Crown Castle
3 Corporate Park Drive, Suite 101
Clifton Park, NY 12065

July 17, 2019

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

RE: **Notice of Exempt Modification for T-Mobile:**
871584 - T-Mobile Site ID: CT11189E
115 Birch Mountain Road, Glastonbury, CT 06033
Latitude: 41° 42′ 32.24″ / Longitude: -72° 28′ 24.41″

Dear Ms. Bachman:

T-Mobile currently maintains six (6) total antennas at the 182-foot mount on the existing 200-foot Self Support Tower, located at 115 Birch Mountain Road, Glastonbury, CT. The tower is owned by Crown Castle and the property is owned by Scarrone Park LLC . T-Mobile now intends to replace three (3) existing antennas with three (3) new 600/700 MHz antennas at the 182-foot mount. T-Mobile is also proposing tower mount modifications as shown on the enclosed mount analysis.

Planned Modifications:
Tower:

Remove:
(3) 1 5/8" Coax
(3) Diplexers

Remove and Replace:
(3) LNX 6515DS-A1M Antenna **(REMOVE)** - (3) RFS-APXVAARR24_43-U-NA20 Antenna 600/700 MHz **(REPLACE)**

(3) RRUS11 B12 **(REMOVE) –** (3) Radio 4449 B71/B12 **(REPLACE)**

Install New:
(3) 1 5/8" Hybrid Fiber Line

Existing to Remain:
(9) 1 5/8" Coax
(3) RFS-APXV18-209015-C-A20 Antenna 1900 MHz
(3) TMA

Ground:

Upgrade: Internal upgrade to existing ground cabinet.

The facility was approved by the Town of Glastonbury Zoning Board of Appeals on August 7, 1998. This approval was made without conditions.

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies §16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to Richard Johnson, Town of Glastonbury Town Manager, Peter Carey, Building Official, Crown Castle as the tower owner, and Scarrone Park LLC, the property owner.

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

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

3. The proposed modification 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 Communication 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-reference telecommunications facility constitutes an exempt modification under R.C.S.A. § 16-50j-72(b)(2). Please send approval/rejection letter to Attn: Anne Marie Zsamba.

Sincerely,

Anne Marie Zsamba
Real Estate Specialist
3 Corporate Park Drive, Suite 101
Clifton Park, NY 12065
(201) 236-9224
AnneMarie.Zsamba@crowncastle.com

Attachments

cc:

Richard Johnson, Town Manager
Town of Glastonbury
Town Hall – 2nd Floor
2155 Main Street
Glastonbury, CT 06033
860.652.7500

Peter Carey, Building Official
Town of Glastonbury
Town Hall – 2nd Floor
2155 Main Street
Glastonbury, CT 06033
860.652.7524

Scarrone Park LLC, Property Owner
C/O Maria A. Toczyska
3385 Hebron Avenue
Glastonbury, CT 06033
860.306.3849

Crown Castle, Tower Owner

ORIGIN ID:GFLA (518) 373-3523
ANNE MARIE ZSAMBA
CROWN CASTLE
3 CORPORATE PARK DRIVE
SUITE 101
CLIFTON PARK, NY 12065
UNITED STATES US

SHIP DATE: 13JUL19
ACTWGT: 2.00 LB
CAD: 104924194/INET4100

BILL SENDER

TO **SCARRONE PARK LLC**

C/O MARIA A. TOCZYSKA
3385 HEBRON AVENUE
GLASTONBURY CT 06033
(860) 306-3849
REF: 1734.7680
INV:
PO:
DEPT:

565J2/A6F9/23AD

J191019010701uv

FedEx Express

MON - 15 JUL 10:30A
PRIORITY OVERNIGHT

TRK# 0201 **7757 3348 0202**

XE BDLA

06033
BDL
CT-US

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Use of this system constitutes your agreement to the service conditions in the current FedEx Service Guide, available on fedex.com.FedEx will not be responsible for any claim in excess of $100 per package, whether the result of loss, damage, delay, non-delivery,misdelivery,or misinformation, unless you declare a higher value, pay an additional charge, document your actual loss and file a timely claim.Limitations found in the current FedEx Service Guide apply. Your right to recover from FedEx for any loss, including intrinsic value of the package, loss of sales, income interest, profit, attorney's fees, costs, and other forms of damage whether direct, incidental,consequential, or special is limited to the greater of $100 or the authorized declared value. Recovery cannot exceed actual documented loss.Maximum for items of extraordinary value is $1,000, e.g. jewelry, precious metals, negotiable instruments and other items listed in our ServiceGuide. Written claims must be filed within strict time limits, see current FedEx Service Guide.

ORIGIN ID:GFLA (518) 373-3523
ANNE MARIE ZSAMBA
CROWN CASTLE
3 CORPORATE PARK DRIVE
SUITE 101
CLIFTON PARK, NY 12065
UNITED STATES US

SHIP DATE: 13JUL19
ACTWGT: 2.00 LB
CAD: 104924194/INET4100

BILL SENDER

TO **PETER CAREY, BUILDING & ZONING OFFI**
TOWN OF GLASTONBURY
TOWN HALL - 2ND FLOOR
2155 MAIN STREET
GLASTONBURY CT 06033
(860) 652-7524

REF: 1734.7680
INV:
PO:
DEPT:

565J2/A6F9/23AD

J191019010701uv

FedEx Express

MON - 15 JUL 10:30A
PRIORITY OVERNIGHT

TRK# 0201 **7757 3347 0911**

XE BDLA

06033
BDL
CT-US

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ANNE MARIE ZSAMBA
CROWN CASTLE
3 CORPORATE PARK DRIVE
SUITE 101
CLIFTON PARK, NY 12065
UNITED STATES US

SHIP DATE: 13JUL19
ACTWGT: 2.00 LB
CAD: 104924194/INET4100

BILL SENDER

TO **RICHARD J. JOHNSON, TOWN MANAGER**
TOWN OF GLASTONBURY
TOWN HALL - 2ND FLOOR
2155 MAIN STREET
GLASTONBURY CT 06033
(860) 652-7500

REF: 1734.7680
INV:
PO:
DEPT:

565J2/A6F9/23AD

J191019010701uv

FedEx Express

MON - 15 JUL 10:30A
PRIORITY OVERNIGHT

TRK# 0201 **7757 3346 2269**

XE BDLA

06033
BDL
CT-US

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ORIGIN ID:GFLA (518) 373-3523
ANNE MARIE ZSAMBA
CROWN CASTLE
3 CORPORATE PARK DRIVE
SUITE 101
CLIFTON PARK, NY 12065
UNITED STATES US

SHIP DATE: 13JUL19
ACTWGT: 4.00 LB
CAD: 104924194/INET4100

BILL SENDER

TO **MELANIE BACHMAN**
CONNECTICUT SITING COUNCIL
10 FRANKLIN SQUARE

NEW BRITAIN CT 06051
(860) 827-2951
INV:
PO:
REF: 1765.6680
DEPT:

565J2/A6F9/23AD

J191019010701uv

FedEx Express

MON - 15 JUL 10:30A
PRIORITY OVERNIGHT

TRK# 0201 **7757 3345 0184**

XE BDLA

06051
BDL
CT-US

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Exhibit A

Property Card

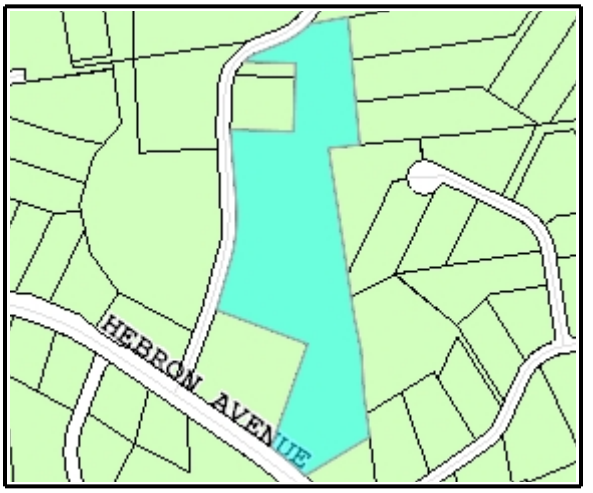
Town of Glastonbury GIS Parcel Report

Report Generated 7/13/2019 2:10:46 PM

Owner of Record

GIS ID: 04200115
Owner: SCARRONE PARK LLC
Co-Owner: C/O TOCZYSKA MARIA A
Address: 3385 HEBRON AVE
City, State ZIP: GLASTONBURY, CT 06033-2806

Account Number: 29203387
Property Address: 115 BIRCH MOUNTAIN RD



Property highlighted in blue

Parcel Information

Map/Street/Lot N6 / 2920 / E0001C **Property ID:** 13487
Developer Lot ID: B **Water:** Well
Parcel Acreage: 11.54 **Sewer:** Septic
Zoning Code: RR **Census:** 5202.01

Valuation Summary

Item	Appraised Value	Assessed Value
Buildings	0	0
Land	808600	566000
Appurtenances	800	600
Total	**809400**	**566600**

Owner of Record	Deed / Page	Sale Date	Sale Price
SCARRONE PARK LLC	3525/0218	11/15/2018	0
TOCZYSKA MARIA A	3525/0216	11/15/2018	0
SCARRONE CAROLYN R REVOCABLE TRUST	3468/0328	01/22/2018	0
SCARRONE CAROLYN R REVOCABLE TRUST	1829/0101	06/03/2003	0
SCARRONE CAROLYN R	1261/0312	07/29/1999	0
SCARRONE CAROLYN R	0544/0017	04/10/1990	0

Building Picture Not Applicable

Building Information

Building ID 0

Year Constructed :
Building Type :
Style :
Occupany :
Stories :
Building Zone :
Roof Type :
Roof Material :
Est. Gross S.F. :
Est. Living S.F. :
Number of Rooms :
Number of Bedrooms :
Number of Bathrooms :
Number of Half-Baths :
Exterior Wall :
Interior Wall :
Interior Floor :
Interior Floor #2 :
Air Conditioning Type :
Heat Type :
Fuel Type :

Building Sketch Not Applicable

Subarea Type	Est. Gross S.F.	Est. Living S.F.

Outbuilding Type	Est. Gross S.F.	Comments
Shed-Metal-Storage	168.00	


BIRCH MOUNTAIN ROAD
RIDGE ROAD
HILL STREET
HORIZON LANE
ELM STREET
SUNRISE DRIVE
PHEASANT CROSSING
MARLBOROUGH

Exhibit B

Construction Drawings

T-MOBILE SITE NAME:

GLASTONBURY/RT-94 & FERN

T-MOBILE SITE NUMBER:

CT11189E

CROWN BU: 871584 / APP#: 479814

67D04G CONFIGURATION

115 BIRCH MTN. RD
GLASTONBURY, CT 06033

EXISTING 200'-0" SELF-SUPPORT TOWER

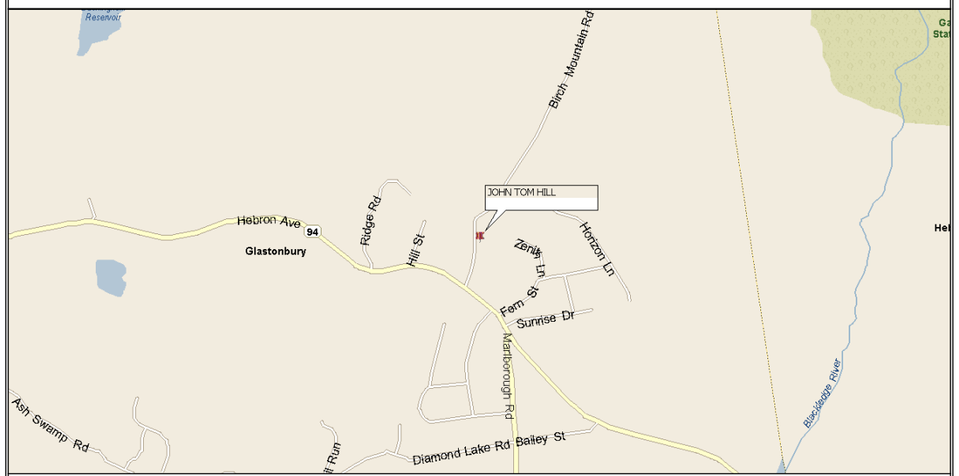
PROJECT SUMMARY

SITE TYPE:	EXISTING EQUIPMENT UPGRADE
SITE ADDRESS:	115 BIRCH MTN. RD GLASTONBURY, CT 06033
JURISDICTION:	HARTFORD COUNTY

NAD83

LATITUDE:	41.708914° N
LONGITUDE:	72.473450° W
TOWER OWNER:	CROWN CASTLE 3200 HORIZON DRIVE, SUITE 150 KING OF PRUSSIA, PA 19406 JASON SMITH (610) 635-3225
CUSTOMER/APPLICANT:	T-MOBILE 4 SYLVAN WAY PARSIPPANY, NJ 07054 (973) 397-4800
OCCUPANCY TYPE:	UNMANNED
A.D.A. COMPLIANCE:	FACILITY IS UNMANNED AND NOT FOR HUMAN HABITATION

LOCATION MAP



NO SCALE

DRAWING INDEX

SHEET #	SHEET DESCRIPTION	REV. #
T-1	TITLE SHEET	1
A-1	OVERALL SITE PLAN	1
A-2	ANTENNA/CABLE SCHEDULE AND AZIMUTH PLANS	1
A-3	TOWER ELEVATION	1
A-4	ANTENNA AND RRU DETAILS	1
E-1	PANEL SCEHDULE AND ONE-LINE DIAGRAM	1

CONTACT INFORMATION

A&E FIRM:	B+T GROUP 1717 S. BOULDER, STE. 300 TULSA, OK 74119	ELECTRIC PROVIDER:	N/A
CONTACT:	MIKE OAKES	TELCO PROVIDER:	AT&T
PHONE:	(918) 587-4630		855-637-9527

DRIVING DIRECTIONS

DEPART FROM BRADLEY INTERNATIONAL AIRPORT ON TERMINAL RD. ROAD NAME CHANGES TO BRADLEY FIELD CONNECTOR. ROAD NAME CHANGES TO CT-20 [BRADLEY FIELD CONNECTOR]. TAKE RAMP (RIGHT) ONTO I-91 [RICHARD P HORAN MEMORIAL HWY]. AT EXIT 30, TAKE RAMP ONTO I-84 [US-44]. AT EXIT 55, TAKE RAMP (RIGHT) ONTO CT-2 [VETERANS OF FOREIGN WARS MEM'L HWY]. AT EXIT 8, KEEP RIGHT ONTO RAMP. KEEP LEFT TO STAY ON RAMP. BEAR LEFT ONTO CT-94 [HEBRON AVE]. TURN LEFT ONTO BIRCH MOUNTAIN RD. TURN RIGHT ONTO LOCAL ROAD(S) AND ARRIVE AT JOHN TOM HILL.

A/E DOCUMENT REVIEW STATUS

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

THE FOLLOWING PARTIES HEREBY APPROVE AND ACCEPT THESE DOCUMENTS AND AUTHORIZE THE CONTRACTOR TO PROCEED WITH THE CONSTRUCTION DESCRIBED HEREIN. ALL DOCUMENTS ARE SUBJECT TO REVIEW BY THE LOCAL BUILDING DEPARTMENT AND MAY IMPOSE CHANGES OR MODIFICATIONS.

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	IBC 2015
STRUCTURAL	IBC 2015
MECHANICAL	IMC 2015
ELECTRICAL	NEC 2017

PROJECT DESCRIPTION

THE PROPOSED PROJECT INCLUDES:

- REMOVE (3) EXISTING ANTENNAS AT 177'-0".
- REMOVE DIPLEXERS.
- REMOVE (3) 1 5/8" COAX.
- REMOVE (3) EXISTING RRUS AT 177'-0".
- REPLACE (1) DUS41 WITH (2) BB6630s
- INSTALL (3) NEW ANTENNAS AT 177'-0".
- INSTALL (3) NEW RRUS AT 177'-0".
- INSTALL (1) NEW SSC
- INSTALL (3) NEW HYBRID CABLES.
- MODIFY EXISTING MOUNTS PER MOUNT ANALYSIS BY PAUL J. FORD DATED 5/2/19.

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.

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

811

CT11189E
BU #: 871584
GLASTONBURY/RT-94 & FERN
115 BIRCH MTN. RD
GLASTONBURY, CT 06033
EXISTING 200'-0" SELF-SUPPORT TOWER

PROJECT NO:	121186.003.01
CHECKED BY:	GEH

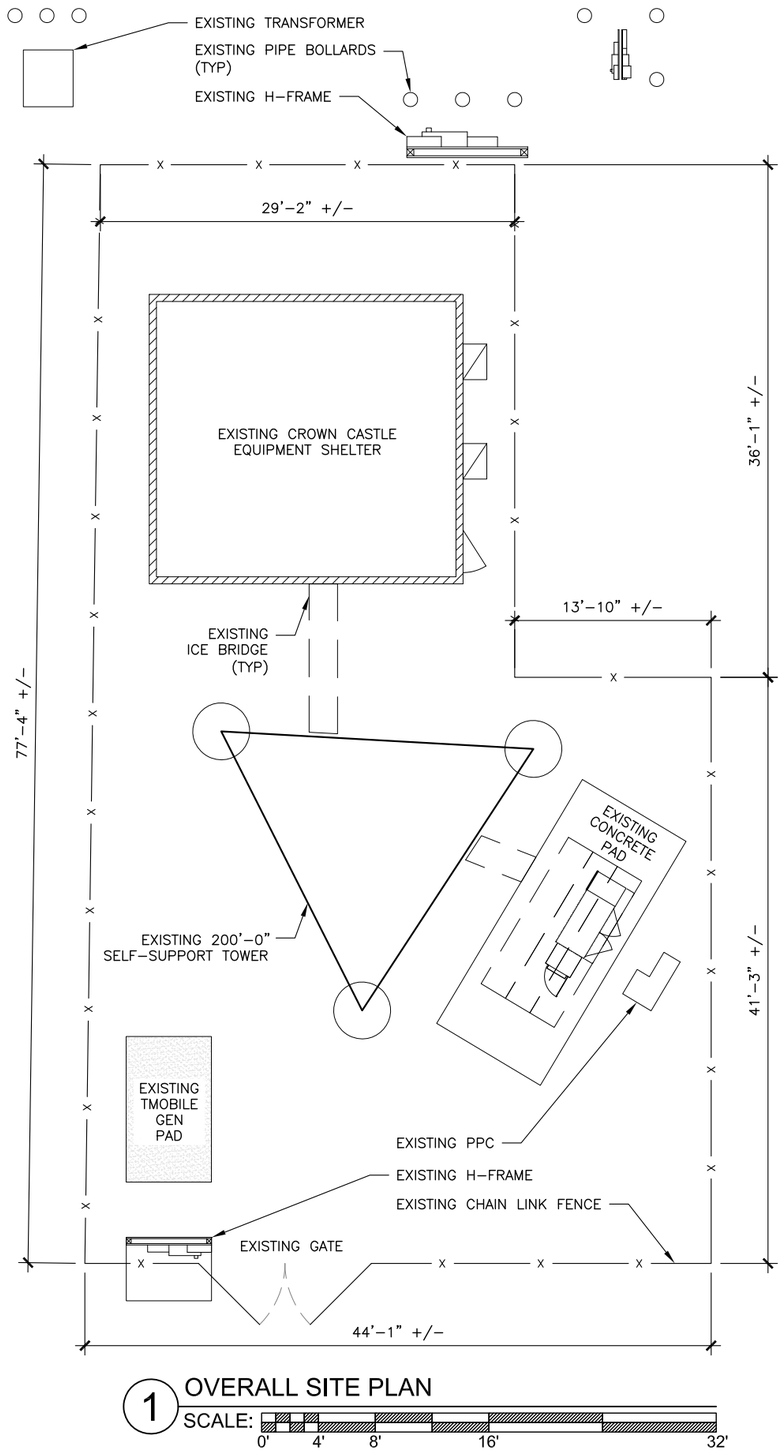
ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION
0	6/14/19	RFC	CONSTRUCTION
1	7/17/19	JJD	CONSTRUCTION

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

STATE OF CONNECTICUT
31627
LICENSED PROFESSIONAL ENGINEER
7/17/19

SHEET NUMBER: T-1
REVISION: 1



1 OVERALL SITE PLAN

SCALE: 0' 4' 8' 16' 32'

GENERAL NOTES:

1. SUBJECT PROPERTY IS KNOWN AS BLOCK TBD LOT TBD AS SHOWN ON THE GLASTONBURY TOWNSHIP TAX MAP AND IS SITUATED AT 115 BIRCH MTN. RD, GLASTONBURY, CT 06033.

2. APPLICANT: T-MOBILE
A DELAWARE LIMITED LIABILITY COMPANY
4 SYLVAN WAY
PARSIPPANY, NEW JERSEY 07054
(973) 397-4800

   TOWER OWNER: CROWN CASTLE INTERNATIONAL

- THE APPLICANT IS TO UPDATE THEIR NETWORK BY INSTALLING THREE (3) NEW PANEL ANTENNAS, THREE (3) NEW RRUS AND THREE (3) NEW HYBRID CABLES MOUNTED ON AN EXISTING SELF-SUPPORT TOWER.

3. THIS FACILITY SHALL BE VISITED ON THE AVERAGE OF ONCE A MONTH FOR MAINTENANCE AND SHALL BE MONITORED FROM A REMOTE FACILITY.

4. THE EXISTING SITE IS LOCATED AT LATITUDE OF 41.708914° N± AND LONGITUDE OF 72.473450° W±. THE HORIZONTAL DATUM ARE IN TERMS OF NORTH AMERICAN DATUM OF 1983 (NAD 83).

5. THIS SET OF PLANS HAS BEEN PREPARED FOR THE PURPOSES OF MUNICIPAL AND AGENCY REVIEW AND APPROVAL. THIS SET OF PLANS SHALL NOT BE UTILIZED AS CONSTRUCTION DOCUMENTS UNTIL ALL CONDITIONS OF APPROVAL HAVE BEEN SATISFIED AND EACH OF THE DRAWINGS HAVE BEEN REVISED TO INDICATED "ISSUED FOR CONSTRUCTION"

6. ALL MATERIALS, WORKMANSHIP, AND CONSTRUCTION FOR THE SITE IMPROVEMENTS SHOWN HEREON SHALL BE IN ACCORDANCE WITH:

   6.A. CURRENT PREVAILING MUNICIPAL AND/OR COUNTY SPECIFICATIONS, STANDARDS, AND REQUIREMENTS.
   6.B. CURRENT PREVAILING UTILITY COMPANY AUTHORITY SPECIFICATIONS, STANDARDS AND REQUIREMENTS.

7. THE CONTRACTOR SHALL NOTIFY B+T GROUP, P.A. IMMEDIATELY IF ANY FIELD-CONDITIONS ENCOUNTERED DIFFER FROM THOSE REPRESENTED HEREON, AND/OR IF SUCH CONDITIONS WOULD OR COULD RENDER THE DESIGNS SHOWN HEREON INAPPROPRIATE AND/OR INEFFECTIVE.

8. THE CONTRACTOR IS RESPONSIBLE TO PROTECT, REPAIR AND/OR REPLACE ANY DAMAGED STRUCTURES, UTILITIES OR LANDSCAPED AREA WHICH MAY BE DISTURBED DURING THE CONSTRUCTION OF THIS FACILITY.

9. THE CONSTRUCTION CONTRACTOR IS SOLELY RESPONSIBLE FOR DETERMINING ALL CONSTRUCTION MEANS AND METHODS. THE CONSTRUCTION CONTRACTOR IS ALSO RESPONSIBLE FOR ALL JOB SITE SAFETY.

10. SITE INFORMATION SHOWN TAKEN FROM CROWN CASTLE SITE PLANS AND FROM CROWN CASTLE INSPECTION PHOTOS.

11. NO GUARANTEE IS MADE NOR SHOULD BE ASSUMED AS TO THE COMPLETENESS OR ACCURACY OF THE HORIZONTAL OR VERTICAL LOCATIONS. ALL PARTIES UTILIZING THIS INFORMATION SHALL FIELD VERIFY THE ACCURACY AND COMPLETENESS OF THE INFORMATION SHOWN PRIOR TO CONSTRUCTION ACTIVITIES.

12. ALL IMPROVEMENTS SHALL BE SUBJECT TO INSPECTION AND APPROVAL BY THE TOWNSHIP ENGINEER WHO WILL BE GIVEN PROPER NOTIFICATION PRIOR TO THE START OF ANY CONSTRUCTION.

