Transcend Wireless

10 Industrial Avenue,
Suite 3
Mahwah, NJ 07430

Phone: 201.684.0055
Fax: 201.684.0066

October 28, 2020

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

Notice of Exempt Modification
101 Talmadge Road, Hamden, CT
Latitude: 41.42305833
Longitude: -72.95111111
T-Mobile site: CT11474A / Anchor

Ms. Bachman:

T-Mobile currently maintains (6) antennas at the 315-foot level of the existing 907 -foot Guyed tower at 101 Talmadge Road in Hamden CT. The Tower and property is owned by LIN Television Corp. T-Mobile now intends to add (3) 2500 MHz Antennas at the 315-foot level of the tower as per the attached mount analysis.

Planned Modifications:

Remove/Replace:
RRUs:
(3) Ericsson Radio 4415 B25 (remove) - (3) Ericsson 4424 B25 RRUs (replace)

Install New:
(3) Ericsson Air 6449 Antenna / 2500 MHz
(3) 6x12 hybrid

Existing to Remain:
(3) RFS APXVAARR24_43-U-NA20 - 600 MHz / 700 MHz
(3) RFS APX16DWV-16DWV-S-E-A20 -2100 MHz
(3) Ericsson 4449 B71 +B85 RRU
(3) 6x12 hybrid

Ground:
Install (1) B160 Battery cabinet and install (1) 6160 Equipment cabinet

There is no record of an original approval of this facility by the Siting Council, however T-Mobile and other carriers have been approved previously for exempt modifications. T-Mobile was unable to obtain any documentation pertaining to an original approval. The proposed modification will not be violating any previous approvals, as subsequent Exempt Modifications have been approved on this tower an there are no known conditions that would restrict exempt modifications

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 The Honorable Curt Balzano Leng, Mayor, Daniel Kops, Town Planner, as well as the tower and property owner.

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

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

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

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

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

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

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

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

Sincerely,

Elizabeth Jamieson
Transcend Wireless
10 Industrial Ave., Suite 3
Mahwah, New Jersey 07430
860-605-7808
EJamieson@TranscendWireless.com

cc:
The Honorable Curt Balzano Leng, Mayor
Daniel Kops, Town Planner
LIN Television Corp, Tower and property owner

Exhibit A

Property card

101 TALMADGE RD

Location	101 TALMADGE RD	**Mblu**	3123/ 008/ / /
Acct#		**Owner**	L I N TELEVISION CORP
Assessment	$373,940	**Appraisal**	$534,200
PID	100690	**Building Count**	1

Current Value

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2016	$34,500	$499,700	$534,200

Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2016	$24,150	$349,790	$373,940

Owner of Record

Owner	L I N TELEVISION CORP	**Sale Price**	$0
Co-Owner		**Certificate**	
Address	333 EAST FRANKLIN ST RICHMOND, VA 23219	**Book & Page**	1905/ 206
		Sale Date	11/29/1999

Ownership History

Ownership History				
Owner	**Sale Price**	**Certificate**	**Book & Page**	**Sale Date**
L I N TELEVISION CORP	$0		1905/ 206	11/29/1999
L W W I BROADCASTING INC	$605,000		1470/ 283	12/29/1994
COOK INLET COMMUNICATIONS CORP	$0		740/ 459	01/03/1986

Building Information

Building 1 : Section 1

Year Built: 1965
Living Area: 812
Building Percent Good: 65

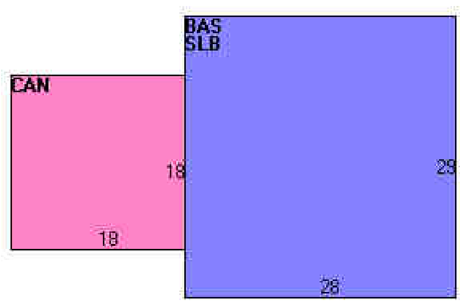
Building Attributes

Field	Description
STYLE	Warehouse
MODEL	Ind/Comm
Grade	C
Stories:	1
Occupancy	1
Exterior Wall 1	Pre-finsh Metl
Exterior Wall 2	
Roof Structure	Flat
Roof Cover	T&G/Rubber
Interior Wall 1	Minim/Masonry
Interior Wall 2	
Interior Floor 1	Concr-Finished
Interior Floor 2	
Heating Fuel	Gas
Heating Type	Hot Air-no Duc
AC Type	None
Bldg Use	RAD/TV TR M96
Total Rooms	
Total Bedrms	00
Total Baths	0
1st Floor Use:	4330
Heat/AC	NONE
Frame Type	STEEL
Baths/Plumbing	NONE
Ceiling/Wall	NONE
Rooms/Prtns	AVERAGE
Wall Height	10
% Comn Wall	0

Building Photo

(http://images.vgsi.com/photos/HamdenCTPhotos//\00\02\80/12.jpg)

Building Layout



(http://images.vgsi.com/photos/HamdenCTPhotos//Sketches/100690_2131

Building Sub-Areas (sq ft)			Legend
Code	Description	Gross Area	Living Area
BAS	First Floor	812	812
CAN	Canopy	324	0
SLB	Slab	0	0
		1,136	812

Extra Features

Extra Features	Legend
No Data for Extra Features	

Land

Land Use

Use Code 4330

Land Line Valuation

Size (Acres) 35.19

Description	RAD/TV TR M96	**Frontage**	0
Zone	R2	**Depth**	0
Neighborhood	140	**Assessed Value**	$349,790
Alt Land Appr	No	**Appraised Value**	$499,700
Category			

Outbuildings

Outbuildings						Legend
Code	**Description**	**Sub Code**	**Sub Description**	**Size**	**Value**	**Bldg #**
FN3	FENCE-6' CHAIN			770 L.F.	$3,500	1

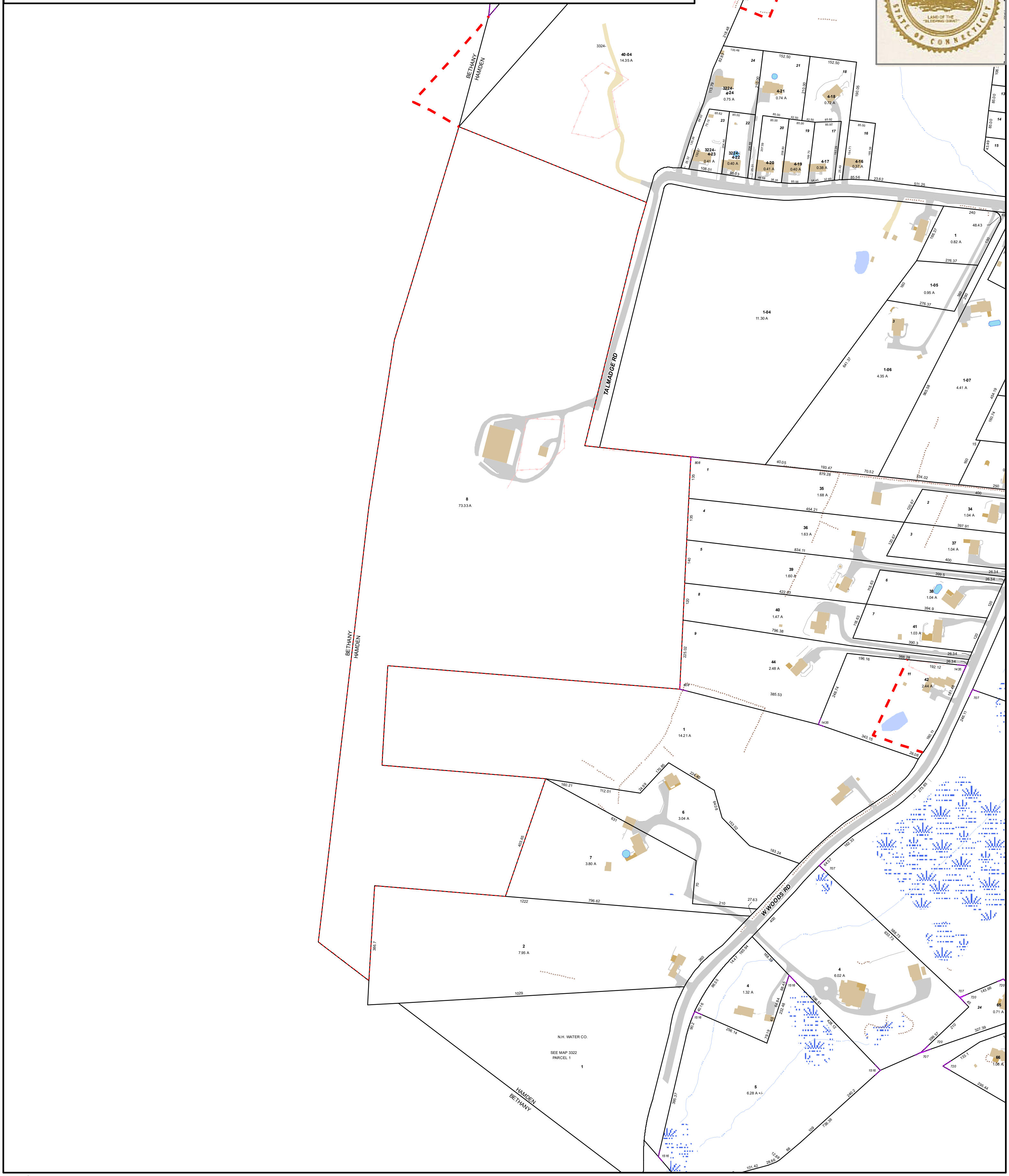
Valuation History

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2019	$34,500	$499,700	$534,200
2018	$34,500	$499,700	$534,200
2017	$34,500	$499,700	$534,200

Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2019	$24,150	$349,790	$373,940
2018	$24,150	$349,790	$373,940
2017	$24,150	$349,790	$373,940

Town of Hamden, Connecticut - Assessment Parcel Map

Parcel: 3123-008-00-0000 Address: 101 TALMADGE RD



N

Approximate Scale: 1 inch = 400 feet

0 200 400 600 800 Feet

Map Produced: October 2020

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

Exhibit B

Construction Drawings

WIRELESS COMMUNICATIONS FACILITY

WTNH HAMDEN
SITE ID: CT11474A
101 TALMADGE ROAD
HAMDEN, CT 06518

T-MOBILE RF CONFIGURATION
67D5998C_1xAIR+1QP+1OP

GENERAL NOTES

1. ALL WORK SHALL BE IN ACCORDANCE WITH THE 2015 INTERNATIONAL BUILDING CODE AS MODIFIED BY THE 2018 CONNECTICUT SUPPLEMENT, INCLUDING THE TIA/EIA-222 REVISION "G" "STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWERS AND SUPPORTING STRUCTURES." 2017 CONNECTICUT FIRE SAFETY CODE, NATIONAL ELECTRICAL CODE AND LOCAL CODES.
2. CONTRACTOR SHALL REVIEW ALL DRAWINGS AND SPECIFICATIONS IN THE CONTRACT DOCUMENT SET. CONTRACTOR SHALL COORDINATE ALL WORK SHOWN IN THE SET OF DRAWINGS. THE CONTRACTOR SHALL PROVIDE A COMPLETE SET OF DRAWINGS TO ALL SUBCONTRACTORS AND ALL RELATED PARTIES. THE SUBCONTRACTORS SHALL EXAMINE ALL THE DRAWINGS AND SPECIFICATIONS FOR THE INFORMATION THAT AFFECTS THEIR WORK.
3. CONTRACTOR SHALL PROVIDE A COMPLETE BUILD-OUT WITH ALL FINISHES, STRUCTURAL, MECHANICAL, AND ELECTRICAL COMPONENTS AND PROVIDE ALL ITEMS AS SHOWN OR INDICATED ON THE DRAWINGS OR IN THE WRITTEN SPECIFICATIONS.
4. CONTRACTOR SHALL FURNISH ALL MATERIAL, LABOR AND EQUIPMENT TO COMPLETE THE WORK AND FURNISH A COMPLETED JOB ALL IN ACCORDANCE WITH LOCAL AND STATE GOVERNING AUTHORITIES AND OTHER AUTHORITIES HAVING LAWFUL JURISDICTION OVER THE WORK.
5. CONTRACTOR SHALL SECURE AND PAY FOR ALL PERMITS AND ALL INSPECTIONS REQUIRED AND SHALL ALSO PAY FEES REQUIRED FOR THE GENERAL CONSTRUCTON, PLUMBING, ELECTRICAL, AND HVAC. PERMITS SHALL BE PAID FOR BY THE RESPECTIVE SUBCONTRACTORS.
6. CONTRACTOR SHALL MAINTAIN A CURRENT SET OF DRAWINGS AND SPECIFICATIONS ON SITE AT ALL TIMES AND INSURE DISTRIBUTION AND SPECIFICATIONS ON SITE AT ALL TIMES AND INSURE DISTRIBUTION OF NEW DRAWINGS TO SUBCONTRACTORS AND OTHER RELEVANT PARTIES AS SOON AS THEY ARE MADE AVAILABLE. ALL OLD DRAWINGS SHALL BE MARKED VOID AND REMOVED FROM THE CONTRACT AREA. THE CONTRACTOR SHALL FURNISH AN 'AS-BUILT' SET OF DRAWINGS TO OWNER UPON COMPLETION OF PROJECT.
7. LOCATION OF EQUIPMENT, AND WORK SUPPLIED BY OTHERS THAT IS DIAGRAMMATICALLY INDICATED ON THE DRAWINGS SHALL BE DETERMINED BY THE CONTRACTOR. THE CONTRACTOR SHALL DETERMINE LOCATIONS AND DIMENSIONS SUBJECT TO STRUCTURAL CONDITIONS AND WORK OF THE SUBCONTRACTORS.
8. THE CONTRACTOR IS SOLELY RESPONSIBLE TO DETERMINE CONSTRUCTION PROCEDURE AND SEQUENCE AND TO ENSURE THE SAFETY OF THE EXISTING STRUCTURES AND ITS COMPONENT PARTS DURING CONSTRUCTION. THIS INCLUDES THE ADDITION OF WHATEVER SHORING, BRACING, UNDERPINNING, ETC. THAT MAY BE NECESSARY.
9. DRAWINGS INDICATE THE MINIMUM STANDARDS, BUT IF ANY WORK SHOULD BE INDICATED TO BE SUBSTANDARD TO ANY ORDINANCES, LAWS, CODES, RULES, OR REGULATIONS BEARING ON THE WORK, THE CONTRACTOR SHALL INCLUDE IN HIS WORK AND SHALL EXECUTE THE WORK CORRECTLY IN ACCORDANCE WITH SUCH ORDINANCES, LAWS, CODES, RULES OR REGULATIONS WITH NO INCREASE IN COSTS.
10. ALL UTILITY WORK SHALL BE IN ACCORDANCE WITH LOCAL UTILITY COMPANY REQUIREMENTS AND SPECIFICATIONS.
11. ALL EQUIPMENT AND PRODUCTS PURCHASED ARE TO BE REVIEWED BY CONTRACTOR AND ALL APPLICABLE SUBCONTRACTORS FOR ANY CONDITION PER MANUFACTURER'S RECOMMENDATIONS. CONTRACTOR TO SUPPLY THESE ITEMS AT NO COST TO OWNER OR CONSTRUCTION MANAGER.
12. ANY AND ALL ERRORS, DISCREPANCIES, AND 'MISSED' ITEMS ARE TO BE BROUGHT TO THE ATTENTION OF THE T-MOBILE CONSTRUCTION MANAGER DURING THE BIDDING PROCESS BY THE CONTRACTOR. ALL THESE ITEMS ARE TO BE INCLUDED IN THE BID. NO 'EXTRA' WILL BE ALLOWED FOR MISSED ITEMS.
13. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL ON-SITE SAFETY FROM THE TIME THE JOB IS AWARDED UNTIL ALL WORK IS COMPLETE AND ACCEPTED BY THE OWNER.
14. CONTRACTOR TO REVIEW ALL SHOP DRAWINGS AND SUBMIT COPY TO ENGINEER FOR APPROVAL. DRAWINGS MUST BEAR THE CHECKER'S INITIALS BEFORE SUBMITTING TO THE CONSTRUCTION MANAGER FOR REVIEW.
15. THE CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS, ELEVATIONS, ANGLES AND EXISTING CONDITIONS AT THE SITE, PRIOR TO FABRICATION AND/OR INSTALLATION OF ANY WORK IN THE CONTRACT AREA.
16. COORDINATION, LAYOUT, FURNISHING AND INSTALLATION OF CONDUITS AND ALL APPURTENANCES REQUIRED FOR PROPER INSTALLATION OF ELECTRICAL AND TELECOMMUNICATION SERVICE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
17. ALL DAMAGE CAUSED TO ANY EXISTING STRUCTURE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR WILL BE HELD LIABLE FOR ALL REPAIRS REQUIRED FOR EXISTING STRUCTURES IF DAMAGED DURING CONSTRUCTION ACTIVITIES.
18. THE CONTRACTOR SHALL CONTACT 'CALL BEFORE YOU DIG' AT LEAST 48 HOURS PRIOR TO ANY EXCAVATIONS AT 1-800-922-4455. ALL UTILITIES SHALL BE IDENTIFIED AND CLEARLY MARKED. CONTRACTOR SHALL MAINTAIN AND PROTECT MARKED UTILITIES THROUGHOUT PROJECT COMPLETION.
19. CONTRACTOR SHALL COMPLY WITH THE OWNER'S ENVIRONMENTAL ENGINEER ON ALL METHODS AND PROVISIONS FOR ALL EXCAVATION ACTIVITIES INCLUDING SOIL DISPOSAL. ALL BACKFILL MATERIALS TO BE PROVIDED BY THE CONTRACTOR.

SITE DIRECTIONS

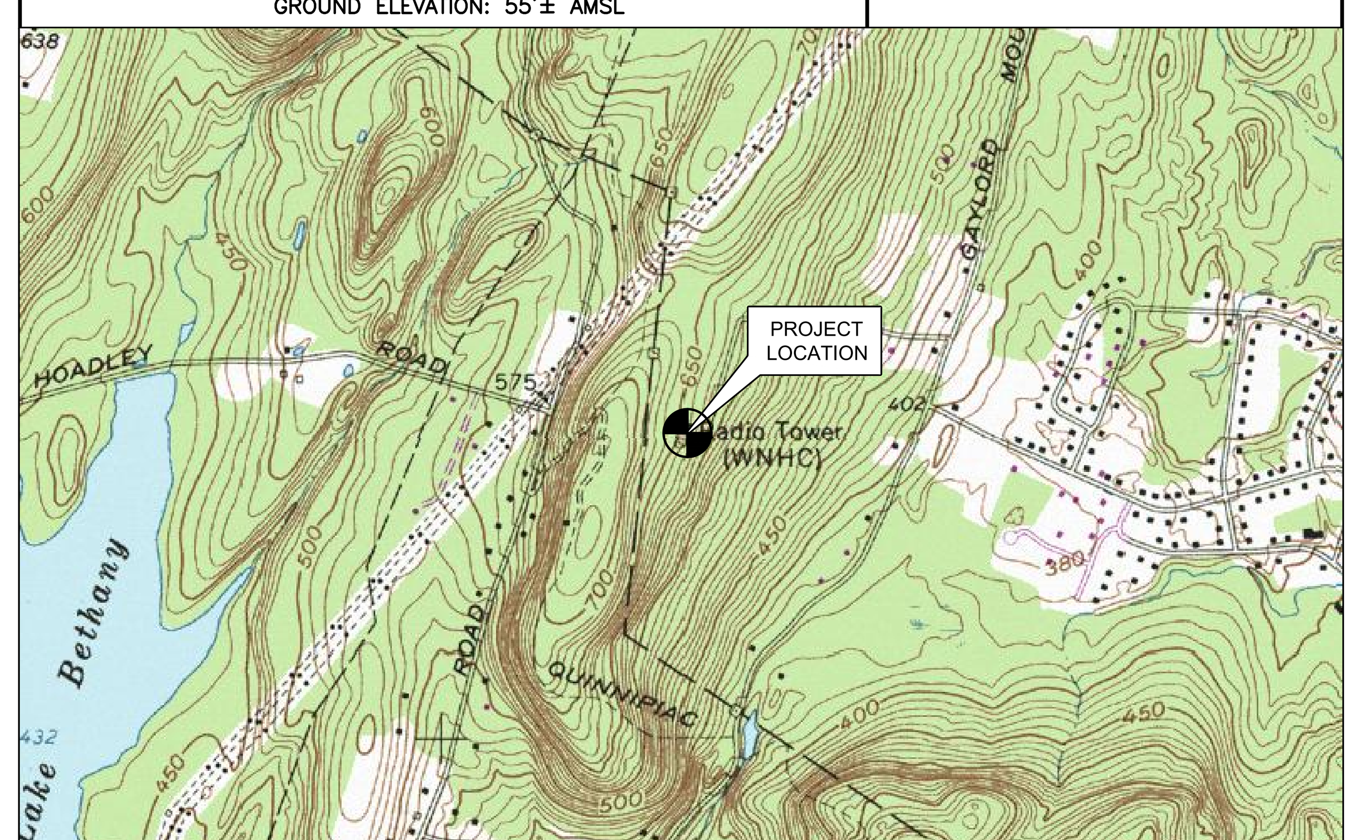
FROM: 35 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002

TO: 101 TALMADGE ROAD
HAMDEN CT, 06518

1.	HEAD NORTH ON GRIFFIN RD S	0.30 MI.
2.	TURN RIGHT ONTO DAY HILL RD	3.60 MI.
3.	USE THE RIGHT LANE TO MERGE ONTO I-91 S VIA THE RAMP TO HARTFORD	0.40 MI.
4.	MERGE ONTO I-91 S	26.0 MI.
5.	TAKE EXIT 17 TO MERGE ONTO CT-15 S/WILBUR CROSS PKWY	6.50 MI.
6.	TAKE EXIT 64 TO MERGE ONTO S TURNPIKE RD	0.08 MI.
7.	USE THE LEFT 2 LANES TO MERGE ONTO S TURNPIKE RD (SIGNS FOR DMR REGION 5 CTR)	1.80 MI.
8.	CONTINUE STRAIGHT ONTO HARTFORD TURNPIKE	0.30 MI.
9.	SLIGHT RIGHT ONTO MT CARMEL AVE	2.90 MI.
10.	CONTINUE STRAIGHT ONTO W WOODS RD	0.80 MI.
11.	SLIGHT RIGHT TO STAY ON W WOODS RD	0.20 MI.
12.	TURN LEFT ONTO SHEPARD AVE	0.05 MI.
13.	TURN RIGHT ONTO W WOODS RD	1.0 MI.
14.	TURN LEFT TO STAY ON W WOODS RD.	0.30 MI.
15.	TURN RIGHT ONTO GAYLORD MOUNTAIN RD	0.01 MI.
16.	TURN LEFT ONTO TALMADGE RD	0.30 MI.

