10 Industrial Ave,
Suite 3
Mahwah NJ 07430

Phone: 201.684.0055
Fax: 201.684.0066

September 7, 2021

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

RE: Notice of Exempt Modification
6 Main Street, Essex, CT 06426
Latitude: 41.34809
Longitude: -72.42648
T-Mobile/Sprint ID: CTHA838A-CT03XC162

Dear Ms. Bachman:

T-Mobile/Sprint currently maintains three (3) antennas at the 118-foot level of the existing 124.5-foot water tower at 6 Main Street, Essex, CT. The 124.5-foot water tower is owned and operated by MacBeth Ventures, LLC c/o HT Partners, LLC.The property is owned by MacBeth Ventures, LLC c/o HT Partners. T-Mobile/Sprint now intends to remove the three (3) existing antennas and add six (6) new 600/700/1900/2100/2500 MHz antennas. The new antennas will be installed at the same 118-foot level of the water tower and will support 5G Services.

Planned Modifications:
Tower:
Remove
(6) 1-5/8" coax cables

Remove
(3) RFS ETCR0654L12H6 panel antennas
(6) 800MHZ 2X50W RRHs
(3) 1900MHz 4X45W RRHs
(3) TD-RRR8x20 RRHs

Install New:
(3) 6/24 100m 4 AWG Hybrid Cables

Install New:
(3) Ericsson AIR6449 B41 panel antennas
(3) RFS APXVAALL24_43-U-NA20 panel antennas

(3) Ericsson Radio 4460 B25+B66
(3) Ericsson Radio 4480 B71+B85

Ground:
Remove
(1) Sprint BTS Cabinet
(1) Sprint Battery Cabinet
(1) Fiber Management Box
(1) 100A PPC Cabinet

Install New:
(1) Ericsson Enclosure 6160 Cabinet
(1) Ericsson Battery B160 Cabinet
(1) 150A Breaker in Existing 200A PPC Cabinet

Existing to Remain:
(1) Generator Power Switch
(1) Telco Cabinet
(1) Exhaust Fan

The original zoning approval for this installation was issued by the Town of Essex on 1/13/1997.T-Mobile/Sprint has been approved for subsequent modifications at their facility. This proposed modification complies with the original approval.

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies§ 16- SOj-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.SA. § 16-SOj-73, a copy of this letter is being sent to Mayor – Norman Needleman, First Selectman, and Carey Duques, Acting Planning & Zoning Official 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/Sprint respectfully submits that the proposed modifications to the abovereferenced telecommunications facility constitute an exempt modification under R.C.S.A. § 16-50j-72(b)(2).

Sincerely,

David DePinto
Transcend Wireless
Cell: 973-907-3243
Email: ddepinto@transcendwireless.com

Attachments
cc: Norman Needleman– First Selectman of the Town of Essex
Carey Duques- Acting Planning & Zoning Department Official
MacBeth Ventures, LLC c/o HT Partners - Property Owner & Tower Owner

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

Transcend Wireless

DePinto, Dave <ddepinto@transcendwireless.com>

UPS Delivery Notification, Tracking Number 1ZV257424292758377

UPS <pkginfo@ups.com>
To: DDEPINTO@transcendwireless.com

Mon, Sep 13, 2021 at 12:26 PM

Hello, your package has been delivered.

Delivery Date: Monday, 09/13/2021
Delivery Time: 12:24 PM
Left At: RESIDENTIAL
Signed by: ROPER

TRANSCEND WIRELESS

Tracking Number:	1ZV257424292758377
Ship To:	ESSEX TOWN HALL 29 WEST AVENUE ESSEX, CT 06426 US
Number of Packages:	1
UPS Service:	UPS Ground
Package Weight:	1.8 LBS
Reference Number:	CTHA838A-CT03XC162

Download the UPS mobile app

Transcend Wireless

DePinto, Dave <ddepinto@transcendwireless.com>

UPS Delivery Notification, Tracking Number 1ZV257424298745361

UPS <pkginfo@ups.com>
To: DDEPINTO@transcendwireless.com

Mon, Sep 13, 2021 at 12:25 PM

Hello, your package has been delivered.

Delivery Date: Monday, 09/13/2021
Delivery Time: 12:24 PM
Left At: RESIDENTIAL
Signed by: ROPER

TRANSCEND WIRELESS

Tracking Number:	1ZV257424298745361
Ship To:	TOWN OF ESSEX- PLANNING & ZONING 29 WEST AVENUE 3RD FLOOR ESSEX, CT 06426 US
Number of Packages:	1
UPS Service:	UPS Ground
Package Weight:	1.8 LBS
Reference Number:	CTHA838A-CT03XC162

Download the UPS mobile app

Transcend Wireless

DePinto, Dave <ddepinto@transcendwireless.com>

UPS Delivery Notification, Tracking Number 1ZV257424299495371

UPS <pkginfo@ups.com>
To: DDEPINTO@transcendwireless.com

Mon, Sep 13, 2021 at 9:44 AM

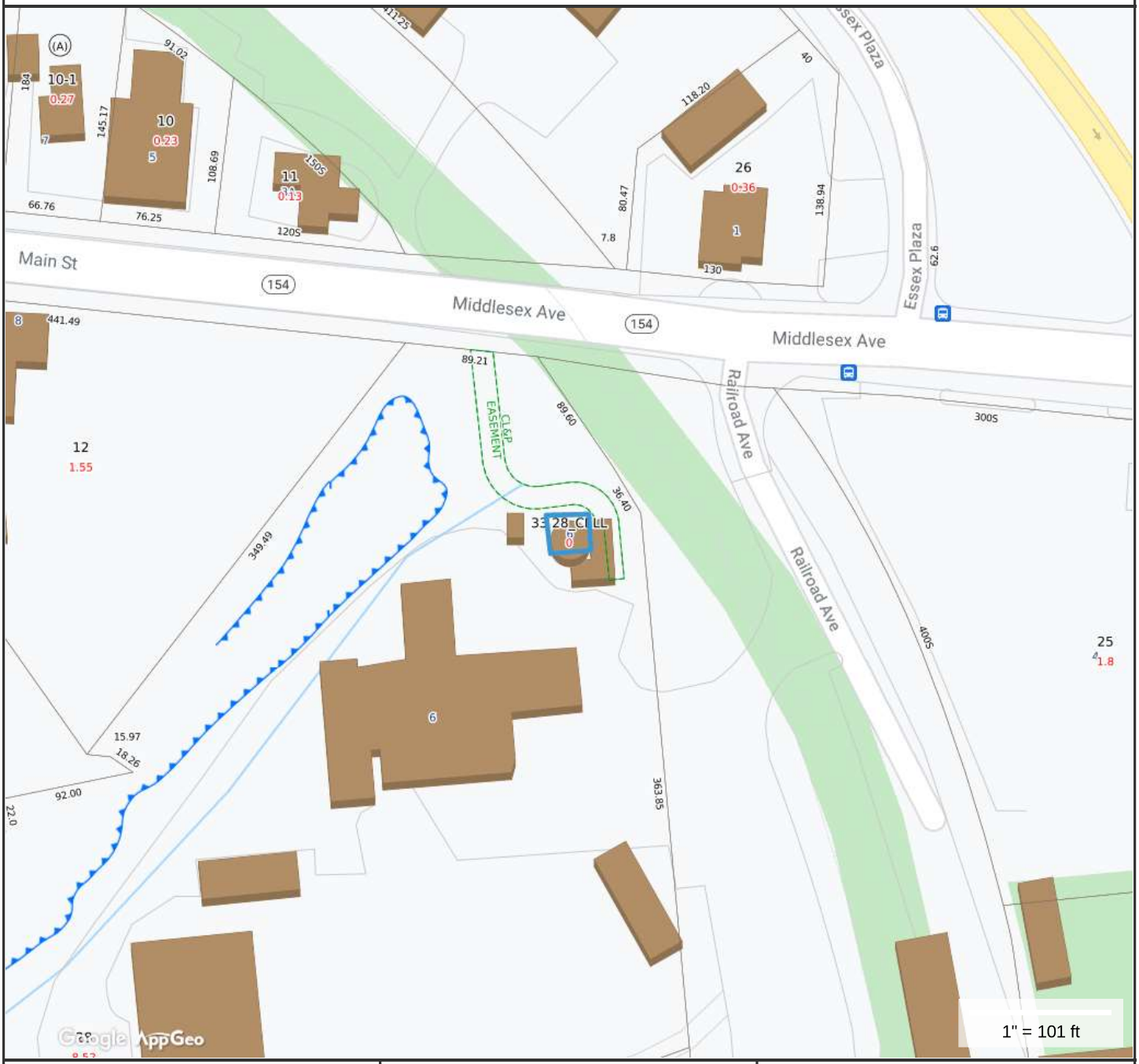
Hello, your package has been delivered.

Delivery Date: Monday, 09/13/2021
Delivery Time: 9:41 AM
Left At: INSIDE DELIV
Signed by: DECKER

TRANSCEND WIRELESS

Tracking Number:	1ZV257424299495371
Ship To:	MACBETH VENTURES/HT PARTNERS LLC 6 MAIN STREET ESSEX, CT 06409 US
Number of Packages:	1
UPS Service:	UPS Ground
Package Weight:	1.8 LBS
Reference Number:	CTHA838A-CT03XC162

Download the UPS mobile app



Property Information

Property ID	33 28-CELL
Location	6 MAIN ST CTBK
Owner	MACBETH VENTURES LLC

MAP FOR REFERENCE ONLY
NOT A LEGAL DOCUMENT

Town of Essex, CT makes no claims and no warranties, expressed or implied, concerning the validity or accuracy of the GIS data presented on this map.

Geometry updated 4/13/2021
Data updated daily

Print map scale is approximate. Critical layout or measurement activities should not be done using this resource.