B+T GRP

CROWN CASTLE

T-Mobile

CT11189E
BU #: 871584
GLASTONBURY/RT-94 & FERN
115 BIRCH MTN. RD
GLASTONBURY, CT 06033
EXISTING 200'-0" SELF-SUPPORT TOWER

PROJECT NO:	121186.003.01
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B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/20

STATE OF CONNECTICUT
31627
LICENSED PROFESSIONAL ENGINEER
7/17/19

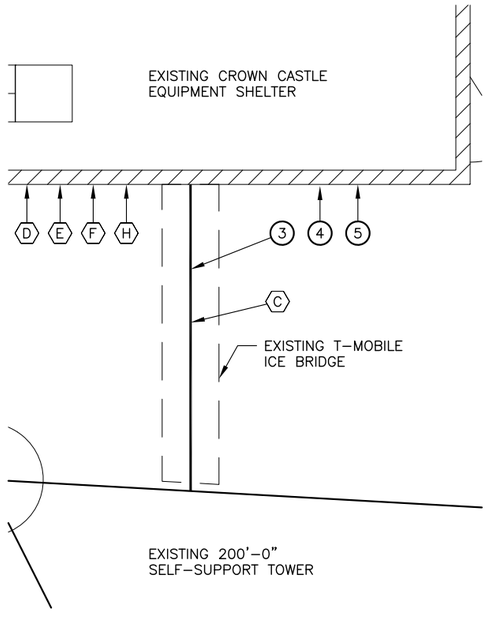
SHEET NUMBER:	REVISION:
A-1	1

LEGEND

EXISTING/DEMOLITION NOTES		INSTALLATION NOTES	
A	EXISTING RFS–APXV18–209015–C–A20 ANTENNA TO REMAIN (TOTAL OF 3)	1	INSTALL RFS APXVAARR24_43–U–NA20 (8 FT) ANTENNAS. PROVIDE NEW 2 7/8" OD SCH.40 PIPE MAST (LENGTH TO BE V.I.F) (TYP. OF 1 PER SECTOR, TOTAL OF 3)
B	EXISTING RRUS11 B12 TO BE REMOVED (TOTAL OF 3)	2	INSTALL RADIO 4449 B12/B71 (TYP. OF 1 PER SECTOR, TOTAL OF 3)
C	REMOVE (3) 1 5/8" COAX	3	INSTALL (3) NEW 6X12 HCS
D	EXISTING DUS41 TO BE REMOVED	4	INSTALL (2) NEW BB6630
E	EXISTING TWIN STYLE 1A TMAS TO REMAIN (TOTAL OF 3)	5	INSTALL NEW SSC
F	EXISTING RBS 6201 ODE CABINET TO REMAIN	6	INSTALL SITEPRO1 STK–U STIFF ARM KIT OR EOR APPROVED EQUIVALENT
G	EXISTING LNX–6515DS–A1M ANTENNA TO BE REMOVED (TOTAL OF 3)	7	REPLACE EXISTING MOUNT PIPES WITH NEW 8FT LONG P2.0 X–STR (2.38" O.D. x .204") WHERE REQUIRED
H	EXISTING DIPLEXERS TO BE REMOVED		

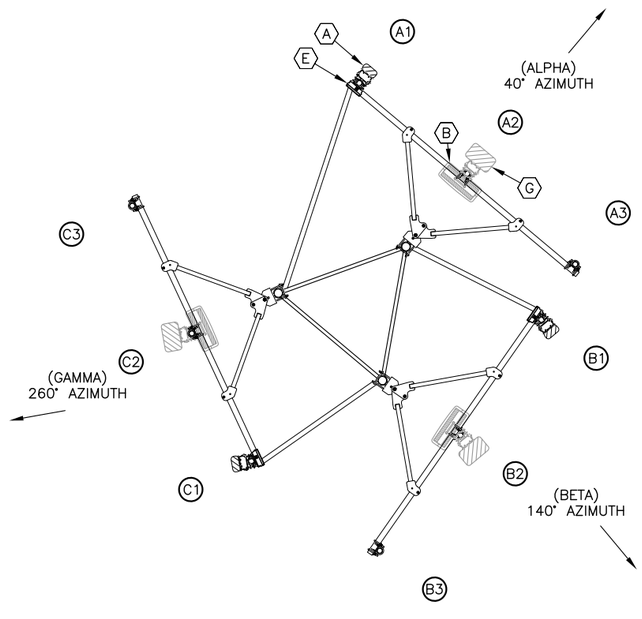
ANTENNA AND CABLE SCHEDULE

SECTOR	POSITION	EXISTING ANTENNAS	PROPOSED ANTENNA CONFIGURATION		E-TILT	M-TILT	ANTENNA CENTERLINE	TMA/RRU	CABLES	JUMPER TYPE	CABLE LENGTH
40° – ALPHA	A1	RFS APXV18–209015–C–A20	G19 L19	–	2°	0°	177'–0"	1/0	(2) 1 5/8" COAX	–	215'–0"
	A2	–	–	–	–	–		–	–	–	–
	A3	**RFS APXVAARR24_43–U–NA20**	**L600 L700**	**B71 + B12**	**2°/2°**	**0°**		**0/1**	**(1) 1 5/8" HYBRID**	**(4) COAX**	**215'–0"**
140° – BETA	B1	RFS APXV18–209015–C–A20	G19 L19	–	2°	0°	177'–0"	1/0	(2) 1 5/8" COAX	–	215'–0"
	B2	–	–	–	–	–		–	–	–	–
	B3	**RFS APXVAARR24_43–U–NA20**	**L600 L700**	**B71 + B12**	**2°/2°**	**0°**		**0/1**	**(1) 1 5/8" HYBRID**	**(4) COAX**	**215'–0"**
260° – GAMMA	G1	RFS APXV18–209015–C–A20	G19 L19	–	2°	0°	177'–0"	1/0	(2) 1 5/8" COAX	–	215'–0"
	G2	–	–	–	–	–		–	–	–	–
	G3	**RFS APXVAARR24_43–U–NA20**	**L600 L700**	**B71 + B12**	**2°/2°**	**0°**		**0/1**	**(1) 1 5/8" HYBRID**	**(4) COAX**	**215'–0"**



1 ENLARGED AREA PLAN

SCALE: 0' 1' 4' 8' 16'

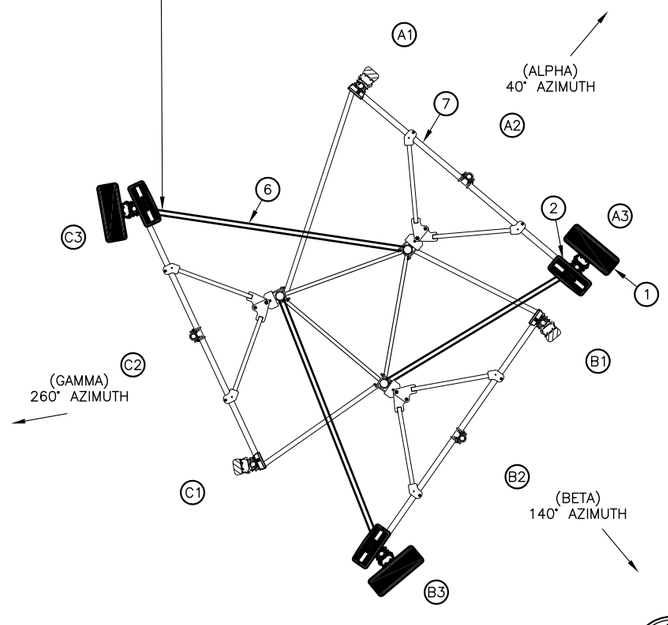


2 EXISTING ANTENNA ORIENTATION

SCALE: 0' 1' 4' 8' 16'

N

EXISTING MOUNT TO BE MODIFIED PER MOUNT ANALYSIS BY PAUL J. FORD DATED 5/2/19



3 PROPOSED ANTENNA ORIENTATION

SCALE: 0' 1' 4' 8' 16'

N

B+T GRP

CROWN CASTLE

T···Mobile

CT11189E
BU #: 871584
GLASTONBURY/RT-94 & FERN
115 BIRCH MTN. RD
GLASTONBURY, CT 06033
EXISTING 200'-0" SELF-SUPPORT TOWER

PROJECT NO:	121186.003.01
CHECKED BY:	GEH

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION
0	6/14/19	RFC	CONSTRUCTION
1	7/17/19	JJD	CONSTRUCTION

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

STATE OF CONNECTICUT
31627
LICENSED
PROFESSIONAL ENGINEER
7/17/19

SHEET NUMBER:	REVISION:
A-2	1

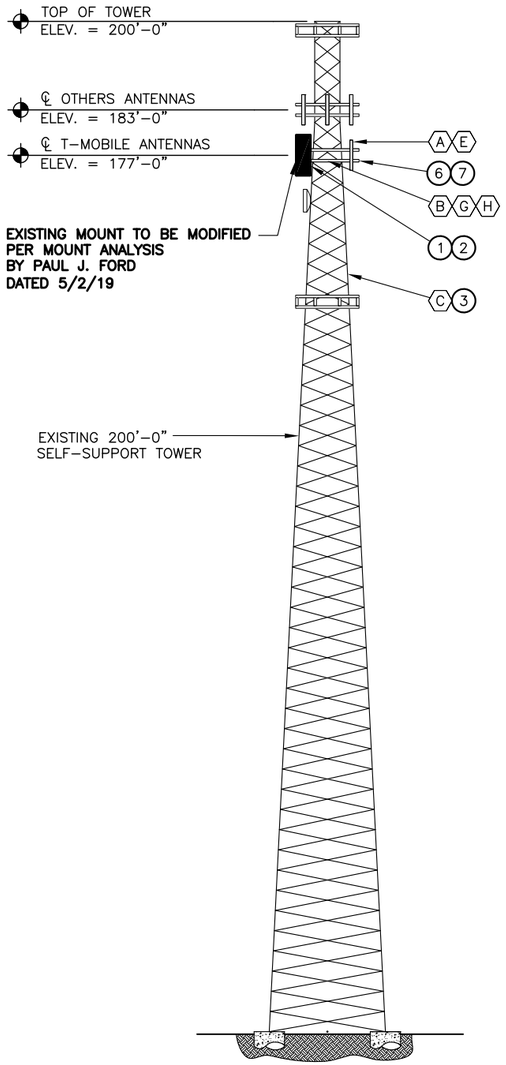
LEGEND

EXISTING/DEMOLITION NOTES		INSTALLATION NOTES	
A	EXISTING RFS–APXV18–209015–C–A20 ANTENNA TO REMAIN (TOTAL OF 3)	1	INSTALL RFS APXVAARR24_43–U–NA20 (8 FT) ANTENNAS. PROVIDE NEW 2 7/8" OD SCH.40 PIPE MAST (LENGTH TO BE V.I.F) (TYP. OF 1 PER SECTOR, TOTAL OF 3)
B	EXISTING RRUS11 B12 TO BE REMOVED (TOTAL OF 3)	2	INSTALL RADIO 4449 B12/B71 (TYP. OF 1 PER SECTOR, TOTAL OF 3)
C	REMOVE (3) 1 5/8" COAX	3	INSTALL (3) NEW 6X12 HCS
D	EXISTING DUS41 TO BE REMOVED	4	INSTALL (2) NEW BB6630
E	EXISTING TWIN STYLE 1A TMAS TO REMAIN (TOTAL OF 3)	5	INSTALL NEW SSC
F	EXISTING RBS 6201 ODE CABINET TO REMAIN	6	INSTALL SITEPRO1 STK–U STIFF ARM KIT OR EOR APPROVED EQUIVALENT
G	EXISTING LNX–6515DS–A1M ANTENNA TO BE REMOVED (TOTAL OF 3)	7	REPLACE EXISTING MOUNT PIPES WITH NEW 8FT LONG P2.0 X–STR (2.38" O.D. x .204") WHERE REQUIRED
H	EXISTING DIPLEXERS TO BE REMOVED		

EXISTING MOUNT IS SUFFICIENT PER STRUCTURAL ANALYSIS BY PIER STRUCTURAL ENGINEERING GROUP DATED 5/22/19.

LEGEND:

- **NEW**
- EXISTING
- FUTURE



1 TOWER ELEVATION

SCALE: 0' 15' 30' 45' 60' 1"=30'

B+T GRP

CROWN CASTLE

T···Mobile

CT11189E
BU #: 871584
GLASTONBURY/RT-94 & FERN
115 BIRCH MTN. RD
GLASTONBURY, CT 06033
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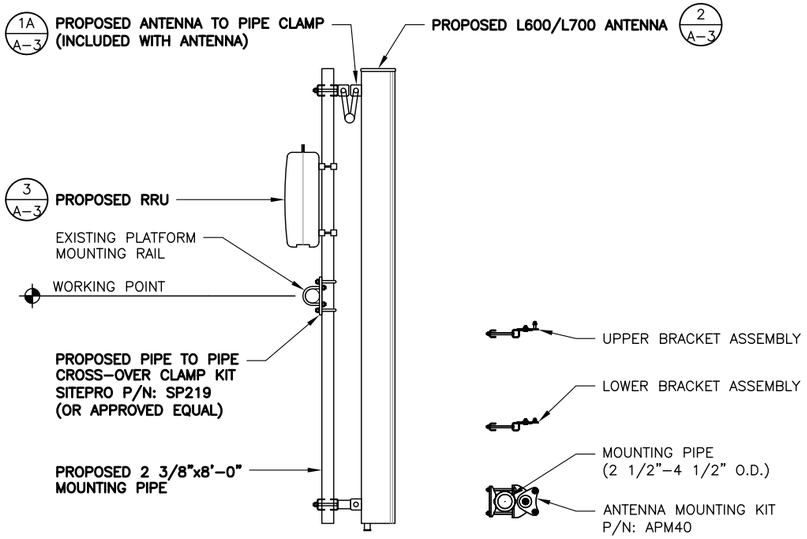
Expires 2/10/20

STATE OF CONNECTICUT · 31627 · LICENSED PROFESSIONAL ENGINEER

7/17/19

SHEET NUMBER:	REVISION:
A-3	1

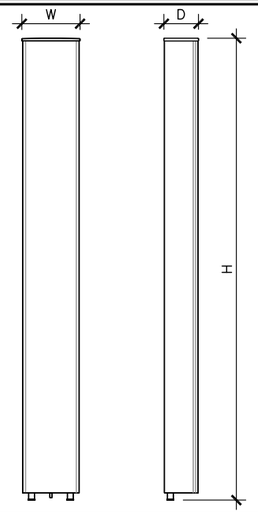


1 PROPOSED ANTENNA & RRU MOUNTING DETAIL

SCALE: N.T.S.

1A ANTENNA MOUNTING BRACKET

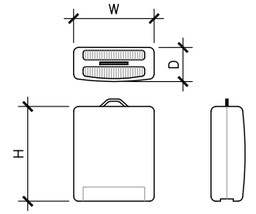
SCALE: N.T.S.



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

2 L600/L700 ANTENNA DETAIL

SCALE: N.T.S.

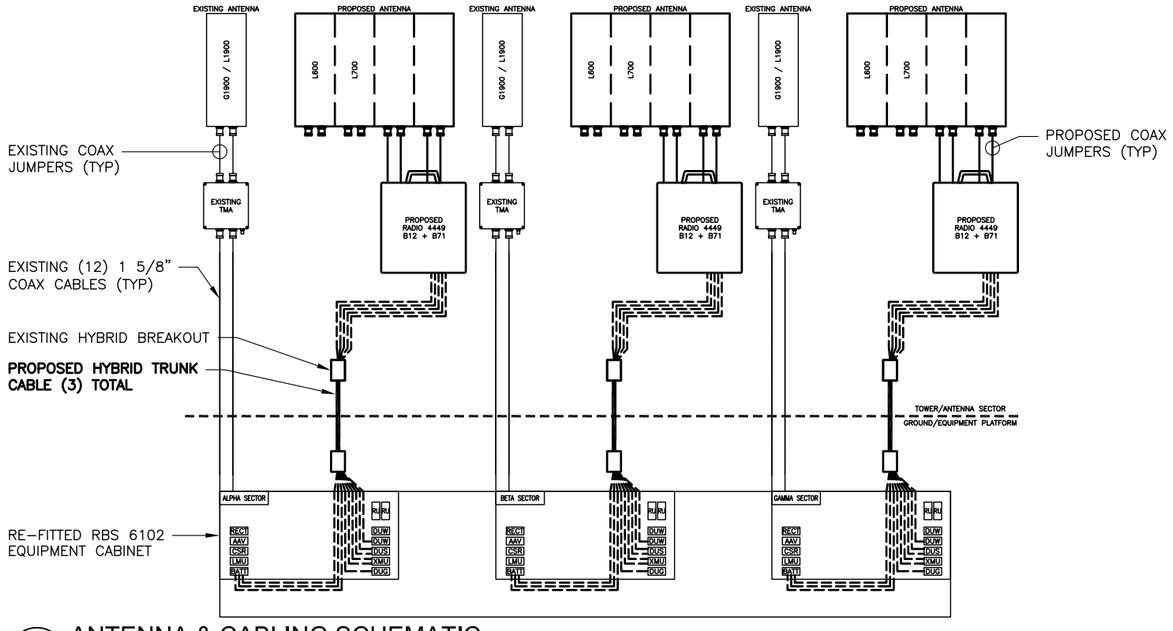


RRU SPECIFICATIONS	
MANUFACTURER	ERICSSON
MODEL #	4449
WIDTH	13.2"
DEPTH	10.4"
HEIGHT	14.9"
WEIGHT	74 LBS

3 REMOTE RADIO UNIT (RRU)

SCALE: N.T.S.

NOTES:
1. TAG ALL EXISTING AND PROPOSED CABLES/JUMPERS PER T-MOBILE SPECIFICATIONS.
2. SEE RF SCHEDULE FOR CABLE AND JUMPER LENGTHS.
3. REFER TO ANTENNA ORIENTATION ON SHEET C-3 FOR EXACT ANTENNA POSITIONING.



4 ANTENNA & CABLING SCHEMATIC

SCALE: N.T.S.

B+T GRP

CROWN CASTLE

T-Mobile

CT11189E
BU #: 871584
GLASTONBURY/RT-94 & FERN
115 BIRCH MTN. RD
GLASTONBURY, CT 06033
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7/17/19

SHEET NUMBER:	REVISION:
A-4	1

FINAL PANEL SCHEDULE

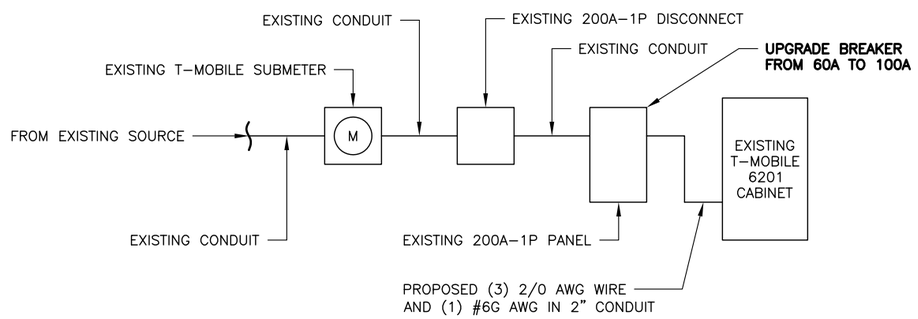
LOAD	POLES	AMPS	BUS L1	BUS L2	BUS L3	AMPS	POLES	LOAD
EQUIPMENT	2	–	1		2	**100**	2	RBS 6201
			3		4			
			5		6	20	1	EQUIPMENT
			7		8			
			9		10			
			11		12			
			13		14			
			15		16			
			17		18			

RATED VOLTAGE: ■120/240 ☐_____. 3 PHASE, 4 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 60A BREAKER IN POSITION 2 AND 4 W/ NEW 100A BREAKER INSIDE PANEL
REPLACE EXISTING WIRES FOR EXISTING 6201 CABINET WITH (3) 2/0 AWG THWN (COPPER) AND (1) #6G AWG. MINIMUM CONDUIT SIZE TO BE 2"
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

CROWN CASTLE

T···Mobile

CT11189E
BU #: 871584
GLASTONBURY/RT-94 & FERN
115 BIRCH MTN. RD
GLASTONBURY, CT 06033
EXISTING 200'-0" SELF-SUPPORT TOWER

PROJECT NO:	121186.003.01
CHECKED BY:	GEH

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION
0	6/14/19	RFC	CONSTRUCTION
1	7/17/19	JJD	CONSTRUCTION

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

STATE OF CONNECTICUT 31627 LICENSED PROFESSIONAL ENGINEER

7/17/19

SHEET NUMBER:	REVISION:
E-1	1

Exhibit C

Structural Analysis Report

Pier Structural Engineering Corp.
55 Northfield Drive E, Suite 198
Waterloo, ON N2K 3T6
Tel: 519-885-3806
Fax: 519-884-3806
www.p-sec.ca

July 16, 2019

Heather Simeone, Tower Structural Analyst
Crown Castle
3530 Toringdon Way Suite 300
Charlotte, NC 28277

Subject:	**Structural Analysis Report**	
Carrier Designation:	Carrier Co-Locate:	**T-Mobile**
	Carrier Site Number:	**CT11189E**
	Carrier Site Name:	**Glastonbury/ Rt-94 & Fern**
Crown Castle Designation:	Crown Castle BU Number:	**871584**
	Crown Castle Site Name:	**John Tom Hill**
	Crown Castle JDE Job Number:	**559293**
	Crown Castle WO Number:	**1729843**
	Crown Castle Order Number:	**479814 Rev. 0**
Engineering Firm Designation:	P-SEC Project Number:	**19994**
Site Data:	**115 Birch Mtn. Road, GLASTONBURY, Hartford County, CT** **Latitude *41° 42' 32.24"*, Longitude *-72° 28' 24.41"*** **200-ft Self Support Tower**	

Dear Heather Simeone,

Pier Structural Engineering Corp. (P-SEC) is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above mentioned tower. This analysis has been performed in accordance with the Crown Castle Structural 'Statement of Work' and the terms of Crown Castle Purchase Order Number 1378321, in accordance with order 479814, revision 0.

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

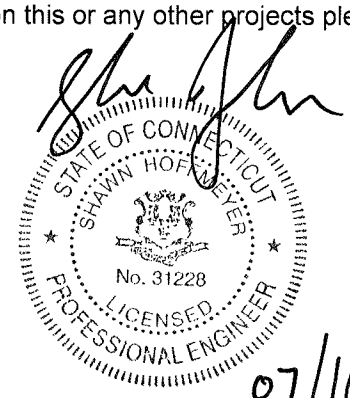
LC7: Proposed Equipment Configuration **Sufficient Capacity-92.3%**

This analysis has been performed in accordance with the 2018 Connecticut State Building Code based upon an ultimate 3-second gust wind speed of 125 mph. Exposure Category C and Risk Category II were used in this analysis.

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

Structural analysis prepared by: Tariq Hasan, E.I.T.

Respectfully submitted by:



07/16/19

Shawn Hoffmeyer, P.E., P.Eng.
CT PE# 31228

tnxTower Report - version 8.0.5.0

Pier Structural Engineering Corp.
55 Northfield Drive E, Suite 198
Waterloo, ON N2K 3T6
Tel: 519-885-3806
Fax: 519-884-3806
www.p-sec.ca

July 16, 2019

Heather Simeone, Tower Structural Analyst
Crown Castle
3530 Toringdon Way Suite 300
Charlotte, NC 28277

Subject:	**Structural Analysis Report**	
Carrier Designation:	Carrier Co-Locate:	**T-Mobile**
	Carrier Site Number:	**CT11189E**
	Carrier Site Name:	**Glastonbury/ Rt-94 & Fern**
Crown Castle Designation:	Crown Castle BU Number:	**871584**
	Crown Castle Site Name:	**John Tom Hill**
	Crown Castle JDE Job Number:	**559293**
	Crown Castle WO Number:	**1729843**
	Crown Castle Order Number:	**479814 Rev. 0**
Engineering Firm Designation:	P-SEC Project Number:	**19994 Rev. 2**
Site Data:	**115 Birch Mtn. Road, GLASTONBURY, Hartford County, CT** **Latitude *41° 42' 32.24"*, Longitude *-72° 28' 24.41"*** **200-ft Self Support Tower**	

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

Structural analysis prepared by: Tariq Hasan, E.I.T.

Respectfully submitted by:

Shawn Hoffmeyer, P.E., P.Eng.
CT PE# 31228

tnxTower Report - version 8.0.5.0

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 200-ft Self Support tower originally designed by SABRE COMMUNICATIONS in November of 1998 for a wind speed of 85 mph per TIA/EIA-222-F.

2) ANALYSIS CRITERIA

The following design parameters have been used in our analysis:

Design Standard:		TIA-222-H Standard
County/State:		Hartford County, CT
Wind Speeds:	*CASE 1*	125 mph (3-second gust)
	CASE 2	50 mph (3-second gust) with 2" radial solid ice
	CASE 3	60 mph (3-second gust) for serviceability
Exposure Category:		C
Topographic Category:		1
Risk Category:		II

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)
182	183	3	ericsson	KRY 112 489/2	12	1-5/8
	182	3	SitePro1	15' Sector Frame		
		3	SitePro1	STK-U Stiff Arm Kit		
	177	3	rfs celwave	APXV18-209015-C-A20		
		3	rfs celwave	APXVAARR24_43-U-NA20		
		3	ericsson	RADIO 4449 B12/B71		

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)
198	208	1	rfs celwave	ALR10-O	3 2	7/8 1/2
	205	1	decibel	DB225-A		
		1	rfs celwave	PD1107-1		
		1	rfs celwave	PD201-7		
	204	1	scala	OGB6-928N		
	198	1	--	Sector Mount [SM 702-3]		
170	171	3	commscope	NNVV-65B-R4	4	1-1/4
		3	rfs celwave	APXVTM14-ALU-I20		
		3	alcatel lucent	PCS 1900MHZ 4X45W-65MHZ		
		6	alcatel lucent	RRH2X50-800		
		3	alcatel lucent	TD-RRH8X20-25		
	170	1	--	Sector Mount [SM 506-3]		
163	163	1	kathrein	PR-850	1	1/2
		1	--	Pipe Mount [PM 601-1]		
144	155	1	sinclair	SRL480N1DT4	2 3	7/8 1/2
	152	2	rfs celwave	PD1109-1		
	144	1	--	Sector Mount [SM 702-3]		

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
53	55	1	lucent	KS24019-L112A	1	1/2

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	C Welti Assoc. dated 8/21/1998	1404208	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	Sabre, Proj. No. 98-10044 dated 11/3/1998	2068370	CCISITES
4-TOWER MANUFACTURER DRAWINGS	Sabre, Proj. No. 98-10044 dated 11/24/1998	1403674	CCISITES
APPLICATION	T-Mobile, Revision #0 dated 4/17/2019	479814	CCISITES

3.1) Analysis Method

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

3.2) Assumptions

1) Tower and structures were built in accordance with the manufacturer's specifications.
2) The tower\structures have been maintained in accordance with the manufacturer's specification.
3) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
4) P-SEC did not analyze antenna supporting mounts as part of this analysis report and assumed they are structurally sufficient. It is the carrier's responsibility to ensure structural compliance of their existing and/or proposed antenna supporting mounts.
5) The existing base plate grout was not considered in this analysis.
6) All equipment model numbers, quantities, and centerline elevations are as provided in the CCI CAD package dated 04/22/2019.

