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

December 8, 2020

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

RE: **Notice of Exempt Modification for T-Mobile:**
823531 - T-Mobile Site ID: CT11896A
41 Padanaram Road, Danbury, CT 06811
Latitude: 41° 25′ 8.10″ / Longitude: -73° 27′ 43.00″

Dear Ms. Bachman:

T-Mobile currently maintains six (6) antennas at the 78-foot mount on the existing 80-foot Monopole Tower, located at 41 Padanaram Road, Danbury, CT. The tower is owned by Crown Castle and the property is owned by Mr. Robert J. Kaufman. T-Mobile now intends to replace three (3) existing antennas with three (3) new three (3) new 600/700 MHz antennas that will be capable of providing 5G services. The new antennas will be installed at the 78-ft level of the tower.

Planned Modifications:
Tower:

Remove and Replace:
(3) AIR21_B4A_B12P Antenna **(REMOVE)** – (3) RFS-APXVAARR24_43-U-NA20 Antenna 600/700/1900 MHz **(5G) (REPLACE)**

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

Install New:
(1) 1 1/2" Hybrid Fiber Line

Existing to Remain:
(6) 1 5/8" Coax
(3) AIR32_B66A_B2A Antenna 1900/2100 MHz
(1) 1 ½" Hybrid Fiber Line
(1) 1 5/8" Hybrid Fiber Line

Ground:

Upgrade to existing ground cabinet. (Internally)
(3) TMAs added to ground at cabinet.
(6) RU22 added to ground at cabinet.

The facility was approved by the Connecticut Siting Council as an 80' telecommunications facility in Petition No. 712 on April 27, 2005.

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 Mark D. Boughton, Mayor for the City of Danbury, Sharon Calitro, Director of Planning & Zoning, Crown Castle as the tower owner, and Mr. Robert Kaufman, 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
Site Acquisition Specialist
3 Corporate Park Drive, Suite 101
Clifton Park, NY 12065
(201) 236-9224
AnneMarie.Zsamba@crowncastle.com

Attachments
cc:

Mark D. Boughton, Mayor (*via email only to m.boughton@danbury-ct.gov*)
City of Danbury
155 Deer Hill Avenue
Danbury, CT 06810
203.797.4500

Sharon Calitro, AICP, Planning Director (*via email only to s.calitro@danbury-ct.gov*)
City of Danbury
155 Deer Hill Avenue
Danbury, CT 06810
203.797.4500

Mr. Robert J. Kaufman, Property Owner
41 Padanaram Road
Danbury, CT 06811

Crown Castle, Tower Owner

From:	Zsamba, Anne Marie
To:	m.boughton@danbury-ct.gov
Subject:	Notice of Exempt Modification - T-Mobile - 823531 - 41 Padanaram Road, Danbury
Date:	Tuesday, December 8, 2020 11:44:00 AM
Attachments:	EM-T-MOBILE-41 PADANARAM RD DANBURY-823531-CT11896A-NOTICE.pdf

Dear Mayor Boughton:

Attached please find T-Mobile's exempt modification application that is being submitted to the Connecticut Siting Council today, December 8, 2020.

In light of the present circumstances with Covid-19, The Council has advised that electronic notification of this filing is acceptable. If you could kindly confirm receipt. Thank you.

Best,
Anne Marie Zsamba

ANNE MARIE ZSAMBA
Site Acquisition Specialist
T: (201) 236-9224
M: (518) 350-3639
F: (724) 416-6112

CROWN CASTLE
3 Corporate Park Drive, Suite 101
Clifton Park, NY 12065
CrownCastle.com

From: Zsamba, Anne Marie
To: s.calitro@danbury-ct.gov
Subject: Notice of Exempt Modification - T-Mobile - 823531 - 41 Padanaram Road, Danbury
Date: Tuesday, December 8, 2020 11:44:00 AM
Attachments: EM-T-MOBILE-41 PADANARAM RD DANBURY-823531-CT11896A-NOTICE.pdf

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M: (518) 350-3639
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CROWN CASTLE
3 Corporate Park Drive, Suite 101
Clifton Park, NY 12065
CrownCastle.com

After printing this label:
1. Use the 'Print' button on this page to print your label to your laser or inkjet printer.
2. Fold the printed page along the horizontal line.
3. Place label in shipping pouch and affix it to your shipment so that the barcode portion of the label can be read and scanned.

Warning: Use only the printed original label for shipping. Using a photocopy of this label for shipping purposes is fraudulent and could result in additional billing charges, along with the cancellation of your FedEx account number.
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.

Exhibit A

Original Facility Approval

Petition No. 712
Omnipoint (T-Mobile)
Danbury, Connecticut
Staff Report
April 27, 2005

T-Mobile seeks to replace an existing 60-foot tall wooden utility pole, on which whip antennas were formerly attached to dispatch concrete trucks, with an 80-foot tall wood laminate pole to which a platform with twelve antennas would be mounted. The antennas would be mounted with a center line of 80 feet; the tops of the antennas would reach 83 feet. The new pole would be designed to accommodate one additional carrier. At the time of its petition submittal, T-Mobile also notified all abutting property owners of its plans.

On April 26, 2005, Council member Ed Wilensky and staff analyst David Martin visited the site of the petition at 41 Pandanaram Road (Route 37) in Danbury. Stephen Humes, Jackie Slaga, Dan O'Connor, and Jeffrey York were present at the field review representing T-Mobile.

The existing pole is located near the top of a small ridge line that parallels Pandanaram Road. The lower portions of the ridge between the pole site and Pandanaram Road are occupied by a concrete plant (at street level) and several graded off levels that are used for the storage of various concrete products. A graveled access road switches back and forth up the side of the ridge to eventually reach the pole, which is in a small cleared area surrounded by mature deciduous trees that appear to be 65 to 70 feet high.

T-Mobile would install a 15-foot by 15-foot fence compound next to the proposed replacement pole to house its ground equipment which would consist of equipment cabinets on two concrete Pands. In its petition, T-Mobile states the compound would be enclosed by a six-foot high chain link fence topped with three strands of barbed wire. During the field review, T-Mobile representatives stated they would be amenable to installing an eight-foot fence without the barbed wire. Utilities would be brought underground to the compound from a utility pole to be placed somewhere lower on the ridge. Underground utilities would be preferable to overhead lines because of the truck traffic and the use of booms to pick up and move the concrete products.

From the pole site, the ridge continues to rise to the north and east. Although there is a residential area just over the crest of the ridge, no houses are visible from the base of the existing pole. Mr. Wilensky and David Martin drove the residential road nearest the ridge line and could not see the existing tower from this location.

To the south of the existing pole, the ridge falls steeply away to a condominium development. The condominium units nearest to the pole site face the side of the ridge and would not be able to see the replacement pole. Units closer to Pandanaram Road may have some views of the higher proposed tower. Mr. Wilensky and David Martin drove through the condominium development but could not see the existing tower.

To the west of the site, Danbury High School is visible on the side of an opposite ridge. There are a few residences also visible on the opposite ridge. However, existing vegetation and distance should make any visual presence of the proposed, higher tower minimal.

View of Existing Pole

View From Pole, Looking Toward Roof Of Nearest Condominiums

Closer View of Condominium Roof from Edge of Ridge

Looking West From Pole Site

Looking Northeast From Site, Existing Pole In Foreground

Exhibit B

Property Card

PADANARAM RD

Location	PADANARAM RD	**Mblu**	H10/ / 140/ /
Acct#		**Owner**	KAUFMAN ROBERT J
Assessment	$1,865,700	**Appraisal**	$2,665,200
PID	10751	**Building Count**	1

Current Value

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2017	$829,700	$1,835,500	$2,665,200
Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2017	$580,800	$1,284,900	$1,865,700

Owner of Record

Owner	KAUFMAN ROBERT J	**Sale Price**	$0
Co-Owner		**Book & Page**	0470/0094
Address	41 PADANARAM RD DANBURY, CT 06811	**Sale Date**	02/07/1969

Ownership History

Ownership History			
Owner	**Sale Price**	**Book & Page**	**Sale Date**
KAUFMAN ROBERT J	$0	0470/0094	02/07/1969

Building Information

Building 1 : Section 1

Year Built:	2006
Living Area:	23,280
Replacement Cost:	$1,029,798
Building Percent Good:	66
Replacement Cost Less Depreciation:	$679,700

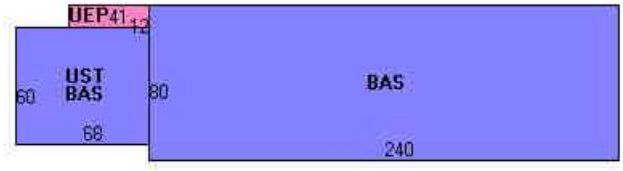
Building Attributes

Field	Description
STYLE	Pre-Eng Mfg
MODEL	Ind/Comm
Grade	Average
Stories:	1
Occupancy	1
Exterior Wall 1	Pre-finsh Metl
Exterior Wall 2	
Roof Structure	Gable/Hip
Roof Cover	Metal/Tin
Interior Wall 1	Minim/Masonry
Interior Wall 2	
Interior Floor 1	Concr-Finished
Interior Floor 2	
Heating Fuel	Oil
Heating Type	Hot Air-no Duc
AC Type	None
Bldg Use	Commercial MDL-96
Total Rooms	
Total Bedrms	00
Total Baths	0
1st Floor Use:	200I
Heat/AC	NONE
Frame Type	FIREPRF STEEL
Baths/Plumbing	AVERAGE
Ceiling/Wall	NONE
Rooms/Prtns	AVERAGE
Wall Height	25
% Comn Wall	0

Building Photo

(http://images.vgsi.com/photos2/DanburyCTPhotos/\00\02\39/88.jpg)

Building Layout



(http://images.vgsi.com/photos2/DanburyCTPhotos//Sketches/10751_1075

Building Sub-Areas (sq ft)			Legend
Code	Description	Gross Area	Living Area
BAS	First Floor	23,280	23,280
UEP	Unfi. Enclosed Porch	492	0
UST	Unf. Storage	4,080	0
		27,852	23,280

Extra Features

Extra Features	Legend
No Data for Extra Features	

Land

Land Use

Use Code 200I

Land Line Valuation

Size (Acres) 9.68

Description	Commercial MDL-96	**Frontage**	0
Zone	CN20	**Depth**	0
Neighborhood	6500	**Assessed Value**	$1,284,900
Alt Land Appr	No	**Appraised Value**	$1,835,500
Category			

Outbuildings

Outbuildings						Legend
Code	**Description**	**Sub Code**	**Sub Description**	**Size**	**Value**	**Bldg #**
CEL	Cell Tower			1 UNITS	$150,000	1

Valuation History

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2019	$829,700	$1,835,500	$2,665,200
2018	$829,700	$1,835,500	$2,665,200
2017	$829,700	$1,835,500	$2,665,200

Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2019	$580,800	$1,284,900	$1,865,700
2018	$580,800	$1,284,900	$1,865,700
2017	$580,800	$1,284,900	$1,865,700

Exhibit C

Construction Drawings

T-MOBILE SITE NAME:

CT896/CONCRETE POLE

T-MOBILE SITE NUMBER:

CT11896A

CROWN BU: 823531 / APP#: 479842

67D92DBL CONFIGURATION

41 PADANARAM RD
DANBURY, CT 06811

EXISTING 80'-0" WOODEN MONOPOLE

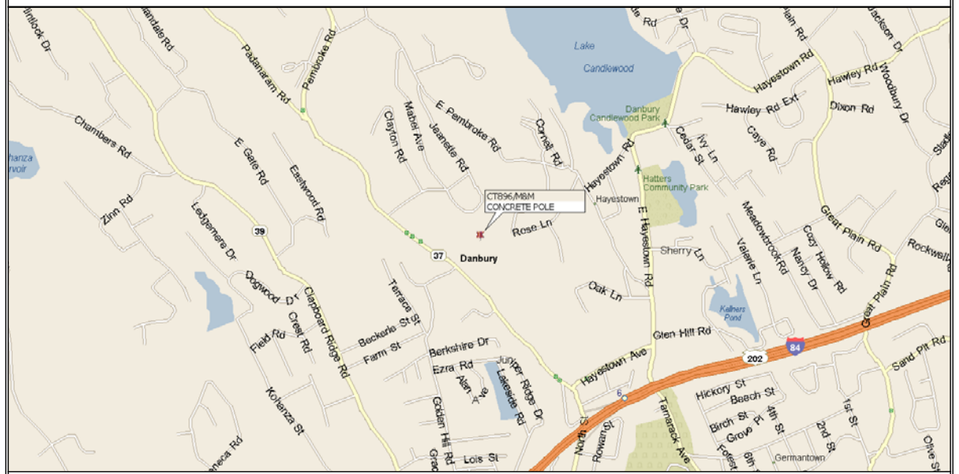
PROJECT SUMMARY

SITE TYPE:	EXISTING EQUIPMENT UPGRADE
SITE ADDRESS:	41 PADANARAM RD DANBURY, CT 06811
JURISDICTION:	FAIRFIELD COUNTY

NAD83

LATITUDE:	41.418900° N
LONGITUDE:	73.461800° 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	2
A-1	OVERALL SITE PLAN	2
A-2	ANTENNA/CABLE SCHEDULE AND AZIMUTH PLANS	2
A-3	TOWER ELEVATION	2
A-4	ANTENNA AND RRU DETAILS	2
E-1	PANEL SCEHDULE AND ONE-LINE DIAGRAM	2

CONTACT INFORMATION

A&E FIRM:	B+T GROUP 1717 S. BOULDER, STE. 300 TULSA, OK 74119	ELECTRIC PROVIDER:	UNITED ILLUMINATING CO. 203-499-2000
CONTACT:	MIKE OAKES	TELCO PROVIDER:	COMCAST PHONE 800-934-6489
PHONE:	(918) 587-4630		

CODE COMPLIANCE

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

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

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 32A-32B, TURN RIGHT ONTO RAMP. TAKE RAMP (LEFT) ONTO I-84 [US-6]. AT EXIT 6, TURN RIGHT ONTO RAMP. TURN RIGHT ONTO CT-37 [NORTH ST]. KEEP STRAIGHT ONTO CT-37 [PADANARAM RD]. TURN RIGHT ONTO JEANETTE RD [JEANETTE ST]. TURN RIGHT ONTO HORSESHOE DR. TURN RIGHT ONTO LOCAL ROAD(S) AND ARRIVE AT CT896/M&M CONCRETE POLE.

PROJECT DESCRIPTION

THE PROPOSED PROJECT INCLUDES:

- REMOVE (3) EXISTING ANTENNAS AT 78'-0".
- REMOVE (2) DUS41s & (1) XMU
- REMOVE (3) RRUS11 B12 RRUS AT CABINET.
- RELOCATE (3) EXISTING ANTENNAS AT 78'-0".
- INSTALL (3) NEW ANTENNAS AT 78'-0".
- INSTALL (3) NEW 4449 B71+B85 AT 78'-0".
- INSTALL (3) NEW TMAS AT CABINET.
- INSTALL (1) NEW 6x12 HCS FIBER.
- INSTALL (1) NEW BB 5216 & (1) BB 6630
- INSTALL (6) NEW RU22s AT CABINET.

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.

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.