6 MAIN ST CTBK

Location	6 MAIN ST CTBK	**Mblu**	33/ 028/ CELL/ /
Acct#	00200101	**Owner**	MACBETH VENTURES LLC
Assessment	$343,800	**Appraisal**	$491,200
PID	1862	**Building Count**	1

Current Value

Appraisal	
Valuation Year	**Total**
2018	$491,200

Assessment	
Valuation Year	**Total**
2018	$343,800

Owner of Record

Owner	MACBETH VENTURES LLC
Co-Owner	C/O HT PARTNER LLC
Address	6 MAIN ST SUITE 312 CENTERBROOK, CT 06409

Sale Price	$0
Certificate	
Book & Page	0180/0285
Sale Date	05/26/1999
Instrument	

Ownership History

Ownership History					
Owner	**Sale Price**	**Certificate**	**Book & Page**	**Instrument**	**Sale Date**
MACBETH VENTURES LLC	$0		0180/0285		05/26/1999

Building Information

Building 1 : Section 1

Year Built: 1999
Living Area: 724
Building Percent Good: 86

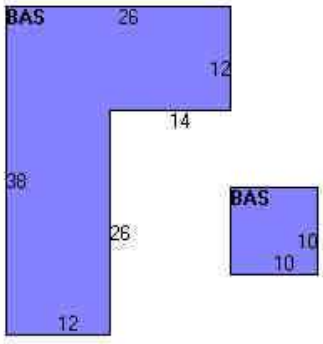
Building Attributes	
Field	**Description**

STYLE	Support Shed
MODEL	Ind/Comm
Grade	B
Stories:	1 Story
Occupancy	1.00
Ext Wall 1	Concr/Cinder
Exterior Wall 2	
Roof Structure	Flat
Roof Cover	Tar + Gravel
Interior Wall 1	Minimum
Interior Wall 2	
Interior Floor 1	Concrete
Interior Floor 2	
Heating Fuel	01
Heating Type	None
AC Type	None/partial
Struct Class	
Bldg Use	Commercial MDL-96
Total Rooms	
Total Bedrms	
Total Baths	
Usrfld 218	
Usrfld 219	
1st Floor Use:	
Heat/AC	None
Frame Type	Masonry
Baths/Plumbing	None
Ceiling/Wall	None
Rooms/Prtns	Light
Wall Height	8.00
% Comn Wall	

Building Photo

(http://images.vgsi.com/photos/EssexCTPhotos//\01\00\02\10.jpg)

Building Layout



(http://images.vgsi.com/photos/EssexCTPhotos//Sketches/1862_1862.jpg)

Building Sub-Areas (sq ft)			Legend
Code	Description	Gross Area	Living Area
BAS	First Floor	724	724
		724	724

Extra Features

Extra Features				Legend
Code	Description	Sub Code	Sub Description	Size
GEN	Generator			1.00 UNITS

Land

Land Use

Land Line Valuation

Use Code	200I	**Size (Acres)**	0
Description	Commercial MDL-96	**Depth**	
Zone	CML	**Assessed Value**	$0
Neighborhood	CI4	**Appraised Value**	$0

Outbuildings

Outbuildings				Legend
Code	**Description**	**Sub Code**	**Sub Description**	**Size**
MSC2	CELL SITE			3.00 UNIT

Valuation History

Appraisal	
Valuation Year	**Total**
2020	$491,200

Assessment	
Valuation Year	**Total**
2020	$343,800

#162

PRINT OR TYPE
Please read Essex Zoning Regulations before completing this Application Form.

TOWN OF ESSEX
Zoning Commission

Town Hall, Essex, Connecticut 06426
Telephone: (203) 767-4341

MAP 33 LOT 28

APPLICATION FOR ZONING PERMIT

1. Property Owner(s) Name(s) Merz & Dickinson d/b/a E.E. Dickinson Company
2. Address(es) 2 Enterprise Dr., Shelton, CT 06484 Telephone(s) _____
3. Applicant(s) Name(s) Sprint PCS
4. Address(es) 9 Barnes Industrial Road, Wallingford, CT 06492 Telephone(s) (203) 294-5620
5. Location of Premises (by street) 6 Main Street a/k/a Railroad Avenue, Centerbrook, CT

   Tax Map No. 33 Tax Lot No. 28 Zoning District Commercial
6. Description of use and any improvements proposed: Installation of antennas on water tower and construction of utility building per approval of amendment to Special Exception granted by the Zoning Commission on December 16, 1996.
7. A Site Plan marked Exhibit "A" is attached clearly showing: Previously submitted
   (a) The location and exact dimensions of all boundaries of the lot;
   (b) The exact aggregate area of the lot and of any portion of it represented by Wetlands and/or Watercourses (including but not limited to, streams, ponds or lakes);
   (c) The location and exact dimensions of all existing and proposed structures and other improvements; including the location and layout of the septic system.
   (d) The exact distance of all existing and proposed structures and other improvements from lot lines;
   (e) Name and location of each street abutting the lot, and the location and width of any other way affording access to the lot from a street;
   (f) The exact percentage of the lot area covered by existing and proposed structures;
   (g) The source of water supply.
8. The following must also be furnished as part of the application: Previously submitted
   (a) A list of the names and mailing addresses, with Tax Map and Tax Lot Numbers, of owners of all land adjacent to the land to which this application relates;
   (b) Fee: checks should be payable to the Town of Essex. Other fees as required.

I/We certify that all the information on this application, including that on the site plan and any attachments, is correct as of the date below and complete. I/We certify that I/we am/are the owner(s) of the premises described above, or the authorized agent of the owner(s) of said premises.

Dated: Rev January 13, 1997 LGG

Applicant(s) or Agent Sprint PCS

Agent: Edward S. Domnarski, Jr., Esq., Cloutier & Domnarski, 29 Elm St., Old Saybrook, CT 06475 (860) 388-3456

FOR OFFICIAL USE ONLY: Application No. 3178 Date Received by ZEA 1/13/97 LGG

Fee Paid pd 8096 Granted 1/13/97 (Date) Denied _____ (Date) Sec. 121 E

Permit No. 97-33-28 Contractor _____

Permit Date January 13, 1997

TOWN OF ESSEX
ZONING PERMIT

Map 33 Lot 28

Issue Date 1/13/97 Hr. 10:15 a.m.

Applicant's Name Sprint PCS Address 9 Barnes Industrial Road Wallingford,CT 06492

Owner's Name: Merz & Dickison DBA-E.E.Dickinson Co. Address 2 Enterprise Dr.,Shelton 06484

Address of Work: 6 Main St., a/k/a Railroad Ave.,Centerbrook,CT

Zoning District: C Description of Improvement or Use

Construction of a second cellular telecommunications facility on the existing water tank located on Railroad Avenue. The second facility shall consist of 9 panel-type antennae placed around the circumference of the water tank, and a radio equipment building near the base of the tank as shown on the revised plans.

ALL AS PER A GRANT OF SPECIAL EXCEPTION APPROVED ON MONDAY, DECEMBER 16, 1996.

THIS IS NOT A BUILDING PERMIT OR A HEALTH DEPT. PERMIT.

NOTES: (1) This is not a building permit. This permit expires one year from date of issue if construction shall not have commenced.

(2) A certified plot plan may be required, at the time of construction of the foundation and at the completion of the structure, to verify compliance with the requirements of the Essex Zoning Regulations.

Signature: Tony Hellman
Zoning Enforcement Agent

ESSEX - SITE #162
120 FOOT MONOPOLE (128' W/LIGHTENING ROD)
SPRINT PCS
PRELIMINARY LAND USE PERMITTING REPORT

Prepared By
Cloutier & Domnarski
November 5, 1996

I. SITE INFORMATION

Street Address	Tax Map Information Map	Block	Lot	Owner
6 Main Street, Centerbrook	33		28	Merz & Dickinson *

* Metro Mobile CTS (20 Alexander Drive, Wallingford, CT 06492) is listed as owner of one building built in 1996. See Tax Assessor's Card.

II. SUMMARY OF REQUIRED PERMITS

A. *Special Exception*

1. A Special Exception is required for a cellular telecommunications facility in a commercial district. Because a Special Exception has previously been granted to E.E. Dickinson to allow installation of the Cellco antennae, we have been advised by Larry Gillian, The Zoning Enforcement Agent, to apply for a modification of the existing Special Exception. We have a copy of the Cellco application and site plan. According to Larry Gillian, there was little opposition to the Cellco application and very few people attended the public hearing. The procedure is set forth below.

2. A Special Exception may be needed pursuant to Section 40J if the antenna exceeds permissible height limitations. See below.

B. *Zoning Permit*

A Zoning Permit is required, in addition to the special exception, for any new improvement or change in an existing improvement, unless it is an accessory improvement, which does not fit within the definition of "building"; i.e. unless it can be classified as a utility transmission tower (which is not defined in the Regulations). Section 121A.

A Zoning Permit is also needed before the commencement of any new nonresidential use of the premises. ("Use" is not defined in the Regulations.)

See Zoning Permit Procedure below.

III. ZONING REVIEW

A) *ZONE*: C - Commercial

B) *USES PERMITTED IN ZONE:*

No use is permitted unless expressly and specifically permitted in the Zoning Regulations. Section 40A.

Section 40L, attached hereto, sets forth the procedure to be followed when a lot is partly in different districts. It appears on the map that a portion of this lot may be in the Limited Industrial district.

A cellular telecommunications facility is permitted as a special principal use and building in a commercial district only when specifically authorized by the Zoning Commission as a special exception. Section 80A.2(W).