SITE COORDINATES: LATITUDE: 41° 25' 22.30" N
LONGITUDE: 72° 57' 4.08" W
GROUND ELEVATION: 55'± AMSL

COORDINATES AND GROUND ELEVATION ARE REFERENCED FROM GOOGLE EARTH



VICINITY MAP

NORTH

PROJECT SUMMARY

THE PROPOSED SCOPE OF WORK CONSISTS OF A MODIFICATION TO THE EXISTING UNMANNED TELECOMMUNICATIONS FACILITY INCLUDING THE FOLLOWING:

1. INSTALL (1) ENCLOSURE 6160 AND (1) BATTERY CABINET B160
2. INSTALL (1) iXRe ROUTER TO NEW ENCLOSURE 6160
3. INSTALL (1) BB6630 FOR L2500 AND (1) BB66448 FOR N2500 TO NEW ENCLOSURE 6160
4. INSTALL (3) 6X12 HYBRID CABLES FOR NEW ANCHOR A&L EQUIPMENT (1 TO EACH SECTOR). LENGTH AND AWG OF NEW HCS TO BE DETERMINED
5. INSTALL (1) AIR6449 B41 FOR L2500 AND N2500 IN POSITION 1
6. REPLACE RADIO 4415 B25 WITH (1) RADIO 4424 B25 FOR L1900 (BOTH CARRIERS) AND GSM TO POSITION 3 AT ANTENNA, AND CONNECT ITS PORTS TO THE MID-BAND PORTS OF THE OCTO ANTENNA.

PROJECT INFORMATION

SITE NAME:	WTNH HAMDEN
SITE ID:	CT11474A
SITE ADDRESS:	101 TALMADGE ROAD HAMDEN, CT 06518
APPLICANT:	T-MOBILE NORTHEAST, LLC 35 GRIFFIN ROAD SOUTH BLOOMFIELD, CT 06002
CONTACT PERSON:	DAN REID (PROJECT MANAGER) TRANSCEND WIRELESS, LLC (203) 592-8291
ENGINEER OF RECORD:	CENTEK ENGINEERING, INC. 63-2 NORTH BRANFORD RD. BRANFORD, CT 06405 CARLO F. CENTORE, PE (203) 488-0580 EXT. 122
PROJECT COORDINATES:	LATITUDE: 41° 25' 22.30" N LONGITUDE: 72° 57' 4.08" W GROUND ELEVATION: 55'± AMSL SITE COORDINATES AND GROUND ELEVATION REFERENCED FROM GOOGLE EARTH.

SHEET INDEX

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	10/21/20	ANC	TJR	CONSTRUCTION DRAWINGS – ISSUED FOR CONSTRUCTION

PROFESSIONAL ENGINEER SEAL

CENTEK engineering
Centered on Solutions
(203) 488-0580
(203) 488-8587 Fax
63-2 North Branford Road
Branford, CT 06405
www.CentekEng.com

T-MOBILE NORTHEAST LLC
WIRELESS COMMUNICATIONS FACILITY
WTNH HAMDEN
SITE ID: CT11474A
101 TALMADGE ROAD
HAMDEN CT, 06518

DATE:	07/23/20
SCALE:	AS NOTED
JOB NO.	20074.59

TITLE SHEET

T-1

NOTES AND SPECIFICATIONS

DESIGN BASIS:

GOVERNING CODE: 2015 INTERNATIONAL BUILDING (IBC) AS MODIFIED BY THE 2018 CONNECTICUT STATE BUILDING CODE.

1. DESIGN CRITERIA:

- RISK CATEGORY II (BASED ON IBC TABLE 1604.5)
- NOMINAL DESIGN SPEED (OTHER STRUCTURE): 97 MPH (Vasd) (EXPOSURE C/ IMPORTANCE FACTOR 1.0 BASED ON ASCE 7-10).

SITE NOTES

1. THE CONTRACTOR SHALL CALL UTILITIES PRIOR TO THE START OF CONSTRUCTION.
2. ACTIVE EXISTING UTILITIES, WHERE ENCOUNTERED IN THE WORK, SHALL BE PROTECTED AT ALL TIMES. THE ENGINEER SHALL BE NOTIFIED IMMEDIATELY, PRIOR TO PROCEEDING, SHOULD ANY UNCOVERED EXISTING UTILITY PRECLUDE COMPLETION OF THE WORK IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.
3. THE AREAS OF THE COMPOUND DISTURBED BY THE WORK SHALL BE RETURNED TO THEIR ORIGINAL CONDITION.
4. CONTRACTOR SHALL MINIMIZE DISTURBANCE TO EXISTING SITE DURING CONSTRUCTION. EROSION CONTROL MEASURES, SHALL BE IN CONFORMANCE WITH THE LOCAL GUIDELINES FOR EROSION AND SEDIMENT CONTROL.
5. IF ANY FIELD CONDITIONS EXIST WHICH PRECLUDE COMPLIANCE WITH THE DRAWINGS, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER AND SHALL PROCEED WITH AFFECTED WORK AFTER CONFLICT IS SATISFACTORILY RESOLVED.

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18. THE CONTRACTOR SHALL CONTACT "DIG SAFE" (DIAL 811) AT LEAST 48 HOURS PRIOR TO ANY EXCAVATIONS. ALL UTILITIES SHALL BE IDENTIFIED AND CLEARLY MARKED. CONTRACTOR SHALL MAINTAIN AND PROTECT MARKED UTILITIES THROUGHOUT PROJECT COMPLETION.
19. CONTRACTOR SHALL COMPLY WITH OWNER'S ENVIRONMENTAL ENGINEER ON ALL METHODS AND PROVISIONS FOR ALL EXCAVATION ACTIVITIES INCLUDING SOIL DISPOSAL. ALL BACKFILL MATERIALS TO BE PROVIDED BY THE CONTRACTOR.
20. THE COUNTY/CITY/TOWN WILL MAKE PERIODIC FIELD OBSERVATION AND INSPECTIONS TO MONITOR THE INSTALLATION, MATERIALS, WORKMANSHIP AND EQUIPMENT INCORPORATED INTO THE PROJECT TO ENSURE COMPLIANCE WITH THE DESIGN PLANS, SPECIFICATIONS, CONTRACT DOCUMENTS AND APPROVED SHOP DRAWINGS.
21. THE COUNTY/CITY/TOWN MUST BE NOTIFIED (2) WORKING DAYS PRIOR TO CONCEALMENT/BURIAL OF ANY SYSTEM OR MATERIAL THAT WILL PREVENT THE DIRECT INSPECTION OF MATERIALS, METHODS OR WORKMANSHIP. EXAMPLES OF THESE PROCESSES ARE BACKFILLING A GROUND RING OR TOWER FOUNDATION, POURING TOWER FOUNDATIONS, BURYING GROUND RODS, PLATES OR GRIDS, ETC. THE CONTRACTOR MAY PROCEED WITH THE SCHEDULED PROCESS (2) WORKING DAYS AFTER PROVIDING NOTICE UNLESS NOTIFIED OTHERWISE BY THE COUNTY/CITY/TOWN.

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	10/21/20	ANC	TJR	CONSTRUCTION DRAWINGS – ISSUED FOR CONSTRUCTION

PROFESSIONAL ENGINEER SEAL

T-Mobile

Transcend Wireless

CENTEK engineering
Centered on Solutions™
(203) 488-0580
(203) 488-8587 Fax
63-2 North Branford Road
Branford, CT 06405
www.CentekEng.com

T-MOBILE NORTHEAST LLC
WIRELESS COMMUNICATIONS FACILITY
WTNH HAMDEN
SITE ID: CT11474A
101 TALMADGE ROAD
HAMDEN CT, 06518

DATE: 07/23/20
SCALE: AS NOTED
JOB NO. 20074.59

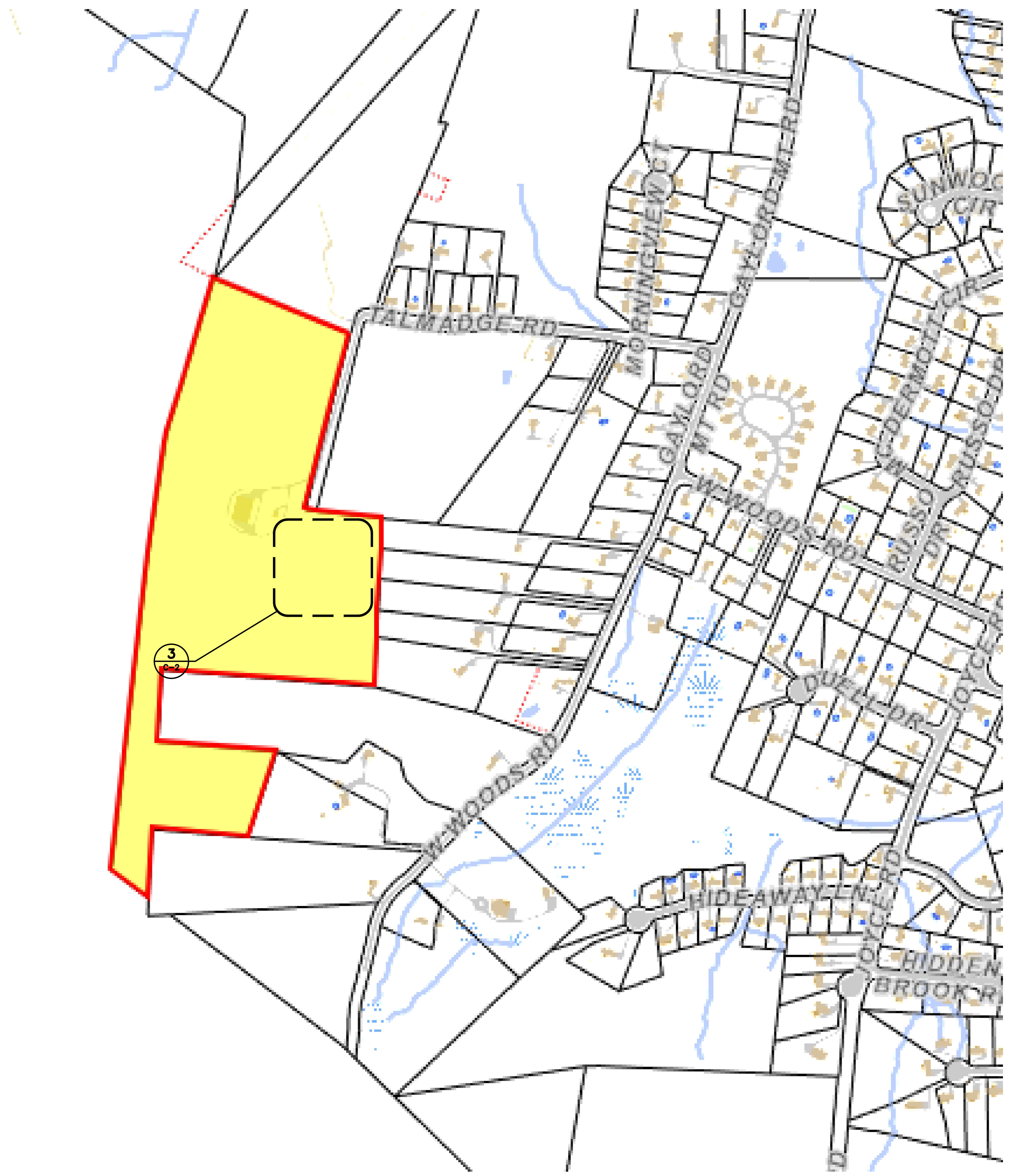
GENERAL NOTES AND SPECIFICATIONS

N-1

NOTE:
ALL COAX LENGTHS TO BE MEASURED AND VERIFIED IN FIELD BEFORE ORDERING

ANTENNA SCHEDULE

SECTOR	EXISTING/PROPOSED	ANTENNA	SIZE (INCHES) (L x W x D)	ANTENNA ℄ HEIGHT	AZIMUTH	(E/P) RRU (QTY)	(E/P) TMA (QTY)	(QTY) PROPOSED COAX (LENGTH)
A1	PROPOSED	ERICSSON (AIR6449 B41)	33.1 x 20.6 x 8.6	315'	45°			(1) 6x12 HYBRID CABLE (±180')
A2	EXISTING	RFS (APX16DWV–16DWV–S–E–A20)	55.9 x 13 x 3.15	315'	45°	(E) RRU 4415 B66A (1)		
A3	EXISTING	RFS (APXVAARR24_43–U–NA20)	95.9 x 24 x 8.7	315'	45°	(E) RRU 4449 B71+B85 (1), (P) RRU 4424 B25 (1)		
B1	PROPOSED	ERICSSON (AIR6449 B41)	33.1 x 20.6 x 8.6	315'	210°			(1) 6x12 HYBRID CABLE (±180')
B2	EXISTING	RFS (APX16DWV–16DWV–S–E–A20)	55.9 x 13 x 3.15	315'	210°	(E) RRU 4415 B66A (1)		
B3	EXISTING	RFS (APXVAARR24_43–U–NA20)	95.9 x 24 x 8.7	315'	210°	(E) RRU 4449 B71+B85 (1), (P) RRU 4424 B25 (1)		
C1	PROPOSED	ERICSSON (AIR6449 B41)	33.1 x 20.6 x 8.6	315'	315°			(1) 6x12 HYBRID CABLE (±180')
C2	EXISTING	RFS (APX16DWV–16DWV–S–E–A20)	55.9 x 13 x 3.15	315'	315°	(E) RRU 4415 B66A (1)		
C3	EXISTING	RFS (APXVAARR24_43–U–NA20)	95.9 x 24 x 8.7	315'	315°	(E) RRU 4449 B71+B85 (1), (P) RRU 4424 B25 (1)		



1 C-1 SITE LOCATION PLAN
SCALE: NOT TO SCALE

TRUE NORTH

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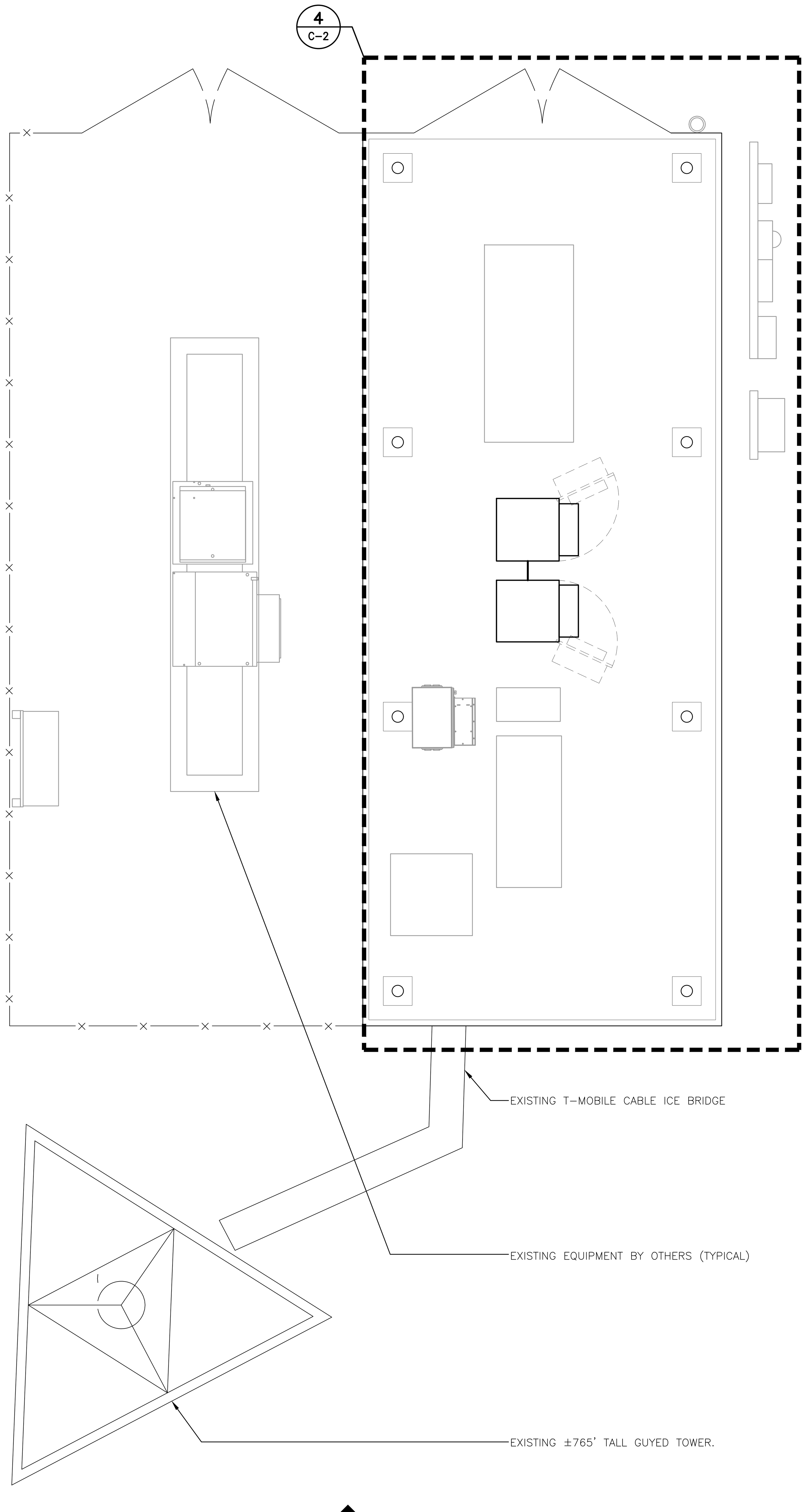
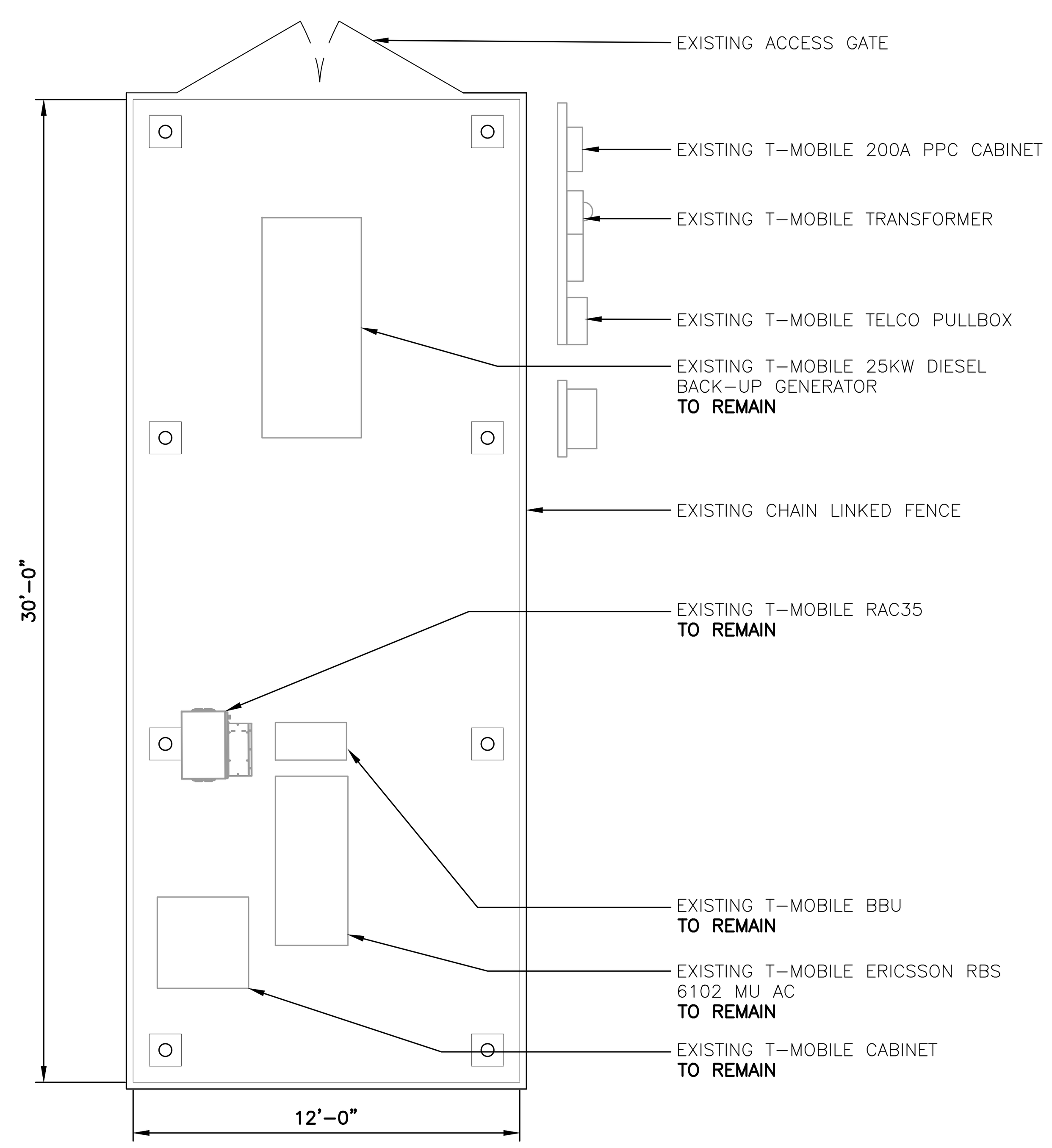
SITE LOCATION PLAN