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

B+T GRP

CROWN CASTLE

T-Mobile

CT11896A
BU #: 823531

CT896/CONCRETE POLE

41 PADANARAM RD
DANBURY, CT 06811

EXISTING 80'-0"
WOODEN MONOPOLE

PROJECT NO:	137173.001.01
CHECKED BY:	MTJ

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION
0	8/7/19	RFC	CONSTRUCTION
1	8/20/20	MLC	CONSTRUCTION
2	9/30/20	LHT	CONSTRUCTION

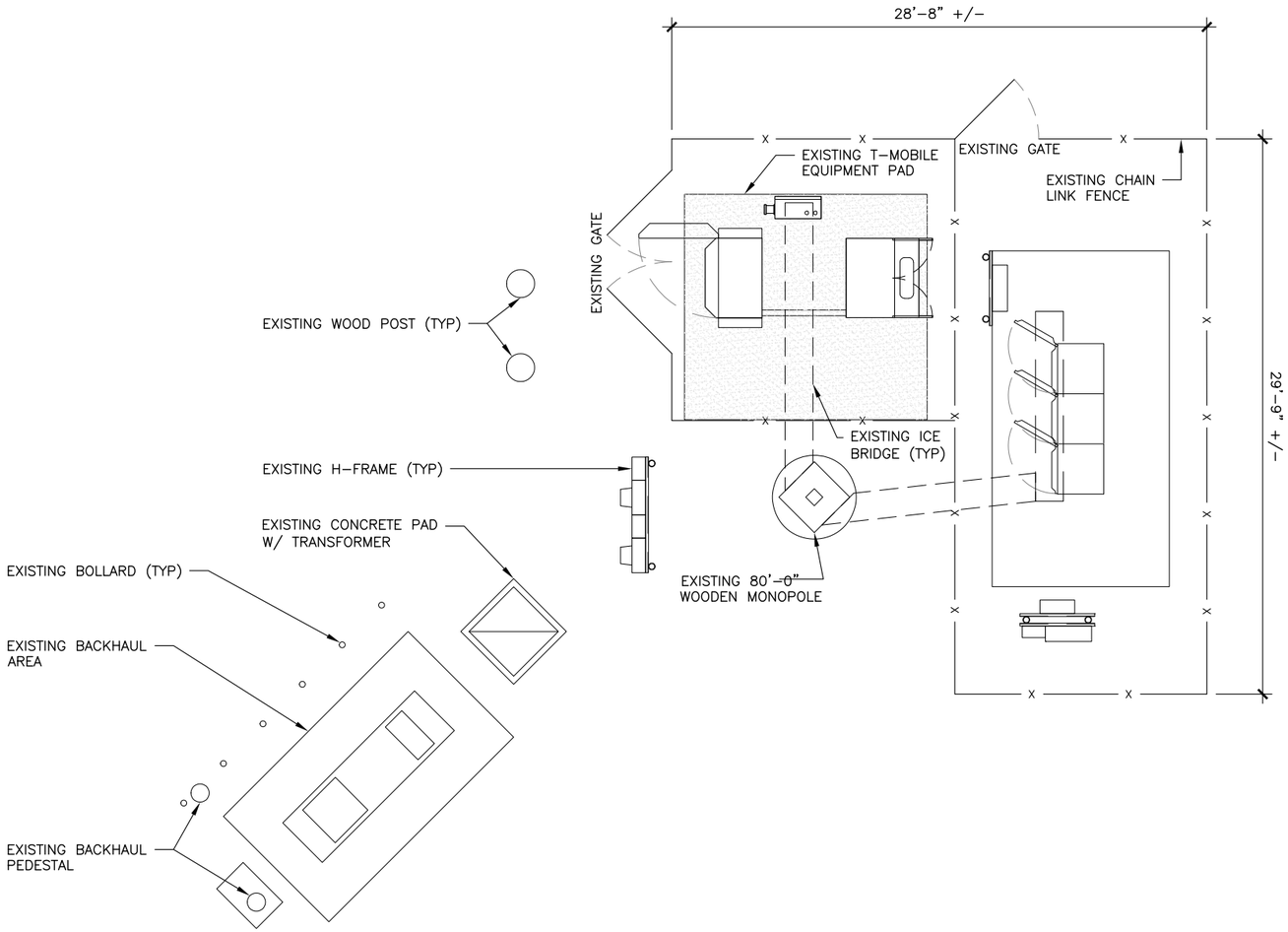
B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/21

STATE OF CONNECTICUT
31627
LICENSED
PROFESSIONAL ENGINEER

9/30/20

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

SHEET NUMBER:	REVISION:
T-1	2



1 OVERALL SITE PLAN

SCALE: 0' 1' 4' 8' 20'

N

GENERAL NOTES:

1. SUBJECT PROPERTY IS SITUATED AT 41 PADANARAM RD, DANBURY, CT 06811.

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) TMAS, NINE (9) RRUS, AND ONE (1) ADDITIONAL CABLE MOUNTED ON AN EXISTING WOODEN MONOPOLE.

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 41.418900° N± AND LONGITUDE OF 73.461800° 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 SITE PLANS AND FROM CROWN 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

CT11896A
BU #: 823531

CT896/CONCRETE POLE

41 PADANARAM RD
DANBURY, CT 06811

EXISTING 80'-0"
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CHECKED BY:	MTJ

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B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/21

STATE OF CONNECTICUT
31627
LICENSED
PROFESSIONAL ENGINEER
9/30/20

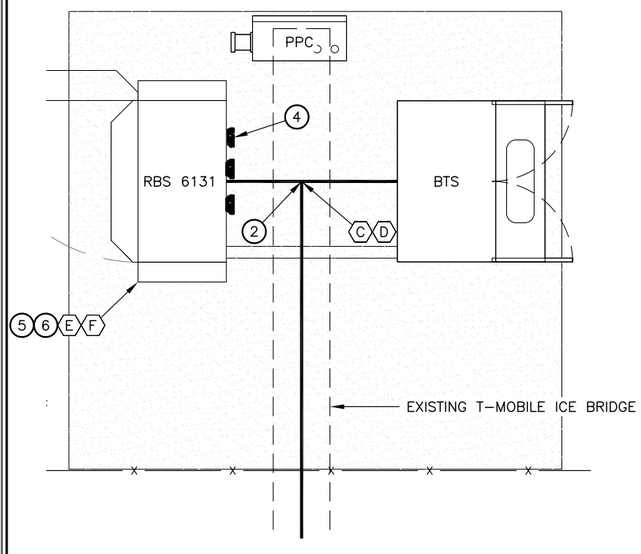
SHEET NUMBER:	REVISION:
A-1	2

LEGEND

EXISTING/DEMOLITION NOTES		INSTALLATION NOTES	
A	EXISTING ERICSSON AIR32 KRD901146-1_B66A_B2A ANTENNA TO BE RELOCATED TO POSITION 1 (TOTAL OF 3)	1	INSTALL RFS APXVAARR24_43-U-NA20 (8 FT) ANTENNAS ON EXISTING MOUNT. 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 ERICSSON AIR21 B4A/B12P ANTENNA TO BE REMOVED (TOTAL OF 3)	2	INSTALL (1) 6x12 HCS FIBER. RUN FROM EQUIPMENT TO ANTENNAS FOLLOWING EXISTING ROUTING
C	EXISTING 9x18 HCS FIBER TO REMAIN (TOTAL OF 1)	3	INSTALL (3) RADIO 4449 B71/B85 AT ANTENNA
D	EXISTING 6x12 HCS FIBER TO REMAIN (TOTAL OF 1)	4	INSTALL (3) NEW TMAs AT CABINET
E	REMOVE (3) RRUS11 B12 RADIOS	5	INSTALL (1) BB 5216 & (1) BB 6630
F	REMOVE (2) DUS41s & (1) XMU	6	INSTALL (6) RU22 RADIOS AT CABINET

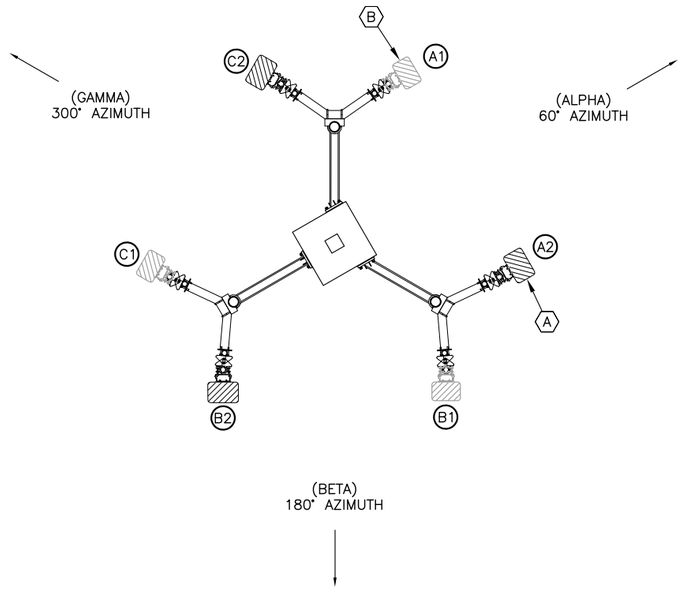
ANTENNA AND CABLE SCHEDULE

SECTOR	POSITION	EXISTING ANTENNAS	PROPOSED ANTENNA CONFIGURATION		E-TILT	M-TILT	ANTENNA CENTERLINE	TMA/RRU	CABLES	JUMPER TYPE	CABLE LENGTH
60° – ALPHA	A1	ERICSSON AIR32 KRD901146-1_B66A_B2	LTE GSM	RU22	2°/2° 2°	0°	78'-0"	0/0	(1) 9x18 HCS FIBER	DC/FIBER	128'-0"
	A2	**RFS APXVAARR24_43-U-NA20**	**LTE UMTS**	**B71 B85 RU22**	**2°/2° 2°**	**0°**		**1/2**	(2) 1 5/8" COAX	**DC/FIBER & 1/2" COAX**	**128'-0"**
180° – BETA	B1	ERICSSON AIR32 KRD901146-1_B66A_B2	LTE GSM	RU22	2°/2° 2°	0°	78'-0"	0/0	**(1) 6x12 HCS FIBER**	DC/FIBER	128'-0"
	B2	**RFS APXVAARR24_43-U-NA20**	**LTE UMTS**	**B71 B85 RU22**	**2°/2° 2°**	**0°**		**1/2**	(2) 1 5/8" COAX	**DC/FIBER & 1/2" COAX**	**128'-0"**
300° – GAMMA	C1	ERICSSON AIR32 KRD901146-1_B66A_B2	LTE GSM	RU22	2°/2° 2°	0°	78'-0"	0/0	(1) 6x12 HCS FIBER	DC/FIBER	128'-0"
	C2	**RFS APXVAARR24_43-U-NA20**	**LTE UMTS**	**B71 B85 RU22**	**2°/2° 2°**	**0°**		**1/2**	(2) 1 5/8" COAX	**DC/FIBER & 1/2" COAX**	**128'-0"**



1 ENLARGED AREA PLAN

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



2 EXISTING ANTENNA ORIENTATION

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

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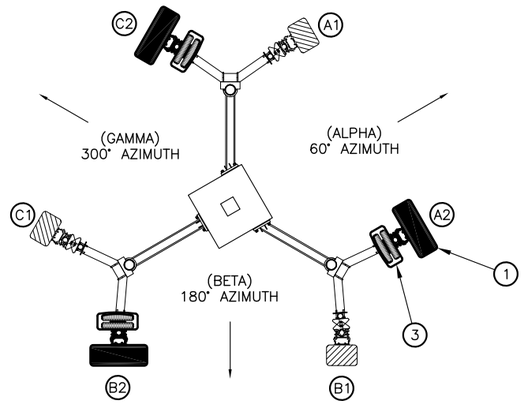


3 PROPOSED ANTENNA ORIENTATION

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

N

B+T GRP

CROWN CASTLE

T-Mobile

CT11896A
BU #: 823531
CT896/CONCRETE POLE
41 PADANARAM RD
DANBURY, CT 06811
EXISTING 80'-0"
WOODEN MONOPOLE

PROJECT NO:	137173.001.01
CHECKED BY:	MTJ

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION
0	8/7/19	RFC	CONSTRUCTION
1	8/20/20	MLC	CONSTRUCTION
2	9/30/20	LHT	CONSTRUCTION

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/21

STATE OF CONNECTICUT 31627 LICENSED PROFESSIONAL ENGINEER

9/30/20

SHEET NUMBER:	REVISION:
A-2	2

LEGEND

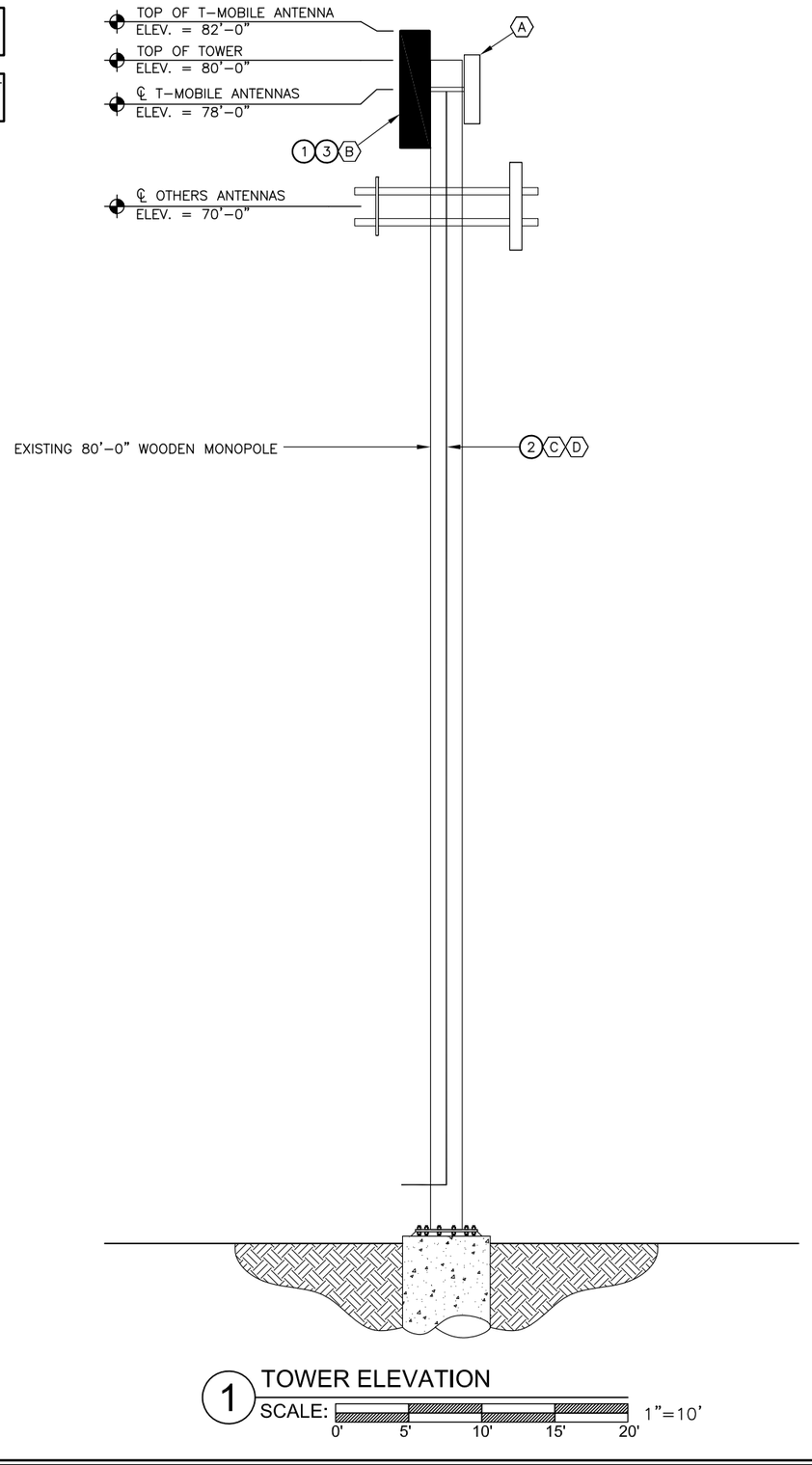
EXISTING/DEMOLITION NOTES		INSTALLATION NOTES	
A	EXISTING ERICSSON AIR32 KRD901146-1_B66A_B2A ANTENNA TO BE RELOCATED TO POSITION 1 (TOTAL OF 3)	1	INSTALL RFS APXVAARR24_43-U-NA20 (8 FT) ANTENNAS ON EXISTING MOUNT. PROVIDE NEW 2 7/8" OD SCH.40 PIPE MAST (LENGTH TO BE V.I.F) (TYP. OF 1 PER SECTOR, TOTAL OF 3)
B	EXISTING ERICSSON AIR21 B4A/B12P ANTENNA TO BE REMOVED (TOTAL OF 3)	2	INSTALL (1) 6x12 HCS FIBER. RUN FROM EQUIPMENT TO ANTENNAS FOLLOWING EXISTING ROUTING
C	EXISTING 9x18 HCS FIBER TO REMAIN (TOTAL OF 1)	3	INSTALL (3) RADIO 4449 B71/B85 AT ANTENNA
D	EXISTING 6x12 HCS FIBER TO REMAIN (TOTAL OF 1)	4	INSTALL (3) NEW TMAs AT CABINET
E	REMOVE (3) RRUS11 B12 RADIOS	5	INSTALL (1) BB 5216 & (1) BB 6630
F	REMOVE (2) DUS41s & (1) XMU	6	INSTALL (6) RU22 RADIOS AT CABINET

EXISTING TOWER IS SUFFICIENT PER STRUCTURAL ANALYSIS BY PAUL J. FORD & CO. DATED 8/17/20.

