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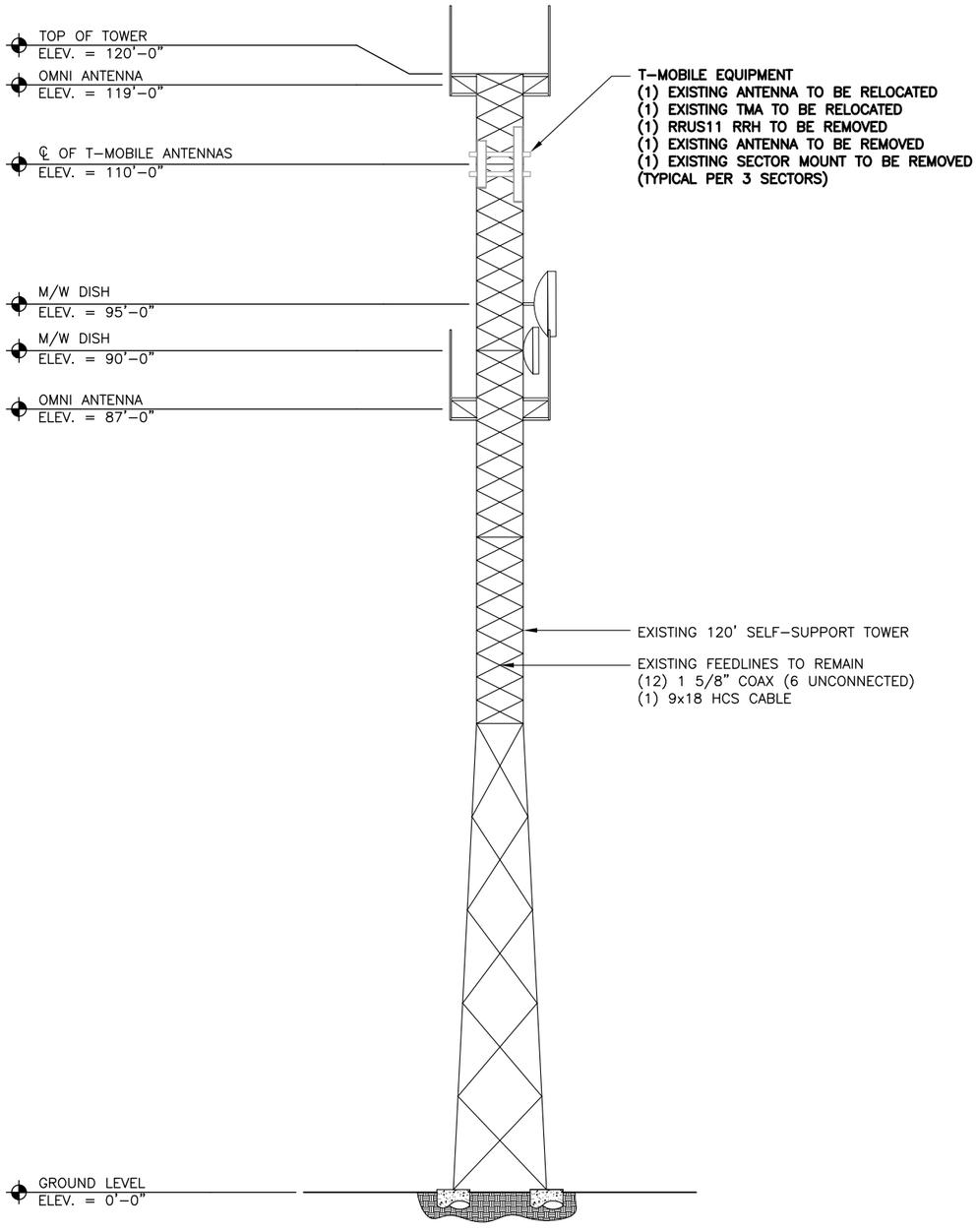
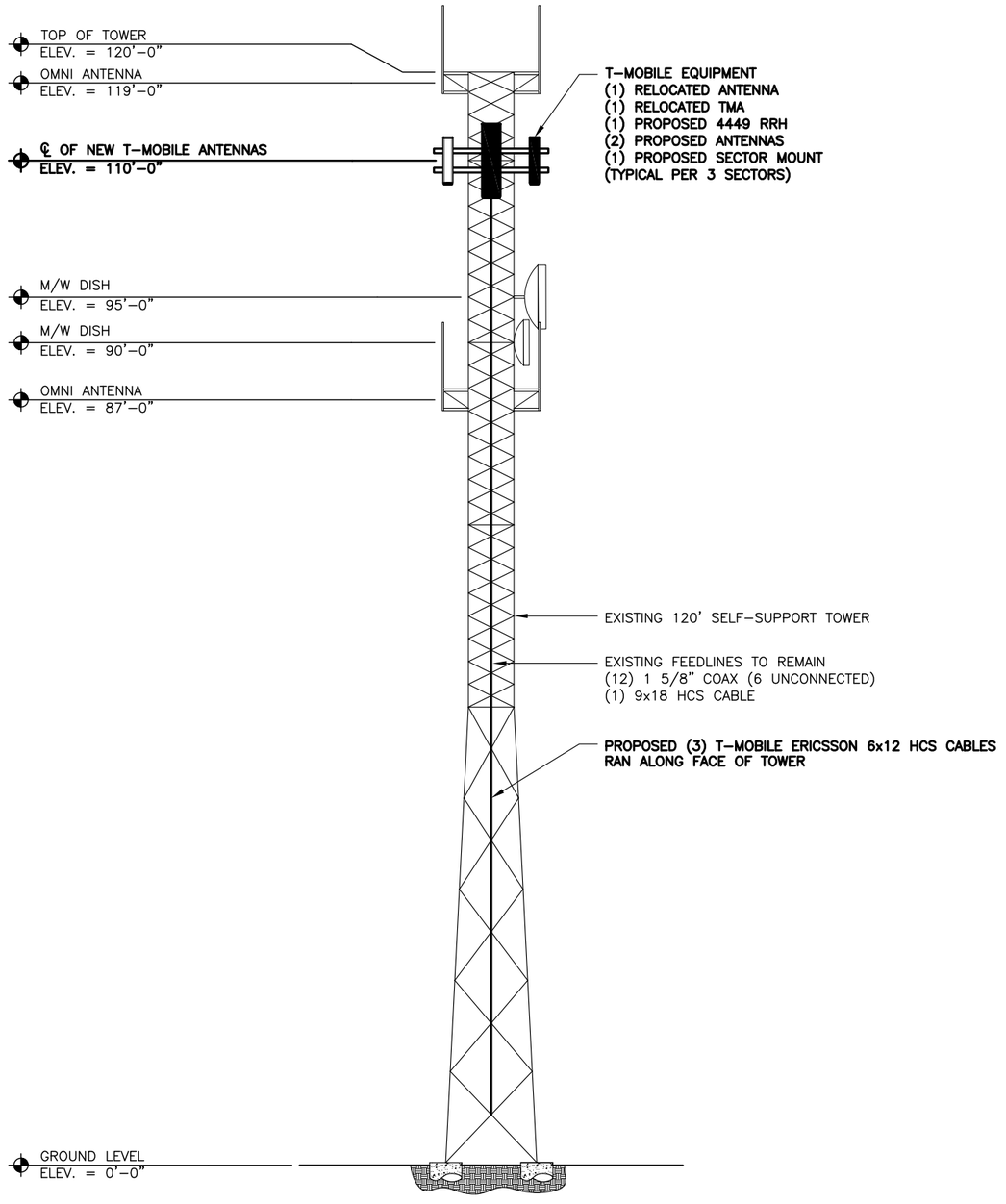
SHEET NUMBER: A-2

REVISION: 1



1 EXISTING TOWER ELEVATION
SCALE: N.T.S.



2 PROPOSED TOWER ELEVATION
SCALE: N.T.S.

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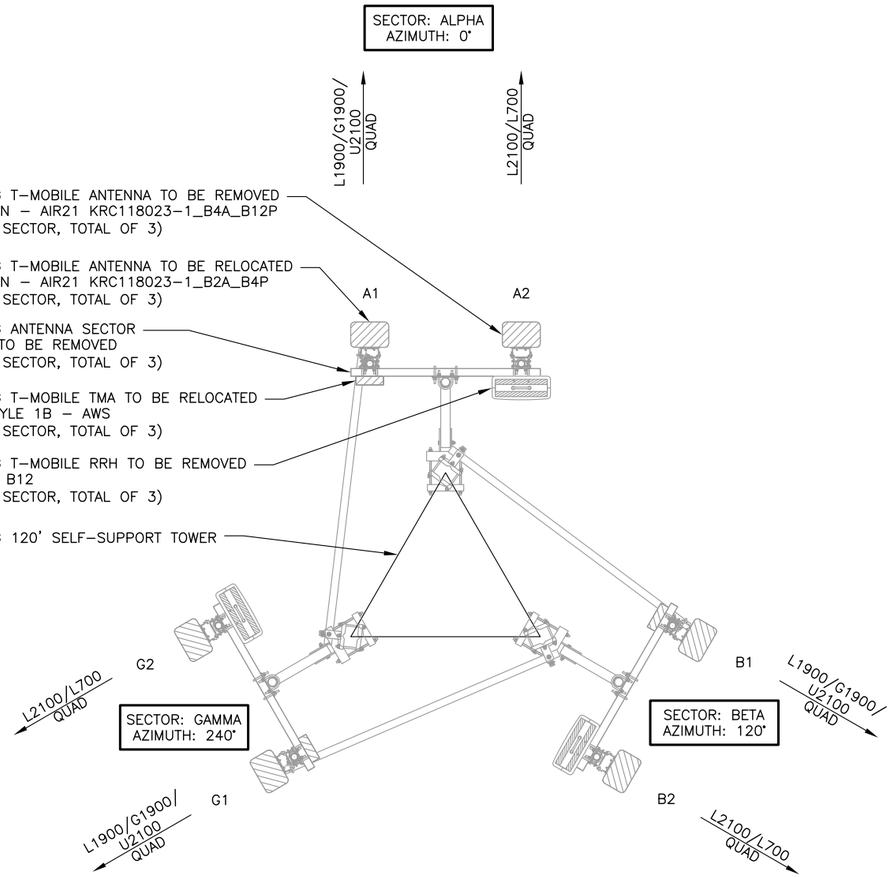
IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS DOCUMENT.

SHEET NUMBER:	REVISION:
A-3	1



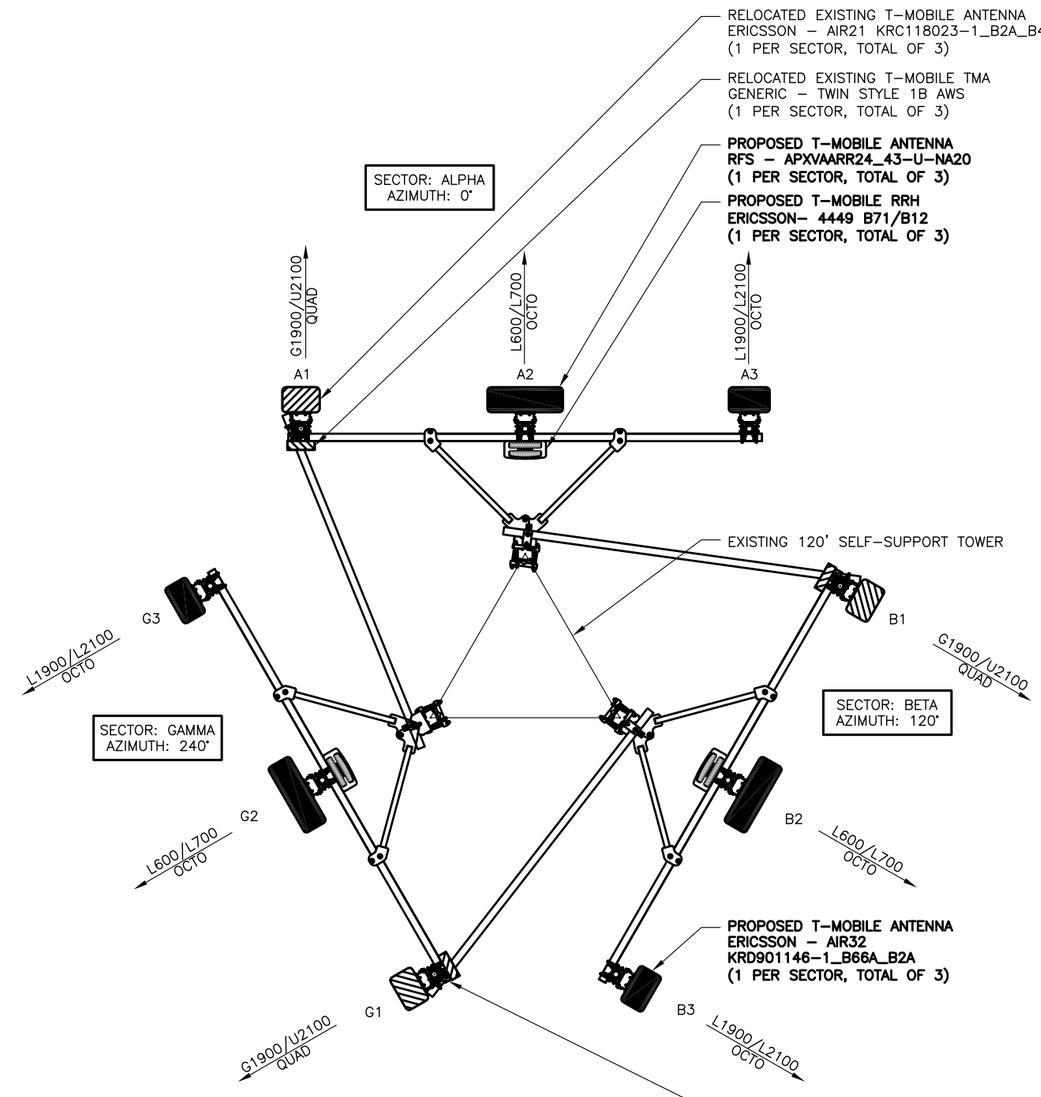
LEGEND:

NEW

EXISTING

1 EXISTING ANTENNA AZIMUTH PLAN

SCALE: N.T.S.



LEGEND:

NEW

EXISTING

2 PROPOSED ANTENNA AZIMUTH PLAN

SCALE: N.T.S.

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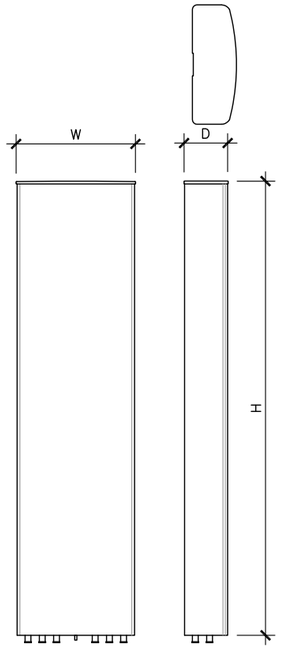
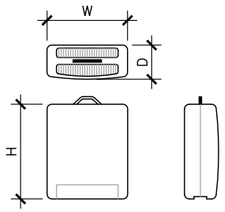
SHEET NUMBER:	REVISION:
A-4	1



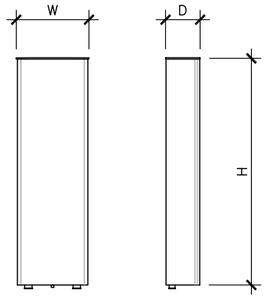
ANTENNA SPECS	
MANUFACTURER	RFS
MODEL #	APXVAARR24_43-U-NA20
WIDTH	24.0"
DEPTH	8.7"
HEIGHT	95.9"
WEIGHT	128.0 LBS

1 ANTENNA DETAIL
SCALE: N.T.S.



RRU SPECIFICATIONS	
MANUFACTURER	ERICSSON
MODEL #	4449 B12 + B71
WIDTH	13.2"
DEPTH	9.3"
HEIGHT	14.9"
WEIGHT	74 LBS

2 RRH DETAIL
SCALE: N.T.S.



ANTENNA SPECS	
MANUFACTURER	ERICSSON
MODEL #	AIR32 B66
WIDTH	12.9"
DEPTH	8.7"
HEIGHT	56.6"
WEIGHT	132.2 LBS

3 ANTENNA DETAIL
SCALE: N.T.S.

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PROJECT NO:	135665.003.01
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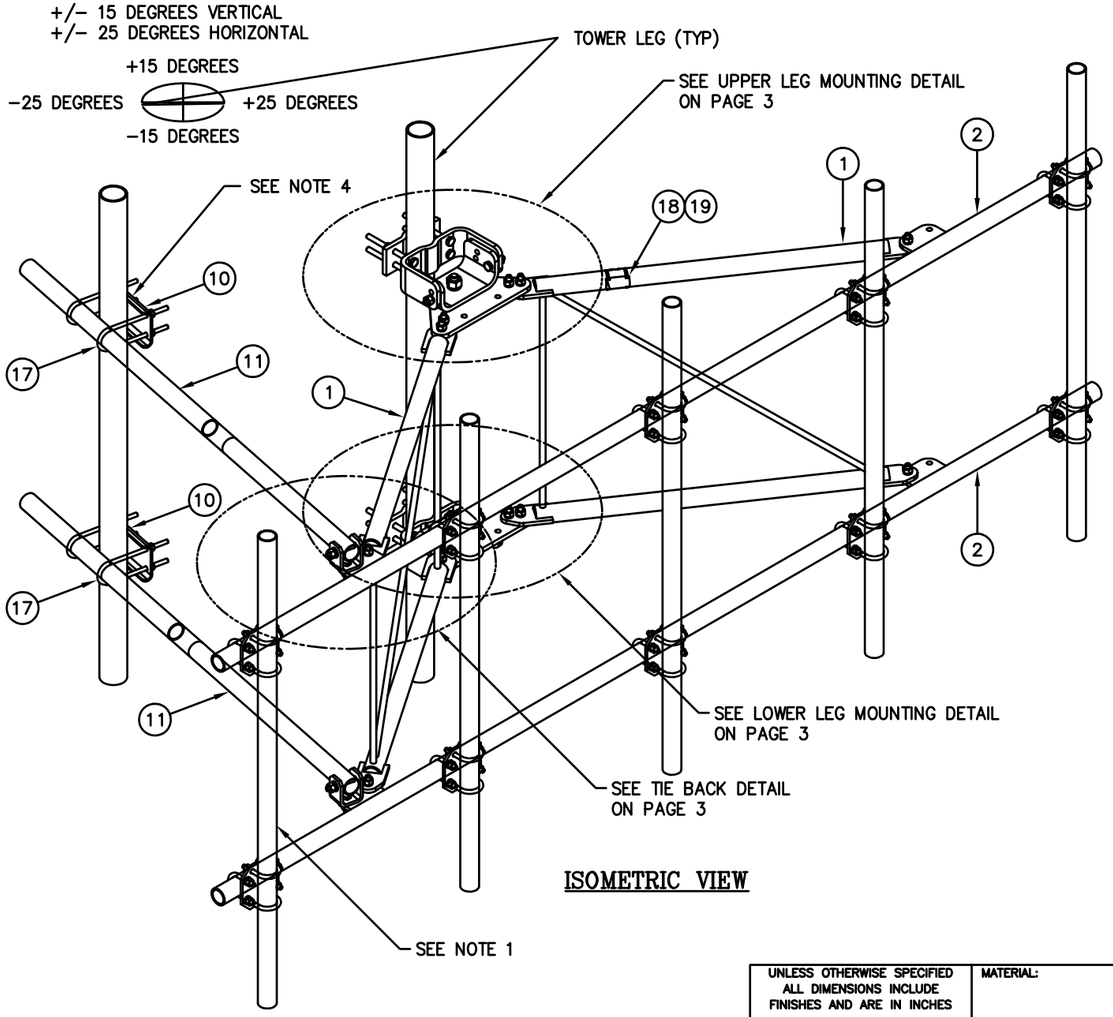
7/19/19

SHEET NUMBER: A-5

REVISION: 1

C10857007C

TIEBACK ANGLE RANGE DETAIL



ISOMETRIC VIEW

C10857007C 12' EHD V-BOOM ASSEMBLY W/TIEBACKS				
ITEM	QTY.	PART NO.	DESCRIPTION	WEIGHT
1.	2	CW01222	WELDMENT, STANDOFF ARM	126
2.	2	CW01223	WELDMENT, FACE PIPE	147
3.	2	CS03109	PLATE, ROTATING	34
4.	1	CS03110	PLATE, PIVOTING (UPPER)	16
5.	1	CS03111	PLATE, LEG CLAMP (UPPER)	17
6.	1	CS03112	PLATE, PIVOTING (LOWER)	14
7.	1	CS03113	PLATE, LEG CLAMP (LOWER)	17
8.	2	CS03114	PLATE, LEG CLAMP (BACK)	14
9.	2	CS00098	PLATE, TIE BACK SWIVEL	5
10.	2	CS03285	PLATE, TIE BACK CLAMP	9
11.	2	CS03333	PIPE, TIE BACK	76
12.	2	C40026073	BOLT ASSEMBLY, 1 ø X 3 A325	4
13.	8	C40140004	BOLT ASSEMBLY, 5/8 ø X 8 A307	13
14.	2	C40026033	BOLT ASSEMBLY, 5/8 ø X 4 1/2 A325	2
15.	12	C40026025	BOLT ASSEMBLY, 5/8 ø X 2 1/2 A325	6
16.	6	C40026024	BOLT ASSEMBLY, 5/8 ø X 2 1/4 A325	3
17.	4	C40034183	U-BOLT ASSEMBLY, 1/2 ø X 2 9/16 C-C	6
18.	1	Z30992017	MOUNT CLASSIFICATION TAG C10857007C	1
19.	2	C40062103	STAINLESS STEEL SELF-LOCKING CABLE TIE	1
			TOTAL WEIGHT	511

PACKAGING NOTE

CK00386 INCLUDES ITEMS 1, 3, 4, 5, 6, 7, 12 & 15 (8 QTY)
CK00392 INCLUDES ITEMS 2, 8, 9, 10, 11, 13, 14, 15 (4 QTY), 16, 17, 18 & 19

NOTES:

1. MOUNTING PIPES & CROSSOVER PLATE KITS MUST BE PURCHASED SEPARATELY.
2. QUANTITIES SHOWN IN LISTS OF MATERIAL ARE FOR ONE (1) V-BOOM ONLY.
3. THIS V-BOOM WILL MOUNT TO THE FOLLOWING:1 1/2"ø TO 5 9/16"ø ROUND LEG.
4. TIEBACKS MUST BE CONNECTED TO A RIGID MEMBER THAT PROVIDES ADEQUATE SUPPORT WITHIN THE LIMITS NOTED ABOVE IN THE TIEBACK ANGLE RANGE DETAIL UNLESS APPROVED BY THE ENGINEER OF RECORD.

UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS INCLUDE FINISHES AND ARE IN INCHES
TOLERANCES: FRACTIONS ± 1/16" ANGLES ± 1/2 DEG. DECIMALS ± .010"
MATERIAL: TOLERANCES DO NOT APPLY TO RAW MATERIAL

REV	DATE	DRW	CHK	DESCRIPTION

Sabre Industries Towers and Poles

12' EHD V-BOOM ASSEMBLY W/TIEBACKS
(3' STANDOFF)
W/NO ANTENNA MOUNTING PIPES

		SIZE	DRAWING NO.	REV
DATE	02/29/16	B	C10857007C	0
DRAWN BY	WRF		SCALE None	PAGE 1 OF 3
CHECKED BY	KLE			

1 SABRE 12' EHD V-BOOM ANTENNA SECTOR MOUNT
SCALE: N.T.S.

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CENTERLINE COMMUNICATIONS

SITE NUMBER:
CTHA242A

SITE NAME:
HA242 / PORTLAND
HS_SST

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95 HIGH ST
PORTLAND, CT 06480

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ISSUED FOR:

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STATE OF CONNECTICUT 31627 LICENSED PROFESSIONAL ENGINEER
7/19/19

SHEET NUMBER: A-5.1
REVISION: 1

ANTENNA NOTES:

1. ANTENNA CONTRACTOR SHALL INSURE THAT ALL ANTENNA MOUNTING PIPES ARE PLUMB.
2. COAXIAL FEEDER & FIBER LENGTHS INDICATED ARE APPROXIMATE.
3. ANTENNA COAXIAL FEEDERS & ANTENNA JUMPERS SHALL BE COLOR CODED PER T–MOBILE REQUIREMENTS. IN ADDITION TO THE COLOR CODE IN THE ANTENNA KEY THE FOLLOWING CHECKER STRIPE SHALL BE ADDED TO EACH ANTENNA COAXIAL FEEDER & ANTENNA JUMPER.

   LTE L600 – WHITE–SOLID STRIPE
   LTE 700 – RED–BLACK CHECKER STRIPE
   LTE PCS – RED–GREEN CHECKER STRIPE
   LTE AWS – YELLOW–BLACK CHECKER STRIPE
   UMTS PCS – RED–WHITE CHECKER STRIPE
   UMTS AWS – GREEN–WHITE CHECKER STRIPE
   GSM PCS – BLACK–WHITE CHECKER STRIPE
4. UMTS AWS LINE 1 & 2 TO HAVE TMA, MOUNTED ON PIPE BEHIND ANTENNA POSITION #2.
5. MULTI–PORTS ANTENNAS: TERMINATE UNUSED ANTENNA PORTS WITH CONNECTOR CAP & WEATHERPROOF THOROUGHLY. JUMPERS FROM TMAS MUST TERMINATE TO OPPOSITE POLARIZATIONS IN EACH SECTOR,
6. CONTRACTOR MUST FOLLOW ALL MANUFACTURERS' RECOMMENDATIONS REGARDING THE INSTALLATION OF COAXIAL CABLES, CONNECTORS & ANTENNAS.
7. MINIMUM BEND RADIUS:

   LDF4–50A (1/2" HARD LINE) = 5"
   FSJ4–50B (1/2" SUPER FLEX) = 1 1/4"
   AVA5–50A (7/8" HARD LINE) = 10"
   AVA7–50A (1 5/8 HARD LINE) = 15"
   LDF7–50A (1 5/8" HARD LINE) = 20"
8. CONTRACTOR SHALL RECORD THE SERIAL, SECTOR & POSITION OF EACH ACTUATOR INSTALLED AT THE ANTENNAS AND FURNISH THE INFORMATION TO T–MOBILE.
9. WEATHERPROOF ALL ANTENNA CONNECTORS WITH SELF–AMALGAMATING TAPE.
10. ANTENNA CONTRACTOR SHALL PERFORM A "TAPE DROP" MEASUREMENT TO CONFIRM/VALIDATE ANTENNA CENTERLINE (ACL) HEIGHT. CONTRACTOR SHALL SUBMIT A COMPLETED HEIGHT VERIFICATION FORM TO THE CONSTRUCTION MANAGER.
11. ALL FIBER RUNS TO BE CONTAINED IN (1) NOKIA HYBRID DC–FIBER CABLE (P/N: ASU9325TYP01) FROM LOWER COVP TO UPPER COVP. HYBRID CABLE SHALL BE COLOR CODED PER T–MOBILE REQUIREMENTS.