This analysis may be affected if any assumptions are not valid or have been made in error. P-SEC 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	200 - 180	Leg	Sabre 2.875x.375	2	-17.997	100.371	17.9	Pass
T2	180 - 160	Leg	Sabre 3.5 x .3	31	-59.264	116.342	50.9	Pass
T3	160 - 140	Leg	Sabre 4 x .318	58	-100.568	149.087	67.5	Pass
T4	140 - 120	Leg	Sabre 4.5 x .438	85	-138.479	211.276	65.5	Pass
T5	120 - 100	Leg	Sabre 5.5625 x .375	106	-174.468	251.617	69.3	Pass
T6	100 - 80	Leg	Sabre 5.5625 x .375	127	-208.709	251.617	82.9	Pass

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
T7	80 - 60	Leg	Sabre 6.625 x .432	148	-239.282	319.517	74.9	Pass
T8	60 - 40	Leg	Sabre 8.625 x .322	163	-271.672	351.500	77.3	Pass
T9	40 - 20	Leg	Sabre 8.625 x .5	178	-304.055	531.396	57.2	Pass
T10	20 - 0	Leg	Sabre 8.625 x .5	193	-335.569	531.396	63.1	Pass
T1	200 - 180	Diagonal	L1 3/4x1 3/4x3/16	10	-3.678	13.849	26.6 42.0 (b)	Pass
T2	180 - 160	Diagonal	L1 3/4x1 3/4x3/16	34	-5.312	9.465	56.1 64.5 (b)	Pass
T3	160 - 140	Diagonal	L1 3/4x1 3/4x3/16	61	-5.873	6.536	89.9	Pass
T4	140 - 120	Diagonal	L2 1/2x2 1/2x3/16	88	-6.537	12.361	52.9 62.7 (b)	Pass
T5	120 - 100	Diagonal	L2 1/2x2 1/2x3/16	109	-6.776	9.610	70.5	Pass
T6	100 - 80	Diagonal	L3x3x3/16	130	-7.202	13.184	54.6 64.7 (b)	Pass
T7	80 - 60	Diagonal	L3 1/2x3 1/2x1/4	151	-8.531	18.994	44.9 54.9 (b)	Pass
T8	60 - 40	Diagonal	L3 1/2x3 1/2x1/4	166	-9.356	16.226	57.7	Pass
T9	40 - 20	Diagonal	L3 1/2x3 1/2x1/4	181	-9.909	13.726	72.2	Pass
T10	20 - 0	Diagonal	L4x4x1/4	196	-10.995	17.670	62.2 65.7 (b)	Pass
T1	200 - 180	Top Girt	L1 3/4x1 3/4x3/16	5	-0.138	7.657	1.8	Pass
							Summary	
						Leg (T6)	82.9	Pass
						Diagonal (T3)	89.9	Pass
						Top Girt (T1)	1.8	Pass
						Bolt Checks	69.8	Pass
						RATING =	**89.9**	**Pass**

Table 5 - Tower Component Stresses vs. Capacity

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
2	Anchor Rods	--	62.0	Pass
2	Base Foundation - Soil	--	52.2	Pass
2	Base Foundation - Structural	--	92.3	Pass
Structure Rating (max from all components) =				**92.3%**

Notes: 1) See full member breakdown and section capacities in Appendix A.
2) See additional documentation in Appendix C for supporting calculations.
.

4.1) Recommendations

The tower and its foundation have sufficient capacity to carry the proposed loading configuration.

No modifications are required at this time.

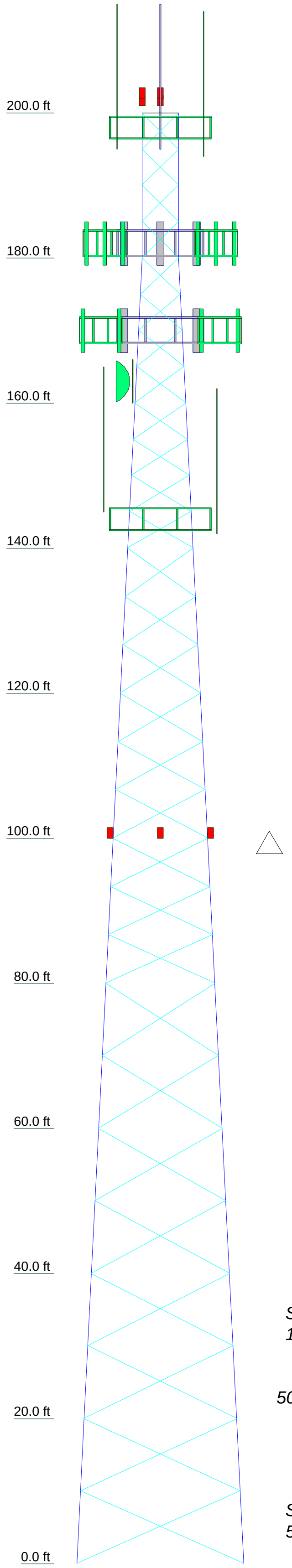
Should you have any questions, please call us anytime at 519-885-3806.

encl.
871584_479814 SA Report_20190716.doc

APPENDIX A

TNXTOWER OUTPUT

Section	Legs	Leg Grade	Diagonals	Diagonal Grade	Top Girts	Face Width (ft)	# Panels @ (ft)	Weight (K)
T1	Sabre 2.875x.375	A572-50	L1 3/4x1 3/4x3/16	A36	L1 3/4x1 3/4x3/16	5	12 @ 4.97917	1.0
T2	Sabre 3.5 x .3	A572-50	L1 3/4x1 3/4x3/16	A36	N.A.		12 @ 4.97917	1.0
T3	Sabre 4 x .318	A572-50	L1 3/4x1 3/4x3/16	A36	N.A.	7	12 @ 4.97917	1.3
T4	Sabre 4.5 x .438	A572-50	L2 1/2x2 1/2x3/16	A36	N.A.	9	9 @ 6.63889	1.9
T5	Sabre 5.5625 x .375	A572-50	L2 1/2x2 1/2x3/16	A36	N.A.	11	9 @ 6.63889	2.1
T6	Sabre 5.5625 x .375	A572-50	L3x3x3/16	A36	N.A.	13	9 @ 6.63889	2.3
T7	Sabre 6.625 x .432	A572-50	L3 1/2x3 1/2x1/4	A36	N.A.	15	8 @ 9.95833	3.1
T8	Sabre 8.625 x .322	A572-50	L3 1/2x3 1/2x1/4	A36	N.A.	17	8 @ 9.95833	3.2
T9	Sabre 8.625 x .5	A572-50	L3 1/2x3 1/2x1/4	A36	N.A.	19	8 @ 9.95833	4.3
T10	Sabre 8.625 x .5	A572-50	L4x4x1/4	A36	N.A.	21	8 @ 9.95833	4.6
						23		24.8



MATERIAL STRENGTH

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

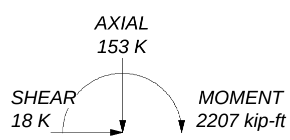
TOWER DESIGN NOTES

1. Tower is located in Hartford County, Connecticut.
2. Tower designed for Exposure C to the TIA-222-H Standard.
3. Tower designed for a 125 mph basic wind in accordance with the TIA-222-H Standard.
4. Tower is also designed for a 50 mph basic wind with 2.00 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Risk Category II.
7. Topographic Category 1 with Crest Height of 0'
8. TheTIA-222-H Annex S
9. -
10. E - Existing, R/MLA - Reserved, P - Proposed
11. Proposed loading at 182ft elevation
12. Reserved loading at 170ft elevation
13. TOWER RATING: 89.9%

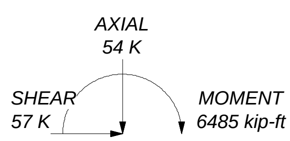
ALL REACTIONS ARE FACTORED

MAX. CORNER REACTIONS AT BASE:
DOWN: 343 K
SHEAR: 35 K

UPLIFT: -299 K
SHEAR: 31 K



TORQUE 21 kip-ft
50 mph WIND - 2.000 in ICE



TORQUE 49 kip-ft
REACTIONS - 125 mph WIND

Pier Structural Engineering
198-55 Northfield Drive East
Waterloo, Ontario, N2K 3T6
Phone: (519)885-3806
FAX: (519)884-3806

Job: ***PSEC 19994 (for T-MOBILE)***		
Project: ***BU 871584 - JOHN TOM HILL***		
Client: CROWN CASTLE	Drawn by: thasan	App'd:
Code: TIA-222-H	Date: 05/09/19	Scale: NTS
Path: H:\PROJECTS\JOB 19000 - 19999\19900 - 19999\19994 - CCI - 871584 - John Tom Hill\871584_LC7_20190508.eri		Dwg No. E-1

Tower Input Data

The main tower is a 3x free standing tower with an overall height of 200' 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 5' at the top and 23' at the base.
This tower is designed using the TIA-222-H standard.
The following design criteria apply:

Tower is located in Hartford County, Connecticut.
Tower base elevation above sea level: 878'.
Basic wind speed of 125 mph.
Risk Category II.
Exposure Category C.
Simplified Topographic Factor Procedure for wind speed-up calculations is used.
Topographic Category: 1.
Crest Height: 0'.
Nominal ice thickness of 2.000 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.
TheTIA-222-H Annex S.
- -.
E - Existing, R/MLA - Reserved, P - Proposed.
Proposed loading at 182ft elevation.
Reserved loading at 170ft elevation.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Tower analysis based on target reliabilities in accordance with Annex S.
Load Modification Factors used: $K_{es}(F_w)$ = 0.95, $K_{es}(t_i)$ = 0.85.
Stress ratio used in tower member design is 1.05.
Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

Consider Moments - Legs
Consider Moments - Horizontals
Consider Moments - Diagonals
Use Moment Magnification
Use Code Stress Ratios
√ Use Code Safety Factors - Guys
Escalate Ice
Always Use Max Kz
Use Special Wind Profile
√ Include Bolts In Member Capacity
Leg Bolts Are At Top Of Section
√ Secondary Horizontal Braces Leg
Use Diamond Inner Bracing (4 Sided)
SR Members Have Cut Ends
SR Members Are Concentric

Distribute Leg Loads As Uniform
Assume Legs Pinned
√ Assume Rigid Index Plate
√ Use Clear Spans For Wind Area
√ Use Clear Spans For KL/r
Retension Guys To Initial Tension
√ Bypass Mast Stability Checks
√ Use Azimuth Dish Coefficients
√ Project Wind Area of Appurt.
Autocalc Torque Arm Areas
Add IBC .6D+W Combination
√ Sort Capacity Reports By Component
Triangulate Diamond Inner Bracing
Treat Feed Line Bundles As Cylinder
Ignore KL/ry For 60 Deg. Angle Legs

Use ASCE 10 X-Brace Ly Rules
√ Calculate Redundant Bracing Forces
Ignore Redundant Members in FEA
√ SR Leg Bolts Resist Compression
All Leg Panels Have Same Allowable
Offset Girt At Foundation
√ Consider Feed Line Torque
√ Include Angle Block Shear Check
Use TIA-222-H Bracing Resist. Exemption
Use TIA-222-H Tension Splice Exemption

Poles

Include Shear-Torsion Interaction
Always Use Sub-Critical Flow
Use Top Mounted Sockets
Pole Without Linear Attachments
Pole With Shroud Or No Appurtenances
Outside and Inside Corner Radii Are Known

Tower Section Geometry

Tower Section	Tower Elevation ft	Assembly Database	Description	Section Width ft	Number of Sections	Section Length ft
T1	200'-180'			5'	1	20'
T2	180'-160'			5'	1	20'
T3	160'-140'			7'	1	20'
T4	140'-120'			9'	1	20'
T5	120'-100'			11'	1	20'
T6	100'-80'			13'	1	20'
T7	80'-60'			15'	1	20'
T8	60'-40'			17'	1	20'
T9	40'-20'			19'	1	20'
T10	20'-0'			21'	1	20'

Tower Section Geometry *(cont'd)*

Tower Section	Tower Elevation ft	Diagonal Spacing ft	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset in	Bottom Girt Offset in
T1	200'-180'	4'11-3/4"	X Brace	No	No	0.000	1.000
T2	180'-160'	4'11-3/4"	X Brace	No	No	0.000	1.000
T3	160'-140'	4'11-3/4"	X Brace	No	No	0.000	1.000
T4	140'-120'	6'7-21/32"	X Brace	No	No	0.000	1.000
T5	120'-100'	6'7-21/32"	X Brace	No	No	0.000	1.000
T6	100'-80'	6'7-21/32"	X Brace	No	No	0.000	1.000
T7	80'-60'	9'11-1/2"	X Brace	No	No	0.000	1.000
T8	60'-40'	9'11-1/2"	X Brace	No	No	0.000	1.000
T9	40'-20'	9'11-1/2"	X Brace	No	No	0.000	1.000
T10	20'-0'	9'11-1/2"	X Brace	No	No	0.000	1.000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 200'-180'	Pipe	Sabre 2.875x.375	A572-50 (50 ksi)	Equal Angle	L1 3/4x1 3/4x3/16	A36 (36 ksi)
T2 180'-160'	Pipe	Sabre 3.5 x .3	A572-50 (50 ksi)	Equal Angle	L1 3/4x1 3/4x3/16	A36 (36 ksi)
T3 160'-140'	Pipe	Sabre 4 x .318	A572-50 (50 ksi)	Equal Angle	L1 3/4x1 3/4x3/16	A36 (36 ksi)
T4 140'-120'	Pipe	Sabre 4.5 x .438	A572-50 (50 ksi)	Equal Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T5 120'-100'	Pipe	Sabre 5.5625 x .375	A572-50 (50 ksi)	Equal Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T6 100'-80'	Pipe	Sabre 5.5625 x .375	A572-50 (50 ksi)	Equal Angle	L3x3x3/16	A36 (36 ksi)
T7 80'-60'	Pipe	Sabre 6.625 x .432	A572-50 (50 ksi)	Equal Angle	L3 1/2x3 1/2x1/4	A36 (36 ksi)
T8 60'-40'	Pipe	Sabre 8.625 x .322	A572-50 (50 ksi)	Equal Angle	L3 1/2x3 1/2x1/4	A36 (36 ksi)
T9 40'-20'	Pipe	Sabre 8.625 x .5	A572-50	Equal Angle	L3 1/2x3 1/2x1/4	A36

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T10 20'-0'	Pipe	Sabre 8.625 x .5	(50 ksi) A572-50 (50 ksi)	Equal Angle	L4x4x1/4	(36 ksi) 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 200'-180'	Equal Angle	L1 3/4x1 3/4x3/16	A36 (36 ksi)	Solid Round		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 200'-180'	0.000	0.000	A36 (36 ksi)	1.05	1	1.025	Mid-Pt	Mid-Pt	Mid-Pt
T2 180'-160'	0.000	0.000	A36 (36 ksi)	1.05	1	1.025	Mid-Pt	Mid-Pt	Mid-Pt
T3 160'-140'	0.000	0.000	A36 (36 ksi)	1.05	1	1.025	Mid-Pt	Mid-Pt	Mid-Pt
T4 140'-120'	0.000	0.000	A36 (36 ksi)	1.05	1	1.025	Mid-Pt	Mid-Pt	Mid-Pt
T5 120'-100'	0.000	0.000	A36 (36 ksi)	1.05	1	1.025	Mid-Pt	Mid-Pt	Mid-Pt
T6 100'-80'	0.000	0.000	A36 (36 ksi)	1.05	1	1.025	Mid-Pt	Mid-Pt	Mid-Pt
T7 80'-60'	0.000	0.000	A36 (36 ksi)	1.05	1	1.025	Mid-Pt	Mid-Pt	Mid-Pt
T8 60'-40'	0.000	0.000	A36 (36 ksi)	1.05	1	1.025	Mid-Pt	Mid-Pt	Mid-Pt
T9 40'-20'	0.000	0.000	A36 (36 ksi)	1.05	1	1.025	Mid-Pt	Mid-Pt	Mid-Pt
T10 20'-0'	0.000	0.000	A36 (36 ksi)	1.05	1	1.025	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 200'-180'	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T2 180'-160'	Yes	No	1	1	1	1	1	1	1	1

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	Legs	K Factors[1] X Brace Diags X	K Brace Diags X	Single Diags X	Girts X	Horiz. X	Sec. Horiz. X	Inner Brace X
				Y	Y	Y	Y	Y	Y	Y
				1	1	1	1	1	1	1
T3 160'-140'	Yes	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T4 140'-120'	Yes	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T5 120'-100'	Yes	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T6 100'-80'	Yes	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T7 80'-60'	Yes	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T8 60'-40'	Yes	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T9 40'-20'	Yes	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T10 20'-0'	Yes	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1

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 200'-180'	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 180'-160'	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 160'-140'	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 140'-120'	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 120'-100'	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 100'-80'	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 80'-60'	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
T8 60'-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
T9 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
T10 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 200'-180'	Flange	0.750 A325X	4	0.625 A325X	1	0.625 A325X	1	0.000 A325N	0	0.625 A325N	0	0.000 A325N	0	0.625 A325N	0
T2 180'-160'	Flange	1.000 A325X	4	0.625 A325X	1	0.000 A325N	0	0.000 A325N	0	0.625 A325N	0	0.000 A325N	0	0.625 A325N	0
T3 160'-140'	Flange	1.000 A325X	4	0.625 A325X	1	0.000 A325N	0	0.000 A325N	0	0.625 A325N	0	0.000 A325N	0	0.625 A325N	0

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.
T4 140'-120'	Flange	1.250 A325X	4	0.625 A325X	1	0.000 A325N	0	0.000 A325N	0	0.625 A325N	0	0.000 A325N	0	0.625 A325N	0
T5 120'-100'	Flange	1.250 A325X	4	0.625 A325X	1	0.000 A325N	0	0.000 A325N	0	0.625 A325N	0	0.000 A325N	0	0.625 A325N	0
T6 100'-80'	Flange	1.250 A325X	6	0.750 A325X	1	0.000 A325N	0	0.000 A325N	0	0.625 A325N	0	0.000 A325N	0	0.625 A325N	0
T7 80'-60'	Flange	1.250 A325X	6	0.750 A325X	1	0.000 A325N	0	0.000 A325N	0	0.625 A325N	0	0.000 A325N	0	0.625 A325N	0
T8 60'-40'	Flange	1.375 A325X	6	0.750 A325X	1	0.000 A325N	0	0.000 A325N	0	0.625 A325N	0	0.000 A325N	0	0.625 A325N	0
T9 40'-20'	Flange	1.375 A325X	6	0.750 A325X	1	0.000 A325N	0	0.000 A325N	0	0.625 A325N	0	0.000 A325N	0	0.625 A325N	0
T10 20'-0'	Flange	0.000 A572-50	0	0.750 A325X	1	0.000 A325N	0	0.000 A325N	0	0.625 A325N	0	0.000 A325N	0	0.625 A325N	0

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
***													
LDF4-50A(1/2) (Carrier 198' E)	B	No	No	Ar (CaAa)	198' - 163'	0.000	0.45	1	1	0.500	0.625		0.000
LDF4-50A(1/2) (Carrier 198' E)	C	No	No	Ar (CaAa)	198' - 0'	-2.000	0.03	1	1	0.500	0.625		0.000
LDF5-50A(7/8) (Carrier 198' E)	B	No	No	Ar (CaAa)	198' - 144'	0.000	0.42	3	2	0.500	1.030		0.000
***													
AVA7-50(1-5/8) (Carrier 182' E)	B	No	No	Ar (CaAa)	182' - 0'	0.000	-0.1	12	8	0.500	2.010		0.001
Feedline Ladder (Af) (Carrier 182' E)	B	No	No	Af (CaAa)	200' - 0'	0.000	-0.1	1	1	3.000	3.000		0.008
***													
HB114-1-0813U4-M5J(1-1/4) (Carrier 170' R)	C	No	No	Ar (CaAa)	170' - 0'	-2.000	0.02	4	4	0.500	1.540		0.001
Feedline Ladder (Af) (Carrier 170' E)	C	No	No	Af (CaAa)	170' - 0'	-1.000	0.03	1	1	3.000	3.000		0.008
***													
FLC 12-50J(1/2)	B	No	No	Ar (CaAa)	163' - 144'	0.000	0.45	2	2	0.500	0.640		0.000

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
(Carrier 163' E) ***													
LDF5-50A(7/8) (Carrier 144' E)	B	No	No	Ar (CaAa)	144' - 0'	0.000	0.42	5	5	0.500	1.030		0.000
LDF4-50A(1/2) (Carrier 144' E) ***	B	No	No	Ar (CaAa)	144' - 56'	0.000	0.45	5	5	0.625	0.625		0.000
LDF4-50A(1/2) (Carrier 53' E) ***	C	No	No	Ar (CaAa)	53' - 0'	-1.500	0.03	1	1	0.630	0.625		0.000
LDF4-50A(1/2) (Lighting Cable 56' E)	B	No	No	Ar (CaAa)	56' - 0'	0.000	0.45	6	6	0.630	0.625		0.000
LDF2-50(3/8") (Lighting Cable 100' E)	B	No	No	Ar (CaAa)	100' - 0'	0.000	0.4	1	1	0.500	0.440		0.000
50-AC-208-8SM(3/4") (Lighting Cable 200' ABN) ***	B	No	No	Ar (CaAa)	200' - 0'	0.000	0.4	1	1	0.740	0.740		0.000
Feedline Ladder (Af) (Carrier 200' E)	B	No	No	Af (CaAa)	200' - 0'	0.000	0.35	1	1	3.000	3.000		0.008
Safety Line 3/8 (Carrier 200' E)	C	No	No	Ar (CaAa)	200' - 0'	1.000	0	1	1	0.375	0.375		0.000
Thin Flat Bar Climbing Ladder (Carrier 200' E) ***	C	No	No	Af (CaAa)	200' - 0'	0.000	0	1	1	2.000	2.000		0.004
1 1/2" Rigid Conduit (Carrier 215' E)	B	No	No	Ar (CaAa)	200' - 0'	0.000	0.43	1	1	1.500	1.500		0.001

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*
Flash Beacon Lighting (Carrier 200' E)	A	From Leg	0.000 0' 1'	0.000	200'	No Ice 1/2" Ice 1" Ice 2" Ice	1.563 2.411 2.644 3.140	1.563 2.411 2.644 3.140	0.050 0.080 0.114 0.191
12' x 2" Pipe Mount (Carrier 200' E)	A	From Leg	0.000 0' 2'	0.000	200'	No Ice 1/2" Ice 1" Ice 2" Ice	2.400 3.625 4.867 7.354	2.400 3.625 4.867 7.354	0.100 0.119 0.145 0.221
Flash Beacon Lighting (Carrier 200' E)	C	From Leg	0.000 0' 1'	0.000	200'	No Ice 1/2" Ice 1" Ice 2" Ice	1.563 2.411 2.644 3.140	1.563 2.411 2.644 3.140	0.050 0.080 0.114 0.191
12' x 2" Pipe Mount (Carrier 200' E)	C	From Leg	0.000 0' 2'	0.000	200'	No Ice 1/2" Ice 1" Ice 2" Ice	2.400 3.625 4.867 7.354	2.400 3.625 4.867 7.354	0.100 0.119 0.145 0.221
Side Lighting (Carrier 100' E)	A	From Leg	0.500 0' 0'	0.000	100'	No Ice 1/2" Ice 1" Ice 2" Ice	0.133 0.194 0.267 0.444	0.133 0.194 0.267 0.444	0.005 0.007 0.010 0.019
Side Lighting (Carrier 100' E)	B	From Leg	0.500 0' 0'	0.000	100'	No Ice 1/2" Ice 1" Ice 2" Ice	0.133 0.194 0.267 0.444	0.133 0.194 0.267 0.444	0.005 0.007 0.010 0.019
Side Lighting (Carrier 100' E)	C	From Leg	0.500 0' 0'	0.000	100'	No Ice 1/2" Ice 1" Ice 2" Ice	0.133 0.194 0.267 0.444	0.133 0.194 0.267 0.444	0.005 0.007 0.010 0.019
**									
DB225-A (Carrier 198' E)	A	From Leg	4.000 0' 7'	0.000	198'	No Ice 1/2" Ice 1" Ice 2" Ice	3.210 5.778 8.346 13.482	3.210 5.778 8.346 13.482	0.037 0.048 0.059 0.081
ALR10-O (Carrier 198' E)	B	From Leg	4.000 0' 10'	0.000	198'	No Ice 1/2" Ice 1" Ice 2" Ice	6.625 15.314 17.394 20.790	6.625 15.314 17.394 20.790	0.092 0.181 0.282 0.525
OGB6-928N (Carrier 198' E)	B	From Leg	4.000 0' 6'	0.000	198'	No Ice 1/2" Ice 1" Ice 2" Ice	0.967 1.329 1.630 2.258	0.967 1.329 1.630 2.258	0.009 0.017 0.028 0.060
PD1107-1 (Carrier 198' E)	C	From Leg	4.000 0' 7'	0.000	198'	No Ice 1/2" Ice 1" Ice 2" Ice	2.180 3.295 4.427 6.424	2.180 3.295 4.427 6.424	0.008 0.025 0.049 0.118
PD201-7 (Carrier 198' E)	C	From Leg	4.000 0' 7'	0.000	198'	No Ice 1/2" Ice 1" Ice 2" Ice	1.015 1.809 2.620 3.757	1.015 1.809 2.620 3.757	0.004 0.013 0.026 0.070
(4) 6' x 2" Mount Pipe (Carrier 198' E)	A	From Leg	4.000 0' 0'	0.000	198'	No Ice 1/2" Ice 1" Ice 2" Ice	1.425 1.925 2.294 3.060	1.425 1.925 2.294 3.060	0.022 0.033 0.048 0.090
(4) 6' x 2" Mount Pipe	B	From Leg	4.000	0.000	198'	No Ice	1.425	1.425	0.022