EXISTING MOUNT IS SUFFICIENT PER MOUNT ANALYSIS REPORT BY PAUL J. FORD & CO. DATED 8/7/20.

LEGEND:

- **NEW**
- EXISTING
- FUTURE



1 TOWER ELEVATION

SCALE: 1"=10'

0' 5' 10' 15' 20'

B+T GRP

CROWN CASTLE

T-Mobile

CT11896A
BU #: 823531

CT896/CONCRETE POLE

41 PADANARAM RD
DANBURY, CT 06811

EXISTING 80'-0"
WOODEN MONOPOLE

PROJECT NO:	137173.001.01
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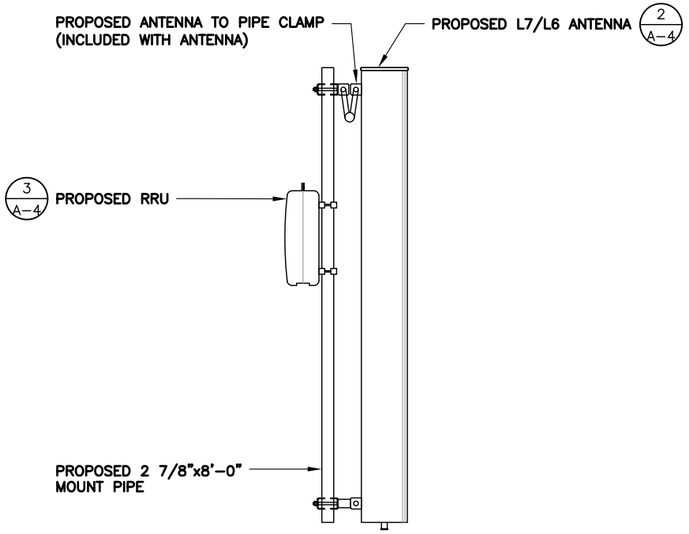
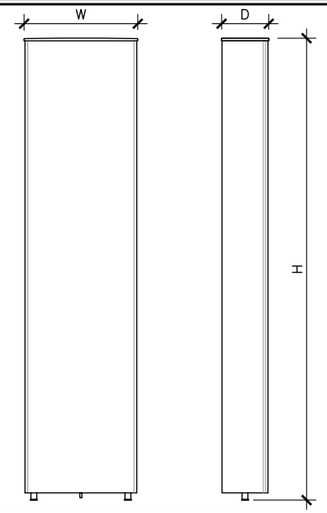
SHEET NUMBER:	REVISION:
A-3	2



1 PROPOSED L7/L6 ANTENNA & RRU MOUNTING DETAIL

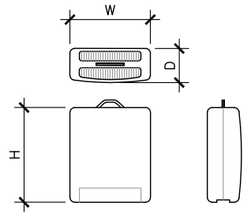
SCALE: 3/8" = 1'-0"



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

2 L7/L6 ANTENNA DETAIL

SCALE: 3/8" = 1'-0"

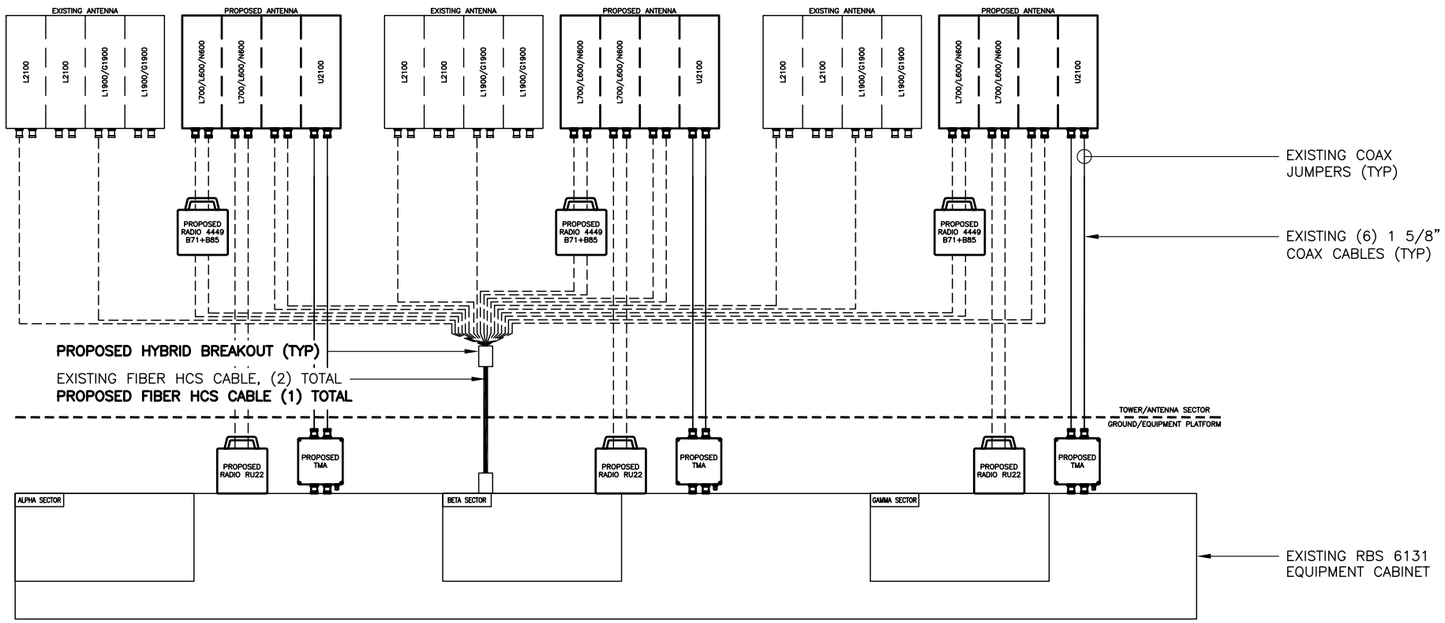


RRU SPECIFICATIONS	
MANUFACTURER	ERICSSON
MODEL #	4449
WIDTH	13.2"
DEPTH	9.3"
HEIGHT	14.9"
WEIGHT	75 LBS

3 REMOTE RADIO UNIT (RRU)

SCALE: 3/8" = 1'-0"

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 A-2 FOR EXACT ANTENNA POSITIONING.



4 ANTENNA & CABLING SCHEMATIC

SCALE: N.T.S.

B+T GRP

CROWN CASTLE

T-Mobile

CT11896A
BU #: 823531

CT896/CONCRETE POLE

41 PADANARAM RD
DANBURY, CT 06811

EXISTING 80'-0"
WOODEN MONOPOLE

PROJECT NO:	137173.001.01
CHECKED BY:	MTJ

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION
0	8/7/19	RFC	CONSTRUCTION
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9/30/20

SHEET NUMBER: A-4

REVISION: 2

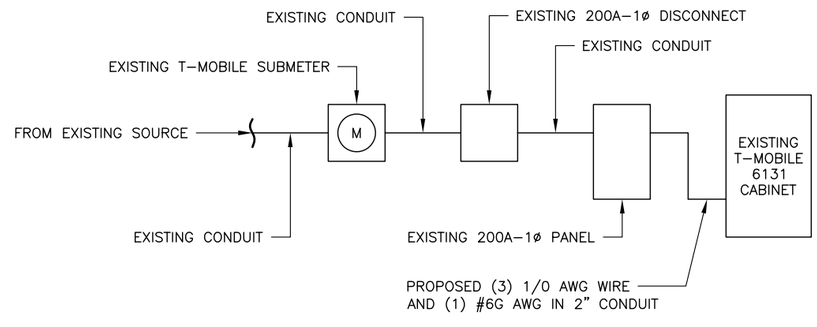
FINAL PANEL SCHEDULE							
LOAD	POLES	AMPS	BUS L1	BUS L2	AMPS	POLES	LOAD
SURGE	2	60A	1	2	20A	1	DDC GFI
			3	4	**125A**	2	RBS 6131
BTS MAIN	2	60A	5	6			
			7	8	20A	1	SPOTLIGHT

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

REPLACE EXISTING BREAKER IN POSITION 4 AND 6 WITH A NEW 2P 125A BREAKER
REPLACE EXISTING WIRES FOR EXISTING 6131 CABINET WITH (3) 1/0 AWG THWN (COPPER) AND (1) #6G AWG. MINIMUM CONDUIT SIZE TO BE 2".
IF 125A BREAKER WILL NOT PROPERLY FIT IN EXISTING PANEL, REPLACE (E) PANEL WITH SQUARE D PANEL QO12040M200RB (OR APPROVED EQUAL).
UPGRADE FEEDER WIRES TO MEET AMPACITY IF NEW PANEL IS REQUIRED.
FINAL PANEL DESIGN AND CALCULATIONS FOR WIRE SIZE WERE BASED OFF OF EXISTING PHOTOS

1 FINAL T-MOBILE PANEL DETAIL

SCALE: N.T.S.



2 ONE-LINE DIAGRAM

SCALE: N.T.S.

B+T GRP

CROWN CASTLE

T···Mobile

CT11896A
BU #: 823531
CT896/CONCRETE POLE
41 PADANARAM RD
DANBURY, CT 06811
EXISTING 80'-0"
WOODEN MONOPOLE

PROJECT NO:	137173.001.01
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REV	DATE	DRWN	DESCRIPTION
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B&T ENGINEERING, INC.
PEC.0001564
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STATE OF CONNECTICUT
31627
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PROFESSIONAL ENGINEER
9/30/20

SHEET NUMBER:	REVISION:
E-1	2

Exhibit D

Structural Analysis Report

PAUL J. FORD & COMPANY

Date: **August 17, 2020**

Denice Nicholson
Crown Castle
3 Corporate Dr
Clifton Park, NY 12065

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

Subject:	**Structural Analysis Report**	
Carrier Designation:	***T-Mobile* Co-Locate**	
	Carrier Site Number:	CT11896A
	Carrier Site Name:	CT896/Concrete Pole
Crown Castle Designation:	**Crown Castle BU Number:**	823531
	Crown Castle Site Name:	CT896/M&M Concrete Pole
	Crown Castle JDE Job Number:	559234
	Crown Castle Work Order Number:	1875111
	Crown Castle Order Number:	479842 Rev. 4
Engineering Firm Designation:	**Paul J. Ford and Company Project Number:**	37520-1749.002.7805
Site Data:	**41 Padanaram Rd, Danbury, Fairfield County, CT** **Latitude *41° 25' 8.1"*, Longitude *-73° 27' 43"*** **80 Foot – Wood Monopole Tower**	

Dear Denice Nicholson,

Paul J. Ford and Company is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above mentioned tower.

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

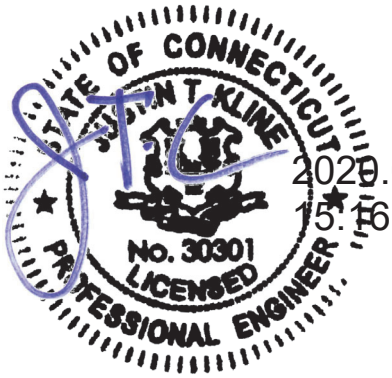
LC5: Proposed Equipment Configuration **Sufficient Capacity (66.3%)**

This analysis utilizes an ultimate 3-second gust wind speed of 120 mph as required by the 2018 Connecticut State Building Code and Appendix N. Applicable Standard references and design criteria are listed in Section 2 - Analysis Criteria.

Respectfully submitted by:

Seth Tschanen

Seth Tschanen, P.E.
Project Engineer
stschanen@pauljford.com



2020.08.17
15:16:51-04'00'

TABLE OF CONTENTS

1) INTRODUCTION

2) ANALYSIS CRITERIA
Table 1 - Proposed Equipment Configuration
Table 2 - Other Considered Equipment

3) ANALYSIS PROCEDURE
Table 3 - Documents Provided
3.1) Analysis Method
3.2) Assumptions

4) ANALYSIS RESULTS
Table 4 - Section Capacity (Summary)
Table 5 – Tower Component Stresses vs. Capacity – LC5
4.1) Recommendations

5) APPENDIX A
CCI Wood Pole Report Output

6) APPENDIX B
Base Level Drawing

7) APPENDIX C
Additional Calculations

1) INTRODUCTION

This tower is an 80 ft Monopole tower designed by LAMINATED WOOD SYSTEMS, INC. in September of 2005.

2) ANALYSIS CRITERIA

NDS Revision:	2015
Risk Category:	II
Wind Speed:	120 mph
Exposure Category:	B
Topographic Factor:	1
Ice Thickness:	1.5 in
Wind Speed with Ice:	50 mph
Service Wind Speed:	60 mph

Table 1 - Proposed Equipment Configuration

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
78.0	78.0	3	ericsson	RRUS 4449	7 2	1 5/8 1 1/2
		3	ericsson	AIR 32 B2A/B66AA w/ Mount Pipe		
		3	rfs celwave	APXVAARR24_43-U-NA20 w/ Mount Pipe		
		1	tower mounts	T-Arm Mount [TA 702-3]		

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)
70.0	70.0	3	alcatel lucent	1900MHZ RRH	3 1	1 1/4 1 5/8
		3	alcatel lucent	800MHZ RRH		
		3	alcatel lucent	RRH2X50-800		
		3	commscope	NNVV-65B-R4 w/ Mount Pipe		
		3	nokia	AAHC w/ Mount Pipe		
		1	tower mounts	Sector Mount [SM 502-3]		

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	FDH Velocitel, 15BKTB1600, 6/9/15	3529191	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	Laminated Wood Systems, TMOB-0018.06A1, 9/20/05	3914350	CCISITES
4-TOWER MANUFACTURER DRAWINGS	Laminated Wood Systems, TMOB-0018.06A1, 9/20/05	3529192	CCISITES

3.1) Analysis Method

CCI Wood Pole Tool (version 2.1.0), a tool internally developed by Crown Castle, was used to calculate member stresses for various load cases. Selected output from the analysis is included in Appendix A. When applicable, Crown Castle has calculated and provided the effective area for panel antennas using approved methods following the intent of the TIA-222 Standard.

3.2) Assumptions

1) Tower and structures were maintained in accordance with the TIA-222 Standard.
2) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.