ANTENNA KEY

SECTOR	STATUS	ANTENNA NUMBER	TYPE	COLOR CODE	ANTENNA VENDOR	MODEL #	AZIMUTH	ELEC. TILT	MECH TILT	RAD CENTER	COAXIAL FEEDER SIZE	COAXIAL FEEDER LENGTH	HYBRID CABLE FEEDER SIZE	HYBRID CABLE FEEDER LENGTH
ALPHA	EXISTING	A–1	G1900 U2100	– –	ERICSSON	AIR21 KRC118023–1_B2A_B4P	0°	2° 6°	0°	56'–0"	– (2) 1 5/8"	– EXISTING	(1) 9x18 HCS	150'
	NEW	**A–2**	**L700 L600**	– –	**RFS**	**APXVAARR24_43–U–NA20**	**0°**	**3° 3°**	**0°**	56'–0"	– –	– –	**(1) 6x12 HCS**	**150'**
	NEW	**A–3**	**L1900 L2100**	– –	**ERICSSON**	**AIR32 KRD901146–1_B66A_B4A**	**0°**	**2° 2°**	**0°**	56'–0"	– –	– –	**(1) 6x12 HCS (SHARED)**	**150'**
BETA	EXISTING	B–1	G1900 U2100	– –	ERICSSON	AIR21 KRC118023–1_B2A_B4P	120°	2° 5°	0°	56'–0"	– (2) 1 5/8"	– EXISTING	(1) 9x18 HCS (SHARED)	150'
	NEW	**B–2**	**L700 L600**	– –	**RFS**	**APXVAARR24_43–U–NA20**	**120°**	**3° 3°**	**0°**	56'–0"	– –	– –	**(1) 6x12 HCS**	**150'**
	NEW	**B–3**	**L1900 L2100**	– –	**ERICSSON**	**AIR32 KRD901146–1_B66A_B4A**	**120°**	**2° 2°**	**0°**	56'–0"	– –	– –	**(1) 6x12 HCS (SHARED)**	**150'**
GAMMA	EXISTING	G–1	G1900 U2100	– –	ERICSSON	AIR21 KRC118023–1_B2A_B4P	240°	2° 8°	0°	56'–0"	– (2) 1 5/8"	– EXISTING	(1) 9x18 HCS (SHARED)	150'
	NEW	**G–2**	**L700 L600**	– –	**RFS**	**APXVAARR24_43–U–NA20**	**240°**	**3° 3°**	**0°**	56'–0"	– –	– –	**(1) 6x12 HCS**	**150'**
	NEW	**G–3**	**L1900 L2100**	– –	**ERICSSON**	**AIR32 KRD901146–1_B66A_B4A**	**350°**	**2° 2°**	**0°**	56'–0"	– –	– –	**(1) 6x12 HCS (SHARED)**	**150'**

EQUIPMENT KEY – ON TOWER

SECTOR	VENDOR	EQUIPMENT	MODEL #	ELEVATION	QUANTITY	STATUS
MULTI	ERICSSON	RRU	4449 B71+B12	56'–0"	3	NEW
MULTI	COMMSCOPE	TMA	TMA–S–DB1921–DD–A	56'–0"	3	EXISTING

1 ANTENNA, RRU & TMA SCHEDULE
SCALE: N.T.S.

B+T GRP

T···Mobile

CENTERLINE COMMUNICATIONS

SITE NUMBER:
CTHA242A

SITE NAME:
HA242 / PORTLAND
HS_SST

SITE ADDRESS:
95 HIGH ST
PORTLAND, CT 06480

PROJECT NO:	135665.003.01
CHECKED BY:	MDW

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION
A	7/1/19	JCO	PRELIMINARY REVIEW
0	7/17/19	RMC	CONSTRUCTION
1	7/19/19	JJD	CONSTRUCTION

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/20

STATE OF CONNECTICUT
31627
LICENSED
PROFESSIONAL ENGINEER
7/19/19

SHEET NUMBER: A-6
REVISION: 1

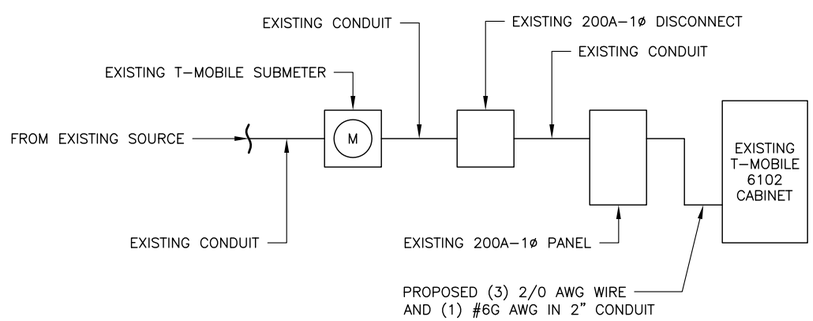
FINAL PANEL SCHEDULE							
LOAD	POLES	AMPS	BUS L1	BUS L2	AMPS	POLES	LOAD
SURGE	2	60A	1	2	20A	1	GFCI
			3	4	50A	2	RBS 3106
RBS 6102	2	**125A**	5	6			
			7	8	20A	1	SPOTLIGHT

RATED VOLTAGE: ■120/240 □_____. 1 PHASE, 3 WIRE	BRANCH POLES: □12 ■24 □30 □42	APPROVED MF'RS	
RATED AMPS: □100 ■225 □400 □_____.	CABINET: ■SURFACE □FLUSH	NEMA □1 ■3R □4X	
□MAIN LUGS ONLY ■MAIN 200 AMPS ■BREAKER □FUSED SWITCH	■HINGED DOOR	■KEYED DOOR LATCH	
□FUSED ■CIRCUIT BREAKER BRANCH DEVICES	□_____ TO BE GFCI BREAKERS	FULL NEUTRAL BUS	GROUND BAR
ALL BREAKERS MUST BE RATED TO INTERRUPT A SHORT CIRCUIT ISC OF 10,000 AMPS SYMMETRICAL			

REPLACE EXISTING BREAKER IN POSITION 5 AND 7 WITH A NEW 2P 125A BREAKER
REPLACE EXISTING WIRES FOR EXISTING 6102 CABINET WITH (3) 2/0 AWG THWN (COPPER) AND (1) #6G AWG. MINIMUM CONDUIT SIZE TO BE 2".
IF 125A BREAKER WILL NOT PROPERLY FIT IN EXISTING PANEL, REPLACE (E) PANEL WITH SQUARE D PANEL QO12040M200RB (OR APPROVED EQUAL).
UPGRADE FEEDER WIRES TO MEET AMPACITY IF NEW PANEL IS REQUIRED.
FINAL PANEL DESIGN AND CALCULATIONS FOR WIRE SIZE WERE BASED OFF OF EXISTING PHOTOS

1 FINAL T-MOBILE PANEL DETAIL

SCALE: N.T.S.



2 ONE-LINE DIAGRAM

SCALE: N.T.S.

B+T GRP

T···Mobile

CENTERLINE COMMUNICATIONS

SITE NUMBER:
CTHA242A

SITE NAME:
HA242 / PORTLAND
HS_SST

SITE ADDRESS:
95 HIGH ST
PORTLAND, CT 06480

PROJECT NO:	135665.003.01
CHECKED BY:	MDW

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION
A	7/1/19	JCO	PRELIMINARY REVIEW
0	7/17/19	RMC	CONSTRUCTION
1	7/19/19	JJD	CONSTRUCTION

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/20

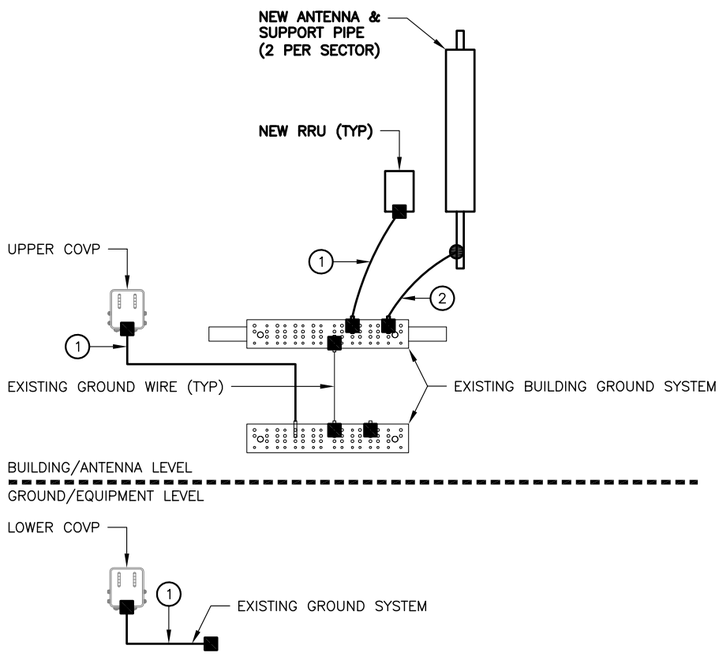
STATE OF CONNECTICUT 31627 LICENSED PROFESSIONAL ENGINEER

7/19/19

SHEET NUMBER:	REVISION:
E-1	1

LEGEND	
●	EXOTHERMIC CONNECTION
■	MECHANICAL CONNECTION
(1)	#2 AWG STRANDED INSULATED COPPER GROUND WIRE
(2)	#2 SOLID TINNED, BARE COPPER GROUND WIRE

TYPICAL SECTOR



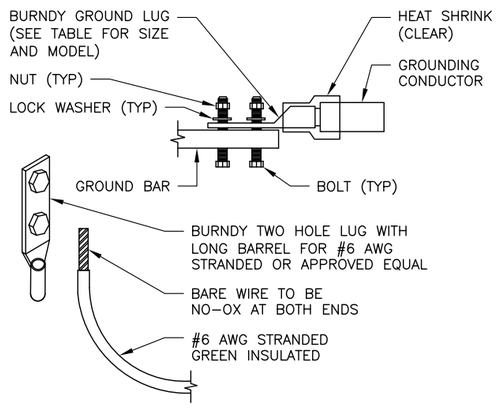
1 ANTENNA GROUND DIAGRAM

SCALE: N.T.S.

WIRE SIZE	BURNDY LUG	BOLT SIZE
#6 AWG GREEN INSULATED	YA6A-2TC38	3/8" - 16 NC S 2 BOLT
#2 AWG SOLID TINNED	YA3A-2TC38	3/8" - 16 NC S 2 BOLT
#2 AWG STRANDED	YA2A-2TC38	3/8" - 16 NC S 2 BOLT
#2/0 AWG STRANDED	YA26-2TC38	3/8" - 16 NC S 2 BOLT
#4/0 AWG STRANDED	YA28-2N	1/2" - 16 NC S 2 BOLT

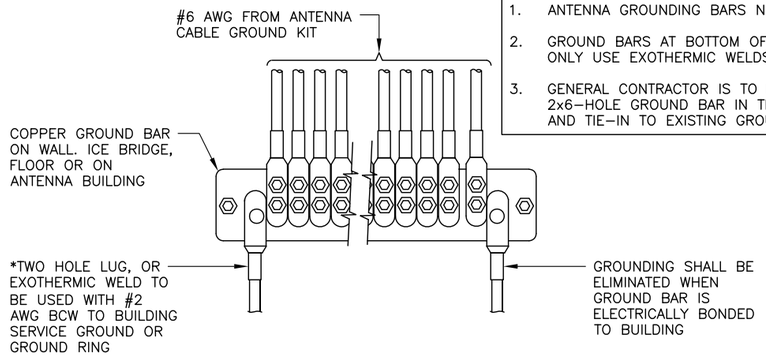
NOTES:

1. ALL HARDWARE BOLTS, NUTS, LOCK WASHERS SHALL BE STAINLESS STEEL. ALL HARDWARE ARE TO BE AS FOLLOWS: BOLT, FLAT WASHER, GROUND BAR, GROUND LUG, FLAT WASHER AND NUT.
2. COPPER SHIELD, ANTIOX, CR NO-OX OR APPROVED EQUAL SHALL BE PLACE WHERE ALL DISSIMILAR METALS CONNECT.
3. ALL LUGS ARE TO BE INSTALLED PER MANUFACTURER'S SPECIFICATIONS.



2 MECHANICAL LUG CONNECTION

SCALE: N.T.S.



NOTES:

1. ANTENNA GROUNDING BARS NOT TO USE INSULATORS.
2. GROUND BARS AT BOTTOM OF BUILDINGS SHALL ONLY USE EXOTHERMIC WELDS.
3. GENERAL CONTRACTOR IS TO FURNISH AND INSTALL A 2x6-HOLE GROUND BAR IN THE GBF OF THE RBS AND TIE-IN TO EXISTING GROUND RING.

3 GROUNDWIRE INSTALLATION

SCALE: N.T.S.

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T-Mobile

CENTERLINE COMMUNICATIONS

SITE NUMBER:
CTHA242A

SITE NAME:
HA242 / PORTLAND
HS_SST

SITE ADDRESS:
95 HIGH ST
PORTLAND, CT 06480

PROJECT NO:	135665.003.01
CHECKED BY:	MDW

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION
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0	7/17/19	RMC	CONSTRUCTION
1	7/19/19	JJD	CONSTRUCTION

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/20

SHEET NUMBER:	REVISION:
G-1	1

Exhibit D

Structural Analysis Report

Date: **July 19, 2019**

Evelyn Rodowicz
Centerline Communications
95 Ryan Drive
Raynham, MA, 02767

B+T Group
1717 S. Boulder, Suite 300
Tulsa, OK 74119
(918) 587-4630

Subject:	**Structural Analysis Report**	
Carrier Designation:	***T-Mobile* Co-Locate**	
Centerline Comm. Designation:	**Site Number:**	CTHA242A
	Site Name:	Portland HS
Engineering Firm Designation:	**B+T Group Project Number:**	135665.004a.01
Site Data:	**95 High Street, Portland, CT 06480, Middlesex County, CT** **Latitude *41° 34' 52.01"*, Longitude *-72° 37' 19.98"*** **120 Foot - Self Support Tower**	

Dear Evelyn Rodowicz,

B+T Group is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above mentioned tower.

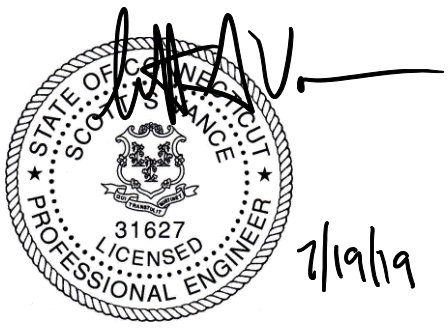
The purpose of the analysis is to determine acceptability of the tower stress level. Based on our analysis we have determined the tower stress level for the structure and foundation, under the following load case, to be:

Proposed Equipment Configuration **Sufficient Capacity**

The analysis has been performed in accordance with the TIA-222-G Standard. This analysis utilizes an ultimate 3-second gust wind speed of 130 mph (converted to an equivalent 101 mph nominal 3-second gust wind speed per Section 1609.3.1 for use with TIA-222 G) as required by the 2015 International Building Code. Exposure Category C with a maximum topographic factor 1 and Risk Category II were used in this analysis.

Structural analysis prepared by: Abigail Enriquez

Respectfully submitted by: B+T Engineering, Inc.
COA: PEC.0001564 Expires: 02/10/2020



Scott S. Vance, P.E.

tnxTower Report - version 8.0.5.0

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 120 ft. Self-Support tower designed by PiROD Inc. and mapped by Hightower Solutions in March of 2017. The original design standard and wind speeds are not available. This tower has been modified by KMCE in September of 2017 but the mod details were not available hence considered those modifications for wind area only.

2) ANALYSIS CRITERIA

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

Table 1 - Proposed Equipment Configuration

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
110.0	110.0	3	Ericsson	AIR21 KRC118023-1_B2A_B4P (Quad)	6 4	1-5/8 1-1/4
		3	Ericsson	AIR32 KRD901146-1_B66A_B2A (Octo)		
		3	Ericsson	RADIO 4449 B12/B71		
		3	Generic	TMA		
		3	RFS Celwave	APXVAARR24_43-U-NA20		
		3	Sabre	C10857007C		

Table 2 - Other Considered Equipment

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
118.0	125.5	3	RFS Celwave	PD220	3	7/8
	118.0	3	--	Standoff Mount		
95.0	95.0	1	Andrew	Andrew 6' w/Radome	2	5/8
		2	--	TMA		
		1	--	Standoff Mount		
90.0	90.0	1	Andrew	Andrew 4' w/Radome	1	EW90
		1	--	Standoff Mount		
87.0	97.0	1	Miscl	20' Omni	1	7/8
	87.0	1	--	Side Arm Mount		
80.0	90.0	2	Miscl	20' Omni	2	7/8
	80.0	2	--	Side Arm Mount		
40.0	40.0	1	--	GPS	1	5/8

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
Tower Data	Structural Analysis by Destek Engg., Job No: 1875008	Date: 04/20/2018	Centerline Communications
Foundation Data	*No Information Available*		
Soil Properties			
Existing Loading	Structural Analysis by Destek Engg., Job No: 1875008	Date: 04/20/2018	Centerline Communications
Proposed Loading	Mount Analysis by B+T Group, Project No: 135665.002.01	Date: 06/12/2019	On File
	CTHA242A_RFDS	Date: 04/16/2019	Centerline Communications

3.1) Analysis Method

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

3.2) Assumptions

1) The tower and structures were built and have been maintained in accordance with the manufacturer's specification.
2) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
3) Mount areas and weights are assumed based on photographs provided.
4) Brace and Flange bolt details were not available, it is assumed that Bolts are designed to the strength of the main tower and hence assumed sufficient.

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

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
T1	120 - 110	Leg	1 3/4	3	-2.311	77.187	3.0	Pass
T2	110 - 90	Leg	1 3/4	35	-34.242	77.187	44.4	Pass
T3	90 - 70	Leg	2	92	-87.826	109.130	80.5	Pass
T4	70 - 50	Leg	2 1/4	149	-139.112	145.571	95.6	Pass
T5	50 - 40	Leg	Pirod 105244	206	-135.891	142.493	95.4	Pass
T6	40 - 20	Leg	Pirod 105217	215	-155.033	214.859	72.2	Pass
T7	20 - 0	Leg	Pirod 105217	230	-169.914	214.859	79.1	Pass
T1	120 - 110	Diagonal	3/4	12	-0.430	4.869	8.8	Pass
T2	110 - 90	Diagonal	3/4	43	-3.506	4.869	72.0	Pass
T3	90 - 70	Diagonal	7/8	103	-4.702	8.884	52.9	Pass
T4	70 - 50	Diagonal	7/8	166	-4.060	7.839	51.8	Pass
T5	50 - 40	Diagonal	L2 1/2x2 1/2x3/16	213	-7.659	12.926	59.3	Pass

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
T6	40 - 20	Diagonal	L2 1/2x2 1/2x3/16	226	-4.047	11.697	34.6	Pass
T7	20 - 0	Diagonal	L2 1/2x2 1/2x3/16	234	-5.115	9.139	56.0	Pass
T1	120 - 110	Top Girt	3/4	5	-0.041	2.623	1.5	Pass
T2	110 - 90	Top Girt	3/4	39	-0.408	2.623	15.5	Pass
T3	90 - 70	Top Girt	7/8	96	-0.208	4.906	4.2	Pass
T4	70 - 50	Top Girt	7/8	153	-0.057	4.949	1.1	Pass
T1	120 - 110	Bottom Girt	3/4	9	-0.212	2.623	8.1	Pass
T2	110 - 90	Bottom Girt	3/4	41	-0.286	2.623	10.9	Pass
T3	90 - 70	Bottom Girt	7/8	99	-0.441	4.906	9.0	Pass
T4	70 - 50	Bottom Girt	7/8	156	-2.433	3.978	61.2	Pass
							Summary	
						Leg (T4)	95.6	Pass
						Diagonal (T2)	72.0	Pass
						Top Girt (T2)	15.5	Pass
						Bottom Girt (T4)	61.2	Pass
						RATING =	**95.6**	**Pass**

Table 5 - Tower Component Stresses vs. Capacity

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	Base	59.3	Pass
1,3	Base Foundation	Base	92.7	Pass

Structure Rating (max from all components) =	95.6%

Notes:
1) See additional documentation in “Appendix C – Additional Calculations” for calculations supporting the % capacity consumed.
2) Foundation capacity determined by comparing analysis reactions to original design reactions.

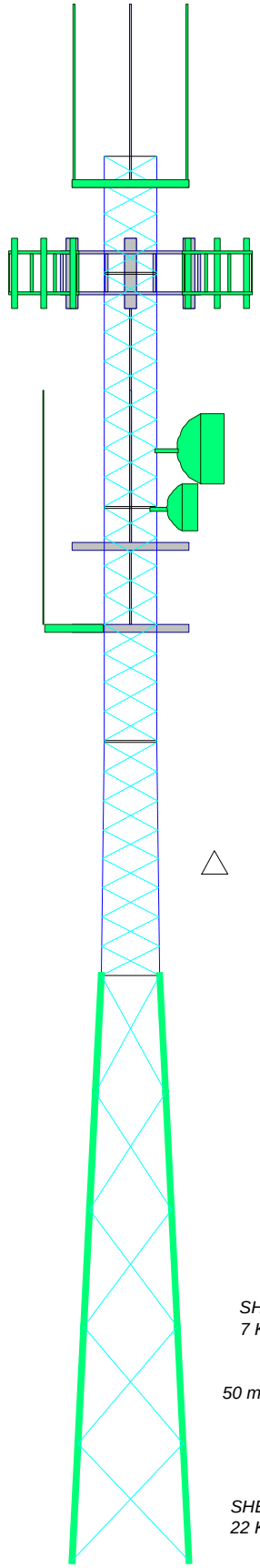
4.1) Recommendations

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

APPENDIX A

TNXTOWER OUTPUT

Section	T7	T6	T5	T4	T3	T2	T1
Legs		Pirod 105217	Pirod 105244	SR 2 1/4	SR 2	SR 1 3/4	
Leg Grade				A572-50			
Diagonals		L2 1/2x2 1/2x3/16		SR 7/8		SR 3/4	
Diagonal Grade				A36			
Top Girts		N.A.		SR 7/8		SR 3/4	
Bottom Girts		N.A.		SR 7/8		SR 3/4	
Face Width (ft)	10	8	6	5	4.5		
# Panels @ (ft)		5 @ 10		8 @ 2.48958	20 @ 2.47917		
Weight (K)	10.0	2.4	2.3	1.1	1.5	1.3	0.9	0.5



MATERIAL STRENGTH

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

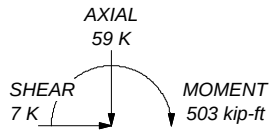
TOWER DESIGN NOTES

1. Tower is located in Middlesex County, Connecticut.
2. Tower designed for Exposure C to the TIA-222-G Standard.
3. Tower designed for a 101 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 50 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Structure Class II.
7. Topographic Category 1 with Crest Height of 0'
8. TOWER RATING: 95.6%

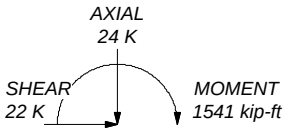
ALL REACTIONS ARE FACTORED

MAX. CORNER REACTIONS AT BASE:
DOWN: 177 K
SHEAR: 15 K

UPLIFT: -165 K
SHEAR: 14 K



TORQUE 2 kip-ft
50 mph WIND - 0.750 in ICE

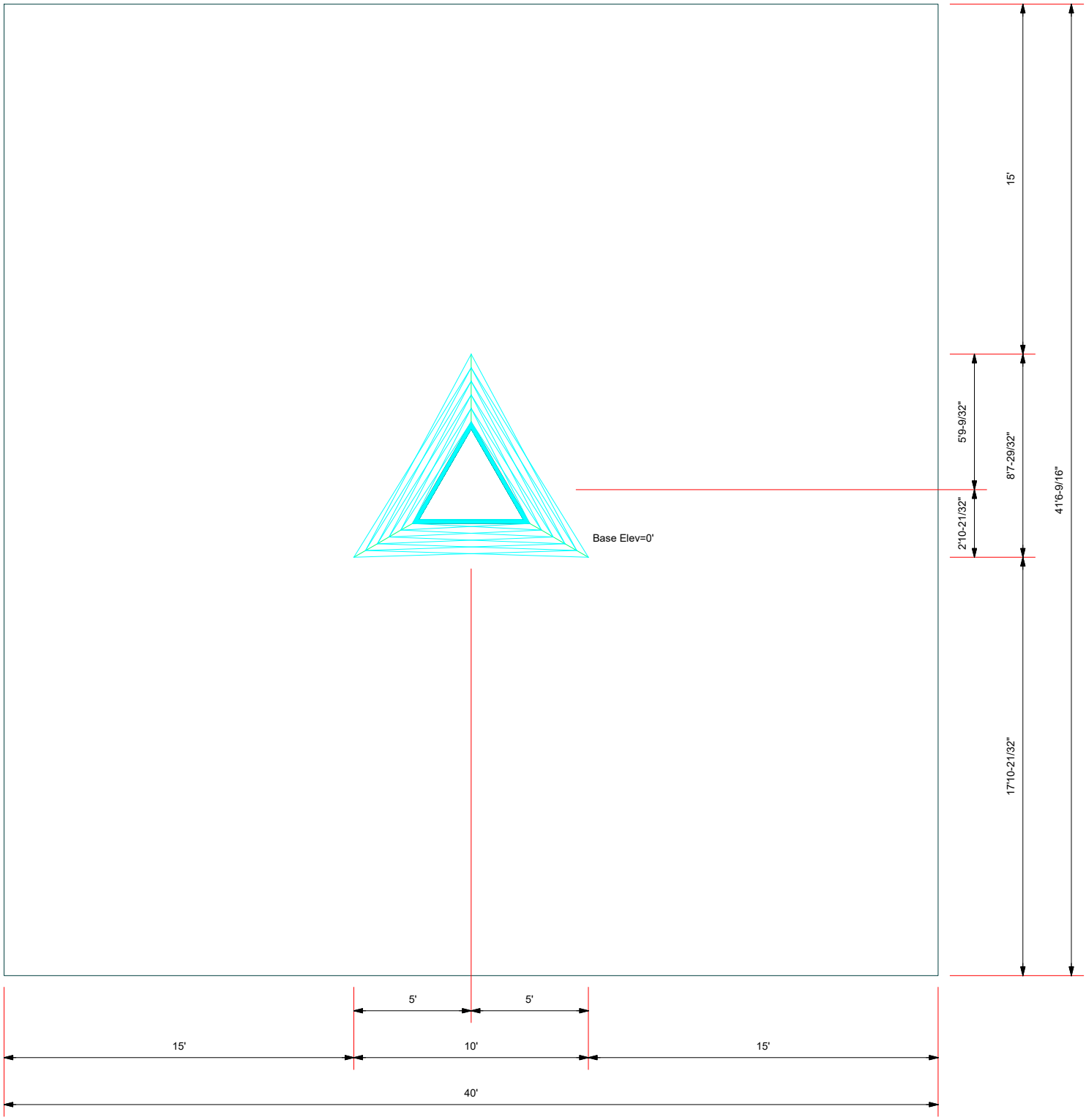


TORQUE 6 kip-ft
REACTIONS - 101 mph WIND

B+T Group
1717 S. Boulder, Suite 300
Tulsa, OK 74119
Phone: 9185874630
FAX: 9182950265

Job: 135665.004.01 - Portland HS, CT (Site# CTHA242A			
Project:			
Client: Centerline Communications	Drawn by: acontreras	App'd:	
Code: TIA-222-G	Date: 07/19/19	Scale: NTS	
Path:		Dwg No. E-1	

Plot Plan
Total Area - 0.04 Acres



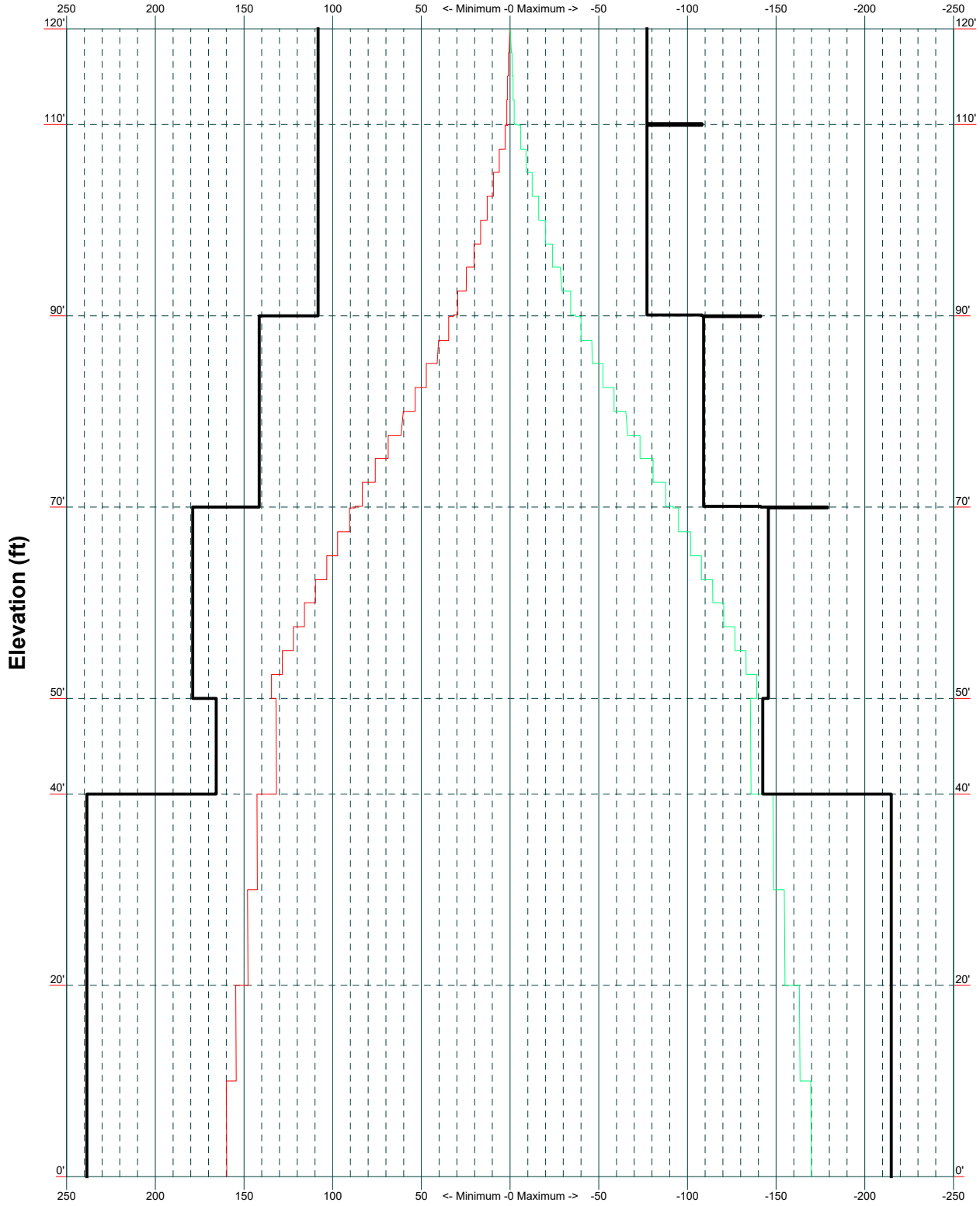
B+T GRP

B+T Group
1717 S. Boulder, Suite 300
Tulsa, OK 74119
Phone: 9185874630
FAX: 9182950265

Job: ***135665.004.01 - Portland HS, CT (Site# CTHA242A***			
Project:			
Client: Centerline Communications	Drawn by: acontreras	App'd:	
Code: TIA-222-G	Date: 07/19/19	Scale: NTS	
Path:		Dwg No. E-2	