C) *LOT, AREA, YARD, AND HEIGHT REQUIREMENTS*:

Section 80C	Required	Proposed
Minimum lot area	30,000 Square Feet	
Minimum lot width	150 Feet	
Maximum building coverage	15%	
Front setback	30 feet	
Side yard setback	15 feet	
Rear yard setback	30 feet	
Maximum building height	30 feet *	

* The building height is determined by measuring vertically from the average ground level at the base to the average roof height. Ten percent of the footprint area may exceed the 30 foot height limitation not to exceed an overall height of 45 feet. Any improvement over 8 feet high is a building, unless it is a utility transmission tower (which is not defined in the Regulations). The general prohibition on building height set forth in Section 40J contains an exception for radio or television towers and antennas which may be erected to a reasonable and necessary height provided they not exceed "15 feet in height above the highest point of the highest ground elevation of the lot or 15 feet in height above the highest point of the highest building on the lot, whichever is the higher".

D) *SITE PLAN REQUIREMENTS*

A Site Development Plan must accompany the application for Special Exception. The requirements are set forth in Section 120C.4 and attached hereto.

A waiver or modification of any of the requirements may be made in writing, pursuant to Section 120.C.8, and submitted with the application and Site Development Plan. The Commission will act upon this request within 21 days, and if granted this will relate back to the

date of filing the application. A waiver of certain items may be granted when these items are not reasonably necessary or appropriate to disposition of the application.

Larry Gillian has indicated that we should be able to get a waiver of most of the site plan requirements.

E) *SPECIAL EXCEPTION PROCEDURE*

Pursuant to Section 120, a lessee may apply for a Special Exception with the written consent of the owner of the premises.

The application form must be accompanied by the signed checklist, supporting information (see below) and the $75.00 fee, and submitted to the Zoning Enforcement Agent for transmittal to the Zoning Commission.

Supporting information includes (1) metes and bounds description of the premises, (2) list of neighboring owners, (3) statement describing the proposed use and all improvements, and (4) Site Plan (see above re: waiver).

All maps and drawings are to be prepared by a registered professional engineer or registered land surveyor. Any proposed improvement shall be drawn by a licensed professional engineer. Section 120D.

A copy of the application must be filed with the Town Clerk at least ten (10) days before the Public Hearing. Notice of the hearing must be published as a legal advertisement. The hearing, on the record, will be held within 65 days of the filing of the application.

The next meeting of the Zoning Commission is November 25, 1996 and we will have to submit the application on or before November 22, 1996. At the November 25th meeting, the Commission may schedule the public hearing for its next meeting which will be held on December 16, 1996.

The Commission will consider the probable effect on the enjoyment, usefulness and value of neighboring premises, including the extent of any radio or television interference resulting from the granting of the exception, which must be by a concurring vote of the majority of the Commission. A decision will be rendered within 65 days of the first Public Hearing.

The granting of a Special Exception is subject to the conditions set forth in Section 130: (Section 130A.1 & 2) the architectural design of buildings and the site plan shall harmonize with the neighborhood and (Section 130A.3-5) the proposed use and improvements shall not adversely affect the enjoyment, usefulness and value of neighboring premises or the pattern and flow of traffic, not shall it unsafely increase building density.

The Commission may impose conditions as needed to prevent any adverse effects upon the health, safety and welfare of the community, the suitability of the land for its general principal use and to prevent any undue annoyance or disturbance to neighbors.

F) *ZONING PERMIT PROCEDURE*

Pursuant to Section 121B, a lessee may apply for a Zoning Permit, with the written consent of the owner of the premises.

The application form must be accompanied by (1) a site plan showing the tax map lot number; (2) a statement describing the improvement or change and the use made thereof, (3) identification of adjacent property owners; and (4) the $20.00 fee, and submitted to the Zoning Enforcement Agent.

The Zoning Enforcement Agent may require any other necessary documentation such as that set forth in Section 120C.1-7 (Special Exception requirements), a title summary or a certified A2 plot plan.

The permit will be granted, within 30 days after receipt of the application, if it complies with the Regulations. The permit may be denied if the land is in a subdivision which has not been approved by the Planning Commission. Notice must be mailed to adjacent property owners when a zoning permit issues.

G) *IMPORTANT DEFINITIONS*

(1) Accessory Improvement - Any improvement which is attendant, subordinate and customarily incidental to the principal improvement on the same premises.

(2) Improvement - Any structural addition to, or other change in the condition of land including the underground installation of utility lines.

(3) Improvement is also defined with regard to zoning permits at Section 121A to include any surfaced outdoor facility exceeding 10 square feet in area.

(4) Cellular Telecommunications Facility - Consists of 1) a building not used for human occupancy which will contain mobile radio telephone transmitting, receiving and related equipment, and 2) antennae attached to an existing structure and connecting cables necessary to permit the broadcasting of mobile two-way radio telephone communications.

(5) Building - Any improvement having a roof and intended for the shelter, housing or enclosure of persons, animals, or materials. Any other improvement more than 8 feet high shall be considered as a building, including a solid fence or wall, but excluding trees, shrubs and utility transmission towers, or an electric light, telephone or telegraph pole, highway or railroad bridge or flagpole; also considered as a building shall be anything located on, above, or beneath the water which is not primarily utilized or intended for navigation.

IV. INLAND WETLANDS REVIEW

There may be a water course on the property. In addition to the Inland Wetlands Map, the Flood Insurance Rate Map and the Water Resource Districts Map must be checked.

V. ZONING BOARD OF APPEALS

If a Special Exception does not issue for the Sprint antenna as a cellular telecommunications facility and/or if a Special Exception does not issue permitting the antenna in excess of the height requirement, then an application for a variance can be made to the Zoning Board of Appeals. A showing that enforcement of the regulations would result in exceptional difficulty or unusual hardship must be made.

VI. OTHER REGULATIONS

VII. MEETING DATES AND SUBMISSION DATES

BOARD OR COMMISSION	MEETING DATES	SUBMISSION DEADLINES
Zoning Board of Appeals	3rd Tuesday of month	
Zoning Commission	3rd Monday of month	
Inland Wetlands Commission	2nd Tuesday of month	

VIII. FILING FEES

TYPE OF PERMIT	FEE
Special Exception	$ 75.00
Zoning Permit	$11.00 to town and $9.00 to DEP
Variance	$40.00 to town and $10.00 to town clerk

IX. NAMES AND TELEPHONE NUMBERS

OFFICIAL	NAME	TELEPHONE NO.
Zoning Enforcement Agent	Larry Gillian	
Town Planner		
Zoning Comm. Chairman	Gregory Ellis	
Planning Comm. Chairman	Russell Smith	
Zoning Bd. of Appeal Chairman	Stuart Ingersoll	
Inland Wetlands Comm. Chairman	Daniel Lapman	

X. GENERAL COMMENTS

n:land-use/sprint/esx-zrpt

Sprint Now part of T-Mobile™

SPRINT ID: CT03XC162
SITE ID: CTHA838A
6 MAIN ST
CENTERBROOK, CT 06409

T-MOBILE RAN TEMPLATE (PROVIDED BY RFDS)

67E5A998E 6160

T-MOBILE A+L TEMPLATE (PROVIDED BY RFDS)

67E5998E_1xAIR+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 CONSTRUCTION, 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 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.

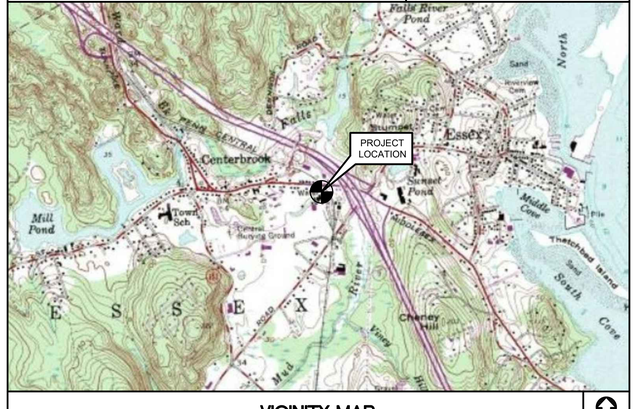
SITE DIRECTIONS

FROM: 35 GRIFFIN ROAD SOUTH, BLOOMFIELD, CT 06002 **TO:** 6 MAIN STREET, CENTERBROOK, CT 06409

1.	GET ON I-91 S IN WINSOR FROM DAY HILL RD.	4.30 MI.
2.	MERGE ONTO I-91 S.	7.30 MI.
3.	KEEP LEFT TO STAY ON I-91 S.	10.5 MI.
4.	USE THE LEFT 2 LANES TO TAKE EXIT 22S TO MERGE ONTO CT-9 S TOWARD MIDDLETOWN.	13.9 MI.
5.	TAKE EXIT 3 FOR CT-154 TOWARD CT-153/ESSEX/WESTBROOK.	0.20 MI.
6.	TURN RIGHT ONTO CT-154 N/MIDDLESEX AVE.	0.06 MI.
7.	TURN LEFT ONTO RAILROAD AVE. DESTINATION WILL BE ON THE RIGHT	0.01 MI.