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

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary)

Elevation (ft)	Size	Controlling Direction	f_b (psi)	f_c (psi)	F'_b (psi)	F'_c (psi)	% Capacity	Pass / Fail
80	26.25 x 12	X-axis	0.00	0.00	2624.28	70.05	0.0	Pass
78	26.25 x 12.3875	X-axis	3.12	3.58	2620.11	73.67	0.4	Pass
73	26.25 x 13.35625	X-axis	118.29	4.62	2610.27	84.05	5.6	Pass
70	26.25 x 13.9375	X-axis	187.38	12.56	2604.71	91.36	12.6	Pass
65	26.25 x 14.90625	X-axis	384.99	13.07	2595.98	105.86	21.5	Pass
60	26.25 x 15.875	X-axis	557.83	13.58	2587.82	124.08	28.1	Pass
55	26.25 x 16.84375	X-axis	709.80	14.11	2580.16	147.43	33.5	Pass
50	26.25 x 17.8125	X-axis	844.02	14.64	2572.96	178.00	37.9	Pass
45	26.25 x 18.78125	X-axis	962.98	15.17	2566.15	219.08	41.7	Pass
40	26.25 x 19.75	X-axis	1068.72	15.72	2559.71	276.02	45.0	Pass
35	26.25 x 20.71875	X-axis	1162.89	16.26	2553.59	357.94	48.0	Pass
30	26.25 x 21.6875	X-axis	1246.83	16.81	2547.76	481.16	50.7	Pass
25	26.25 x 22.65625	X-axis	1321.68	17.37	2542.2	675.54	53.2	Pass
20	26.25 x 23.625	X-axis	1388.78	17.92	2536.88	987.47	55.5	Pass
15	26.25 x 24.59375	X-axis	1449.21	18.48	2531.79	1383.57	57.7	Pass
10	26.25 x 25.5625	X-axis	1503.89	19.05	2526.9	1604.73	59.7	Pass
5	26.25 x 26.53125	X-axis	1553.57	19.61	2522.21	1676.39	61.7	Pass
0	26.25 x 27.5	X-axis	1598.89	20.13	2517.69	1693.46	63.5	Pass
							Summary	
						Rating =	63.5	Pass

Table 5 - Tower Component Stresses vs. Capacity – LC5

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Base Foundation Structural	0	66.0	Pass
1	Base Foundation Soil Interaction	0	66.3	Pass

Structure Rating (max from all components) =	66.3%

Notes:

- All structural ratings are per TIA-222-H Section 15.5

1) See additional documentation in “Appendix C – Additional Calculations” for calculations supporting the % capacity consumed.

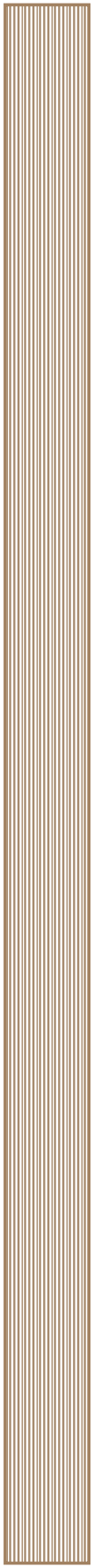
4.1) Recommendations

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

APPENDIX A

CCI WOOD POLE REPORT OUTPUT

80 ft



0.0 ft

Length (ft)	Top Dim (in)	Bot Dim (in)	Material	Weight (k)
80	26.25 x 12	26.25 x 27.5	Southern Pine	9.79

TOWER ANALYSIS NOTES

1. Tower is located in Fairfield County, CT
2. Tower was analyzed for a 120 mph 3-second gust wind in accordance with ASCE 7-10
3. Exposure category B used in analysis
4. Topographic Kzt factor of 1 used in analaysis.

TOWER RATING: 63.5%

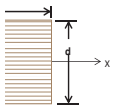
FACTORED REACTIONS

AXIAL
15 kips

SHEAR
9 kips

MOMENT
441 kips

120 mph Ultimate 3-sec Gust Wind Speed



CROWN CASTLE
The Pathway to Possible

Crown Castle
2000 Corporate Drive
Canonsburg, PA 15317
Phone: (724) 416-2000

Job:	***BU# 823531***			
Project:				
Client:	CROWN CASTLE	Drawn by:		App'd:
Code:	2015 IBC	Date:	8/17/2020	Scale: NTS
Path:	G:\TOWER\375_Crown_Castle\2020\37520-1749_823531_CT896-M&M Concr			Dwg No. E-1

Geometry

Pole Data:

Lumber Type:	Glulam	
Pole Length:	80	ft
Wood Species:	Southern Pine	
Wood Database:	24F-V5	
Design Interval:	5	ft

Pole Properties:

Eminy =	790000	psi
Fby =	1750	psi
Eminx =	900000	psi
Fbx =	2400	psi
Fc =	1450	psi

Wood Density:	0.034	kcf
Cond. Treatment:	Air Dried	
Temperature:	90	°F

Pole Geometry:

Diameter Top (in)	Diameter Bottom (in)	X-Axis Top Width "b" (in)	X-Axis Bottom Width "b" (in)	Raceway X-Axis Width (in)	Y-Axis Top Width "d" (in)	Y-Axis Bottom Width "d" (in)	Raceway Y-Axis Width (in)
		26.25	26.25	0	12	27.5	0

Discrete Loading

Mount CL Elev (ft)	Vertical Offset (ft)	Database	Model	Qty	Offset Type	Face	Azimuth	C_aA_a Front (ft^2)	C_aA_a Side (ft^2)	Weight (lb)
78	0	ERICSSON	AIR 32 B2A/B66AA	1	From Face	B	-30	6.75	6.87	132.20
78	0	ERICSSON	AIR 32 B2A/B66AA	1	From Face	C	0	6.75	6.87	132.20
78	0	ERICSSON	AIR 32 B2A/B66AA	1	From Face	D	30	6.75	6.87	132.20
78	0	RFS CELWAVE	APXVAARR24_43-U-NA20	1	From Face	B	-30	14.69	7.55	96.80
78	0	RFS CELWAVE	APXVAARR24_43-U-NA20	1	From Face	C	0	14.69	7.55	96.80
78	0	RFS CELWAVE	APXVAARR24_43-U-NA20	1	From Face	D	30	14.69	7.55	96.80
78	0	ERICSSON	RRUS 4449	1	From Face	B	-30	1.97	1.40	70.50
78	0	ERICSSON	RRUS 4449	1	From Face	C	0	1.97	1.40	70.50
78	0	ERICSSON	RRUS 4449	1	From Face	D	30	1.97	1.40	70.50
70	0	COMMSCOPE	NNVV-65B-R4	1	From Face	B	-30	7.55	4.23	77.40
70	0	COMMSCOPE	NNVV-65B-R4	1	From Face	C	0	7.55	4.23	77.40
70	0	COMMSCOPE	NNVV-65B-R4	1	From Face	D	30	7.55	4.23	77.40
70	0	NOKIA	AAHC	1	From Face	B	-30	4.41	2.69	103.62
70	0	NOKIA	AAHC	1	From Face	C	0	4.41	2.69	103.62
70	0	NOKIA	AAHC	1	From Face	D	30	4.41	2.69	103.62
70	0	ALCATEL LUCENT	RRH2X50-800	1	From Face	B	-30	1.70	1.28	52.90
70	0	ALCATEL LUCENT	RRH2X50-800	1	From Face	C	0	1.70	1.28	52.90
70	0	ALCATEL LUCENT	RRH2X50-800	1	From Face	D	30	1.70	1.28	52.90
70	0	ALCATEL LUCENT	1900MHZ RRH	1	From Face	B	-30	2.49	3.26	44.00
70	0	ALCATEL LUCENT	1900MHZ RRH	1	From Face	C	0	2.49	3.26	44.00
70	0	ALCATEL LUCENT	1900MHZ RRH	1	From Face	D	30	2.49	3.26	44.00
70	0	ALCATEL LUCENT	800MHZ RRH	1	From Face	B	-30	2.13	1.77	53.00
70	0	ALCATEL LUCENT	800MHZ RRH	1	From Face	C	0	2.13	1.77	53.00
70	0	ALCATEL LUCENT	800MHZ RRH	1	From Face	D	30	2.13	1.77	53.00
78		Tower Mounts	Side Arm Mount [SO 702-3	1	None			3.22	3.22	81.00
70		Tower Mounts	Sector Mount [SM 502-3]	1	None			33.02	33.02	1673.10

Linear Loading

Start Height (ft)	End Height (ft)	Nominal Width (in)	Face	Total #	# Exposed	Diameter (in)	Weight (plf)
0	78	1-5/8	A	4	1	1.98	0.82
0	78	1-1/2	A	1	0	1.5	0.9835
0	78	1-5/8	B	3	1	1.98	0.82
0	78	1-1/2	B	1	0	1.5	0.9835
0	70	1-1/4	C	3	0	1.54	1.3
0	70	1-5/8	C	1	1	1.66	2.39

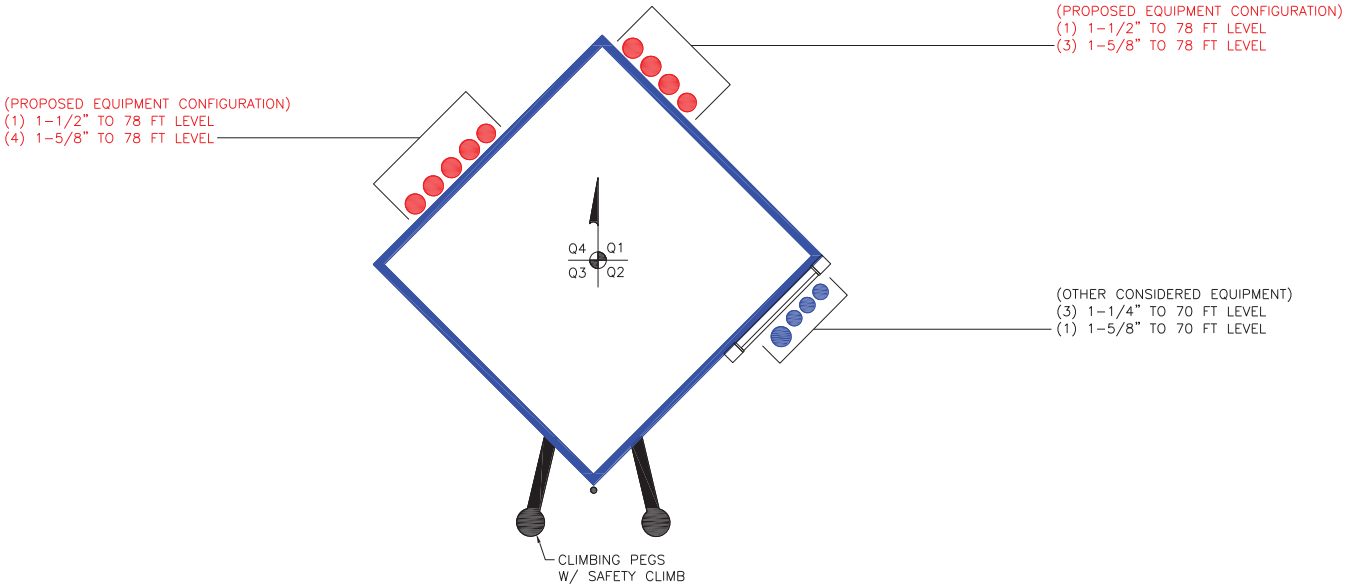
Results

Elevation (ft)	Breadth (in)	Depth (in)	Axial (k)	Shear (k)	Moment (k-ft)	f_b (psi)	f_c (psi)	F'_b (psi)	F'_c (psi)	% Capacity
80	26.25	12.00	0.000	0.087	0.000	0.00	0.00	2624.28	70.05	0.0%
78	26.25	12.39	1.166	1.504	0.174	3.12	3.58	2620.11	73.67	0.4%
73	26.25	13.36	1.621	1.859	7.693	118.29	4.62	2610.27	84.05	5.6%
70	26.25	13.94	4.596	3.583	13.270	187.38	12.56	2604.71	91.36	12.6%
65	26.25	14.91	5.113	4.013	31.188	384.99	13.07	2595.98	105.86	21.5%
60	26.25	15.88	5.660	4.433	51.253	557.83	13.58	2587.82	124.08	28.1%
55	26.25	16.84	6.237	4.843	73.419	709.80	14.11	2580.16	147.43	33.5%
50	26.25	17.81	6.844	5.242	97.634	844.02	14.64	2572.96	178.00	37.9%
45	26.25	18.78	7.481	5.628	123.841	962.98	15.17	2566.15	219.08	41.7%
40	26.25	19.75	8.148	6.002	151.983	1068.72	15.72	2559.71	276.02	45.0%
35	26.25	20.72	8.845	6.363	181.996	1162.89	16.26	2553.59	357.94	48.0%
30	26.25	21.69	9.572	6.707	213.808	1246.83	16.81	2547.76	481.16	50.7%
25	26.25	22.66	10.329	7.051	247.344	1321.68	17.37	2542.20	675.54	53.2%
20	26.25	23.63	11.116	7.396	282.600	1388.78	17.92	2536.88	987.47	55.5%
15	26.25	24.59	11.933	7.740	319.578	1449.21	18.48	2531.79	1383.57	57.7%
10	26.25	25.56	12.780	8.084	358.278	1503.89	19.05	2526.90	1604.73	59.7%
5	26.25	26.53	13.658	8.428	398.698	1553.57	19.61	2522.21	1676.39	61.7%
0	26.25	27.50	14.530	8.600	440.840	1598.89	20.13	2517.69	1693.46	63.5%

Elevation (ft)	Breadth (in)	Depth (in)	Axial (k)	Shear (k)	Moment (k-ft)	f_b (psi)	f_c (psi)	F'_b (psi)	F'_c (psi)	% Capacity
80	12.00	26.25	0.000	0.040	0.000	0.00	0.00	1814.35	61.52	0.0%
78	12.39	26.25	1.166	1.288	0.080	0.68	3.58	1871.05	64.70	0.3%
73	13.36	26.25	1.621	1.460	6.523	51.03	4.62	1978.44	73.82	3.1%
70	13.94	26.25	4.596	3.013	10.903	81.74	12.56	2023.51	80.25	7.0%
65	14.91	26.25	5.113	3.246	25.968	182.03	13.07	2076.61	93.00	11.7%
60	15.88	26.25	5.660	3.489	42.201	277.77	13.58	2111.86	109.03	15.9%
55	16.84	26.25	6.237	3.741	59.648	370.02	14.11	2136.29	129.57	19.9%
50	17.81	26.25	6.844	4.000	78.353	459.62	14.64	2153.95	156.49	23.6%
45	18.78	26.25	7.481	4.265	98.352	547.18	15.17	2167.17	192.69	27.3%
40	19.75	26.25	8.148	4.534	119.675	633.15	15.72	2177.37	242.93	30.8%
35	20.72	26.25	8.845	4.806	142.344	717.88	16.26	2185.43	315.39	34.3%
30	21.69	26.25	9.572	5.078	166.372	801.58	16.81	2191.93	424.88	37.7%
25	22.66	26.25	10.329	5.362	191.763	884.40	17.37	2197.26	599.47	41.1%
20	23.63	26.25	11.116	5.659	218.574	966.72	17.92	2201.71	889.57	44.5%
15	24.59	26.25	11.933	5.967	246.868	1048.85	18.48	2205.45	1309.67	47.9%
10	25.56	26.25	12.780	6.288	276.705	1131.06	19.05	2208.65	1587.09	51.4%
5	26.53	26.25	13.658	6.621	308.145	1213.59	19.61	2240.00	1673.78	54.2%
0	27.50	26.25	14.530	6.792	341.250	1296.62	20.13	2240.00	1693.44	57.9%

APPENDIX B

BASE LEVEL DRAWING



BUSINESS UNIT: 823531 TOWER ID: C_BASELEVEL

APPENDIX C

ADDITIONAL CALCULATIONS

NDS Version	2015-ASD

X-X Base Reactions

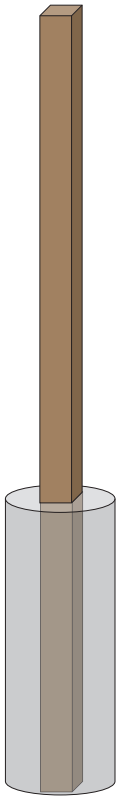
Moment (k-ft):	440.84
Axial (k):	14.53
Shear (k):	8.60

Y-Y Base Reactions

Moment (k-ft):	341.25
Axial (k):	14.53
Shear (k):	6.79

Pole Properties

Encased:	Yes	*Select*
Depth to check pole (ft):	2.3	



Foundation Dimensions

Caisson Diameter (ft):	4.5
Depth Below Existing Grade (ft):	13.5
Extension Above Grade (ft):	0

Soil Properties

Ultimate Gross Bearing (ksf):	42.20	
Neglect Top Layer:	Yes	*Select*
Groundwater:	No	*Select*

Layer Top Depth (ft)	Layer Bottom Depth (ft)	Layer Thickness (ft)	Effective Unit Weight of Soil (pcf)	Cohesion (ksf)	Internal Friction Angle (deg)	SPT Blow Count	Allowable Skin Friction (ksf)
0	2.25	2.25	100	0	27	0	0.000
2.25	4	1.75	125	0	37	0	0.000
4	13.5	9.5	130	0	40	50	0.584