TIA-222-G - 101 mph/50 mph 0.750 in Ice Exposure C

Leg Capacity ——— **Leg Compression (K)**



B+T GRP

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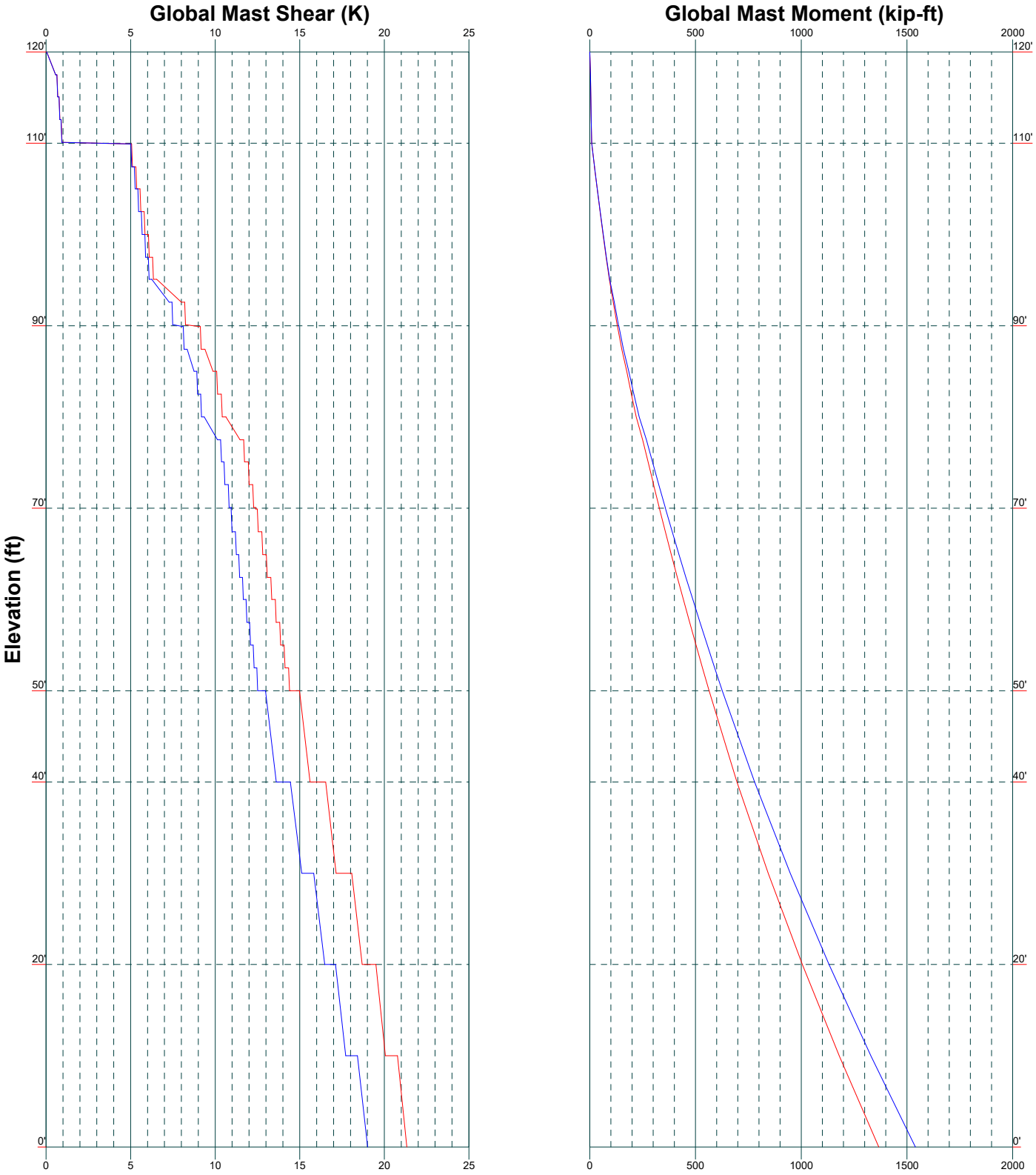
1717 S. Boulder, Suite 300
Tulsa, OK 74119
Phone: 9185874630
FAX: 9182950265

Job: *135665.004.01 - Portland HS, CT (Site# CTHA242A*			
Project:			
Client: Centerline Communications	Drawn by: acontreras	App'd:	
Code: TIA-222-G	Date: 07/19/19	Scale: NTS	
Path:		Dwg No. E-3	

TIA-222-G - 101 mph/50 mph 0.750 in Ice Exposure C

Maximum Values

Vx Vz Mx Mz



B+T GRP

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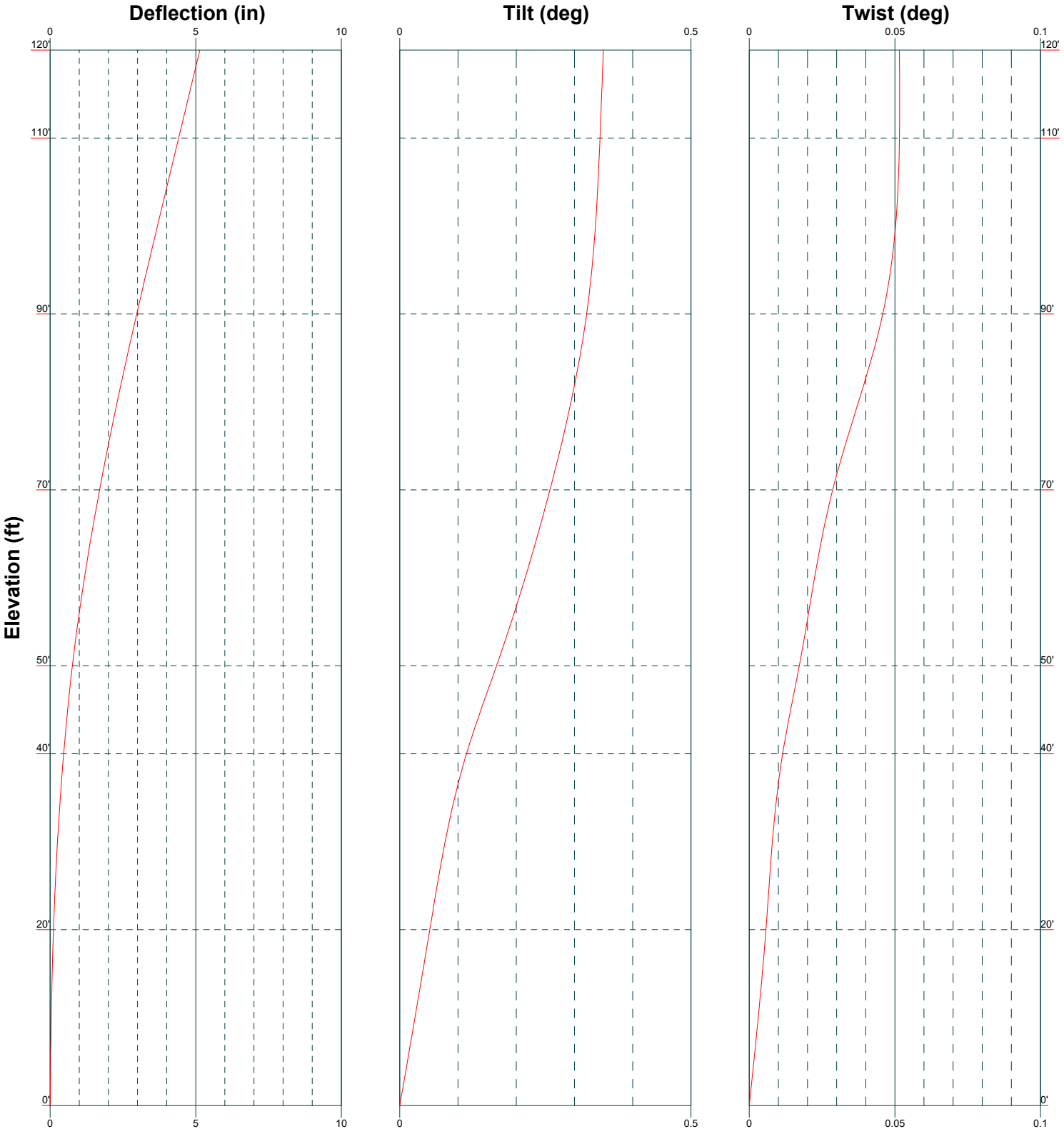
1717 S. Boulder, Suite 300
Tulsa, OK 74119
Phone: 9185874630
FAX: 9182950265

Job: *135665.004.01 - Portland HS, CT (Site# CTHA242A*			
Project:			
Client: Centerline Communications	Drawn by: acontreras	App'd:	
Code: TIA-222-G	Date: 07/19/19	Scale: NTS	
Path:		Dwg No. E-4	

TIA-222-G - Service - 60 mph

Maximum Values



B+T GRP

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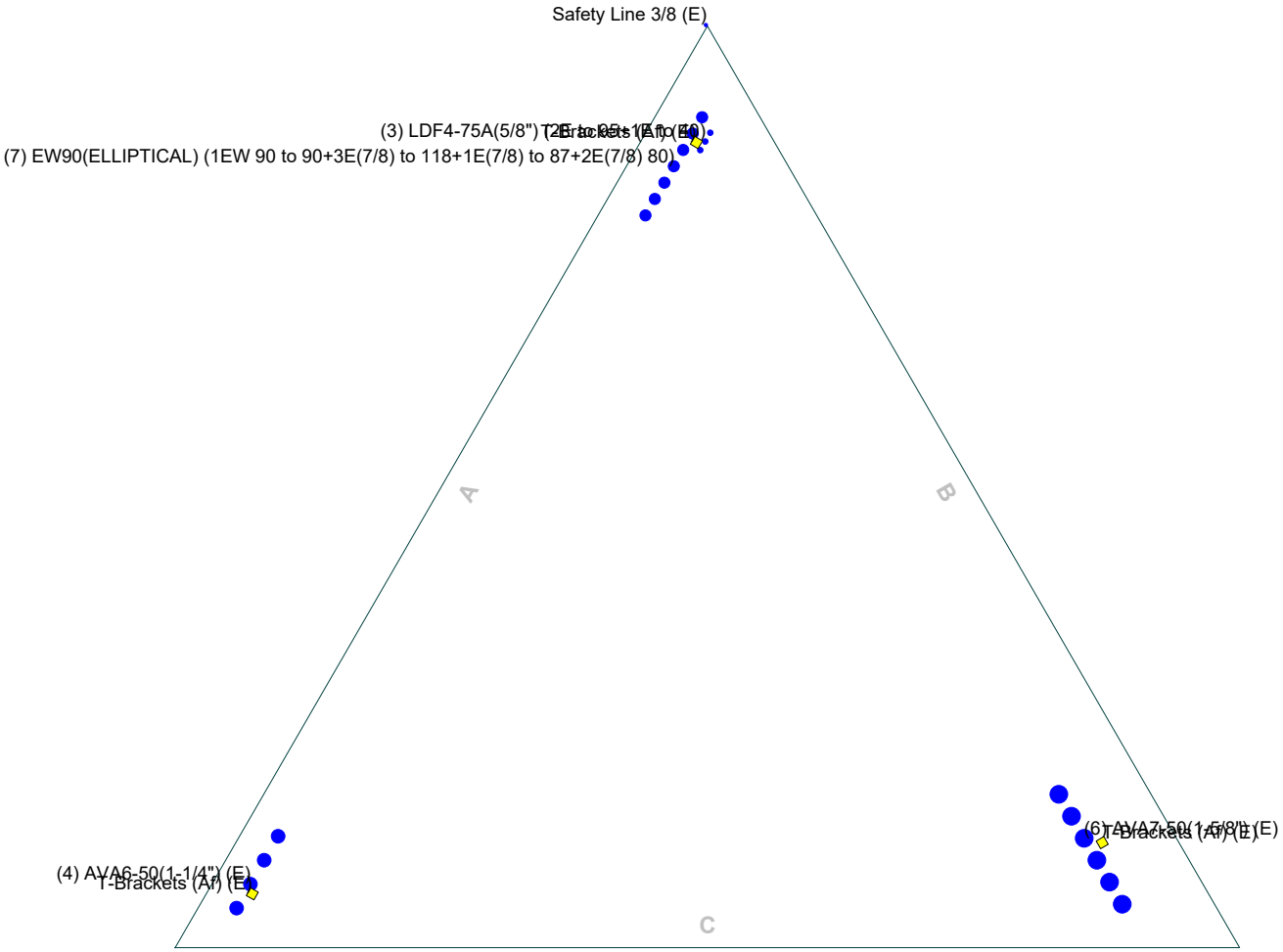
1717 S. Boulder, Suite 300
Tulsa, OK 74119
Phone: 9185874630
FAX: 9182950265

Job: *135665.004.01 - Portland HS, CT (Site# CTHA242A*			
Project:			
Client: Centerline Communications	Drawn by: acontreras	App'd:	
Code: TIA-222-G	Date: 07/19/19	Scale: NTS	
Path:		Dwg No. E-5	

Feed Line Plan

Round Flat App In Face App Out Face Truss-Leg



B+T Group 1717 S. Boulder, Suite 300 Tulsa, OK 74119 Phone: 9185874630 FAX: 9182950265	Job: ***135665.004.01 - Portland HS, CT (Site# CTHA242A***		
	Project:		
	Client: Centerline Communications	Drawn by: acontreras	App'd:
	Code: TIA-222-G	Date: 07/19/19	Scale: NTS
	Path:		Dwg No. E-7

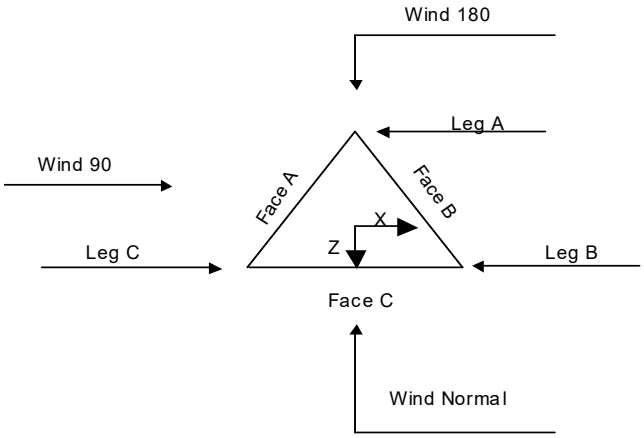
Tower Input Data

The main tower is a 3x free standing tower with an overall height of 120' above the ground line.
The base of the tower is set at an elevation of 0' above the ground line.
The face width of the tower is 4'6" at the top and 10' at the base.
This tower is designed using the TIA-222-G standard.
The following design criteria apply:

Tower is located in Middlesex County, Connecticut.
Basic wind speed of 101 mph.
Structure Class II.
Exposure Category C.
Topographic Category 1.
Crest Height 0'.
Nominal ice thickness of 0.750 in.
Ice thickness is considered to increase with height.
Ice density of 56.000 pcf.
A wind speed of 50 mph is used in combination with ice.
Temperature drop of 50.000 °F.
Deflections calculated using a wind speed of 60 mph.
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	120'-110'			4'6"	1	10'
T2	110'-90'			4'6"	1	20'
T3	90'-70'			4'6"	1	20'
T4	70'-50'			4'6"	1	20'
T5	50'-40'			5'	1	10'
T6	40'-20'			6'	1	20'
T7	20'-0'			8'	1	20'

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	120'-110'	2'5-3/4"	X Brace	No	No	0.000	1.000
T2	110'-90'	2'5-3/4"	X Brace	No	No	1.000	1.000
T3	90'-70'	2'5-3/4"	X Brace	No	No	1.000	1.000
T4	70'-50'	2'5-7/8"	X Brace	No	No	1.000	0.000
T5	50'-40'	10'	X Brace	No	No	0.000	0.000
T6	40'-20'	10'	X Brace	No	No	0.000	0.000
T7	20'-0'	10'	X Brace	No	No	0.000	0.000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 120'-110'	Solid Round	1 3/4	A572-50 (50 ksi)	Solid Round	3/4	A36 (36 ksi)
T2 110'-90'	Solid Round	1 3/4	A572-50 (50 ksi)	Solid Round	3/4	A36 (36 ksi)
T3 90'-70'	Solid Round	2	A572-50 (50 ksi)	Solid Round	7/8	A36 (36 ksi)
T4 70'-50'	Solid Round	2 1/4	A572-50 (50 ksi)	Solid Round	7/8	A36 (36 ksi)
T5 50'-40'	Truss Leg	Pirod 105244	A572-50 (50 ksi)	Equal Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T6 40'-20'	Truss Leg	Pirod 105217	A572-50 (50 ksi)	Equal Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T7 20'-0'	Truss Leg	Pirod 105217	A572-50 (50 ksi)	Equal Angle	L2 1/2x2 1/2x3/16	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 120'-110'	Solid Round	3/4	A36 (36 ksi)	Solid Round	3/4	A36 (36 ksi)
T2 110'-90'	Solid Round	3/4	A36 (36 ksi)	Solid Round	3/4	A36 (36 ksi)
T3 90'-70'	Solid Round	7/8	A36 (36 ksi)	Solid Round	7/8	A36 (36 ksi)
T4 70'-50'	Solid Round	7/8	A36 (36 ksi)	Solid Round	7/8	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 120'-110'	0.000	0.000	A36 (36 ksi)	1	1.05	1.05	Mid-Pt	Mid-Pt	Mid-Pt
T2 110'-90'	0.000	0.000	A36 (36 ksi)	1	1.07	1.05	Mid-Pt	Mid-Pt	Mid-Pt
T3 90'-70'	0.000	0.000	A36 (36 ksi)	1	1.07	1.05	Mid-Pt	Mid-Pt	Mid-Pt
T4 70'-50'	0.000	0.000	A36 (36 ksi)	1	1.07	1.05	Mid-Pt	Mid-Pt	Mid-Pt
T5 50'-40'	0.000	0.000	A36 (36 ksi)	1.05	1	1.05	Mid-Pt	Mid-Pt	Mid-Pt

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
T6 40'-20'	0.000	0.000	A36 (36 ksi)	1.05	1	1.05	Mid-Pt	Mid-Pt	Mid-Pt
T7 20'-0'	0.000	0.000	A36 (36 ksi)	1.1	1	1.07	Mid-Pt	Mid-Pt	Mid-Pt

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 120'-110'	No	Yes	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T2 110'-90'	No	Yes	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T3 90'-70'	No	Yes	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T4 70'-50'	No	Yes	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T5 50'-40'	Yes	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T6 40'-20'	Yes	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T7 20'-0'	Yes	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	0.5	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)*

	Truss-Leg K Factors					
	Truss-Legs Used As Leg Members			Truss-Legs Used As Inner Members		
Tower Elevation ft	Leg Panels	X Brace Diagonals	Z Brace Diagonals	Leg Panels	X Brace Diagonals	Z Brace Diagonals
T5 50'-40'	1	0.5	0.85	1	0.5	0.85
T6 40'-20'	1	0.5	0.85	1	0.5	0.85
T7 20'-0'	1	0.5	0.85	1	0.5	0.85

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U
T1 120'-110'	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T2 110'-90'	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T3 90'-70'	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T4 70'-50'	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T5 50'-40'	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T6 40'-20'	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T7 20'-0'	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Connection Type	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
		Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.
T1 120'-110'	Flange	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.000 A325N	0
T2 110'-90'	Flange	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.000 A325N	0
T3 90'-70'	Flange	0.750 A325N	0	0.625 A325N	0	0.625 A325N	0	0.000 A325N	0	0.625 A325N	0	0.625 A325N	0	0.000 A325N	0
T4 70'-50'	Flange	1.000 A325N	0	1.000 A325N	0	0.625 A325N	0	0.000 A325N	0	0.625 A325N	0	0.625 A325N	0	0.000 A325N	0
T5 50'-40'	Flange	1.000 A325N	0	1.000 A325N	0	0.625 A325N	0	0.000 A325N	0	0.625 A325N	0	0.625 A325N	0	0.000 A325N	0
T6 40'-20'	Flange	1.000 A325N	0	1.000 A325N	0	0.625 A325N	0	0.000 A325N	0	0.625 A325N	0	0.625 A325N	0	0.000 A325N	0
T7 20'-0'	Flange	1.000 A325N	0	1.000 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	1

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 klf
$RB AVA7-50(1-5/8") (E)	B	No	No	Ar (CaAa)	110' - 0'	-8.000	0.35	6	6	0.850 1.000	2.010		0.001
T-Brackets (Af) (E)	B	No	No	Af (CaAa)	110' - 0'	-7.000	0.35	1	1	1.000	1.000		0.008
$RB AVA6-50(1-1/4") (E)	A	No	No	Ar (CaAa)	110' - 0'	-3.000	-0.4	4	4	1.560	1.560		0.000
T-Brackets	A	No	No	Af (CaAa)	110' - 0'	-4.000	-0.42	1	1	1.000	1.000		0.008

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 klf
(Af) (E) ***$RB***													
EW90(ELLIPTICAL) (1EW 90 to 90+3E(7/8) to 118+1E(7/8) to 87+2E(7/8) 80)	A	No	No	Ar (CaAa)	80' - 0'	-4.000	0.37	7	7	0.850 0.750	1.280		0.000
EW90(ELLIPTICAL) (1EW 90 to 90+3E(7/8) to 118+1E(7/8) to 87+2E(7/8) 80)	A	No	No	Ar (CaAa)	87' - 80'	-4.000	0.37	5	5	0.850 0.750	1.280		0.000
EW90(ELLIPTICAL) (1EW 90 to 90+3E(7/8) to 118+1E(7/8) to 87+2E(7/8) 80)	A	No	No	Ar (CaAa)	90' - 87'	-4.000	0.37	4	4	0.850 0.750	1.280		0.000
AVA5-50(7/8") (1EW 90 to 90+3E(7/8) to 118+1E(7/8) to 87+2E(7/8) 80) ***$RB***	A	No	No	Ar (CaAa)	118' - 90'	-4.000	0.37	3	3	0.850 0.750	1.102		0.000
LDF4-75A(5/8") (2E to 95+1E to 40)	A	No	No	Ar (CaAa)	40' - 0'	-6.000	0.405	3	3	0.500	0.630		0.000
LDF4-75A(5/8") (2E to 95+1E to 40)	A	No	No	Ar (CaAa)	95' - 40'	-6.000	0.405	2	2	0.500	0.630		0.000
T-Brackets (Af) (E) ***$RB***	A	No	No	Af (CaAa)	118' - 0'	-5.000	0.4	1	1	1.000	1.000		0.008
Safety Line 3/8 (E) ***$RB***	A	No	No	Ar (CaAa)	120' - 0'	0.000	0.5	1	1	0.375	0.375		0.000
1.25" SR (E-Mod)	A	No	No	Ar (CaAa)	50' - 20'	0.000	0.495	1	1	1.250	1.250		0.004
1.25" SR (E-Mod)	A	No	No	Ar (CaAa)	50' - 20'	0.000	-0.495	1	1	1.250	1.250		0.004
1.25" SR (E-Mod)	B	No	No	Ar (CaAa)	50' - 20'	0.000	0.495	1	1	1.250	1.250		0.004
1.25" SR (E-Mod)	B	No	No	Ar (CaAa)	50' - 20'	0.000	-0.495	1	1	1.250	1.250		0.004
1.25" SR (E-Mod)	C	No	No	Ar (CaAa)	50' - 20'	0.000	0.495	1	1	1.250	1.250		0.004
1.25" SR (E-Mod)	C	No	No	Ar (CaAa)	50' - 20'	0.000	-0.495	1	1	1.250	1.250		0.004

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 klf
$RB													

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number	C_AA_A ft^2/ft	Weight klf
$RB								

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
T1	120'-110'	A	0.000	0.000	4.353	0.000	0.077
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000	0.000
T2	110'-90'	A	0.000	0.000	27.139	0.000	0.396
		B	0.000	0.000	27.453	0.000	0.252
		C	0.000	0.000	0.000	0.000	0.000
T3	90'-70'	A	0.000	0.000	37.393	0.000	0.419
		B	0.000	0.000	27.453	0.000	0.252
		C	0.000	0.000	0.000	0.000	0.000
T4	70'-50'	A	0.000	0.000	40.337	0.000	0.427
		B	0.000	0.000	27.453	0.000	0.252
		C	0.000	0.000	0.000	0.000	0.000
T5	50'-40'	A	0.000	0.000	22.668	0.000	0.297
		B	0.000	0.000	16.227	0.000	0.210
		C	0.000	0.000	2.500	0.000	0.084
T6	40'-20'	A	0.000	0.000	46.597	0.000	0.597
		B	0.000	0.000	32.453	0.000	0.419
		C	0.000	0.000	5.000	0.000	0.167
T7	20'-0'	A	0.000	0.000	41.597	0.000	0.430
		B	0.000	0.000	27.453	0.000	0.252
		C	0.000	0.000	0.000	0.000	0.000

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
T1	120'-110'	A	1.699	0.000	0.000	17.361	0.000	0.270
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	0.000	0.000
T2	110'-90'	A	1.676	0.000	0.000	92.986	0.000	1.461
		B		0.000	0.000	60.986	0.000	1.011

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
		C		0.000	0.000	0.000	0.000	0.000
T3	90'-70'	A	1.639	0.000	0.000	119.495	0.000	1.753
		B		0.000	0.000	60.611	0.000	0.993
		C		0.000	0.000	0.000	0.000	0.000
T4	70'-50'	A	1.592	0.000	0.000	123.876	0.000	1.788
		B		0.000	0.000	60.141	0.000	0.971
		C		0.000	0.000	0.000	0.000	0.000
T5	50'-40'	A	1.547	0.000	0.000	69.918	0.000	1.061
		B		0.000	0.000	38.531	0.000	0.664
		C		0.000	0.000	8.689	0.000	0.189
T6	40'-20'	A	1.486	0.000	0.000	139.746	0.000	2.079
		B		0.000	0.000	75.949	0.000	1.286
		C		0.000	0.000	16.886	0.000	0.366
T7	20'-0'	A	1.331	0.000	0.000	118.040	0.000	1.563
		B		0.000	0.000	57.506	0.000	0.851
		C		0.000	0.000	0.000	0.000	0.000

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
T1	120'-110'	0.144	-4.632	0.113	-4.214
T2	110'-90'	0.061	3.457	-0.238	0.792
T3	90'-70'	0.148	0.584	-0.111	-0.970
T4	70'-50'	0.167	-0.200	-0.119	-1.445
T5	50'-40'	0.122	-0.336	-0.071	-0.938
T6	40'-20'	0.178	-1.000	-0.125	-1.794
T7	20'-0'	0.252	-1.668	-0.211	-3.084

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T1	13	AVA5-50(7/8")	110.00 - 118.00	0.6000	0.4602
T1	17	T-Brackets (Af)	110.00 - 118.00	0.6000	0.4602
T1	19	Safety Line 3/8	110.00 - 120.00	0.6000	0.4602
T2	4	AVA7-50(1-5/8")	90.00 - 110.00	0.6000	0.4876
T2	5	T-Brackets (Af)	90.00 - 110.00	0.6000	0.4876
T2	7	AVA6-50(1-1/4")	90.00 - 110.00	0.6000	0.4876
T2	8	T-Brackets (Af)	90.00 - 110.00	0.6000	0.4876
T2	13	AVA5-50(7/8")	90.00 - 110.00	0.6000	0.4876
T2	16	LDF4-75A(5/8")	90.00 - 95.00	0.6000	0.4876
T2	17	T-Brackets (Af)	90.00 - 110.00	0.6000	0.4876
T2	19	Safety Line 3/8	90.00 - 110.00	0.6000	0.4876
T3	4	AVA7-50(1-5/8")	70.00 - 90.00	0.6000	0.4803
T3	5	T-Brackets (Af)	70.00 - 90.00	0.6000	0.4803
T3	7	AVA6-50(1-1/4")	70.00 - 90.00	0.6000	0.4803

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T3	8	T-Brackets (Af)	70.00 - 90.00	0.6000	0.4803
T3	10	EW90(ELLIPTICAL)	70.00 - 80.00	0.6000	0.4803
T3	11	EW90(ELLIPTICAL)	80.00 - 87.00	0.6000	0.4803
T3	12	EW90(ELLIPTICAL)	87.00 - 90.00	0.6000	0.4803
T3	16	LDF4-75A(5/8")	70.00 - 90.00	0.6000	0.4803
T3	17	T-Brackets (Af)	70.00 - 90.00	0.6000	0.4803
T3	19	Safety Line 3/8	70.00 - 90.00	0.6000	0.4803
T4	4	AVA7-50(1-5/8")	50.00 - 70.00	0.6000	0.4952
T4	5	T-Brackets (Af)	50.00 - 70.00	0.6000	0.4952
T4	7	AVA6-50(1-1/4")	50.00 - 70.00	0.6000	0.4952
T4	8	T-Brackets (Af)	50.00 - 70.00	0.6000	0.4952
T4	10	EW90(ELLIPTICAL)	50.00 - 70.00	0.6000	0.4952
T4	16	LDF4-75A(5/8")	50.00 - 70.00	0.6000	0.4952
T4	17	T-Brackets (Af)	50.00 - 70.00	0.6000	0.4952
T4	19	Safety Line 3/8	50.00 - 70.00	0.6000	0.4952
T5	4	AVA7-50(1-5/8")	40.00 - 50.00	0.6000	0.3394
T5	5	T-Brackets (Af)	40.00 - 50.00	0.6000	0.3394
T5	7	AVA6-50(1-1/4")	40.00 - 50.00	0.6000	0.3394
T5	8	T-Brackets (Af)	40.00 - 50.00	0.6000	0.3394
T5	10	EW90(ELLIPTICAL)	40.00 - 50.00	0.6000	0.3394
T5	16	LDF4-75A(5/8")	40.00 - 50.00	0.6000	0.3394
T5	17	T-Brackets (Af)	40.00 - 50.00	0.6000	0.3394
T5	19	Safety Line 3/8	40.00 - 50.00	0.6000	0.3394
T5	21	1.25" SR	40.00 - 50.00	0.6000	0.3394
T5	22	1.25" SR	40.00 - 50.00	0.6000	0.3394
T5	23	1.25" SR	40.00 - 50.00	0.6000	0.3394
T5	24	1.25" SR	40.00 - 50.00	0.6000	0.3394
T5	25	1.25" SR	40.00 - 50.00	0.6000	0.3394
T5	26	1.25" SR	40.00 - 50.00	0.6000	0.3394
T6	4	AVA7-50(1-5/8")	20.00 - 40.00	0.6000	0.4441
T6	5	T-Brackets (Af)	20.00 - 40.00	0.6000	0.4441
T6	7	AVA6-50(1-1/4")	20.00 - 40.00	0.6000	0.4441
T6	8	T-Brackets (Af)	20.00 - 40.00	0.6000	0.4441
T6	10	EW90(ELLIPTICAL)	20.00 - 40.00	0.6000	0.4441
T6	15	LDF4-75A(5/8")	20.00 - 40.00	0.6000	0.4441
T6	17	T-Brackets (Af)	20.00 - 40.00	0.6000	0.4441
T6	19	Safety Line 3/8	20.00 - 40.00	0.6000	0.4441
T6	21	1.25" SR	20.00 - 40.00	0.6000	0.4441
T6	22	1.25" SR	20.00 - 40.00	0.6000	0.4441
T6	23	1.25" SR	20.00 - 40.00	0.6000	0.4441
T6	24	1.25" SR	20.00 - 40.00	0.6000	0.4441
T6	25	1.25" SR	20.00 - 40.00	0.6000	0.4441
T6	26	1.25" SR	20.00 - 40.00	0.6000	0.4441
T7	4	AVA7-50(1-5/8")	0.00 - 20.00	0.6000	0.5479
T7	5	T-Brackets (Af)	0.00 - 20.00	0.6000	0.5479
T7	7	AVA6-50(1-1/4")	0.00 - 20.00	0.6000	0.5479
T7	8	T-Brackets (Af)	0.00 - 20.00	0.6000	0.5479
T7	10	EW90(ELLIPTICAL)	0.00 - 20.00	0.6000	0.5479
T7	15	LDF4-75A(5/8")	0.00 - 20.00	0.6000	0.5479
T7	17	T-Brackets (Af)	0.00 - 20.00	0.6000	0.5479
T7	19	Safety Line 3/8	0.00 - 20.00	0.6000	0.5479