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
(Carrier 198' E)			0'			1/2" Ice	1.925	1.925	0.033
			0'			1" Ice	2.294	2.294	0.048
						2" Ice	3.060	3.060	0.090
(4) 6' x 2" Mount Pipe	C	From Leg	4.000	0.000	198'	No Ice	1.425	1.425	0.022
(Carrier 198' E)			0'			1/2" Ice	1.925	1.925	0.033
			0'			1" Ice	2.294	2.294	0.048
						2" Ice	3.060	3.060	0.090
(2) 4' x 2" Pipe Mount	A	From Leg	4.000	0.000	198'	No Ice	0.785	0.785	0.029
(Carrier 198' E)			0'			1/2" Ice	1.028	1.028	0.035
			0'			1" Ice	1.281	1.281	0.044
						2" Ice	1.814	1.814	0.072
(2) 4' x 2" Pipe Mount	B	From Leg	4.000	0.000	198'	No Ice	0.785	0.785	0.029
(Carrier 198' E)			0'			1/2" Ice	1.028	1.028	0.035
			0'			1" Ice	1.281	1.281	0.044
						2" Ice	1.814	1.814	0.072
(2) 4' x 2" Pipe Mount	C	From Leg	4.000	0.000	198'	No Ice	0.785	0.785	0.029
(Carrier 198' E)			0'			1/2" Ice	1.028	1.028	0.035
			0'			1" Ice	1.281	1.281	0.044
						2" Ice	1.814	1.814	0.072
Sector Mount [SM 702-3]	C	None		0.000	198'	No Ice	37.400	37.400	1.551
(Carrier 198' E)						1/2" Ice	54.200	54.200	2.352
						1" Ice	71.000	71.000	3.153
						2" Ice	104.600	104.600	4.755
***									
APXVAARR24_43-U-NA20	A	From Leg	4.000	0.000	182'	No Ice	20.480	11.024	0.161
w/ Mount Pipe			0'			1/2" Ice	21.231	12.550	0.297
(Carrier 182' P)			-5'			1" Ice	21.990	14.099	0.444
						2" Ice	23.444	16.451	0.775
APXVAARR24_43-U-NA20	B	From Leg	4.000	0.000	182'	No Ice	20.480	11.024	0.161
w/ Mount Pipe			0'			1/2" Ice	21.231	12.550	0.297
(Carrier 182' P)			-5'			1" Ice	21.990	14.099	0.444
						2" Ice	23.444	16.451	0.775
APXVAARR24_43-U-NA20	C	From Leg	4.000	0.000	182'	No Ice	20.480	11.024	0.161
w/ Mount Pipe			0'			1/2" Ice	21.231	12.550	0.297
(Carrier 182' P)			-5'			1" Ice	21.990	14.099	0.444
						2" Ice	23.444	16.451	0.775
RADIO 4449 B12/B71	A	From Leg	4.000	0.000	182'	No Ice	1.650	1.163	0.074
(Carrier 182' P)			0'			1/2" Ice	1.810	1.301	0.090
			-5'			1" Ice	1.978	1.447	0.109
						2" Ice	2.336	1.762	0.155
RADIO 4449 B12/B71	B	From Leg	4.000	0.000	182'	No Ice	1.650	1.163	0.074
(Carrier 182' P)			0'			1/2" Ice	1.810	1.301	0.090
			-5'			1" Ice	1.978	1.447	0.109
						2" Ice	2.336	1.762	0.155
RADIO 4449 B12/B71	C	From Leg	4.000	0.000	182'	No Ice	1.650	1.163	0.074
(Carrier 182' P)			0'			1/2" Ice	1.810	1.301	0.090
			-5'			1" Ice	1.978	1.447	0.109
						2" Ice	2.336	1.762	0.155
APXV18-209015-C-A20 w/	A	From Leg	4.000	0.000	182'	No Ice	4.184	3.556	0.048
Mount Pipe			0'			1/2" Ice	4.629	4.352	0.084
(Carrier 182' E)			-5'			1" Ice	5.065	5.061	0.127
						2" Ice	5.931	6.529	0.234
APXV18-209015-C-A20 w/	B	From Leg	4.000	0.000	182'	No Ice	4.184	3.556	0.048
Mount Pipe			0'			1/2" Ice	4.629	4.352	0.084
(Carrier 182' E)			-5'			1" Ice	5.065	5.061	0.127
						2" Ice	5.931	6.529	0.234
APXV18-209015-C-A20 w/	C	From Leg	4.000	0.000	182'	No Ice	4.184	3.556	0.048

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
Mount Pipe			0'			1/2" Ice	4.629	4.352	0.084
(Carrier 182' E)			-5'			1" Ice	5.065	5.061	0.127
						2" Ice	5.931	6.529	0.234
(2) KRY 112 489/2	B	From Leg	4.000	0.000	182'	No Ice	0.559	0.365	0.015
(Carrier 182' E)			0'			1/2" Ice	0.658	0.448	0.020
			1'			1" Ice	0.764	0.542	0.027
						2" Ice	0.998	0.752	0.046
KRY 112 489/2	C	From Leg	4.000	0.000	182'	No Ice	0.559	0.365	0.015
(Carrier 182' E)			0'			1/2" Ice	0.658	0.448	0.020
			1'			1" Ice	0.764	0.542	0.027
						2" Ice	0.998	0.752	0.046
(3) 15' Sector Frame	C	None		0.000	182'	No Ice	41.388	41.388	1.926
(Carrier 182' E)						1/2" Ice	56.125	56.125	2.698
						1" Ice	70.862	70.862	3.471
						2" Ice	100.338	100.338	5.017
(3) 8' x 3" Mount Pipe	A	From Leg	4.000	0.000	182'	No Ice	2.400	2.400	0.041
(Carrier 182' P)			0'			1/2" Ice	3.188	3.188	0.058
			0'			1" Ice	3.675	3.675	0.081
						2" Ice	4.676	4.676	0.143
6' x 2" Horizontal Mount Pipe	A	From Leg	4.000	0.000	182'	No Ice	0.500	0.500	0.028
(Carrier 182' P)			0'			1/2" Ice	1.065	1.065	0.171
			0'			1" Ice	1.439	1.439	0.322
						2" Ice	2.217	2.217	0.646
(3) 8' x 3" Mount Pipe	B	From Leg	4.000	0.000	182'	No Ice	2.400	2.400	0.041
(Carrier 182' P)			0'			1/2" Ice	3.188	3.188	0.058
			0'			1" Ice	3.675	3.675	0.081
						2" Ice	4.676	4.676	0.143
6' x 2" Horizontal Mount Pipe	B	From Leg	4.000	0.000	182'	No Ice	0.500	0.500	0.028
(Carrier 182' P)			0'			1/2" Ice	1.065	1.065	0.171
			0'			1" Ice	1.439	1.439	0.322
						2" Ice	2.217	2.217	0.646
(3) 8' x 3" Mount Pipe	C	From Leg	4.000	0.000	182'	No Ice	2.400	2.400	0.041
(Carrier 182' P)			0'			1/2" Ice	3.188	3.188	0.058
			0'			1" Ice	3.675	3.675	0.081
						2" Ice	4.676	4.676	0.143
6' x 2" Horizontal Mount Pipe	C	From Leg	4.000	0.000	182'	No Ice	0.500	0.500	0.028
(Carrier 182' P)			0'			1/2" Ice	1.065	1.065	0.171
			0'			1" Ice	1.439	1.439	0.322
						2" Ice	2.217	2.217	0.646
6' x 2" Mount Pipe	A	From Leg	4.000	0.000	182'	No Ice	1.425	1.425	0.022
(Carrier 182' E)			0'			1/2" Ice	1.925	1.925	0.033
			0'			1" Ice	2.294	2.294	0.048
						2" Ice	3.060	3.060	0.090
6' x 2" Mount Pipe	B	From Leg	4.000	0.000	182'	No Ice	1.425	1.425	0.022
(Carrier 182' E)			0'			1/2" Ice	1.925	1.925	0.033
			0'			1" Ice	2.294	2.294	0.048
						2" Ice	3.060	3.060	0.090
6' x 2" Mount Pipe	C	From Leg	4.000	0.000	182'	No Ice	1.425	1.425	0.022
(Carrier 182' E)			0'			1/2" Ice	1.925	1.925	0.033
			0'			1" Ice	2.294	2.294	0.048
						2" Ice	3.060	3.060	0.090
**									
APXVTM14-ALU-I20 w/	A	From Leg	4.000	0.000	170'	No Ice	6.580	4.959	0.077
Mount Pipe			0'			1/2" Ice	7.031	5.754	0.132
(Carrier 170' R)			1'			1" Ice	7.473	6.472	0.193
						2" Ice	8.385	7.941	0.339
APXVTM14-ALU-I20 w/	B	From Leg	4.000	0.000	170'	No Ice	6.580	4.959	0.077

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Mount Pipe			0'			1/2" Ice	7.031	5.754	0.132
(Carrier 170' R)			1'			1" Ice	7.473	6.472	0.193
						2" Ice	8.385	7.941	0.339
APXVTM14-ALU-I20 w/ Mount Pipe	C	From Leg	4.000 0'	0.000	170'	No Ice 1/2" Ice	6.580 7.031	4.959 5.754	0.077 0.132
(Carrier 170' R)			1'			1" Ice	7.473	6.472	0.193
						2" Ice	8.385	7.941	0.339
NNVV-65B-R4 w/ Mount Pipe	A	From Leg	4.000 0'	0.000	170'	No Ice 1/2" Ice	12.509 13.108	7.413 8.598	0.103 0.194
(Carrier 170' R)			1'			1" Ice	13.672	9.496	0.293
						2" Ice	14.822	11.328	0.520
NNVV-65B-R4 w/ Mount Pipe	B	From Leg	4.000 0'	0.000	170'	No Ice 1/2" Ice	12.509 13.108	7.413 8.598	0.103 0.194
(Carrier 170' R)			1'			1" Ice	13.672	9.496	0.293
						2" Ice	14.822	11.328	0.520
NNVV-65B-R4 w/ Mount Pipe	C	From Leg	4.000 0'	0.000	170'	No Ice 1/2" Ice	12.509 13.108	7.413 8.598	0.103 0.194
(Carrier 170' R)			1'			1" Ice	13.672	9.496	0.293
						2" Ice	14.822	11.328	0.520
PCS 1900MHZ 4X45W-65MHZ	A	From Leg	4.000 0'	0.000	170'	No Ice 1/2" Ice	2.322 2.527	2.238 2.441	0.060 0.083
(Carrier 170' R)			1'			1" Ice	2.739	2.651	0.110
						2" Ice	3.185	3.093	0.173
PCS 1900MHZ 4X45W-65MHZ	B	From Leg	4.000 0'	0.000	170'	No Ice 1/2" Ice	2.322 2.527	2.238 2.441	0.060 0.083
(Carrier 170' R)			1'			1" Ice	2.739	2.651	0.110
						2" Ice	3.185	3.093	0.173
PCS 1900MHZ 4X45W-65MHZ	C	From Leg	4.000 0'	0.000	170'	No Ice 1/2" Ice	2.322 2.527	2.238 2.441	0.060 0.083
(Carrier 170' R)			1'			1" Ice	2.739	2.651	0.110
						2" Ice	3.185	3.093	0.173
TD-RRH8X20-25	A	From Leg	4.000 0'	0.000	170'	No Ice 1/2" Ice	4.045 4.298	1.535 1.714	0.070 0.097
(Carrier 170' R)			1'			1" Ice	4.557	1.901	0.128
						2" Ice	5.098	2.295	0.201
TD-RRH8X20-25	B	From Leg	4.000 0'	0.000	170'	No Ice 1/2" Ice	4.045 4.298	1.535 1.714	0.070 0.097
(Carrier 170' R)			1'			1" Ice	4.557	1.901	0.128
						2" Ice	5.098	2.295	0.201
TD-RRH8X20-25	C	From Leg	4.000 0'	0.000	170'	No Ice 1/2" Ice	4.045 4.298	1.535 1.714	0.070 0.097
(Carrier 170' R)			1'			1" Ice	4.557	1.901	0.128
						2" Ice	5.098	2.295	0.201
(2) RRH2X50-800	A	From Leg	4.000 0'	0.000	170'	No Ice 1/2" Ice	1.701 1.864	1.282 1.428	0.053 0.070
(Carrier 170' R)			1'			1" Ice	2.035	1.580	0.090
						2" Ice	2.398	1.908	0.138
(2) RRH2X50-800	B	From Leg	4.000 0'	0.000	170'	No Ice 1/2" Ice	1.701 1.864	1.282 1.428	0.053 0.070
(Carrier 170' R)			1'			1" Ice	2.035	1.580	0.090
						2" Ice	2.398	1.908	0.138
(2) RRH2X50-800	C	From Leg	4.000 0'	0.000	170'	No Ice 1/2" Ice	1.701 1.864	1.282 1.428	0.053 0.070
(Carrier 170' R)			1'			1" Ice	2.035	1.580	0.090
						2" Ice	2.398	1.908	0.138
3.5"x8' Pipe	A	From Leg	4.000 0'	0.000	170'	No Ice 1/2" Ice	2.800 3.405	2.800 3.405	0.061 0.081
(Carrier 170' R)									

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0'			1" Ice	3.894	3.894	0.106
						2" Ice	4.900	4.900	0.174
3.5"x8' Pipe	B	From Leg	4.000	0.000	170'	No Ice	2.800	2.800	0.061
(Carrier 170' R)			0'			1/2" Ice	3.405	3.405	0.081
			0'			1" Ice	3.894	3.894	0.106
						2" Ice	4.900	4.900	0.174
3.5"x8' Pipe	C	From Leg	4.000	0.000	170'	No Ice	2.800	2.800	0.061
(Carrier 170' R)			0'			1/2" Ice	3.405	3.405	0.081
			0'			1" Ice	3.894	3.894	0.106
						2" Ice	4.900	4.900	0.174
6' x 2" Mount Pipe	A	From Leg	4.000	0.000	170'	No Ice	1.425	1.425	0.022
(Carrier 170' E)			0'			1/2" Ice	1.925	1.925	0.033
			0'			1" Ice	2.294	2.294	0.048
						2" Ice	3.060	3.060	0.090
6' x 2" Mount Pipe	B	From Leg	4.000	0.000	170'	No Ice	1.425	1.425	0.022
(Carrier 170' E)			0'			1/2" Ice	1.925	1.925	0.033
			0'			1" Ice	2.294	2.294	0.048
						2" Ice	3.060	3.060	0.090
6' x 2" Mount Pipe	C	From Leg	4.000	0.000	170'	No Ice	1.425	1.425	0.022
(Carrier 170' E)			0'			1/2" Ice	1.925	1.925	0.033
			0'			1" Ice	2.294	2.294	0.048
						2" Ice	3.060	3.060	0.090
Sector Mount [SM 506-3]	C	None		0.000	170'	No Ice	35.470	35.470	1.742
(Carrier 170' E)						1/2" Ice	50.600	50.600	2.348
						1" Ice	65.730	65.730	2.953
						2" Ice	95.990	95.990	4.164
***									
Pipe Mount [PM 601-1]	C	From Leg	0.500	0.000	163'	No Ice	3.000	0.900	0.065
(Carrier 163' E)			0'			1/2" Ice	3.740	1.120	0.079
			0'			1" Ice	4.480	1.340	0.093
						2" Ice	5.960	1.780	0.122
***									
(2) PD1109-1	B	From Leg	4.000	0.000	144'	No Ice	2.833	2.833	0.017
(Carrier 144' E)			0'			1/2" Ice	3.894	3.894	0.038
			8'			1" Ice	4.972	4.972	0.065
						2" Ice	6.367	6.367	0.141
SRL480N1DT4	C	From Leg	4.000	0.000	144'	No Ice	3.813	3.813	0.030
(Carrier 144' E)			0'			1/2" Ice	5.367	5.367	0.058
			11'			1" Ice	6.938	6.938	0.096
						2" Ice	10.129	10.129	0.202
(4) 6' x 2" Mount Pipe	A	From Leg	4.000	0.000	144'	No Ice	1.425	1.425	0.022
(Carrier 144' E)			0'			1/2" Ice	1.925	1.925	0.033
			0'			1" Ice	2.294	2.294	0.048
						2" Ice	3.060	3.060	0.090
(4) 6' x 2" Mount Pipe	B	From Leg	4.000	0.000	144'	No Ice	1.425	1.425	0.022
(Carrier 144' E)			0'			1/2" Ice	1.925	1.925	0.033
			0'			1" Ice	2.294	2.294	0.048
						2" Ice	3.060	3.060	0.090
(4) 6' x 2" Mount Pipe	C	From Leg	4.000	0.000	144'	No Ice	1.425	1.425	0.022
(Carrier 144' E)			0'			1/2" Ice	1.925	1.925	0.033
			0'			1" Ice	2.294	2.294	0.048
						2" Ice	3.060	3.060	0.090
(2) 4' x 2" Pipe Mount	A	From Leg	4.000	0.000	144'	No Ice	0.785	0.785	0.029
(Carrier 144' E)			0'			1/2" Ice	1.028	1.028	0.035
			0'			1" Ice	1.281	1.281	0.044
						2" Ice	1.814	1.814	0.072
(2) 4' x 2" Pipe Mount	B	From Leg	4.000	0.000	144'	No Ice	0.785	0.785	0.029

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
(Carrier 144' E)			0' 0'			1/2" Ice 1" Ice 2" Ice	1.028 1.281 1.814	1.028 1.281 1.814	0.035 0.044 0.072
(2) 4' x 2" Pipe Mount (Carrier 144' E)	C	From Leg	4.000 0' 0'	0.000	144'	No Ice 1/2" Ice 1" Ice 2" Ice	0.785 1.028 1.281 1.814	0.785 1.028 1.281 1.814	0.029 0.035 0.044 0.072
Sector Mount [SM 702-3] (Carrier 144' E) ***	C	None		0.000	144'	No Ice 1/2" Ice 1" Ice 2" Ice	37.400 54.200 71.000 104.600	37.400 54.200 71.000 104.600	1.551 2.352 3.153 4.755
KS24019-L112A (Carrier 53' E) ***	C	From Leg	4.000 0' 2'	0.000	53'	No Ice 1/2" Ice 1" Ice 2" Ice	0.141 0.198 0.262 0.415	0.141 0.198 0.262 0.415	0.005 0.007 0.009 0.018

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
PR-850 (Carrier 163' E) ***	C	Grid	From Leg	1.000 0' 0'	60.000		163'	5.667	No Ice 1/2" Ice 1" Ice 2" Ice	25.220 25.970 26.710 28.210	0.038 0.170 0.300 0.570

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.0 Wind 0 deg - No Ice
3	0.9 Dead+1.0 Wind 0 deg - No Ice
4	1.2 Dead+1.0 Wind 30 deg - No Ice
5	0.9 Dead+1.0 Wind 30 deg - No Ice
6	1.2 Dead+1.0 Wind 60 deg - No Ice
7	0.9 Dead+1.0 Wind 60 deg - No Ice
8	1.2 Dead+1.0 Wind 90 deg - No Ice
9	0.9 Dead+1.0 Wind 90 deg - No Ice
10	1.2 Dead+1.0 Wind 120 deg - No Ice
11	0.9 Dead+1.0 Wind 120 deg - No Ice
12	1.2 Dead+1.0 Wind 150 deg - No Ice
13	0.9 Dead+1.0 Wind 150 deg - No Ice
14	1.2 Dead+1.0 Wind 180 deg - No Ice
15	0.9 Dead+1.0 Wind 180 deg - No Ice

Comb. No.	Description
16	1.2 Dead+1.0 Wind 210 deg - No Ice
17	0.9 Dead+1.0 Wind 210 deg - No Ice
18	1.2 Dead+1.0 Wind 240 deg - No Ice
19	0.9 Dead+1.0 Wind 240 deg - No Ice
20	1.2 Dead+1.0 Wind 270 deg - No Ice
21	0.9 Dead+1.0 Wind 270 deg - No Ice
22	1.2 Dead+1.0 Wind 300 deg - No Ice
23	0.9 Dead+1.0 Wind 300 deg - No Ice
24	1.2 Dead+1.0 Wind 330 deg - No Ice
25	0.9 Dead+1.0 Wind 330 deg - No Ice
26	1.2 Dead+1.0 Ice+1.0 Temp
27	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
28	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
29	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
30	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
31	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
32	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
33	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
34	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
39	Dead+Wind 0 deg - Service
40	Dead+Wind 30 deg - Service
41	Dead+Wind 60 deg - Service
42	Dead+Wind 90 deg - Service
43	Dead+Wind 120 deg - Service
44	Dead+Wind 150 deg - Service
45	Dead+Wind 180 deg - Service
46	Dead+Wind 210 deg - Service
47	Dead+Wind 240 deg - Service
48	Dead+Wind 270 deg - Service
49	Dead+Wind 300 deg - Service
50	Dead+Wind 330 deg - Service

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Leg C	Max. Vert	18	343.442	30.960	-17.036
	Max. H_x	18	343.442	30.960	-17.036
	Max. H_z	7	-299.171	-27.504	15.045
	Min. Vert	7	-299.171	-27.504	15.045
	Min. H_x	7	-299.171	-27.504	15.045
	Min. H_z	18	343.442	30.960	-17.036
Leg B	Max. Vert	10	319.793	-27.830	-16.276
	Max. H_x	23	-272.061	24.305	14.235
	Max. H_z	23	-272.061	24.305	14.235
	Min. Vert	23	-272.061	24.305	14.235
	Min. H_x	10	319.793	-27.830	-16.276
	Min. H_z	10	319.793	-27.830	-16.276
Leg A	Max. Vert	2	320.027	0.938	32.532
	Max. H_x	21	13.250	3.424	1.014
	Max. H_z	2	320.027	0.938	32.532
	Min. Vert	15	-275.073	-0.941	-28.478
	Min. H_x	9	13.039	-3.392	0.997
	Min. H_z	15	-275.073	-0.941	-28.478

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	200 - 180	5.782	47	0.273	0.046
T2	180 - 160	4.636	47	0.264	0.042
T3	160 - 140	3.557	47	0.232	0.035
T4	140 - 120	2.630	47	0.190	0.029
T5	120 - 100	1.871	47	0.157	0.023
T6	100 - 80	1.248	47	0.123	0.017
T7	80 - 60	0.770	47	0.088	0.012
T8	60 - 40	0.432	47	0.062	0.009
T9	40 - 20	0.203	47	0.035	0.006
T10	20 - 0	0.064	47	0.018	0.003

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
200'	Flash Beacon Lighting	47	5.782	0.273	0.046	289969
198'	DB225-A	47	5.666	0.273	0.046	289969
182'	APXVAARR24_43-U-NA20 w/ Mount Pipe	47	4.749	0.266	0.043	80053
170'	APXVTM14-ALU-I20 w/ Mount Pipe	47	4.083	0.251	0.039	40084
163'	PR-850	47	3.711	0.238	0.036	30583
144'	(2) PD1109-1	47	2.802	0.198	0.030	27123
100'	Side Lighting	47	1.248	0.123	0.017	32658
53'	KS24019-L112A	47	0.341	0.052	0.008	49029

Bolt Design Data

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt K	Allowable Load per Bolt K	Ratio Load / Allowable	Allowable Ratio	Criteria
T1	200	Leg	A325X	0.750	4	4.163	30.101	0.138	1.05	Bolt Tension
		Diagonal	A325X	0.625	1	3.476	7.875	0.441	1.05	Member Block Shear
		Top Girt	A325X	0.625	1	0.138	13.050	0.011	1.05	Member Bearing
T2	180	Leg	A325X	1.000	4	13.863	54.517	0.254	1.05	Bolt Tension
		Diagonal	A325X	0.625	1	5.330	7.875	0.677	1.05	Member Block Shear
T3	160	Leg	A325X	1.000	4	23.197	54.517	0.425	1.05	Bolt Tension
		Diagonal	A325X	0.625	1	5.769	7.875	0.733	1.05	Member Block Shear
T4	140	Leg	A325X	1.250	4	32.188	87.220	0.369	1.05	Bolt Tension

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt K	Allowable Load per Bolt K	Ratio Load / Allowable	Allowable Ratio	Criteria
		Diagonal	A325X	0.625	1	6.522	9.914	0.658	1.05	Member Block Shear
T5	120	Leg	A325X	1.250	4	40.227	87.220	0.461	1.05	Bolt Tension
		Diagonal	A325X	0.625	1	6.618	9.914	0.668	1.05	Member Block Shear
T6	100	Leg	A325X	1.250	6	31.843	87.220	0.365	1.05	Bolt Tension
		Diagonal	A325X	0.750	1	7.080	10.424	0.679	1.05	Member Block Shear
T7	80	Leg	A325X	1.250	6	36.650	87.220	0.420	1.05	Bolt Tension
		Diagonal	A325X	0.750	1	8.269	14.355	0.576	1.05	Member Bearing
T8	60	Leg	A325X	1.375	6	41.287	103.939	0.397	1.05	Bolt Tension
		Diagonal	A325X	0.750	1	8.666	14.355	0.604	1.05	Member Bearing
T9	40	Leg	A325X	1.375	6	45.746	103.939	0.440	1.05	Bolt Tension
		Diagonal	A325X	0.750	1	9.219	14.355	0.642	1.05	Member Bearing
T10	20	Diagonal	A325X	0.750	1	9.907	14.355	0.690	1.05	Member Bearing