C-1

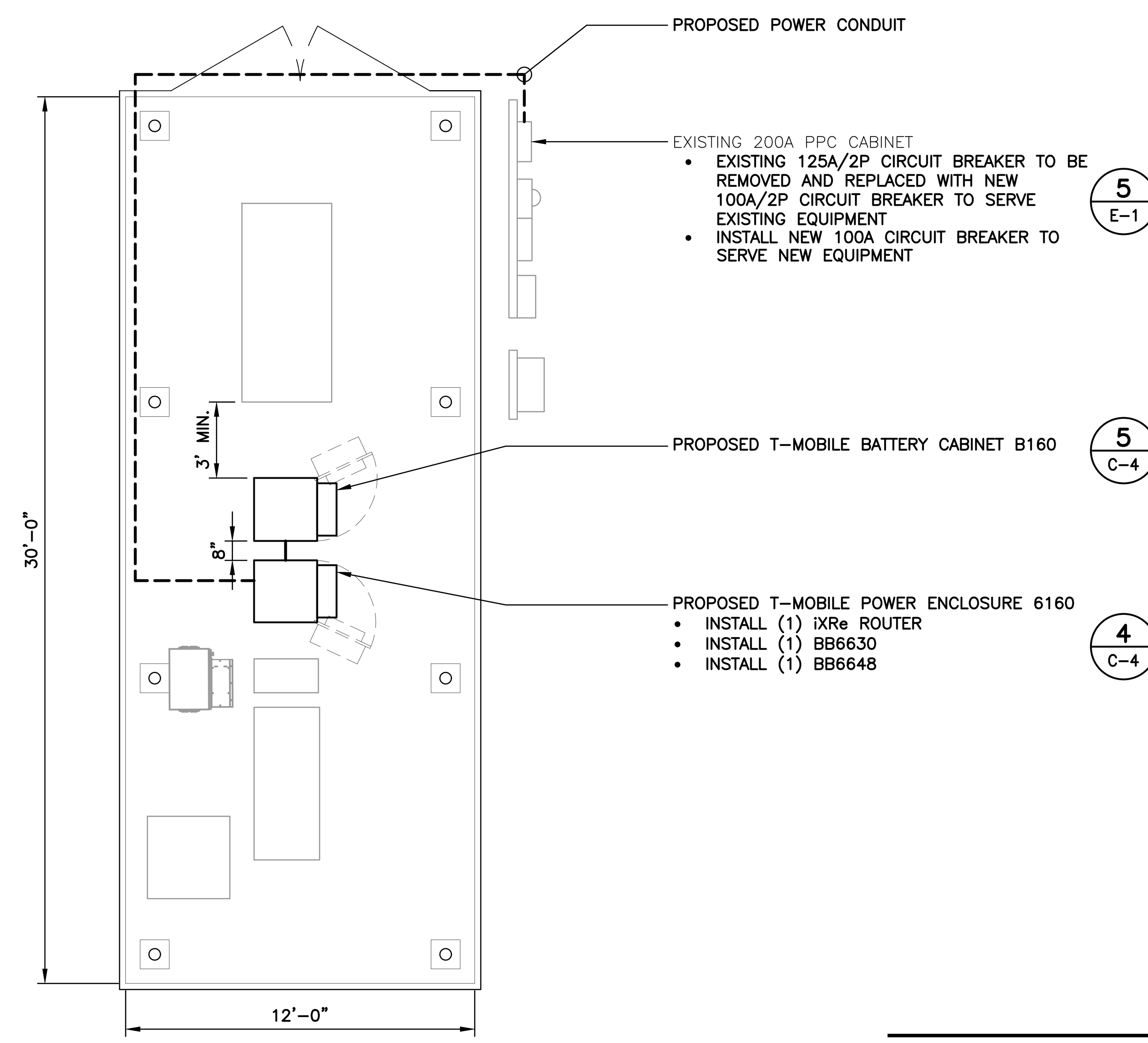
Sheet No. 3 of 7



1 C-2 **COMPOUND PLAN**
SCALE: 3/8" = 1'
TRUE NORTH



3 C-2 **EQUIPMENT PLAN - EXISTING**
SCALE: 1/4" = 1'
TRUE NORTH



4 C-2 **EQUIPMENT PLAN - PROPOSED**
SCALE: 1/4" = 1'
TRUE NORTH

STRUCTURAL COMPLIANCE

ANTENNA MOUNTS

A STRUCTURAL ANALYSIS OF THE ANTENNA MOUNTS WAS PERFORMED FOR THE PROPOSED EQUIPMENT INSTALLATION AND THEY WERE FOUND TO BE STRUCTURALLY SUFFICIENT TO ACCOMMODATE THE PROPOSED LOADING.

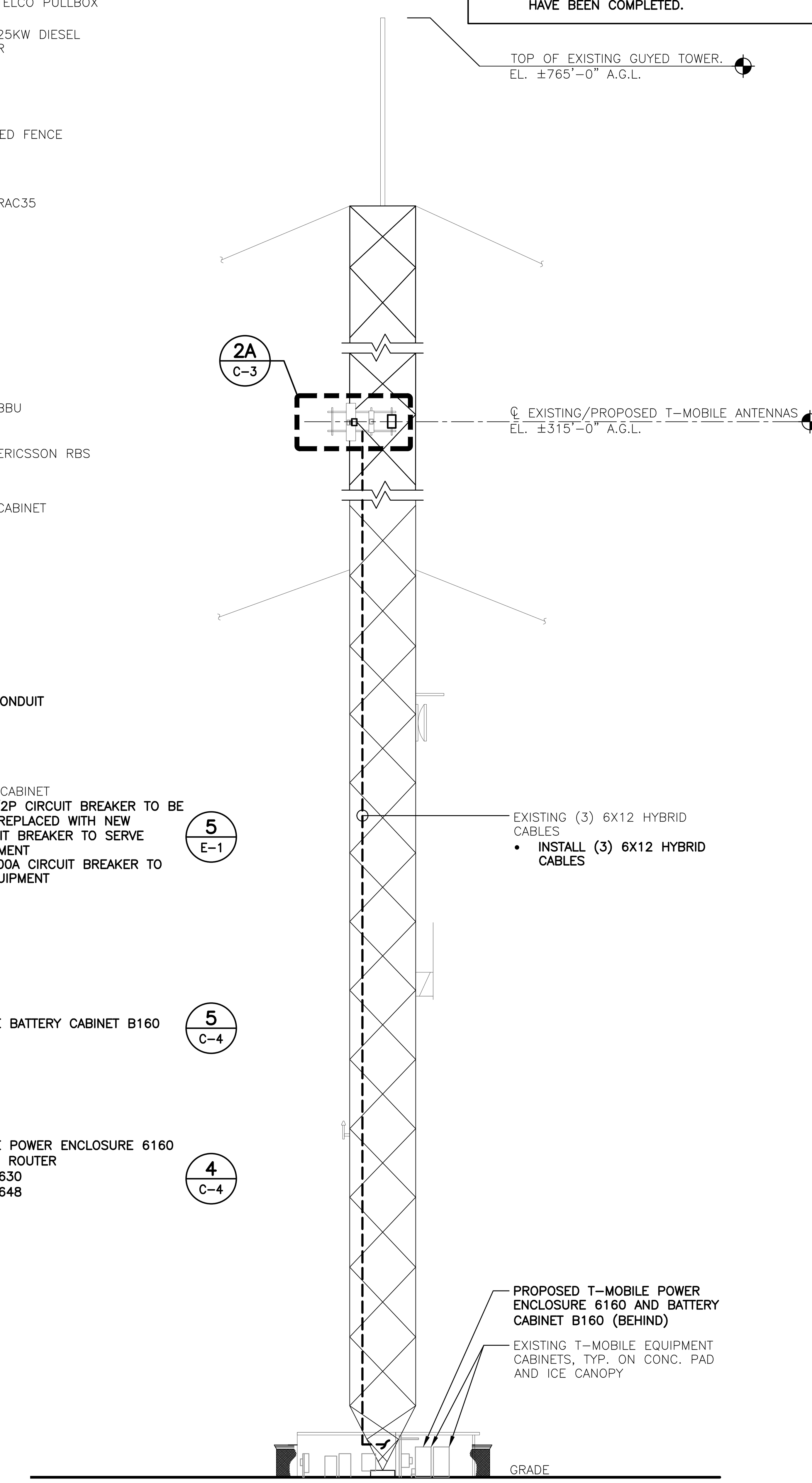
REFER TO THE ANTENNA MOUNT ANALYSIS REPORT PREPARED BY CENTEK ENGINEERING (PROJECT # 20074.59) DATED 07/28/20 FOR ADDITIONAL INFORMATION AND REQUIREMENTS.

TOWER AND TOWER FOUNDATION

A STRUCTURAL ANALYSIS OF THE TOWER AND TOWER FOUNDATION WAS PERFORMED FOR THE PROPOSED EQUIPMENT INSTALLATION AND THEY WERE FOUND TO BE STRUCTURALLY SUFFICIENT TO ACCOMMODATE THE PROPOSED LOADING.

REFER TO THE STRUCTURAL ANALYSIS REPORT PREPARED BY "STAINLESS" (PROJECT # 362029) DATED 10/08/20 FOR ADDITIONAL INFORMATION AND REQUIREMENTS.

NOTE: NO EQUIPMENT SHALL BE INSTALLED ON THE HOSTING STRUCTURE WITHOUT A PASSING STRUCTURAL ANALYSIS REPORT AND CONTRACTOR PRIOR CONFIRMATION THAT ANY AND ALL REQUISITE MODIFICATIONS HAVE BEEN COMPLETED.



2 C-2 **TOWER ELEVATION - PROPOSED**
SCALE: 1" = 10'

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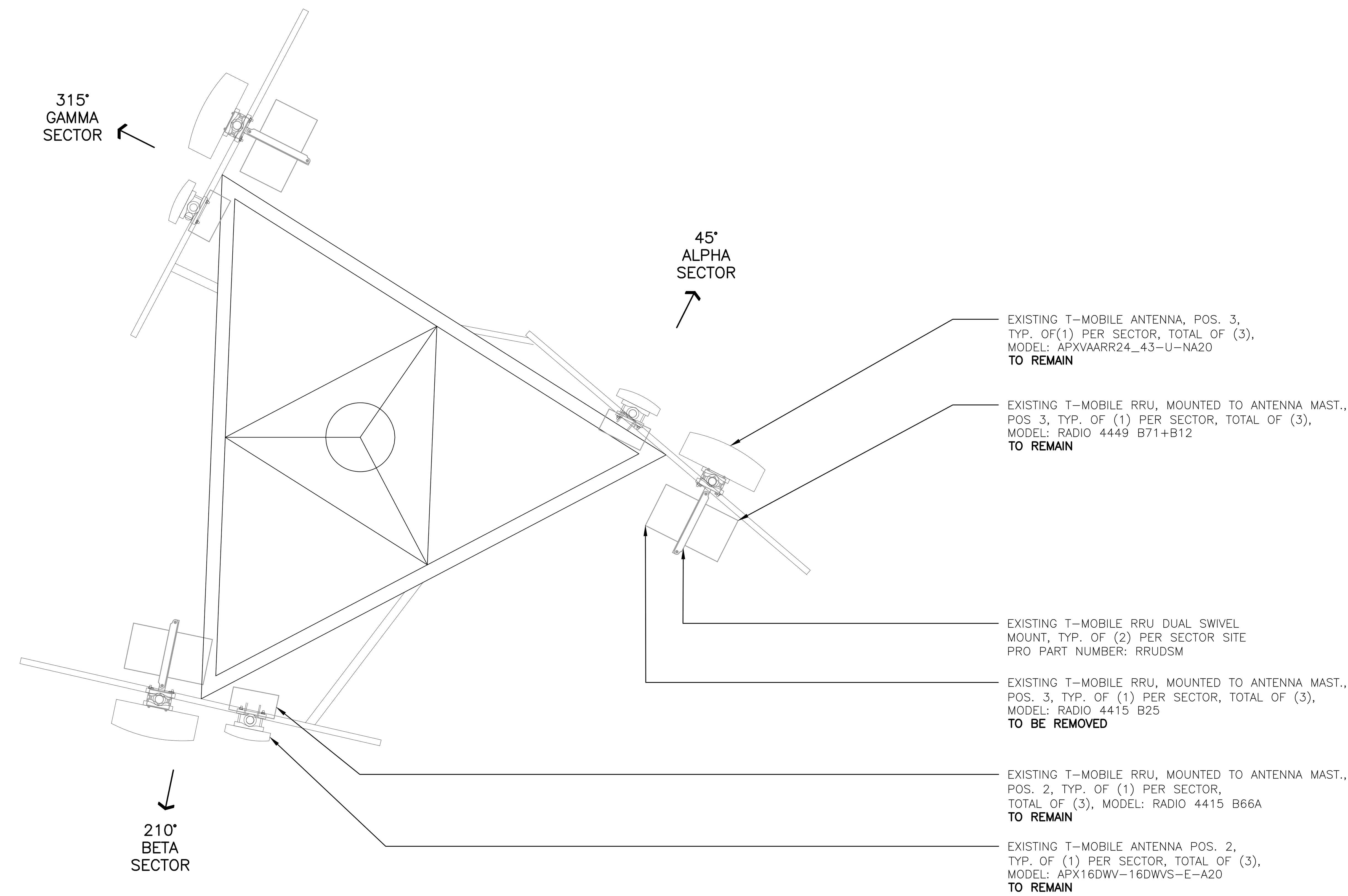
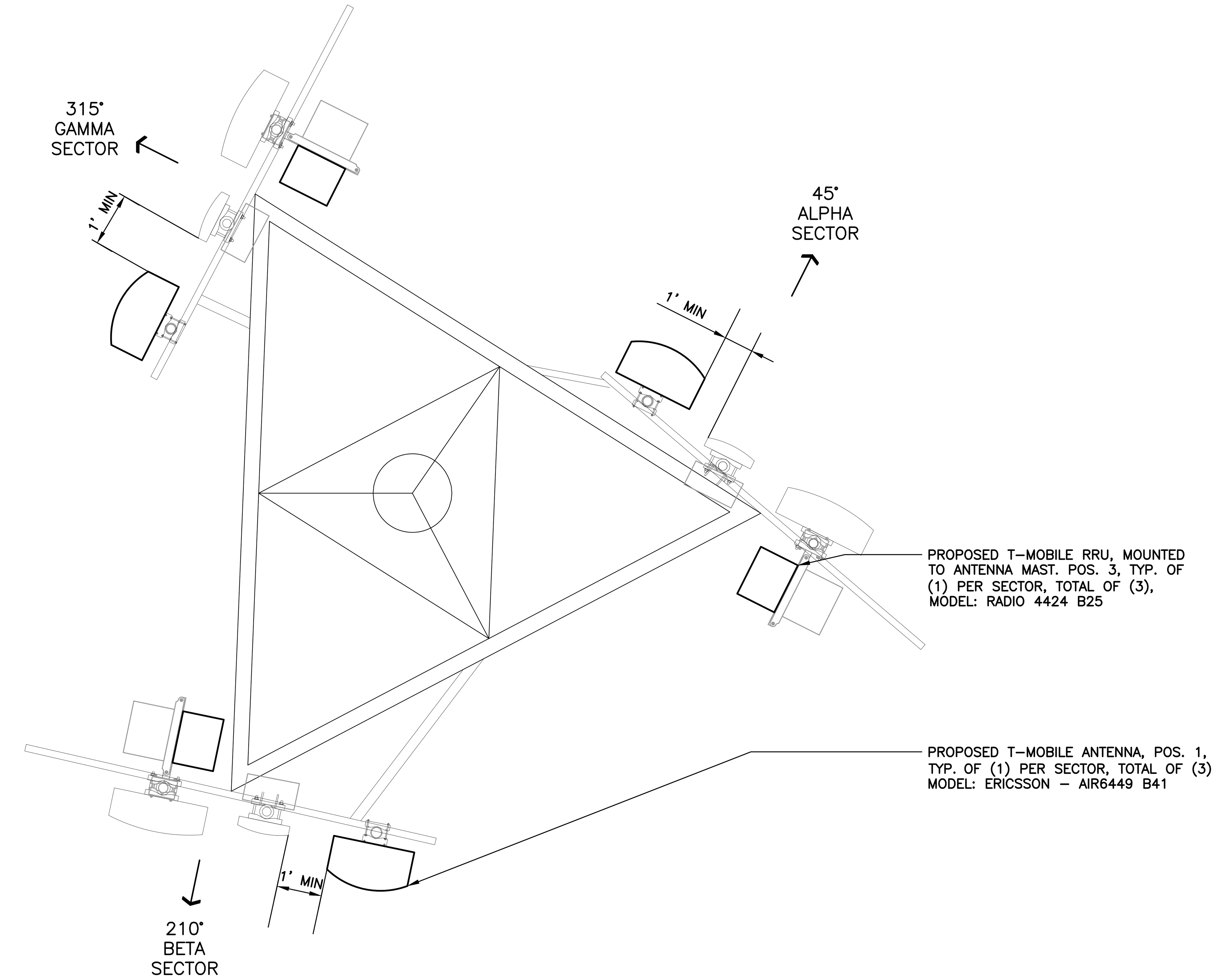
COMPOUND PLAN, EQUIPMENT PLAN, AND ELEVATION

C-2

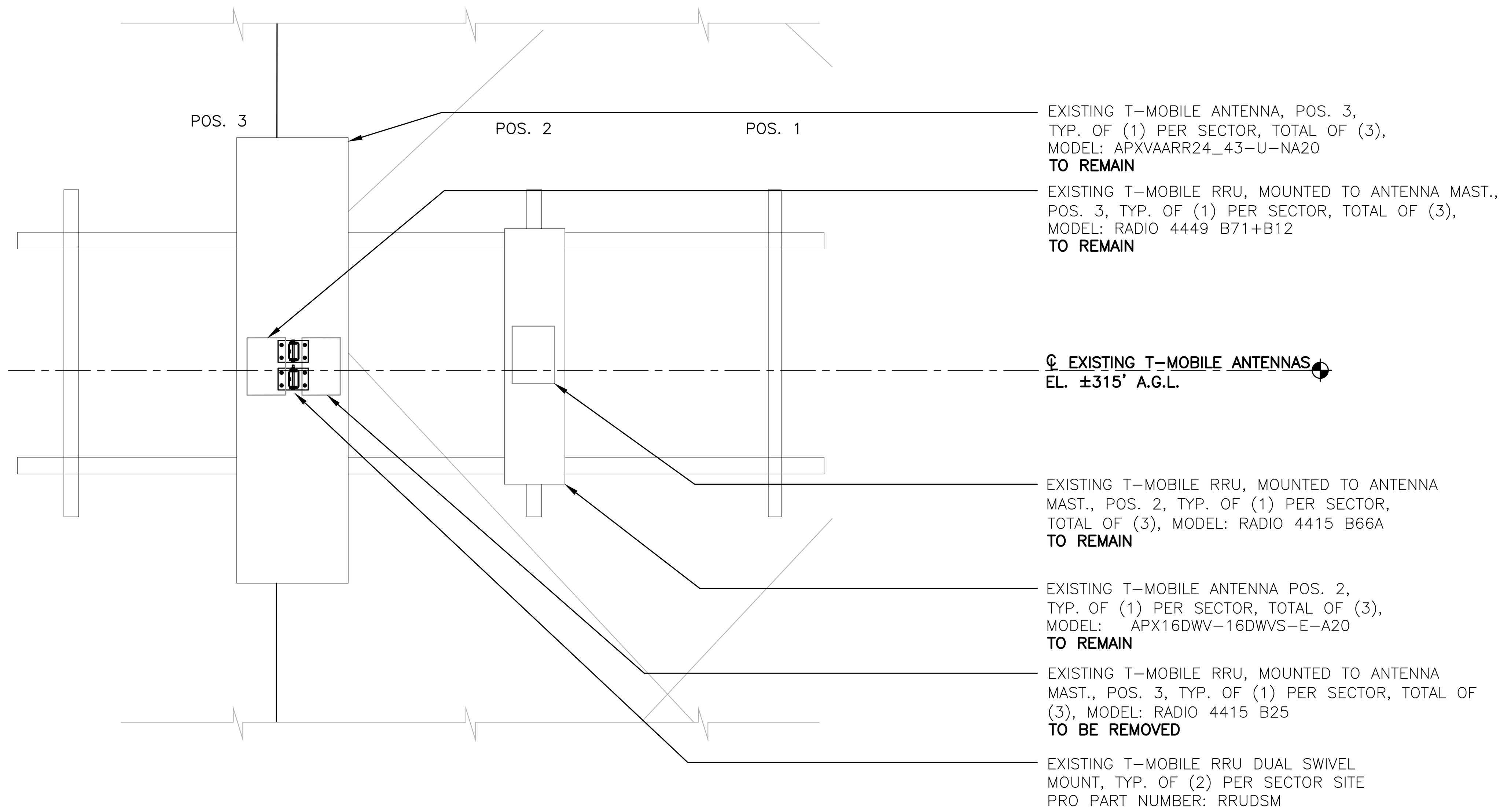
Sheet No. 4 of 7



1 C-3 **PROPOSED ANTENNA MOUNTING CONFIGURATION**
SCALE: 1/2" = 1'
TRUE NORTH

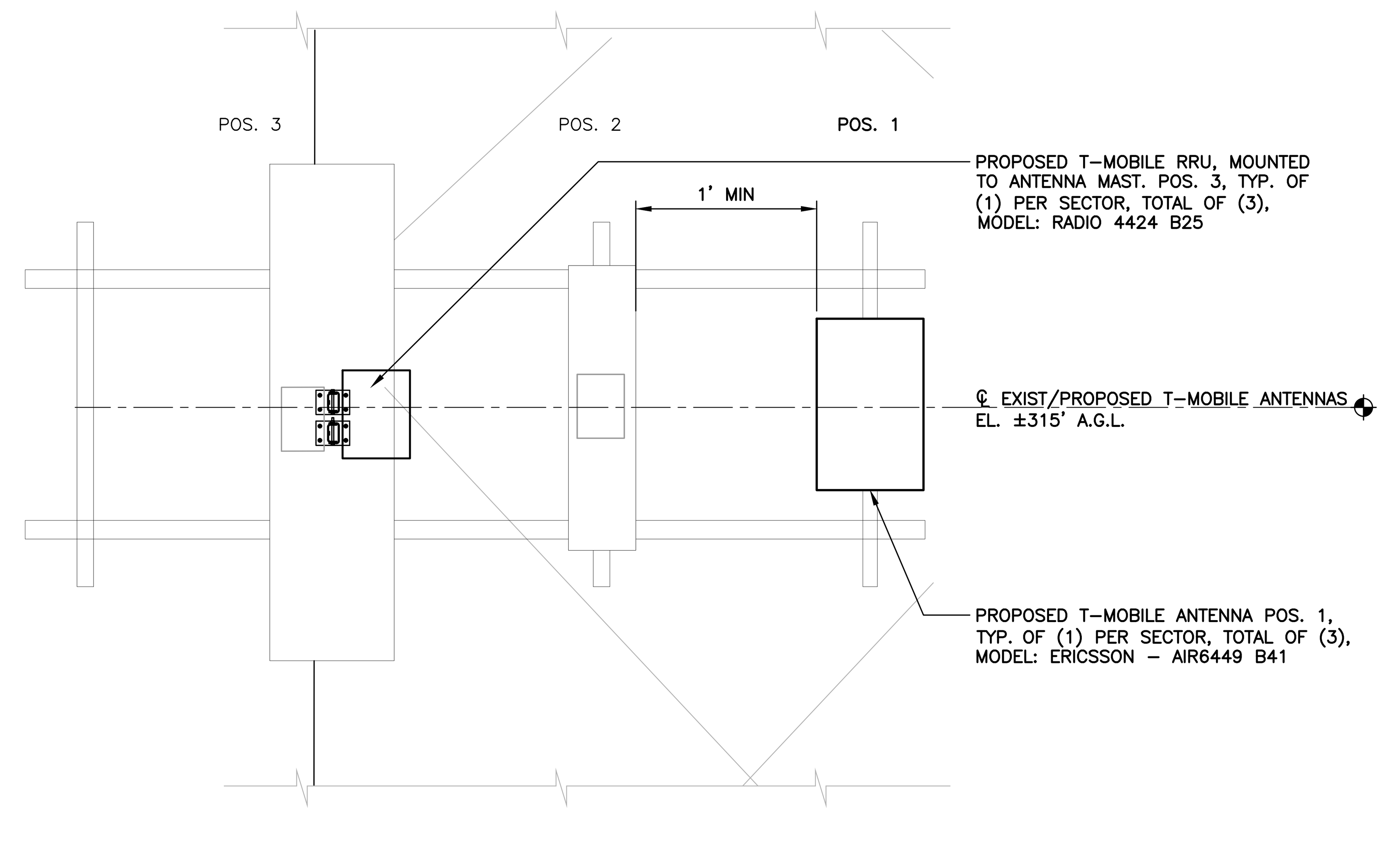


2 C-3 **PROPOSED ANTENNA MOUNTING CONFIGURATION**
SCALE: 1/2" = 1'
TRUE NORTH



TYPICAL SECTOR

1A C-3 **ANTENNA ELEVATION - EXISTING**
SCALE: 1/2" = 1'