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
PD220	A	From Leg	3.000	0.000	118'	No Ice	3.080	3.080	0.023
(E)			0'			1/2" Ice	5.300	5.300	0.049
			7'6"			1" Ice	7.537	7.537	0.088
PD220	B	From Leg	3.000	0.000	118'	No Ice	3.080	3.080	0.023
(E)			0'			1/2" Ice	5.300	5.300	0.049
			7'6"			1" Ice	7.537	7.537	0.088
PD220	C	From Leg	3.000	0.000	118'	No Ice	3.080	3.080	0.023
(E)			0'			1/2" Ice	5.300	5.300	0.049
			7'6"			1" Ice	7.537	7.537	0.088
Side Arm Mount [SO 305-3]	C	None		0.000	118'	No Ice	2.640	2.640	0.090
(E-per photo)						1/2" Ice	4.100	4.100	0.130
						1" Ice	5.560	5.560	0.170
$RB-per SA									
$RB-per MSA & RFDS									
AIR21	A	From Leg	4.000	0.000	110'	No Ice	6.162	5.545	0.103
KRC118023-1_B2A_B4P			0'			1/2" Ice	6.600	6.303	0.159
(Quad) w/ Mount Pipe			0'			1" Ice	7.033	6.998	0.222
(E-Installed)									
AIR21	B	From Leg	4.000	0.000	110'	No Ice	6.162	5.545	0.103
KRC118023-1_B2A_B4P			0'			1/2" Ice	6.600	6.303	0.159
(Quad) w/ Mount Pipe			0'			1" Ice	7.033	6.998	0.222
(E-Installed)									
AIR21	C	From Leg	4.000	0.000	110'	No Ice	6.162	5.545	0.103
KRC118023-1_B2A_B4P			0'			1/2" Ice	6.600	6.303	0.159
(Quad) w/ Mount Pipe			0'			1" Ice	7.033	6.998	0.222
(E-Installed)									
TMA	A	From Leg	4.000	0.000	110'	No Ice	0.583	0.398	0.013
(E-Installed)			0'			1/2" Ice	0.688	0.488	0.018
			0'			1" Ice	0.799	0.586	0.025
TMA	B	From Leg	4.000	0.000	110'	No Ice	0.583	0.398	0.013
(E-Installed)			0'			1/2" Ice	0.688	0.488	0.018
			0'			1" Ice	0.799	0.586	0.025
TMA	C	From Leg	4.000	0.000	110'	No Ice	0.583	0.398	0.013
(E-Installed)			0'			1/2" Ice	0.688	0.488	0.018
			0'			1" Ice	0.799	0.586	0.025
APXVAARR24_43-U-NA20	A	From Leg	4.000	0.000	110'	No Ice	14.690	6.870	0.186
w/ Mount Pipe			0'			1/2" Ice	15.460	7.550	0.315
(P)			0'			1" Ice	16.230	8.250	0.458
APXVAARR24_43-U-NA20	B	From Leg	4.000	0.000	110'	No Ice	14.690	6.870	0.186
w/ Mount Pipe			0'			1/2" Ice	15.460	7.550	0.315
(P)			0'			1" Ice	16.230	8.250	0.458
APXVAARR24_43-U-NA20	C	From Leg	4.000	0.000	110'	No Ice	14.690	6.870	0.186
w/ Mount Pipe			0'			1/2" Ice	15.460	7.550	0.315
(P)			0'			1" Ice	16.230	8.250	0.458
AIR32	A	From Leg	4.000	0.000	110'	No Ice	6.747	6.070	0.127
KRD901146-1_B66A_B2A			0'			1/2" Ice	7.202	6.867	0.188
(Octo) w/ Mount Pipe			0'			1" Ice	7.648	7.583	0.255
(P)									
AIR32	B	From Leg	4.000	0.000	110'	No Ice	6.747	6.070	0.127
KRD901146-1_B66A_B2A			0'			1/2" Ice	7.202	6.867	0.188
(Octo) w/ Mount Pipe			0'			1" Ice	7.648	7.583	0.255
(P)									
AIR32	C	From Leg	4.000	0.000	110'	No Ice	6.747	6.070	0.127
KRD901146-1_B66A_B2A			0'			1/2" Ice	7.202	6.867	0.188
(Octo) w/ Mount Pipe			0'			1" Ice	7.648	7.583	0.255
(P)									

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
RADIO 4449 B12/B71	A	From Leg	4.000	0.000	110'	No Ice	1.650	1.300	0.075
(P)			0'			1/2" Ice	1.810	1.445	0.092
			0'			1" Ice	1.978	1.597	0.112
RADIO 4449 B12/B71	B	From Leg	4.000	0.000	110'	No Ice	1.650	1.300	0.075
(P)			0'			1/2" Ice	1.810	1.445	0.092
			0'			1" Ice	1.978	1.597	0.112
RADIO 4449 B12/B71	C	From Leg	4.000	0.000	110'	No Ice	1.650	1.300	0.075
(P)			0'			1/2" Ice	1.810	1.445	0.092
			0'			1" Ice	1.978	1.597	0.112
10.5' x 2.375" horizontal	A	From Leg	2.000	0.000	110'	No Ice	2.494	2.494	0.035
mount pipe			0'			1/2" Ice	3.572	3.572	0.054
(P-additional tieback)			0'			1" Ice	4.667	4.667	0.079
10.5' x 2.375" horizontal	B	From Leg	2.000	0.000	110'	No Ice	2.494	2.494	0.035
mount pipe			0'			1/2" Ice	3.572	3.572	0.054
(P-additional tieback)			0'			1" Ice	4.667	4.667	0.079
10.5' x 2.375" horizontal	C	From Leg	2.000	0.000	110'	No Ice	2.494	2.494	0.035
mount pipe			0'			1/2" Ice	3.572	3.572	0.054
(P-additional tieback)			0'			1" Ice	4.667	4.667	0.079
Sector Mount [SM 502-3]	C	None		0.000	110'	No Ice	33.020	33.020	1.673
(P-(C10857007C /MA))						1/2" Ice	47.360	47.360	2.224
						1" Ice	61.700	61.700	2.775
$RB									
(2) TMA 9.4"x7.3"x3.5"	B	From Leg	2.000	0.000	95'	No Ice	0.572	0.276	0.010
(E-per photo)			0'			1/2" Ice	0.668	0.350	0.015
			0'			1" Ice	0.772	0.432	0.021
Side Arm Mount [SO 202-1]	B	From Leg	1.000	0.000	95'	No Ice	2.960	2.530	0.110
(E)			0'			1/2" Ice	4.100	3.510	0.134
			0'			1" Ice	5.240	4.490	0.157
$RB									
Side Arm Mount [SO 201-1]	B	From Leg	0.500	0.000	90'	No Ice	2.960	2.110	0.096
(E)			0'			1/2" Ice	4.100	2.930	0.117
			0'			1" Ice	5.240	3.750	0.138
$RB									
20' Omni	A	From Leg	6.000	0.000	87'	No Ice	6.000	6.000	0.200
(E-per photo)			0'			1/2" Ice	8.033	8.033	0.243
			10'			1" Ice	10.083	10.083	0.299
10' horizontal x 2" Pipe	A	From Face	3.000	0.000	87'	No Ice	2.000	2.000	0.100
Mount			0'			1/2" Ice	3.025	3.025	0.116
(E-TB/photo)			0'			1" Ice	4.067	4.067	0.137
Side Arm Mount [SO 308-1]	A	From Leg	3.000	0.000	87'	No Ice	0.980	3.030	0.053
(E-per photo)			0'			1/2" Ice	1.700	5.220	0.079
			0'			1" Ice	2.420	7.410	0.105
$RB									
20' Omni	A	From Leg	6.000	0.000	80'	No Ice	6.000	6.000	0.200
(E-per photo)			0'			1/2" Ice	8.033	8.033	0.243
			10'			1" Ice	10.083	10.083	0.299
20' Omni	C	From Leg	6.000	0.000	80'	No Ice	6.000	6.000	0.200
(E-per photo)			0'			1/2" Ice	8.033	8.033	0.243
			10'			1" Ice	10.083	10.083	0.299
10' horizontal x 2" Pipe	B	From Face	3.000	0.000	80'	No Ice	2.000	2.000	0.100
Mount			0'			1/2" Ice	3.025	3.025	0.116
(E-TB/photo)			0'			1" Ice	4.067	4.067	0.137
10' horizontal x 2" Pipe	C	From Face	3.000	0.000	80'	No Ice	2.000	2.000	0.100
Mount			0'			1/2" Ice	3.025	3.025	0.116
(E-TB/photo)			0'			1" Ice	4.067	4.067	0.137
Side Arm Mount [SO 308-1]	A	From Leg	3.000	0.000	80'	No Ice	0.980	3.030	0.053
(E-per photo)			0'			1/2" Ice	1.700	5.220	0.079

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0'			1" Ice	2.420	7.410	0.105
Side Arm Mount [SO 308-1]	C	From Leg	3.000	0.000	80'	No Ice	0.980	3.030	0.053
(E-per photo)			0'			1/2" Ice	1.700	5.220	0.079
			0'			1" Ice	2.420	7.410	0.105
$RB									
GPS	C	From Leg	0.500	0.000	40'	No Ice	0.000	0.000	0.000
(E-leg mounted)			0'			1/2" Ice	0.000	0.000	0.000
			0'			1" Ice	0.000	0.000	0.000
$RB									

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
Andrew 6' w/Radome	B	Paraboloid	From	2.000	0.000		95'	6.000	No Ice	28.274	0.380
(E)		w/Shroud (HP)	Leg	0'					1/2" Ice	29.065	0.450
				0'					1" Ice	29.856	0.520
$RB											
Andrew 4' w/Radome	B	Paraboloid	From	1.000	0.000		90'	4.000	No Ice	12.566	0.140
(E)		w/Shroud (HP)	Leg	0'					1/2" Ice	13.095	0.282
				0'					1" Ice	13.624	0.424
$RB											

Truss-Leg Properties

Section Designation	Area in^2	Area Ice in^2	Self Weight K	Ice Weight K	Equiv. Diameter in	Equiv. Diameter Ice in	Leg Area in^2
Pirod 105244	1026.861	3073.276	0.563	0.502	7.131	21.342	3.682
Pirod 105217	2130.748	6346.467	0.619	0.924	7.398	22.036	5.301
Pirod 105217	2130.748	6209.817	0.631	0.780	7.398	21.562	5.301

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.6 Wind 0 deg - No Ice
3	1.2D+1.6W (pattern 1) 0 deg - No Ice
4	1.2D+1.6W (pattern 2) 0 deg - No Ice
5	0.9 Dead+1.6 Wind 0 deg - No Ice

Comb. No.	Description
6	1.2 Dead+1.6 Wind 30 deg - No Ice
7	1.2D+1.6W (pattern 1) 30 deg - No Ice
8	1.2D+1.6W (pattern 2) 30 deg - No Ice
9	0.9 Dead+1.6 Wind 30 deg - No Ice
10	1.2 Dead+1.6 Wind 60 deg - No Ice
11	1.2D+1.6W (pattern 1) 60 deg - No Ice
12	1.2D+1.6W (pattern 2) 60 deg - No Ice
13	0.9 Dead+1.6 Wind 60 deg - No Ice
14	1.2 Dead+1.6 Wind 90 deg - No Ice
15	1.2D+1.6W (pattern 1) 90 deg - No Ice
16	1.2D+1.6W (pattern 2) 90 deg - No Ice
17	0.9 Dead+1.6 Wind 90 deg - No Ice
18	1.2 Dead+1.6 Wind 120 deg - No Ice
19	1.2D+1.6W (pattern 1) 120 deg - No Ice
20	1.2D+1.6W (pattern 2) 120 deg - No Ice
21	0.9 Dead+1.6 Wind 120 deg - No Ice
22	1.2 Dead+1.6 Wind 150 deg - No Ice
23	1.2D+1.6W (pattern 1) 150 deg - No Ice
24	1.2D+1.6W (pattern 2) 150 deg - No Ice
25	0.9 Dead+1.6 Wind 150 deg - No Ice
26	1.2 Dead+1.6 Wind 180 deg - No Ice
27	1.2D+1.6W (pattern 1) 180 deg - No Ice
28	1.2D+1.6W (pattern 2) 180 deg - No Ice
29	0.9 Dead+1.6 Wind 180 deg - No Ice
30	1.2 Dead+1.6 Wind 210 deg - No Ice
31	1.2D+1.6W (pattern 1) 210 deg - No Ice
32	1.2D+1.6W (pattern 2) 210 deg - No Ice
33	0.9 Dead+1.6 Wind 210 deg - No Ice
34	1.2 Dead+1.6 Wind 240 deg - No Ice
35	1.2D+1.6W (pattern 1) 240 deg - No Ice
36	1.2D+1.6W (pattern 2) 240 deg - No Ice
37	0.9 Dead+1.6 Wind 240 deg - No Ice
38	1.2 Dead+1.6 Wind 270 deg - No Ice
39	1.2D+1.6W (pattern 1) 270 deg - No Ice
40	1.2D+1.6W (pattern 2) 270 deg - No Ice
41	0.9 Dead+1.6 Wind 270 deg - No Ice
42	1.2 Dead+1.6 Wind 300 deg - No Ice
43	1.2D+1.6W (pattern 1) 300 deg - No Ice
44	1.2D+1.6W (pattern 2) 300 deg - No Ice
45	0.9 Dead+1.6 Wind 300 deg - No Ice
46	1.2 Dead+1.6 Wind 330 deg - No Ice
47	1.2D+1.6W (pattern 1) 330 deg - No Ice
48	1.2D+1.6W (pattern 2) 330 deg - No Ice
49	0.9 Dead+1.6 Wind 330 deg - No Ice
50	1.2 Dead+1.0 Ice+1.0 Temp
51	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
52	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
53	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
54	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
55	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
56	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
57	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
58	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
59	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
60	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
61	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
62	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
63	Dead+Wind 0 deg - Service
64	Dead+Wind 30 deg - Service
65	Dead+Wind 60 deg - Service
66	Dead+Wind 90 deg - Service
67	Dead+Wind 120 deg - Service

Comb. No.	Description
68	Dead+Wind 150 deg - Service
69	Dead+Wind 180 deg - Service
70	Dead+Wind 210 deg - Service
71	Dead+Wind 240 deg - Service
72	Dead+Wind 270 deg - Service
73	Dead+Wind 300 deg - Service
74	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T1	120 - 110	Leg	Max Tension	45	2.201	-0.106	-0.063
			Max. Compression	2	-2.715	-0.001	-0.059
			Max. Mx	40	1.504	-0.109	-0.026
			Max. My	28	1.690	0.000	0.123
			Max. Vy	18	0.643	0.052	0.030
			Max. Vx	2	-0.749	-0.001	-0.059
		Diagonal	Max Tension	46	0.433	0.000	0.000
			Max. Compression	18	-0.430	0.000	0.000
			Max. Mx	55	0.012	-0.005	0.000
			Max. My	61	-0.047	-0.005	0.000
			Max. Vy	62	0.010	-0.005	-0.000
			Max. Vx	61	-0.000	0.000	0.000
		Top Girt	Max Tension	29	0.032	0.000	0.000
			Max. Compression	59	-0.041	0.000	0.000
			Max. Mx	50	-0.021	0.018	0.000
			Max. My	6	-0.010	0.000	-0.000
			Max. Vy	50	-0.016	0.000	0.000
			Max. Vx	6	0.000	0.000	0.000
		Bottom Girt	Max Tension	18	0.215	0.000	0.000
			Max. Compression	42	-0.212	0.000	0.000
			Max. Mx	50	0.009	0.018	0.000
			Max. My	6	0.004	0.000	-0.000
			Max. Vy	50	-0.016	0.000	0.000
			Max. Vx	6	0.000	0.000	0.000
T2	110 - 90	Leg	Max Tension	13	31.938	0.187	-0.064
			Max. Compression	18	-36.885	-0.103	-0.052
			Max. Mx	38	24.888	-0.196	-0.050
			Max. My	2	-35.149	-0.040	-0.192
			Max. Vy	34	-3.500	0.102	-0.052
			Max. Vx	2	-3.645	-0.003	0.112
		Diagonal	Max Tension	14	3.425	0.000	0.000
			Max. Compression	38	-3.506	0.000	0.000
			Max. Mx	55	0.859	-0.006	0.000
			Max. My	10	-2.995	-0.001	0.002
			Max. Vy	55	0.010	-0.006	0.000
			Max. Vx	10	0.001	0.000	0.000
		Top Girt	Max Tension	18	0.417	0.000	0.000
			Max. Compression	42	-0.408	0.000	0.000
			Max. Mx	50	0.012	0.017	0.000
			Max. My	6	0.007	0.000	-0.000
			Max. Vy	50	-0.015	0.000	0.000
			Max. Vx	6	0.000	0.000	0.000
		Bottom Girt	Max Tension	10	0.300	0.000	0.000
			Max. Compression	37	-0.286	0.000	0.000
			Max. Mx	50	0.030	0.017	0.000
			Max. My	6	0.012	0.000	-0.000

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vy	50	-0.015	0.000	0.000
			Max. Vx	6	0.000	0.000	0.000
T3	90 - 70	Leg	Max Tension	45	87.313	-0.190	-0.127
			Max. Compression	18	-91.888	-0.229	-0.142
			Max. Mx	34	-35.711	0.413	-0.164
			Max. My	2	-35.118	0.050	0.428
			Max. Vy	34	-5.074	0.228	-0.131
			Max. Vx	2	-5.533	0.004	0.255
		Diagonal	Max Tension	46	4.615	0.000	0.000
			Max. Compression	46	-4.702	0.000	0.000
			Max. Mx	55	1.401	-0.008	-0.000
			Max. My	10	-3.704	-0.001	0.002
			Max. Vy	55	0.012	-0.008	-0.000
			Max. Vx	10	0.001	0.000	0.000
		Top Girt	Max Tension	18	0.180	0.000	0.000
			Max. Compression	45	-0.208	0.000	0.000
			Max. Mx	50	0.033	0.019	0.000
			Max. My	6	0.008	0.000	-0.000
			Max. Vy	50	-0.017	0.000	0.000
			Max. Vx	6	0.000	0.000	0.000
		Bottom Girt	Max Tension	42	0.434	0.000	0.000
			Max. Compression	21	-0.441	0.000	0.000
			Max. Mx	50	0.022	0.019	0.000
			Max. My	6	0.013	0.000	-0.000
			Max. Vy	50	-0.017	0.000	0.000
			Max. Vx	6	0.000	0.000	0.000
T4	70 - 50	Leg	Max Tension	45	134.497	0.095	0.001
			Max. Compression	18	-139.112	0.936	0.004
			Max. Mx	18	-139.112	0.936	0.004
			Max. My	38	-11.689	0.076	-0.365
			Max. Vy	18	-4.609	0.653	0.033
			Max. Vx	38	2.391	0.044	-0.219
		Diagonal	Max Tension	42	4.020	0.000	0.000
			Max. Compression	46	-4.064	0.000	0.000
			Max. Mx	55	0.921	-0.008	-0.000
			Max. My	42	-3.705	-0.001	0.002
			Max. Vy	55	0.012	-0.008	-0.000
			Max. Vx	42	0.001	0.000	0.000
		Top Girt	Max Tension	19	0.042	0.000	0.000
			Max. Compression	43	-0.057	0.000	0.000
			Max. Mx	50	0.018	0.019	0.000
			Max. My	6	-0.002	0.000	-0.000
			Max. Vy	50	-0.017	0.000	0.000
			Max. Vx	6	0.000	0.000	0.000
		Bottom Girt	Max Tension	42	2.730	0.000	0.000
			Max. Compression	21	-2.433	0.000	0.000
			Max. Mx	50	0.268	0.023	0.000
			Max. My	6	-0.102	0.000	-0.000
			Max. Vy	50	0.018	0.000	0.000
			Max. Vx	6	0.000	0.000	0.000
T5	50 - 40	Leg	Max Tension	45	131.966	-0.913	-0.006
			Max. Compression	18	-135.891	6.057	-0.026
			Max. Mx	42	131.244	-6.709	-0.056
			Max. My	38	-11.557	0.043	-12.928
			Max. Vy	42	0.691	-6.709	-0.056
			Max. Vx	38	1.361	0.043	-12.928
		Diagonal	Max Tension	21	7.013	0.000	0.000
			Max. Compression	42	-7.659	0.000	0.000
			Max. Mx	42	2.420	0.138	0.017
			Max. My	42	2.413	-0.065	-0.029
			Max. Vy	61	0.031	0.065	-0.001

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vx	42	0.006	0.000	0.000
T6	40 - 20	Leg	Max Tension	45	148.006	-6.935	-0.018
			Max. Compression	18	-155.033	5.894	-0.002
			Max. Mx	45	148.006	-6.935	-0.018
			Max. My	38	-13.211	0.042	-12.928
			Max. Vy	55	0.218	3.098	-0.009
			Max. Vx	38	-0.981	0.042	-12.928
		Diagonal	Max Tension	18	3.755	0.000	0.000
			Max. Compression	45	-4.047	0.000	0.000
			Max. Mx	38	3.686	0.108	0.003
			Max. My	41	-3.281	-0.063	-0.018
			Max. Vy	61	0.035	0.058	-0.009
			Max. Vx	38	0.004	-0.065	-0.018
T7	20 - 0	Leg	Max Tension	45	159.989	-5.295	-0.007
			Max. Compression	18	-169.914	-0.000	-0.000
			Max. Mx	42	153.534	-5.901	-0.017
			Max. My	38	-14.886	-0.048	-9.740
			Max. Vy	42	-0.639	-5.380	-0.010
			Max. Vx	38	-1.071	-0.048	-9.740
		Diagonal	Max Tension	45	4.503	0.000	0.000
			Max. Compression	18	-5.115	0.000	0.000
			Max. Mx	38	0.001	0.081	0.007
			Max. My	41	-3.988	-0.037	-0.020
			Max. Vy	60	0.037	0.056	-0.012
			Max. Vx	41	0.003	-0.037	-0.020

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Leg C	Max. Vert	34	173.488	12.849	-7.523
	Max. H_x	34	173.488	12.849	-7.523
	Max. H_z	13	-157.596	-11.798	6.771
	Min. Vert	13	-157.596	-11.798	6.771
	Min. H_x	13	-157.596	-11.798	6.771
	Min. H_z	34	173.488	12.849	-7.523
Leg B	Max. Vert	18	176.726	-12.983	-7.730
	Max. H_x	45	-165.471	12.178	7.263
	Max. H_z	45	-165.471	12.178	7.263
	Min. Vert	45	-165.471	12.178	7.263
	Min. H_x	18	176.726	-12.983	-7.730
	Min. H_z	18	176.726	-12.983	-7.730
Leg A	Max. Vert	2	165.763	-0.053	14.127
	Max. H_x	10	83.422	0.799	7.147
	Max. H_z	2	165.763	-0.053	14.127
	Min. Vert	29	-149.138	-0.063	-12.808
	Min. H_x	36	-56.345	-0.726	-4.867
	Min. H_z	29	-149.138	-0.063	-12.808

Tower Mast Reaction Summary

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
Dead Only	19.781	0.000	0.000	-1.468	-0.978	0.000
1.2 Dead+1.6 Wind 0 deg - No Ice	23.738	-1.040	-19.212	-1367.027	96.700	0.949
1.2D+1.6W (pattern 1) 0 deg - No Ice	23.738	-1.040	-17.468	-1171.445	96.705	0.944
1.2D+1.6W (pattern 2) 0 deg - No Ice	23.738	-0.624	-15.508	-1154.486	57.539	0.644
0.9 Dead+1.6 Wind 0 deg - No Ice	17.803	-1.040	-19.212	-1362.651	96.706	0.940
1.2 Dead+1.6 Wind 30 deg - No Ice	23.738	9.334	-15.765	-1134.055	-676.684	6.066
1.2D+1.6W (pattern 1) 30 deg - No Ice	23.738	8.463	-14.256	-964.674	-578.869	6.054
1.2D+1.6W (pattern 2) 30 deg - No Ice	23.738	7.522	-12.787	-964.922	-570.336	5.350
0.9 Dead+1.6 Wind 30 deg - No Ice	17.803	9.334	-15.765	-1130.323	-674.414	6.064
1.2 Dead+1.6 Wind 60 deg - No Ice	23.738	17.605	-9.349	-653.931	-1263.032	1.804
1.2D+1.6W (pattern 1) 60 deg - No Ice	23.738	16.096	-8.477	-556.137	-1093.637	1.808
1.2D+1.6W (pattern 2) 60 deg - No Ice	23.738	14.392	-7.820	-572.981	-1069.906	1.859
0.9 Dead+1.6 Wind 60 deg - No Ice	17.803	17.605	-9.349	-651.611	-1259.098	1.809
1.2 Dead+1.6 Wind 90 deg - No Ice	23.738	21.308	0.565	51.136	-1506.123	-2.163
1.2D+1.6W (pattern 1) 90 deg - No Ice	23.738	19.565	0.565	51.144	-1310.543	-2.143
1.2D+1.6W (pattern 2) 90 deg - No Ice	23.738	17.577	0.339	29.956	-1283.708	-1.402
0.9 Dead+1.6 Wind 90 deg - No Ice	17.803	21.308	0.565	51.439	-1501.537	-2.153
1.2 Dead+1.6 Wind 120 deg - No Ice	23.738	17.899	10.296	726.605	-1268.627	-3.441
1.2D+1.6W (pattern 1) 120 deg - No Ice	23.738	16.389	9.424	628.818	-1099.255	-3.432
1.2D+1.6W (pattern 2) 120 deg - No Ice	23.738	14.508	8.353	611.891	-1067.625	-2.539
0.9 Dead+1.6 Wind 120 deg - No Ice	17.803	17.899	10.296	724.984	-1264.706	-3.428
1.2 Dead+1.6 Wind 150 deg - No Ice	23.738	10.110	16.315	1162.413	-737.827	-1.536
1.2D+1.6W (pattern 1) 150 deg - No Ice	23.738	9.238	14.805	993.021	-640.041	-1.539
1.2D+1.6W (pattern 2) 150 deg - No Ice	23.738	8.048	13.223	982.695	-608.278	-0.733
0.9 Dead+1.6 Wind 150 deg - No Ice	17.803	10.110	16.315	1159.513	-735.396	-1.525
1.2 Dead+1.6 Wind 180 deg - No Ice	23.738	0.673	18.764	1346.409	-64.454	-2.319
1.2D+1.6W (pattern 1) 180 deg - No Ice	23.738	0.673	17.021	1150.807	-64.452	-2.314
1.2D+1.6W (pattern 2) 180 deg - No Ice	23.738	0.404	15.240	1140.686	-39.156	-1.470
0.9 Dead+1.6 Wind 180 deg - No Ice	17.803	0.673	18.764	1342.965	-63.954	-2.310
1.2 Dead+1.6 Wind 210 deg - No Ice	23.738	-9.043	15.934	1146.425	646.629	-6.069
1.2D+1.6W (pattern 1) 210 deg - No Ice	23.738	-8.171	14.424	977.024	548.848	-6.057

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
1.2D+1.6W (pattern 2) 210 deg - No Ice	23.738	-7.347	12.888	970.917	551.324	-5.351
0.9 Dead+1.6 Wind 210 deg - No Ice	17.803	-9.043	15.934	1143.551	645.069	-6.066
1.2 Dead+1.6 Wind 240 deg - No Ice	23.738	-18.176	9.255	628.848	1292.689	-0.432
1.2D+1.6W (pattern 1) 240 deg - No Ice	23.738	-16.666	8.384	531.052	1123.317	-0.437
1.2D+1.6W (pattern 2) 240 deg - No Ice	23.738	-14.735	7.764	556.491	1086.729	-1.032
0.9 Dead+1.6 Wind 240 deg - No Ice	17.803	-18.176	9.255	627.526	1289.298	-0.437
1.2 Dead+1.6 Wind 270 deg - No Ice	23.738	-21.692	-0.682	-65.881	1539.981	2.702
1.2D+1.6W (pattern 1) 270 deg - No Ice	23.738	-19.948	-0.682	-65.876	1344.404	2.682
1.2D+1.6W (pattern 2) 270 deg - No Ice	23.738	-17.807	-0.409	-40.256	1303.063	1.728
0.9 Dead+1.6 Wind 270 deg - No Ice	17.803	-21.692	-0.682	-65.221	1535.896	2.692
1.2 Dead+1.6 Wind 300 deg - No Ice	23.738	-17.914	-10.305	-743.693	1289.591	3.443
1.2D+1.6W (pattern 1) 300 deg - No Ice	23.738	-16.405	-9.433	-645.898	1120.204	3.434
1.2D+1.6W (pattern 2) 300 deg - No Ice	23.738	-14.517	-8.359	-623.593	1079.247	2.540
0.9 Dead+1.6 Wind 300 deg - No Ice	17.803	-17.914	-10.305	-741.100	1286.181	3.430
1.2 Dead+1.6 Wind 330 deg - No Ice	23.738	-10.403	-16.588	-1191.837	763.211	1.001
1.2D+1.6W (pattern 1) 330 deg - No Ice	23.738	-9.531	-15.079	-1022.457	665.411	1.004
1.2D+1.6W (pattern 2) 330 deg - No Ice	23.738	-8.224	-13.387	-1001.785	622.552	0.409
0.9 Dead+1.6 Wind 330 deg - No Ice	17.803	-10.403	-16.588	-1187.951	761.295	0.989
1.2 Dead+1.0 Ice+1.0 Temp	58.947	0.000	0.000	-5.554	-2.698	-0.000
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	58.947	-0.191	-6.197	-461.696	15.453	-0.246
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	58.947	3.129	-5.328	-397.666	-234.034	0.063
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	58.947	5.723	-3.135	-232.541	-423.254	-0.651
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	58.947	6.854	0.111	4.820	-501.172	-1.660
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	58.947	5.946	3.413	241.925	-434.486	-1.485
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	58.947	3.347	5.541	399.368	-250.313	-0.424
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	58.947	0.129	6.142	448.122	-14.925	0.012
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	58.947	-3.079	5.356	389.238	223.800	-0.064
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	58.947	-5.802	3.109	217.364	422.857	0.886
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	58.947	-6.919	-0.131	-17.943	501.978	1.753
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	58.947	-5.967	-3.425	-255.719	433.542	1.485
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	58.947	-3.397	-5.588	-415.011	249.660	0.332