Compression Checks

Leg Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	200 - 180	Sabre 2.875x.375	20'	4'11-3/4"	66.9 K=1.00	2.945	-17.997	95.591	0.188 [1]
T2	180 - 160	Sabre 3.5 x .3	20'13/32"	4'11-27/32"	52.7 K=1.00	3.016	-59.264	110.802	0.535 [1]
T3	160 - 140	Sabre 4 x .318	20'13/32"	4'11-27/32"	45.8 K=1.00	3.678	-100.568	141.988	0.708 [1]
T4	140 - 120	Sabre 4.5 x .438	20'13/32"	6'7-13/16"	55.2 K=1.00	5.589	-138.479	201.215	0.688 [1]
T5	120 - 100	Sabre 5.5625 x .375	20'13/32"	6'7-13/16"	43.4 K=1.00	6.111	-174.468	239.635	0.728 [1]
T6	100 - 80	Sabre 5.5625 x .375	20'13/32"	6'7-13/16"	43.4 K=1.00	6.111	-208.709	239.635	0.871 [1]
T7	80 - 60	Sabre 6.625 x .432	20'13/32"	9'11-11/16"	54.5 K=1.00	8.405	-239.282	304.302	0.786 [1]
T8	60 - 40	Sabre 8.625 x .322	20'13/32"	9'11-11/16"	40.7 K=1.00	8.399	-271.672	334.762	0.812 [1]
T9	40 - 20	Sabre 8.625 x .5	20'13/32"	9'11-11/16"	41.6 K=1.00	12.763	-304.055	506.091	0.601 [1]
T10	20 - 0	Sabre 8.625 x .5	20'13/32"	9'11-11/16"	41.6 K=1.00	12.763	-335.569	506.091	0.663 [1]

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	200 - 180	L1 3/4x1 3/4x3/16	7'11/16"	3'2-9/16"	114.2 K=1.02	0.621	-3.678	13.190	0.279 [1]
T2	180 - 160	L1 3/4x1 3/4x3/16	8'4-19/32"	4'7/32"	140.4 K=1.00	0.621	-5.312	9.014	0.589 [1]
T3	160 - 140	L1 3/4x1 3/4x3/16	10'3/4"	4'10-1/32"	169.0 K=1.00	0.621	-5.873	6.225	0.944 [1]
T4	140 - 120	L2 1/2x2 1/2x3/16	12'6-23/32"	6'1-5/16"	148.1 K=1.00	0.902	-6.537	11.773	0.555 [1]
T5	120 - 100	L2 1/2x2 1/2x3/16	14'3-9/16"	6'11-1/8"	168.0 K=1.00	0.902	-6.776	9.153	0.740 [1]
T6	100 - 80	L3x3x3/16	16'1-1/8"	7'9-15/16"	157.6 K=1.00	1.090	-7.202	12.556	0.574 [1]
T7	80 - 60	L3 1/2x3 1/2x1/4	19'3-7/32"	9'5-15/32"	163.5 K=1.00	1.690	-8.531	18.090	0.472 [1]
T8	60 - 40	L3 1/2x3 1/2x1/4	21'1/16"	10'2-25/32"	176.9 K=1.00	1.690	-9.356	15.453	0.605 [1]
T9	40 - 20	L3 1/2x3 1/2x1/4	22'9-7/16"	11'1-1/2"	192.4 K=1.00	1.690	-9.909	13.072	0.758 [1]
T10	20 - 0	L4x4x1/4	24'7-7/32"	12'13/32"	181.6 K=1.00	1.940	-10.995	16.829	0.653 [1]

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	200 - 180	L1 3/4x1 3/4x3/16	5'	4'5-5/8"	156.1 K=1.00	0.621	-0.138	7.292	0.019 [1]

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	200 - 180	Sabre 2.875x.375	20'	1"	1.1	2.945	16.652	132.536	0.126 [1]
T2	180 - 160	Sabre 3.5 x .3	20'13/32"	1"	0.9	3.016	55.450	135.717	0.409 [1]
T3	160 - 140	Sabre 4 x .318	20'13/32"	1"	0.8	3.678	92.788	165.529	0.561 [1]
T4	140 - 120	Sabre 4.5 x .438	20'13/32"	1"	0.7	5.589	128.752	251.522	0.512 [1]
T5	120 - 100	Sabre 5.5625 x .375	20'13/32"	1"	0.5	6.111	160.909	275.012	0.585 [1]
T6	100 - 80	Sabre 5.5625 x .375	20'13/32"	1"	0.5	6.111	191.061	275.012	0.695 [1]

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T7	80 - 60	Sabre 6.625 x .432	20'13/32"	1"	0.5	8.405	219.898	378.222	0.581 [1]
T8	60 - 40	Sabre 8.625 x .322	20'13/32"	1"	0.3	8.399	247.722	377.967	0.655 [1]
T9	40 - 20	Sabre 8.625 x .5	20'13/32"	1"	0.3	12.763	274.479	574.322	0.478 [1]
T10	20 - 0	Sabre 8.625 x .5	20'13/32"	1"	0.3	12.763	300.495	574.322	0.523 [1]

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	200 - 180	L1 3/4x1 3/4x3/16	7'11/16"	3'2-9/16"	75.1	0.360	3.476	15.675	0.222 [1]
T2	180 - 160	L1 3/4x1 3/4x3/16	8'4-19/32"	4'7/32"	93.1	0.360	5.330	15.675	0.340 [1]
T3	160 - 140	L1 3/4x1 3/4x3/16	10'3/4"	4'10-1/32"	111.4	0.360	5.769	15.675	0.368 [1]
T4	140 - 120	L2 1/2x2 1/2x3/16	11'5-7/16"	5'6-25/32"	88.1	0.571	6.522	24.840	0.263 [1]
T5	120 - 100	L2 1/2x2 1/2x3/16	14'3-9/16"	6'11-1/8"	109.1	0.571	6.618	24.840	0.266 [1]
T6	100 - 80	L3x3x3/16	16'1-1/8"	7'9-15/16"	101.9	0.694	7.080	30.209	0.234 [1]
T7	80 - 60	L3 1/2x3 1/2x1/4	19'3-7/32"	9'5-15/32"	105.7	1.103	8.269	47.999	0.172 [1]
T8	60 - 40	L3 1/2x3 1/2x1/4	21'1/16"	10'2-25/32"	114.3	1.103	8.666	47.999	0.181 [1]
T9	40 - 20	L3 1/2x3 1/2x1/4	21'10-3/4"	10'8-3/16"	119.2	1.103	9.219	47.999	0.192 [1]
T10	20 - 0	L4x4x1/4	24'7-7/32"	12'13/32"	116.9	1.291	9.907	56.156	0.176 [1]

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	200 - 180	L1 3/4x1 3/4x3/16	5'	4'5-5/8"	106.4	0.360	0.072	15.675	0.005 [1]

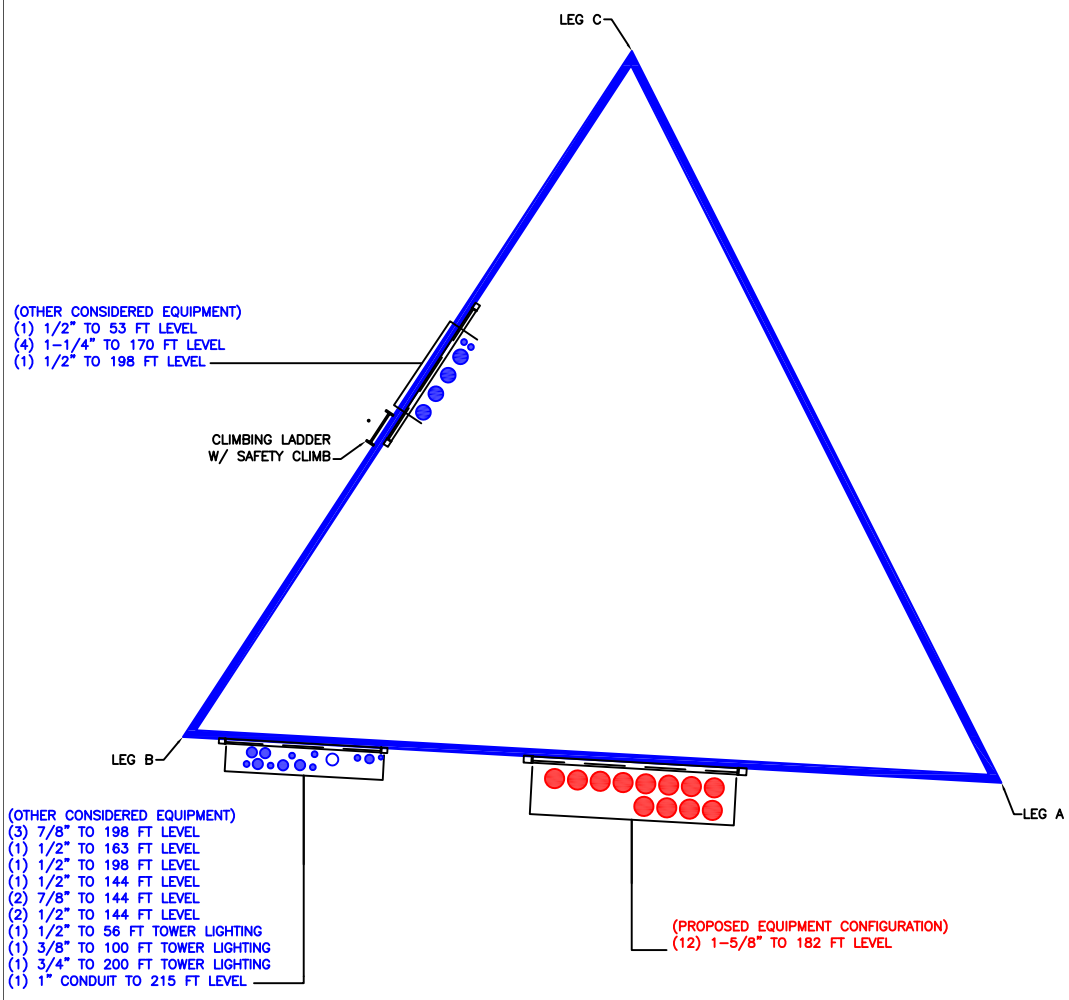
Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
T1	200 - 180	Leg	Sabre 2.875x.375	2	-17.997	100.371	17.9	Pass
T2	180 - 160	Leg	Sabre 3.5 x .3	31	-59.264	116.342	50.9	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
T3	160 - 140	Leg	Sabre 4 x .318	58	-100.568	149.087	67.5	Pass
T4	140 - 120	Leg	Sabre 4.5 x .438	85	-138.479	211.276	65.5	Pass
T5	120 - 100	Leg	Sabre 5.5625 x .375	106	-174.468	251.617	69.3	Pass
T6	100 - 80	Leg	Sabre 5.5625 x .375	127	-208.709	251.617	82.9	Pass
T7	80 - 60	Leg	Sabre 6.625 x .432	148	-239.282	319.517	74.9	Pass
T8	60 - 40	Leg	Sabre 8.625 x .322	163	-271.672	351.500	77.3	Pass
T9	40 - 20	Leg	Sabre 8.625 x .5	178	-304.055	531.396	57.2	Pass
T10	20 - 0	Leg	Sabre 8.625 x .5	193	-335.569	531.396	63.1	Pass
T1	200 - 180	Diagonal	L1 3/4x1 3/4x3/16	10	-3.678	13.849	26.6	Pass
							42.0 (b)	
T2	180 - 160	Diagonal	L1 3/4x1 3/4x3/16	34	-5.312	9.465	56.1	Pass
							64.5 (b)	
T3	160 - 140	Diagonal	L1 3/4x1 3/4x3/16	61	-5.873	6.536	89.9	Pass
T4	140 - 120	Diagonal	L2 1/2x2 1/2x3/16	88	-6.537	12.361	52.9	Pass
							62.7 (b)	
T5	120 - 100	Diagonal	L2 1/2x2 1/2x3/16	109	-6.776	9.610	70.5	Pass
T6	100 - 80	Diagonal	L3x3x3/16	130	-7.202	13.184	54.6	Pass
							64.7 (b)	
T7	80 - 60	Diagonal	L3 1/2x3 1/2x1/4	151	-8.531	18.994	44.9	Pass
							54.9 (b)	
T8	60 - 40	Diagonal	L3 1/2x3 1/2x1/4	166	-9.356	16.226	57.7	Pass
T9	40 - 20	Diagonal	L3 1/2x3 1/2x1/4	181	-9.909	13.726	72.2	Pass
T10	20 - 0	Diagonal	L4x4x1/4	196	-10.995	17.670	62.2	Pass
							65.7 (b)	
T1	200 - 180	Top Girt	L1 3/4x1 3/4x3/16	5	-0.138	7.657	1.8	Pass
							Summary	
						Leg (T6)	82.9	Pass
						Diagonal (T3)	89.9	Pass
						Top Girt (T1)	1.8	Pass
						Bolt Checks	69.8	Pass
						RATING =	**89.9**	**Pass**

APPENDIX B

BASE LEVEL DRAWING



Clients

CROWN CASTLE

Professional Stamp

Revisions

No.	Description	Date
A	ISSUED FOR REVIEW	05.08.19

Engineering Firm

P-SEC
ph: 519-885-3806
fx: 519-886-0076
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PIER STRUCTURAL ENGINEERING CORP
55 NORTHFIELD DR. E, SUITE 198
WATERLOO, ON N2K 3T6

PSEC Job No.

19994

Site Name

871584
JOHN TOM HILL

Site Design

Sheet Title

TX LINES

Drawn by TH

Checked by

Approved By

Sheet

A-1

APPENDIX C

ADDITIONAL CALCULATIONS

CCIplate

Project Information

BU #	871584
Site Name	JOHN TOM HILL
Order #	479814 Rev 0

Tower Information

Tower Type	Self Support
TIA-222 Rev	H

☑ Apply TIA-222-H Section 15.5

Applied Loads

	Comp.	Uplift
Axial (k)	343.00	299.00
Shear (k)	35.00	31.00

Anchor Rod Data

Quantity:	8	
Diameter (in):	1.5	
Material Grade:	A572-50	Fy=50 ksi Fu=65 ksi
Grout Considered:	No	Not Considered, lar<=1(d)
l_{ar} (in):	1.125	
Eta Factor, η:		
Thread Type:	N-Included	
Configuration:	Symmetrical	

Anchor Rod Results

Axial, Pu_c (kips)	42.88	
Shear, Vu (kips)	4.38	
Moment, Mu (kip-in)	-	
Axial Cap., φPn_c (kips)	70.50	
Shear Cap., ϕVn (kips)	21.15	
Moment Cap., ϕMn (kip-in)	-	
Stress Rating	62.0%	**Pass**

Pier and Pad Foundation

BU # :	871584
Site Name:	JOHN TOM HILL
App. Number:	479814 Rev 0

TIA-222 Revision:	H
Tower Type:	Self Support

Top & Bot. Pad Rein. Different?:	☐
Block Foundation?:	☐

Superstructure Analysis Reactions		
Compression, P_{comp}:	343	kips
Compression Shear, Vu_comp:	35	kips
Uplift, P_{uplift}:	299	kips
Uplift Shear, V_{u_uplift}:	31	kips
Tower Height, **H**:	200	ft
Base Face Width, **BW**:	23	ft
BP Dist. Above Fdn, bp_{dist}:	2.635	in

Pier Properties		
Pier Shape:	Circular	
Pier Diameter, **dpier**:	3.5	ft
Ext. Above Grade, **E**:	0.5	ft
Pier Rebar Size, **Sc**:	7	
Pier Rebar Quantity, **mc**:	14	
Pier Tie/Spiral Size, **St**:	3	
Pier Tie/Spiral Quantity, **mt**:	10	
Pier Reinforcement Type:	Tie	
Pier Clear Cover, cc_{pier}:	3	in

Pad Properties		
Depth, **D**:	10	ft
Pad Width, **W**:	15	ft
Pad Thickness, **T**:	1.8	ft
Pad Rebar Size (Bottom), **Sp**:	7	
Pad Rebar Quantity (Bottom), **mp**:	20	
Pad Clear Cover, cc_{pad}:	3	in

Material Properties		
Rebar Grade, **Fy**:	60	ksi
Concrete Compressive Strength, **F'c**:	3	ksi
Dry Concrete Density, δ**c**:	150	pcf

Soil Properties		
Total Soil Unit Weight, γ:	135	pcf
Ultimate Gross Bearing, Qult:	16.000	ksf
Cohesion, **Cu**:	0.000	ksf
Friction Angle, φ:	36	degrees
SPT Blow Count, N_{blows}:	28	
Base Friction, μ:	0.6	
Neglected Depth, **N**:	3.30	ft
Foundation Bearing on Rock?	No	
Groundwater Depth, **gw**:	8	ft

<--Toggle between Gross and Net

Foundation Analysis Checks	Capacity	Demand	Rating*	Check
Uplift (kips)	545.59	299.00	**52.2%**	**Pass**
Lateral (Sliding) (kips)	128.91	31.00	**22.9%**	**Pass**
Bearing Pressure (ksf)	12.00	3.04	**24.1%**	**Pass**
*Pier Flexure (Comp.) (kip*ft)*	957.79	304.50	**30.3%**	**Pass**
*Pier Flexure (Tension) (kip*ft)*	278.14	269.70	**92.3%**	**Pass**
Pier Compression (kip)	4592.74	357.92	**7.4%**	**Pass**
*Pad Flexure (kip*ft)*	891.17	380.53	**40.7%**	**Pass**
Pad Shear - 1-way (kips)	255.66	99.20	**37.0%**	**Pass**
Pad Shear - 2-way (Comp) (ksi)	0.164	0.101	**58.4%**	**Pass**
*Flexural 2-way (Comp) (kip*ft)*	1045.15	182.70	**16.6%**	**Pass**
Pad Shear - 2-way (Uplift) (ksi)	0.164	0.107	**62.0%**	**Pass**
*Flexural 2-way (Tension) (kip*ft)*	1045.15	161.82	**14.7%**	**Pass**

**Rating per TIA-222-H Section 15.5*

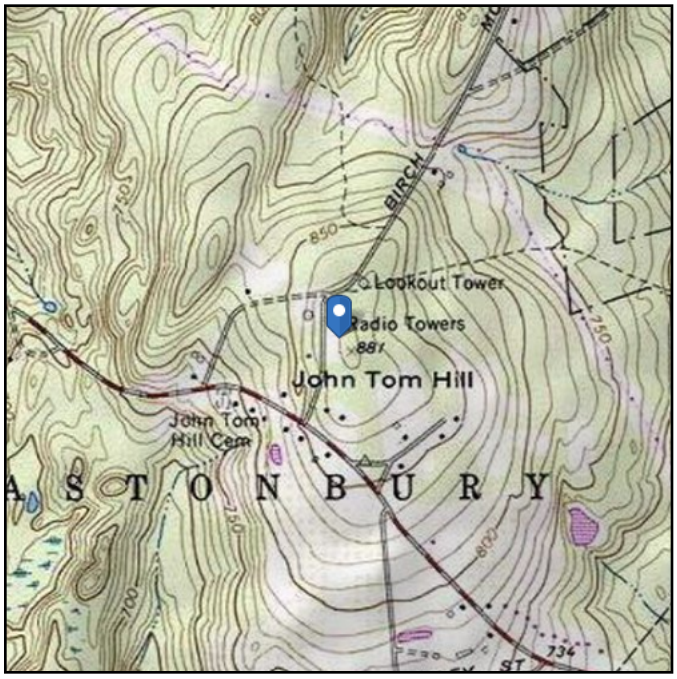
Soil Rating*:	**52.2%**
Structural Rating*:	**92.3%**

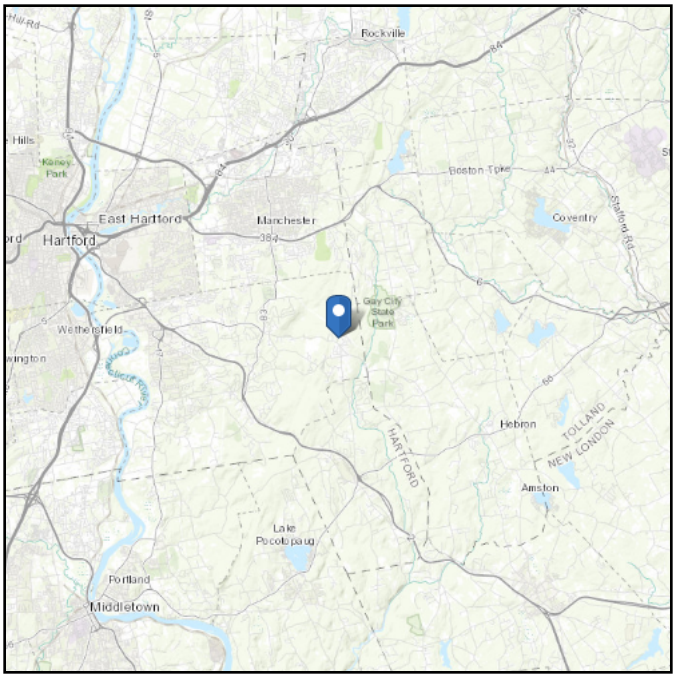
ASCE 7 Hazards Report

Address:
No Address at This Location

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

Elevation: 877.95 ft (NAVD 88)
Latitude: 41.708956
Longitude: -72.473447





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:	Thu Aug 30 2018

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).

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

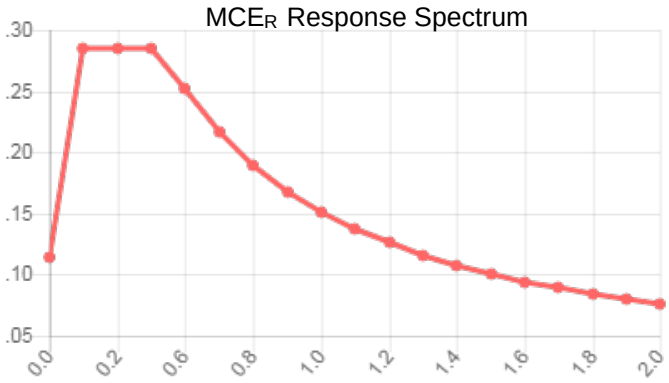
Seismic

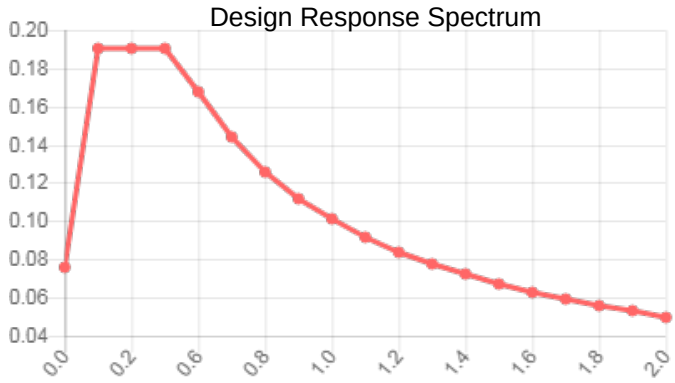
Site Soil Class: D - Stiff Soil

Results:

S_S :	0.178	S_{DS} :	0.190
S_1 :	0.063	S_{D1} :	0.101
F_a :	1.600	T_L :	6.000
F_v :	2.400	PGA :	0.090
S_{MS} :	0.285	PGA_M :	0.143
S_{M1} :	0.151	F_{PGA} :	1.600
		I_e :	1

Seismic Design Category B





Data Accessed: Thu Aug 30 2018

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:	1.00 in.
Concurrent Temperature:	5 F
Gust Speed:	50 mph
Data Source:	Standard ASCE/SEI 7-10, Figs. 10-2 through 10-8
Date Accessed:	Thu Aug 30 2018

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.

871584 – John Tom Hill
Exposure C, Topographic Category 1

Exhibit D

Mount Analysis

PAUL J. FORD & COMPANY

Date: May 2, 2019

Kevin Morrow
Crown Castle
3530 Toringdon Way
Charlotte, NC 28277

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

Subject:	**Mount Analysis Report**	
Carrier Designation:	***T-Mobile* Equipment Change-out**	
	Carrier Site Number:	CT11189E
	Carrier Site Name:	Glastonbury/Rt-94 & Fern
Crown Castle Designation:	**Crown Castle BU Number:**	871584
	Crown Castle Site Name:	John Tom Hill
	Crown Castle JDE Job Number:	559293
	Crown Castle Purchase Order Number:	1370719
	Crown Castle Order Number:	479814 Rev. 0
Engineering Firm Designation:	**Paul J Ford and Company Project Number:**	A37519-1779.001.8190
Site Data:	**115 Birch Mtn. Road, Glastonbury, Hartford County, CT**	
	Latitude 41.708956°, Longitude -72.473447°	
Structure Information:	**Tower Height & Type:**	**200 Foot Self Support**
	Mount Elevation:	**182 Foot**
	Mount Type:	**(3) 15 Foot Sector Frame**

Dear Kevin Morrow,

Paul J Ford and Company is pleased to submit this "Mount Analysis Report" to determine the structural integrity of the T-Mobile antenna mounting system with the proposed appurtenance and equipment addition on the abovementioned supporting tower structure. Analysis of the existing supporting tower structure is to be completed by others and therefore is not part of this analysis. Analysis of the antenna mounting system as a tie-off point is not part of this document.

The purpose of the analysis is to determine acceptability of the mount stress level. Based on our analysis we have determined the mount stress level to be:

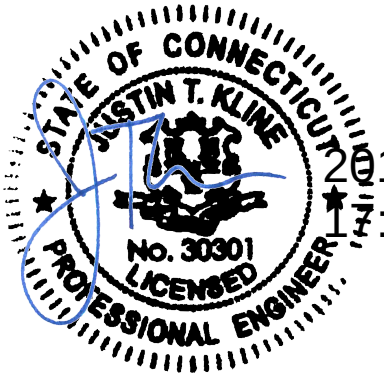
15' Sector Frame (typical) **SUFFICIENT***

***The mount has sufficient capacity once the changes, as described in Section 4.1 Recommendations of this report, are completed.**

This analysis utilizes an ultimate 3-second gust wind speed of 125 mph as required by the 2018 Connecticut Building Code and Appendix N. Applicable Standard references and design criteria are listed in Section 2 - Analysis Criteria.

Respectfully submitted by:

Rebekah M. Dorris, EI
Structural Designer
RDorris@pauljford.com



2019.05.03 17:14:53-04'00'

TABLE OF CONTENTS

1) INTRODUCTION

The existing mounts under consideration are (3) 15' Sector Frame mounts estimated based on photos and models of previously analyzed mounts of similar type.