Soil Checks

	Available Capacity	Demand	Check	% Capacity
Pier-Soil Interaction (FOS):	3.02	2.00	Pass	66.3%
Bearing (kips):	414.02	46.74	Pass	11.3%

Structural Checks

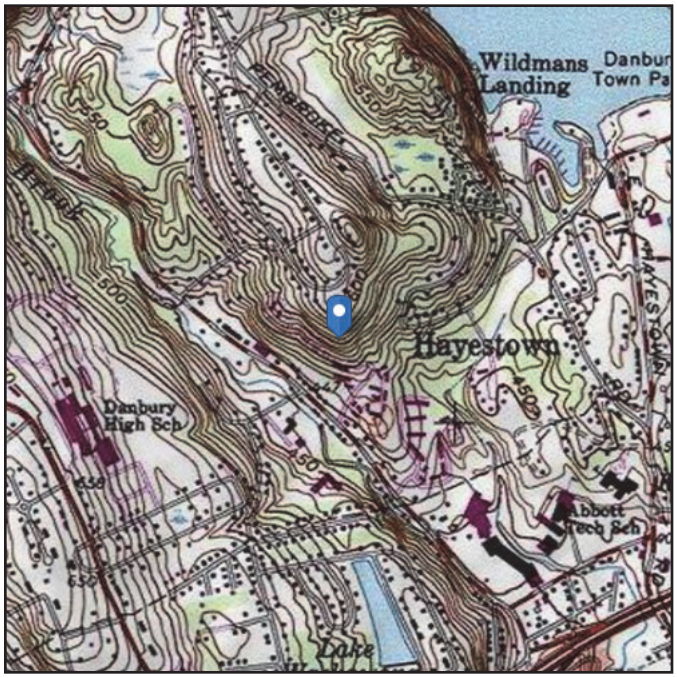
	F'_b (psi)	F'_c (psi)	Bending (psi	Axial (psi)	Check	% Capacity
X-X Embedded Wood Capacity:	2517.69	1693.46	1661.05	20.60	Pass	66.0%
Y-Y Embedded Wood Capacity:	2240.00	1693.44	1374.21	20.60	Pass	61.3%

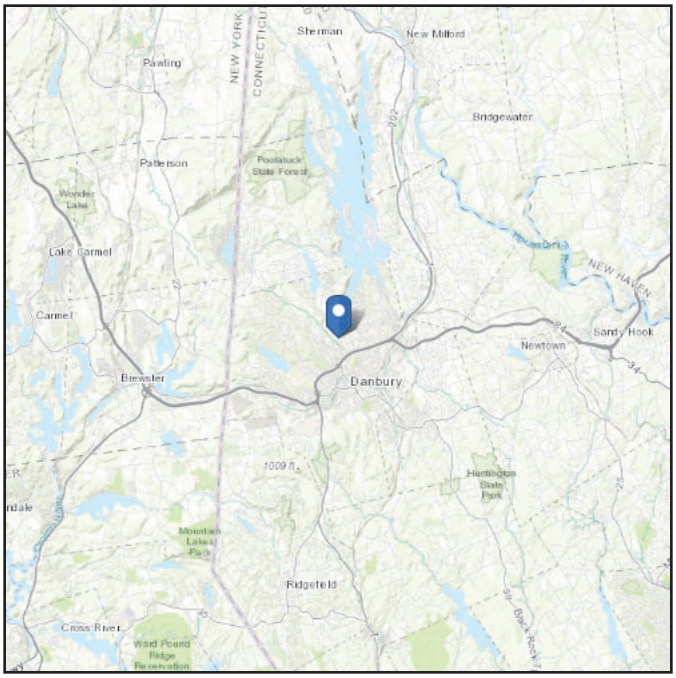
ASCE 7 Hazards Report

Address:
No Address at This Location

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

Elevation: 571.29 ft (NAVD 88)
Latitude: 41.418917
Longitude: -73.461944





Wind

Results:

Wind Speed:	116 Vmph
10-year MRI	76 Vmph
25-year MRI	85 Vmph
50-year MRI	90 Vmph
100-year MRI	96 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.

Ice

Results:

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

Exhibit E

Mount Analysis

PAUL J. FORD & COMPANY

Date: August 7, 2020

Kevin Morrow
Crown Castle
6325 Ardrey Kell Road
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:	CT11896A
	Carrier Site Name:	CT896/Concrete Pole
Crown Castle Designation:	**Crown Castle BU Number:**	823531
	Crown Castle Site Name:	CT896/M&M Concrete Pole
	Crown Castle JDE Job Number:	559234
	Crown Castle Purchase Order Number:	1557309
	Crown Castle Order Number:	479842 Rev. 4
Engineering Firm Designation:	**Paul J Ford and Company Project Number:**	A37520-1749.001.7190
Site Data:	**41 Padanaram Rd, Danbury, Fairfield County, CT 06811** **Latitude 41.418917°, Longitude -73.461944°**	
Structure Information:	**Tower Height & Type:**	**80 Foot Monopole**
	Mount Elevation:	**78 Foot**
	Mount Type:	**(3) 1.25 Foot T-Arm**

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:

1.25' T-Arm **SUFFICIENT**

This analysis utilizes an ultimate 3-second gust wind speed of 120 mph as required by the 2018 Connecticut State Building Code and Appendix N. Applicable Standard references and design criteria are listed in Section 2 - Analysis Criteria.

Respectfully submitted by:

Anthony Pelino, E.I.
Structural Designer
apelino@pauljford.com

D.S.

TABLE OF CONTENTS

1) INTRODUCTION

2) ANALYSIS CRITERIA
Table 1 - Proposed Equipment Configuration

3) ANALYSIS PROCEDURE
Table 2 - Documents Provided
3.1) Analysis Method
3.2) Assumptions

4) ANALYSIS RESULTS
Table 3 - Mount Component Capacity
4.1) Recommendations

5) STANDARD CONDITIONS

6) APPENDIX A
SOFTWARE INPUT CALCULATIONS

7) APPENDIX B
SOFTWARE ANALYSIS OUTPUT

1) INTRODUCTION

The existing mounts under consideration are (3) 1.25' T-Arm 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:	120 mph
Exposure Category:	B
Topographic Factor at Base:	1.00
Topographic Factor at Mount:	1.00
Ice Thickness:	1.5 in
Wind Speed with Ice:	50 mph

Table 1 - Proposed Equipment Configuration

Mount Centerline (ft)	Antenna Centerline (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Mount / Modification Details
78	78	3	ERICSSON	AIR 32 B2A B66AA	(3)-SECTOR MOUNT (0.6')
		3	RFS CELWAVE	APXVAARR24_43-U-NA20	
		3	ERICSSON	RRUS 4449	

3) ANALYSIS PROCEDURE

Table 2 - Documents Provided

Document	Remarks	Reference	Source
Photos	Dated: 06/17/2020	-	CCISites
Order	ID: 479842 Rev. 4 Dated: 04/12/2019	-	CCISites
Tower Manufacturer Drawings	Laminated Wood Systems, TMOB-0018-06A1, Dated: 09/20/2005	3529192	CCISites

3.1) Analysis Method

RISA-3D (version 17.0.3), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases.

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

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 A36 (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 the photographs and/or the TIA inspection referenced in Table 2. Member information and dimensions not provided have been assumed based on previous experience with similar mounts. No guarantee can be made as to the accuracy of these assumptions without a complete mount mapping.*

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

4) ANALYSIS RESULTS

Table 3 - Mount Component Capacity

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1,2	Face Horizontals	78	98.5	Pass
1,2	Standoff Members		53.4	Pass
1,2	Mount Pipes		43.4	Pass
1,2	Mount to Tower Connection		76.2	Pass

Mount Rating (max from all components) =	98.5%

Notes:
1) See additional documentation in "Appendix C – Software Analysis Output" for calculations supporting the % capacity consumed.
2) Rating per TIA-222-H, Section 15.5

4.1) Recommendations

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

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

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

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

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

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

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

****

APPENDIX A

SOFTWARE INPUT CALCULATION

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

Project # 37520-1749.001.7190
By ADP

Analysis 30 degrees
EPA Method TIA
File _Client.r3d

Date: 08/07/20

v2.4, Effective 6/16/2020

Mount Loading per TIA-222-H

Structure & Wind Speed

Analysis Scope=	Client	
Structure Type =	Mount	
Mount Type =	3 Sectors	
Mount Centerline (z) =	78	ft
C/L Y Coordinate =	0	in
Ultimate Wind Speed =	120	mph
Service Wind Speed =	30	mph
Ice Wind Speed =	50	mph
Ice Thickness =	1.5	in
Const. Duration =		
Non-Op Wind Speed =	#N/A	mph
Op Wind Speed =	30	mph

Topography

Risk Category =	II	
Exposure Category =	B	
Topographic Category =	1	
Structure Base Height (Z_s) =	571.29	ft
Crest Height (H) =		ft

Maintenance Point Loads

	Load	Label	Node #		Load	Label	Node #
L_{m1} =	0 lbs	N3	3	L_{v1} =	0 lbs	N3	3
L_{m2} =	0 lbs	N4	4	L_{v2} =	0 lbs	N4	4
L_{m3} =	0 lbs	N3	3	L_{v3} =	0 lbs	N5	5
L_{m4} =	0 lbs	N4	4	L_{v4} =	0 lbs	N6	6

Velocity Pressure Coefficients

z_g =	1200	ft	(Table 2-4)
α' =	7.00		(Table 2-4)
K_z =	0.92		(Section 2.6.5.2)
K_{zmin} = 0.70			
K_{zcalc} = 0.92			
K_{zmax} = 2.01			
K_{zt} =	1.00		(Section 2.6.6.2.1)
K_d =	0.95		(Section 16.6)
K_e =	0.98		(Section 2.6.8)
G_h =	1.00		(Section 16.6)
K_{es} =	1.0		(Annex S - Wind Force)
q_z=	31.58	psf	(Section 2.6.11.6)

Ice Loading

I_i =	1.00		(Table 2-3)
K_{es} =	1.0		(Annex S - Ice)
q_{iz}=	5.60	psf	(Section 2.6.11.6)
K_{iz} =	1.09		(Section 2.6.10)
t_{iz} =	1.63	in	(Section 2.6.10)
h =		in	(Bar Grating Height)
W_i =	7.63	psf	(Grating Ice Weight)

Wind Pressure

	Override		
K_a =	0.9		(on all Appurt. / Member Forces)
$(q_z)(G_h)(K_{es})$ =	31.58	psf	(28.42 after Ka applied)
$(q_{iz})(G_h)(K_{es})$ =	5.60	psf	(Ice)

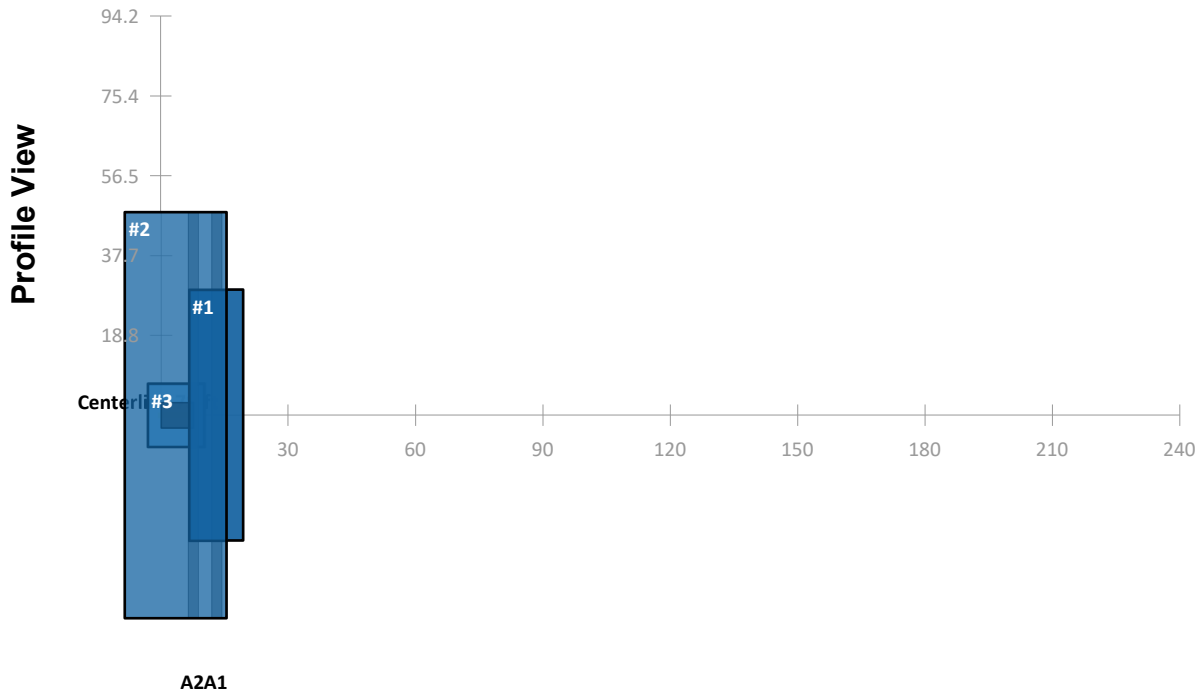
Antennas

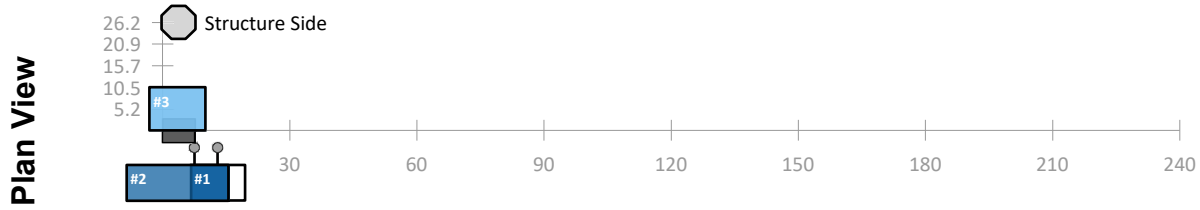
Item	Status	Mounting Location	Manufacturer	Antenna	Height (in)	Width (in)	Depth (in)	Flat or Round	Weight (lbs)	Sector / Face	Position	Quantity	Orientation	Use tnxTower C_AA_A (CFD)	Top/Bottom Mounting Point Spacing	Override Spacing (in)	Max Antenna C/L (ft)	Min Antenna C/L (ft)	Antenna C/L (ft)	Antenna Top Mount Location from Mount Pipe Bottom (in)	Antenna Bottom Mount Location from Mount Pipe Bottom (in)	Override Top Antenna Mounting Location (in)	Override Bottom Antenna Mounting Location (in)	Normal Wind Force per Antenna (lbs)	Transverse Wind Force per Antenna (lbs)
1	E	Mount	ERICSSON	AIR 32 B2A B66AA	59.25	12.87	8.66	Flat	132.2	C	1	1	Normal	No	53.25		79.781	76.219	78	74.63	21.38			194.664	141.059
2	P	Mount	RFS CELWAVE	APXVAARR24_43-U-NA20_CCI CFD	95.9	24	8.7	Flat	128	C	2	1	Normal	Yes	89.90		78.254	77.746	78	92.95	3.05			416.913	151.191
3	P	Mount	ERICSSON	RRUS 4449	14.96	13.19	10.43	Flat	73	C	2	1	Normal	No	8.96		81.627	74.373	78	52.48	43.52			46.732	36.953
4	E	Mount	ERICSSON	AIR 32 B2A B66AA	59.25	12.87	8.66	Flat	132.2	A	1	1	Normal	No	53.25		79.781	76.219	78	74.63	21.38			194.664	141.059
5	P	Mount	RFS CELWAVE	APXVAARR24_43-U-NA20_CCI CFD	95.9	24	8.7	Flat	128	A	2	1	Normal	Yes	89.90		78.254	77.746	78	92.95	3.05			416.913	151.191
6	P	Mount	ERICSSON	RRUS 4449	14.96	13.19	10.43	Flat	73	A	2	1	Normal	No	8.96		81.627	74.373	78	52.48	43.52			46.732	36.953
7	E	Mount	ERICSSON	AIR 32 B2A B66AA	59.25	12.87	8.66	Flat	132.2	B	1	1	Normal	No	53.25		79.781	76.219	78	74.63	21.38			194.664	141.059
8	P	Mount	RFS CELWAVE	APXVAARR24_43-U-NA20_CCI CFD	95.9	24	8.7	Flat	128	B	2	1	Normal	Yes	89.90		78.254	77.746	78	92.95	3.05			416.913	151.191
9	P	Mount	ERICSSON	RRUS 4449	14.96	13.19	10.43	Flat	73	B	2	1	Normal	No	8.96		81.627	74.373	78	52.48	43.52			46.732	36.953