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
Dead+Wind 0 deg - Service	19.781	-0.229	-4.237	-302.071	20.554	0.206
Dead+Wind 30 deg - Service	19.781	2.059	-3.477	-250.774	-149.704	1.333
Dead+Wind 60 deg - Service	19.781	3.883	-2.062	-145.071	-278.802	0.402
Dead+Wind 90 deg - Service	19.781	4.700	0.125	10.165	-332.337	-0.467
Dead+Wind 120 deg - Service	19.781	3.948	2.271	158.880	-280.049	-0.757
Dead+Wind 150 deg - Service	19.781	2.230	3.599	254.820	-163.179	-0.345
Dead+Wind 180 deg - Service	19.781	0.148	4.139	295.324	-14.921	-0.513
Dead+Wind 210 deg - Service	19.781	-1.995	3.514	251.294	141.635	-1.334
Dead+Wind 240 deg - Service	19.781	-4.009	2.041	137.359	283.878	-0.095
Dead+Wind 270 deg - Service	19.781	-4.784	-0.150	-15.595	338.325	0.588
Dead+Wind 300 deg - Service	19.781	-3.951	-2.273	-164.830	283.185	0.758
Dead+Wind 330 deg - Service	19.781	-2.295	-3.659	-263.498	167.290	0.224

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX	PY	PZ	PX	PY	PZ	% Error
	K	K	K	K	K	K	
1	0.000	-19.781	0.000	0.000	19.781	0.000	0.000%
2	-1.040	-23.738	-19.212	1.040	23.738	19.212	0.000%
3	-1.040	-23.738	-17.468	1.040	23.738	17.468	0.000%
4	-0.624	-23.738	-15.508	0.624	23.738	15.508	0.000%
5	-1.040	-17.803	-19.212	1.040	17.803	19.212	0.000%
6	9.334	-23.738	-15.765	-9.334	23.738	15.765	0.000%
7	8.463	-23.738	-14.256	-8.463	23.738	14.256	0.000%
8	7.522	-23.738	-12.787	-7.522	23.738	12.787	0.000%
9	9.334	-17.803	-15.765	-9.334	17.803	15.765	0.000%
10	17.605	-23.738	-9.349	-17.605	23.738	9.349	0.000%
11	16.096	-23.738	-8.477	-16.096	23.738	8.477	0.000%
12	14.392	-23.738	-7.820	-14.392	23.738	7.820	0.000%
13	17.605	-17.803	-9.349	-17.605	17.803	9.349	0.000%
14	21.308	-23.738	0.565	-21.308	23.738	-0.565	0.000%
15	19.565	-23.738	0.565	-19.565	23.738	-0.565	0.000%
16	17.577	-23.738	0.339	-17.577	23.738	-0.339	0.000%
17	21.308	-17.803	0.565	-21.308	17.803	-0.565	0.000%
18	17.899	-23.738	10.296	-17.899	23.738	-10.296	0.000%
19	16.389	-23.738	9.424	-16.389	23.738	-9.424	0.000%
20	14.508	-23.738	8.353	-14.508	23.738	-8.353	0.000%
21	17.899	-17.803	10.296	-17.899	17.803	-10.296	0.000%
22	10.110	-23.738	16.315	-10.110	23.738	-16.315	0.000%
23	9.238	-23.738	14.805	-9.238	23.738	-14.805	0.000%
24	8.048	-23.738	13.223	-8.048	23.738	-13.223	0.000%
25	10.110	-17.803	16.315	-10.110	17.803	-16.315	0.000%
26	0.673	-23.738	18.764	-0.673	23.738	-18.764	0.000%
27	0.673	-23.738	17.021	-0.673	23.738	-17.021	0.000%
28	0.404	-23.738	15.240	-0.404	23.738	-15.240	0.000%
29	0.673	-17.803	18.764	-0.673	17.803	-18.764	0.000%
30	-9.043	-23.738	15.934	9.043	23.738	-15.934	0.000%
31	-8.171	-23.738	14.424	8.171	23.738	-14.424	0.000%
32	-7.347	-23.738	12.888	7.347	23.738	-12.888	0.000%
33	-9.043	-17.803	15.934	9.043	17.803	-15.934	0.000%
34	-18.176	-23.738	9.255	18.176	23.738	-9.255	0.000%
35	-16.666	-23.738	8.384	16.666	23.738	-8.384	0.000%
36	-14.735	-23.738	7.764	14.735	23.738	-7.764	0.000%
37	-18.176	-17.803	9.255	18.176	17.803	-9.255	0.000%
38	-21.692	-23.738	-0.682	21.692	23.738	0.682	0.000%
39	-19.948	-23.738	-0.682	19.948	23.738	0.682	0.000%
40	-17.807	-23.738	-0.409	17.807	23.738	0.409	0.000%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
41	-21.692	-17.803	-0.682	21.692	17.803	0.682	0.000%
42	-17.914	-23.738	-10.305	17.914	23.738	10.305	0.000%
43	-16.405	-23.738	-9.433	16.405	23.738	9.433	0.000%
44	-14.517	-23.738	-8.359	14.517	23.738	8.359	0.000%
45	-17.914	-17.803	-10.305	17.914	17.803	10.305	0.000%
46	-10.403	-23.738	-16.588	10.403	23.738	16.588	0.000%
47	-9.531	-23.738	-15.079	9.531	23.738	15.079	0.000%
48	-8.224	-23.738	-13.387	8.224	23.738	13.387	0.000%
49	-10.403	-17.803	-16.588	10.403	17.803	16.588	0.000%
50	0.000	-58.947	0.000	0.000	58.947	-0.000	0.000%
51	-0.191	-58.947	-6.197	0.191	58.947	6.197	0.000%
52	3.129	-58.947	-5.328	-3.129	58.947	5.328	0.000%
53	5.723	-58.947	-3.135	-5.723	58.947	3.135	0.000%
54	6.854	-58.947	0.111	-6.854	58.947	-0.111	0.000%
55	5.946	-58.947	3.413	-5.946	58.947	-3.413	0.000%
56	3.347	-58.947	5.541	-3.347	58.947	-5.541	0.000%
57	0.129	-58.947	6.142	-0.129	58.947	-6.142	0.000%
58	-3.079	-58.947	5.356	3.079	58.947	-5.356	0.000%
59	-5.802	-58.947	3.109	5.802	58.947	-3.109	0.000%
60	-6.919	-58.947	-0.131	6.919	58.947	0.131	0.000%
61	-5.967	-58.947	-3.425	5.967	58.947	3.425	0.000%
62	-3.397	-58.947	-5.588	3.397	58.947	5.588	0.000%
63	-0.229	-19.781	-4.237	0.229	19.781	4.237	0.000%
64	2.059	-19.781	-3.477	-2.059	19.781	3.477	0.000%
65	3.883	-19.781	-2.062	-3.883	19.781	2.062	0.000%
66	4.700	-19.781	0.125	-4.700	19.781	-0.125	0.000%
67	3.948	-19.781	2.271	-3.948	19.781	-2.271	0.000%
68	2.230	-19.781	3.599	-2.230	19.781	-3.599	0.000%
69	0.149	-19.781	4.139	-0.148	19.781	-4.139	0.000%
70	-1.995	-19.781	3.514	1.995	19.781	-3.514	0.000%
71	-4.009	-19.781	2.041	4.009	19.781	-2.041	0.000%
72	-4.784	-19.781	-0.150	4.784	19.781	0.150	0.000%
73	-3.951	-19.781	-2.273	3.951	19.781	2.273	0.000%
74	-2.295	-19.781	-3.659	2.295	19.781	3.659	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	0.00000636
3	Yes	4	0.00000001	0.00000678
4	Yes	4	0.00000001	0.00000646
5	Yes	4	0.00000001	0.00000226
6	Yes	4	0.00000001	0.00000995
7	Yes	4	0.00000001	0.00000888
8	Yes	4	0.00000001	0.00000898
9	Yes	4	0.00000001	0.00000573
10	Yes	4	0.00000001	0.00001084
11	Yes	4	0.00000001	0.00001013
12	Yes	4	0.00000001	0.00000995
13	Yes	4	0.00000001	0.00000494
14	Yes	4	0.00000001	0.00001065
15	Yes	4	0.00000001	0.00000956
16	Yes	4	0.00000001	0.00000944
17	Yes	4	0.00000001	0.00000654

18	Yes	4	0.00000001	0.00000686
19	Yes	4	0.00000001	0.00000720
20	Yes	4	0.00000001	0.00000678
21	Yes	4	0.00000001	0.00000229
22	Yes	4	0.00000001	0.00000975
23	Yes	4	0.00000001	0.00000873
24	Yes	4	0.00000001	0.00000873
25	Yes	4	0.00000001	0.00000569
26	Yes	4	0.00000001	0.00000986
27	Yes	4	0.00000001	0.00000938
28	Yes	4	0.00000001	0.00000930
29	Yes	4	0.00000001	0.00000446
30	Yes	4	0.00000001	0.00001006
31	Yes	4	0.00000001	0.00000892
32	Yes	4	0.00000001	0.00000904
33	Yes	4	0.00000001	0.00000585
34	Yes	4	0.00000001	0.00000691
35	Yes	4	0.00000001	0.00000721
36	Yes	4	0.00000001	0.00000679
37	Yes	4	0.00000001	0.00000243
38	Yes	4	0.00000001	0.00001134
39	Yes	4	0.00000001	0.00001015
40	Yes	4	0.00000001	0.00000984
41	Yes	4	0.00000001	0.00000701
42	Yes	4	0.00000001	0.00001118
43	Yes	4	0.00000001	0.00001051
44	Yes	4	0.00000001	0.00001013
45	Yes	4	0.00000001	0.00000505
46	Yes	4	0.00000001	0.00001045
47	Yes	4	0.00000001	0.00000934
48	Yes	4	0.00000001	0.00000913
49	Yes	4	0.00000001	0.00000613
50	Yes	4	0.00000001	0.00000833
51	Yes	4	0.00000001	0.00009204
52	Yes	4	0.00000001	0.00009493
53	Yes	4	0.00000001	0.00009812
54	Yes	4	0.00000001	0.00009586
55	Yes	4	0.00000001	0.00009353
56	Yes	4	0.00000001	0.00009488
57	Yes	4	0.00000001	0.00009613
58	Yes	4	0.00000001	0.00009426
59	Yes	4	0.00000001	0.00009279
60	Yes	4	0.00000001	0.00009634
61	Yes	4	0.00000001	0.00009909
62	Yes	4	0.00000001	0.00009585
63	Yes	4	0.00000001	0.00000001
64	Yes	4	0.00000001	0.00000001
65	Yes	4	0.00000001	0.00000001
66	Yes	4	0.00000001	0.00000001
67	Yes	4	0.00000001	0.00000001
68	Yes	4	0.00000001	0.00000001
69	Yes	4	0.00000001	0.00000001
70	Yes	4	0.00000001	0.00000001
71	Yes	4	0.00000001	0.00000001
72	Yes	4	0.00000001	0.00000001
73	Yes	4	0.00000001	0.00000001
74	Yes	4	0.00000001	0.00000001

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	120 - 110	5.140	72	0.347	0.053
T2	110 - 90	4.413	72	0.346	0.053
T3	90 - 70	2.973	72	0.323	0.046
T4	70 - 50	1.699	72	0.259	0.029
T5	50 - 40	0.764	72	0.167	0.017
T6	40 - 20	0.466	72	0.114	0.011
T7	20 - 0	0.114	72	0.052	0.004

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
118'	PD220	72	4.995	0.347	0.053	281970
110'	AIR21 KRC118023-1_B2A_B4P (Quad) w/ Mount Pipe	72	4.413	0.346	0.053	222532
95'	Andrew 6' w/Radome	72	3.324	0.333	0.049	34419
90'	Andrew 4' w/Radome	72	2.973	0.323	0.046	24825
87'	20' Omni	72	2.767	0.316	0.044	22063
80'	20' Omni	72	2.304	0.296	0.038	18067
40'	GPS	72	0.466	0.114	0.011	14753

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	120 - 110	23.521	38	1.593	0.242
T2	110 - 90	20.182	38	1.589	0.242
T3	90 - 70	13.572	38	1.483	0.209
T4	70 - 50	7.748	38	1.185	0.134
T5	50 - 40	3.483	38	0.761	0.078
T6	40 - 20	2.123	38	0.521	0.050
T7	20 - 0	0.519	38	0.239	0.018

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
118'	PD220	38	22.854	1.593	0.242	66561
110'	AIR21 KRC118023-1_B2A_B4P (Quad) w/ Mount Pipe	38	20.182	1.589	0.242	53003
95'	Andrew 6' w/Radome	38	15.185	1.527	0.222	7928
90'	Andrew 4' w/Radome	38	13.572	1.483	0.209	5708
87'	20' Omni	38	12.629	1.450	0.199	5041
80'	20' Omni	38	10.512	1.354	0.172	4050
40'	GPS	38	2.123	0.521	0.050	3227

Compression Checks

Leg Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	120 - 110	1 3/4	10'	2'5-3/4"	68.0 K=1.00	2.405	-2.311	77.187	0.030 [1] ✔
T2	110 - 90	1 3/4	20'	2'5-3/4"	68.0 K=1.00	2.405	-34.242	77.187	0.444 [1] ✔
T3	90 - 70	2	20'	2'5-3/4"	59.5 K=1.00	3.142	-87.826	109.130	0.805 [1] ✔
T4	70 - 50	2 1/4	20'1/32"	2'5-7/8"	53.1 K=1.00	3.976	-139.112	145.571	0.956 [1] ✔
T5	50 - 40	Pirod 105244	10'7/32"	10'7/32"	45.4 K=1.00	3.682	-135.891	142.493	0.954 [1] ✔
T6	40 - 20	Pirod 105217	20'13/32"	10'7/32"	37.8 K=1.00	5.301	-155.033	214.859	0.722 [1] ✔
T7	20 - 0	Pirod 105217	20'13/32"	10'7/32"	37.8 K=1.00	5.301	-169.914	214.859	0.791 [1] ✔

[1] P_u / ϕP_n controls

Truss-Leg Diagonal Data

Section No.	Elevation ft	Diagonal Size	L_d ft	Kl/r	ϕP_n K	A in^2	V_u K	ϕV_n K	Stress Ratio
T5	50 - 40	0.5	1'5-25/32"	121.0	165.670	0.196	1.362	3.389	0.402 ✔
T6	40 - 20	0.5	1'5-21/32"	120.0	238.565	0.196	0.983	3.335	0.295 ✔
T7	20 - 0	0.5	1'5-21/32"	120.0	238.565	0.196	1.071	3.335	0.321 ✔

Diagonal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	120 - 110	3/4	5'1-21/32"	2'5-27/32"	143.2 K=0.90	0.442	-0.430	4.869	0.088 [1] ✔
T2	110 - 90	3/4	5'1-21/32"	2'5-27/32"	143.2 K=0.90	0.442	-3.506	4.869	0.720 [1] ✔

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T3	90 - 70	7/8	5'1-21/32"	2'5-11/16"	122.1 K=0.90	0.601	-4.702	8.884	0.529 [1] ✔
T4	70 - 50	7/8	5'6-1/32"	2'7-31/32"	131.5 K=0.90	0.601	-4.060	7.839	0.518 [1] ✔
T5	50 - 40	L2 1/2x2 1/2x3/16	11'5"	5'2-9/32"	124.5 K=0.99	0.902	-7.659	12.926	0.593 [1] ✔
T6	40 - 20	L2 1/2x2 1/2x3/16	11'11-5/32"	5'7-3/32"	131.9 K=0.97	0.902	-4.047	11.697	0.346 [1] ✔
T7	20 - 0	L2 1/2x2 1/2x3/16	13'9-9/16"	6'6-13/32"	149.3 K=0.94	0.902	-5.115	9.139	0.560 [1] ✔

[1] P_u / ϕP_n controls

Top Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	120 - 110	3/4	4'6"	4'4-1/4"	195.1 K=0.70	0.442	-0.041	2.623	0.015 [1] ✔
T2	110 - 90	3/4	4'6"	4'4-1/4"	195.1 K=0.70	0.442	-0.408	2.623	0.155 [1] ✔
T3	90 - 70	7/8	4'6"	4'4"	166.4 K=0.70	0.601	-0.208	4.906	0.042 [1] ✔
T4	70 - 50	7/8	4'6-1/32"	4'3-25/32"	165.7 K=0.70	0.601	-0.057	4.949	0.011 [1] ✔

[1] P_u / ϕP_n controls

Bottom Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	120 - 110	3/4	4'6"	4'4-1/4"	195.1 K=0.70	0.442	-0.212	2.623	0.081 [1] ✔
T2	110 - 90	3/4	4'6"	4'4-1/4"	195.1 K=0.70	0.442	-0.286	2.623	0.109 [1] ✔
T3	90 - 70	7/8	4'6"	4'4"	166.4 K=0.70	0.601	-0.441	4.906	0.090 [1] ✔
T4	70 - 50	7/8	5'	4'9-3/4"	184.8 K=0.70	0.601	-2.433	3.978	0.612 [1] ✔

[1] P_u / ϕP_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 K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	120 - 110	1 3/4	10'	1"	2.3	2.405	2.201	108.238	0.020 [1] ✔
T2	110 - 90	1 3/4	20'	1"	2.3	2.405	31.938	108.238	0.295 [1] ✔
T3	90 - 70	2	20'	1"	2.0	3.142	87.313	141.372	0.618 [1] ✔
T4	70 - 50	2 1/4	20'1/32"	2'5-7/8"	53.1	3.976	134.497	178.924	0.752 [1] ✔
T5	50 - 40	Pirod 105244	10'7/32"	10'7/32"	45.4	3.682	131.966	165.670	0.797 [1] ✔
T6	40 - 20	Pirod 105217	20'13/32"	10'7/32"	37.8	5.301	148.006	238.565	0.620 [1] ✔
T7	20 - 0	Pirod 105217	20'13/32"	10'7/32"	37.8	5.301	159.989	238.565	0.671 [1] ✔

[1] $P_u / \phi P_n$ controls

Truss-Leg Diagonal Data

Section No.	Elevation ft	Diagonal Size	L_d ft	Kl/r	ϕP_n K	A in^2	V_u K	ϕV_n K	Stress Ratio
T5	50 - 40	0.5	1'5-25/32"	121.0	165.670	0.196	1.362	3.389	0.402 ✔
T6	40 - 20	0.5	1'5-21/32"	120.0	238.565	0.196	0.983	3.335	0.295 ✔
T7	20 - 0	0.5	1'5-21/32"	120.0	238.565	0.196	1.071	3.335	0.321 ✔

Diagonal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	120 - 110	3/4	5'1-21/32"	2'5-27/32"	159.1	0.442	0.433	14.314	0.030 [1] ✔
T2	110 - 90	3/4	5'1-21/32"	2'5-27/32"	159.1	0.442	3.425	14.314	0.239 [1] ✔
T3	90 - 70	7/8	5'1-21/32"	2'5-11/16"	135.7	0.601	4.615	19.483	0.237 [1] ✔

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T4	70 - 50	7/8	5'2-1/16"	2'6"	137.1	0.601	4.020	19.483	0.206 [1] ✔
T5	50 - 40	L2 1/2x2 1/2x3/16	11'5"	5'2-9/32"	80.1	0.902	7.013	29.225	0.240 [1] ✔
T6	40 - 20	L2 1/2x2 1/2x3/16	11'11-5/32"	5'7-3/32"	86.2	0.902	3.755	29.225	0.128 [1] ✔
T7	20 - 0	L2 1/2x2 1/2x3/16	13'9-9/16"	6'6-13/32"	100.8	0.902	4.503	29.225	0.154 [1] ✔

[1] P_u / ϕP_n controls

Top Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	120 - 110	3/4	4'6"	4'4-1/4"	278.7	0.442	0.032	14.314	0.002 [1] ✔
T2	110 - 90	3/4	4'6"	4'4-1/4"	278.7	0.442	0.417	14.314	0.029 [1] ✔
T3	90 - 70	7/8	4'6"	4'4"	237.7	0.601	0.180	19.483	0.009 [1] ✔
T4	70 - 50	7/8	4'6-1/32"	4'3-25/32"	236.7	0.601	0.042	19.483	0.002 [1] ✔

[1] P_u / ϕP_n controls

Bottom Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	120 - 110	3/4	4'6"	4'4-1/4"	278.7	0.442	0.215	14.314	0.015 [1] ✔
T2	110 - 90	3/4	4'6"	4'4-1/4"	278.7	0.442	0.300	14.314	0.021 [1] ✔
T3	90 - 70	7/8	4'6"	4'4"	237.7	0.601	0.434	19.483	0.022 [1] ✔
T4	70 - 50	7/8	5'	4'9-3/4"	264.0	0.601	2.730	19.483	0.140 [1] ✔

[1] P_u / ϕP_n controls

Section Capacity Table

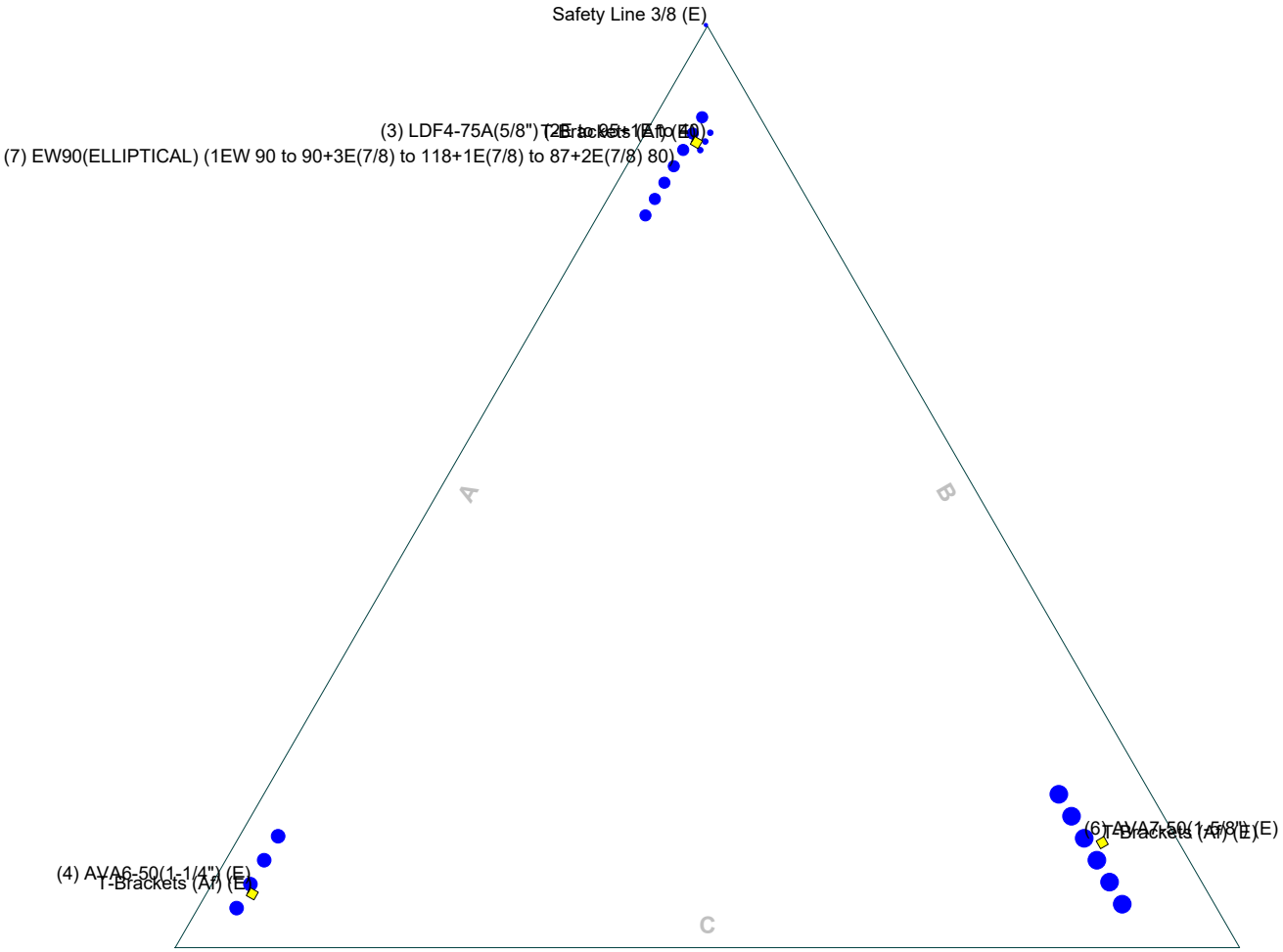
Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
T1	120 - 110	Leg	1 3/4	3	-2.311	77.187	3.0	Pass
T2	110 - 90	Leg	1 3/4	35	-34.242	77.187	44.4	Pass
T3	90 - 70	Leg	2	92	-87.826	109.130	80.5	Pass
T4	70 - 50	Leg	2 1/4	149	-139.112	145.571	95.6	Pass
T5	50 - 40	Leg	Pirod 105244	206	-135.891	142.493	95.4	Pass
T6	40 - 20	Leg	Pirod 105217	215	-155.033	214.859	72.2	Pass
T7	20 - 0	Leg	Pirod 105217	230	-169.914	214.859	79.1	Pass
T1	120 - 110	Diagonal	3/4	12	-0.430	4.869	8.8	Pass
T2	110 - 90	Diagonal	3/4	43	-3.506	4.869	72.0	Pass
T3	90 - 70	Diagonal	7/8	103	-4.702	8.884	52.9	Pass
T4	70 - 50	Diagonal	7/8	166	-4.060	7.839	51.8	Pass
T5	50 - 40	Diagonal	L2 1/2x2 1/2x3/16	213	-7.659	12.926	59.3	Pass
T6	40 - 20	Diagonal	L2 1/2x2 1/2x3/16	226	-4.047	11.697	34.6	Pass
T7	20 - 0	Diagonal	L2 1/2x2 1/2x3/16	234	-5.115	9.139	56.0	Pass
T1	120 - 110	Top Girt	3/4	5	-0.041	2.623	1.5	Pass
T2	110 - 90	Top Girt	3/4	39	-0.408	2.623	15.5	Pass
T3	90 - 70	Top Girt	7/8	96	-0.208	4.906	4.2	Pass
T4	70 - 50	Top Girt	7/8	153	-0.057	4.949	1.1	Pass
T1	120 - 110	Bottom Girt	3/4	9	-0.212	2.623	8.1	Pass
T2	110 - 90	Bottom Girt	3/4	41	-0.286	2.623	10.9	Pass
T3	90 - 70	Bottom Girt	7/8	99	-0.441	4.906	9.0	Pass
T4	70 - 50	Bottom Girt	7/8	156	-2.433	3.978	61.2	Pass
							Summary	
						Leg (T4)	95.6	Pass
						Diagonal (T2)	72.0	Pass
						Top Girt (T2)	15.5	Pass
						Bottom Girt (T4)	61.2	Pass
						RATING =	**95.6**	**Pass**

APPENDIX B

BASE LEVEL DRAWING

Feed Line Plan

Round Flat App In Face App Out Face Truss-Leg



B+T Group 1717 S. Boulder, Suite 300 Tulsa, OK 74119 Phone: 9185874630 FAX: 9182950265	Job: ***135665.004.01 - Portland HS, CT (Site# CTHA242A***		
	Project:		
	Client: Centerline Communications	Drawn by: acontreras	App'd:
	Code: TIA-222-G	Date: 07/19/19	Scale: NTS
	Path:		Dwg No. E-7

APPENDIX C

ADDITIONAL CALCULATIONS

Project Information

Site #	CTHA242A
Site Name	Portland HS, CT
County	Middlesex

Tower Information

Tower Type	Self Support
TIA-222 Rev	G

☐ Load Z Normalization

Applied Loads

	Comp.	Uplift
Axial (k)	180.00	164.00
Shear (k)	16.00	14.00

Anchor Rod Data

Quantity:	6
Diameter (in):	1
Material Grade:	A325
Grout Considered:	No
l_{ar} (in):	0
Eta Factor, η:	0.5
Thread Type:	N-Included
Configuration:	Symmetrical

Fy=92 ksi Fu=120 ksi

Anchor Rod Results

Axial, Pu_c (kips)	30.00
Shear, Vu (kips)	2.67
Moment, Mu (kip-in)	-
Axial Cap., φPn_t (kips)	58.18
Shear Cap., ϕVn (kips)	-
Moment Cap., ϕMn (kip-in)	-
Stress Rating	60.7%

Pass

PROJECT	**135665.004.01 - Portland HS, CT**				
SUBJECT	**Foundation Comparison**				
DATE	**07/19/19**	PAGE	1	OF	1

B+T GRP
1717 S. Boulder, Suite 300
Tulsa, OK 74119
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AE

Rev. G - SST

Factored TnxTowers Reactions

Down	=	177	k
Uplift	=	165	k
Shear	=	14	k-ft

Un-Factored Original Design Reactions

Down	=	144.6	k
Uplift	=	131.9	k
Shear	=	24.2	k-ft

Percent Capacity

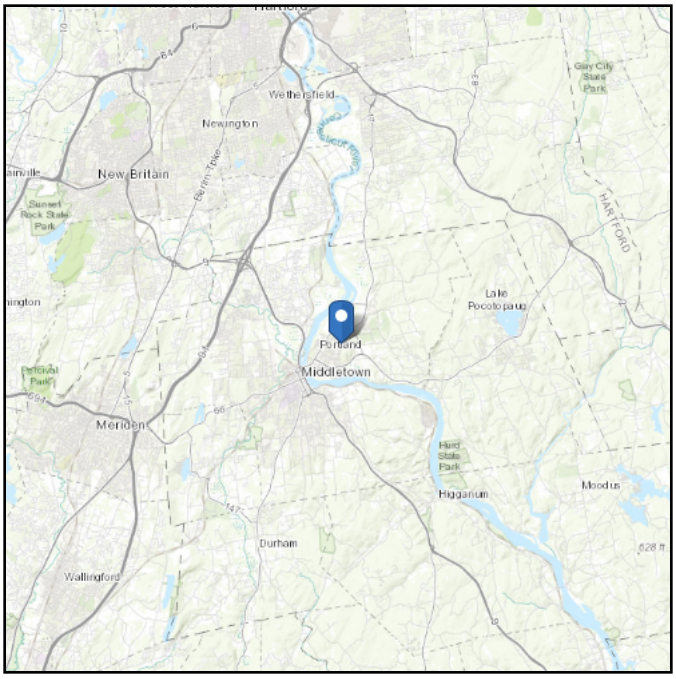
Down	=	**90.7%**	Pass
Uplift	=	**92.7%**	Pass
Shear	=	**42.9%**	Pass

ASCE 7 Hazards Report

Address:
No Address at This Location

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

Elevation: 352.08 ft (NAVD 88)
Latitude: 41.581115
Longitude: -72.622217



Wind

Results:

Wind Speed:	125 Vmph
10-year MRI	77 Vmph
25-year MRI	87 Vmph
50-year MRI	94 Vmph
100-year MRI	102 Vmph

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

Date Accessed: Tue Jun 18 2019

Value provided is 3-second gust wind speeds at 33 ft above ground for Exposure C Category, based on linear interpolation between contours. Wind speeds are interpolated in accordance with the 7-10 Standard. Wind speeds correspond to approximately a 7% probability of exceedance in 50 years (annual exceedance probability = 0.00143, MRI = 700 years).