SITE COORDINATES: LATITUDE: 41° 21' 04.7" N
LONGITUDE: 72° 24' 22.2" W
GROUND ELEVATION: ±36' 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. REMOVE EXISTING SPRINT EQUIPMENT
2. INSTALL (1) APXVAALL24_43-U-NA20 ANTENNA PER SECTOR. TOTAL (3)
3. INSTALL (1) AIR6449 B41 ANTENNA PER SECTOR. TOTAL (3)
4. INSTALL (1) RADIO 4480 B71+B85 PER SECTOR, TOTAL (3)
5. INSTALL (1) RADIO 4460 B25+B66 PER SECTOR. TOTAL (3)
6. INSTALL 150A CIRCUIT BREAKER
7. REMOVE ALL EXISTING HYBRID, INSTALL (3) 6/24 4AWG HYBRIDS
8. INSTALL (1) T-MOBILE POWER ENCLOSURE 6160
9. INSTALL (1) T-MOBILE BATTERY CABINET B160
10. REMOVE EXISTING 100A METER AND CIRCUIT BREAKER.
11. INSTALL (1) 200A METER AND CIRCUIT BREAKER.
12. INSTALL 12' PIPE MAST. TYP. (1) PER SECTOR. TOTAL (3)
13. EQUIPMENT SHELTER TO BE PAINTED TO MATCH (BENJAMIN MOORE: HC-51 AUDUBON RUSSET)

PROJECT INFORMATION

SPRINT ID:	CT03XC162
SITE ID:	CTHA838A
SITE ADDRESS:	6 MAIN ST CENTERBROOK, CT 06409 (PROVIDED BY RFDS)
APPLICANT:	T-MOBILE NORTHEAST, LLC 35 GRIFFIN ROAD SOUTH BLOOMFIELD, CT 06002
CONTACT PERSON:	KYLE RICHERS TRANSCEND WIRELESS, LLC (908) 447-4716
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°-21'-04.7" N LONGITUDE: 72°-24'-22.2" W GROUND ELEVATION: 36'± AMSL SITE COORDINATES AND GROUND ELEVATION REFERENCED FROM GOOGLE EARTH.

SHEET INDEX

SHT. NO.	DESCRIPTION	REV.
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C-2	COMPOUND PLAN, EQUIPMENT PLAN, AND ELEVATION	2
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REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
2	08/03/21	RTS	TJR	CONSTRUCTION DRAWINGS - REVISED PER NEW RFDS
1	06/15/21	JLW	TJR	CONSTRUCTION DRAWINGS - REVISED PER CLIENT COMMENTS
0	06/03/21	JLW	TJR	CONSTRUCTION DRAWINGS - ISSUED FOR CONSTRUCTION

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www.CentekEng.com

T-MOBILE NORTHEAST LLC

SPRINT ID: CT03XC162
SITE ID: CTHA838A
6 MAIN ST
CENTERBROOK, CT 06409

DATE: 04/14/21
SCALE: AS NOTED
JOB NO. 21005.25

TITLE SHEET

T-1

Sheet No. 1 of 9

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): 135 MPH (Vult) (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.

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 CONSTRUCTION, 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 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 IT'S 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 MFR.'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 SITE OWNER'S 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 CONDUIT 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.
18. 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.
19. 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.
20. 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.

STRUCTURAL STEEL

1. ALL STRUCTURAL STEEL IS DESIGNED BY ALLOWABLE STRESS DESIGN (ASD)

   A. STRUCTURAL STEEL (W SHAPES)---ASTM A992 (FY = 50 KSI)
   B. STRUCTURAL STEEL (OTHER SHAPES)---ASTM A36 (FY = 36 KSI)
   C. STRUCTURAL HSS (RECTANGULAR SHAPES)---ASTM A500 GRADE B, (FY = 46 KSI)
   D. STRUCTURAL HSS (ROUND SHAPES)---ASTM A500 GRADE B, (FY = 42 KSI)
   E. PIPE---ASTM A53 (FY = 35 KSI)
   F. CONNECTION BOLTS---ASTM A325-N
   G. U-BOLTS---ASTM A36
   H. ANCHOR RODS----ASTM F 1554
   I. WELDING ELECTRODE---ASTM E 70XX

2. CONTRACTOR TO REVIEW ALL SHOP DRAWINGS AND SUBMIT COPY TO ENGINEER FOR APPROVAL. DRAWINGS MUST BEAR THE CHECKER'S INITIALS BEFORE SUBMITTING TO THE ENGINEER FOR REVIEW. SHOP DRAWINGS SHALL INCLUDE THE FOLLOWING: SECTION PROFILES, SIZES, CONNECTION ATTACHMENTS, REINFORCING, ANCHORAGE, SIZE AND TYPE OF FASTENERS AND ACCESSORIES. INCLUDE ERECTION DRAWINGS, ELEVATIONS AND DETAILS.
3. STRUCTURAL STEEL SHALL BE DETAILED, FABRICATED AND ERECTED IN ACCORDANCE WITH THE LATEST PROVISIONS OF AISC MANUAL OF STEEL CONSTRUCTION.
4. PROVIDE ALL PLATES, CLIP ANGLES, CLOSURE PIECES, STRAP ANCHORS, MISCELLANEOUS PIECES AND HOLES REQUIRED TO COMPLETE THE STRUCTURE.
5. FIT AND SHOP ASSEMBLE FABRICATIONS IN THE LARGEST PRACTICAL SECTIONS FOR DELIVERY TO SITE.
6. INSTALL FABRICATIONS PLUMB AND LEVEL, ACCURATELY FITTED, AND FREE FROM DISTORTIONS OR DEFECTS.
7. AFTER ERECTION OF STRUCTURES, TOUCHUP ALL WELDS, ABRASIONS AND NON-GALVANIZED SURFACES WITH A 95% ORGANIC ZINC RICH PAINT IN ACCORDANCE WITH ASTM 780.
8. ALL STEEL MATERIAL (EXPOSED TO WEATHER) SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123 "ZINC (HOT DIPPED GALVANIZED) COATINGS" ON IRONS AND STEEL PRODUCTS.
9. ALL BOLTS, ANCHORS AND MISCELLANEOUS HARDWARE SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A153 "ZINC COATING (HOT-DIP) ON IRON AND STEEL HARDWARE".
10. THE ENGINEER SHALL BE NOTIFIED OF ANY INCORRECTLY FABRICATED, DAMAGED OR OTHERWISE MISFITTING OR NON CONFORMING MATERIALS OR CONDITIONS TO REMEDIAL OR CORRECTIVE ACTION. ANY SUCH ACTION SHALL REQUIRE ENGINEER REVIEW.
11. CONNECTION ANGLES SHALL HAVE A MINIMUM THICKNESS OF 1/4 INCHES.
12. STRUCTURAL CONNECTION BOLTS SHALL CONFORM TO ASTM A325. ALL BOLTS SHALL BE 3/4" DIAMETER MINIMUM AND SHALL HAVE A MINIMUM OF TWO BOLTS, UNLESS OTHERWISE ON THE DRAWINGS.
13. LOCK WASHER ARE NOT PERMITTED FOR A325 STEEL ASSEMBLIES.
14. SHOP CONNECTIONS SHALL BE WELDED OR HIGH STRENGTH BOLTED.
15. MILL BEARING ENDS OF COLUMNS, STIFFENERS, AND OTHER BEARING SURFACES TO TRANSFER LOAD OVER ENTIRE CROSS SECTION.
16. FABRICATE BEAMS WITH MILL CAMBER UP.
17. LEVEL AND PLUMB INDIVIDUAL MEMBERS OF THE STRUCTURE TO AN ACCURACY OF 1:500, BUT NOT TO EXCEED 1/4" IN THE FULL HEIGHT OF THE COLUMN.
18. COMMENCEMENT OF STRUCTURAL STEEL WORK WITHOUT NOTIFYING THE ENGINEER OF ANY DISCREPANCIES WILL BE CONSIDERED ACCEPTANCE OF PRECEDING WORK.
19. INSPECTION AND TESTING OF ALL WELDING AND HIGH STRENGTH BOLTING SHALL BE PERFORMED BY AN INDEPENDENT TESTING LABORATORY.
20. FOUR COPIES OF ALL INSPECTION TEST REPORTS SHALL BE SUBMITTED TO THE ENGINEER WITHIN TEN (10) WORKING DAYS OF THE DATE OF INSPECTION.

WATER TANK NOTES

GENERAL:

1. THE CONTRACTOR SHALL OBTAIN, IN WRITING, FROM THE OWNER REQUIREMENTS FOR TANK INSPECTIONS PRIOR TO COMMENCING WITH THE WORK ON THE TANK.
2. CONTRACTOR SHALL PROVIDE ADEQUATE PROTECTION TO THE EXISTING WATER TANK AND STRUCTURE DURING INSTALLATION. SHOULD ANY DAMAGE OCCUR, THE CONTRACTOR SHALL IMMEDIATELY INFORM THE ENGINEER AND WATER TANK OWNER, AND IS LIABLE TO RECTIFY DAMAGE AT NO EXTRA COST TO THE CLIENT OR OWNER. THE EMERGENCY CONTACT INFORMATION IS AS FOLLOWS:
   CONNECTICUT WATER COMPANY: AL BRAIG (860) 664-6058.
   CENTEK ENGINEERING, INC.: CARLO F. CENTORE 203-488-0580 EXTN:122

SURFACE PREPARATION:

1. PREPARE SURFACE TO BE WELDED BY SPOT REMOVING PAINT TO BARE METAL USING POWER WIRE BRUSHING IN ACCORDANCE WITH SSPC-SP-11 STANDARDS, (STEEL STRUCTURES PAINTING COUNCIL)
2. CLEANING PROCEDURES SHALL BE VERIFIED AS MEETING THE MINIMUM REQUIREMENTS PER THE STUD MANUFACTURER'S WRITTEN INSTRUCTIONS. CONTRACTOR SHALL SUBMIT MANUFACTURER'S SPECIFICATION TO THE ENGINEER PRIOR TO COMMENCING WITH THE WORK.
3. WHERE LEAD BASED PAINT HAS BEEN DETERMINED TO BE PRESENT AN APPROVED VACUUM ATTACHMENT TO THE GRINDER SHALL BE USED.
4. FOLLOW POWER TOOL CLEANING WITH A SOLVENT CLEANING TO REMOVE ANY OILS, CONTAMINANTS, RUST OR DIRT PRIOR TO STUD WELDING, (SSPC-SP1 BY STEEL STRUCTURES PAINTING COUNCIL)

REPAINTING AND FINISHING:

1. ALL EXISTING PAINT ON WATER TANK STRUCTURES SHALL BE TESTED BY AN OUTSIDE CONSULTANT IF MAKE-UP OF PAINT IS UNKNOWN. TESTING SHALL BE PERFORMED PRIOR TO THE START OF ANY CONSTRUCTION AND IS NOT THE RESPONSIBILITY OF THE CONTRACTOR.
2. A 3" RADIAL AREA SHALL BE PREPARED AND PAINTED AFTER INSTALLATION OF ALL STUD WELDS. WHERE A CONTINUOUS RUN OF WELDS IS PROPOSED, A CONTINUOUS STRIP 3" PAST THE OUTERMOST PROPOSED STUD PLACEMENT SHALL BE PREPARED AND PAINTED TO CREATE A MORE AESTHETICALLY FINISHED INSTALLATION.
3. ANY REMEDIAL PAINTING CAUSED BY THE INSTALLATION SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR. PAINT SHALL MATCH BOTH IN COLOR AND SPECIFICATION TO THE WATER TANK'S EXISTING CONDITION.
4. SURFACE TO BE REPAINTED SHALL BE FIRST POWER TOOL CLEANED FOLLOWED BY SOLVENT CLEANED TO REMOVE ANY OILS, CONTAMINANTS, RUST OR DIRT PRIOR TO REPAINTING. (SSPC-SP1 BY STEEL STRUCTURES PAINTING COUNCIL).
5. SURFACE CLEANING SHALL BE FOLLOWED WITH A PRIMER COAT ON THE SAME DAY.
6. CONTRACTOR TO VERIFY EXISTING PAINT ON THE WATER TANK BY CONTACTING DAVID POPE OF TNEMEC (PHONE# 203-247-8218).

STUD WELDING AND BOLTING TO EXISTING WATER TANK:

1. ALL ATTACHMENTS TO WATER TANK SHALL BE DONE BY STUD WELD. STUD WELDS SHALL BE BY THE CAPACITOR DISCHARGE-CONTACT METHOD. STUDS SHALL BE NELSON TFTC (LOW CARBON MILD STEEL) 1/4" DIAMETER MAXIMUM. WELD SHALL CONFORM TO AWS D1.I, LATEST EDITION.
2. USE LOW CARBON MILD STEELL HEX NUTS AND LOCK WASHERS. MAXIMUM HEX NUT TORQUE TO 6 FT-LB (72 IN-LB) CONTACT TRW NELSON STUD WELDING (1-888-635-9395 OR 1-215-363-0180) FOR EQUIPMENT AND WELDING TEST/CERTIFICATION.
3. UNAUTHORIZED WELDING TO THE WATERTANK IS PROHIBITTED.
4. CONTRACTOR SHALL RECEIVE IN WRITING THE OWNERS REQUIREMENTS FOR TANK INSPECTIONS PRIOR TO COMMENCING WITH THE WORK ON THE TANK. UPON THE COMPLETION OF CONSTRUCTION, THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING A WRITTEN RELEASE FROM THE OWNER STATING THAT ALL WORK DONE WAS PERFORMED IN ACCORDANCE WITH THE CONSTRUCTION DOCUMENTS AND THE OWNERS WRITTEN REQUIREMENTS AND RELEASES ALL LIABILITY TO THE CONTRACTOR, THE ENGINEER, AND THE STUD MANUFACTURER.
5. CONTRACTOR SHALL COMPLY WITH AWS D1.1 AND AWS C5.4 FOR PROCEDURES, APPEARANCE AND QUALITY OF WELDS, AND FOR METHODS USED IN CORRECTING WELDING. ALL WELDERS AND WELDING PROCESSES SHALL BE QUALIFIED IN ACCORDANCE WITH AWS "STANDARD QUALIFICATION PROCEDURES." CONTRACTOR SHALL ADHERE TO AWS RECOMMENDED "SAFE PRACTICES FOR WELDING."
6. WELDING PARAMETERS, MACHINE POWER AND DWELL TIME SHALL BE QUALIFIED FOR THE WELDING POSITION, MATERIAL THICKNESS AND STUD SIZE TO BE USED. IF CHANGES IN THE SET-UP OCCUR AS DEFINED IN AWS D1.1, THE PROCEDURE MUST BE REQUALIFIED.
7. ALL STUD WELDING TO BE TO THE EXISTING TANK SHALL BE PERFORMED WITH A CAPACITOR DISCHARGE STUD WELDER AS MANUFACTURED BY TRW , INC. OR APPROVED EQUAL. ALL WELDS TO BE PERFORMED BY A CERTIFIED WELDER.
8. ALL PAINTED SURFACES AFFECTED BY WELDING OPERATIONS SHALL BE REPAINTED TO MATCH ADJACENT EXISTING SURFACES. PAINTING SHALL INCLUDE COATING OF THE STUDS.

STUD QUALIFICATION TESTING AND SAMPLING:

1. THE QUALIFICATION OF STUD APPLICATION AND PRE-PRODUCTION TESTING SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF CHAPTER 7 "STUD WELDING" OF AWS D1.1. INITIAL QUALIFICATION TESTING SHALL BE PERFORMED UNDER INSPECTION BY THE ENGINEER.
2. STUD APPLICATION SHALL BE QUALIFIED BY STUD WELDING TEN (10) SPECIMENS CONSECUTIVELY TO ASTM A-36 STEEL BASE MATERIALS USING RECOMMENDED PROCEDURES AND SETTINGS FOR EACH DIAMETER, POSITION, AND SURFACE GEOMETRY. THE TEN SPECIMENS SHALL BE TORQUE OR BEND TESTED TO FAILURE. STUD APPLICATION SHALL BE CONSIDERED QUALIFIED IF ALL TEST SPECIMENS ARE TESTED TO DESTRUCTION WITHOUT FAILURE IN THE WELD.

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	06/03/21	JLW	TJR	CONSTRUCTION DRAWINGS - ISSUED FOR CONSTRUCTION
1	06/15/21	JLW	TJR	CONSTRUCTION DRAWINGS - REVISED PER CLIENT COMMENTS
2	08/03/21	RTS	TJR	CONSTRUCTION DRAWINGS - REVISED PER NEW RFDS

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T-MOBILE NORTHEAST LLC

SPRINT ID: CT03XC162
SITE ID: CTHA838A
6 MAIN ST
CENTERBROOK, CT 06409

DATE: 04/14/21
SCALE: AS NOTED
JOB NO. 21005.25

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	RFS–APXVAALL24_43–U–NA20	95.9 x 24 x 8.5	118'	300°	(P) RADIO 4480 B71+B85 (1), (P) RADIO 4460 B25+B66 (1)		(1) 6/24 4AWG HYBRID CABLE (±170' CONTRACTOR TO VERIFY)
A2	PROPOSED	ERICSSON–AIR6449 B41	33.1 x 20.6 x 8.6	118'	300°			
B1	PROPOSED	RFS–APXVAALL24_43–U–NA20	95.9 x 24 x 8.5	118'	120°	(P) RADIO 4480 B71+B85 (1), (P) RADIO 4460 B25+B66 (1)		(1) 6/24 4AWG HYBRID CABLE (±200' CONTRACTOR TO VERIFY)
B2	PROPOSED	ERICSSON–AIR6449 B41	33.1 x 20.6 x 8.6	118'	120°			
C1	PROPOSED	RFS–APXVAALL24_43–U–NA20	95.9 x 24 x 8.5	118'	210°	(P) RADIO 4480 B71+B85 (1), (P) RADIO 4460 B25+B66 (1)		(1) 6/24 4AWG HYBRID CABLE (±200' CONTRACTOR TO VERIFY)
C2	PROPOSED	ERICSSON–AIR6449 B41	33.1 x 20.6 x 8.6	118'	210°			

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

TRUE NORTH

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
2	08/03/21	RTS	TJR	CONSTRUCTION DRAWINGS – REVISED PER NEW RFDS
1	06/15/21	JLW	TJR	CONSTRUCTION DRAWINGS – REVISED PER CLIENT COMMENTS
0	06/03/21	JLW	TJR	CONSTRUCTION DRAWINGS – ISSUED FOR CONSTRUCTION

PROFESSIONAL ENGINEER SEAL

STATE OF CONNECTICUT — LICENSED PROFESSIONAL ENGINEER — TIMOTHY J. ROBERTS

Sprint Nextel T-Mobile Transcend Wireless

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Centered on Solutions℠
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(203) 488-8587 Fax
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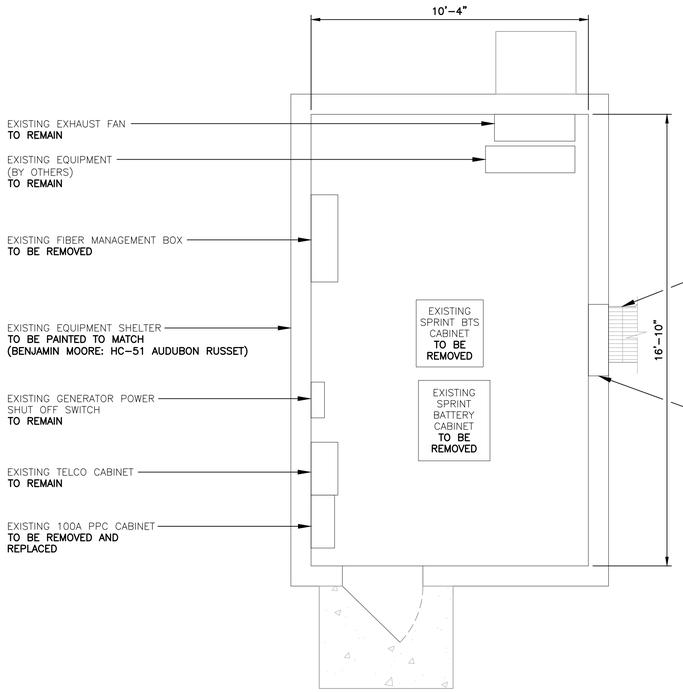
SITE ID: CTHA838A
6 MAIN ST
CENTERBROOK, CT 06409