Dishes

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

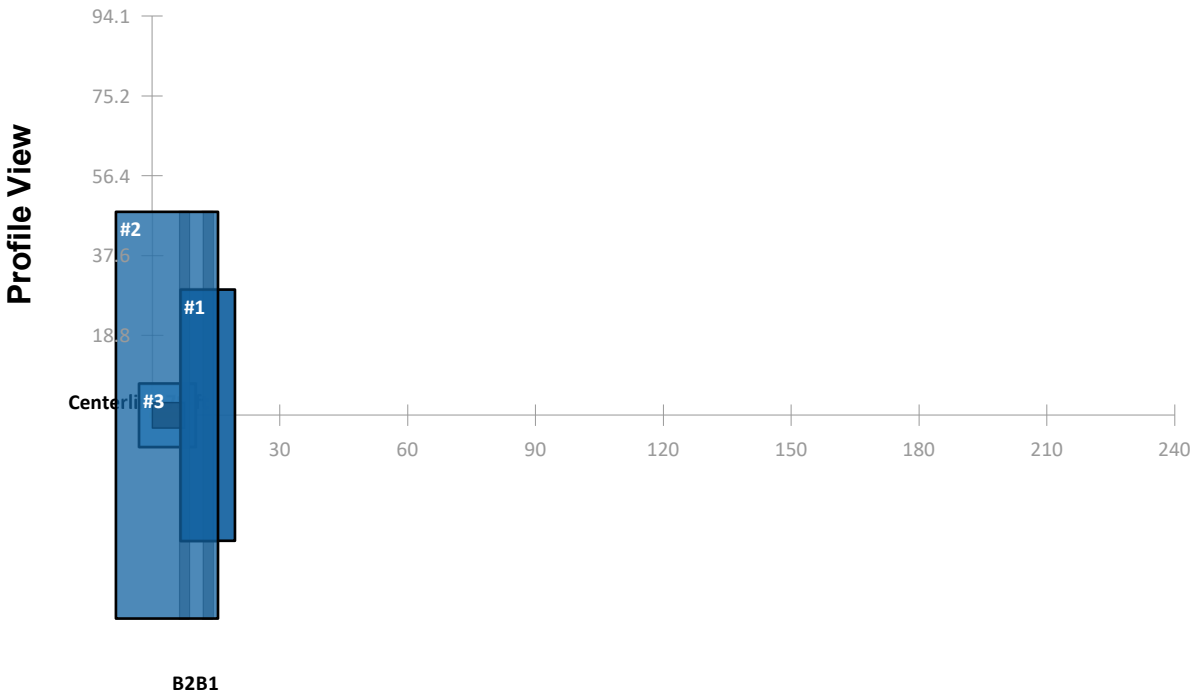
Sector A

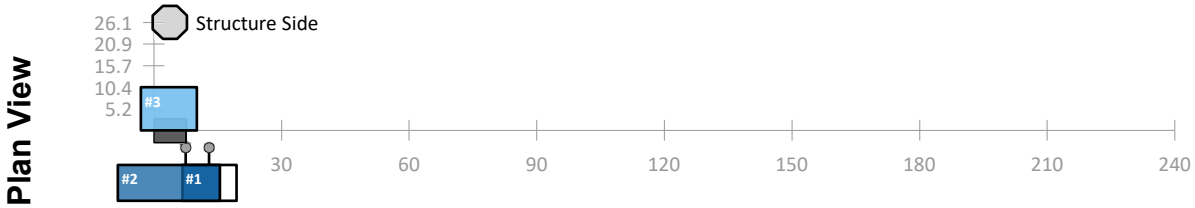




Ref ID	Type	Manufacturer	Model	Height (in)	Width (in)	Depth (in)	Center Line (ft)	Mount Pipe	Tangential Offset (in)	Normal Offset (in)
#1	Antenna	ERICSSON	AIR 32 B2A B66AA	59.25	12.87	8.66	78.00	A1	0.00	3.00
#2	Antenna	RFS CELWAVE	APXVAARR24_43-U-NA20	95.90	24.00	8.70	78.00	A2	0.00	3.00
#3	TME/RRH	ERICSSON	RRUS 4449	14.96	13.19	10.43	78.00	A2	0.00	-3.00

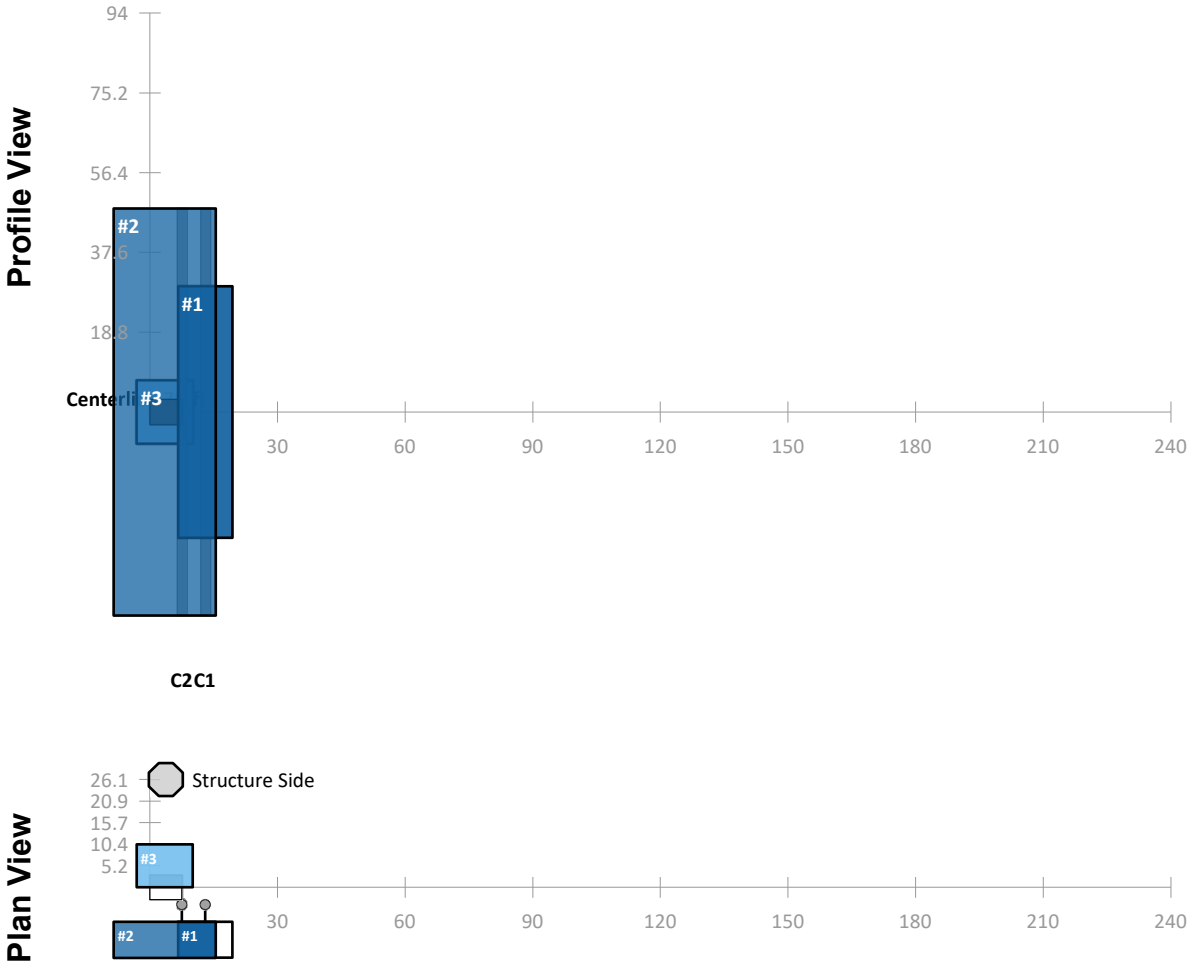
Sector B





Ref ID	Type	Manufacturer	Model	Height (in)	Width (in)	Depth (in)	Center Line (ft)	Mount Pipe	Horizontal Offset (in)	Lateral Offset (in)
#1	Antenna	ERICSSON	AIR 32 B2A B66AA	59.25	12.87	8.66	78.00	B1	0.00	3.00
#2	Antenna	RFS CELWAVE	APXVAARR24_43-U-NA20	95.90	24.00	8.70	78.00	B2	0.00	3.00
#3	TME/RRH	ERICSSON	RRUS 4449	14.96	13.19	10.43	78.00	B2	0.00	-3.00

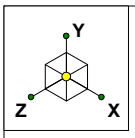
Sector C

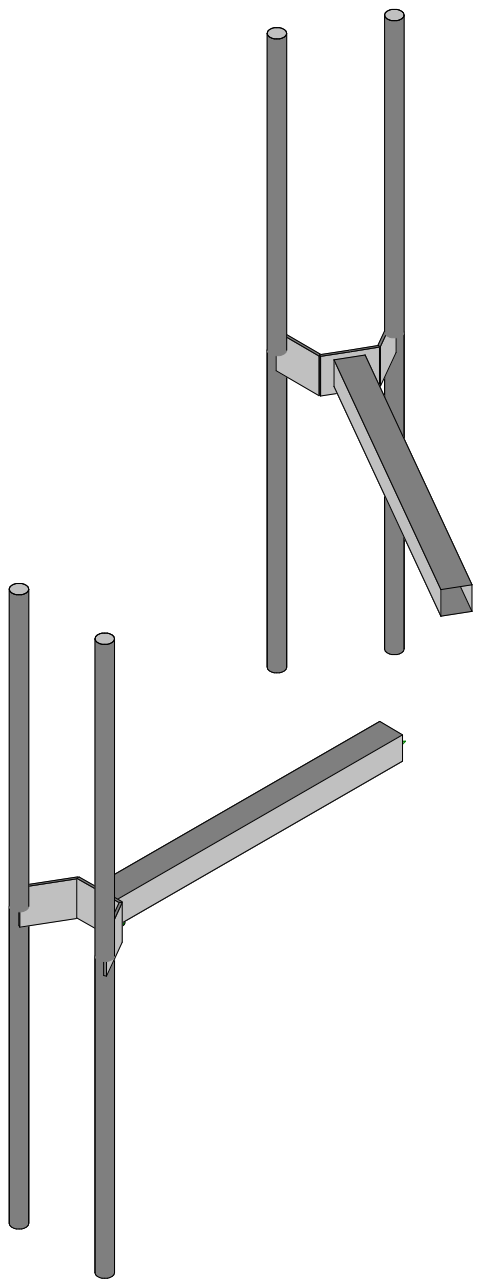


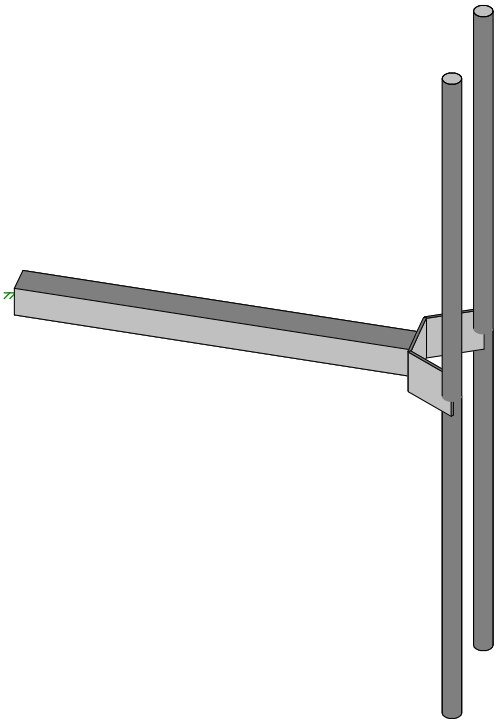
Ref ID	Type	Manufacturer	Model	Height (in)	Width (in)	Depth (in)	Center Line (ft)	Mount Pipe	Horizontal Offset (in)	Lateral Offset (in)
#1	Antenna	ERICSSON	AIR 32 B2A B66AA	59.25	12.87	8.66	78.00	C1	0.00	3.00
#2	Antenna	RFS CELWAVE	APXVAARR24_43-U-NA20	95.90	24.00	8.70	78.00	C2	0.00	3.00
#3	TME/RRH	ERICSSON	RRUS 4449	14.96	13.19	10.43	78.00	C2	0.00	-3.00