2) ANALYSIS CRITERIA

TIA-222 Revision:	TIA-222-H
Risk Category:	II
Ultimate Wind Speed:	125 mph
Exposure Category:	C
Topographic Factor at Base:	1.0
Topographic Factor at Mount:	1.0
Ice Thickness:	2.0
Wind Speed with Ice:	50 mph
Live Loading Wind Speed:	30 mph
Man Live Load at Mid/End-Points:	250 lb
Man Live Load at Mount Pipes:	500 lb

Table 1 - Proposed Equipment Configuration

Mount Centerline (ft)	Antenna Centerline (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Mount / Modification Details
182	183	3	Ericsson	KRY 112 489/2	(3) 15' Sector Frame
	177	3	RFS	APXVAARR24_43-U-NA20	
		3	RFS	APXV18-209015-C-A20	
		3	Ericsson	RADIO 4449 B12/B71	

3) ANALYSIS PROCEDURE

Table 2 - Documents Provided

Document	Remarks	Reference	Source
Mount Manufacturer Drawings	Antenna Mounting T-Boom (4 Pipe) Dated: 07/07/97	-	Sabre Communications
TIA Inspection	Dated: 01/28/19	-	CCISites
Order	ID: 479814 Rev. 0 Dated: 04/17/19	-	CCISites

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 tower and calculate member stresses for various loading cases.

This analysis was performed in accordance with Crown Castle's ENG-SOW-10208 *Tower Mount Analysis* (Revision C).

3.2) Assumptions

1) *The analysis of the existing tower or the effect of the mount attachment to the tower is not within the current scope of work.*
2) *The antenna mounting system was properly fabricated, installed and maintained in good condition, twist free and plumb in accordance with its original design and manufacturer's specifications and all bolts are tightened as specified by the manufacturer and AISC requirements.*
3) *The configuration of antennas, mounts, and other appurtenances are as specified in Table 1.*
4) *All member connections have been designed to meet or exceed the load carrying capacity of the connected member unless otherwise specified in this report. All U-Bolt connections have been properly tightened. This analysis will be required to be revised if the existing conditions in the field differ from those shown in the above referenced documents or assumed in this analysis. No allowance was made for any damaged, missing, or rusted members.*
5) *Steel grades are as follows, unless noted otherwise:*
   - *a) Channel, Solid Round, Angle, Plate, Unistrut* — *ASTM A36 (GR 36)*
   - *b) Pipe* — *ASTM A53 (GR 35)*
   - *c) HSS (Rectangular)* — *ASTM 500 (GR B-46)*
   - *d) HSS (Round)* — *ASTM 500 (GR B-42)*
   - *e) Threaded Rods* — *ASTM F1554 (GR 36)*
   - *f) Connection Bolts* — *ASTM A325*
   - *g) U-Bolts* — *SAE J429 (GR 2)*
6) *Proposed equipment is to be installed in the locations specified in Appendix A. Any changes to the proposed equipment locations will render this report invalid.*
7) *Mount has been modeled based on photographs and the TIA inspection referenced in Table 2, indicating a match to the Sabre Communications Antenna Mounting T-Boom (4 Pipes). Member information and dimensions not provided have been assumed to match those specified in the manufacturer drawings referenced in Table 2. No guarantee can be made as to the accuracy of these assumptions without a complete mount mapping.*
8) *Existing mount pipes are replaced with 8-ft long, P2.0 X-STR (2.38" O.D. x 0.204") mount pipes where required.*

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

4) ANALYSIS RESULTS

Table 3 - Mount Component Capacity

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1, 2	Face Horizontals	182	55.1	Pass
1, 2	Standoff Members		78.5	Pass
1, 2	Tie Backs		13.8	Pass
1, 2	Bracing Members		28.3	Pass
1, 2	Mount Pipes		70.0	Pass
1, 2	Mount to Tower Connection		22.8	Pass

Mount Rating (max from all components) =	78.5%

Notes:
1) See additional documentation in "Appendix C – Software Analysis Output" for calculations supporting the % capacity consumed.
2) All sectors are typical.

Table 4 - Tieback Connection Data Table

Tower Connection Node No.	Existing / Proposed	Resultant End Reaction (lb)	Connected Member Type	Connected Member Size	Member Compressive Capacity (lb)[3]	Notes
N76	Existing	823	Leg	Pipe 3.5 x 0.3	5817	1, 3
N75A	Proposed	1143	Leg	Pipe 3.5 x 0.3	1745	2, 3

Notes:
1) Tieback connection point is within 25% of either end of the connected tower member
2) Tieback connection point is NOT within 25% of either end of the connected tower member
3) Reduced member compressive capacity according to CED-STD-10294 *Standard for Installation of Mounts and Appurtenances*

4.1) Recommendations

The mount will have sufficient capacity to carry the proposed loading configuration. In order for the results of the analysis to be considered valid, modification listed below must be completed:

- Install SitePro1 STK-U Stiff Arm Kit or EOR approved equivalent in accordance with attached manufacturer drawings. The new tieback is to be installed as shown in "Appendix D – Supplemental Modification Information". Connection to tower must be to adjacent tower leg.
- Replace existing mount pipes with new 8-ft. long P2.0 X-STR (2.38" O.D. x 0.204") where required. See Appendix A/D details.

No structural modifications are required at this time, provided that the above-listed changes are implemented.

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

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

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

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

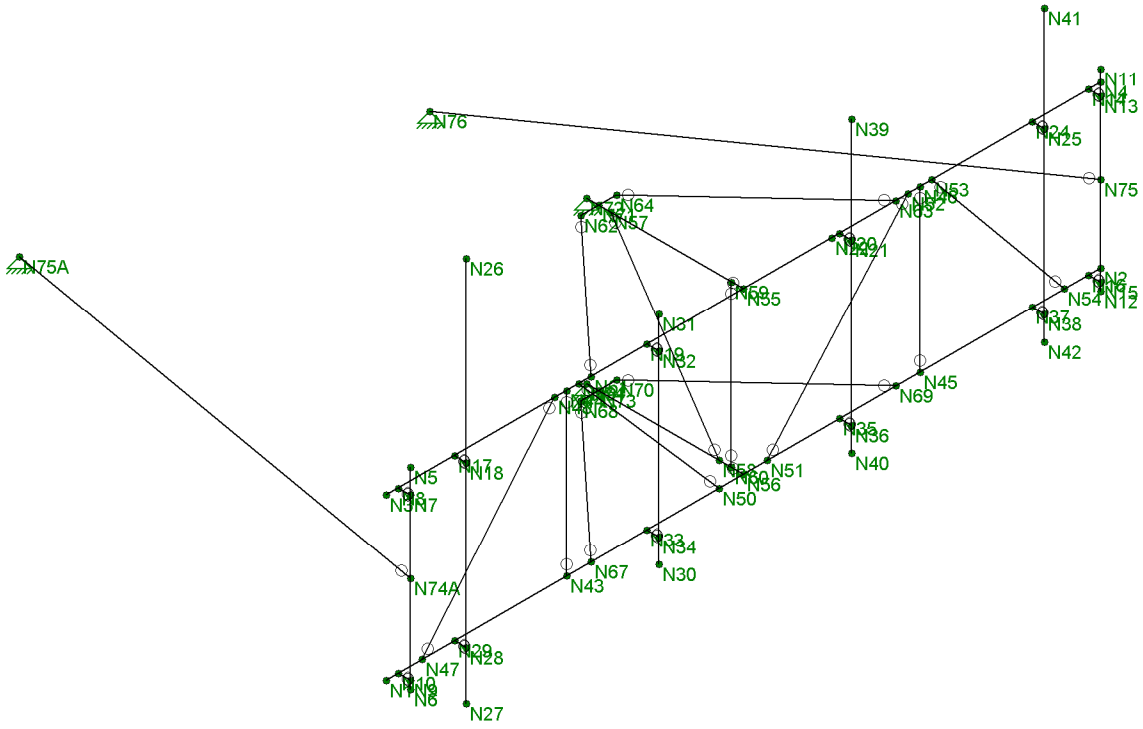
4) The standard of care for all Professional Engineering Services performed or furnished by Paul J. Ford and Company under this project will be the skill and care used by members of the Consultant's profession practicing under similar circumstances at the same time and in the same locality.

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

****

APPENDIX A

WIRE FRAME AND RENDERED MODELS



Envelope Only Solution

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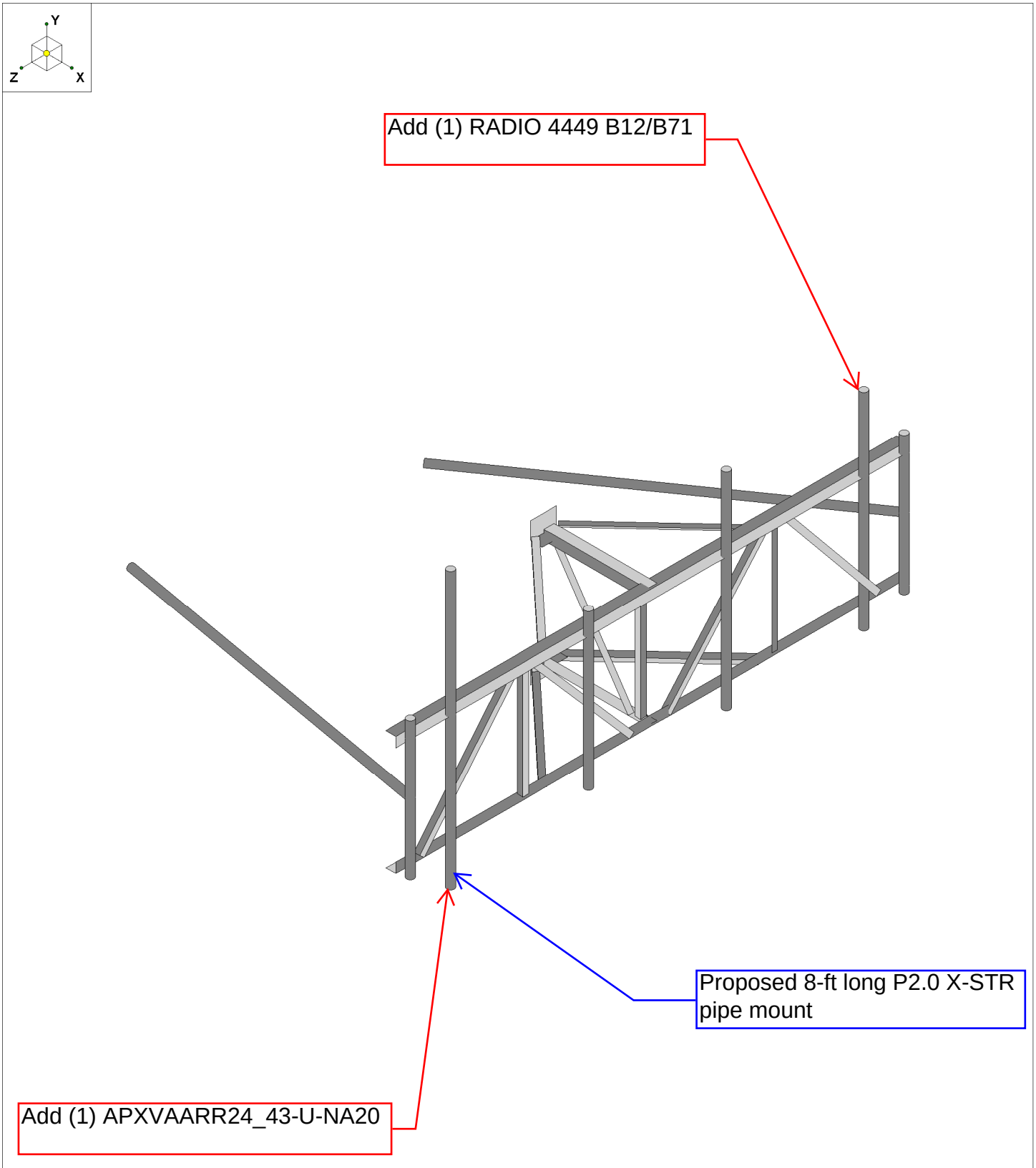

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APPENDIX B

SOFTWARE INPUT CALCULATION

ANSI/TIA-222H - WIND & ICE LOAD CALCULATIONS

Site Code/Name	871584 - John Tom Hill
State	Connecticut
County	Hartford
V	125 mph
V_i	50 mph
t_i	2.0 in
z_s	880 ft
z	182 ft

Structure Class	II
Exposure Category	C
Topographic Category	1
Wind direction probability factor	0.95
Gust factor	1
Wind Pressure (including Ka = 0.9)	47.56 psf
t_{iz}	2.37 in

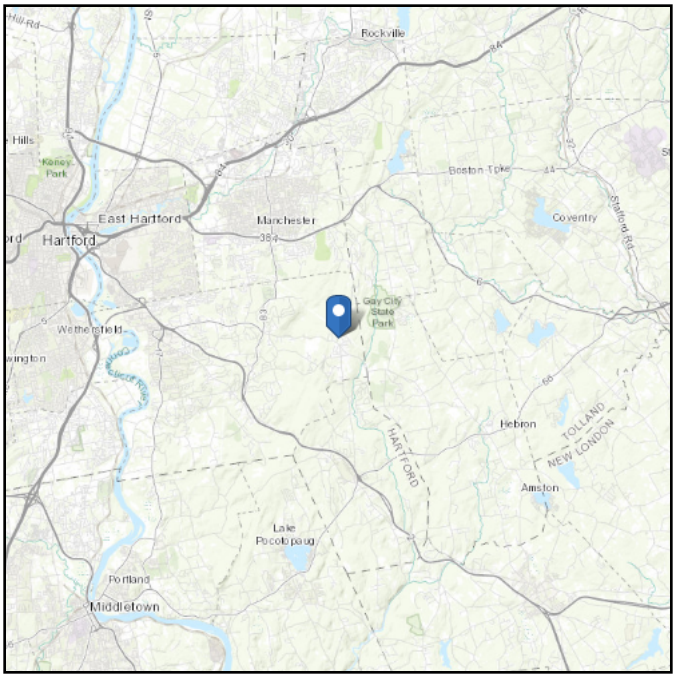
Dead and Wind Forces for Equipment									
Manufacturer	Model	L [in]	W [in]	D [in]	0° [lbs]	30° [lbs]	60° [lbs]	90° [lbs]	Weight [lbs]
RFS	APXV18-209015-C-A20	72	6.65	3.15	241.6	217.3	168.7	144.5	25.3
RFS	APXVAARR24_43-U-NA20	95.9	24	8.7	962.7	827.7	557.7	422.7	128.0
Ericsson	KRY 112 489/2	11	6.1	3.94	26.6	24.3	19.7	17.4	15.4
Ericsson	RADIO 4449 B12/B71	14.95	13.19	9.25	78.2	72.3	60.6	54.8	75.0

ASCE 7 Hazards Report

Address:
No Address at This Location

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

Elevation: 879.67 ft (NAVD 88)
Latitude: 41.708889
Longitude: -72.473333



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:	Thu May 02 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.

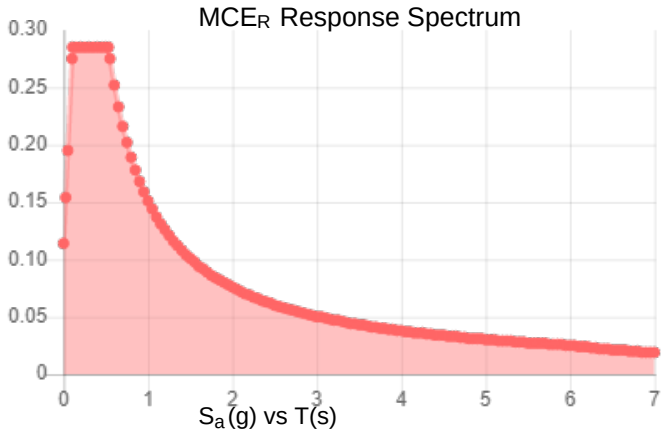
Seismic

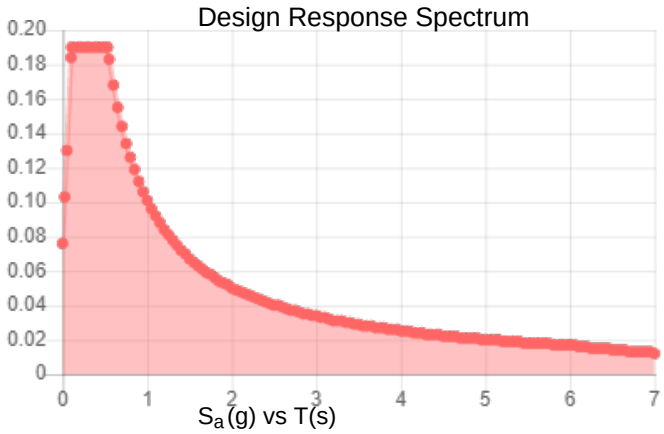
Site Soil Class: D - Stiff Soil

Results:

S_S :	0.178	S_{DS} :	0.19
S_1 :	0.063	S_{D1} :	0.101
F_a :	1.6	T_L :	6
F_v :	2.4	PGA :	0.09
S_{MS} :	0.285	PGA_M :	0.143
S_{M1} :	0.151	F_{PGA} :	1.6
		I_e :	1

Seismic Design Category B





Data Accessed: Thu May 02 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:

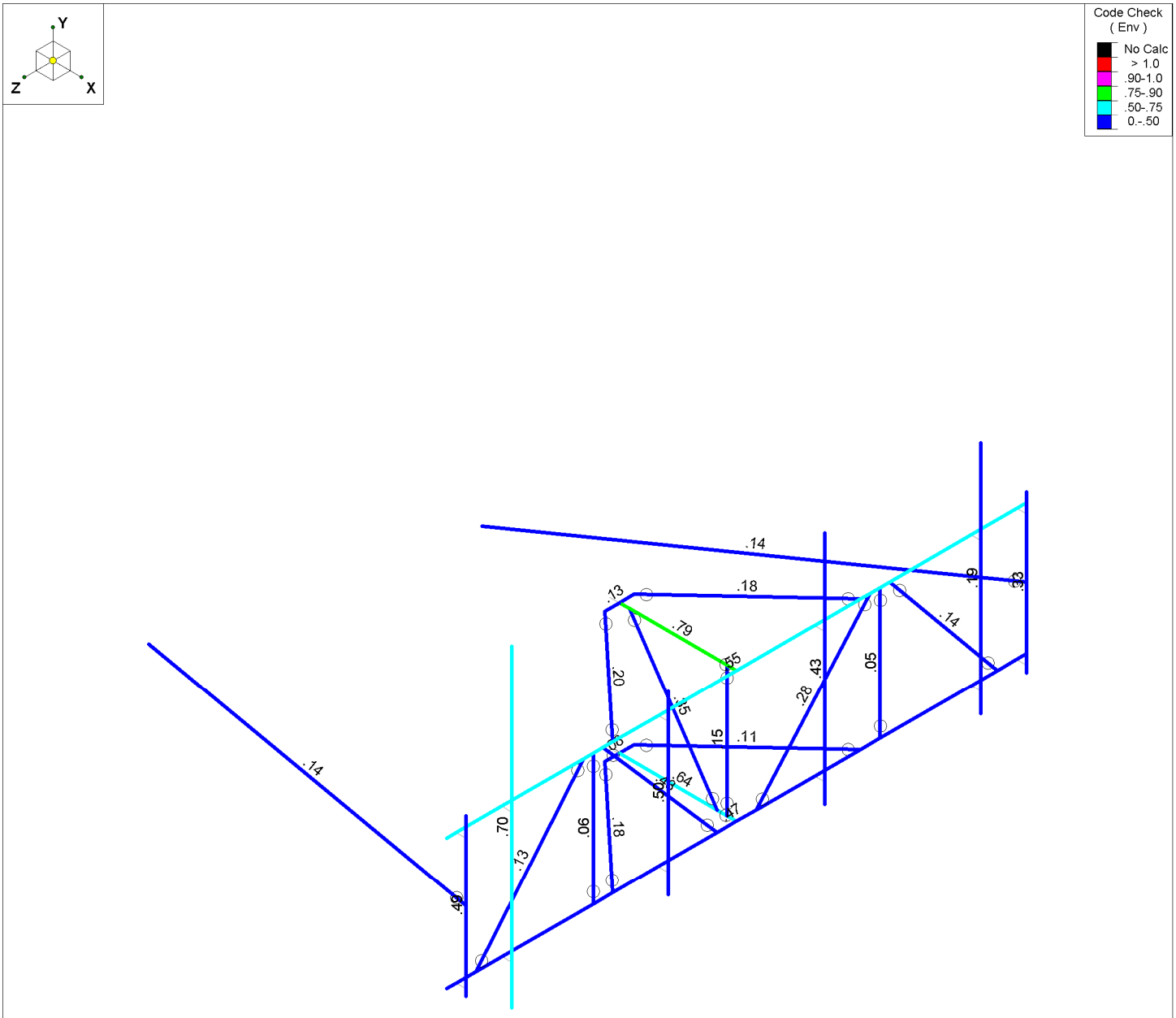
Ice Thickness:	1.00 in.
Concurrent Temperature:	5 F
Gust Speed:	50 mph
Data Source:	Standard ASCE/SEI 7-10, Figs. 10-2 through 10-8
Date Accessed:	Thu May 02 2019

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.

APPENDIX C

SOFTWARE ANALYSIS OUTPUT



Member Code Checks Displayed (Enveloped)
Envelope Only Solution

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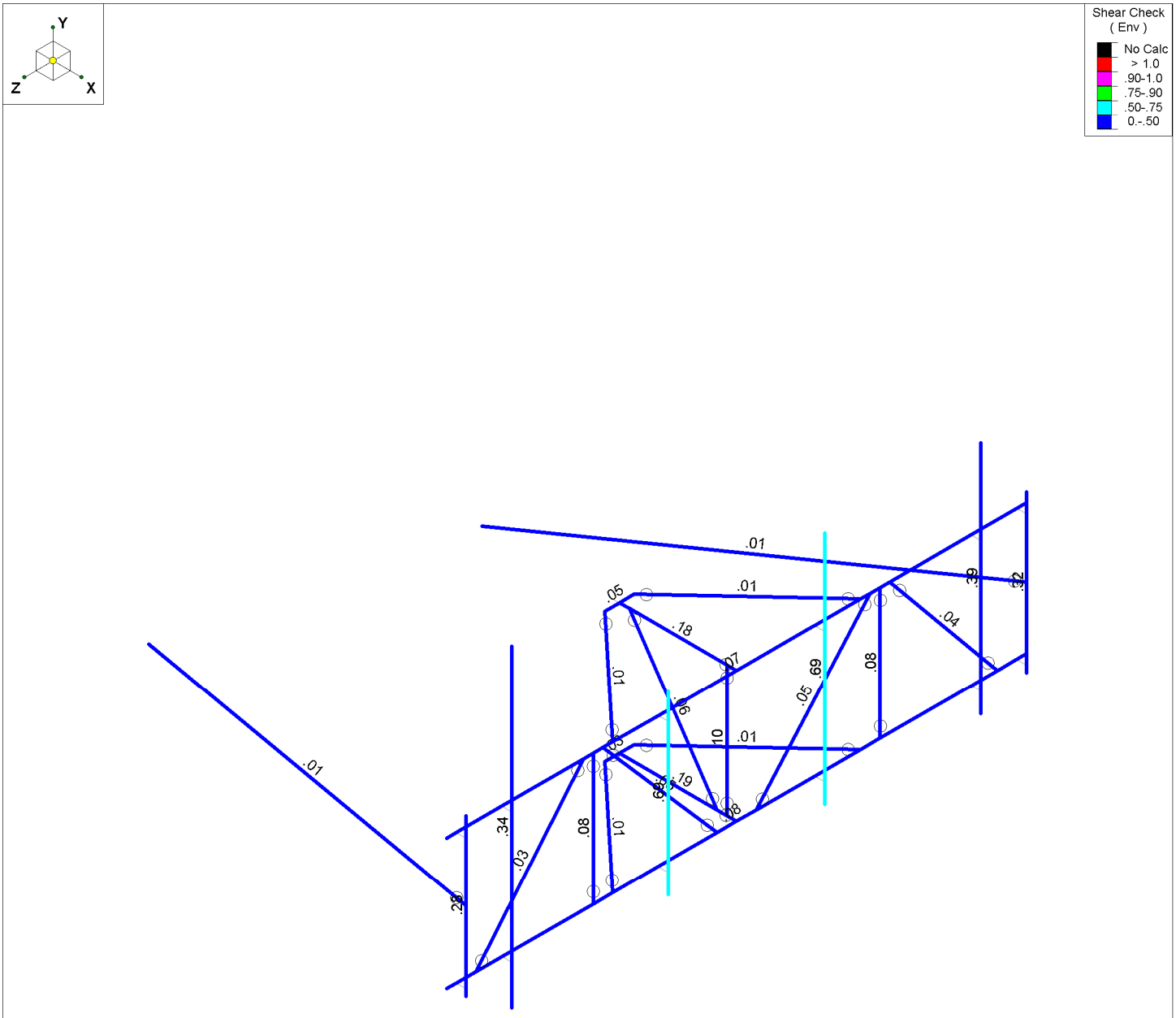