DATE: 04/14/21
SCALE: AS NOTED
JOB NO. 21005.25

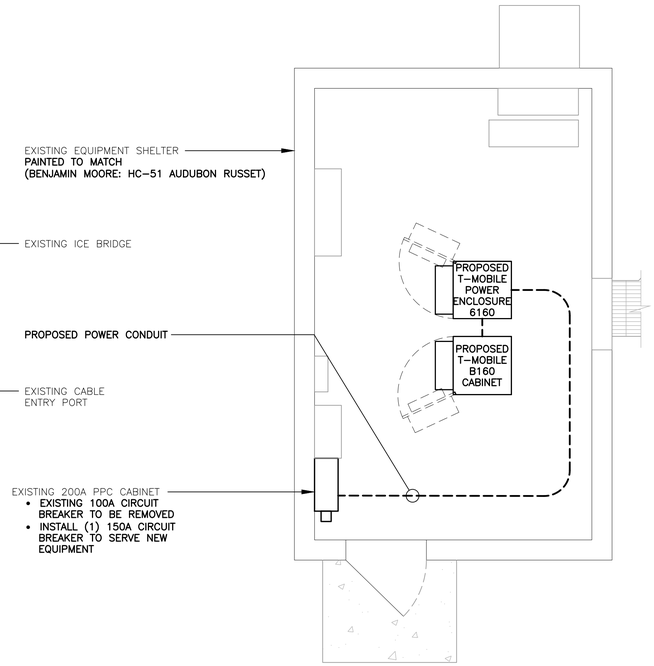
SITE LOCATION PLAN

C-1

Sheet No. 3 of 9



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



2 C-2 **PROPOSED EQUIPMENT PLAN**
SCALE: 3/8" = 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 DEFICIENT AND WARRANTING MODIFICATION PRIOR TO INSTALLATION OF THE PROPOSED EQUIPMENT. FOR REQUIRED STRUCTURAL MODIFICATIONS, SEE SHEET(S) S-1 FOR ADDITIONAL DETAILS.

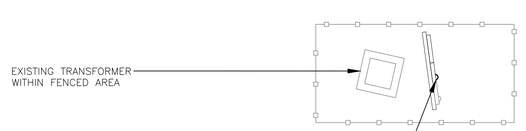
REFER TO THE ANTENNA MOUNT ANALYSIS REPORT PREPARED BY CENTEK ENGINEERING (PROJECT # 21005.25) DATED 08/13/21 FOR ADDITIONAL INFORMATION AND REQUIREMENTS.

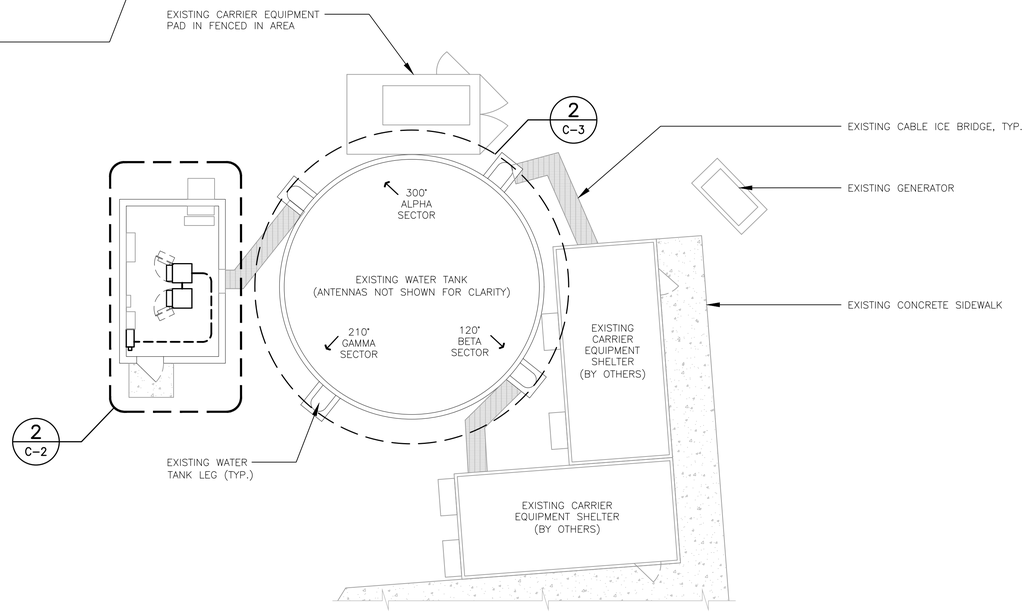
WATERTANK

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

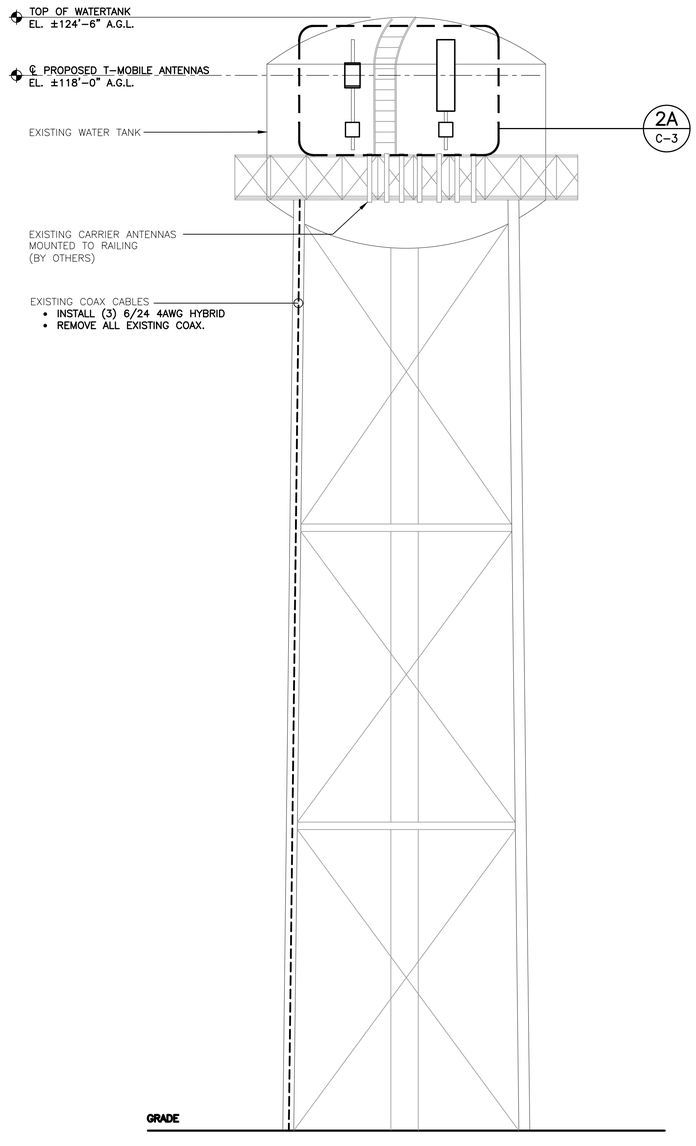
REFER TO THE STRUCTURAL ANALYSIS REPORT PREPARED BY CENTEK ENGINEERING (PROJECT # 21005.25) DATED 08/16/21 FOR ADDITIONAL INFORMATION AND REQUIREMENTS.

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.





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



4 C-2 **WATERTANK ELEVATION - PROPOSED**
SCALE: 1/8" = 1'

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
2	08/03/21	RTS	TJR	CONSTRUCTION DRAWINGS - REVISED PER NEW RFDS
1	06/15/21	JLW	TJR	CONSTRUCTION DRAWINGS - REVISED PER CLIENT COMMENTS
0	06/03/21	JLW	TJR	CONSTRUCTION DRAWINGS - ISSUED FOR CONSTRUCTION

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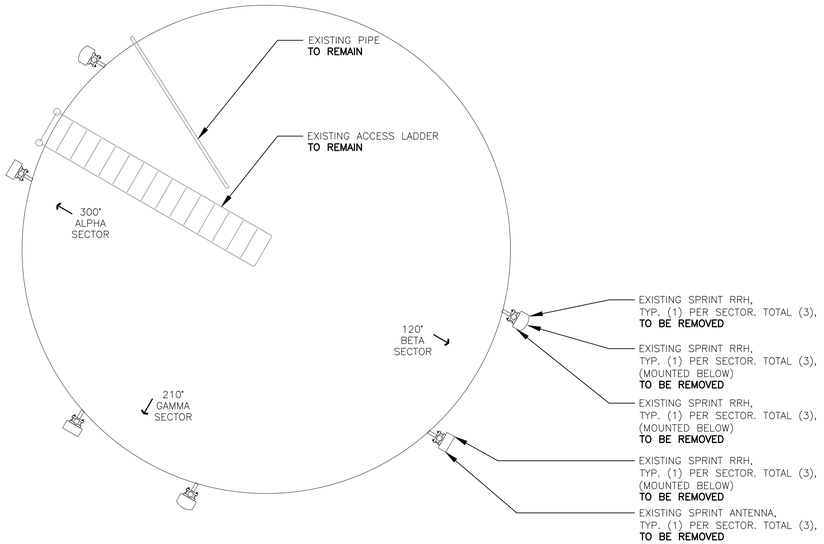
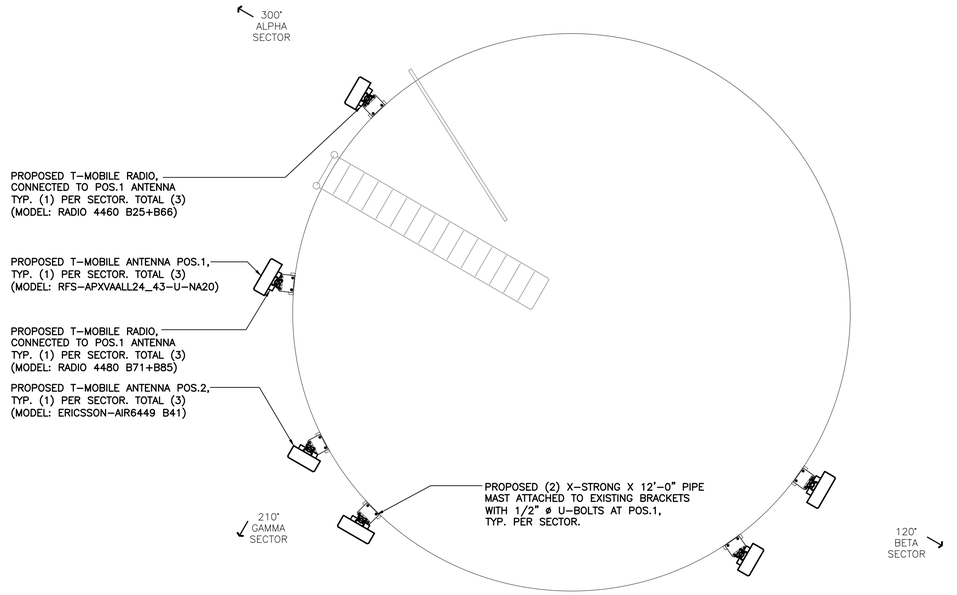
COMPOUND PLAN, EQUIPMENT PLAN, AND ELEVATION