APPENDIX B

SOFTWARE ANALYSIS OUTPUT

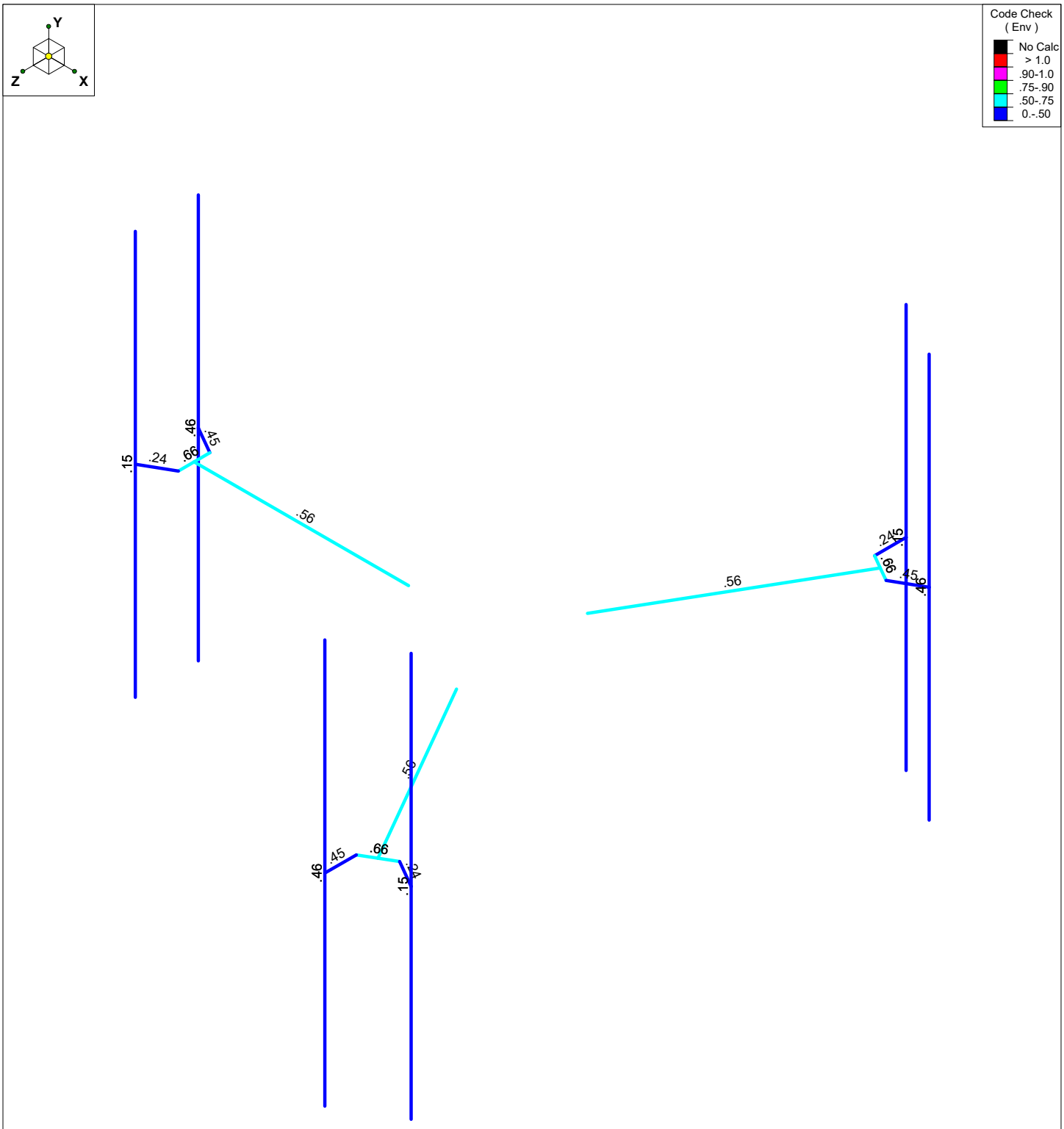






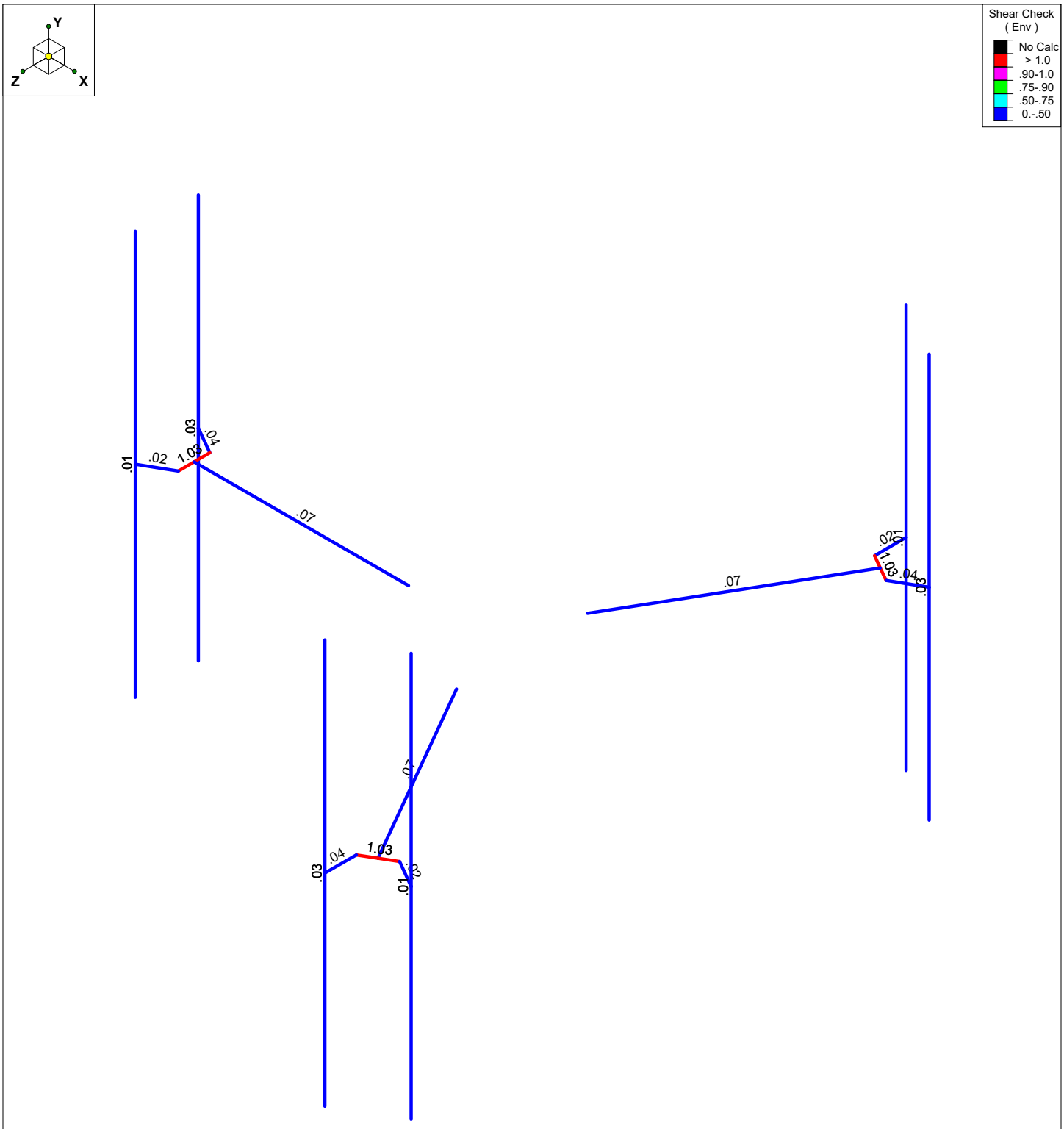
Envelope Only Solution

Paul J Ford and Company	823531- CT896/M&M Concrete Pole	SK - 1
ADP		Aug 5, 2020 at 3:27 PM
37520-1749.001.7190		37520-1749_Client.r3d



Member Code Checks Displayed (Enveloped)
Envelope Only Solution

Paul J Ford and Company	823531- CT896/M&M Concrete Pole	SK - 2
ADP		Aug 7, 2020 at 8:27 AM
37520-1749.001.7190		37520-1749.001.7190_Client.r3d



Member Shear Checks Displayed (Enveloped)
Envelope Only Solution

Paul J Ford and Company	823531- CT896/M&M Concrete Pole	SK - 3
ADP		Aug 7, 2020 at 8:28 AM
37520-1749.001.7190		37520-1749.001.7190_Client.r3d

(Global) Model Settings

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

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

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

(Global) Model Settings, Continued

Seismic Code	ASCE 7-10
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 RND	29000	11154	.3	.65	.527	42	1.4	58	1.3
5	A500 Gr.B Rect	29000	11154	.3	.65	.527	46	1.4	58	1.3
6	A53 Gr.B	29000	11154	.3	.65	.49	35	1.6	60	1.2
7	A1085	29000	11154	.3	.65	.49	50	1.4	65	1.3

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rules
1	M1	N3	N5			PL6" x 0.38"	None	None	A36 Gr.36	Typical
2	CBC1	N5	N6			PL6" x 0.38"	None	None	A36 Gr.36	Typical
3	M3	N6	N4			PL6" x 0.38"	None	None	A36 Gr.36	Typical
4	M4	N2	N1			HSS4X4X3	None	None	A500 Gr.B Rect	Typical
5	C2	N9	N7			PIPE_2.0	None	None	A53 Gr.B	Typical
6	C1	N10	N8			PIPE_2.0	None	None	A53 Gr.B	Typical
7	M7	N13	N15			PL6" x 0.38"	None	None	A36 Gr.36	Typical
8	CBB1	N15	N16			PL6" x 0.38"	None	None	A36 Gr.36	Typical
9	M9	N16	N14			PL6" x 0.38"	None	None	A36 Gr.36	Typical
10	M10	N12	N11			HSS4X4X3	None	None	A500 Gr.B Rect	Typical
11	B2	N19	N17			PIPE_2.0	None	None	A53 Gr.B	Typical
12	B1	N20	N18			PIPE_2.0	None	None	A53 Gr.B	Typical
13	M13	N23	N25			PL6" x 0.38"	None	None	A36 Gr.36	Typical
14	CBA1	N25	N26			PL6" x 0.38"	None	None	A36 Gr.36	Typical
15	M15	N26	N24			PL6" x 0.38"	None	None	A36 Gr.36	Typical
16	M16	N22	N21			HSS4X4X3	None	None	A500 Gr.B Rect	Typical
17	A2	N29	N27			PIPE_2.0	None	None	A53 Gr.B	Typical
18	A1	N30	N28			PIPE_2.0	None	None	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	** NA **			None
2	CBC1						Yes	** NA **			None
3	M3						Yes	** NA **			None
4	M4						Yes	** NA **			None
5	C2						Yes	** NA **			None
6	C1						Yes	** NA **			None
7	M7						Yes	** NA **			None
8	CBB1						Yes	** NA **			None
9	M9						Yes	** NA **			None
10	M10						Yes	** NA **			None
11	B2						Yes	** NA **			None
12	B1						Yes	** NA **			None
13	M13						Yes	** NA **			None
14	CBA1						Yes	** NA **			None
15	M15						Yes	** NA **			None
16	M16						Yes	** NA **			None
17	A2						Yes	** NA **			None
18	A1						Yes	** NA **			None

Hot Rolled Steel Design Parameters

	Label	Shape	Length[in]	Lbyy[in]	Lbzz[in]	Lcomp top[in]	Lcomp bot[in]	L-torqu...	Kyy	Kzz	Cb	Function
1	M1	PL6" x 0.38"	7.5									Lateral
2	CBC1	PL6" x 0.38"	7.5									Lateral
3	M3	PL6" x 0.38"	7.5									Lateral
4	M4	HSS4X4X3	51									Lateral
5	C2	PIPE_2.0	96									Lateral
6	C1	PIPE_2.0	96									Lateral
7	M7	PL6" x 0.38"	7.5									Lateral
8	CBB1	PL6" x 0.38"	7.5									Lateral
9	M9	PL6" x 0.38"	7.5									Lateral
10	M10	HSS4X4X3	51									Lateral
11	B2	PIPE_2.0	96									Lateral
12	B1	PIPE_2.0	96									Lateral
13	M13	PL6" x 0.38"	7.5									Lateral
14	CBA1	PL6" x 0.38"	7.5									Lateral
15	M15	PL6" x 0.38"	7.5									Lateral
16	M16	HSS4X4X3	51									Lateral
17	A2	PIPE_2.0	96									Lateral
18	A1	PIPE_2.0	96									Lateral

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distribut...	Area(Me...	Surface(...
1	Dead	None		-1.1			18			
2	Wind 0	None					36	36		
3	Wind 30	None					36	36		
4	Wind 60	None					36	36		
5	Wind 90	None					36	36		
6	Wind 120	None					36	36		
7	Wind 150	None					36	36		
8	Ice Load	None					18	18		
9	Ice 0	None					36	36		
10	Ice 30	None					36	36		
11	Ice 60	None					36	36		

Basic Load Cases (Continued)

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distribut...	Area(Me...	Surface(...
12	Ice 90	None					36	36		
13	Ice 120	None					36	36		
14	Ice 150	None					36	36		
15	Lm1	None				1				
16	Lm2	None				1				
17	Lm3	None				1				
18	Lm4	None				1				
19	Lv1	None				1				
20	Lv2	None				1				
21	Lv3	None				1				
22	Lv4	None				1				

Load Combinations

	Description	S...	P...	S...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
1	1.4 D	Yes	Y		1	1.4																				
2	1.2 D + 1.0 Wo @ 0	Yes	Y		1	1.2	2	1																		
3	1.2 D + 1.0 Wo @ 30	Yes	Y		1	1.2	3	1																		
4	1.2 D + 1.0 Wo @ 60	Yes	Y		1	1.2	4	1																		
5	1.2 D + 1.0 Wo @ 90	Yes	Y		1	1.2	5	1																		
6	1.2 D + 1.0 Wo @ 120	Yes	Y		1	1.2	6	1																		
7	1.2 D + 1.0 Wo @ 150	Yes	Y		1	1.2	7	1																		
8	1.2 D + 1.0 Wo @ 180	Yes	Y		1	1.2	2	-1																		
9	1.2 D + 1.0 Wo @ 210	Yes	Y		1	1.2	3	-1																		
10	1.2 D + 1.0 Wo @ 240	Yes	Y		1	1.2	4	-1																		
11	1.2 D + 1.0 Wo @ 270	Yes	Y		1	1.2	5	-1																		
12	1.2 D + 1.0 Wo @ 300	Yes	Y		1	1.2	6	-1																		
13	1.2 D + 1.0 Wo @ 330	Yes	Y		1	1.2	7	-1																		
14	1.2 D + 1.0 Di + 1.0 Wi @ 0	Yes	Y		1	1.2	8	1	9	1																
15	1.2 D + 1.0 Di + 1.0 Wi @ 30	Yes	Y		1	1.2	8	1	10	1																
16	1.2 D + 1.0 Di + 1.0 Wi @ 60	Yes	Y		1	1.2	8	1	11	1																
17	1.2 D + 1.0 Di + 1.0 Wi @ 90	Yes	Y		1	1.2	8	1	12	1																
18	1.2 D + 1.0 Di + 1.0 Wi @ 120	Yes	Y		1	1.2	8	1	13	1																
19	1.2 D + 1.0 Di + 1.0 Wi @ 150	Yes	Y		1	1.2	8	1	14	1																
20	1.2 D + 1.0 Di + 1.0 Wi @ 180	Yes	Y		1	1.2	8	1	9	-1																
21	1.2 D + 1.0 Di + 1.0 Wi @ 210	Yes	Y		1	1.2	8	1	10	-1																
22	1.2 D + 1.0 Di + 1.0 Wi @ 240	Yes	Y		1	1.2	8	1	11	-1																
23	1.2 D + 1.0 Di + 1.0 Wi @ 270	Yes	Y		1	1.2	8	1	12	-1																
24	1.2 D + 1.0 Di + 1.0 Wi @ 300	Yes	Y		1	1.2	8	1	13	-1																
25	1.2 D + 1.0 Di + 1.0 Wi @ 330	Yes	Y		1	1.2	8	1	14	-1																
26	1.2 D + 1.5 Lm1 + 1.0 Wm @ 0	Yes	Y		1	1.2	15	1.5	2	.063																
27	1.2 D + 1.5 Lm1 + 1.0 Wm @ 30	Yes	Y		1	1.2	15	1.5	3	.063																
28	1.2 D + 1.5 Lm1 + 1.0 Wm @ 60	Yes	Y		1	1.2	15	1.5	4	.063																
29	1.2 D + 1.5 Lm1 + 1.0 Wm @ 90	Yes	Y		1	1.2	15	1.5	5	.063																
30	1.2 D + 1.5 Lm1 + 1.0 Wm @ 120	Yes	Y		1	1.2	15	1.5	6	.063																
31	1.2 D + 1.5 Lm1 + 1.0 Wm @ 150	Yes	Y		1	1.2	15	1.5	7	.063																
32	1.2 D + 1.5 Lm1 + 1.0 Wm @ 180	Yes	Y		1	1.2	15	1.5	2	.063																
33	1.2 D + 1.5 Lm1 + 1.0 Wm @ 210	Yes	Y		1	1.2	15	1.5	3	.063																
34	1.2 D + 1.5 Lm1 + 1.0 Wm @ 240	Yes	Y		1	1.2	15	1.5	4	.063																
35	1.2 D + 1.5 Lm1 + 1.0 Wm @ 270	Yes	Y		1	1.2	15	1.5	5	.063																
36	1.2 D + 1.5 Lm1 + 1.0 Wm @ 300	Yes	Y		1	1.2	15	1.5	6	.063																
37	1.2 D + 1.5 Lm1 + 1.0 Wm @ 330	Yes	Y		1	1.2	15	1.5	7	.063																
38	1.2 D + 1.5 Lm2 + 1.0 Wm @ 0	Yes	Y		1	1.2	16	1.5	2	.063																
39	1.2 D + 1.5 Lm2 + 1.0 Wm @ 30	Yes	Y		1	1.2	16	1.5	3	.063																
40	1.2 D + 1.5 Lm2 + 1.0 Wm @ 60	Yes	Y		1	1.2	16	1.5	4	.063																
41	1.2 D + 1.5 Lm2 + 1.0 Wm @ 90	Yes	Y		1	1.2	16	1.5	5	.063																

Load Combinations (Continued)