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

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

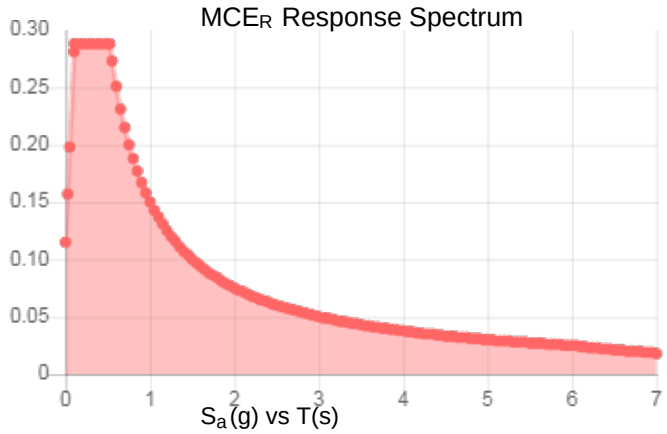
Seismic

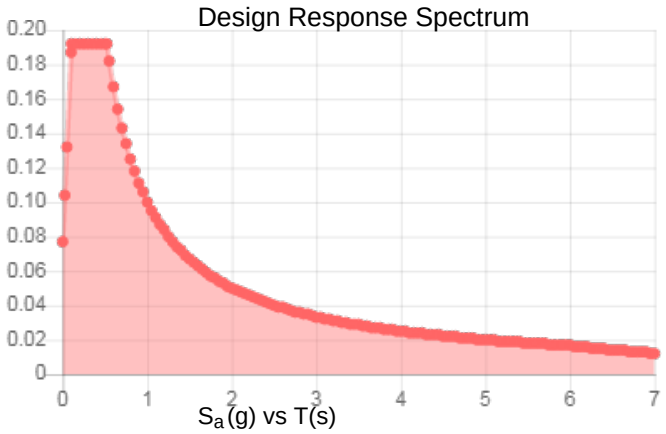
Site Soil Class: D - Stiff Soil

Results:

S_S :	0.18	S_{DS} :	0.192
S_1 :	0.063	S_{D1} :	0.1
F_a :	1.6	T_L :	6
F_v :	2.4	PGA :	0.091
S_{MS} :	0.288	PGA_M :	0.146
S_{M1} :	0.15	F_{PGA} :	1.6
		I_e :	1

Seismic Design Category B





Data Accessed: Tue Jun 18 2019

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

Ice

Results:

Ice Thickness:	0.75 in.
Concurrent Temperature:	15 F
Gust Speed:	50 mph
Data Source:	Standard ASCE/SEI 7-10, Figs. 10-2 through 10-8
Date Accessed:	Tue Jun 18 2019

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

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

Exhibit E

Mount Analysis

June 12, 2019

Peter Fales
Centerline Communications, LLC.
95 Ryan Drive, Ste 1
Raynham, MA 02767
(508) 386-0863

B+T Group
1717 S. Boulder, Suite 300
Tulsa, OK 74119
(918) 587-4630
btwo@btgrp.com

Subject:	**Appurtenance Mount Replacement Analysis Report**	
Carrier Designation:	**Site Number:**	CTHA242A
	Site Name:	Portland HS
Engineering Firm Designation:	**B+T Group Project Number:**	135665.002.01
Site Data:	**95 High Street, Portland, CT, 06480, Middlesex County** **Latitude *41.58111*°, Longitude *-72.62221*°** **Self-Support Tower** **(3) Sector Mount**	

Dear Mr. Fales,

B+T Group is pleased to submit this **"Appurtenance Mount Replacement Analysis Report"** to determine the structural integrity of the antenna mount on the above-mentioned structure.

The purpose of the analysis is to determine acceptability of the mount's stress level. Based on our analysis we have determined the stress level for the mount under the following load case to be:

Existing + Proposed Equipment Note: See Table 1 for the final loading configuration	**Sufficient Capacity** **(Passing at 76.0%)**

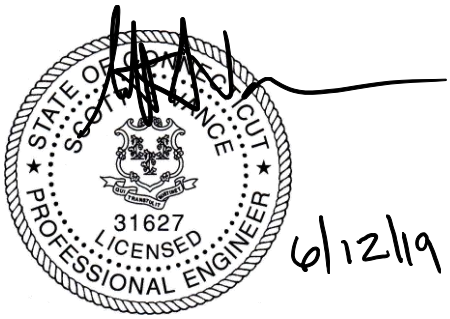
The analysis has been performed in accordance with the ANSI/TIA-222-G Standard. This analysis utilizes an ultimate 3-second gust wind speed of 130 mph (converted to an equivalent 101 mph nominal 3-second gust wind speed per Section 1609.3.1 for use with ANSI/TIA-222 G) as required by the 2015 International Building Code. Exposure Category C and Risk Category II were used in this analysis.

All the equipment proposed in this report shall be installed in accordance with the drawings for the determined available structural capacity to be effective.

We at *B+T Group* appreciate the opportunity of providing our continuing professional services to you and *Centerline Communications, LLC.* If you have any questions or need further assistance on this or any other projects, please give us a call.

Mount structural analysis prepared by: Joseph Variamparampil

Respectfully submitted by: B&T Engineering, Inc.
COA: PEC.0001564 Expires: 02/10/2020



Scott S. Vance, P.E.

TABLE OF CONTENTS

1) INTRODUCTION

The appurtenance mount consists of Sabre sector mount, Part# C10857007C at 109 ft., attached to self-support tower at 95 High Street, Portland, CT, 06480, Middlesex County. The proposed antenna loading information was obtained from Centerline Communications, LLC. All information provided to B+T Group was assumed accurate and complete.

2) ANALYSIS CRITERIA

The structural analysis was performed for this mount in accordance with the ANSI/TIA-222-G-2-2005 Structural Standard for Antenna Supporting Structures and Antennas – Addendum 2 using a 3-second gust wind speed of 101 mph with no ice and 50 mph with 0.75 inch escalated ice thickness. Exposure Category C & Topographic Category 1. In addition, the sector mount has been analyzed for various live loading conditions consisting of a 250-lb man live load applied individually at the midpoint and cantilevered ends of horizontal members as well as a 500-pound man live load applied individually at mount pipe locations using a 3-second gust of 30 mph. The mount was analyzed under 30º increments in the wind direction. The analyzed loading is detailed in Table 1.

Table 1 – Proposed and Existing Equipment Information

Loading	RAD Center Elev. (ft.)	Position	Qty.	Manufacturer	Model / Type	Note
Proposed	110	2	3	RFS	APXVAARR24_43-U-NA20	1
		3	3	Ericsson	AIR32 KRD901146-1_B66A_B2A	
		2	3	Ericsson	RADIO 4449 B12/B71	2
Existing	110	1	3	Ericsson	AIR21 KRC118023-1_B2A_B4P	3
		1	3	Generic	TMA	4

Note:
(1) Proposed Antenna to be installed on the Mount Pipe.
(2) Proposed Equipment to be installed on the Mount Pipe
(3) Existing Equipment installed on the Mount Pipe
(4) Existing Equipment installed on the Tower

Table 2 - Documents Provided

Documents	Remarks	Reference	Source
RFDS	Existing Loading Proposed Loading	Date: 04/16/2019	Centerline Communications, LLC.

3) ANALYSIS PROCEDURE

3.1) Analysis Method

RISA-3D (Version 17.0.2), a commercially available analysis software package, was used to create a three-dimensional model of the mount and calculate member stresses and deflections for various loading cases. Selected output from the analysis is included in Appendix A.

Manufacturers' drawing were used to create the model

3.2) Assumptions

1. The mount was built in accordance with the manufacturer's specifications.
2. The mount has been maintained in accordance with the manufacturer's specifications and is free of damage.
3. The configuration of antennas and other appurtenances are as specified in Table 1.

4. All mount components have been assumed to be in sufficient condition to carry their full design capacity for the analysis.
5. Mount areas and weights are determined from field measurements, standard material properties, and/or manufacturer product data.
   The following assumptions have been included in the analysis of the mount]

Component	Section	Length	Note
Proposed Mount Pipe for New Antenna	2” Std. Pipe	8’-0”	In all Positions

6. Serviceability with respect to antenna twist, tilt, roll or lateral translation is not checked and is left to the carrier or tower owner to ensure conformance.
7. All prior structural modifications, if any are assumed to be correctly installed and fully effective.
8. 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.
9. The following material grades were assumed (Unless Noted Otherwise):
   a) Connection Bolts : ASTM A325
   b) Steel Pipe : ASTM A53 (GR. 35)
   c) HSS (Round) : ASTM 500 (GR. B-42)
   d) HSS (Rectangular) : ASTM 500 (GR. B-46)
   e) Channel : ASTM A36 (GR. 36)
   f) Steel Solid Rod : ASTM A36 (GR. 36)
   g) Steel Plate : ASTM A36 (GR. 36)
   h) Steel Angle : ASTM A36 (GR. 36)
   i) UNISTRUT : ASTM A570 (GR. 33)

This analysis may be affected if any assumptions are not valid or have been made in error. B+T Group should be notified to determine the effect on the structural integrity of the antenna mounting system.

4) ANALYSIS RESULTS

Table 3 – Mount Component Stresses vs. Capacity

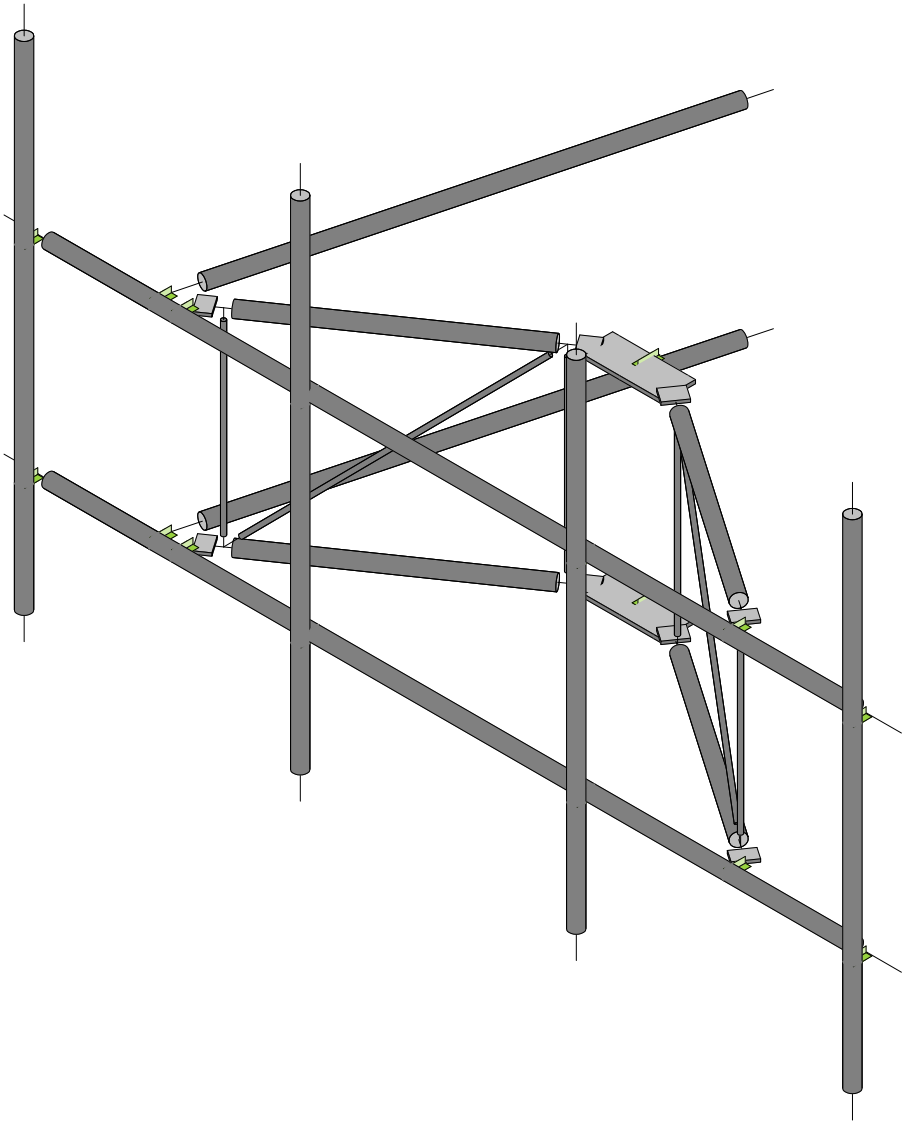
Notes	Component	Elevation (ft.)	% Capacity	Pass / Fail
-	Main Horizontals	110	52.0	Pass
-	Support Horizontals	110	14.7	Pass
-	Verticals	110	1.0	Pass
-	Diagonals	110	13.5	Pass
-	Connection Plates	110	46.9	Pass
-	Mount Pipes	110	76.0	Pass
-	Tieback	110	6.4	Pass

5) RECOMMENDATIONS

The **Sabre sector mount, Part# C10857007C** has sufficient capacity to carry the existing and proposed loads and is in compliance with the ANSI/TIA-222-G standard for the proposed and existing loading. (Refer to the RISA output for the specific members).

APPENDIX A

(RISA-3D Output)



Envelope Only Solution

B+T Group	CTHA242A - Portland HS	SK - 1
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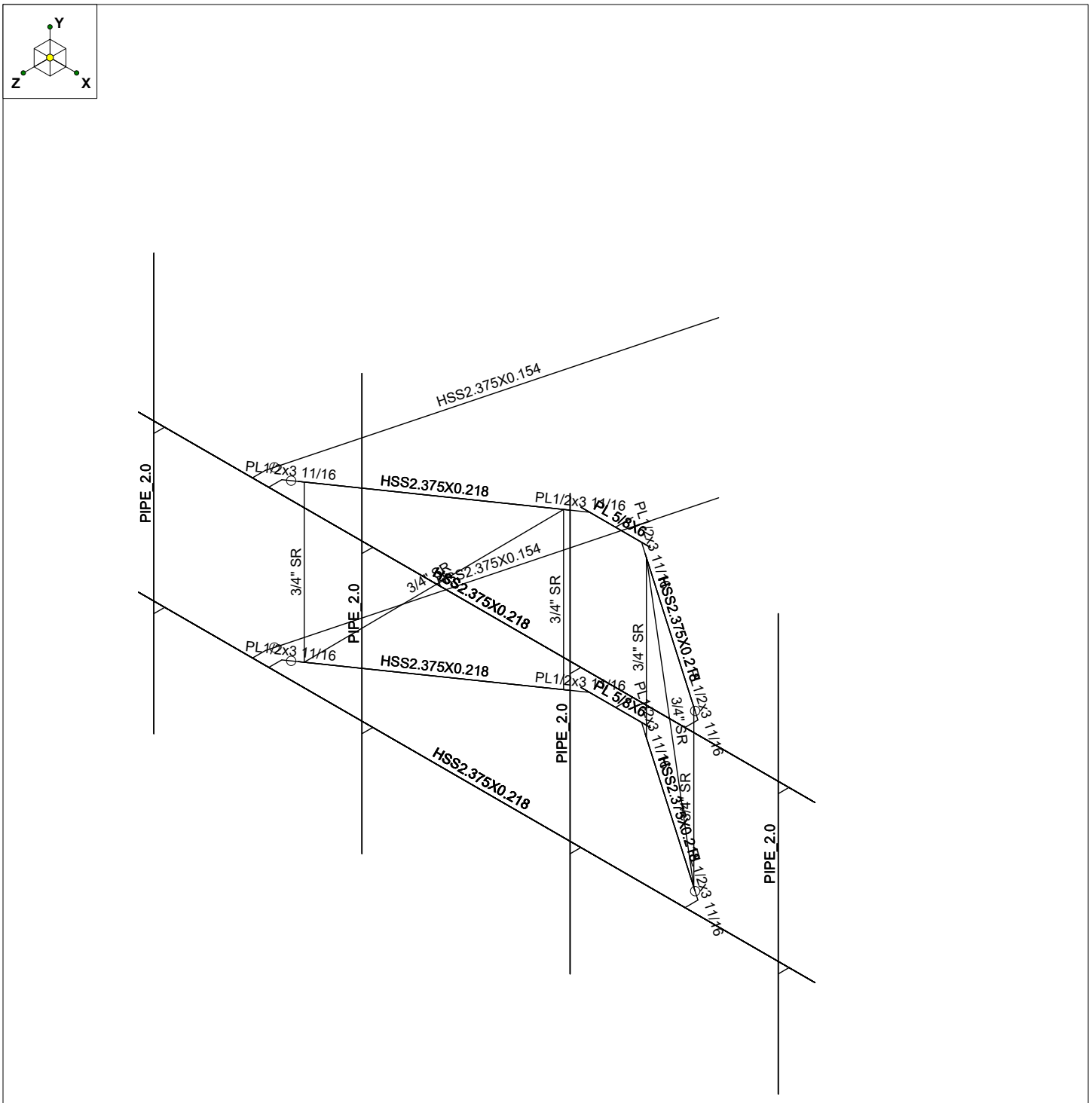

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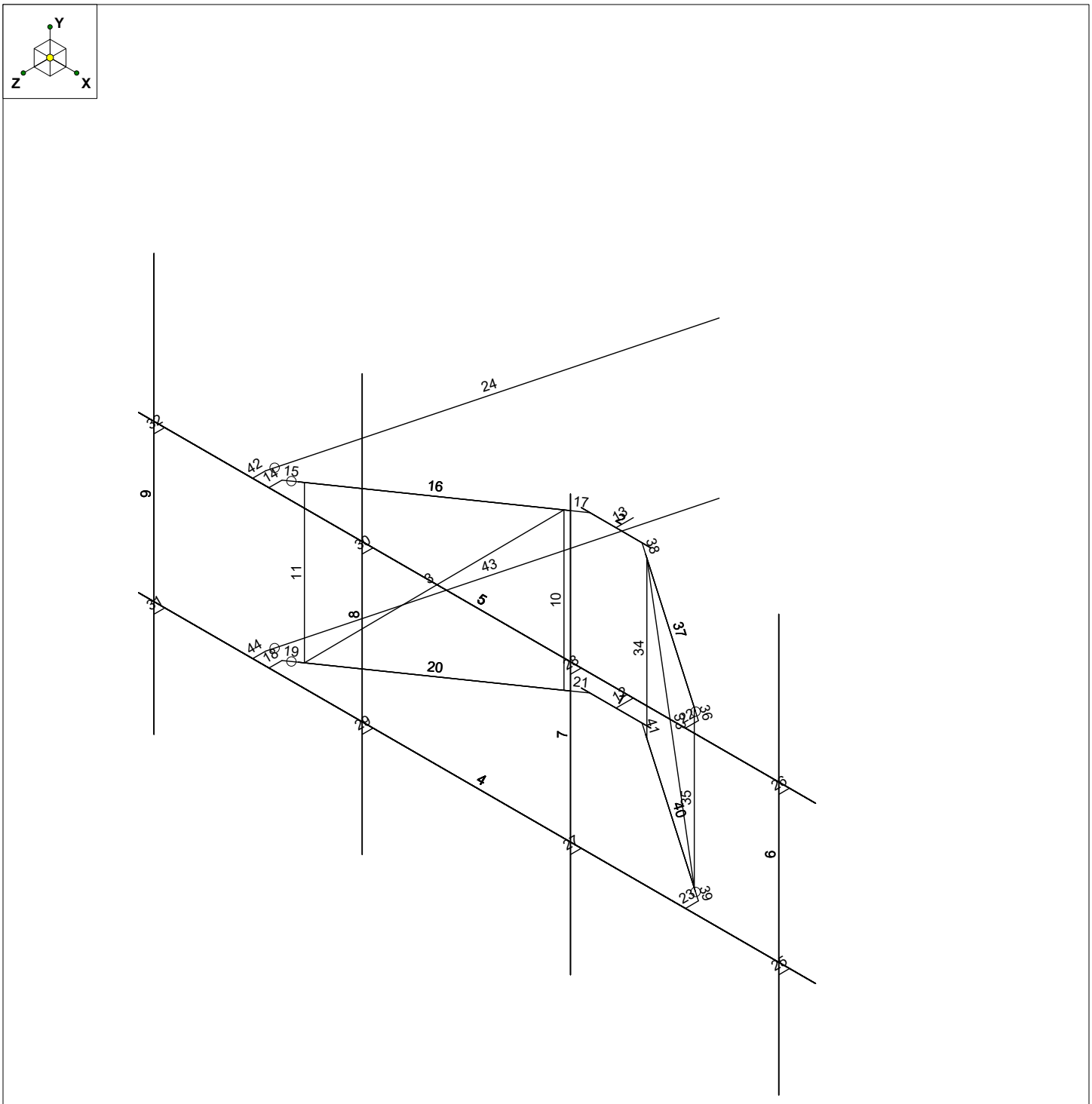

Envelope Only Solution

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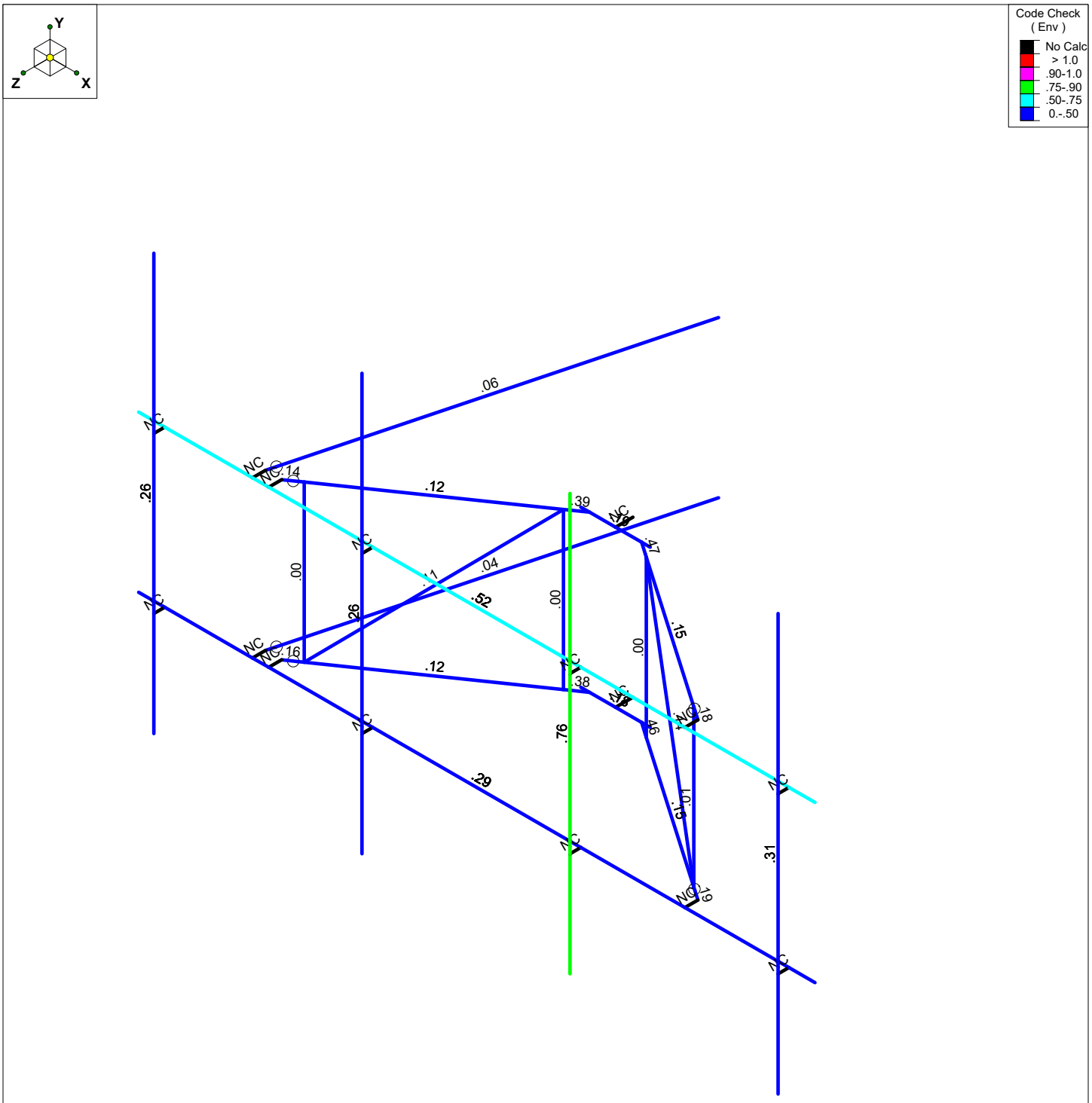

Member Code Checks Displayed (Enveloped)
Envelope Only Solution

B+T Group	CTHA242A - Portland HS	SK - 4
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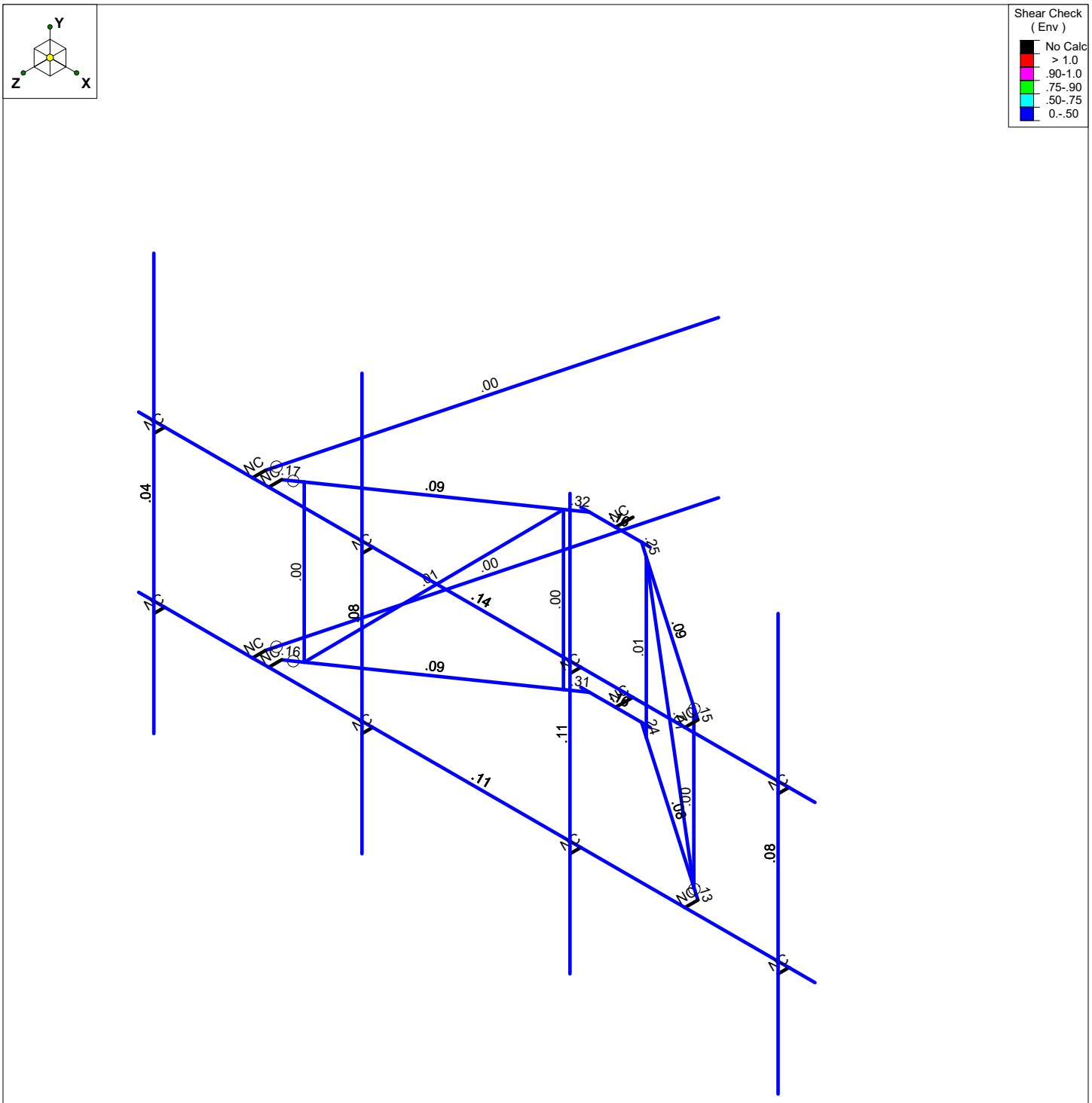