TYPICAL SECTOR

2A C-3 **ANTENNA ELEVATION - PROPOSED**
SCALE: 1/2" = 1'

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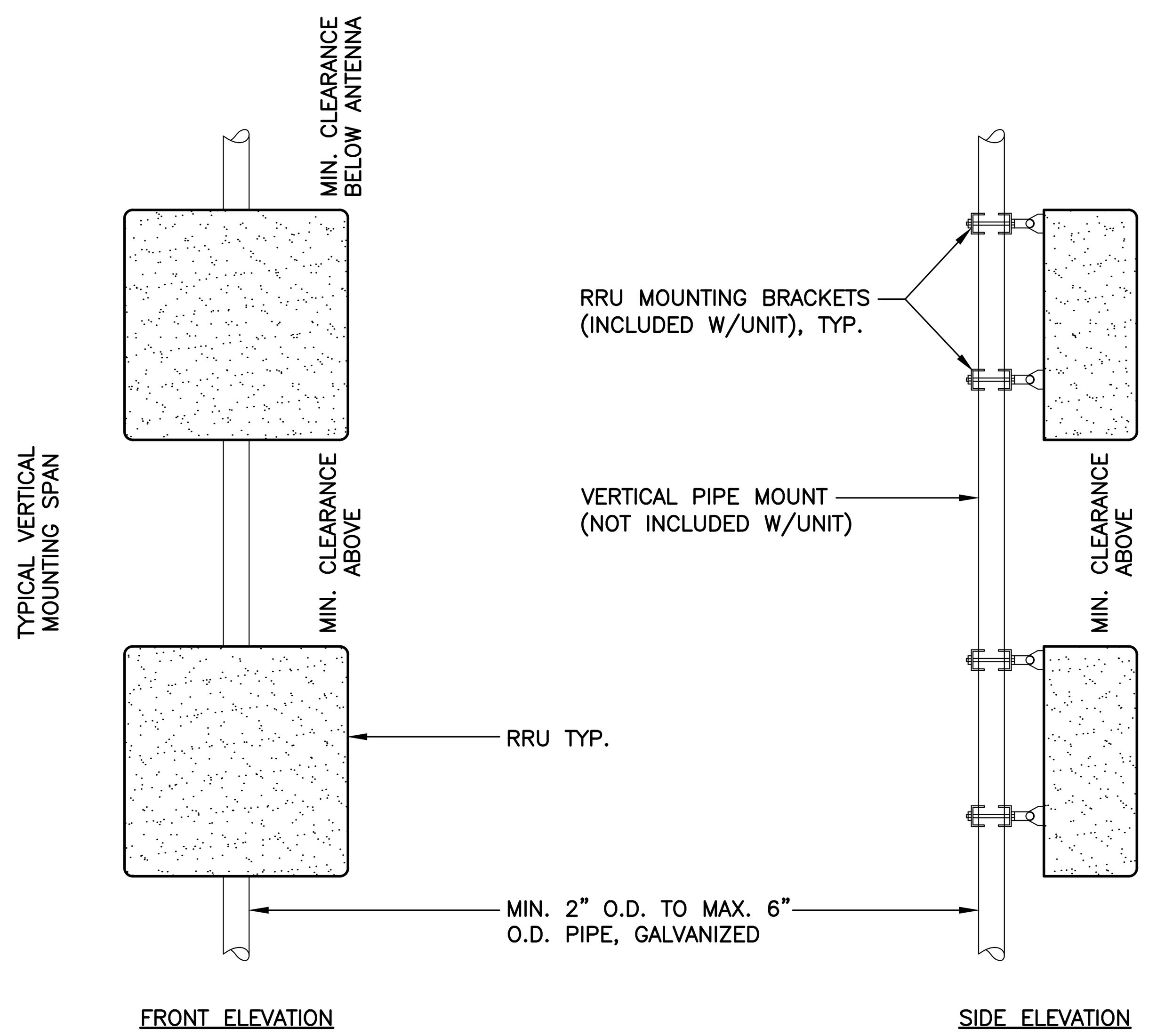
SCALE: AS NOTED
JOB NO. 20074.59

ANTENNA PLANS

C-3

Sheet No. 5 of 7

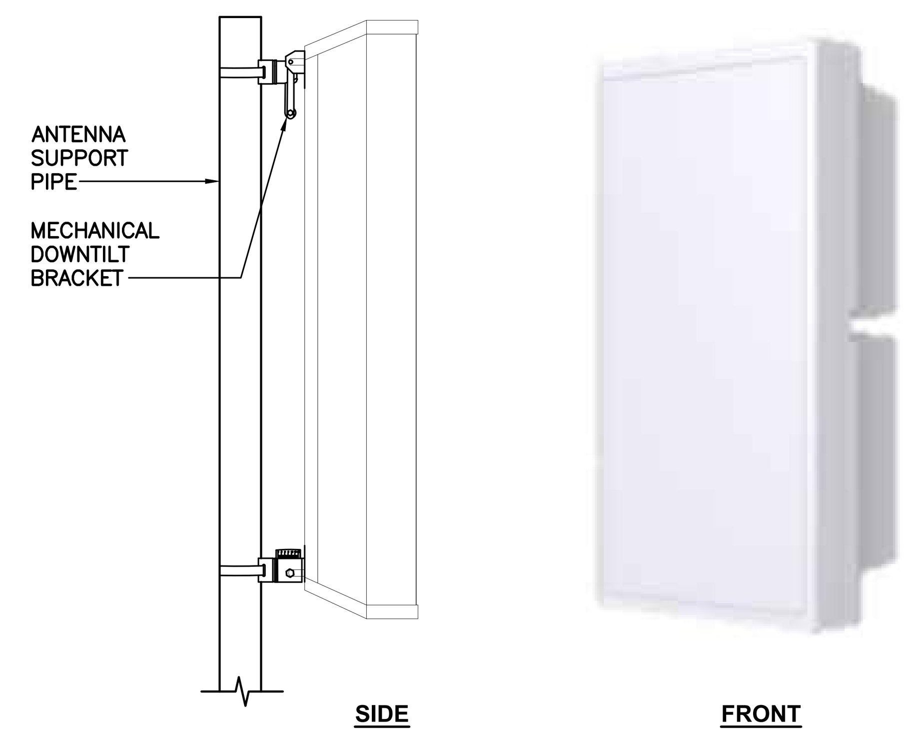


NOTES:

1. T-MOBILE SHALL SUPPLY RRU, AND RRU POLE-MOUNTING BRACKET. CONTRACTOR SHALL SUPPLY POLE/PIPE AND INSTALL ALL MOUNTING HARDWARE INCLUDING ERICSSON RRU POLE-MOUNTING BRACKET. CONTRACTOR SHALL INSTALLS RRU AND MAKES CABLE TERMINATIONS.
2. NO PAINTING OF THE RRU OR SOLAR SHIELD IS ALLOWED.

1 C-4 TYPICAL RRUS MOUNTING DETAILS

SCALE: NOT TO SCALE



ALPHA/BETA/GAMMA ANTENNA		
EQUIPMENT	DIMENSIONS	WEIGHT
MAKE: ERICSSON MODEL: AIR6449 B41	33.1"L x 20.6"W x 8.6"D	±104 LBS.

NOTES:
1. CONTRACTOR TO COORDINATE FINAL EQUIPMENT MODEL SELECTION WITH T-MOBILE CONSTRUCTION MANAGER PRIOR TO ORDERING.

2 C-4 PROPOSED ANTENNA DETAIL

SCALE: NOT TO SCALE

FRONT VIEW

RRU (REMOTE RADIO UNIT)			
EQUIPMENT	DIMENSIONS	WEIGHT	CLEARANCES
MAKE: ERICSSON MODEL: RADIO 4424 B25	16.5"L x 13.5"W x 9.6"D	±86 LBS.	BEHIND ANT.: 8" MIN. BELOW ANT.: 20" MIN. BELOW RRU: 16" MIN.

NOTES:
1. CONTRACTOR TO COORDINATE FINAL EQUIPMENT MODEL SELECTION WITH T-MOBILE CONSTRUCTION MANAGER PRIOR TO ORDERING.

3 C-4 PROPOSED RRU DETAIL

SCALE: NOT TO SCALE

EQUIPMENT CABINET		
EQUIPMENT	DIMENSIONS	WEIGHT
MAKE: ERICSSON MODEL: ENCLOSURE 6160	62.0"H x 26.0"W x 26.0"D	±1200 LBS

4 C-4 ENCLOSURE 6160 (OUTDOOR)

SCALE: NOT TO SCALE

EQUIPMENT CABINET		
EQUIPMENT	DIMENSIONS	WEIGHT
MAKE: ERICSSON MODEL: BATTERY CABINET B160	62.0"H x 26.0"W x 26.0"D	±1883 LBS

5 C-4 BATTERY CABINET DETAIL

NOT TO SCALE

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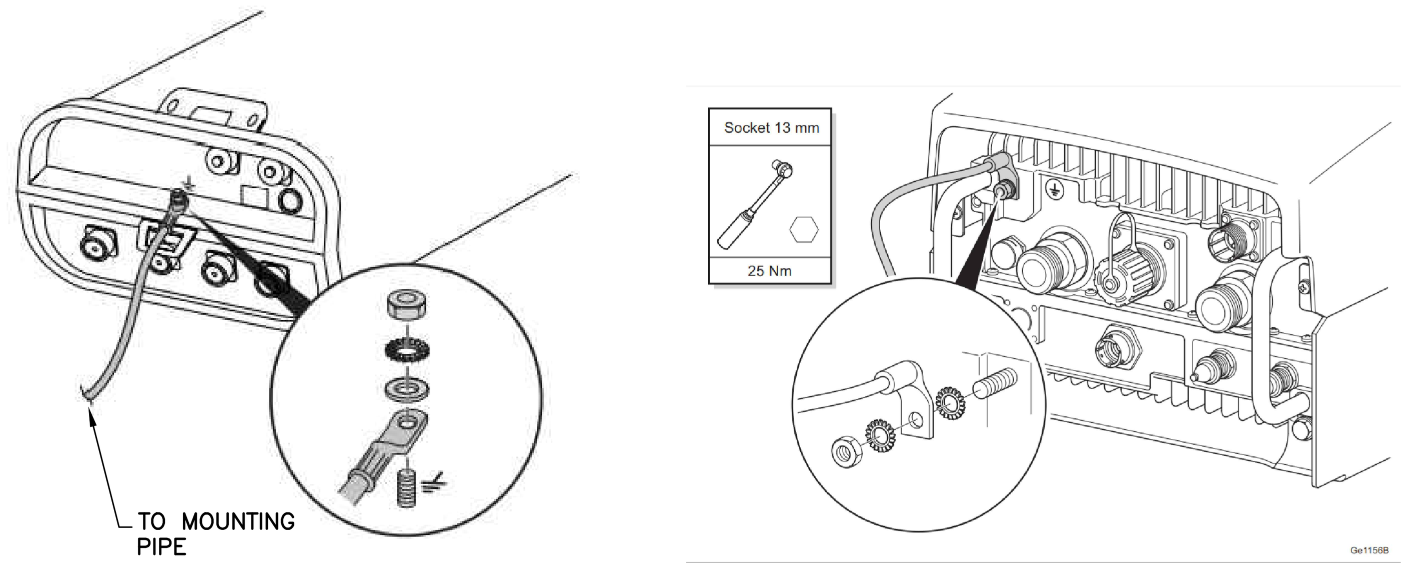
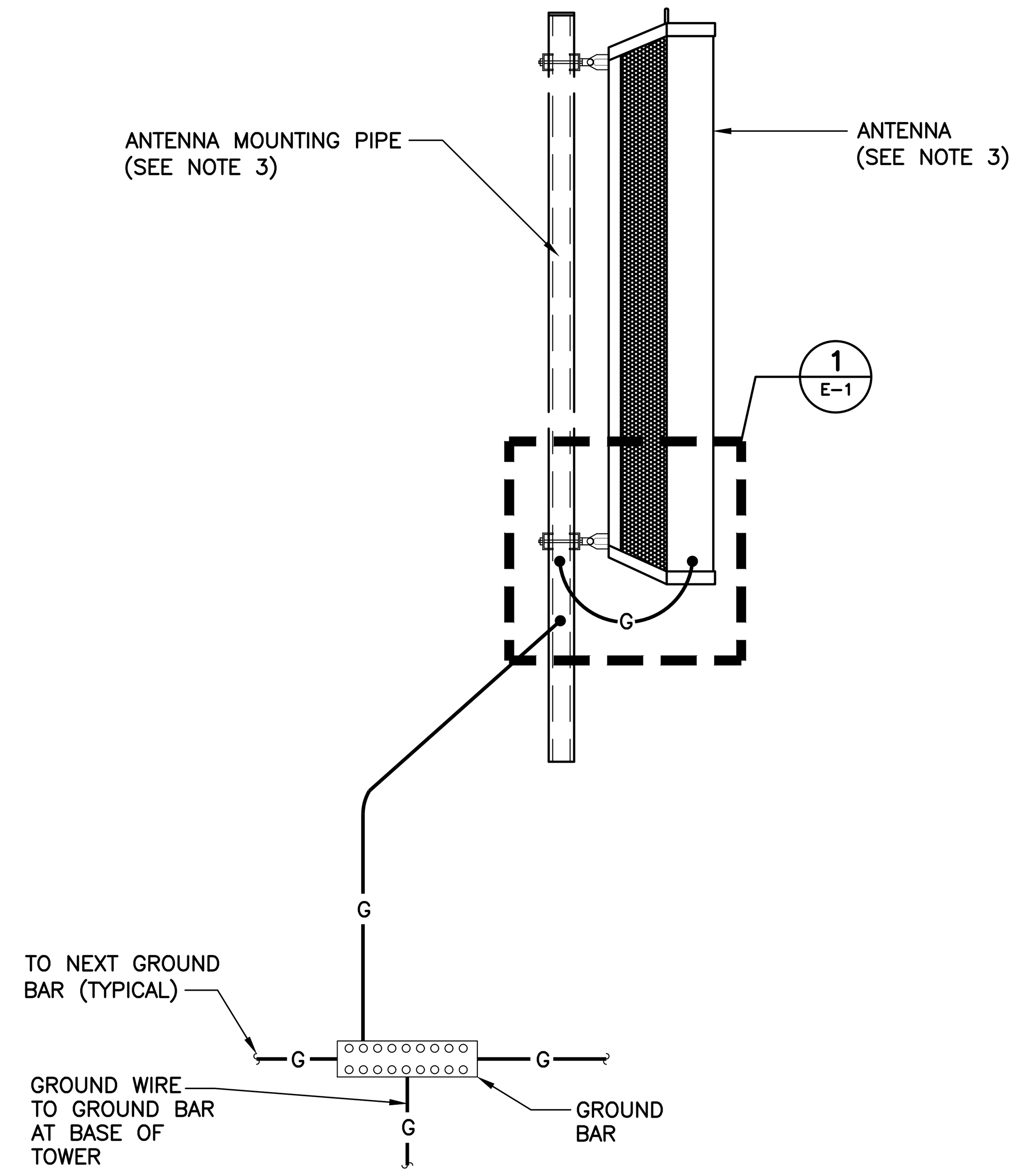
TYPICAL EQUIPMENT DETAILS

C-4

Sheet No. 6 of 7



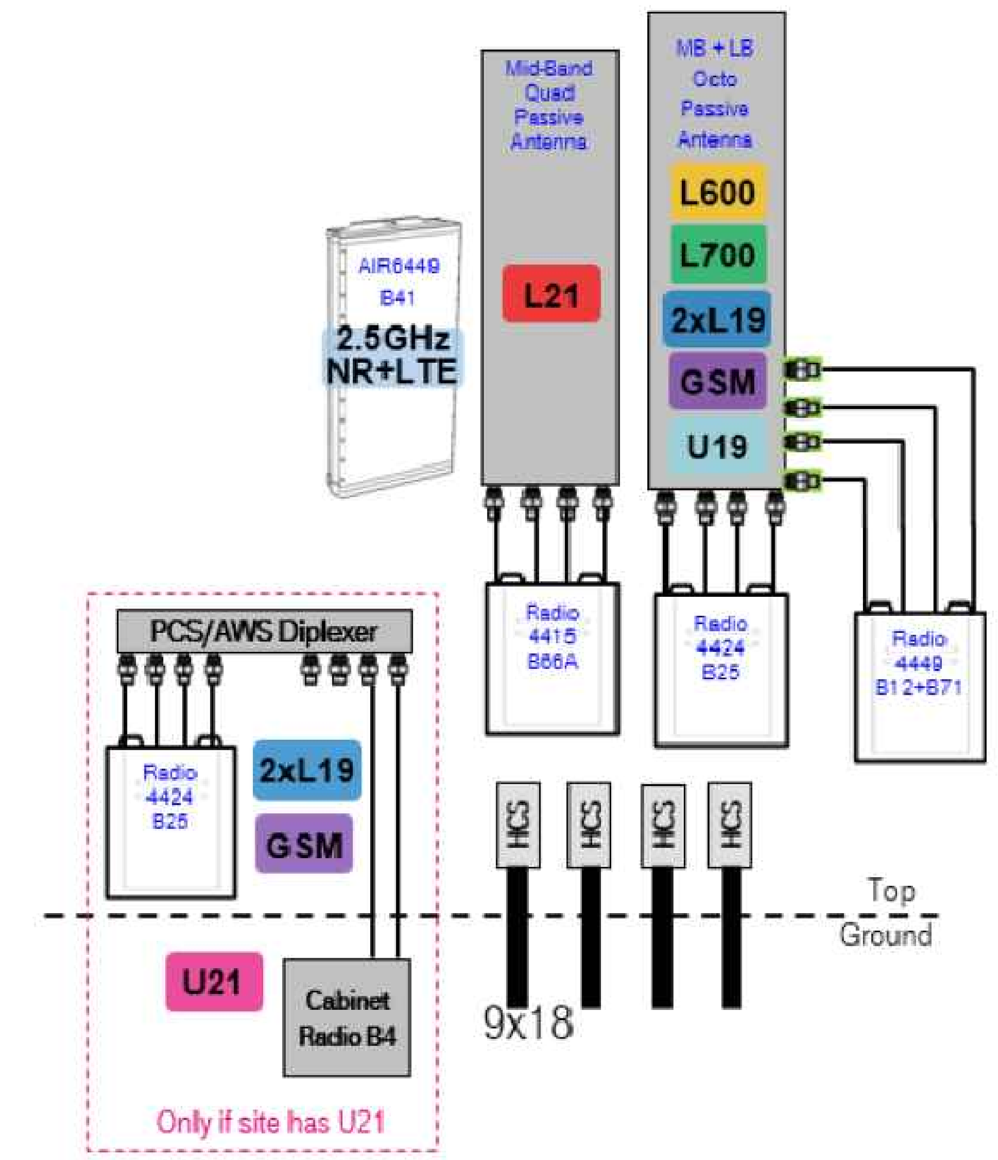
1 E-1 **TYPICAL ANTENNA/RRU GROUNDING DETAILS**
SCALE: NOT TO SCALE



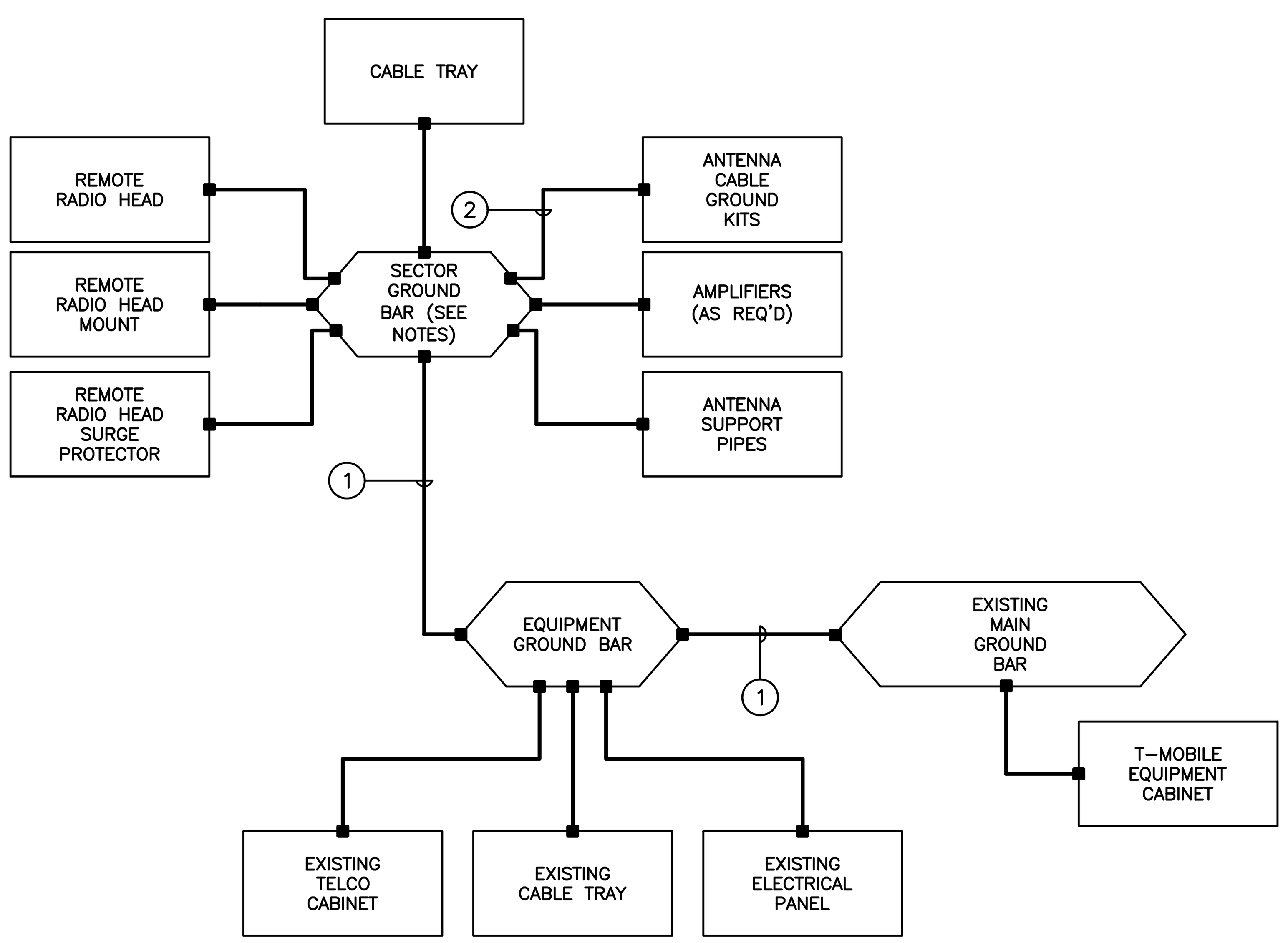
NOTES:

1. BOND COAXIAL CABLE GROUND KITS TO EACH OWNER'S GROUND BAR ALONG ENTIRE COAX RUN FROM ANTENNA TO SHELTER.
2. BOND ALL EQUIPMENT TO GROUND PER NEC AND MANUFACTURERS SPECIFICATIONS.
3. DETAIL IS TYPICAL FOR ALL ANTENNA SECTORS, INCLUDING GPS ANTENNA.