	Description	S...	P...	S...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
42	1.2 D + 1.5 Lm2 + 1.0 Wm @ 120	Yes	Y		1	1.2	16	1.5	6	.063																
43	1.2 D + 1.5 Lm2 + 1.0 Wm @ 150	Yes	Y		1	1.2	16	1.5	7	.063																
44	1.2 D + 1.5 Lm2 + 1.0 Wm @ 180	Yes	Y		1	1.2	16	1.5	2	.063																
45	1.2 D + 1.5 Lm2 + 1.0 Wm @ 210	Yes	Y		1	1.2	16	1.5	3	.063																
46	1.2 D + 1.5 Lm2 + 1.0 Wm @ 240	Yes	Y		1	1.2	16	1.5	4	.063																
47	1.2 D + 1.5 Lm2 + 1.0 Wm @ 270	Yes	Y		1	1.2	16	1.5	5	.063																
48	1.2 D + 1.5 Lm2 + 1.0 Wm @ 300	Yes	Y		1	1.2	16	1.5	6	.063																
49	1.2 D + 1.5 Lm2 + 1.0 Wm @ 330	Yes	Y		1	1.2	16	1.5	7	.063																
50	1.2 D + 1.5 Lm3 + 1.0 Wm @ 0	Yes	Y		1	1.2	17	1.5	2	.063																
51	1.2 D + 1.5 Lm3 + 1.0 Wm @ 30	Yes	Y		1	1.2	17	1.5	3	.063																
52	1.2 D + 1.5 Lm3 + 1.0 Wm @ 60	Yes	Y		1	1.2	17	1.5	4	.063																
53	1.2 D + 1.5 Lm3 + 1.0 Wm @ 90	Yes	Y		1	1.2	17	1.5	5	.063																
54	1.2 D + 1.5 Lm3 + 1.0 Wm @ 120	Yes	Y		1	1.2	17	1.5	6	.063																
55	1.2 D + 1.5 Lm3 + 1.0 Wm @ 150	Yes	Y		1	1.2	17	1.5	7	.063																
56	1.2 D + 1.5 Lm3 + 1.0 Wm @ 180	Yes	Y		1	1.2	17	1.5	2	.063																
57	1.2 D + 1.5 Lm3 + 1.0 Wm @ 210	Yes	Y		1	1.2	17	1.5	3	.063																
58	1.2 D + 1.5 Lm3 + 1.0 Wm @ 240	Yes	Y		1	1.2	17	1.5	4	.063																
59	1.2 D + 1.5 Lm3 + 1.0 Wm @ 270	Yes	Y		1	1.2	17	1.5	5	.063																
60	1.2 D + 1.5 Lm3 + 1.0 Wm @ 300	Yes	Y		1	1.2	17	1.5	6	.063																
61	1.2 D + 1.5 Lm3 + 1.0 Wm @ 330	Yes	Y		1	1.2	17	1.5	7	.063																
62	1.2 D + 1.5 Lm4 + 1.0 Wm @ 0	Yes	Y		1	1.2	18	1.5	2	.063																
63	1.2 D + 1.5 Lm4 + 1.0 Wm @ 30	Yes	Y		1	1.2	18	1.5	3	.063																
64	1.2 D + 1.5 Lm4 + 1.0 Wm @ 60	Yes	Y		1	1.2	18	1.5	4	.063																
65	1.2 D + 1.5 Lm4 + 1.0 Wm @ 90	Yes	Y		1	1.2	18	1.5	5	.063																
66	1.2 D + 1.5 Lm4 + 1.0 Wm @ 120	Yes	Y		1	1.2	18	1.5	6	.063																
67	1.2 D + 1.5 Lm4 + 1.0 Wm @ 150	Yes	Y		1	1.2	18	1.5	7	.063																
68	1.2 D + 1.5 Lm4 + 1.0 Wm @ 180	Yes	Y		1	1.2	18	1.5	2	-.0...																
69	1.2 D + 1.5 Lm4 + 1.0 Wm @ 210	Yes	Y		1	1.2	18	1.5	3	-.0...																
70	1.2 D + 1.5 Lm4 + 1.0 Wm @ 240	Yes	Y		1	1.2	18	1.5	4	-.0...																
71	1.2 D + 1.5 Lm4 + 1.0 Wm @ 270	Yes	Y		1	1.2	18	1.5	5	-.0...																
72	1.2 D + 1.5 Lm4 + 1.0 Wm @ 300	Yes	Y		1	1.2	18	1.5	6	-.0...																
73	1.2 D + 1.5 Lm4 + 1.0 Wm @ 330	Yes	Y		1	1.2	18	1.5	7	-.0...																
74	1.2 D + 1.5 Lv1	Yes	Y		1	1.2	19	1.5																		
75	1.2 D + 1.5 Lv2	Yes	Y		1	1.2	20	1.5																		
76	1.2 D + 1.5 Lv3	Yes	Y		1	1.2	21	1.5																		
77	1.2 D + 1.5 Lv4	Yes	Y		1	1.2	22	1.5																		
78	1.0 D	Yes	Y		1	1																				

Envelope Joint Reactions

	Joint		X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	N1	max	786.609	11	1412.557	25	505.482	2	.248	15	2.332	3	-2.054	78
2		min	-786.609	5	454.43	78	-505.482	8	.043	78	-2.323	9	-6.451	17
3	N11	max	620.357	12	1412.557	25	716.327	2	-1.8	78	2.332	11	3.013	14
4		min	-620.357	6	454.43	78	-716.327	8	-5.71	25	-2.323	5	.99	78
5	N21	max	620.357	10	1412.557	25	716.327	2	5.464	22	2.332	7	3.439	20
6		min	-620.357	4	454.43	78	-716.327	8	1.757	78	-2.323	13	1.064	78
7	Totals:	max	1938.136	11	4237.67	25	1938.136	2						
8		min	-1938.136	5	1363.29	78	-1938.136	8						

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

	Member	Shape	Code C...	Loc[in]	LC	Shear ...	Loc[in]	Dir	LC	phi*Pnc [lb]	phi*Pnt [lb]	phi*Mn y-...	phi*Mn z-...	Cb	Eqn
1	CBC1	PL6" x 0.38"	.660	3.75	4	1.034	3.75	y	23	57757.121	73872	.585	9.234	1....	H1-1b
2	CBB1	PL6" x 0.38"	.660	3.75	12	1.034	3.75	y	19	57757.121	73872	.585	9.234	1....	H1-1b
3	CBA1	PL6" x 0.38"	.660	3.75	8	1.034	3.75	y	15	57757.121	73872	.585	9.234	1....	H1-1b

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

	Member	Shape	Code C...	Loc[in]	LC	Shear ...	Loc[in]	Dir	LC	phi*Pnc [lb]	phi*Pnt [lb]	phi*Mn y-...	phi*Mn z-...	Cb	Eqn
4	M16	HSS4X4X3	.561	51	24	.071	51	y	20	99323.283	106812	12.662	12.662	1....	H1-1b
5	M10	HSS4X4X3	.561	51	16	.071	51	y	24	99323.283	106812	12.662	12.662	1....	H1-1b
6	M4	HSS4X4X3	.561	51	20	.071	51	y	16	99323.283	106812	12.662	12.662	1....	H1-1b
7	M13	PL6" x 0.38"	.449	7.5	8	.035	7.5	y	14	57757.121	73872	.585	9.234	1....	H1-1b
8	M7	PL6" x 0.38"	.449	7.5	12	.035	7.5	y	18	57757.121	73872	.585	9.234	1....	H1-1b
9	M1	PL6" x 0.38"	.449	7.5	4	.035	7.5	y	22	57757.121	73872	.585	9.234	1....	H1-1b
10	C2	PIPE_2.0	.456	48	11	.027	48		11	14916.096	32130	1.872	1.872	1....	H1-1b
11	A2	PIPE_2.0	.456	48	3	.027	48		3	14916.096	32130	1.872	1.872	1....	H1-1b
12	B2	PIPE_2.0	.456	48	7	.027	48		7	14916.096	32130	1.872	1.872	1....	H1-1b
13	M15	PL6" x 0.38"	.242	0	11	.016	0	y	17	57757.121	73872	.585	9.234	1....	H1-1b
14	M9	PL6" x 0.38"	.242	0	9	.016	0	y	21	57757.121	73872	.585	9.234	1....	H1-1b
15	M3	PL6" x 0.38"	.242	0	13	.016	0	y	25	57757.121	73872	.585	9.234	1....	H1-1b
16	B1	PIPE_2.0	.147	48	7	.013	48		7	14916.096	32130	1.872	1.872	1....	H1-1b
17	A1	PIPE_2.0	.147	48	3	.013	48		3	14916.096	32130	1.872	1.872	1....	H1-1b
18	C1	PIPE_2.0	.147	48	11	.013	48		11	14916.096	32130	1.872	1.872	1....	H1-1b

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

Project # 37520-1749.001.7190
By ADP
Date: 08/07/20
v3.5, Effective 06/26/2020

MOUNT TO TOWER CONNECTION CHECKS-LRFD

TIA Rev.	**H-15.5**	**AISC**	**15th**
Mount Type	**3-Sector**	**Checks**	**Bolts & Welds**

REACTIONS FROM RISA-3D

NODE	LC	Horizontal Shear (k)	Vertical Shear (k)	Axial along member(k)	Moment about horizontal axis (ft-k)	Moment about Vertical axis (ft-k)	Torque (ft-k)
N1	**Envelope**	**0.51**	**1.41**	**0.79**	**6.45**	**2.33**	**0.25**

Bolt Information	Type	Dia (in)	Quantity	Vertical Bolt spacing (D) (in)	Horizontal Bolt spacing (B) (in)
	A325N	**0.625**	**4**	**7.5**	**7.5**

CHECKS	Forces	Strength	**Rating**
TENSION (K)	7.22	20.7	**34.9%**
		Reduced Tensile Rating	**-**
SHEAR (k)	0.52	12.4	**4.1%**

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

Standoff Member	Type	Width (b) (in)	Depth (d) (in)	thickness (in)	Weld Size	Weld Assumed?	Stiffeners present
	Rectangle	**4**	**4**	**0.1875**	**0.1875**	**yes**	**No**

WELDS CHECKS	Resultant (k)	Strength (k)	**Rating**
	3.34	4.18	**80.0%**

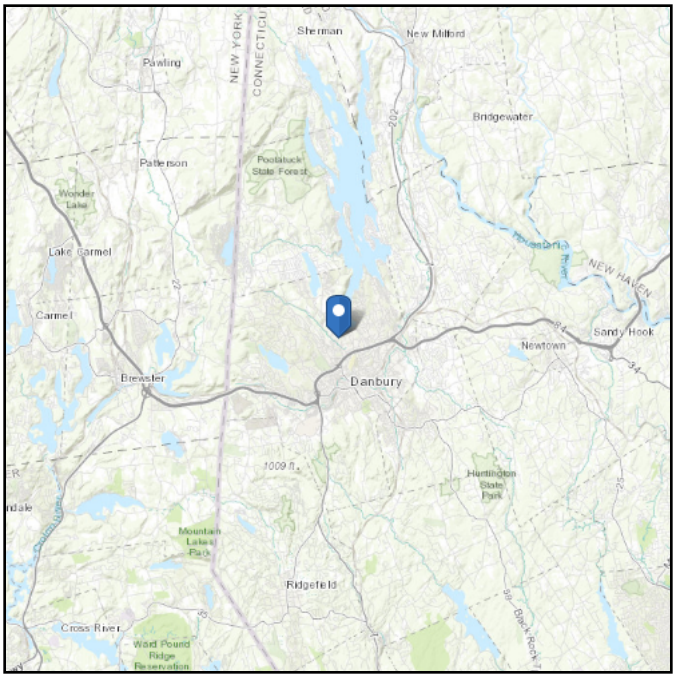
Controlling Rating per TIA-222-H Section 15.5:	**76.2%**

ASCE 7 Hazards Report

Address:
No Address at This Location

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

Elevation: 571.29 ft (NAVD 88)
Latitude: 41.418917
Longitude: -73.461944



Wind

Results:

Wind Speed:	116 Vmph ⟵ Jurisdiction requires 120 mph Ult wind speed
10-year MRI	76 Vmph
25-year MRI	85 Vmph
50-year MRI	90 Vmph
100-year MRI	96 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.

Ice

Results:

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

Exhibit F

Power Density/RF Emissions Report

Transcom Engineering, Inc.

Wireless Network Design and Deployment

Radio Frequency Emissions Analysis Report

T-MOBILE Existing Facility

Site ID: CT11896A

CT896/M&M Concrete Pole
41 Padanaram Rd
Danbury, CT 06811

May 23, 2019

Transcom Engineering Project Number: 737001-0048

Site Compliance Summary	
Compliance Status:	**COMPLIANT**
Site total MPE% of FCC general population allowable limit:	**25.02 %**

May 23, 2019

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

Emissions Analysis for Site: **CT11896A – CT896/M&M Concrete Pole**

Transcom Engineering, Inc ("Transcom") was directed to analyze the proposed upgrades to the T-MOBILE facility located at **41 Padanaram Rd, Danbury, 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 **41 Padanaram Rd, Danbury, 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
LTE	2100 MHz (AWS)	2	60
GSM	1900 MHz (PCS)	1	15
LTE / 5G NR	600 MHz	2	40
LTE	700 MHz	2	20
UMTS	2100 MHz (AWS)	1	40

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	Ericsson AIR32 B66A / B2A	80
A	2	RFS APXVAARR18_43-C-NA20	80
B	1	Ericsson AIR32 B66A / B2A	80
B	2	RFS APXVAARR18_43-C-NA20	80
C	1	Ericsson AIR32 B66A / B2A	80
C	2	RFS APXVAARR18_43-C-NA20	80

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 **2100 MHz (AWS) UMTS** radios are ground mounted the following cable loss values were used. For each ground mounted **2100 MHz (AWS) UMTS** radio there was **1.42 dB** of cable loss calculated into the system gains / losses for this site. These values were calculated based upon the manufacturers specifications for **110 feet** of **1-1/4"** 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	Ericsson AIR32 B66A / B2A	1900 MHz (PCS) / 2100 MHz (AWS)	15.85	7	295	11,345.46	7.45
Antenna A2	RFS APXVAARR18_43-C-NA20	600 MHz / 700 MHz / 2100 MHz (AWS)	12.85 / 13.55 / 17.15	5	160	3,944.32	4.78
						Sector A Composite MPE%	**12.23**
Antenna B1	Ericsson AIR32 B66A / B2A	1900 MHz (PCS) / 2100 MHz (AWS)	15.85		295	11,345.46	7.45
Antenna B2	RFS APXVAARR18_43-C-NA20	600 MHz / 700 MHz / 2100 MHz (AWS)	12.85 / 13.55 / 17.15		160	3,944.32	4.78
						Sector B Composite MPE%	**12.23**
Antenna C1	Ericsson AIR32 B66A / B2A	1900 MHz (PCS) / 2100 MHz (AWS)	15.85	7	295	11,345.46	7.45
Antenna C2	RFS APXVAARR18_43-C-NA20	600 MHz / 700 MHz / 2100 MHz (AWS)	12.85 / 13.55 / 17.15	5	160	3,944.32	4.78
						Sector C Composite MPE%	**12.23**

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	**12.23 %**
Sprint	12.49 %
Clearwire	0.30 %
Site Total MPE %:	**25.02 %**

Table 4: All Carrier MPE Contributions

T-MOBILE Sector A Total:	12.23 %
T-MOBILE Sector B Total:	12.23 %
T-MOBILE Sector C Total:	12.23 %
Site Total:	25.02 %

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	1,538.37	80	40.40	1900 MHz (PCS)	1000	4.04%
T-Mobile 2100 MHz (AWS) LTE	2	2,307.55	80	30.30	2100 MHz (AWS)	1000	3.03%
T-Mobile 1900 MHz (PCS) GSM	1	576.89	80	3.79	1900 MHz (PCS)	1000	0.38%
T-Mobile 600 MHz LTE / 5G NR	2	771.01	80	10.12	600 MHz	400	2.53%
T-Mobile 700 MHz LTE	2	452.93	80	5.95	700 MHz	467	1.27%
T-Mobile 2100 MHz (AWS) UMTS	1	1,496.44	80	9.82	2100 MHz (AWS)	1000	0.98%
						Total:	**12.23%**

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:	12.23 %
Sector B:	12.23 %
Sector C:	12.23 %
T-MOBILE Maximum Total (per sector):	12.23 %
Site Total:	25.02 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **25.02 %** 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.

Scott Heffernan
RF Engineering Director
Transcom Engineering, Inc
PO Box 1048
Sterling, MA 01564