C-2

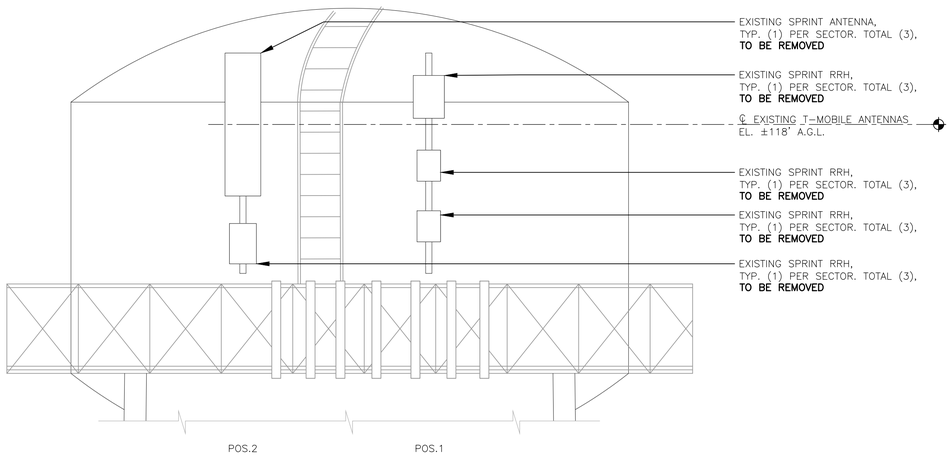
Sheet No. 4 of 9



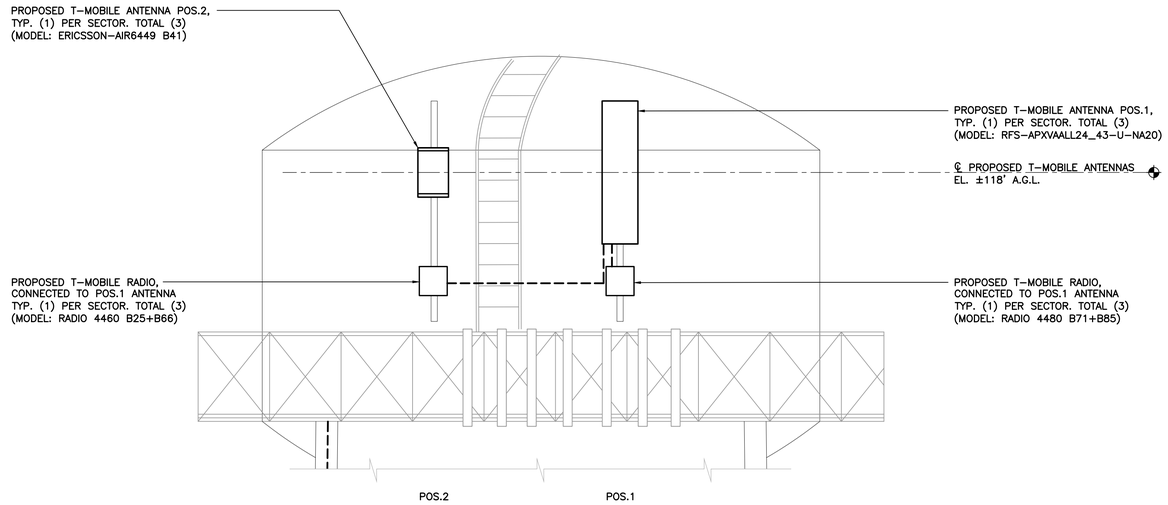
1 C-3 **ANTENNA PLAN - EXISTING** TRUE NORTH
SCALE: 1/4" = 1'



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



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



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

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
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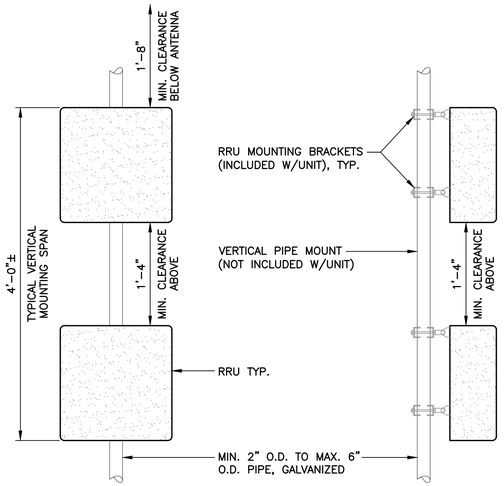
JOB NO.	21005.25

ANTENNA PLANS AND ELEVATIONS

C-3

Sheet No. 5 of 9

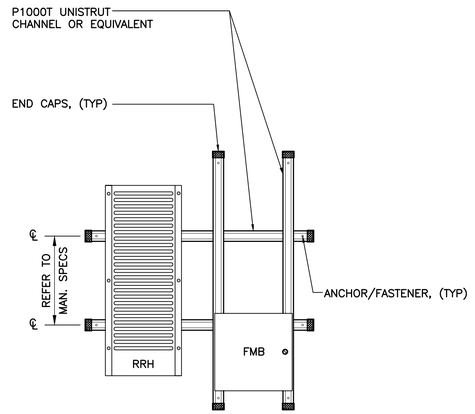


FRONT ELEVATION SIDE ELEVATION

NOTES: (PIPE MOUNTING)

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.
2. NO PAINTING OF THE RRU OR SOLAR SHIELD IS ALLOWED.

1 C–4 **TYPICAL RRU MOUNTING DETAIL**
SCALE: NOT TO SCALE



FRONT ELEVATION

NOTES: (UNISTRUT MOUNTING)

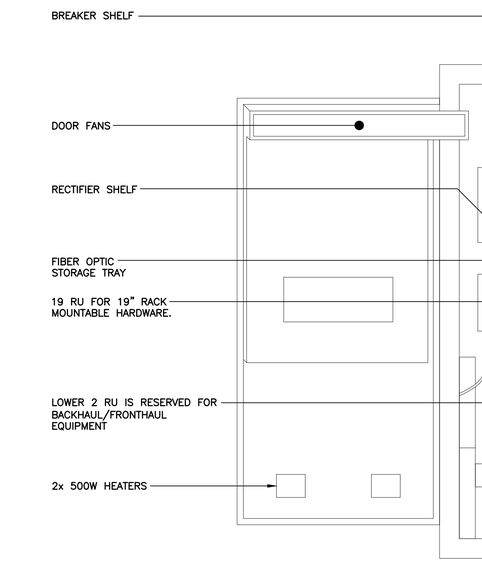
1. INSTALL A MINIMUM OF (2) ANCHORS PER UNISTRUT (± 16"o/c MIN).
2. MOUNT RRU TO UNISTRUT WITH 3/8"ø UNISTRUT BOLTING HARDWARE AND SPRING NUTS. TYPICAL FOUR PER BRACKET.
3. NO PAINTING OF THE RRU OR SOLAR SHIELD IS ALLOWED.

AIR6449 B41

APX2VALL24_43-U-NA20

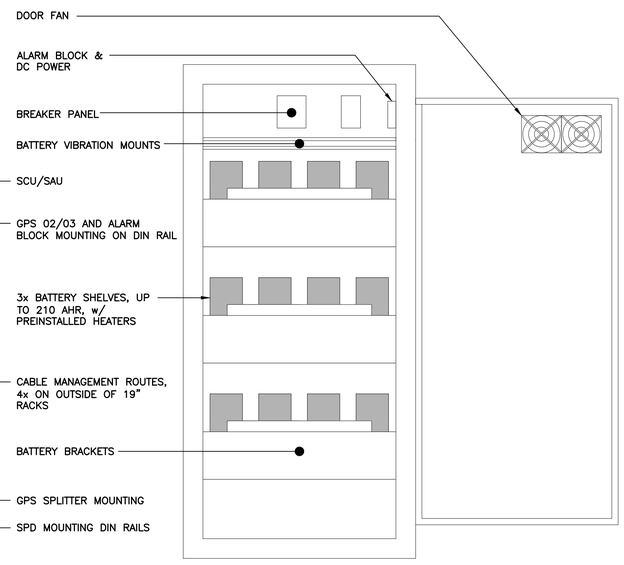
ALPHA/BETA/GAMMA ANTENNA		
EQUIPMENT	DIMENSIONS	WEIGHT
MAKE: ERICSSON MODEL: AIR6449 B41	33.1"L x 20.6"W x 8.6"D	±104 LBS.
MAKE: RFS MODEL: APXVAALL24_43–U–NA20	95.9"L x 24.0"W x 8.5"D	±150 LBS.
NOTES: 1. CONTRACTOR TO COORDINATE FINAL EQUIPMENT MODEL SELECTION WITH T–MOBILE CONSTRUCTION MANAGER PRIOR TO ORDERING.		