2 E-1 **TYPICAL ANTENNA GROUNDING DETAIL**
SCALE: NOT TO SCALE



3 E-1 **PROPOSED PLUMBING DIAGRAM**
SCALE: NOT TO SCALE



GROUNDING SCHEMATIC NOTES

(1) #2 AWG

(2) #6 AWG

GENERAL NOTES:

1. ALL SURGE SUPPRESSION EQUIPMENT SHALL BE BONDED TO GROUND PER MANUFACTURER'S SPECIFICATIONS
2. UNLESS OTHERWISE NOTED OR REQUIRED BY CODE, GROUND CONDUCTORS SHOWN SHALL BE #2 AWG (SOLID TINNED BCW – EXTERIOR; STRANDED GREEN INSULATED – INTERIOR).
3. ALL SECTOR GROUND BARS SHALL BE BONDED TOGETHER WITH #2 AWG SOLID TINNED BCW.
4. BOND ALL EQUIPMENT CABINETS AND BATTERY CABINETS TO GROUND PER MANUFACTURER'S SPECIFICATIONS.
5. COORDINATE ALL TOWER MOUNTED EQUIPMENT WITH OWNER.
6. ALL TOWER MOUNTED AMPLIFIERS AND ASSOCIATED EQUIPMENT SHALL BE BONDED TO THE SECTOR GROUND BAR PER MANUFACTURER'S SPECIFICATIONS.
7. ALL GROUNDING SHALL BE IN ACCORDANCE WITH NEC AND OWNER'S REQUIREMENTS.

4 E-1 **TYPICAL GROUNDING SCHEMATIC DETAIL**
SCALE: NOT TO SCALE

RISER DIAGRAM NOTES

(1) EXISTING 200A, 120/240V, SINGLE PHASE PANEL TO REMAIN.

(2) EXISTING CONDUITS AND CONDUCTORS TO REMAIN.

(3) EXISTING EQUIPMENT CABINET TO REMAIN.

(4) EXISTING 125A/2P CIRCUIT BREAKER SERVING EXISTING EQUIPMENT CABINET TO BE REMOVED AND REPLACED WITH NEW 100A/2P CIRCUIT BREAKER. COORDINATE CABINET DOWNGRADE WITH CONSTRUCTION MANAGER.

(5) NEW 100A/2P CIRCUIT BREAKER TO SERVE NEW EQUIPMENT CABINET.

(6) (3) #1 AWG, (1) #8 AWG GROUND, 1-1/4" CONDUIT.

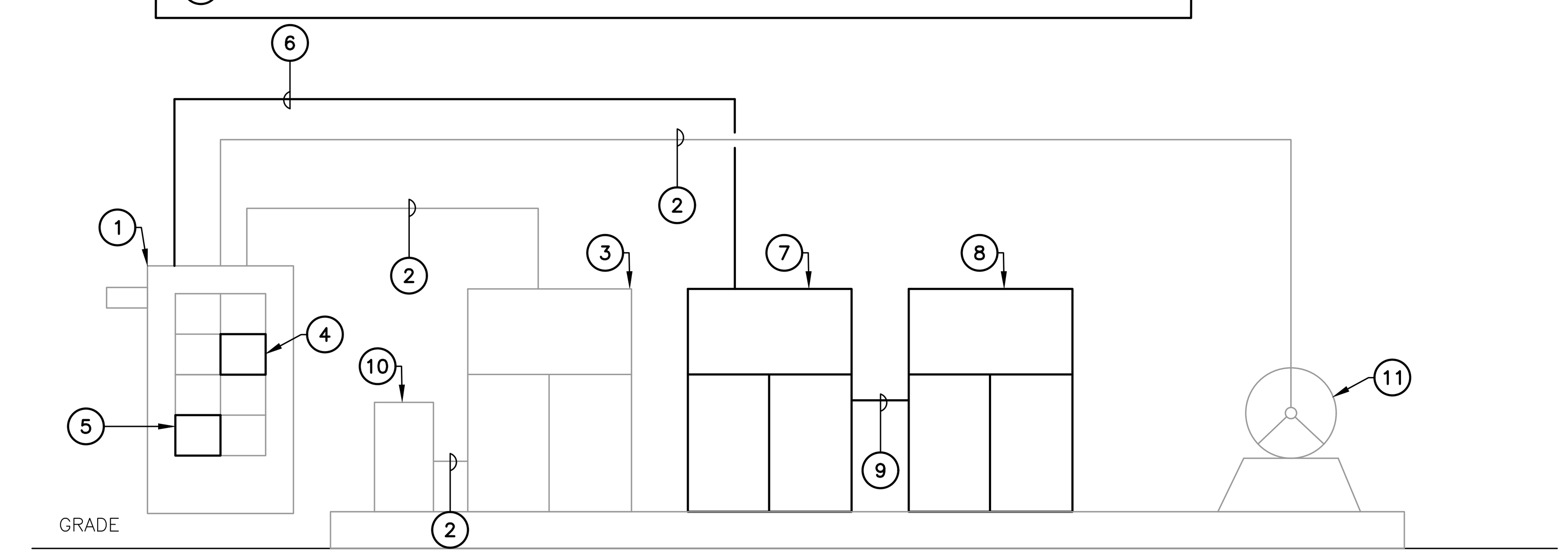
(7) NEW RADIO EQUIPMENT CABINET.

(8) NEW BATTERY CABINET.

(9) DC CONDUIT AND CONDUCTORS FOR BATTERY CABINET CONNECTION PER MANUFACTURERS SPECIFICATIONS.

(10) EXISTING BBU CABINET TO REMAIN.

(11) EXISTING GENERATOR TO REMAIN.



5 E-1 **ELECTRICAL POWER RISER DIAGRAM**
SCALE: NOT TO SCALE

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TYPICAL ELECTRICAL DETAILS

E-1

Sheet No. 7 of 7

Exhibit C
Structural Analysis Report

REPORT 362029

DATE: 10/8/2020

SUFFICIENT CAPACITY – 99%

PASSING RIGOROUS STRUCTURAL ANALYSIS

FOR A 904' OVERALL HEIGHT G-12 GUYED TOWER

NEW HAVEN (HAMDEN), CT

PREPARED BY: AV

APPROVED: KP

CHECKED BY: AP

Date	Pages	Remarks

Rev.	Date	Description

SECTION PAGE

APPENDIX

Rev.	Date	Description

A. AUTHORIZATION/PURPOSE

As authorized by Elizabeth Jamieson of Transcend Wireless, a structural analysis was performed to investigate the adequacy of a 904’ overall height Stainless G-12 guyed tower at 101 Talmadge Road in Hamden, Connecticut to support specified equipment.

B. TOWER HISTORY

The tower was originally designed and furnished in 1995 by Stainless. It was designed in accordance with TIA/EIA-222-E for a wind speed of 85 mph and 73.6 mph with 1/2” ice while supporting the following equipment:

1. One (1) top mounted Dielectric TCL-12A8 (S) antenna, fed by two (2) 6-1/8” rigid lines.
2. One (1) top mounted HDTV antenna, fed by one (1) WR1150 waveguide (future).
3. One (1) Dielectric TFU-28JSM Ch. 59 antenna, at the 730’ level, fed by one (1) WR1150 waveguide.
4. One (1) Dielectric TFU-28JSM HDTV Ch. 14 antenna, at the 670’ level, fed by one (1) WR1150 waveguide (future).
5. Two (2) ENG Super Quad antennas at the 760’ level, fed by one (1) 1-5/8” line and one (1) 1/2” control cable (one future).
6. One (1) ERI 6-bay panel type FM antenna at the 610’ level, fed by one (1) 6-1/8” rigid line (future).
7. Two (2) Andrew MMDS wireless cable antennas at the 565’ level, fed by one (1) EW20 waveguide (future).
8. One (1) ERI SHPX-3AE FM antenna at the 545’ level, fed by one (1) 3” line.
9. One (1) ERI SHPX-3AE FM antenna at the 520’ level, fed by one (1) 3” line.
10. Three (3) whip antennas at the 750’ level, fed by one (1) 1-5/8” line to each.
11. Three (3) whip antennas at the 500’ level, fed by one (1) 1-5/8” line to each.
12. Three (3) whip antennas at the 400’ level, fed by one (1) 1-5/8” line to each.
13. Three (3) whip antennas at the 350’ level, fed by one (1) 1-5/8” line to each (future).
14. Three (3) whip antennas at the 325’ level, fed by one (1) 1-5/8” line to each (future).
15. Three (3) whip antennas at the 300’ level, fed by one (1) 1-5/8” line to each (future).
16. One (1) Scala PR-450U antenna at the 339’ level, fed by one (1) 7/8” line.
17. One (1) Scala PR-450U antenna at the 247’ level, fed by one (1) 7/8” line.
18. One (1) 6’ grid dish at the 400’ level, fed by one (1) 1-5/8” line.
19. Two (2) 6’ grid dishes at the 325’ level, fed by one (1) 1-5/8” line to each (future).
20. Two (2) 6’ grid dishes at the 225’ level, fed by one (1) 1-5/8” line to each (future).

Rev.	Date	Description

21. Two (2) 8’ dishes with radomes at the 325’ level, fed by one (1) EW63 waveguide to each (one future).
22. One (1) 8’ dish with radome at the 166’ level, fed by one (1) EW63 waveguide (future).
23. One (1) 8’ dish with radome at the 150’ level, fed by one (1) EW63 waveguide (future).
24. One (1) inside climbing ladder with cable type safety device for the full height of the tower.
25. One (1) single car elevator with guide rails, cables, motor and elevator equipment.
26. Ice shields for all side mounted antennas, except the whip antennas.
27. One (1) red lighting system with circuits in rigid conduit for the full height of the tower.

❖ In 1998, the bottom stack Dielectric THP-O-2-1 antenna of the top mounted stack system was installed per Stainless Report 362006. The guy wires of all the four levels were also re-tensioned.

❖ The tower was modified in 2015 by Stainless per Report 362017. The modifications were as follows:

- Installed additional horizontal sub-bracing at the midpoints of the following bay:

Location	No of bays
591.3’ – 583.8’	1

- Replaced existing diagonal braces with new, higher capacity members at the following bay:

Location	No of bays
621.3’ – 613.8’	1

❖ In 2018, the tower was modified per Stainless Report 362023. The modifications consisted the following:

- Installed additional horizontal sub-bracing at the midpoints of the following bay:

Location	No of bays
553.8’ – 546.3’	1

❖ In 2020, the tower was recommended to be modified per Stainless Report 362026 dated 6/16/2020. These modifications are considered to be installed for this analysis and consist of the following:

- Adjusted guy wire tensions in all guy levels.

Stainless has no record of any other modifications to the tower structure or its foundations.

Rev.	Date	Description

C. CONDITIONS INVESTIGATED

The analysis was performed for the tower supporting specified equipment based upon the following sources:

- Stainless Proposal P20_3620_003 dated 8/26/2020.
- Stainless Report 362027 dated 7/8/2020.
- Emails from Elizabeth Jamieson of Transcend Wireless dated 8/12/2020 and 10/5/2020 about proposed equipment.
- Equipment RFDS file “1_CT11474A_Anchor_3_draft_2020-07-16.pdf”

APPURTENANCE	ELEVATION, ft.	FEED LINES
Stacked TCL-12A8(S) Ch. 8 / THP-O-2-1 Ch. 10	Tower top	6-1/8”/3-1/8” rigid
10’ omni	758	1-5/8”*
5’ omni	750	7/8”
Super Quad ENG	744	1-5/8”* & 1/2” control cable
DB408	742	1-5/8”*
Ice shield	681	-
PL8 8’ diameter dish/radome	678	EW63 & 1/2” cable
(2) Commscope MD-SQ3 (Assumed Installed, (1) above each VHLPX3-6W dish at 650’)	655	--
(1) Commscope VHLPX3-6W dish (Azimuth 231 degrees) (1) Commscope VHLPX3-6W dish (Azimuth 51 degrees) (4) SAF MXM MK2 Radio units	650	(6) 1/2" (LDF4-50A) (6) 1/4" fiber cables (6) 1/4" copper power cables
PL6-65 6’ diameter dish/radome	630	EW63 & 1/2” cable
(2) Dualight 12004-rot-1r07-001	605	--
6015-2/3R FM	591	4-1/16” rigid
SWR FMEC/ 2-HWS-TA	550	7/8” (420’-550’) 1-5/8” (0’-420’)
(2) DB408	529	(2) 7/8”
DB408	510	7/8”
6810-2R 2-bay FM	458	6-1/8” rigid**
15’ omni (unused)	420	1/2”
5’ omni	348	7/8”
Ice shield	346	-
6’ diameter grid dish	339	7/8”

Rev.	Date	Description

(3) Ericsson AIR6449 B41 (Proposed) **(3) Ericsson Radio 4424 B25 (Proposed)** (3) RFS APX16DWV-16DWV-S-E-A20 (Existing) (3) RFS APXVAARR24_43-U-NA20 (Existing) (3) Ericsson Radio 4415 B66A (Existing) (3) Ericsson Radio 4449 B71+B85 (Existing) (3) Sector mounts (Existing) (3) Ericsson Radio 4415 B25 **(To be removed)**	315	**(3) 1-3/8” hybrid cables (Proposed)** (3) 1-3/8” hybrid cables (Existing)
(2) Dualight 12004-rot-1r07-001	302	--
(3) APXVSPP18-C-A20 (3) APXVTM14-C-120 (3) TD-RRH8x20 (6) RRUs (3) sector mounts	200	(3) 1-1/4” Hybriflex (1) 1-1/4” Hybriflex cable
Ice shield	166	-
8’ diameter dish/radome	160	(2) EW63
(1) DSiF03F36D-D on sidearm	110	(2) 7/8 lines
15’ omni (unused)	102	1/2”
ASPG952 (unused)	100	2-1/4”
GPS unit	75	1/2”
(2) support conduits	To 200 & 45	1” conduit
Support conduit	To 315	1-1/4” conduit
(7) support conduits	To 200’, 348’, 2 x 420’, 529’, 758’, top of tower	1-1/2” conduit
(2) support conduits	To 650	1-1/2” conduit
Ladder with cable safety device	To top of tower	3/8” cable
Elevator system	To top of tower	-
FAA red lighting system	To top of tower	1” conduit to 45 1-1/2” conduit from 45’ to tower top

*Shared Line
** This coax was cut at the 440’ – 480’ level and a 20’ length of 3” heliax was used to connect the 6-1/8” rigid coax to the antenna. The remaining length of the 6-1/8” rigid coax from 480’ to the top of tower was left in place

The locations of the existing transmission lines are based upon the cross section from Stainless Report 362027 dated 7/8/2020. The locations of the transmission lines are shown on page A-2

Rev.	Date	Description

of this report. Deviating from the line arrangement as shown may invalidate the results of this analysis.

D. LOADS AND STRESSES

The analysis was performed using the following design parameters in accordance with the 2018 Connecticut Building Code, based on the 2015 IBC and ANSI/TIA-222-G, Structural Standard for Antenna Supporting Structures and Antennas, including Addenda 1 & 2, dated 2007 and 2009 respectively.

- Risk Category II
- 125 mph ultimate 3-second gust wind speed with no ice.
- 50 mph basic design wind speed with 3/4” design ice thickness.
- Exposure Category B
- Topographic Category 1 (Mad Mare Ridge) (SEE wind direction, ridge, crest point=650ft, base point=400ft, L/2=980ft, x=390ft windward, Kzt max=1.482)
- 0.186 earthquake spectral response acceleration at short periods (S_s)
- Earthquake Site Class D

The ultimate design wind speed is converted to a nominal design wind speed for use in ANSI/TIA 222-G based upon the following formula:

$$V_{asd} = V_{ult} * (0.6)^{1/2}$$
$$= 125 * (0.6)^{1/2}$$
$$= 97 \text{ mph}$$

Seismic effects need not be considered as the value of Ss is less than 1.0 per Section 2.7.3 of. ANSI/TIA 222-G. Load and resistance factors used to evaluate the adequacy of the structure were in accordance with ANSI/TIA-222-G.

E. METHOD OF ANALYSIS

The analysis was performed using tnxTower, a commercial computer-aided finite element tower program for the non-linear analysis of towers subject to simultaneous lateral and axial loads.

Rev.	Date	Description

F. RESULTS

The results of the analysis show the following ratings:

COMPONENT	SPAN	RATING %
Tower top	--	69
Leg compression	4	98
	3	93
	2	84
	1	87
Leg tension	4	70
	3	--
	2	--
	1	--
Diagonals	4	98
	3	75
	2	83
	1	87
Horizontals	4	81
	3	77
	2	60
	1	52
Guys	4	71
	3	66
	2	77
	1	86
Foundations	Base	88
	Inner anchors	99
	Outer anchors	69

The rating is defined as the percentage of the component design capacity that is used up in supporting itself and the loading from the antennas and transmission lines under the design wind and ice loading conditions. Ratings of up to 105% for tower members, and up to 110% for foundations are typically considered acceptable due to tolerances in calculating the applied loads on the tower as well as member design capacities. However, the state of Connecticut mandates a maximum rating of 100%, and the tower has been reviewed based on 100% maximum rating.

The twist and sway of the dishes under a service wind load of 60 mph 3-second gust service wind speed are as follows:

Rev.	Date	Description

Dish	Elevation, ft.	Sway, degrees	Twist, degrees
PL8 8’ diameter dish/ radome	678	0.07	0.71
Commscope VHLPX3-6W dishes (Assumed Installed)	650	0.07	0.71
PL6-65 6’ diameter dish/ radome	630	0.07	0.71
6’ diameter grid dish	339	0.05	0.75
8’ diameter dish/ radome	160	0.08	0.65

G. CONCLUSIONS AND RECOMMENDATIONS

Based on the preceding results, the following conclusions may be drawn:

1. The tower supporting equipment as specified in Section C above is adequate to achieve an ultimate 3-second gust wind speed of 125 mph with no ice and a nominal design wind speed of 50 mph with 3/4” design ice thickness in accordance with the 2018 Connecticut Building Code, based on the 2015 IBC, and ANSI/TIA-222-G, and with the analysis parameters of Section D.

H. PROVISIONS OF ANALYSIS

The analysis performed and the conclusions contained herein are based on the assumption that the tower has been properly installed and maintained, including, but not limited to the following:

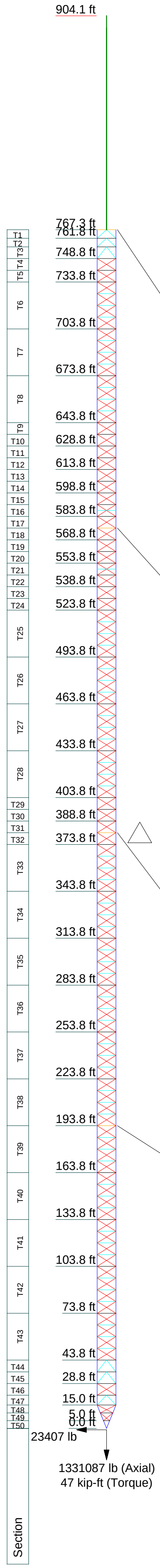
1. Proper alignment and plumbness.
2. Correct guy tensions.
3. Correct bolt tightness.
4. No significant deterioration or damage to any component.