Member Shear Checks Displayed (Enveloped)
Envelope Only Solution

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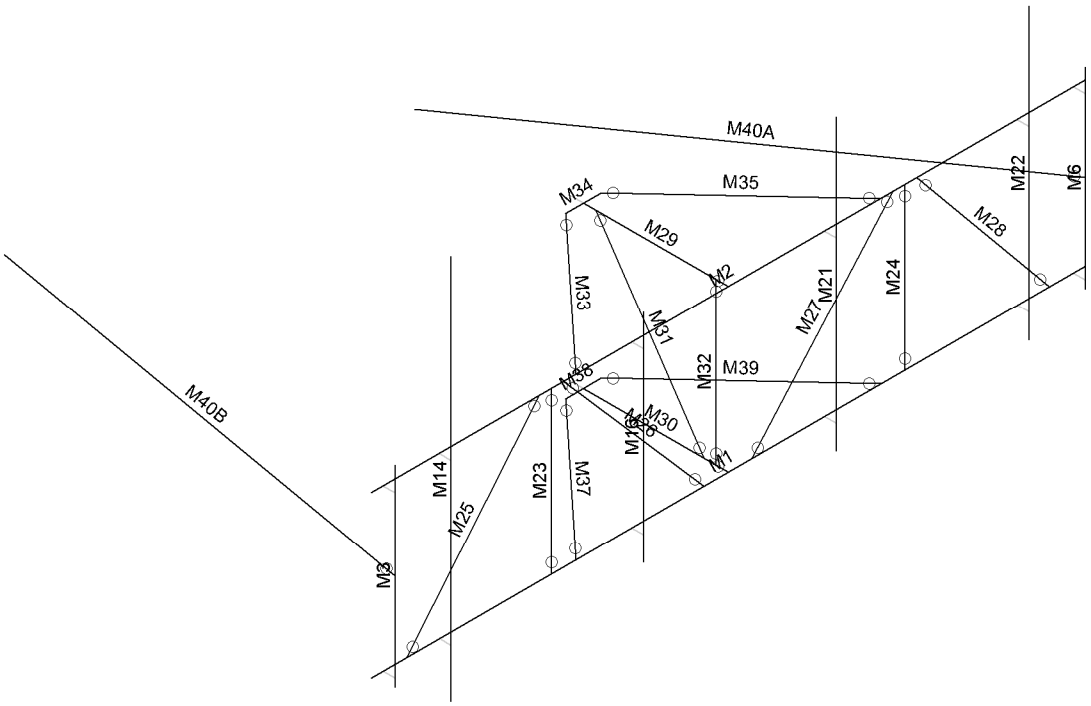

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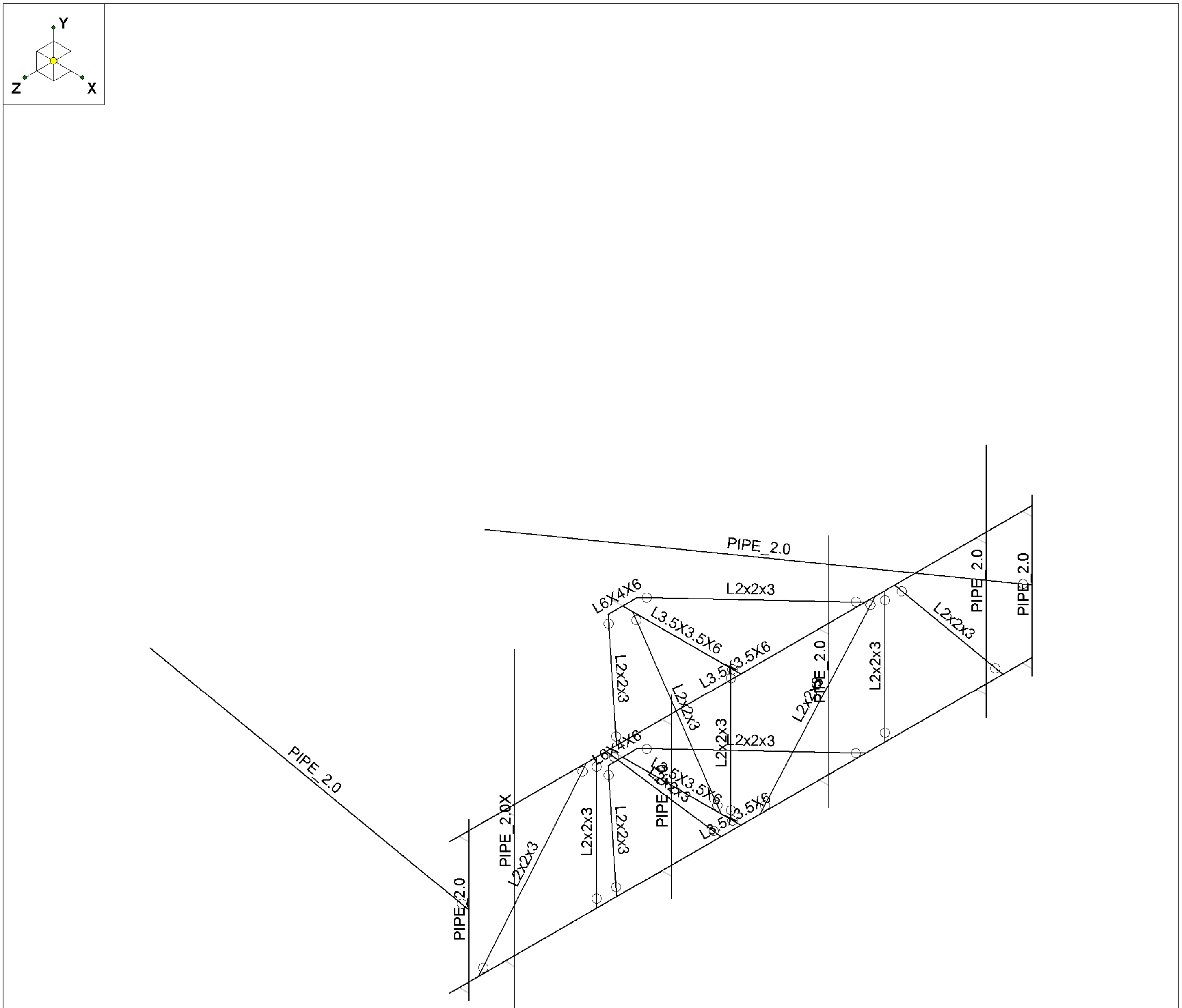

Envelope Only Solution

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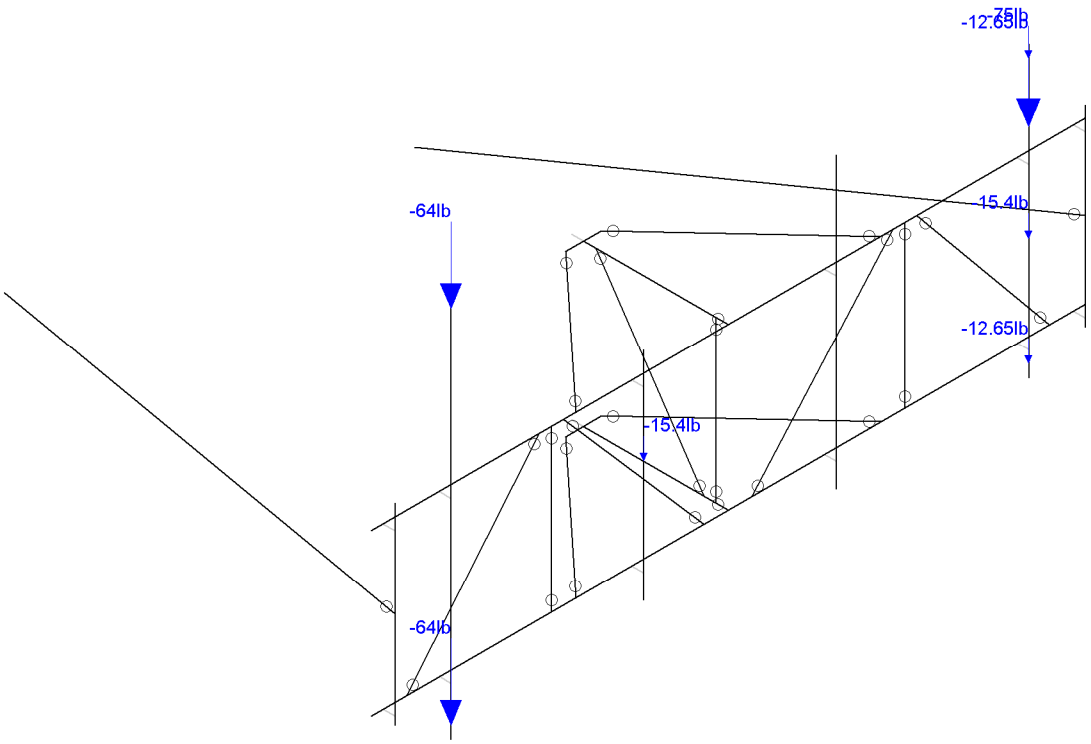

Loads: BLC 2, We
Envelope Only Solution

Paul J Ford	871584_John Tom Hill	SK - 7
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(Global) Model Settings

Display Sections for Member Calcs	5
Max Internal Sections for Member Calcs	97
Include Shear Deformation?	Yes
Increase Nailing Capacity for Wind?	Yes
Include Warping?	Yes
Trans Load Btwn Intersecting Wood Wall?	Yes
Area Load Mesh (in^2)	144
Merge Tolerance (in)	.12
P-Delta Analysis Tolerance	0.50%
Include P-Delta for Walls?	Yes
Automatically Iterate Stiffness for Walls?	Yes
Max Iterations for Wall Stiffness	3
Gravity Acceleration (in/sec^2)	386.4
Wall Mesh Size (in)	24
Eigensolution Convergence Tol. (1.E-)	4
Vertical Axis	Y
Global Member Orientation Plane	XZ
Static Solver	Sparse Accelerated
Dynamic Solver	Accelerated Solver

Hot Rolled Steel Code	AISC 15th(360-16): LRFD
Adjust Stiffness?	Yes(Iterative)
RISAConnection Code	AISC 14th(360-10): LRFD
Cold Formed Steel Code	AISI S100-16: LRFD
Wood Code	None
Wood Temperature	< 100F
Concrete Code	None
Masonry Code	None
Aluminum Code	None - Building
Stainless Steel Code	None

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

(Global) Model Settings, Continued

Seismic Code	ASCE 7-16
Seismic Base Elevation (in)	Not Entered
Add Base Weight?	Yes
Ct X	.02
Ct Z	.02
T X (sec)	Not Entered
T Z (sec)	Not Entered
R X	3
R Z	3
Ct Exp. X	.75
Ct Exp. Z	.75
SD1	1
SDS	1
S1	1
TL (sec)	5
Risk Cat	I or II
Drift Cat	Other
Om Z	1
Om X	1
Cd Z	4
Cd X	4
Rho Z	1
Rho X	1

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (\1E...	Density[k/ft...	Yield[ksi]	Ry	Fu[ksi]	Rt
1	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 42	29000	11154	.3	.65	.49	42	1.4	58	1.3
5	A500 Gr.B 46	29000	11154	.3	.65	.49	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

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rules
1	M1	N1	N2		270	L3.5X3.5X6	Beam	Single Angle	A36 Gr.36	Typical
2	M2	N3	N4		180	L3.5X3.5X6	Beam	Single Angle	A36 Gr.36	Typical
3	M3	N5	N6			PIPE_2.0	Column	Pipe	A53 Gr.B	Typical
4	M4	N7	N8			RIGID	None	None	RIGID	Typical
5	M5	N9	N10			RIGID	None	None	RIGID	Typical
6	M6	N11	N12			PIPE_2.0	Column	Pipe	A53 Gr.B	Typical
7	M7	N13	N14			RIGID	None	None	RIGID	Typical
8	M8	N15	N16			RIGID	None	None	RIGID	Typical
9	M9	N17	N18			RIGID	None	None	RIGID	Typical
10	M10	N19	N32			RIGID	None	None	RIGID	Typical
11	M11	N20	N21			RIGID	None	None	RIGID	Typical
12	M13	N24	N25			RIGID	None	None	RIGID	Typical
13	M14	N26	N27			PIPE_2.0X	Column	Pipe	A53 Gr.B	Typical
14	M15	N28	N29			RIGID	None	None	RIGID	Typical
15	M16	N31	N30			PIPE_2.0	Column	Pipe	A53 Gr.B	Typical
16	M18	N33	N34			RIGID	None	None	RIGID	Typical
17	M19	N35	N36			RIGID	None	None	RIGID	Typical
18	M20	N37	N38			RIGID	None	None	RIGID	Typical
19	M21	N39	N40			PIPE_2.0	Column	Pipe	A53 Gr.B	Typical

Member Primary Data (Continued)

	Label	I Joint	J Joint	K Joint	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rules
20	M22	N41	N42			PIPE_2.0	Column	Pipe	A53 Gr.B	Typical
21	M23	N43	N44		270	L2x2x3	Column	Single Angle	A36 Gr.36	Typical
22	M24	N45	N46			L2x2x3	Column	Single Angle	A36 Gr.36	Typical
23	M25	N47	N48		180	L2x2x3	VBrace	Single Angle	A36 Gr.36	Typical
24	M26	N49	N50		180	L2x2x3	VBrace	Single Angle	A36 Gr.36	Typical
25	M27	N51	N52		180	L2x2x3	VBrace	Single Angle	A36 Gr.36	Typical
26	M28	N53	N54		180	L2x2x3	VBrace	Single Angle	A36 Gr.36	Typical
27	M29	N55	N71		90	L3.5X3.5X6	Beam	Single Angle	A36 Gr.36	Typical
28	M30	N56	N73			L3.5X3.5X6	Beam	Single Angle	A36 Gr.36	Typical
29	M31	N57	N58		90	L2x2x3	VBrace	Single Angle	A36 Gr.36	Typical
30	M32	N59	N60			L2x2x3	Column	Single Angle	A36 Gr.36	Typical
31	M33	N61	N62		90	L2x2x3	Beam	Single Angle	A36 Gr.36	Typical
32	M34	N62	N64			L6X4X6	Beam	Single Angle	A36 Gr.36	Typical
33	M35	N63	N64		180	L2x2x3	Beam	Single Angle	A36 Gr.36	Typical
34	M37	N67	N68			L2x2x3	Beam	Single Angle	A36 Gr.36	Typical
35	M38	N70	N68		180	L6X4X6	Beam	Single Angle	A36 Gr.36	Typical
36	M39	N69	N70		270	L2x2x3	Beam	Single Angle	A36 Gr.36	Typical
37	M40	N71	N72			RIGID	None	None	RIGID	Typical
38	M41	N73	N74			RIGID	None	None	RIGID	Typical
39	M40A	N75	N76			PIPE_2.0	Beam	Pipe	A53 Gr.B	Typical
40	M40B	N74A	N75A			PIPE_2.0	Beam	Pipe	A53 Gr.B	Typical

Member Advanced Data

	Label	I Release	J Release	I Offset[in]	J Offset[in]	T/C Only	Physical	Defl Rat...	Analysis ...	Inactive	Seismic...
1	M1						Yes	Default			None
2	M2						Yes				None
3	M3						Yes	** NA **			None
4	M4		OOOXOO				Yes	** NA **			None
5	M5		OOOXOO				Yes	** NA **			None
6	M6						Yes	** NA **			None
7	M7		OOOXOO				Yes	** NA **			None
8	M8		OOOXOO				Yes	** NA **			None
9	M9	OOOXOX					Yes	** NA **			None
10	M10	OOOXOX					Yes	** NA **			None
11	M11	OOOXOX					Yes	** NA **			None
12	M13	OOOXOX					Yes	** NA **			None
13	M14						Yes	** NA **			None
14	M15		OOOXOO				Yes	** NA **			None
15	M16						Yes	** NA **			None
16	M18	OOOXOX					Yes	** NA **			None
17	M19	OOOXOX					Yes	** NA **			None
18	M20	OOOXOX					Yes	** NA **			None
19	M21						Yes	** NA **			None
20	M22						Yes	** NA **			None
21	M23	BenPIN	BenPIN				Yes	** NA **			None
22	M24	BenPIN	BenPIN				Yes	** NA **			None
23	M25	BenPIN	BenPIN				Yes	** NA **			None
24	M26	BenPIN	BenPIN				Yes	** NA **			None
25	M27	BenPIN	BenPIN				Yes	** NA **			None
26	M28	BenPIN	BenPIN				Yes	** NA **			None
27	M29	BenPIN					Yes	Default			None
28	M30	BenPIN					Yes	Default			None
29	M31	BenPIN	BenPIN				Yes	** NA **			None
30	M32	BenPIN	BenPIN				Yes	** NA **			None
31	M33	BenPIN	BenPIN				Yes	Default			None

Member Advanced Data (Continued)

	Label	I Release	J Release	I Offset[in]	J Offset[in]	T/C Only	Physical	Defl Rat...	Analysis ...	Inactive	Seismic...
32	M34						Yes				None
33	M35	BenPIN	BenPIN				Yes	Default			None
34	M37	BenPIN	BenPIN				Yes	Default			None
35	M38						Yes				None
36	M39	BenPIN	BenPIN				Yes	Default			None
37	M40						Yes	** NA **			None
38	M41						Yes	** NA **			None
39	M40A	BenPIN					Yes	Default			None
40	M40B	BenPIN					Yes	Default			None

Hot Rolled Steel Design Parameters

	Label	Shape	Length[in]	Lbyy[in]	Lbzz[in]	Lcomp top[in]	Lcomp bot[in]	L-torqu...	Kyy	Kzz	Cb	Function
1	M1	L3.5X3.5X6	178	51	51	Lbyy						Lateral
2	M2	L3.5X3.5X6	178	51	51	Lbyy						Lateral
3	M3	PIPE_2.0	48			Lbyy						Lateral
4	M6	PIPE_2.0	48			Lbyy						Lateral
5	M14	PIPE_2.0X	96			Lbyy						Lateral
6	M16	PIPE_2.0	54			Lbyy						Lateral
7	M21	PIPE_2.0	72			Lbyy						Lateral
8	M22	PIPE_2.0	72			Lbyy						Lateral
9	M23	L2x2x3	40			Lbyy						Lateral
10	M24	L2x2x3	40			Lbyy						Lateral
11	M25	L2x2x3	51.856			Lbyy						Lateral
12	M26	L2x2x3	53.151			Lbyy						Lateral
13	M27	L2x2x3	53.151			Lbyy						Lateral
14	M28	L2x2x3	51.856			Lbyy						Lateral
15	M29	L3.5X3.5X6	36			Lbyy						Lateral
16	M30	L3.5X3.5X6	36			Lbyy						Lateral
17	M31	L2x2x3	48.26			Lbyy						Lateral
18	M32	L2x2x3	40			Lbyy						Lateral
19	M33	L2x2x3	49.176			Lbyy						Lateral
20	M34	L6X4X6	9			Lbyy						Lateral
21	M35	L2x2x3	49.176			Lbyy						Lateral
22	M37	L2x2x3	49.176			Lbyy						Lateral
23	M38	L6X4X6	9			Lbyy						Lateral
24	M39	L2x2x3	49.176			Lbyy						Lateral
25	M40A	PIPE_2.0	120			Lbyy						Lateral
26	M40B	PIPE_2.0	120			Lbyy						Lateral

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distributed	Area(Me...	Surface(P...
1	Self We	DL		-1.1						
2	We	DL					7			
3	Ice We	DL					7	24		
4	W0	WL					7	24		
5	W30	WL					14	48		
6	W60	WL					14	48		
7	W90	WL					7	24		
8	W120	WL					14	48		
9	W150	WL					14	48		
10	W0 + Ice	WL					7	24		
11	W30 + Ice	WL					14	48		
12	W60 + Ice	WL					14	48		
13	W90 + Ice	WL					7	24		

Basic Load Cases (Continued)

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distributed	Area(Me...	Surface(P...
14	W120 + Ice	WL					14	48		
15	W150 + Ice	WL					14	48		
16	500lbs LM 1	LL				1				
17	500lbs LM 2	LL				1				
18	500lbs LM 3	LL				1				
19	500lbs LM 4	LL				1				
20	250lbs LV 5	LL				1				
21	250lbs LV 6	LL				1				

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	Dead	Yes	Y		1	1.4	2	1.4																
2	Dead + Wind 0°	Yes	Y		1	1.2	2	1.2	4	1														
3	Dead + Wind 30°	Yes	Y		1	1.2	2	1.2	5	1														
4	Dead + Wind 60°	Yes	Y		1	1.2	2	1.2	6	1														
5	Dead + Wind 90°	Yes	Y		1	1.2	2	1.2	7	1														
6	Dead + Wind 120°	Yes	Y		1	1.2	2	1.2	8	1														
7	Dead + Wind 150°	Yes	Y		1	1.2	2	1.2	9	1														
8	Dead + Wind 180°	Yes	Y		1	1.2	2	1.2	4	-1														
9	Dead + Wind 210°	Yes	Y		1	1.2	2	1.2	5	-1														
10	Dead + Wind 240°	Yes	Y		1	1.2	2	1.2	6	-1														
11	Dead + Wind 270°	Yes	Y		1	1.2	2	1.2	7	-1														
12	Dead + Wind 300°	Yes	Y		1	1.2	2	1.2	8	-1														
13	Dead + Wind 330°	Yes	Y		1	1.2	2	1.2	9	-1														
14	Dead + Ice + Wind Ice 0°	Yes	Y		1	1.2	2	1.2	10	1	3	1												
15	Dead + Ice + Wind Ice 30°	Yes	Y		1	1.2	2	1.2	11	1	3	1												
16	Dead + Ice + Wind Ice 60°	Yes	Y		1	1.2	2	1.2	12	1	3	1												
17	Dead + Ice + Wind Ice 90°	Yes	Y		1	1.2	2	1.2	13	1	3	1												
18	Dead + Ice + Wind Ice 1...	Yes	Y		1	1.2	2	1.2	14	1	3	1												
19	Dead + Ice + Wind Ice 1...	Yes	Y		1	1.2	2	1.2	15	1	3	1												
20	Dead + Ice + Wind Ice 1...	Yes	Y		1	1.2	2	1.2	10	-1	3	1												
21	Dead + Ice + Wind Ice 2...	Yes	Y		1	1.2	2	1.2	11	-1	3	1												
22	Dead + Ice + Wind Ice 2...	Yes	Y		1	1.2	2	1.2	12	-1	3	1												
23	Dead + Ice + Wind Ice 2...	Yes	Y		1	1.2	2	1.2	13	-1	3	1												
24	Dead + Ice + Wind Ice 3...	Yes	Y		1	1.2	2	1.2	14	-1	3	1												
25	Dead + Ice + Wind Ice 3...	Yes	Y		1	1.2	2	1.2	15	-1	3	1												
26	Dead + LM5001 + Wred 0°	Yes	Y		1	1.2	2	1.2	16	1.5	4	.08												
27	Dead + LM5001 + Wred ...	Yes	Y		1	1.2	2	1.2	16	1.5	5	.08												
28	Dead + LM5001 + Wred ...	Yes	Y		1	1.2	2	1.2	16	1.5	6	.08												
29	Dead + LM5001 + Wred ...	Yes	Y		1	1.2	2	1.2	16	1.5	7	.08												
30	Dead + LM5001 + Wred ...	Yes	Y		1	1.2	2	1.2	16	1.5	8	.08												
31	Dead + LM5001 + Wred ...	Yes	Y		1	1.2	2	1.2	16	1.5	9	.08												
32	Dead + LM5001 + Wred ...	Yes	Y		1	1.2	2	1.2	16	1.5	4	-.08												
33	Dead + LM5001 + Wred ...	Yes	Y		1	1.2	2	1.2	16	1.5	5	-.08												
34	Dead + LM5001 + Wred ...	Yes	Y		1	1.2	2	1.2	16	1.5	6	-.08												
35	Dead + LM5001 + Wred ...	Yes	Y		1	1.2	2	1.2	16	1.5	7	-.08												
36	Dead + LM5001 + Wred ...	Yes	Y		1	1.2	2	1.2	16	1.5	8	-.08												
37	Dead + LM5001 + Wred ...	Yes	Y		1	1.2	2	1.2	16	1.5	9	-.08												
38	Dead + LM5002 + Wred 0°	Yes	Y		1	1.2	2	1.2	17	1.5	4	.08												
39	Dead + LM5002 + Wred ...	Yes	Y		1	1.2	2	1.2	17	1.5	5	.08												
40	Dead + LM5002 + Wred ...	Yes	Y		1	1.2	2	1.2	17	1.5	6	.08												
41	Dead + LM5002 + Wred ...	Yes	Y		1	1.2	2	1.2	17	1.5	7	.08												
42	Dead + LM5002 + Wred ...	Yes	Y		1	1.2	2	1.2	17	1.5	8	.08												
43	Dead + LM5002 + Wred ...	Yes	Y		1	1.2	2	1.2	17	1.5	9	.08												
44	Dead + LM5002 + Wred ...	Yes	Y		1	1.2	2	1.2	17	1.5	4	-.08												