Member Shear Checks Displayed (Enveloped)
Envelope Only Solution

B+T Group	CTHA242A - Portland HS	SK - 5
JV		June 12, 2019 at 11:19 AM
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Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (\1E..Density[k/ft...		Yield[ksi]	Ry	Fu[ksi]	Rt
1	A992	29000	11154	.3	.65	.49	50	1.1	65	1.1
2	A36 Gr.36	29000	11154	.3	.65	.49	36	1.5	58	1.2
3	A572 Gr.50	29000	11154	.3	.65	.49	50	1.1	65	1.1
4	A500 Gr.B RND	29000	11154	.3	.65	.527	42	1.4	58	1.3
5	A500 Gr.B Rect	29000	11154	.3	.65	.527	46	1.4	58	1.3
6	A53 Gr.B	29000	11154	.3	.65	.49	35	1.6	60	1.2
7	A1085	29000	11154	.3	.65	.49	50	1.4	65	1.3
8	A53 Gr.B 50	29000	11154	.3	.65	.49	50	1.5	58	1.2

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design Rul...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	Main Horizontals	HSS2.375...	Beam	Pipe	A53 Gr.B 50	Typical	1.39	.824	.824	1.65
2	Supporting Horizontals	HSS2.375...	Beam	Pipe	A53 Gr.B 50	Typical	1.39	.824	.824	1.65
3	Verticals	3/4" SR	Column	BAR	A572 Gr.50	Typical	.442	.016	.016	.031
4	Diagonals	3/4" SR	HBrace	BAR	A572 Gr.50	Typical	.442	.016	.016	.031
5	Connection Plate	PL 5/8X6	Beam	RECT	A572 Gr.50	Typical	3.75	.122	11.25	.456
6	Plates	PL1/2x3 11...	Beam	RECT	A572 Gr.50	Typical	1.844	.038	2.09	.141
7	Mount-Pipe	PIPE 2.0	Column	Pipe	A53 Gr.B	Typical	1.02	.627	.627	1.25
8	Tieback	HSS2.375...	Beam	Pipe	A53 Gr.B 50	Typical	1	.627	.627	1.25

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rules
1	1	16	15		90	Connection Pl...	Beam	RECT	A572 Gr.50	Typical
2	2	5	18		90	Connection Pl...	Beam	RECT	A572 Gr.50	Typical
3	3	50	51			Diagonals	HBrace	BAR	A572 Gr.50	Typical
4	4	1	2			Main Horizont...	Beam	Pipe	A53 Gr.B 50	Typical
5	5	3	4			Main Horizont...	Beam	Pipe	A53 Gr.B 50	Typical
6	6	13	14			Mount-Pipe	Column	Pipe	A53 Gr.B	Typical
7	7	11	12			Mount-Pipe	Column	Pipe	A53 Gr.B	Typical
8	8	9	10			Mount-Pipe	Column	Pipe	A53 Gr.B	Typical
9	9	7	8			Mount-Pipe	Column	Pipe	A53 Gr.B	Typical
10	10	51	52			Verticals	Column	BAR	A572 Gr.50	Typical
11	11	49	50			Verticals	Column	BAR	A572 Gr.50	Typical
12	12	30	28			RIGID	None	None	RIGID	Typical
13	13	29	19			RIGID	None	None	RIGID	Typical
14	14	31	32			RIGID	None	None	RIGID	Typical
15	15	31	47		90	Plates	Beam	RECT	A572 Gr.50	Typical
16	16	47	53			Supporting Ho...	Beam	Pipe	A53 Gr.B 50	Typical
17	17	53	6		90	Plates	Beam	RECT	A572 Gr.50	Typical
18	18	33	34			RIGID	None	None	RIGID	Typical
19	19	33	48		90	Plates	Beam	RECT	A572 Gr.50	Typical
20	20	48	54			Supporting Ho...	Beam	Pipe	A53 Gr.B 50	Typical
21	21	54	17		90	Plates	Beam	RECT	A572 Gr.50	Typical
22	22	35	36			RIGID	None	None	RIGID	Typical
23	23	37	38			RIGID	None	None	RIGID	Typical
24	24	65	N73			Tieback	Beam	Pipe	A53 Gr.B 50	Typical
25	25	42	23			RIGID	None	None	RIGID	Typical
26	26	46	27			RIGID	None	None	RIGID	Typical
27	27	41	22			RIGID	None	None	RIGID	Typical
28	28	45	26			RIGID	None	None	RIGID	Typical
29	29	40	21			RIGID	None	None	RIGID	Typical
30	30	44	25			RIGID	None	None	RIGID	Typical
31	31	39	20			RIGID	None	None	RIGID	Typical

Member Primary Data (Continued)

	Label	I Joint	J Joint	K Joint	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rules
32	32	43	24			RIGID	None	None	RIGID	Typical
33	33	60	61			Diagonals	HBrace	BAR	A572 Gr.50	Typical
34	34	61	62			Verticals	Column	BAR	A572 Gr.50	Typical
35	35	59	60			Verticals	Column	BAR	A572 Gr.50	Typical
36	36	35	57		90	Plates	Beam	RECT	A572 Gr.50	Typical
37	37	57	63			Supporting Ho...	Beam	Pipe	A53 Gr.B 50	Typical
38	38	63	55		90	Plates	Beam	RECT	A572 Gr.50	Typical
39	39	37	58		90	Plates	Beam	RECT	A572 Gr.50	Typical
40	40	58	64			Supporting Ho...	Beam	Pipe	A53 Gr.B 50	Typical
41	41	64	56		90	Plates	Beam	RECT	A572 Gr.50	Typical
42	42	65	66			RIGID	None	None	RIGID	Typical
43	43	68	N74			Tieback	Beam	Pipe	A53 Gr.B 50	Typical
44	44	68	69			RIGID	None	None	RIGID	Typical

Hot Rolled Steel Design Parameters

	Label	Shape	Length[ft]	Lbyy[ft]	Lbzz[ft]	Lcomp top[ft]	Lcomp bot[ft]	L-torq...	Kyy	Kzz	Cb	Functi...
1	1	Connection...	1.333			Lbyy						Lateral
2	2	Connection...	1.333			Lbyy						Lateral
3	3	Diagonals	4.673			Lbyy						Lateral
4	4	Main Horiz...	13			Lbyy						Lateral
5	5	Main Horiz...	13			Lbyy						Lateral
6	6	Mount-Pipe	8			Lbyy						Lateral
7	7	Mount-Pipe	8			Lbyy						Lateral
8	8	Mount-Pipe	8			Lbyy						Lateral
9	9	Mount-Pipe	8			Lbyy						Lateral
10	10	Verticals	3			Lbyy						Lateral
11	11	Verticals	3			Lbyy						Lateral
12	15	Plates	.227			Lbyy						Lateral
13	16	Supporting ...	3.75			Lbyy						Lateral
14	17	Plates	.276			Lbyy						Lateral
15	19	Plates	.227			Lbyy						Lateral
16	20	Supporting ...	3.75			Lbyy						Lateral
17	21	Plates	.276			Lbyy						Lateral
18	24	Tieback	6.964			Lbyy						Lateral
19	33	Diagonals	4.673			Lbyy						Lateral
20	34	Verticals	3			Lbyy						Lateral
21	35	Verticals	3			Lbyy						Lateral
22	36	Plates	.227			Lbyy						Lateral
23	37	Supporting ...	3.75			Lbyy						Lateral
24	38	Plates	.276			Lbyy						Lateral
25	39	Plates	.227			Lbyy						Lateral
26	40	Supporting ...	3.75			Lbyy						Lateral
27	41	Plates	.276			Lbyy						Lateral
28	43	Tieback	6.964			Lbyy						Lateral

Joint Coordinates and Temperatures

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Diap...
1	1	-6.5	-3	3.000033	0	
2	2	6.5	-3	3.000033	0	
3	3	-6.5	0	3.000033	0	
4	4	6.5	0	3.000033	0	
5	5	-0.666667	0	0.333363	0	
6	6	-.5	0	0.333363	0	
7	7	-6	3	3.208366	0	

Joint Coordinates and Temperatures (Continued)

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Diap...
8	8	-6	-5	3.208367	0	
9	9	-2	3	3.208366	0	
10	10	-2	-5	3.208366	0	
11	11	2	3	3.208366	0	
12	12	2	-5	3.208367	0	
13	13	6	3	3.208366	0	
14	14	6	-5	3.208366	0	
15	15	0.666667	-3	0.333363	0	
16	16	-0.666667	-3	0.333363	0	
17	17	-.5	-3	0.333363	0	
18	18	0.666667	0	0.333363	0	
19	19	0	0	0.333363	0	
20	20	-6	-3	3.000033	0	
21	21	-2	-3	3.000033	0	
22	22	2	-3	3.000033	0	
23	23	6	-3	3.000033	0	
24	24	-6	0	3.000033	0	
25	25	-2	0	3.000033	0	
26	26	2	0	3.000033	0	
27	27	6	0	3.000033	0	
28	28	0	-3	0.333363	0	
29	29	0	0	0.00003	0	
30	30	0	-3	0.00003	0	
31	31	-4	0	2.750033	0	
32	32	-4	0	3.000033	0	
33	33	-4	-3	2.750033	0	
34	34	-4	-3	3.000033	0	
35	35	4	0	2.750033	0	
36	36	4	0	3.000033	0	
37	37	4	-3	2.750033	0	
38	38	4	-3	3.000033	0	
39	39	-6	-3	3.208366	0	
40	40	-2	-3	3.208366	0	
41	41	2	-3	3.208366	0	
42	42	6	-3	3.208366	0	
43	43	-6	0	3.208366	0	
44	44	-2	0	3.208366	0	
45	45	2	0	3.208366	0	
46	46	6	0	3.208366	0	
47	47	-3.812998	0	2.620911	0	
48	48	-3.812998	-3	2.620911	0	
49	49	-3.744423	0	2.573561	0	
50	50	-3.744423	-3	2.573561	0	
51	51	-0.79571	0	0.537544	0	
52	52	-0.79571	-3	0.537544	0	
53	53	-0.727135	0	0.490195	0	
54	54	-0.727135	-3	0.490195	0	
55	55	.5	0	0.333363	0	
56	56	.5	-3	0.333363	0	
57	57	3.812998	0	2.620911	0	
58	58	3.812998	-3	2.620911	0	
59	59	3.744423	0	2.573561	0	
60	60	3.744423	-3	2.573561	0	
61	61	0.79571	0	0.537544	0	
62	62	0.79571	-3	0.537544	0	
63	63	0.727135	0	0.490195	0	
64	64	0.727135	-3	0.490195	0	

Joint Coordinates and Temperatures (Continued)

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Diap...
65	65	-4.3125	0	2.750033	0	
66	66	-4.3125	0	3.000033	0	
67	68	-4.3125	-3	2.750033	0	
68	69	-4.3125	-3	3.000033	0	
69	N72	2.25	0	-3.897114	0	
70	N73	-2.25	.25	-3.897114	0	
71	N74	-2.25	-2.75	-3.897114	0	

Joint Loads and Enforced Displacements (BLC 9 : Live Load a)

	Joint Label	L,D,M	Direction	Magnitude[(k,k-ft), (in,rad), (k*s^2/f...
1	20	L	Y	-.5

Joint Loads and Enforced Displacements (BLC 10 : Live Load b)

	Joint Label	L,D,M	Direction	Magnitude[(k,k-ft), (in,rad), (k*s^2/f...
1	21	L	Y	-.5

Joint Loads and Enforced Displacements (BLC 11 : Live Load c)

	Joint Label	L,D,M	Direction	Magnitude[(k,k-ft), (in,rad), (k*s^2/f...
1	22	L	Y	-.5

Joint Loads and Enforced Displacements (BLC 12 : Live Load d)

	Joint Label	L,D,M	Direction	Magnitude[(k,k-ft), (in,rad), (k*s^2/f...
1	23	L	Y	-.5

Member Point Loads (BLC 1 : Dead)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	6	Y	-.042	%10
2	6	Y	-.042	%60
3	6	Y	-.01	%50
4	6	Y	0	0
5	6	Y	0	0
6	7	Y	-.064	%5
7	7	Y	-.064	%95
8	7	Y	-.075	%50
9	7	Y	0	0
10	7	Y	0	0
11	8	Y	-.053	%10
12	8	Y	-.053	%60
13	8	Y	0	0
14	8	Y	0	0
15	8	Y	0	0

Member Point Loads (BLC 2 : 0 Wind - No Ice)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	6	Z	-.095	%10
2	6	Z	-.095	%60
3	6	Z	-.027	%50
4	6	Z	0	0
5	6	Z	0	0
6	7	Z	-.324	%5
7	7	Z	-.324	%95
8	7	Z	-.053	%50

Member Point Loads (BLC 2 : 0 Wind - No Ice) (Continued)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
9	7	Z	0	0
10	7	Z	0	0
11	8	Z	-.104	%10
12	8	Z	-.104	%60
13	8	Z	0	0
14	8	Z	0	0
15	8	Z	0	0

Member Point Loads (BLC 3 : 90 Wind - No Ice)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	6	X	-.063	%10
2	6	X	-.063	%60
3	6	X	-.011	%50
4	6	X	0	0
5	6	X	0	0
6	7	X	-.117	%5
7	7	X	-.117	%95
8	7	X	-.037	%50
9	7	X	0	0
10	7	X	0	0
11	8	X	-.07	%10
12	8	X	-.07	%60
13	8	X	0	0
14	8	X	0	0
15	8	X	0	0

Member Point Loads (BLC 4 : 0 Wind - Ice)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	6	Z	-.031	%10
2	6	Z	-.031	%60
3	6	Z	-.012	%50
4	6	Z	0	0
5	6	Z	0	0
6	7	Z	-.093	%5
7	7	Z	-.093	%95
8	7	Z	-.02	%50
9	7	Z	0	0
10	7	Z	0	0
11	8	Z	-.034	%10
12	8	Z	-.034	%60
13	8	Z	0	0
14	8	Z	0	0
15	8	Z	0	0

Member Point Loads (BLC 5 : 90 Wind - Ice)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	6	X	-.023	%10
2	6	X	-.023	%60
3	6	X	-.006	%50
4	6	X	0	0
5	6	X	0	0
6	7	X	-.041	%5
7	7	X	-.041	%95
8	7	X	-.015	%50
9	7	X	0	0

Member Point Loads (BLC 5 : 90 Wind - Ice) (Continued)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
10	7	X	0	0
11	8	X	-.025	%10
12	8	X	-.025	%60
13	8	X	0	0
14	8	X	0	0
15	8	X	0	0

Member Point Loads (BLC 6 : 0 Wind - Service)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	6	Z	-.008	%10
2	6	Z	-.008	%60
3	6	Z	-.002	%50
4	6	Z	0	0
5	6	Z	0	0
6	7	Z	-.028	%5
7	7	Z	-.028	%95
8	7	Z	-.005	%50
9	7	Z	0	0
10	7	Z	0	0
11	8	Z	-.009	%10
12	8	Z	-.009	%60
13	8	Z	0	0
14	8	Z	0	0
15	8	Z	0	0

Member Point Loads (BLC 7 : 90 Wind - Service)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	6	X	-.005	%10
2	6	X	-.005	%60
3	6	X	-.0009	%50
4	6	X	0	0
5	6	X	0	0
6	7	X	-.01	%5
7	7	X	-.01	%95
8	7	X	-.003	%50
9	7	X	0	0
10	7	X	0	0
11	8	X	-.006	%10
12	8	X	-.006	%60
13	8	X	0	0
14	8	X	0	0
15	8	X	0	0

Member Point Loads (BLC 8 : Ice)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	6	Y	-.076	%10
2	6	Y	-.076	%60
3	6	Y	-.021	%50
4	6	Y	0	0
5	6	Y	0	0
6	7	Y	-.225	%5
7	7	Y	-.225	%95
8	7	Y	-.046	%50
9	7	Y	0	0
10	7	Y	0	0

Member Point Loads (BLC 8 : Ice) (Continued)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
11	8	Y	-.084	%10
12	8	Y	-.084	%60
13	8	Y	0	0
14	8	Y	0	0
15	8	Y	0	0

Member Point Loads (BLC 13 : Maint LL 1)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	16	Y	-.25	%50

Member Point Loads (BLC 14 : Maint LL 2)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	20	Y	-.25	%50

Member Point Loads (BLC 15 : Maint LL 3)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	37	Y	-.25	%50

Member Point Loads (BLC 16 : Maint LL 4)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	40	Y	-.25	%50

Member Point Loads (BLC 17 : Maint LL 5)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	5	Y	-.25	%95

Member Point Loads (BLC 18 : Maint LL 6)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	4	Y	-.25	%95

Member Distributed Loads (BLC 2 : 0 Wind - No Ice)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	1	Z	-.003	-.003	0	0
2	2	Z	-.003	-.003	0	0
3	3	Z	-.002	-.002	0	0
4	4	Z	-.008	-.008	0	0
5	5	Z	-.008	-.008	0	0
6	6	Z	-.008	-.008	0	0
7	7	Z	-.008	-.008	0	0
8	8	Z	-.008	-.008	0	0
9	9	Z	-.008	-.008	0	0
10	10	Z	-.002	-.002	0	0
11	11	Z	-.002	-.002	0	0
12	15	Z	-.002	-.002	0	0
13	16	Z	-.007	-.007	0	0
14	17	Z	-.002	-.002	0	0
15	19	Z	-.002	-.002	0	0
16	20	Z	-.007	-.007	0	0
17	21	Z	-.002	-.002	0	0
18	24	Z	-.008	-.008	0	0
19	33	Z	-.002	-.002	0	0
20	34	Z	-.002	-.002	0	0

Member Distributed Loads (BLC 2 : 0 Wind - No Ice) (Continued)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
21	35	Z	-.002	-.002	0	0
22	36	Z	-.002	-.002	0	0
23	37	Z	-.007	-.007	0	0
24	38	Z	-.002	-.002	0	0
25	39	Z	-.002	-.002	0	0
26	40	Z	-.007	-.007	0	0
27	41	Z	-.002	-.002	0	0
28	43	Z	-.008	-.008	0	0

Member Distributed Loads (BLC 3 : 90 Wind - No Ice)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	1	X	-.003	-.003	0	0
2	2	X	-.003	-.003	0	0
3	3	X	-.002	-.002	0	0
4	4	X	-.008	-.008	0	0
5	5	X	-.008	-.008	0	0
6	6	X	-.008	-.008	0	0
7	7	X	-.008	-.008	0	0
8	8	X	-.008	-.008	0	0
9	9	X	-.008	-.008	0	0
10	10	X	-.002	-.002	0	0
11	11	X	-.002	-.002	0	0
12	15	X	-.002	-.002	0	0
13	16	X	-.007	-.007	0	0
14	17	X	-.002	-.002	0	0
15	19	X	-.002	-.002	0	0
16	20	X	-.007	-.007	0	0
17	21	X	-.002	-.002	0	0
18	24	X	-.008	-.008	0	0
19	33	X	-.002	-.002	0	0
20	34	X	-.002	-.002	0	0
21	35	X	-.002	-.002	0	0
22	36	X	-.002	-.002	0	0
23	37	X	-.007	-.007	0	0
24	38	X	-.002	-.002	0	0
25	39	X	-.002	-.002	0	0
26	40	X	-.007	-.007	0	0
27	41	X	-.002	-.002	0	0
28	43	X	-.008	-.008	0	0

Member Distributed Loads (BLC 4 : 0 Wind - Ice)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	1	Z	-.006	-.006	0	0
2	2	Z	-.006	-.006	0	0
3	3	Z	-.002	-.002	0	0
4	4	Z	-.002	-.002	0	0
5	5	Z	-.002	-.002	0	0
6	6	Z	-.002	-.002	0	0
7	7	Z	-.002	-.002	0	0
8	8	Z	-.002	-.002	0	0
9	9	Z	-.002	-.002	0	0
10	10	Z	-.002	-.002	0	0
11	11	Z	-.002	-.002	0	0
12	15	Z	-.007	-.007	0	0
13	16	Z	-.002	-.002	0	0
14	17	Z	-.007	-.007	0	0

Member Distributed Loads (BLC 4 : 0 Wind - Ice) (Continued)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
15	19	Z	-.007	-.007	0	0
16	20	Z	-.002	-.002	0	0
17	21	Z	-.007	-.007	0	0
18	24	Z	-.002	-.002	0	0
19	33	Z	-.002	-.002	0	0
20	34	Z	-.002	-.002	0	0
21	35	Z	-.002	-.002	0	0
22	36	Z	-.007	-.007	0	0
23	37	Z	-.002	-.002	0	0
24	38	Z	-.007	-.007	0	0
25	39	Z	-.007	-.007	0	0
26	40	Z	-.002	-.002	0	0
27	41	Z	-.007	-.007	0	0
28	43	Z	-.002	-.002	0	0

Member Distributed Loads (BLC 5 : 90 Wind - Ice)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	1	X	-.006	-.006	0	0
2	2	X	-.006	-.006	0	0
3	3	X	-.002	-.002	0	0
4	4	X	-.002	-.002	0	0
5	5	X	-.002	-.002	0	0
6	6	X	-.002	-.002	0	0
7	7	X	-.002	-.002	0	0
8	8	X	-.002	-.002	0	0
9	9	X	-.002	-.002	0	0
10	10	X	-.002	-.002	0	0
11	11	X	-.002	-.002	0	0
12	15	X	-.007	-.007	0	0
13	16	X	-.002	-.002	0	0
14	17	X	-.007	-.007	0	0
15	19	X	-.007	-.007	0	0
16	20	X	-.002	-.002	0	0
17	21	X	-.007	-.007	0	0
18	24	X	-.002	-.002	0	0
19	33	X	-.002	-.002	0	0
20	34	X	-.002	-.002	0	0
21	35	X	-.002	-.002	0	0
22	36	X	-.007	-.007	0	0
23	37	X	-.002	-.002	0	0
24	38	X	-.007	-.007	0	0
25	39	X	-.007	-.007	0	0
26	40	X	-.002	-.002	0	0
27	41	X	-.007	-.007	0	0
28	43	X	-.002	-.002	0	0

Member Distributed Loads (BLC 6 : 0 Wind - Service)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	1	Z	-.0003	-.0003	0	0
2	2	Z	-.0003	-.0003	0	0
3	3	Z	-.0001	-.0001	0	0
4	4	Z	-.0003	-.0003	0	0
5	5	Z	-.0003	-.0003	0	0
6	6	Z	-.0003	-.0003	0	0
7	7	Z	-.0003	-.0003	0	0
8	8	Z	-.0003	-.0003	0	0

Member Distributed Loads (BLC 6 : 0 Wind - Service) (Continued)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
9	9	Z	-.0003	-.0003	0	0
10	10	Z	-.0001	-.0001	0	0
11	11	Z	-.0001	-.0001	0	0
12	15	Z	-.0002	-.0002	0	0
13	16	Z	-.0003	-.0003	0	0
14	17	Z	-.0002	-.0002	0	0
15	19	Z	-.0002	-.0002	0	0
16	20	Z	-.0003	-.0003	0	0
17	21	Z	-.0002	-.0002	0	0
18	24	Z	-.0003	-.0003	0	0
19	33	Z	-.0001	-.0001	0	0
20	34	Z	-.0001	-.0001	0	0
21	35	Z	-.0001	-.0001	0	0
22	36	Z	-.0002	-.0002	0	0
23	37	Z	-.0003	-.0003	0	0
24	38	Z	-.0002	-.0002	0	0
25	39	Z	-.0002	-.0002	0	0
26	40	Z	-.0003	-.0003	0	0
27	41	Z	-.0002	-.0002	0	0
28	43	Z	-.0003	-.0003	0	0

Member Distributed Loads (BLC 7 : 90 Wind - Service)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	1	X	-.0003	-.0003	0	0
2	2	X	-.0003	-.0003	0	0
3	3	X	-.0001	-.0001	0	0
4	4	X	-.0003	-.0003	0	0
5	5	X	-.0003	-.0003	0	0
6	6	X	-.0003	-.0003	0	0
7	7	X	-.0003	-.0003	0	0
8	8	X	-.0003	-.0003	0	0
9	9	X	-.0003	-.0003	0	0
10	10	X	-.0001	-.0001	0	0
11	11	X	-.0001	-.0001	0	0
12	15	X	-.0002	-.0002	0	0
13	16	X	-.0003	-.0003	0	0
14	17	X	-.0002	-.0002	0	0
15	19	X	-.0002	-.0002	0	0
16	20	X	-.0003	-.0003	0	0
17	21	X	-.0002	-.0002	0	0
18	24	X	-.0003	-.0003	0	0
19	33	X	-.0001	-.0001	0	0
20	34	X	-.0001	-.0001	0	0
21	35	X	-.0001	-.0001	0	0
22	36	X	-.0002	-.0002	0	0
23	37	X	-.0003	-.0003	0	0
24	38	X	-.0002	-.0002	0	0
25	39	X	-.0002	-.0002	0	0
26	40	X	-.0003	-.0003	0	0
27	41	X	-.0002	-.0002	0	0
28	43	X	-.0003	-.0003	0	0

Member Distributed Loads (BLC 8 : Ice)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	1	Y	-.016	-.016	0	0
2	2	Y	-.016	-.016	0	0

Member Distributed Loads (BLC 8 : Ice) (Continued)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
3	3	Y	-.005	-.005	0	0
4	4	Y	-.008	-.008	0	0
5	5	Y	-.008	-.008	0	0
6	6	Y	-.008	-.008	0	0
7	7	Y	-.008	-.008	0	0
8	8	Y	-.008	-.008	0	0
9	9	Y	-.008	-.008	0	0
10	10	Y	-.005	-.005	0	0
11	11	Y	-.005	-.005	0	0
12	15	Y	-.011	-.011	0	0
13	16	Y	-.008	-.008	0	0
14	17	Y	-.011	-.011	0	0
15	19	Y	-.011	-.011	0	0
16	20	Y	-.008	-.008	0	0
17	21	Y	-.011	-.011	0	0
18	24	Y	-.008	-.008	0	0
19	33	Y	-.005	-.005	0	0
20	34	Y	-.005	-.005	0	0
21	35	Y	-.005	-.005	0	0
22	36	Y	-.011	-.011	0	0
23	37	Y	-.008	-.008	0	0
24	38	Y	-.011	-.011	0	0
25	39	Y	-.011	-.011	0	0
26	40	Y	-.008	-.008	0	0
27	41	Y	-.011	-.011	0	0
28	43	Y	-.008	-.008	0	0

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distributed	Area(Me...	Surface(P...
1	Dead	DL		-1			15			
2	0 Wind - No Ice	WLZ					15	28		
3	90 Wind - No Ice	WLX					15	28		
4	0 Wind - Ice	WLZ					15	28		
5	90 Wind - Ice	WLX					15	28		
6	0 Wind - Service	WLZ					15	28		
7	90 Wind - Service	WLX					15	28		
8	Ice	OL1					15	28		
9	Live Load a	LL				1				
10	Live Load b	LL				1				
11	Live Load c	LL				1				
12	Live Load d	LL				1				
13	Maint LL 1	LL					1			
14	Maint LL 2	LL					1			
15	Maint LL 3	LL					1			
16	Maint LL 4	LL					1			
17	Maint LL 5	LL					1			
18	Maint LL 6	LL					1			
19	Maint LL 7	LL								
20	Maint LL 8	LL								
21	Maint LL 9	LL								
22	Maint LL 10	LL								
23	Maint LL 11	LL								
24	Maint LL 12	LL								
25	Maint LL 13	LL								
26	Maint LL 14	LL								

Basic Load Cases (Continued)

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distributed	Area(Me...	Surface(P...
27	Maint LL 15	LL								