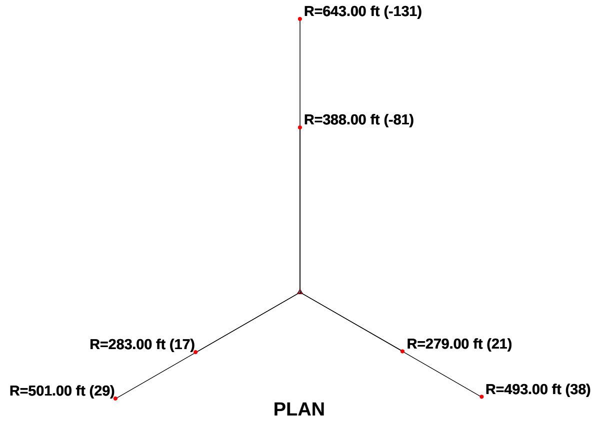
Furthermore, the information and conclusions contained in this Report were determined by application of the current "state-of-the-arts" engineering and analysis procedures and formulae, and Stainless assumes no obligations to revise any of the information or conclusions contained in this Report in the event that such engineering and analysis procedures and formulae are hereafter modified or revised. In addition, under no circumstances will Stainless have any obligation or responsibility whatsoever for or on account of consequential or incidental damages sustained by any person, firm or organization as a result of any information or conclusions contained in the Report, and the maximum liability of Stainless, if any, pursuant to this Report shall be limited to the total funds actually received by Stainless for preparation of this Report.

Rev.	Date	Description

Customer has requested Stainless to prepare and submit to Customer an engineering analysis with respect to the Subject Tower and has further requested Stainless to make appropriate recommendations regarding suggested structural modifications and changes to the Subject Tower. In making such request of Stainless, Customer has informed Stainless that Customer will make a determination as to whether or not to implement any of the changes or modifications which may be suggested by Stainless and that Customer will have any such changes or modifications made by riggers, erectors and other subcontractors of Customer's choice.

Customer hereby agrees and acknowledges that Stainless shall have no liability whatsoever to Customer or to others for any work or services performed by any persons other than Stainless in connection with the implementation of any structural changes or modifications recommended by Stainless including but not limited to any services rendered for Customer or for others by riggers, erectors or other subcontractors. Customer acknowledges and agrees that any riggers, erectors or subcontractors retained or employed by Customer shall be solely responsible to Customer and to others for the quality of work performed by them and that Stainless shall have no liability or responsibility whatsoever as a result of any negligence or breach of contract by any such rigger, erector or subcontractor.



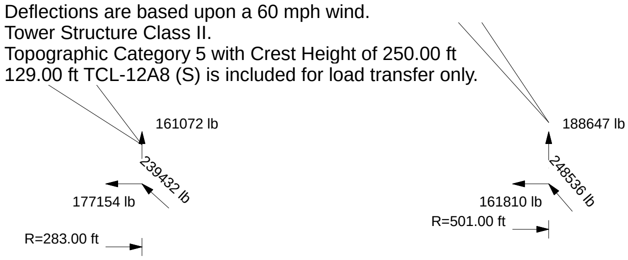


DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Dielectric THP-O2-1 wraparound	802.58	RADIO 4424 B25	315
ELEVATOR BEAMS_WEIGHT	767	RADIO 4424 B25	315
10' WHIP	758	APX16DWV-16DWVS-E-A20 w/ Mount Pipe	315
5' OMNI ANTENNA	750	APX16DWV-16DWVS-E-A20 w/ Mount Pipe	315
NURAD SUPERQUAD II ENG	744	APXVAARR24_43-U-NA20 w/ Mount Pipe	315
DB408	742	RADIO 4449 B71/B85A	315
ICE SHIELD	681	APXVAARR24_43-U-NA20 w/ Mount Pipe	315
PL8	678	APXVAARR24_43-U-NA20 w/ Mount Pipe	315
MD-SQ3	655	APX16DWV-16DWVS-E-A20 w/ Mount Pipe	315
MD-SQ3	655	(2) Dualight 12004-RTO-1R07-001	302
(2) SAF MXM Mk2 Radio Unit	655	(2) Beacon	302
(2) SAF MXM Mk2 Radio Unit	655	(2) 800 MHz RRH	200
VHLPX3-6W Dish	650	(2) 800 MHz RRH	200
VHLPX3-6W Dish	650	(2) 800 MHz RRH	200
Andrew PL6-65	630	Sector mount	200
(2) Dualight 12004-RTO-1R07-001	605	Sector mount	200
(2) Beacon	605	Sector mount	200
SHIVELY 6015-2/3R wraparound FM	591	APXSPP18-C-A20 w/ Mount Pipe	200
SWR FMEC/2-HWS-TA	550	APXSPP18-C-A20 w/ Mount Pipe	200
Mounts for SWR FMEC	550	TD-RRH8x20	200
(2) DB408	529	APXSPP18-C-A20 w/ Mount Pipe	200
DB408	510	TD-RRH8x20	200
SHVLY 6810 FW RAD_MT	458	APXVTM14-C-I20 w/ Mount Pipe	200
15' WHIP (UNUSED)	420	APXVTM14-C-I20 w/ Mount Pipe	200
5' OMNI ANTENNA	348	APXVTM14-C-I20 w/ Mount Pipe	200
ICE SHIELD	346	TD-RRH8x20	200
6' Grid Dish	339	ICE SHIELD	166
RADIO 4449 B71/B85A	315	8' MW Dish/radome	160
RADIO 4449 B71/B85A	315	DSiF03F36D-D on sidearm	110
RADIO 4415 B66A	315	15' WHIP (UNUSED)	102
RADIO 4415 B66A	315	ASGP952 ANTENNA (UNUSED)	100
RADIO 4415 B66A	315	GPS ANTENNA	75
Sector mount	315		
Sector mount	315		
Sector mount	315		
Air 6449 B41 w/ Pipe Mount	315		
Air 6449 B41 w/ Pipe Mount	315		
Air 6449 B41 w/ Pipe Mount	315		
RADIO 4424 B25	315		

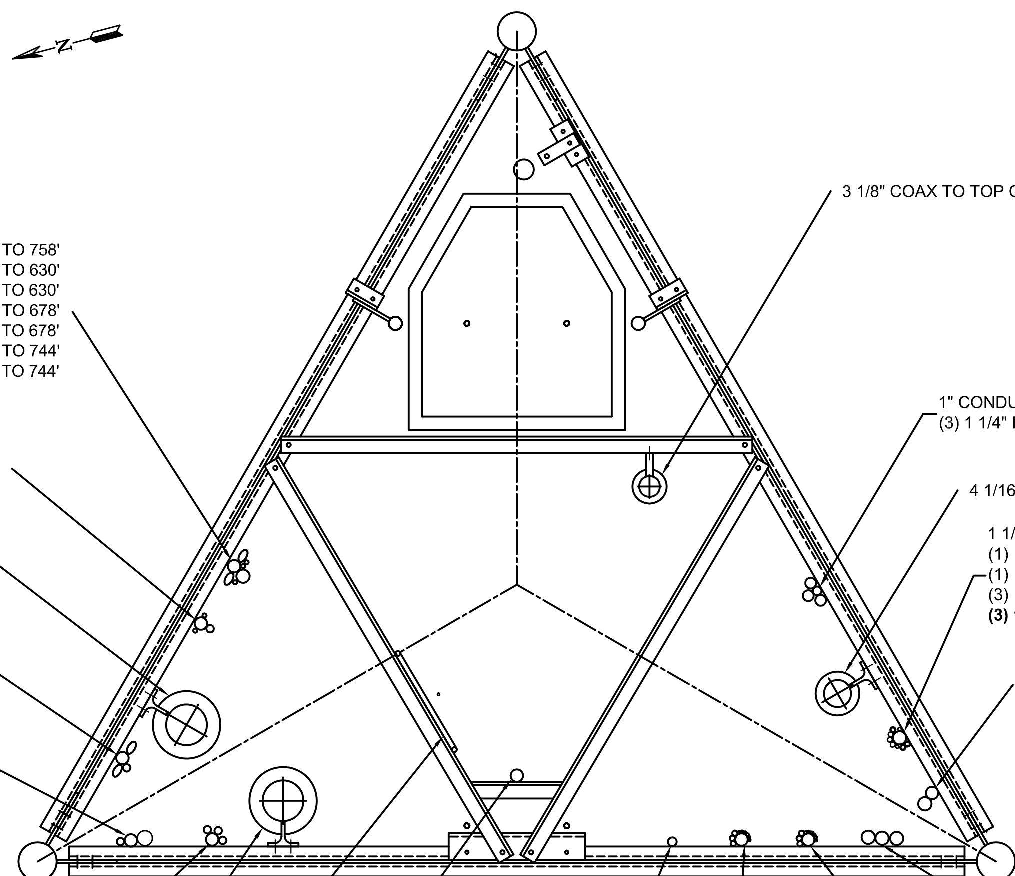
TOWER DESIGN NOTES

1. Tower designed for Exposure B to the TIA-222-G Standard.
2. Tower designed for a 97 mph basic wind in accordance with the TIA-222-G Standard.
3. Tower is also designed for a 50 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 60 mph wind.
5. Tower Structure Class II.
6. Topographic Category 5 with Crest Height of 250.00 ft
7. 129.00 ft TCL-12A8 (S) is included for load transfer only.



ALL REACTIONS ARE FACTORED

FDH-IS_Logo — ***Stainless*** 6521 Meridien Drive, Raleigh, NC 27616, Phone: (919) 755-1012, FAX: (919) 755-1031	Job: ***362029 New Haven (Hamden) CT***
	Project: ***767' steel height Stainless G-12 guyed tower***
	Client: Transcend Wireless · Drawn by: AVago · App'd:
	Code: TIA-222-G · Date: 10/05/20 · Scale: NTS
	Path: E:\AEV\STAINLESS\PROJECTS\2020\09 SEP\362029_New Haven (Hamden), CT_WTNH (PR-004602)\^362029\eng\tnxTower\362029.eri · Dwg No. E-1



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A BUSINESS OF FDH INFRASTRUCTURE SERVICES
100 West Main Street, Suite 400
Lansdale, PA 19446

LINEAR APPURTENANCES
NEW HAVEN (HAMDEN), CT

REV	BY	DATE	REVISION DESCRIPTION	D.CK	DATE	E.CK	DATE
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PREPARED BY	AV	9/30/2020
CHECKED BY		
ENGINEER REVIEW		
PROJECT NUMBER	362029	
DRAWING NUMBER	A-2	

Exhibit D
Mount Analysis

CENTEK engineering

Centered on Solutions℠

Structural Analysis Report

Antenna Mount Analysis

T-Mobile Site #: CT11474A

101 Talmadge Road
Hamden, CT

Centek Project No. 20074.59

Date: July 28, 2020

Max Stress Ratio = 67.1%

STATE OF CONNECTICUT
TIMOTHY J. LYNN
No. 29336
LICENSED
PROFESSIONAL ENGINEER

Prepared for:

T-Mobile USA
35 Griffin Road
Bloomfield, CT 06002

Table of Contents

CENTEK engineering

Centered on Solutions℠

July 28, 2020

Mr. Dan Reid
Transcend Wireless
10 Industrial Ave
Mahwah, NJ 07430

Re: Structural Letter ~ Antenna Mount
T-Mobile – Site Ref: CT11474A
101 Talmadge Road
Hamden, CT 06518

Centek Project No. 20074.59

Dear Mr. Reid,

Centek Engineering, Inc. has reviewed the T-Mobile antenna installation at the above referenced site. The purpose of the review is to determine the structural adequacy of the existing mount, consisting of three (3) sector frames attached to the existing structure, to support the equipment configuration. The review considered the effects of wind load, dead load and ice load. The review considered the effects of wind load, dead load and ice load in accordance with the 2015 International Building Code as modified by the 2018 Connecticut State Building Code (CTBC) including ASCE 7-10 and ANSI/TIA-222-G *Structural Standards for Steel Antenna Towers and Supporting Structures*.

The loads considered in this analysis consist of the following:

- T-Mobile:
  Sector Frames: Three (3) RFS APX16DWV-16DWVS panel antennas, three (3) RFS APXVAARR24-43-panel antennas, three (3) Ericsson AIR6449 panel antennas, three (3) Ericsson 4449 remote radio units, three (3) Ericsson 4415 remote radio units and three (3) Ericsson 4424 remote radio units mounted on three (3) Sector Frames with a RAD center elevation of 315-ft +/- AGL.

The antenna mount was analyzed per the requirements of the 2015 International Building Code as modified by the 2018 Connecticut State Building Code considering a nominal design wind speed of 97 mph for Hamden as required in Appendix N of the 2018 Connecticut State Building Code.

A structural analysis of tower and foundation needs to be completed prior to any work.

Based on our review of the installation, it is our opinion that the subject antenna mount has sufficient capacity to support the aforementioned antenna configuration. If there are any questions regarding this matter, please feel free to call.

Respectfully Submitted by:

Timothy J. Lynn, PE
Structural Engineer

STATE OF CONNECTICUT
TIMOTHY J. LYNN
No. 29336
LICENSED
PROFESSIONAL ENGINEER

Section 2 - Calculations

Development of Design Heights, Exposure Coefficients, and Velocity Pressures Per TIA-222-G

Wind Speeds

Basic Wind Speed $V := 97$ mph (User Input - 2018 CSBC Appendix N)

Basic Wind Speed with Ice $V_i := 50$ mph (User Input per Annex B of TIA-222-G)

Input

Structure Type = $Structure\_Type := Lattice$ (User Input)

Structure Category = $SC := II$ (User Input)

Exposure Category = $Exp := C$ (User Input)

Structure Height = $h := 765$ ft (User Input)

Height to Center of Antennas = $z_{Ant} := 315$ ft (User Input)

Radial Ice Thickness = $t_i := 0.75$ in (User Input per Annex B of TIA-222-G)

Radial Ice Density = $Id := 56.00$ pcf (User Input)

Topograpic Factor = $K_{zt} := 1.0$ (User Input)

$K_a := 1.0$ (User Input)

Gust Response Factor = $G_H = 0.85$ (User Input)

Output

Wind Direction Probability Factor =

$$K_d := \begin{vmatrix} 0.95 \text{ if } Structure\_Type = Pole \\ 0.85 \text{ if } Structure\_Type = Lattice \end{vmatrix} = 0.85$$

(Per Table 2-2 of TIA-222-G)

Importance Factors =

$$I_{Wind} := \begin{vmatrix} 0.87 \text{ if } SC = 1 \\ 1.00 \text{ if } SC = 2 \\ 1.15 \text{ if } SC = 3 \end{vmatrix} = 1$$

(Per Table 2-3 of TIA-222-G)

$$I_{Wind\_w\_Ice} := \begin{vmatrix} 0 \text{ if } SC = 1 \\ 1.00 \text{ if } SC = 2 \\ 1.00 \text{ if } SC = 3 \end{vmatrix} = 1$$

$$I_{ice} := \begin{vmatrix} 0 \text{ if } SC = 1 \\ 1.00 \text{ if } SC = 2 \\ 1.25 \text{ if } SC = 3 \end{vmatrix} = 1$$

$$K_{iz} := \left(\frac{z_{Ant}}{33}\right)^{0.1} = 1.253$$

$$t_{iz} := 2.0 \cdot t_i \cdot I_{ice} \cdot K_{iz} \cdot K_{zt}^{0.35} = 1.88$$

Velocity Pressure Coefficient Antennas =

$$Kz_{Ant} := 2.01 \left(\left(\frac{z_{Ant}}{zg}\right)\right)^{\frac{2}{\alpha}} = 1.611$$

Velocity Pressure w/o Ice Antennas =

$$qz_{Ant} := 0.00256 \cdot K_d \cdot Kz_{Ant} \cdot V^2 \cdot I_{Wind} = 32.992$$

Velocity Pressure with Ice Antennas =

$$qz_{ice.Ant} := 0.00256 \cdot K_d \cdot Kz_{Ant} \cdot V_i^2 \cdot I_{Wind} = 8.766$$

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	RFSAPXVAARR24-43		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 95.9$	in	(User Input)
Antenna Width =	$W_{ant} := 24$	in	(User Input)
Antenna Thickness =	$T_{ant} := 8.7$	in	(User Input)
Antenna Weight =	$WT_{ant} := 153$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 1$		(User Input)
Antenna Aspect Ratio =	$Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 4.0$		
Antenna Force Coefficient =	$Ca_{ant} = 1.27$		

Wind Load (without ice)

Surface Area for One Antenna = $SA_{antF} := \frac{L_{ant} \cdot W_{ant}}{144} = 16$ sf

Total Antenna Wind Force = $F_{ant} := qz_{Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antF} = 568$ lbs

Surface Area for One Antenna = $SA_{antS} := \frac{L_{ant} \cdot T_{ant}}{144} = 5.8$ sf

Total Antenna Wind Force = $F_{ant} := qz_{Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antS} = 206$ lbs

Wind Load (with ice)

Surface Area for One Antenna w/ Ice = $SA_{ICEantF} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (W_{ant} + 2 \cdot t_{iz})}{144} = 19.2$ sf

Total Antenna Wind Force w/ Ice = $Fi_{ant} := qz_{ice.Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantF} = 181$ lbs

Surface Area for One Antenna w/ Ice = $SA_{ICEantS} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz})}{144} = 8.6$ sf

Total Antenna Wind Force w/ Ice = $Fi_{ant} := qz_{ice.Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantS} = 81$ lbs

Gravity Load (without ice)

Weight of All Antennas = $WT_{ant} \cdot N_{ant} = 153$ lbs

Gravity Loads (ice only)

Volume of Each Antenna = $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 2 \times 10^4$ cu in

Volume of Ice on Each Antenna = $V_{ice} := (L_{ant} + 2 \cdot t_{iz})(W_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz}) - V_{ant} = 1 \times 10^4$ cu in

Weight of Ice on Each Antenna = $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 468$ lbs

Weight of Ice on All Antennas = $W_{ICEant} \cdot N_{ant} = 468$ lbs

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model = RFS APX16DWV-16DWVS

Antenna Shape = Flat (User Input)

Antenna Height = $L_{ant} := 55.9$ in (User Input)

Antenna Width = $W_{ant} := 13$ in (User Input)

Antenna Thickness = $T_{ant} := 3.15$ in (User Input)

Antenna Weight = $WT_{ant} := 45$ lbs (User Input)

Number of Antennas = $N_{ant} := 1$ (User Input)

Antenna Aspect Ratio = $Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 4.3$

Antenna Force Coefficient = $Ca_{ant} = 1.28$

Wind Load (without ice)

Surface Area for One Antenna = $SA_{antF} := \frac{L_{ant} \cdot W_{ant}}{144} = 5$ sf

Total Antenna Wind Force = $F_{ant} := qz_{Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antF} = 181$ lbs

Surface Area for One Antenna = $SA_{antS} := \frac{L_{ant} \cdot T_{ant}}{144} = 1.2$ sf

Total Antenna Wind Force = $F_{ant} := qz_{Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antS} = 44$ lbs

Wind Load (with ice)

Surface Area for One Antenna w/ Ice = $SA_{ICEantF} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (W_{ant} + 2 \cdot t_{iz})}{144} = 6.9$ sf

Total Antenna Wind Force w/ Ice = $Fi_{ant} := qz_{ice.Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantF} = 66$ lbs

Surface Area for One Antenna w/ Ice = $SA_{ICEantS} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz})}{144} = 2.9$ sf

Total Antenna Wind Force w/ Ice = $Fi_{ant} := qz_{ice.Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantS} = 27$ lbs

Gravity Load (without ice)

Weight of All Antennas = $WT_{ant} \cdot N_{ant} = 45$ lbs

Gravity Loads (ice only)

Volume of Each Antenna = $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 2289$ cu in

Volume of Ice on Each Antenna = $V_{ice} := (L_{ant} + 2 \cdot t_{iz})(W_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz}) - V_{ant} = 4619$ cu in

Weight of Ice on Each Antenna = $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 150$ lbs

Weight of Ice on All Antennas = $W_{ICEant} \cdot N_{ant} = 150$ lbs

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	Ericsson AIR6449		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 33.1$	in	(User Input)
Antenna Width =	$W_{ant} := 20.5$	in	(User Input)
Antenna Thickness =	$T_{ant} := 8.3$	in	(User Input)
Antenna Weight =	$WT_{ant} := 103$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 1$		(User Input)

Antenna Aspect Ratio = $Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 1.6$

Antenna Force Coefficient = $Ca_{ant} = 1.2$

Wind Load (without ice)

Surface Area for One Antenna = $SA_{antF} := \frac{L_{ant} \cdot W_{ant}}{144} = 4.7$ sf

Total Antenna Wind Force = $F_{ant} := qz_{Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antF} = 159$ lbs

Surface Area for One Antenna = $SA_{antS} := \frac{L_{ant} \cdot T_{ant}}{144} = 1.9$ sf

Total Antenna Wind Force = $F_{ant} := qz_{Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antS} = 64$ lbs

Wind Load (with ice)

Surface Area for One Antenna w/ Ice = $SA_{ICEantF} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (W_{ant} + 2 \cdot t_{iz})}{144} = 6.2$ sf

Total Antenna Wind Force w/ Ice = $Fi_{ant} := qz_{ice.Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantF} = 56$ lbs

Surface Area for One Antenna w/ Ice = $SA_{ICEantS} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz})}{144} = 3.1$ sf

Total Antenna Wind Force w/ Ice = $Fi_{ant} := qz_{ice.Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantS} = 28$ lbs

Gravity Load (without ice)

Weight of All Antennas = $WT_{ant} \cdot N_{ant} = 103$ lbs

Gravity Loads (ice only)

Volume of Each Antenna = $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 5632$ cu in

Volume of Ice on Each Antenna = $V_{ice} := (L_{ant} + 2 \cdot t_{iz})(W_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz}) - V_{ant} = 5151$ cu in

Weight of Ice on Each Antenna = $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 167$ lbs

Weight of Ice on All Antennas = $W_{ICEant} \cdot N_{ant} = 167$ lbs

Development of Wind & Ice Load on RRUS

RRUS Data:

RRUS Model = Ericsson 4449

RRUS Shape = Flat (User Input)

RRUS Height = $L_{RRUS} := 14.9$ in (User Input)

RRUS Width = $W_{RRUS} := 13.2$ in (User Input)

RRUS Thickness = $T_{RRUS} := 10.4$ in (User Input)