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..
45	Dead + LM5002 + Wred ...	Yes	Y		1	1.2	2	1.2	17	1.5	5	-.08														
46	Dead + LM5002 + Wred ...	Yes	Y		1	1.2	2	1.2	17	1.5	6	-.08														
47	Dead + LM5002 + Wred ...	Yes	Y		1	1.2	2	1.2	17	1.5	7	-.08														
48	Dead + LM5002 + Wred ...	Yes	Y		1	1.2	2	1.2	17	1.5	8	-.08														
49	Dead + LM5002 + Wred ...	Yes	Y		1	1.2	2	1.2	17	1.5	9	-.08														
50	Dead + LM5003 + Wred 0°	Yes	Y		1	1.2	2	1.2	18	1.5	4	.08														
51	Dead + LM5003 + Wred ...	Yes	Y		1	1.2	2	1.2	18	1.5	5	.08														
52	Dead + LM5003 + Wred ...	Yes	Y		1	1.2	2	1.2	18	1.5	6	.08														
53	Dead + LM5003 + Wred ...	Yes	Y		1	1.2	2	1.2	18	1.5	7	.08														
54	Dead + LM5003 + Wred ...	Yes	Y		1	1.2	2	1.2	18	1.5	8	.08														
55	Dead + LM5003 + Wred ...	Yes	Y		1	1.2	2	1.2	18	1.5	9	.08														
56	Dead + LM5003 + Wred ...	Yes	Y		1	1.2	2	1.2	18	1.5	4	-.08														
57	Dead + LM5003 + Wred ...	Yes	Y		1	1.2	2	1.2	18	1.5	5	-.08														
58	Dead + LM5003 + Wred ...	Yes	Y		1	1.2	2	1.2	18	1.5	6	-.08														
59	Dead + LM5003 + Wred ...	Yes	Y		1	1.2	2	1.2	18	1.5	7	-.08														
60	Dead + LM5003 + Wred ...	Yes	Y		1	1.2	2	1.2	18	1.5	8	-.08														
61	Dead + LM5003 + Wred ...	Yes	Y		1	1.2	2	1.2	18	1.5	9	-.08														
62	Dead + LM5004 + Wred 0°	Yes	Y		1	1.2	2	1.2	19	1.5	4	.08														
63	Dead + LM5004 + Wred ...	Yes	Y		1	1.2	2	1.2	19	1.5	5	.08														
64	Dead + LM5004 + Wred ...	Yes	Y		1	1.2	2	1.2	19	1.5	6	.08														
65	Dead + LM5004 + Wred ...	Yes	Y		1	1.2	2	1.2	19	1.5	7	.08														
66	Dead + LM5004 + Wred ...	Yes	Y		1	1.2	2	1.2	19	1.5	8	.08														
67	Dead + LM5004 + Wred ...	Yes	Y		1	1.2	2	1.2	19	1.5	9	.08														
68	Dead + LM5004 + Wred ...	Yes	Y		1	1.2	2	1.2	19	1.5	4	-.08														
69	Dead + LM5004 + Wred ...	Yes	Y		1	1.2	2	1.2	19	1.5	5	-.08														
70	Dead + LM5004 + Wred ...	Yes	Y		1	1.2	2	1.2	19	1.5	6	-.08														
71	Dead + LM5004 + Wred ...	Yes	Y		1	1.2	2	1.2	19	1.5	7	-.08														
72	Dead + LM5004 + Wred ...	Yes	Y		1	1.2	2	1.2	19	1.5	8	-.08														
73	Dead + LM5004 + Wred ...	Yes	Y		1	1.2	2	1.2	19	1.5	9	-.08														
74	Dead + LV2505	Yes	Y		1	1.2	2	1.2	20	1.5																
75	Dead + LV2506	Yes	Y		1	1.2	2	1.2	21	1.5																
76	Service 60mph Wind 0°	Yes	Y		1	1	2	1	4	.32																

Envelope Joint Reactions

	Joint		X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [k-in]	LC	MY [k-in]	LC	MZ [k-in]	LC
1	N72	max	493.429	2	4763.204	17	1455.366	12	0	76	0	76	0	76
2		min	-4341.472	20	1038.458	76	-1607.872	6	0	1	0	1	0	1
3	N74	max	4164.715	14	-121.637	76	1471.337	72	0	76	0	76	0	76
4		min	570.688	8	-617.981	25	-1333.973	30	0	1	0	1	0	1
5	N76	max	682.54	13	95.449	25	430.954	7	0	76	0	76	0	76
6		min	-701.25	7	19.559	76	-421.22	13	0	1	0	1	0	1
7	N75A	max	1126.898	3	97.271	21	188.469	3	0	76	0	76	0	76
8		min	-1141.527	9	9.505	3	-187.862	9	0	1	0	1	0	1
9	Totals:	max	3236.535	2	4328.462	23	1933.339	12						
10		min	-3236.519	8	954.428	76	-1933.338	6						

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

	Member	Shape	Code ...	Loc[in]	LC	Shear ...	Loc[in]	Dir	LC	phi*Pnc [...	phi*Pnt [l...	phi*Mn y...	phi*Mn z...	Cb	Eqn
1	M29	L3.5X3.5X6	.785	33	17	.183	36	z	18	69978.801	81000	40.078	89.424	1...	H2-1
2	M14	PIPE_2.0X	.700	44	8	.339	44		62	19844.858	44100	30.366	30.366	1...	H1-1b
3	M30	L3.5X3.5X6	.642	6	15	.191	6	y	24	69978.801	81000	40.078	89.424	1...	H2-1
4	M2	L3.5X3.5X6	.551	50.063	7	.068	46.354	y	21	60395.819	81000	40.078	62.061	1	H2-1
5	M16	PIPE_2.0	.498	8.438	63	.691	47.813		63	25203.832	32130	22.459	22.459	1...	H3-6
6	M3	PIPE_2.0	.494	24	3	.278	24		33	26521.424	32130	22.459	22.459	1...	H1-1b

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

	Member	Shape	Code ...	Loc[in]	LC	Shear ...	Loc[in]	Dir	LC	phi*Pnc [...	phi*Pnt [l...	phi*Mn y...	phi*Mn z...	Cb	Eqn
7	M1	L3.5X3.5X6	.474	66.75	73	.076	89	z	17	60395.819	81000	40.078	62.061	1	H2-1
8	M26	L2x2x3	.434	27.129	17	.055	53.151	y	62	8736.909	23392.8	6.693	12.692	1....	H2-1
9	M21	PIPE_2.0	.432	26.25	63	.692	66		63	20866.733	32130	22.459	22.459	1....	H3-6
10	M31	L2x2x3	.348	24.13	15	.062	0	z	33	10403.802	23392.8	6.693	12.991	1....	H2-1
11	M6	PIPE_2.0	.329	24	13	.321	46		63	26521.424	32130	22.459	22.459	1....	H1-1b
12	M27	L2x2x3	.283	26.022	35	.052	0	y	62	8736.909	23392.8	6.693	12.692	1....	H2-1
13	M33	L2x2x3	.205	24.588	13	.011	49.176	z	24	10085.728	23392.8	6.693	12.933	1....	H2-1
14	M22	PIPE_2.0	.188	66	63	.387	66		63	20866.733	32130	22.459	22.459	1....	H3-6
15	M37	L2x2x3	.182	24.588	25	.012	0	y	18	10085.728	23392.8	6.693	12.933	1....	H2-1
16	M35	L2x2x3	.179	24.588	15	.011	49.176	y	19	10085.728	23392.8	6.693	12.933	1....	H2-1
17	M32	L2x2x3	.154	21.25	25	.098	0	y	63	13407.172	23392.8	6.693	13.532	1....	H2-1
18	M28	L2x2x3	.145	25.928	16	.036	0	y	63	9179.087	23392.8	6.693	12.769	1....	H2-1
19	M40B	PIPE_2.0	.138	60	16	.010	120		23	9836.597	32130	22.459	22.459	1....	H1-1b
20	M40A	PIPE_2.0	.138	60	25	.010	0		25	9836.597	32130	22.459	22.459	1....	H1-1b
21	M34	L6X4X6	.127	4.5	7	.051	4.5	z	7	107464....	116964	61.31	184.212	1....	H2-1
22	M25	L2x2x3	.126	25.928	24	.032	0	y	33	9179.087	23392.8	6.693	12.769	1....	H2-1
23	M39	L2x2x3	.115	24.588	28	.010	49.176	z	23	10085.728	23392.8	6.693	12.933	1....	H2-1
24	M38	L6X4X6	.076	4.5	72	.031	4.5	z	72	107464....	116964	61.31	176.892	1....	H2-1
25	M23	L2x2x3	.061	20	2	.077	40	z	62	13407.172	23392.8	6.693	13.532	1....	H2-1
26	M24	L2x2x3	.049	20	2	.078	0	y	63	13407.172	23392.8	6.693	13.532	1....	H2-1

SITE DETAILS

Site Name/Code	871584 - John Tom Hill
Date	02/05/2019
Engineer	SC

CONNECTION PARAMETERS

Loadcase #		17	
Number of bolts		4	
Bolt Diameter	d	1/2	*in*
Tensile Area	A_b	0.20	in^2
Tensile Area	A_n	0.14	in^2
Grade		J429 Grade 2	
Bolt Ultimate Strength	F_{ub}	74	*ksi*
Connection length reduction factor	R_b	1	

Connection Sketch/Photo

CONNECTION LOADS

Bending Moment	Mxx	**0.00**	*kips-in*
Bending Moment	Mzz	**0.00**	*kips-in*
Torsional Moment	Myy	**0.00**	*kips-in*
Shear Force	Vx	**4.76**	*kips*
Shear Force	Vz	**1.44**	*kips*
Axial Force	Ty	**3.89**	*kips*

SOFTWARE REACTIONS TABLE

L...	Joint Label	X [lb]	Y [lb]	Z [lb]	MX [k-in]	MY [k-in]	MZ [k-in]
17	N72	-3893.766	4763.204	-1437.85	0	0	0
17	N74	3902.776	-610.113	525.789	0	0	0
17	N76	-207.576	87.547	142.652	0	0	0
17	N75A	198.649	87.815	11.169	0	0	0

BOLT CHECK

Bolt Tension Capacity

$\phi R_{nt} = 0.75 * F_{ub} * A_n$

$\phi R_{nt} =$ **7.9** *kips*

Maximum Bolt Tension

$T_{ub} = F_{Mxx} + F_{Mzz} + T_y/4$

$T_{ub} =$ **0.97** *kips*

Tension Ratio: **12.4%** PASS

Bolt Shear Capacity

$\phi R_{nv} = 0.75*0.625*0.8*Fub*Ab*Rb$

$\phi R_{nv} =$ **5.4** *kips*

Maximum Bolt Shear

$V_{ub} = \text{sqrt}((V_x/4)^2 + (V_y/4)^2) + F_{Myy}$

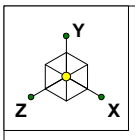
$V_{ub} =$ **1.24** *kips*

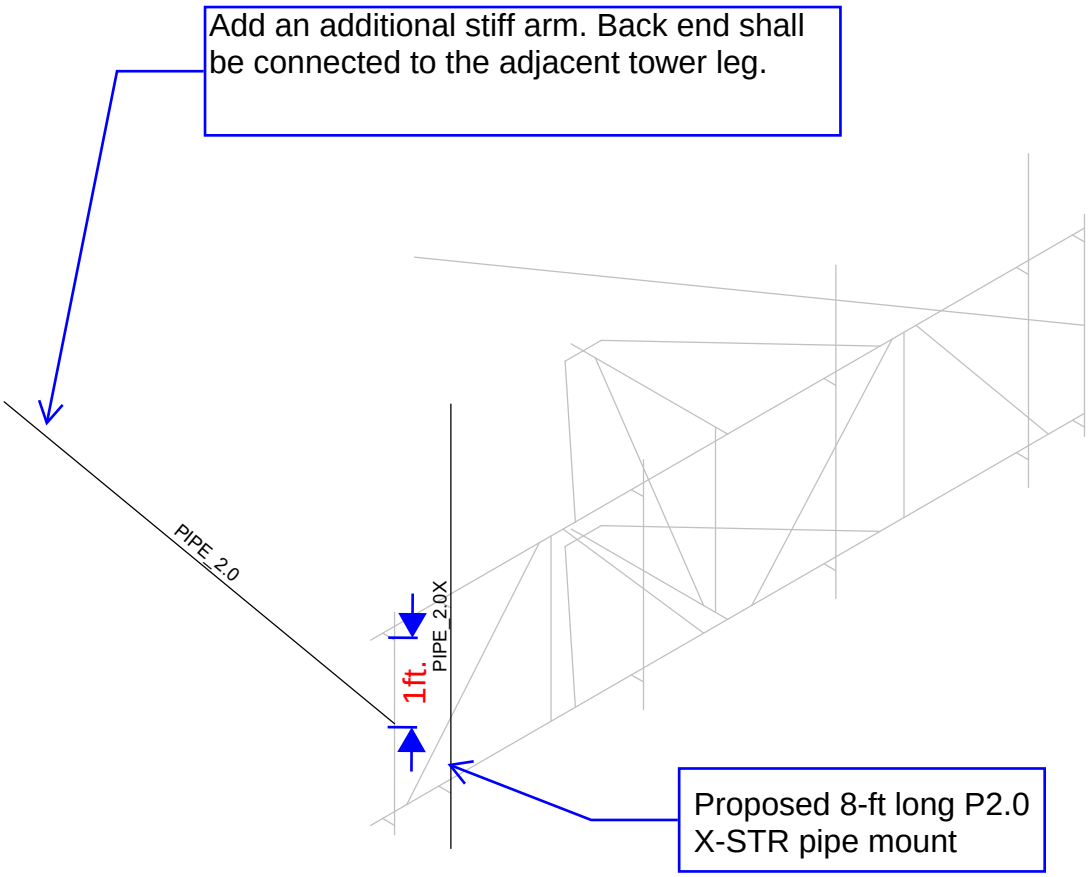
Shear Ratio: **22.8%** PASS

$(T_{ub} / \phi R_{nt})^2 + (V_{ub} / \phi R_{nv})^2 < 1.0$ Ratio **6.7%** PASS

APPENDIX D

SUPPLEMENTAL MODIFICATION INFORMATION

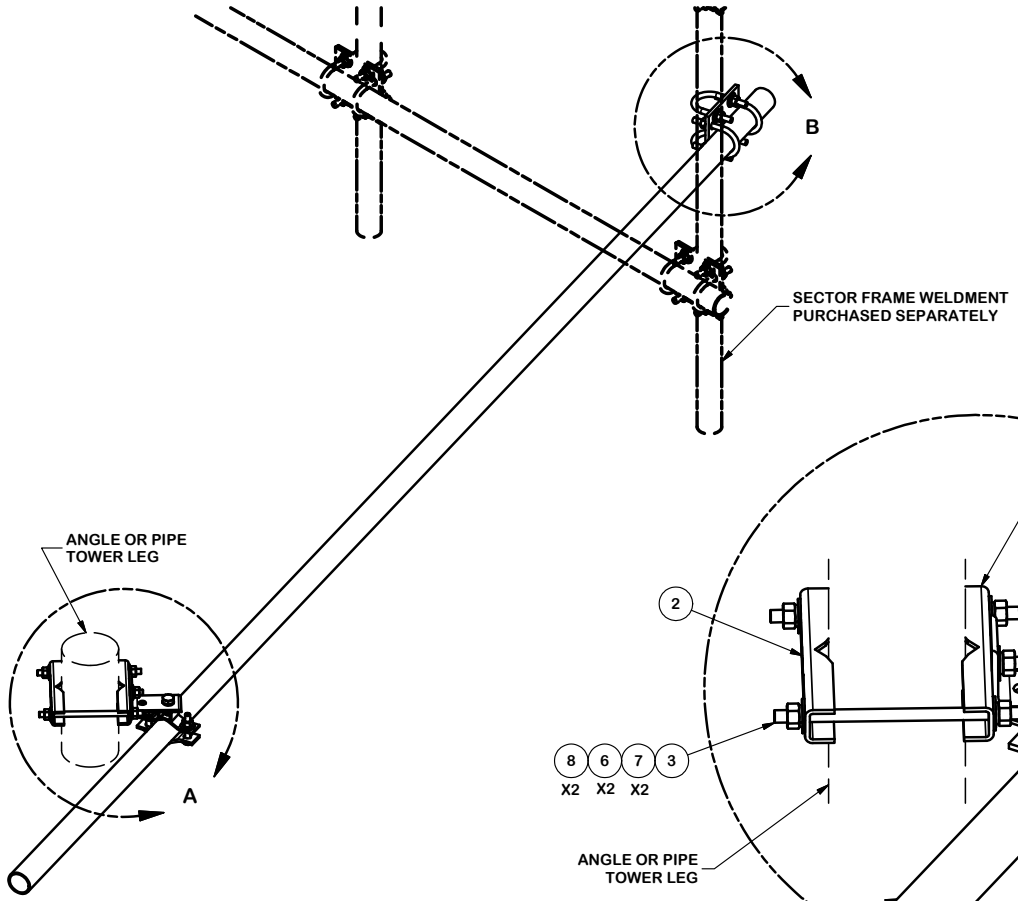




Paul J Ford	871584_John Tom Hill	SK - 8
SC		May 3, 2019 at 9:52 AM
A37519-1779.001.8190		871584_John Tom Hill.R3D

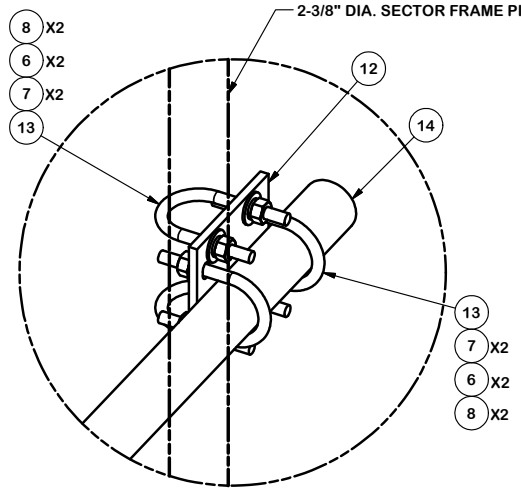
APPENDIX E

MANUFACTURER DRAWINGS (FOR REFERENCE ONLY)



PARTS LIST						
ITEM	QTY	PART NO.	PART DESCRIPTION	LENGTH	UNIT WT.	NET WT.
1	1	X-STA3	STIFF ARM ANGLE BRACKET	2 1/2 in	1.39	1.39
2	2	X-STU	STIFF ARM CHANNEL BRACKET		1.37	2.74
3	2	G12R-10	1/2" x 10" THREADED ROD (HDG.)		3.23	6.45
4	1	G12112	1/2" x 1-1/2" HDG HEX BOLT GR5	1 1/2 in	0.15	0.15
5	2	G1203	1/2" x 3" HDG HEX BOLT GR5 FULL THREAD	3 in	0.22	0.43
6	15	G12LW	1/2" HDG LOCKWASHER		0.01	0.21
7	17	G12FW	1/2" HDG USS FLATWASHER		0.03	0.58
8	15	G12NUT	1/2" HDG HEAVY 2H HEX NUT		0.07	1.07
9	1	G58112	5/8" x 1-1/2" HDG BOLT	1 1/2 in	0.25	0.25
10	1	G58LW	5/8" HDG LOCKWASHER		0.03	0.03
11	1	G58NUT	5/8" HDG HEAVY 2H HEX NUT		0.13	0.13
12	1	SCX1	CROSSOVER PLATE 2-3/8" X 2-3/8"		3.71	3.71
13	4	X-UB1212	1/2" X 2-1/2" X 4-1/2" X 2" U-BOLT (HDG.)		0.66	2.63
14	1	P2150	2-3/8" OD X 150" SCH 40 GALVANIZED PIPE	150 in	48.06	48.06
15	1	ACP	4-1/16" CLAMP HALF, 1/4" THK.		0.65	0.65
16	1	SAM	STIFF ARM MOUNT CLAMP		0.77	0.77
					TOTAL WT. #	63.79

DETAIL A



DETAIL B

TOLERANCE NOTES

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

DESCRIPTION: SECTOR FRAME STIFF ARM KIT

SITE PRO 1 — A valmont COMPANY

Engineering Support Team: 1-888-753-7446

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

CPD NO.	DRAWN BY	ENG. APPROVAL	PART NO.	PAGE
4647	KC8 8/16/2012		STK-U	1 OF 1
CLASS / SUB: 81 / 02	DRAWING USAGE: CUSTOMER	CHECKED BY: CEK 2/18/2013	DWG. NO.: STK-U	

Exhibit E

Power Density/RF Emissions Report

Transcom Engineering, Inc.

Wireless Network Design and Deployment

Radio Frequency Emissions Analysis Report

T-MOBILE Existing Facility

Site ID: CT11189E

Glastonbury/ Rt-94 & Fern
115 Birch Mountain Road
Glastonbury, CT 06033

May 28, 2019

Transcom Engineering Project Number: 737001-0047

Site Compliance Summary	
Compliance Status:	**COMPLIANT**
Site total MPE% of FCC general population allowable limit:	**6.84 %**

May 28, 2019

T-MOBILE
Attn: Jason Overbey, RF Manager
35 Griffin Road South
Bloomfield, CT 6009

Emissions Analysis for Site: **CT11189E – Glastonbury/ Rt-94 & Fern**

Transcom Engineering, Inc ("Transcom") was directed to analyze the proposed upgrades to the T-MOBILE facility located at **115 Birch Mountain Road, Glastonbury, CT**, 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 (μW/cm2). 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.

Population 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 & 700 MHz 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) and 2100 MHz (AWS) 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 performed for the proposed upgrades to the T-MOBILE antenna facility located at **115 Birch Mountain Road, Glastonbury, CT**, 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 manufactures supplied specifications, minus 10 dB for directional panel antennas, 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.

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. All power values expressed and analyzed are maximum power levels expected to be used on all radios.

All emissions values for additional carriers were taken from the Connecticut Siting Council (CSC) active MPE database. Values in this database are provided by the individual carriers themselves

For each sector the following channel counts, frequency bands and power levels were utilized as shown in *Table 1*:

Technology	Frequency Band	Channel Count	Transmit Power per Channel (W)
LTE	1900 MHz (PCS)	4	40
GSM	1900 MHz (PCS)	1	15
LTE / 5G NR	600 MHz	2	40
LTE	700 MHz	2	20

Table 1: Channel Data Table

The following antennas listed in *Table 2* were used in the modeling for transmission in the 600, 700 MHz, 1900 MHz (PCS) and 2100 MHz (AWS) frequency bands. This is based on feedback from the carrier with regards to anticipated antenna selection. Maximum gain values for all antennas are listed in the Inventory and Power Data table below. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB for directional panel antennas, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

Sector	Antenna Number	Antenna Make / Model	Antenna Centerline (ft)
A	1	RFS APXV18-209015-C-A20	177
A	2	RFS APXVAARR24_43-U-NA20	177
B	1	RFS APXV18-209015-C-A20	177
B	2	RFS APXVAARR24_43-U-NA20	177
C	1	RFS APXV18-209015-C-A20	177
C	2	RFS APXVAARR24_43-U-NA20	177

Table 2: Antenna Data

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

Cable losses were factored in the calculations for this site. Since all **1900 MHz (PCS)** radios are ground mounted the following cable loss values were used. For each ground mounted **1900 MHz (PCS)** radio there was **1.82 dB** of cable loss calculated into the system gains / losses for this site. These values were calculated based upon the manufacturers specifications for **215 feet** of **1-5/8"** coax.

RESULTS

Per the calculations completed for the proposed T-MOBILE configurations *Table 3* shows resulting emissions power levels and percentages of the FCC's allowable general population limit.

Antenna ID	Antenna Make / Model	Frequency Bands	Antenna Gain (dBd)	Channel Count	Total TX Power (W)	ERP (W)	MPE %
Antenna A1	RFS APXV18-209015-C-A20	1900 MHz (PCS)	15.55	5	175	4,130.84	0.50
Antenna A2	RFS APXVAARR24_43-U-NA20	600 MHz / 700 MHz	12.95 / 13.35	4	120	2,443.03	0.72
						Sector A Composite MPE%	**1.22**
Antenna B1	RFS APXV18-209015-C-A20	1900 MHz (PCS)	15.55	5	175	4,130.84	0.50
Antenna B2	RFS APXVAARR24_43-U-NA20	600 MHz / 700 MHz	12.95 / 13.35	4	120	2,443.03	0.72
						Sector B Composite MPE%	**1.22**
Antenna C1	RFS APXV18-209015-C-A20	1900 MHz (PCS)	15.55	5	175	4,130.84	0.50
Antenna C2	RFS APXVAARR24_43-U-NA20	600 MHz / 700 MHz	12.95 / 13.35	4	120	2,443.03	0.72
						Sector C Composite MPE%	**1.22**

Table 3: T-MOBILE Emissions Levels

The Following table (*table 4*) shows all additional carriers on site and their MPE% as recorded in the CSC active MPE database for this facility along with the newly calculated maximum T-MOBILE MPE contributions per this report. FCC OET 65 specifies that for carriers utilizing directional antennas that the highest recorded sector value be used for composite site MPE values due to their greatly reduced emissions contributions in the directions of the adjacent sectors. For this site, all three sectors have the same configuration yielding the same results on all three sectors. *Table 5* below shows a summary for each T-MOBILE Sector as well as the composite MPE value for the site.

Site Composite MPE%	
Carrier	**MPE%**
T-MOBILE – Max Per Sector Value	**1.22 %**
Tilcon Tomasso	0.12 %
Arch Cmcns	0.09 %
SkyTel	0.08 %
Arch Cmcns	0.16 %
US Drug	0.08 %
Internal Revenue	0.08 %
Connecticut Radio	0.12 %
Federal Express	0.08 %
Northeast Paging	0.45 %
Stamm Const.	0.15 %
Unknown	2.16 %
Sprint	2.05 %
Site Total MPE %:	**6.84 %**

Table 4: All Carrier MPE Contributions

T-MOBILE Sector A Total:	1.22 %
T-MOBILE Sector B Total:	1.22 %
T-MOBILE Sector C Total:	1.22 %
Site Total:	6.84 %

Table 5: Site MPE Summary

FCC OET 65 specifies that for carriers utilizing directional antennas that the highest recorded sector value be used for composite site MPE values due to their greatly reduced emissions contributions in the directions of the adjacent sectors. *Table 6* below details a breakdown by frequency band and technology for the MPE power values for the maximum calculated T-MOBILE sector(s). For this site, all three sectors have the same configuration yielding the same results on all three sectors.

T-MOBILE _ Frequency Band / Technology Max Power Values (Per Sector)	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ($\mu W/cm^2$)	Frequency (MHz)	Allowable MPE ($\mu W/cm^2$)	Calculated % MPE
T-Mobile 1900 MHz (PCS) LTE	4	944.19	177	4.64	1900 MHz (PCS)	1000	0.46%
T-Mobile 1900 MHz (PCS) GSM	1	354.07	177	0.44	1900 MHz (PCS)	1000	0.04%
T-Mobile 600 MHz LTE / 5G NR	2	788.97	177	1.94	600 MHz	400	0.49%
T-Mobile 700 MHz LTE	2	432.54	177	1.06	700 MHz	467	0.23%
						Total:	**1.22%**

Table 6: T-MOBILE Maximum Sector MPE Power Values

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:	1.22 %
Sector B:	1.22 %
Sector C:	1.22 %
T-MOBILE Maximum Total (per sector):	1.22 %
Site Total:	6.84 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **6.84 %** 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.

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Sterling, MA 01564