Load Combinations

	Description	So...	P...	S...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...
1	1.4 Dead	Yes	Y		1	1.4																		
2	0.9 D + 1.6 - 0 W	Yes	Y		1	.9	2	1.6																
3	0.9 D + 1.6 - 30 W	Yes	Y		1	.9	2	1.386	3	.8														
4	0.9 D + 1.6 - 60 W	Yes	Y		1	.9	3	1.386	2	.8														
5	0.9 D + 1.6 - 90 W	Yes	Y		1	.9	3	1.6																
6	0.9 D + 1.6 - 120 W	Yes	Y		1	.9	3	1.386	2	-.8														
7	0.9 D + 1.6 - 150 W	Yes	Y		1	.9	2	-1.3...	3	.8														
8	0.9 D + 1.6 - 180 W	Yes	Y		1	.9	2	-1.6																
9	0.9 D + 1.6 - 210 W	Yes	Y		1	.9	2	-1.3...	3	-.8														
10	0.9 D + 1.6 - 240 W	Yes	Y		1	.9	3	-1.3...	2	-.8														
11	0.9 D + 1.6 - 270 W	Yes	Y		1	.9	3	-1.6																
12	0.9 D + 1.6 - 300 W	Yes	Y		1	.9	3	-1.3...	2	.8														
13	0.9 D + 1.6 - 330 W	Yes	Y		1	.9	2	1.386	3	-.8														
14	1.2 D + 1.6 - 0 W	Yes	Y		1	1.2	2	1.6																
15	1.2 D + 1.6 - 30 W	Yes	Y		1	1.2	2	1.386	3	.8														
16	1.2 D + 1.6 - 60 W	Yes	Y		1	1.2	3	1.386	2	.8														
17	1.2 D + 1.6 - 90 W	Yes	Y		1	1.2	3	1.6																
18	1.2 D + 1.6 - 120 W	Yes	Y		1	1.2	3	1.386	2	-.8														
19	1.2 D + 1.6 - 150 W	Yes	Y		1	1.2	2	-1.3...	3	.8														
20	1.2 D + 1.6 - 180 W	Yes	Y		1	1.2	2	-1.6																
21	1.2 D + 1.6 - 210 W	Yes	Y		1	1.2	2	-1.3...	3	-.8														
22	1.2 D + 1.6 - 240 W	Yes	Y		1	1.2	3	-1.3...	2	-.8														
23	1.2 D + 1.6 - 270 W	Yes	Y		1	1.2	3	-1.6																
24	1.2 D + 1.6 - 300 W	Yes	Y		1	1.2	3	-1.3...	2	.8														
25	1.2 D + 1.6 - 330 W	Yes	Y		1	1.2	2	1.386	3	-.8														
26	0.9 D + 1.6 - 0 W/I...	Yes	Y		1	.9	4	1.6			8	1												
27	0.9 D + 1.6 - 30 W...	Yes	Y		1	.9	4	1.386	5	.8	8	1												
28	0.9 D + 1.6 - 60 W...	Yes	Y		1	.9	5	1.386	4	.8	8	1												
29	0.9 D + 1.6 - 90 W...	Yes	Y		1	.9	5	1.6			8	1												
30	0.9 D + 1.6 - 120 ...	Yes	Y		1	.9	5	1.386	4	-.8	8	1												
31	0.9 D + 1.6 - 150 ...	Yes	Y		1	.9	4	-1.3...	5	.8	8	1												
32	0.9 D + 1.6 - 180 ...	Yes	Y		1	.9	4	-1.6			8	1												
33	0.9 D + 1.6 - 210 ...	Yes	Y		1	.9	4	-1.3...	5	-.8	8	1												
34	0.9 D + 1.6 - 240 ...	Yes	Y		1	.9	5	-1.3...	4	-.8	8	1												
35	0.9 D + 1.6 - 270 ...	Yes	Y		1	.9	5	-1.6			8	1												
36	0.9 D + 1.6 - 300 ...	Yes	Y		1	.9	5	-1.3...	4	.8	8	1												
37	0.9 D + 1.6 - 330 ...	Yes	Y		1	.9	4	1.386	5	-.8	8	1												
38	1.2 D + 1.0 - 0 W/I...	Yes	Y		1	1.2	4	1			8	1												
39	1.2 D + 1.0 - 30 W...	Yes	Y		1	1.2	4	.866	5	.5	8	1												
40	1.2 D + 1.0 - 60 W...	Yes	Y		1	1.2	5	.866	4	.5	8	1												
41	1.2 D + 1.0 - 90 W...	Yes	Y		1	1.2	5	1			8	1												
42	1.2 D + 1.0 - 120 ...	Yes	Y		1	1.2	5	.866	4	-.5	8	1												
43	1.2 D + 1.0 - 150 ...	Yes	Y		1	1.2	4	-.866	5	.5	8	1												
44	1.2 D + 1.0 - 180 ...	Yes	Y		1	1.2	4	-1			8	1												
45	1.2 D + 1.0 - 210 ...	Yes	Y		1	1.2	4	-.866	5	-.5	8	1												
46	1.2 D + 1.0 - 240 ...	Yes	Y		1	1.2	5	-.866	4	-.5	8	1												
47	1.2 D + 1.0 - 270 ...	Yes	Y		1	1.2	5	-1			8	1												
48	1.2 D + 1.0 - 300 ...	Yes	Y		1	1.2	5	-.866	4	.5	8	1												
49	1.2 D + 1.0 - 330 ...	Yes	Y		1	1.2	4	.866	5	-.5	8	1												
50	1.2 D + 1.5 LL a +...	Yes	Y		1	1.2	6	1			9	1.5												
51	1.2 D + 1.5 LL a +...	Yes	Y		1	1.2	6	.866	7	.5	9	1.5												

Load Combinations (Continued)

	Description	So...	P...	S...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...
52	1.2 D + 1.5 LL a +...	Yes	Y		1	1.2	7	.866	6	.5	9	1.5														
53	1.2 D + 1.5 LL a +...	Yes	Y		1	1.2	7	1			9	1.5														
54	1.2 D + 1.5 LL a +...	Yes	Y		1	1.2	7	.866	6	-.5	9	1.5														
55	1.2 D + 1.5 LL a +...	Yes	Y		1	1.2	6	-.866	7	.5	9	1.5														
56	1.2 D + 1.5 LL a +...	Yes	Y		1	1.2	6	-1			9	1.5														
57	1.2 D + 1.5 LL a +...	Yes	Y		1	1.2	6	-.866	7	-.5	9	1.5														
58	1.2 D + 1.5 LL a +...	Yes	Y		1	1.2	7	-.866	6	-.5	9	1.5														
59	1.2 D + 1.5 LL a +...	Yes	Y		1	1.2	7	-1			9	1.5														
60	1.2 D + 1.5 LL a +...	Yes	Y		1	1.2	7	-.866	6	.5	9	1.5														
61	1.2 D + 1.5 LL a +...	Yes	Y		1	1.2	6	.866	7	-.5	9	1.5														
62	1.2 D + 1.5 LL b +...	Yes	Y		1	1.2	6	1			10	1.5														
63	1.2 D + 1.5 LL b +...	Yes	Y		1	1.2	6	.866	7	.5	10	1.5														
64	1.2 D + 1.5 LL b +...	Yes	Y		1	1.2	7	.866	6	.5	10	1.5														
65	1.2 D + 1.5 LL b +...	Yes	Y		1	1.2	7	1			10	1.5														
66	1.2 D + 1.5 LL b +...	Yes	Y		1	1.2	7	.866	6	-.5	10	1.5														
67	1.2 D + 1.5 LL b +...	Yes	Y		1	1.2	6	-.866	7	.5	10	1.5														
68	1.2 D + 1.5 LL b +...	Yes	Y		1	1.2	6	-1			10	1.5														
69	1.2 D + 1.5 LL b +...	Yes	Y		1	1.2	6	-.866	7	-.5	10	1.5														
70	1.2 D + 1.5 LL b +...	Yes	Y		1	1.2	7	-.866	6	-.5	10	1.5														
71	1.2 D + 1.5 LL b +...	Yes	Y		1	1.2	7	-1			10	1.5														
72	1.2 D + 1.5 LL b +...	Yes	Y		1	1.2	7	-.866	6	.5	10	1.5														
73	1.2 D + 1.5 LL b +...	Yes	Y		1	1.2	6	.866	7	-.5	10	1.5														
74	1.2 D + 1.5 LL c + ...	Yes	Y		1	1.2	6	1			11	1.5														
75	1.2 D + 1.5 LL c + ...	Yes	Y		1	1.2	6	.866	7	.5	11	1.5														
76	1.2 D + 1.5 LL c + ...	Yes	Y		1	1.2	7	.866	6	.5	11	1.5														
77	1.2 D + 1.5 LL c + ...	Yes	Y		1	1.2	7	1			11	1.5														
78	1.2 D + 1.5 LL c + ...	Yes	Y		1	1.2	7	.866	6	-.5	11	1.5														
79	1.2 D + 1.5 LL c + ...	Yes	Y		1	1.2	6	-.866	7	.5	11	1.5														
80	1.2 D + 1.5 LL c + ...	Yes	Y		1	1.2	6	-1			11	1.5														
81	1.2 D + 1.5 LL c + ...	Yes	Y		1	1.2	6	-.866	7	-.5	11	1.5														
82	1.2 D + 1.5 LL c + ...	Yes	Y		1	1.2	7	-.866	6	-.5	11	1.5														
83	1.2 D + 1.5 LL c + ...	Yes	Y		1	1.2	7	-1			11	1.5														
84	1.2 D + 1.5 LL c + ...	Yes	Y		1	1.2	7	-.866	6	.5	11	1.5														
85	1.2 D + 1.5 LL c + ...	Yes	Y		1	1.2	6	.866	7	-.5	11	1.5														
86	1.2 D + 1.5 LL d +...	Yes	Y		1	1.2	6	1			12	1.5														
87	1.2 D + 1.5 LL d +...	Yes	Y		1	1.2	6	.866	7	.5	12	1.5														
88	1.2 D + 1.5 LL d +...	Yes	Y		1	1.2	7	.866	6	.5	12	1.5														
89	1.2 D + 1.5 LL d +...	Yes	Y		1	1.2	7	1			12	1.5														
90	1.2 D + 1.5 LL d +...	Yes	Y		1	1.2	7	.866	6	-.5	12	1.5														
91	1.2 D + 1.5 LL d +...	Yes	Y		1	1.2	6	-.866	7	.5	12	1.5														
92	1.2 D + 1.5 LL d +...	Yes	Y		1	1.2	6	-1			12	1.5														
93	1.2 D + 1.5 LL d +...	Yes	Y		1	1.2	6	-.866	7	-.5	12	1.5														
94	1.2 D + 1.5 LL d +...	Yes	Y		1	1.2	7	-.866	6	-.5	12	1.5														
95	1.2 D + 1.5 LL d +...	Yes	Y		1	1.2	7	-1			12	1.5														
96	1.2 D + 1.5 LL d +...	Yes	Y		1	1.2	7	-.866	6	.5	12	1.5														
97	1.2 D + 1.5 LL d +...	Yes	Y		1	1.2	6	.866	7	-.5	12	1.5														
98	1.2 D + 1.5 LL Mai...	Yes	Y		1	1.2					13	1.5														
99	1.2 D + 1.5 LL Mai...	Yes	Y		1	1.2					14	1.5														
100	1.2 D + 1.5 LL Mai...	Yes	Y		1	1.2					15	1.5														
101	1.2 D + 1.5 LL Mai...	Yes	Y		1	1.2					16	1.5														
102	1.2 D + 1.5 LL Mai...	Yes	Y		1	1.2					17	1.5														
103	1.2 D + 1.5 LL Mai...	Yes	Y		1	1.2					18	1.5														
104	1.2 D + 1.5 LL Mai...	Yes	Y		1	1.2					19	1.5														
105	1.2 D + 1.5 LL Mai...	Yes	Y		1	1.2					20	1.5														
106	1.2 D + 1.5 LL Mai...	Yes	Y		1	1.2					21	1.5														
107	1.2 D + 1.5 LL Mai...	Yes	Y		1	1.2					22	1.5														
108	1.2 D + 1.5 LL Mai...	Yes	Y		1	1.2					23	1.5														

Load Combinations (Continued)

	Description	So...	P...	S...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...
109	1.2 D + 1.5 LL Mai...	Yes	Y		1	1.2					24	1.5												
110	1.2 D + 1.5 LL Mai...	Yes	Y		1	1.2					25	1.5												
111	1.2 D + 1.5 LL Mai...	Yes	Y		1	1.2					26	1.5												
112	1.2 D + 1.5 LL Mai...	Yes	Y		1	1.2					27	1.5												

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	29	max	1.55	5	1.381	40	2.309	13	0	112	0	112	0	112
2		min	-2.045	23	.304	9	-3.767	19	0	1	0	1	0	1
3	30	max	1.951	89	1.261	43	2.53	49	0	112	0	112	0	112
4		min	-1.376	59	.258	13	-.559	7	0	1	0	1	0	1
5	N73	max	.374	24	.064	24	1.171	6	0	112	0	112	0	112
6		min	-.333	6	-.035	6	-1.3	24	0	1	0	1	0	1
7	N74	max	.144	12	.04	36	.697	18	0	112	0	112	0	112
8		min	-.186	18	-.016	6	-.56	12	0	1	0	1	0	1
9	Totals:	max	2.017	17	2.704	49	2.941	14						
10		min	-2.017	11	.75	7	-2.941	8						

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

	Member	Shape	Code Check	Loc...	LC	She...	Loc....		LC	phi*P...	phi*P...	phi*M...	phi*M...	...	Eqn
1	1	PL 5/8X6	.180	.667	38	.157	.667	y	39	94.955	168.75	2.197	21.094	...	H1-1b
2	2	PL 5/8X6	.191	.667	44	.162	.667	y	44	94.955	168.75	2.197	21.094	...	H1-1b
3	3	3/4" SR	.110	4.6...	54	.010	0		49	1.116	19.88	.249	.249	...	H1-1...
4	4	HSS2.375X0.2...	.286	8.3...	8	.105	10....		20	7.649	62.55	3.6	3.6	...	H1-1b
5	5	HSS2.375X0.2...	.520	8.5...	20	.144	10....		14	7.649	62.55	3.6	3.6	...	H1-1a
6	6	PIPE_2.0	.309	3	94	.083	3		20	14.916	32.13	1.872	1.872	...	H1-1b
7	7	PIPE_2.0	.760	3	14	.112	3		20	14.916	32.13	1.872	1.872	...	H1-1b
8	8	PIPE_2.0	.263	3	45	.078	3		20	14.916	32.13	1.872	1.872	...	H1-1b
9	9	PIPE_2.0	.264	3	55	.037	3		56	14.916	32.13	1.872	1.872	...	H1-1b
10	10	3/4" SR	.000	0	112	.005	0		45	2.707	19.88	.249	.249	...	H1-1a
11	11	3/4" SR	.000	0	112	.004	3		27	2.707	19.88	.249	.249	...	H1-1a
12	15	PL1/2x3 11/16	.141	.227	53	.175	.227	y	38	80.842	82.98	.864	6.376	...	H1-1b
13	16	HSS2.375X0.2...	.123	3.6...	55	.094	3.75		49	48.725	62.55	3.6	3.6	...	H1-1b
14	17	PL1/2x3 11/16	.386	0	55	.324	.276	y	48	79.846	82.98	.864	6.376	...	H1-1b
15	19	PL1/2x3 11/16	.156	.227	56	.165	.227	y	46	80.842	82.98	.864	6.376	...	H1-1b
16	20	HSS2.375X0.2...	.124	3.6...	53	.090	3.75		41	48.725	62.55	3.6	3.6	...	H1-1b
17	21	PL1/2x3 11/16	.378	0	53	.312	.276	y	38	79.846	82.98	.864	6.376	...	H1-1b
18	24	HSS2.375X0.1...	.064	0	6	.003	6.9...		16	19.93	45	2.674	2.674	...	H1-1...
19	33	3/4" SR	.135	4.6...	47	.009	4.6...		20	1.116	19.88	.249	.249	2	H1-1...
20	34	3/4" SR	.000	0	112	.006	0		31	2.707	19.88	.249	.249	...	H1-1a
21	35	3/4" SR	.010	0	8	.005	0		19	2.707	19.88	.249	.249	...	H1-1...
22	36	PL1/2x3 11/16	.181	.227	38	.149	.227	y	14	80.842	82.98	.864	6.376	...	H1-1b
23	37	HSS2.375X0.2...	.146	3.6...	45	.087	3.75		39	48.725	62.55	3.6	3.6	...	H1-1b
24	38	PL1/2x3 11/16	.469	0	46	.248	0	y	51	79.846	82.98	.864	6.376	...	H1-1b
25	39	PL1/2x3 11/16	.190	.227	44	.134	.227	y	56	80.842	82.98	.864	6.376	...	H1-1b
26	40	HSS2.375X0.2...	.147	3.6...	49	.081	3.75		44	48.725	62.55	3.6	3.6	...	H1-1b
27	41	PL1/2x3 11/16	.459	0	49	.238	0	y	56	79.846	82.98	.864	6.376	...	H1-1b
28	43	HSS2.375X0.1...	.045	3.4...	17	.003	6.9...		16	19.93	45	2.674	2.674	...	H1-1b

Exhibit F

Power Density/RF Emissions Report

EBI Consulting

environmental | engineering | due diligence

RADIO FREQUENCY EMISSIONS ANALYSIS REPORT
EVALUATION OF HUMAN EXPOSURE POTENTIAL TO NON-IONIZING EMISSIONS

T-Mobile Existing Facility

Site ID: CTHA242A

HA242/PortlandHS_SST
95 High Street
Portland, Connecticut 06480

May 16, 2019

EBI Project Number: 6219001647

Site Compliance Summary	
Compliance Status:	**COMPLIANT**
Site total MPE% of FCC general population allowable limit:	**12.2%**

21 B Street, Burlington, MA 01803 · Tel: (781) 273.2500 · Fax: (781) 273.3311

May 16, 2019

T-Mobile
Attn: Jason Overbey, RF Manager
35 Griffin Road South
Bloomfield, Connecticut 06002

Emissions Analysis for Site: CTHA242A - HA242/PortlandHS_SST

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **95 High Street** in **Portland, Connecticut** for the purpose of determining whether the emissions from the Proposed T-Mobile Antenna Installation located on this property are within specified federal limits.

All information used in this report was analyzed as a percentage of current Maximum Permissible Exposure (% MPE) as listed in the FCC OET Bulletin 65 Edition 97-01and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter ($\mu W/cm^2$). The number of $\mu W/cm^2$ calculated at each sample point is called the power density. The exposure limit for power density varies depending upon the frequencies being utilized. Wireless Carriers and Paging Services use different frequency bands each with different exposure limits; therefore, it is necessary to report results and limits in terms of percent MPE rather than power density.

All results were compared to the FCC (Federal Communications Commission) radio frequency exposure rules, 47 CFR 1.1307(b)(1) – (b)(3), to determine compliance with the Maximum Permissible Exposure (MPE) limits for General Population/Uncontrolled environments as defined below.

General population/uncontrolled exposure limits apply to situations in which the general population may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Therefore, members of the general population would always be considered under this category when exposure is not employment related, for example, in the case of a telecommunications tower that exposes persons in a nearby residential area.

Public exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ($\mu W/cm^2$). The general population exposure limits for the 600 MHz and 700 MHz frequency bands are approximately 400 $\mu W/cm^2$ and 467 $\mu W/cm^2$, respectively. The general population exposure limit for the 1900 MHz (PCS), 2100 MHz (AWS) and 11 GHz frequency bands is 1000 $\mu W/cm^2$. Because each carrier will be using different frequency bands, and each frequency band has different exposure limits, it is necessary to report percent of MPE rather than power density.

Occupational/controlled exposure limits apply to situations in which persons are exposed as a consequence of their employment and in which those persons who are exposed have been made fully aware of the potential for exposure and can exercise control over their exposure. Occupational/controlled exposure limits also apply where exposure is of a transient nature as a result of incidental passage through a location where exposure levels may be above general population/uncontrolled limits (see below), as long as the exposed person has been made fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means.

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were done for the proposed T-Mobile Wireless antenna facility located at 95 High Street in Portland, Connecticut using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since T-Mobile is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufacturer's supplied specifications, minus 10 dB for directional panel antennas and 20 dB for highly focused parabolic microwave dishes, was focused at the base of the tower. For this report, the sample point is the top of a 6-foot person standing at the base of the tower.

For all calculations, all equipment was calculated using the following assumptions:

1) 1 LTE channel (600 MHz Band) was considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

2) 2 LTE channels (700 MHz Band) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

3) 4 GSM channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

4) 2 LTE channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.

5) 2 UMTS channels (AWS Band - 2100 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

6) 2 LTE channels (AWS Band – 2100 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.

7) All radios at the proposed installation were considered to be running at full power and were uncombined in their RF transmissions paths per carrier prescribed configuration. Per FCC OET Bulletin No. 65 - Edition 97-01 recommendations to achieve the maximum anticipated value at each sample point, all power levels emitting from the proposed antenna installation are increased by a factor of 2.56 to account for possible in-phase reflections from the surrounding environment. This is rarely the case, and if so, is never continuous.

8) For the following calculations, the sample point was the top of a 6-foot person standing at the base of the tower. The maximum gain of the antenna per the antenna manufacturer's supplied specifications, minus 10 dB for directional panel antennas and 20 dB for highly focused parabolic microwave dishes, was used in this direction. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

9) The antenna mounting height centerline of the proposed antennas is 110 feet above ground level (AGL).

10) Emissions values for additional carriers were taken from the Connecticut Siting Council active database. Values in this database are provided by the individual carriers themselves.

11) All calculations were done with respect to uncontrolled / general population threshold limits.

T-Mobile Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	1	Antenna #:	1	Antenna #:	1
Make / Model:	Ericsson AIR21 B2A/B4P	Make / Model:	Ericsson AIR21 B2A/B4P	Make / Model:	Ericsson AIR21 B2A/B4P
Frequency Bands:	1900 MHz / 2100 MHz	Frequency Bands:	1900 MHz / 2100 MHz	Frequency Bands:	1900 MHz / 2100 MHz
Gain:	15.35 dBd / 15.35 dBd	Gain:	15.35 dBd / 15.35 dBd	Gain:	15.35 dBd / 15.35 dBd
Height (AGL):	110 feet	Height (AGL):	110 feet	Height (AGL):	110 feet
Channel Count:	6	Channel Count:	6	Channel Count:	6
Total TX Power (W):	180 Watts	Total TX Power (W):	180 Watts	Total TX Power (W):	180 Watts
ERP (W):	6,169.82	ERP (W):	6,169.82	ERP (W):	6,169.82
Antenna A1 MPE %:	**1.83%**	Antenna B1 MPE %:	**1.83%**	Antenna C1 MPE %:	**1.83%**
Antenna #:	**2**	Antenna #:	**2**	Antenna #:	**2**
Make / Model:	RFS APXVAARR24_43-U-NA20	Make / Model:	RFS APXVAARR24_43-U-NA20	Make / Model:	RFS APXVAARR24_43-U-NA20
Frequency Bands:	700 MHz / 600 MHz	Frequency Bands:	700 MHz / 600 MHz	Frequency Bands:	700 MHz / 600 MHz
Gain:	13.35 dBd / 12.95 dBd	Gain:	13.35 dBd / 12.95 dBd	Gain:	13.35 dBd / 12.95 dBd
Height (AGL):	110 feet	Height (AGL):	110 feet	Height (AGL):	110 feet
Channel Count:	3	Channel Count:	3	Channel Count:	3
Total TX Power (W):	90 Watts	Total TX Power (W):	90 Watts	Total TX Power (W):	90 Watts
ERP (W):	1,889.36	ERP (W):	1,889.36	ERP (W):	1,889.36
Antenna A2 MPE %:	**1.27%**	Antenna B2 MPE %:	**1.27%**	Antenna C2 MPE %:	**1.27%**
Antenna #:	**3**	Antenna #:	**3**	Antenna #:	**3**
Make / Model:	Ericsson AIR32 B66A/B2A	Make / Model:	Ericsson AIR32 B66A/B2A	Make / Model:	Ericsson AIR32 B66A/B2A
Frequency Bands:	2100 MHz / 1900 MHz	Frequency Bands:	2100 MHz / 1900 MHz	Frequency Bands:	2100 MHz / 1900 MHz
Gain:	15.85 dBd / 15.35 dBd	Gain:	15.85 dBd / 15.35 dBd	Gain:	15.85 dBd / 15.35 dBd
Height (AGL):	110 feet	Height (AGL):	110 feet	Height (AGL):	110 feet
Channel Count:	4	Channel Count:	4	Channel Count:	4
Total TX Power (W):	240 Watts	Total TX Power (W):	240 Watts	Total TX Power (W):	240 Watts
ERP (W):	8,728.31	ERP (W):	8,728.31	ERP (W):	8,728.31
Antenna A3 MPE %:	**2.59%**	Antenna B3 MPE %:	**2.59%**	Antenna C3 MPE %:	**2.59%**

Site Composite MPE %	
Carrier	**MPE %**
T-Mobile (Max at Sector A):	5.69%
Unknown Carrier1	1.46%
Unknown Carrier2	4.86%
Clearwire	0.19%
Site Total MPE % :	12.2%

T-Mobile Sector A Total:	5.69%
T-Mobile Sector B Total:	5.69%
T-Mobile Sector C Total:	5.69%
Site Total:	5.69%

T-Mobile Maximum MPE Power Values (Sector A)

T-Mobile Frequency Band / Technology (Sector A)	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density (μW/cm²)	Frequency (MHz)	Allowable MPE (μW/cm²)	Calculated % MPE
T-Mobile 1900 MHz GSM	4	1028.30	110.0	12.22	1900 MHz GSM	1000	1.22%
T-Mobile 2100 MHz UMTS	2	1028.30	110.0	6.11	2100 MHz UMTS	1000	0.61%
T-Mobile 700 MHz LTE	2	648.82	110.0	3.86	700 MHz LTE	467	0.83%
T-Mobile 600 MHz LTE	1	591.73	110.0	1.76	600 MHz LTE	400	0.44%
T-Mobile 2100 MHz LTE	2	2307.55	110.0	13.71	2100 MHz LTE	1000	1.37%
T-Mobile 1900 MHz LTE	2	2056.61	110.0	12.22	1900 MHz LTE	1000	1.22%
						Total:	**5.69%**

Summary

All calculations performed for this analysis yielded results that were **within** the allowable limits for general population exposure to RF Emissions.

The anticipated maximum composite contributions from the T-Mobile facility as well as the site composite emissions value with regards to compliance with FCC's allowable limits for general population exposure to RF Emissions are shown here:

T-Mobile Sector	Power Density Value (%)
Sector A:	5.69%
Sector B:	5.69%
Sector C:	5.69%
T-Mobile Maximum MPE % (Sector A):	5.69%
Site Total:	12.2%
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **5.69%** of the allowable FCC established general population limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions.

FCC guidelines state that if a site is found to be out of compliance (over allowable thresholds), that carriers over a 5% contribution to the composite value will require measures to bring the site into compliance. For this facility, the composite values calculated were well within the allowable 100% threshold standard per the federal government.

Exhibit G

Mailings Receipt/Proof of Notice

UPS CampusShip: View/Print Label

1. **Ensure there are no other shipping or tracking labels attached to your package.** Select the Print button on the print dialog box that appears. Note: If your browser does not support this function select Print from the File menu to print the label.

2. **Fold the printed label at the solid line below.** Place the label in a UPS Shipping Pouch. If you do not have a pouch, affix the folded label using clear plastic shipping tape over the entire label.

3. **GETTING YOUR SHIPMENT TO UPS**
   Customers with a Daily Pickup
   Your driver will pickup your shipment(s) as usual.

   Customers without a Daily Pickup
   Take your package to any location of The UPS Store®, UPS Access Point(TM) location, UPS Drop Box, UPS Customer Center, Staples® or Authorized Shipping Outlet near you. Items sent via UPS Return Services(SM) (including via Ground) are also accepted at Drop Boxes. To find the location nearest you, please visit the Resources area of CampusShip and select UPS Locations.
   Schedule a same day or future day Pickup to have a UPS driver pickup all your CampusShip packages.
   Hand the package to any UPS driver in your area.

UPS Access Point™
TIENDA ECUADOR
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DANBURY ,CT 06810

UPS Access Point™
THE UPS STORE
42 LAKE AVENUE EXT
DANBURY ,CT 06811

UPS Access Point™
PAGUE MENOS SUPERMARKET
107 TRIANGLE ST
DANBURY ,CT 06810

FOLD HERE

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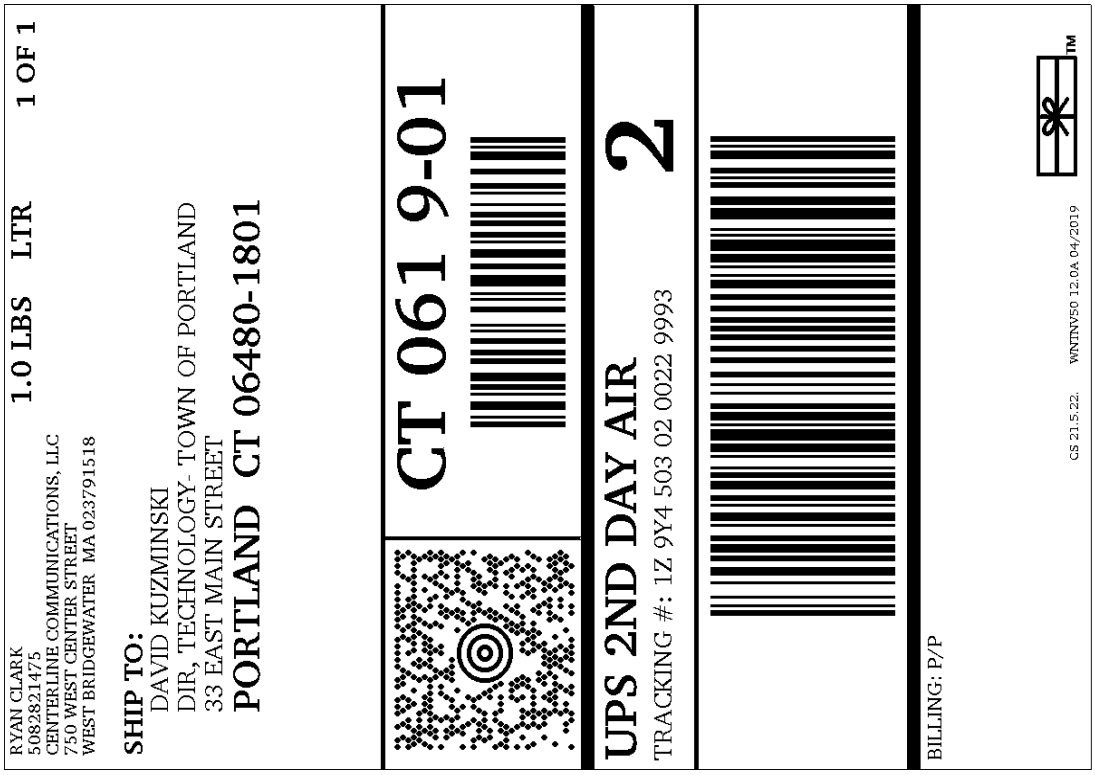

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