RRUS Weight = $WT_{RRUS} := 74$ lbs (User Input)

Number of RRUS's = $N_{RRUS} := 1$ (User Input)

RRUS Aspect Ratio = $Ar_{RRUS} := \frac{L_{RRUS}}{W_{RRUS}} = 1.1$

RRUS Force Coefficient = $Ca_{RRUS} = 1.2$

Wind Load (without ice)

Surface Area for One RRUS = $SA_{RRUSF} := \frac{L_{RRUS} \cdot W_{RRUS}}{144} = 1.4$ sf

Total RRUS Wind Force = $F_{RRUS} := qz_{Ant} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{RRUSF} = 46$ lbs

Surface Area for One RRUS = $SA_{RRUSS} := \frac{L_{RRUS} \cdot T_{RRUS}}{144} = 1.1$ sf

Total RRUS Wind Force = $F_{RRUS} := qz_{Ant} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{RRUSS} = 36$ lbs

Wind Load (with ice)

Surface Area for One RRUS w/ Ice = $SA_{ICERRUSF} := \frac{(L_{RRUS} + 2 \cdot t_{iz}) \cdot (W_{RRUS} + 2 \cdot t_{iz})}{144} = 2.2$ sf

Total RRUS Wind Force w/ Ice = $Fi_{RRUS} := qz_{ice.Ant} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{ICERRUSF} = 20$ lbs

Surface Area for One RRUS w/ Ice = $SA_{ICERRUSS} := \frac{(L_{RRUS} + 2 \cdot t_{iz}) \cdot (T_{RRUS} + 2 \cdot t_{iz})}{144} = 1.8$ sf

Total RRUS Wind Force w/ Ice = $Fi_{RRUS} := qz_{ice.Ant} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{ICERRUSS} = 16$ lbs

Gravity Load (without ice)

Weight of All RRUSs = $WT_{RRUS} \cdot N_{RRUS} = 74$ lbs

Gravity Loads (ice only)

Volume of Each RRUS = $V_{RRUS} := L_{RRUS} \cdot W_{RRUS} \cdot T_{RRUS} = 2045$ cu in

Volume of Ice on Each RRUS = $V_{ice} := (L_{RRUS} + 2 \cdot t_{iz})(W_{RRUS} + 2 \cdot t_{iz}) \cdot (T_{RRUS} + 2 \cdot t_{iz}) - V_{RRUS} = ¿$ cu in

Weight of Ice on Each RRUS = $W_{ICERRUS} := \frac{V_{ice}}{1728} \cdot Id = 79$ lbs

Weight of Ice on All RRUSs = $W_{ICERRUS} \cdot N_{RRUS} = 79$ lbs

Development of Wind & Ice Load on RRUS

RRUS Data:

RRUS Model = Ericsson 4415

RRUS Shape = Flat (User Input)

RRUS Height = $L_{RRUS} := 14.9$ in (User Input)

RRUS Width = $W_{RRUS} := 13.2$ in (User Input)

RRUS Thickness = $T_{RRUS} := 5.4$ in (User Input)

RRUS Weight = $WT_{RRUS} := 47$ lbs (User Input)

Number of RRUS's = $N_{RRUS} := 1$ (User Input)

RRUS Aspect Ratio = $Ar_{RRUS} := \frac{L_{RRUS}}{W_{RRUS}} = 1.1$

RRUS Force Coefficient = $Ca_{RRUS} = 1.2$

Wind Load (without ice)

Surface Area for One RRUS = $SA_{RRUSF} := \frac{L_{RRUS} \cdot W_{RRUS}}{144} = 1.4$ sf

Total RRUS Wind Force = $F_{RRUS} := qz_{Ant} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{RRUSF} = 46$ lbs

Surface Area for One RRUS = $SA_{RRUSS} := \frac{L_{RRUS} \cdot T_{RRUS}}{144} = 0.6$ sf

Total RRUS Wind Force = $F_{RRUS} := qz_{Ant} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{RRUSS} = 19$ lbs

Wind Load (with ice)

Surface Area for One RRUS w/ Ice = $SA_{ICERRUSF} := \frac{(L_{RRUS} + 2 \cdot t_{iz}) \cdot (W_{RRUS} + 2 \cdot t_{iz})}{144} = 2.2$ sf

Total RRUS Wind Force w/ Ice = $Fi_{RRUS} := qz_{ice.Ant} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{ICERRUSF} = 20$ lbs

Surface Area for One RRUS w/ Ice = $SA_{ICERRUSS} := \frac{(L_{RRUS} + 2 \cdot t_{iz}) \cdot (T_{RRUS} + 2 \cdot t_{iz})}{144} = 1.2$ sf

Total RRUS Wind Force w/ Ice = $Fi_{RRUS} := qz_{ice.Ant} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{ICERRUSS} = 11$ lbs

Gravity Load (without ice)

Weight of All RRUSs = $WT_{RRUS} \cdot N_{RRUS} = 47$ lbs

Gravity Loads (ice only)

Volume of Each RRUS = $V_{RRUS} := L_{RRUS} \cdot W_{RRUS} \cdot T_{RRUS} = 1062$ cu in

Volume of Ice on Each RRUS = $V_{ice} := (L_{RRUS} + 2 \cdot t_{iz})(W_{RRUS} + 2 \cdot t_{iz}) \cdot (T_{RRUS} + 2 \cdot t_{iz}) - V_{RRUS} = 1836$ cu in

Weight of Ice on Each RRUS = $W_{ICERRUS} := \frac{V_{ice}}{1728} \cdot Id = 60$ lbs

Weight of Ice on All RRUSs = $W_{ICERRUS} \cdot N_{RRUS} = 60$ lbs

Development of Wind & Ice Load on RRUS

RRUS Data:

RRUS Model = Ericsson 4424

RRUS Shape = Flat (User Input)

RRUS Height = $L_{RRUS} := 16.5$ in (User Input)

RRUS Width = $W_{RRUS} := 13.5$ in (User Input)

RRUS Thickness = $T_{RRUS} := 9.6$ in (User Input)

RRUS Weight = $WT_{RRUS} := 88$ lbs (User Input)

Number of RRUS's = $N_{RRUS} := 1$ (User Input)

RRUS Aspect Ratio = $Ar_{RRUS} := \frac{L_{RRUS}}{W_{RRUS}} = 1.2$

RRUS Force Coefficient = $Ca_{RRUS} = 1.2$

Wind Load (without ice)

Surface Area for One RRUS = $SA_{RRUSF} := \frac{L_{RRUS} \cdot W_{RRUS}}{144} = 1.5$ sf

Total RRUS Wind Force = $F_{RRUS} := qz_{Ant} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{RRUSF} = 52$ lbs

Surface Area for One RRUS = $SA_{RRUSS} := \frac{L_{RRUS} \cdot T_{RRUS}}{144} = 1.1$ sf

Total RRUS Wind Force = $F_{RRUS} := qz_{Ant} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{RRUSS} = 37$ lbs

Wind Load (with ice)

Surface Area for One RRUS w/ Ice = $SA_{ICERRUSF} := \frac{(L_{RRUS} + 2 \cdot t_{iz}) \cdot (W_{RRUS} + 2 \cdot t_{iz})}{144} = 2.4$ sf

Total RRUS Wind Force w/ Ice = $Fi_{RRUS} := qz_{ice.Ant} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{ICERRUSF} = 22$ lbs

Surface Area for One RRUS w/ Ice = $SA_{ICERRUSS} := \frac{(L_{RRUS} + 2 \cdot t_{iz}) \cdot (T_{RRUS} + 2 \cdot t_{iz})}{144} = 1.9$ sf

Total RRUS Wind Force w/ Ice = $Fi_{RRUS} := qz_{ice.Ant} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{ICERRUSS} = 17$ lbs

Gravity Load (without ice)

Weight of All RRUSs = $WT_{RRUS} \cdot N_{RRUS} = 88$ lbs

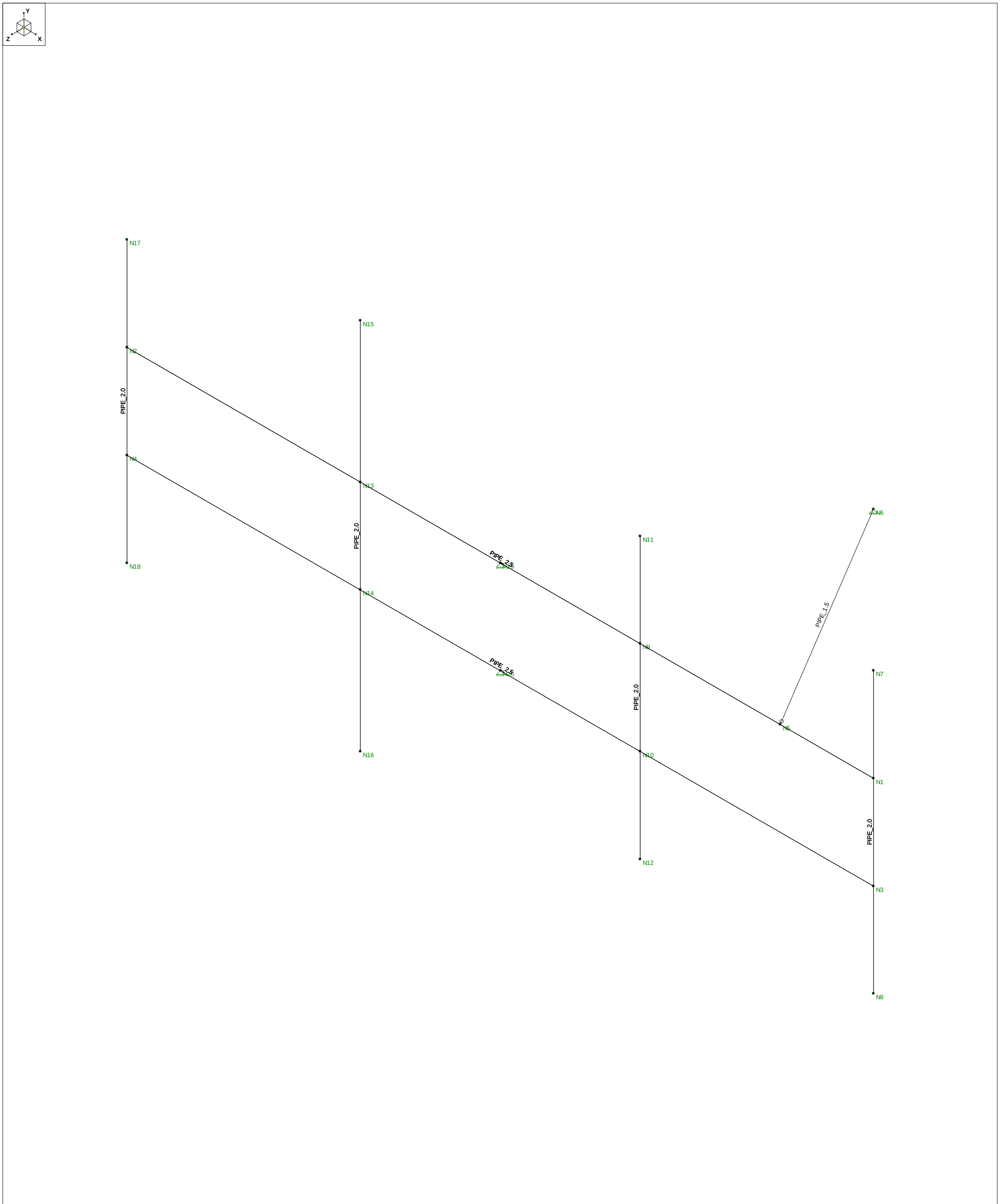
Gravity Loads (ice only)

Volume of Each RRUS = $V_{RRUS} := L_{RRUS} \cdot W_{RRUS} \cdot T_{RRUS} = 2138$ cu in

Volume of Ice on Each RRUS = $V_{ice} := (L_{RRUS} + 2 \cdot t_{iz})(W_{RRUS} + 2 \cdot t_{iz}) \cdot (T_{RRUS} + 2 \cdot t_{iz}) - V_{RRUS} = 2533$ cu in

Weight of Ice on Each RRUS = $W_{ICERRUS} := \frac{V_{ice}}{1728} \cdot Id = 82$ lbs

Weight of Ice on All RRUSs = $W_{ICERRUS} \cdot N_{RRUS} = 82$ lbs



Loads: BLC 1, Self Weight
Envelope Only Solution

Centek	CT11474A	
TJL		July 28, 2020 at 10:26 AM
20074.59	Member Framing	CT11474A_AMA.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 (ft/sec^2)	32.2
Wall Mesh Size (in)	12
Eigensolution Convergence Tol. (1.E-)	4
Vertical Axis	Y
Global Member Orientation Plane	XZ
Static Solver	Sparse Accelerated
Dynamic Solver	Accelerated Solver

Hot Rolled Steel Code	AISC 14th(360-10): LRFD
Adjust Stiffness?	Yes(Iterative)
RISAConnection Code	AISC 14th(360-10): ASD
Cold Formed Steel Code	AISI S100-10: ASD
Wood Code	AWC NDS-12: ASD
Wood Temperature	< 100F
Concrete Code	ACI 318-11
Masonry Code	ACI 530-11: ASD
Aluminum Code	AA ADM1-10: ASD - 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 (ft)	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	1
Cd X	1
Rho Z	1
Rho X	1
Footing Overturning Safety Factor	1
Optimize for OTM/Sliding	No
Check Concrete Bearing	No
Footing Concrete Weight (k/ft^3)	150.001
Footing Concrete f'c (ksi)	4
Footing Concrete Ec (ksi)	3644
Lambda	1
Footing Steel fy (ksi)	60
Minimum Steel	0.0018
Maximum Steel	0.0075
Footing Top Bar	#3
Footing Top Bar Cover (in)	2
Footing Bottom Bar	#3
Footing Bottom Bar Cover (in)	3.5
Pedestal Bar	#3
Pedestal Bar Cover (in)	1.5
Pedestal Ties	#3

Hot Rolled Steel Properties

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

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design Rul...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	(E) Horz	PIPE_2.5	Beam	Pipe	A53 Grade B	Typical	1.61	1.45	1.45	2.89
2	(E) Stiff Arm	PIPE_1.5	Beam	Pipe	A53 Grade B	Typical	.749	.293	.293	.586
3	(E)Antenna Mast	PIPE_2.0	Column	Pipe	A53 Grade B	Typical	1.02	.627	.627	1.25

Hot Rolled Steel Design Parameters

	Label	Shape	Length[ft]	Lbyy[ft]	Lbzz[ft]	Lcomp top[...	Lcomp bot[...	L-torq...	Kyy	Kzz	Cb	Functi...
1	M1	(E) Stiff Arm	5.831			Lbyy						Lateral
2	M2	(E) Horz	16	Segment	Segment	Segment	Segment	Segm...				Lateral
3	M3	(E) Horz	16	Segment	Segment	Segment	Segment	Segm...				Lateral
4	M4	(E)Antenna Mast	6			Lbyy						Lateral
5	M5	(E)Antenna Mast	6			Lbyy						Lateral
6	M6	(E)Antenna Mast	8			Lbyy						Lateral
7	M7	(E)Antenna Mast	6			Lbyy						Lateral

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(d...	Section/Shape	Type	Design List	Material	Design Rul...
1	M1	N5	N6			(E) Stiff Arm	Beam	Pipe	A53 Gra...	Typical
2	M2	N1	N2			(E) Horz	Beam	Pipe	A53 Gra...	Typical
3	M3	N3	N4			(E) Horz	Beam	Pipe	A53 Gra...	Typical
4	M4	N8	N7		60	(E)Antenna Mast	Column	Pipe	A53 Gra...	Typical
5	M5	N12	N11		60	(E)Antenna Mast	Column	Pipe	A53 Gra...	Typical
6	M6	N16	N15		60	(E)Antenna Mast	Column	Pipe	A53 Gra...	Typical
7	M7	N18	N17		60	(E)Antenna Mast	Column	Pipe	A53 Gra...	Typical

Joint Coordinates and Temperatures

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Dia...
1	N1	8	1	0	0	
2	N2	-8	1	0	0	
3	N3	8	-1	0	0	
4	N4	-8	-1	0	0	
5	N5	6	1	0	0	
6	N6	3	1	-5	0	
7	N7	8	3	0	0	
8	N8	8	-3	0	0	
9	N9	3	1	0	0	
10	N10	3	-1	0	0	
11	N11	3	3	0	0	
12	N12	3	-3	0	0	
13	N13	-3	1	0	0	
14	N14	-3	-1	0	0	
15	N15	-3	4	0	0	
16	N16	-3	-4	0	0	
17	N17	-8	3	0	0	
18	N18	-8	-3	0	0	
19	N19	0	1	0	0	
20	N20	0	-1	0	0	

Joint Boundary Conditions

	Joint Label	X [k/in]	Y [k/in]	Z [k/in]	X Rot.[k-ft/rad]	Y Rot.[k-ft/rad]	Z Rot.[k-ft/rad]
1	N6	Reaction	Reaction	Reaction			
2	N19	Reaction	Reaction	Reaction			
3	N20	Reaction	Reaction	Reaction			

Member Point Loads (BLC 2 : Equipment Weight)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M5	Y	-.023	.5
2	M5	Y	-.023	5.5
3	M6	Y	-.077	.5
4	M6	Y	-.077	7.5
5	M4	Y	-.052	2.5
6	M4	Y	-.052	5.5
7	M5	Y	-.074	%50
8	M6	Y	-.047	6.5
9	M6	Y	-.088	6.5

Member Point Loads (BLC 3 : Ice Weight)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M5	Y	-.075	.5
2	M5	Y	-.075	5.5
3	M6	Y	-.234	.5
4	M6	Y	-.234	7.5
5	M4	Y	-.084	2.5
6	M4	Y	-.084	5.5
7	M5	Y	-.079	%50
8	M6	Y	-.06	6.5
9	M6	Y	-.082	6.5

Member Point Loads (BLC 4 : Wind w/ Ice X)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M5	X	.014	.5
2	M5	X	.014	5.5
3	M6	X	.041	.5
4	M6	X	.041	7.5
5	M4	X	.014	2.5
6	M4	X	.014	5.5
7	M5	X	.016	%50
8	M6	X	.022	6.5

Member Point Loads (BLC 5 : Wind X)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M5	X	.022	.5
2	M5	X	.022	5.5
3	M6	X	.103	.5
4	M6	X	.103	7.5
5	M4	X	.032	2.5
6	M4	X	.032	5.5
7	M5	X	.036	%50

Member Point Loads (BLC 5 : Wind X) (Continued)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
8	M6	X	.052	6.5

Member Point Loads (BLC 6 : Wind w/ Ice Z)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M5	Z	.033	.5
2	M5	Z	.033	5.5
3	M6	Z	.091	.5
4	M6	Z	.091	7.5
5	M4	Z	.028	2.5
6	M4	Z	.028	5.5

Member Point Loads (BLC 7 : Wind Z)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M5	Z	.091	.5
2	M5	Z	.091	5.5
3	M6	Z	.284	.5
4	M6	Z	.284	7.5
5	M4	Z	.08	2.5
6	M4	Z	.08	5.5

Member Distributed Loads (BLC 4 : Wind w/ Ice X)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	M7	X	.003	.003	0	0
2	M6	X	.003	.003	0	0
3	M5	X	.003	.003	0	0
4	M4	X	.003	.003	0	0
5	M1	X	.003	.003	0	0

Member Distributed Loads (BLC 5 : Wind X)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	M7	X	.009	.009	0	0
2	M6	X	.009	.009	0	0
3	M5	X	.009	.009	0	0
4	M4	X	.009	.009	0	0
5	M1	X	.009	.009	0	0

Member Distributed Loads (BLC 6 : Wind w/ Ice Z)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	M7	Z	.003	.003	0	0
2	M2	Z	.003	.003	0	0
3	M3	Z	.003	.003	0	0

Member Distributed Loads (BLC 7 : Wind Z)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	M7	Z	.009	.009	0	0
2	M2	Z	.009	.009	0	0
3	M3	Z	.009	.009	0	0

Basic Load Cases

	BLC Description	Category	X Gra...	Y Gra...	Z Gra...	Joint	Point	Distrib..	Area(...	Surfa...
1	Self Weight	None		-1						
2	Equipment Weight	None					9			
3	Ice Weight	None					9			
4	Wind w/ Ice X	None					8	5		
5	Wind X	None					8	5		
6	Wind w/ Ice Z	None					6	3		
7	Wind Z	None					6	3		

Load Combinations

	Description	Solve	P...	S...	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac...
1	1.2D + 1.6W (X-direc...	Yes	Y		1	1.2	2	1.2	5	1.6														
2	0.9D + 1.6W (X-direc...	Yes	Y		1	.9	2	.9	5	1.6														
3	1.2D + 1.0Di + 1.0Wi...	Yes	Y		1	1.2	2	1.2	3	1	4	1												
4	1.2D + 1.6W (Z-direc...	Yes	Y		1	1.2	2	1.2	7	1.6														
5	0.9D + 1.6W (Z-direc...	Yes	Y		1	.9	2	.9	7	1.6														
6	1.2D + 1.0Di + 1.0Wi...	Yes	Y		1	1.2	2	1.2	3	1	6	1												

Envelope Joint Reactions

	Joint		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	N6	max	.05	4	.009	3	.084	4	0	6	0	6	0	6
2		min	-.042	1	.007	5	0	1	0	1	0	1	0	1
3	N19	max	-.207	5	1.01	3	0	2	0	6	0	6	0	6
4		min	-.913	1	.354	5	-1.219	4	0	1	0	1	0	1
5	N20	max	.309	6	.97	6	0	3	0	6	0	6	0	6
6		min	-.198	2	.224	2	-.869	5	0	1	0	1	0	1
7	Totals:	max	0	6	1.959	6	0	3						
8		min	-1.102	1	.714	2	-2.003	4						

Envelope Joint Displacements

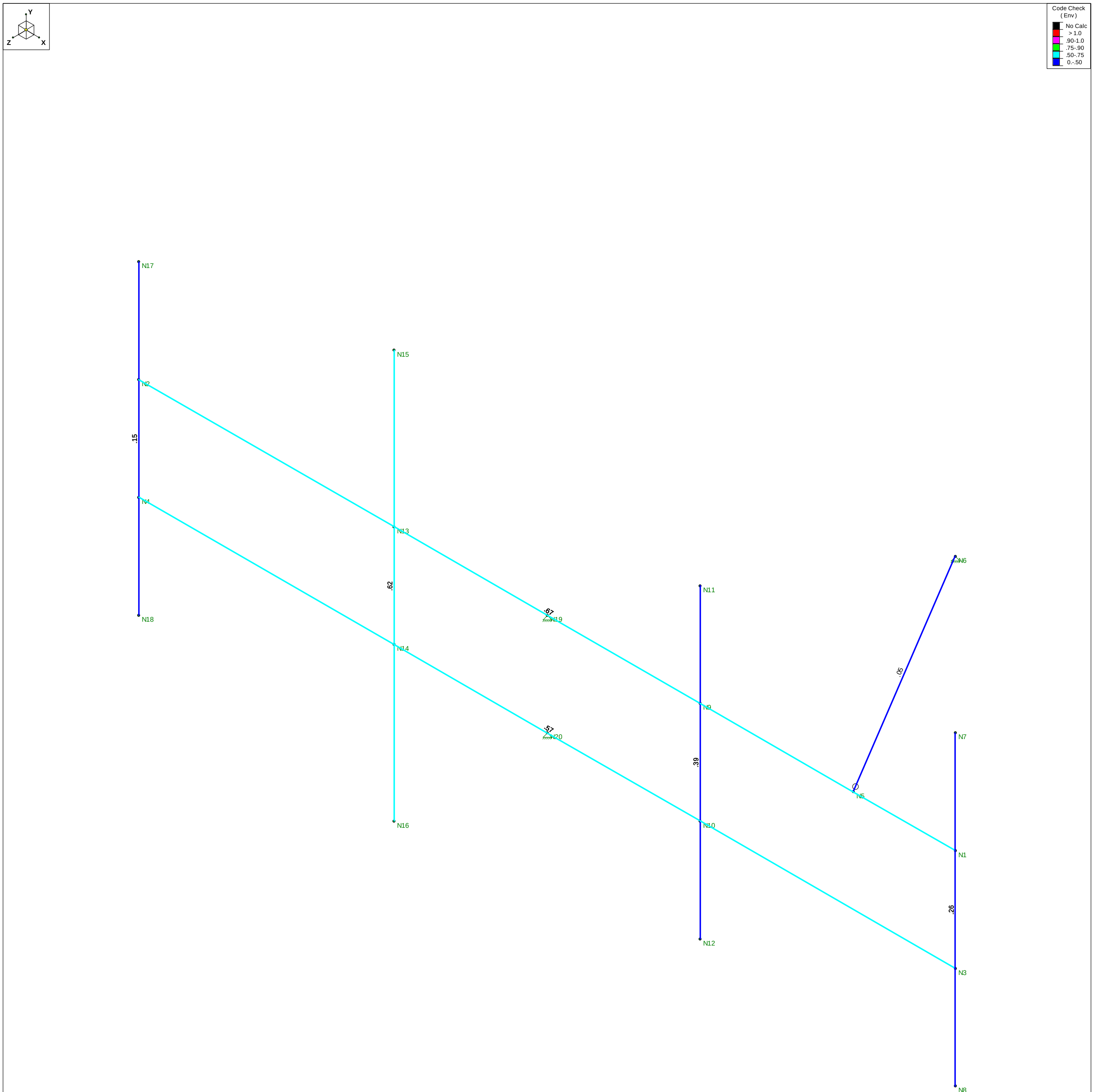
	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [rad]	LC	Y Rotatio...	LC	Z Rotatio...	LC
1	N1	max	.002	3	-.126	5	.239	5	7.917e-03	4	1.425e-05	3	-6.878e-04	5
2		min	0	5	-.299	3	-.001	3	1.257e-07	2	-1.021e-02	5	-1.829e-03	3
3	N2	max	0	2	-.077	2	3.316	5	3.478e-03	5	3.875e-02	4	6.638e-04	3
4		min	-.001	6	-.249	6	0	2	-1.644e-07	3	9.411e-06	2	2.87e-04	5
5	N3	max	0	2	-.126	5	.081	5	5.045e-03	4	1.428e-05	3	-7.073e-04	5
6		min	-.002	6	-.299	3	-.001	3	1.256e-07	2	-9.668e-03	5	-1.796e-03	3
7	N4	max	.001	3	-.078	2	3.292	4	-2.261e-08	2	3.878e-02	4	6.14e-04	6
8		min	0	5	-.249	6	0	2	-1.464e-03	4	9.413e-06	2	1.321e-05	2
9	N5	max	.002	3	-.095	5	0	2	7.272e-03	4	1.424e-05	3	-1.744e-03	5
10		min	0	5	-.218	3	-.001	4	1.053e-07	2	-9.414e-03	5	-4.371e-03	3
11	N6	max	0	6	0	6	0	6	2.908e-03	4	2.185e-03	1	1.016e-03	5
12		min	0	1	0	1	0	1	7.786e-04	2	1.563e-05	5	-5.095e-03	3
13	N7	max	.05	3	-.126	5	.455	5	9.349e-03	4	1.425e-05	3	-6.882e-04	5
14		min	.017	5	-.299	3	-.001	3	1.258e-07	2	-1.021e-02	5	-2.028e-03	3
15	N8	max	-.014	2	-.126	5	0	2	5.045e-03	4	1.428e-05	3	-5.234e-04	2
16		min	-.045	6	-.299	3	-.041	4	1.256e-07	2	-9.668e-03	5	-1.786e-03	6

Envelope Joint Displacements (Continued)

	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [rad]	LC	Y Rotatio...	LC	Z Rotatio...	LC
17	N9	max	.001	3	-.035	5	0	2	6.304e-03	4	1.423e-05	3	-1.086e-03	5
18		min	0	5	-.07	3	-.236	5	7.474e-08	2	-2.016e-03	5	-2.645e-03	3
19	N10	max	0	2	-.035	5	0	2	1.822e-04	4	1.434e-05	3	-9.566e-04	2
20		min	-.001	6	-.07	3	-.309	4	-3.423e-05	6	-2.05e-05	6	-2.572e-03	6
21	N11	max	.068	3	-.035	5	0	2	7.928e-03	4	1.423e-05	3	-1.087e-03	5
22		min	.027	5	-.07	3	-.055	5	7.476e-08	2	-2.016e-03	5	-2.844e-03	3
23	N12	max	-.013	2	-.035	5	0	2	2.315e-07	3	1.434e-05	3	-3.744e-04	2
24		min	-.063	6	-.07	3	-.283	4	-1.452e-03	5	-2.05e-05	6	-2.569e-03	6
25	N13	max	0	2	-.036	2	1.05	5	8.376e-03	5	3.548e-02	5	2.581e-03	6
26		min	0	6	-.137	6	0	2	-1.082e-07	3	9.39e-06	2	-2.957e-04	2
27	N14	max	0	3	-.037	2	1.036	4	0	2	3.487e-02	4	2.776e-03	3
28		min	0	5	-.137	6	0	2	-6.524e-03	4	9.391e-06	2	9.011e-04	5
29	N15	max	.19	2	-.037	2	1.721	5	2.252e-02	4	3.548e-02	5	2.618e-03	6
30		min	-.095	6	-.138	6	0	2	-1.097e-07	3	9.39e-06	2	-6.985e-03	2
31	N16	max	.225	1	-.037	2	1.638	4	0	2	3.487e-02	4	7.762e-03	1
32		min	.033	5	-.138	6	0	2	-2.054e-02	4	9.391e-06	2	8.996e-04	5
33	N17	max	-.007	5	-.078	2	3.403	5	3.668e-03	5	3.875e-02	4	6.242e-04	3
34		min	-.016	3	-.249	6	0	2	-1.644e-07	3	9.411e-06	2	2.87e-04	5
35	N18	max	.016	6	-.078	2	3.33	4	-2.261e-08	2	3.878e-02	4	6.14e-04	6
36		min	.004	2	-.249	6	0	2	-1.654e-03	4	9.413e-06	2	2.033e-04	2
37	N19	max	0	6	0	6	0	6	7.332e-03	5	1.841e-02	5	1.449e-03	3
38		min	0	1	0	1	0	1	3.242e-08	2	9.29e-06	2	1.909e-04	5
39	N20	max	0	6	0	6	0	6	6.22e-08	3	1.928e-02	4	1.395e-03	6
40		min	0	1	0	1	0	1	-3.171e-03	4	9.328e-06	2	-2.013e-04	2

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

	Member	Shape	Code Check	Lo...	LC	She...	Lo...	...	...	phi*P...	phi*P...	phi*...	phi*...	Cb	Eqn
1	M1	PIPE_1.5	.049	2....	1	.005	5....		1	12.433	23.593	1.105	1.105	1.1...	H1-...
2	M2	PIPE_2.5	.671	8	4	.115	11		4	47.114	50.715	3.596	3.596	2.1...	H1-...
3	M3	PIPE_2.5	.575	8	4	.118	8		4	47.114	50.715	3.596	3.596	2.18	H1-...
4	M4	PIPE_2.0	.261	4	3	.052	2		6	20.867	32.13	1.872	1.872	4.7...	H1-...
5	M5	PIPE_2.0	.393	4	3	.100	2		4	20.867	32.13	1.872	1.872	4.7...	H1-...
6	M6	PIPE_2.0	.622	3	4	.078	3		6	14.916	32.13	1.872	1.872	1.4...	H1-...
7	M7	PIPE_2.0	.146	2	4	.016	2		6	20.867	32.13	1.872	1.872	2.0...	H1-...



Member Code Checks Displayed (Enveloped)
Loads: BLC 1, Self Weight
Envelope Only Solution

Centek	CT11474A Unity Check	
TJL		July 28, 2020 at 10:26 AM
20074.59		CT11474A_AMA.R3D

Exhibit E

Power Density/RF Emissions Report

EBI Consulting

environmental | engineering | due diligence

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

T-Mobile Existing Facility

Site ID: CT11474A

WTNH Hamden
101 Talmadge Road
Hamden, Connecticut 06518

October 27, 2020

EBI Project Number: 6220005559

Site Compliance Summary	
Compliance Status:	**COMPLIANT**
Site total MPE% of FCC general population allowable limit:	**4.32%**

October 27, 2020

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

Emissions Analysis for Site: CT11474A - WTNH Hamden

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **101 Talmadge Road** in **Hamden, Connecticut** for the purpose of determining whether the emissions from the Proposed T-Mobile Antenna Installation located on this property are within specified federal limits.

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

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

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

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

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

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were done for the proposed T-Mobile Wireless antenna facility located at 101 Talmadge Road in Hamden, Connecticut using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since T-Mobile is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufacturer's supplied specifications, minus 10 dB for directional panel antennas and 20 dB for highly focused parabolic microwave dishes, was focused at the base of the tower. For this report, the sample point is the top of a 6-foot person standing at the base of the tower.

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

1) 2 LTE channels (600 MHz Band) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.
2) 1 NR channel (600 MHz Band) was considered for each sector of the proposed installation. This Channel has a transmit power of 80 Watts.
3) 2 LTE channels (700 MHz Band) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.
4) 4 GSM channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.
5) 2 LTE channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.

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

7) 2 LTE channels (BRS Band - 2500 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 40 Watts per Channel.

8) 2 NR channels (BRS Band - 2500 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 40 Watts per Channel.

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

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

11) The antennas used in this modeling are the Ericsson AIR 6449 for the 2500 MHz / 2500 MHz channel(s), the RFS APX16DWV-16DWV-S-E-A20 for the 2100 MHz channel(s), the RFS APXVAARR24_43-U-NA20 for the 600 MHz / 600 MHz / 700 MHz / 1900 MHz / 1900 MHz channel(s) in Sector A, the Ericsson AIR 6449 for the 2500 MHz / 2500 MHz channel(s), the RFS APX16DWV-16DWV-S-E-A20 for the 2100 MHz channel(s), the RFS APXVAARR24_43-U-NA20 for the 600 MHz / 600 MHz / 700 MHz / 1900 MHz / 1900 MHz channel(s) in Sector B, the Ericsson AIR 6449 for the 2500 MHz / 2500 MHz channel(s), the RFS APX16DWV-16DWV-S-E-A20 for the 2100 MHz channel(s), the RFS APXVAARR24_43-U-NA20 for the 600 MHz / 600 MHz / 700 MHz / 1900 MHz / 1900 MHz channel(s) in Sector C. This is based on feedback from the carrier with regard to anticipated antenna selection. All Antenna gain values and associated transmit power levels are shown in the Site Inventory and Power Data table below. The maximum gain of the antenna per the antenna manufacturer's supplied specifications, minus 10 dB for directional panel antennas and 20 dB for highly focused parabolic microwave dishes, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

12) The antenna mounting height centerline of the proposed antennas is 315 feet above ground level (AGL).

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

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

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

T-Mobile Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	**1**	Antenna #:	**1**	Antenna #:	**1**
Make / Model:	Ericsson AIR 6449	Make / Model:	Ericsson AIR 6449	Make / Model:	Ericsson AIR 6449
Frequency Bands:	2500 MHz / 2500 MHz	Frequency Bands:	2500 MHz / 2500 MHz	Frequency Bands:	2500 MHz / 2500 MHz
Gain:	22.05 dBd / 22.05 dBd	Gain:	22.05 dBd / 22.05 dBd	Gain:	22.05 dBd / 22.05 dBd
Height (AGL):	315 feet	Height (AGL):	315 feet	Height (AGL):	315 feet
Channel Count:	8	Channel Count:	8	Channel Count:	8
Total TX Power (W):	320 Watts	Total TX Power (W):	320 Watts	Total TX Power (W):	320 Watts
ERP (W):	51,303.85	ERP (W):	51,303.85	ERP (W):	51,303.85
Antenna A1 MPE %:	**1.86%**	Antenna B1 MPE %:	**1.86%**	Antenna C1 MPE %:	**1.86%**
Antenna #:	**2**	Antenna #:	**2**	Antenna #:	**2**
Make / Model:	RFS APX16DWV-16DWV-S-E-A20	Make / Model:	RFS APX16DWV-16DWV-S-E-A20	Make / Model:	RFS APX16DWV-16DWV-S-E-A20
Frequency Bands:	2100 MHz	Frequency Bands:	2100 MHz	Frequency Bands:	2100 MHz
Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	315 feet	Height (AGL):	315 feet	Height (AGL):	315 feet
Channel Count:	2	Channel Count:	2	Channel Count:	2
Total TX Power (W):	120 Watts	Total TX Power (W):	120 Watts	Total TX Power (W):	120 Watts
ERP (W):	4,668.54	ERP (W):	4,668.54	ERP (W):	4,668.54
Antenna A2 MPE %:	**0.17%**	Antenna B2 MPE %:	**0.17%**	Antenna C2 MPE %:	**0.17%**
Antenna #:	**3**	Antenna #:	**3**	Antenna #:	**3**
Make / Model:	RFS APXVAARR24_43-U-NA20	Make / Model:	RFS APXVAARR24_43-U-NA20	Make / Model:	RFS APXVAARR24_43-U-NA20
Frequency Bands:	600 MHz / 600 MHz / 700 MHz / 1900 MHz / 1900 MHz	Frequency Bands:	600 MHz / 600 MHz / 700 MHz / 1900 MHz / 1900 MHz	Frequency Bands:	600 MHz / 600 MHz / 700 MHz / 1900 MHz / 1900 MHz
Gain:	12.95 dBd / 12.95 dBd / 13.35 dBd / 15.65 dBd / 15.65 dBd	Gain:	12.95 dBd / 12.95 dBd / 13.35 dBd / 15.65 dBd / 15.65 dBd	Gain:	12.95 dBd / 12.95 dBd / 13.35 dBd / 15.65 dBd / 15.65 dBd
Height (AGL):	315 feet	Height (AGL):	315 feet	Height (AGL):	315 feet
Channel Count:	11	Channel Count:	11	Channel Count:	11
Total TX Power (W):	440 Watts	Total TX Power (W):	440 Watts	Total TX Power (W):	440 Watts
ERP (W):	12,873.80	ERP (W):	12,873.80	ERP (W):	12,873.80
Antenna A3 MPE %:	**0.67%**	Antenna B3 MPE %:	**0.67%**	Antenna C3 MPE %:	**0.67%**

Site Composite MPE %	
Carrier	**MPE %**
T-Mobile (Max at Sector A):	2.70%
Sprint	1.62%
Site Total MPE % :	4.32%

T-Mobile MPE % Per Sector	
T-Mobile Sector A Total:	2.70%
T-Mobile Sector B Total:	2.70%
T-Mobile Sector C Total:	2.70%
Site Total MPE % :	4.32%

T-Mobile Maximum MPE Power Values (Sector A)

T-Mobile Frequency Band / Technology (Sector A)	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density (µW/cm²)	Frequency (MHz)	Allowable MPE (µW/cm²)	Calculated % MPE
T-Mobile 2500 MHz LTE	4	6412.98	315.0	9.29	2500 MHz LTE	1000	0.93%
T-Mobile 2500 MHz NR	4	6412.98	315.0	9.29	2500 MHz NR	1000	0.93%
T-Mobile 2100 MHz LTE	2	2334.27	315.0	1.69	2100 MHz LTE	1000	0.17%
T-Mobile 600 MHz LTE	2	591.73	315.0	0.43	600 MHz LTE	400	0.11%
T-Mobile 600 MHz NR	1	1577.94	315.0	0.57	600 MHz NR	400	0.14%
T-Mobile 700 MHz LTE	2	648.82	315.0	0.47	700 MHz LTE	467	0.10%
T-Mobile 1900 MHz GSM	4	1101.85	315.0	1.60	1900 MHz GSM	1000	0.16%
T-Mobile 1900 MHz LTE	2	2203.69	315.0	1.60	1900 MHz LTE	1000	0.16%
						Total:	**2.70%**

• NOTE: Totals may vary by approximately 0.01% due to summation of remainders in calculations.

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:	2.70%
Sector B:	2.70%
Sector C:	2.70%
T-Mobile Maximum MPE % (Sector A):	2.70%
Site Total:	4.32%
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **4.32%** of the allowable FCC established general population limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions.

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

Exhibit F

Mailing Receipts/Proof of Notice

View/Print Label

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

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

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

   Customers without a scheduled Pickup
   - Schedule a Pickup on ups.com to have a UPS driver pickup all of your packages.
   - Take your package to any location of The UPS Store®, UPS Access Point(TM) location, UPS Drop Box, UPS Customer Center, Staples® or Authorized Shipping Outlet near you. To find the location nearest you, please visit the 'Locations' Quick link at ups.com.

UPS Access Point™
MICHAELS STORE # 7773
75 INTERSTATE SHOP CTR
RAMSEY NJ 07446-1130

UPS Access Point™
THE UPS STORE
115 FRANKLIN TPKE
MAHWAH NJ 07430-1325

UPS Access Point™
THE UPS STORE
120 E MAIN ST
RAMSEY NJ 07446-1925

FOLD HERE

NEIL GUERRIERO
3473040176
TRANSCEND WIRELESS
10 INDUSTRIAL AVE
MAHWAH NJ 07430

LTR 1 OF 1

SHIP TO:
10 FRANKLIN SQUARE
CONNECTICUT SITING COUNCIL
10 FRANKLIN SQUARE
NEW BRITAIN CT 06051

CT 067 9-06

UPS 2ND DAY AIR 2
TRACKING #: 1Z V25 742 02 9849 1871

BILLING: P/P

Reference #1: CT11474A
Reference #2: CSC

XOL 20.10.23 NV45 34.0A 10/2020*

View/Print Label

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

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

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   - Take your package to any location of The UPS Store®, UPS Access Point(TM) location, UPS Drop Box, UPS Customer Center, Staples® or Authorized Shipping Outlet near you. To find the location nearest you, please visit the 'Locations' Quick link at ups.com.

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75 INTERSTATE SHOP CTR
RAMSEY NJ 07446-1130

UPS Access Point™
THE UPS STORE
115 FRANKLIN TPKE
MAHWAH NJ 07430-1325

UPS Access Point™
THE UPS STORE
120 E MAIN ST
RAMSEY NJ 07446-1925

FOLD HERE

NEIL GUERRIERO
3473040176
TRANSCEND WIRELESS
10 INDUSTRIAL AVE
MAHWAH NJ 07430

LTR 1 OF 1

SHIP TO:
PROPERTY MGT
LIN TELEVISION CORP
333 EAST FRANKLIN ST
RICHMOND VA 23219

VA 230 2-01

UPS 2ND DAY AIR 2

TRACKING #: 1Z V25 742 02 9211 6742

BILLING: P/P

Reference #1: CT11474A
Reference #2: LL

XOL 20.10.23 NV45 34.0A 10/2020*

View/Print Label

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

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MAHWAH NJ 07430-1325

UPS Access Point™
THE UPS STORE
120 E MAIN ST
RAMSEY NJ 07446-1925

FOLD HERE

NEIL GUERRIERO
3473040176
TRANSCEND WIRELESS
10 INDUSTRIAL AVE
MAHWAH NJ 07430

LTR

1 OF 1

SHIP TO:
THE HONORABLE CURT LENG, MAYOR
TOWN OF HAMDEN
2750 DIXWELL AVENUE
HAMDEN CT 06518

CT 065 2-03

UPS 2ND DAY AIR 2

TRACKING #: 1Z V25 742 02 9601 1857

BILLING: P/P

Reference #1: CT11474A
Reference #2: Mayor

XOL 20.10.23 NV45 34.0A 10/2020*

View/Print Label

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

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   Customers without a scheduled Pickup
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   - Take your package to any location of The UPS Store®, UPS Access Point(TM) location, UPS Drop Box, UPS Customer Center, Staples® or Authorized Shipping Outlet near you. To find the location nearest you, please visit the 'Locations' Quick link at ups.com.

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115 FRANKLIN TPKE
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UPS Access Point™
THE UPS STORE
120 E MAIN ST
RAMSEY NJ 07446-1925

FOLD HERE

NEIL GUERRIERO
3473040176
TRANSCEND WIRELESS
10 INDUSTRIAL AVE
MAHWAH NJ 07430

LTR 1 OF 1

SHIP TO:
DANIEL KOPS, TOWN PLANNER
TOWN OF HAMDEN
3RD FLOOR
2750 DIXWELL AVENUE
HAMDEN CT 06518

CT 065 2-03

UPS 2ND DAY AIR 2

TRACKING #: 1Z V25 742 02 9974 1867

BILLING: P/P

Reference #1: CT11474A
Reference #2: Planner

XOL 20.10.23 NV45 34.0A 10/2020*