2 C–4 **PROPOSED ANTENNA DETAIL**
SCALE: NOT TO SCALE



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

3 C–4 **ENCLOSURE 6160 CABINET DETAIL**
SCALE: NOT TO SCALE



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

4 C–4 **BATTERY B160 CABINET DETAIL**
SCALE: NOT TO SCALE

RADIO 4460 B25+B66

RADIO 4480 B71+B85

RRU (REMOTE RADIO UNIT)			
EQUIPMENT	DIMENSIONS	WEIGHT	CLEARANCES
MAKE: ERICSSON MODEL: RADIO 4460 B25+B66	19.6"L x 15.7"W x 12.1"D	±109 LBS.	BEHIND ANT.: 8" MIN. BELOW ANT.: 20" MIN. BELOW RRU: 16" MIN.
MAKE: ERICSSON MODEL: RADIO 4480 B71+B85	21.8"L x 15.7"W x 7.5"D	±84 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.			

5 C–4 **PROPOSED RRU DETAIL**
SCALE: NOT TO SCALE

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
2	08/03/21	RTS	TJR	CONSTRUCTION DRAWINGS – REVISED PER NEW RFDS
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0	06/03/21	JLW	TJR	CONSTRUCTION DRAWINGS – ISSUED FOR CONSTRUCTION

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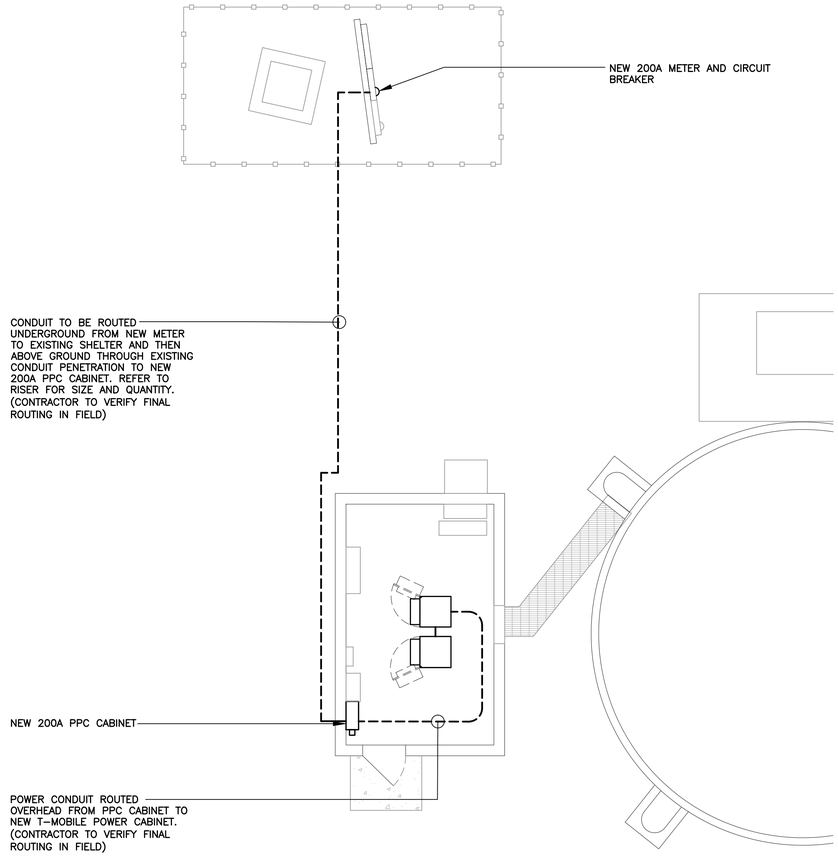
TYPICAL EQUIPMENT DETAILS

C-4

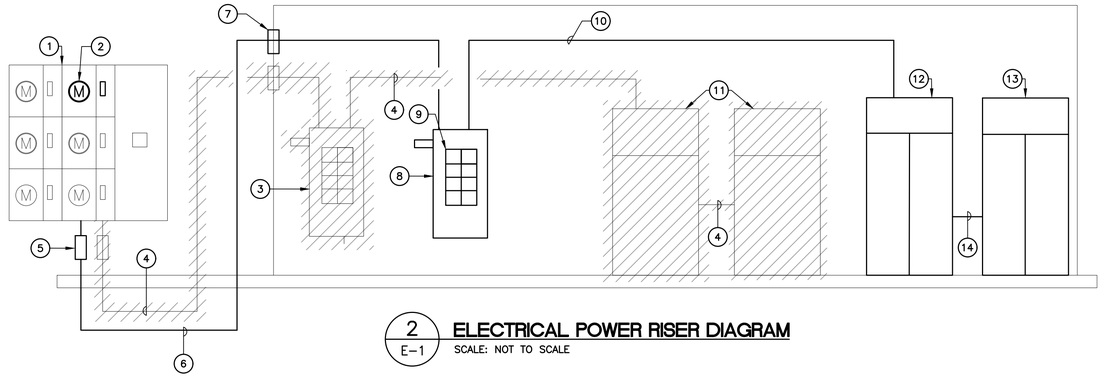
Sheet No. 6 of 9



1 / E-1 **ELECTRICAL CONDUIT ROUTING PLAN**
SCALE: 3/8" = 1'

RISER DIAGRAM NOTES

1. EXISTING MULTI METER CENTER TO REMAIN.
2. EXISTING 100A METER AND CIRCUIT BREAKER TO BE REMOVED AND REPLACED WITH NEW 200A METER AND CIRCUIT BREAKER.
3. EXISTING 100A PPC CABINET TO BE REMOVED AND REPLACED. RELOCATE ALL EXISTING CIRCUIT BREAKERS TO NEW PPC CABINET.
4. EXISTING CONDUITS AND CONDUCTORS TO BE REMOVED
5. EXPANSION COUPLING TYP.
6. (3) 3/0 AWG, (1) #6 AWG GROUND, 2-1/2" CONDUIT.
7. EXTERIOR WALL PENETRATION. COORDINATE WITH CIVIL AND STRUCTURAL DRAWINGS. CONTRACTOR IS RESPONSIBLE FOR ENSURING PENETRATION IS THOROUGHLY WATERPROOF.
8. NEW 200A PPC CABINET.
9. NEW 150/2P CIRCUIT BREAKER TO SERVE NEW EQUIPMENT CABINET.
10. (3) 1/0 AWG, (1) #6 AWG GROUND, 1-1/2" CONDUIT.
11. EXISTING CABINETS TO BE REMOVED
12. NEW T-MOBILE EQUIPMENT CABINET
13. NEW T-MOBILE BATTERY CABINET
14. DC CONDUIT AND CONDUCTORS FOR BATTERY CABINET CONNECTION PER MANUFACTURERS SPECIFICATIONS.



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

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
2	08/03/21	RTS	TJR	CONSTRUCTION DRAWINGS - REVISED PER NEW RFDS
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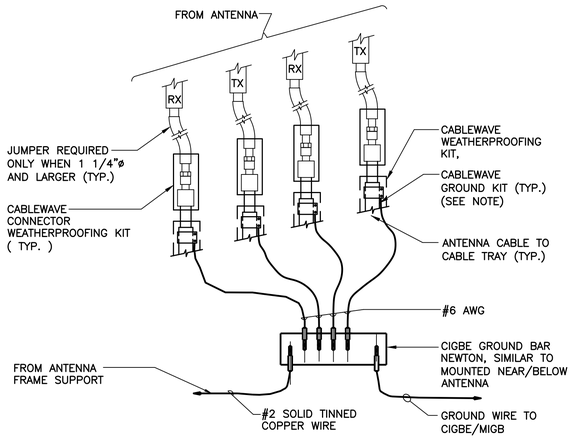
ELECTRICAL RISER DIAGRAM AND CONDUIT ROUTING

E-1

Sheet No. 7 of 9

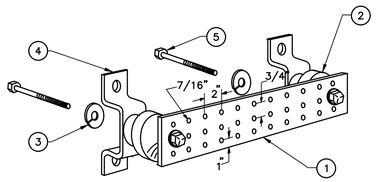


NOTES:

1. DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO CIGBE

1 E-2 CONNECTION OF GROUND WIRES TO GROUND BAR

SCALE: NOT TO SCALE

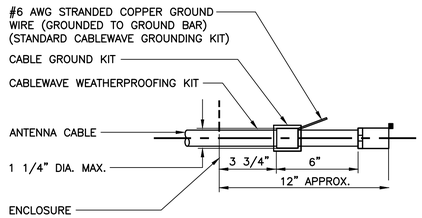


NOTES

1. TINNED COPPER GROUND BAR, 1/4" x 4" x 20", NEWTON INSTRUMENT CO. HOLE CENTERS TO MATCH NEMA DOUBLE LUG CONFIGURATION.
2. INSULATORS, NEWTON INSTRUMENT CAT. NO. 3061-4.
3. 5/8" LOCK WASHERS, NEWTON INSTRUMENT CO. CAT. NO. 3015-8.
4. WALL MOUNTING BRACKET, NEWTON INSTRUMENT CO. CAT NO. A-6056.
5. 5/8-11 x 1" STAINLESS STEEL TRUSS SPANNER MACHINE SCREWS.

2 E-2 GROUND BAR DETAIL

SCALE: NOT TO SCALE

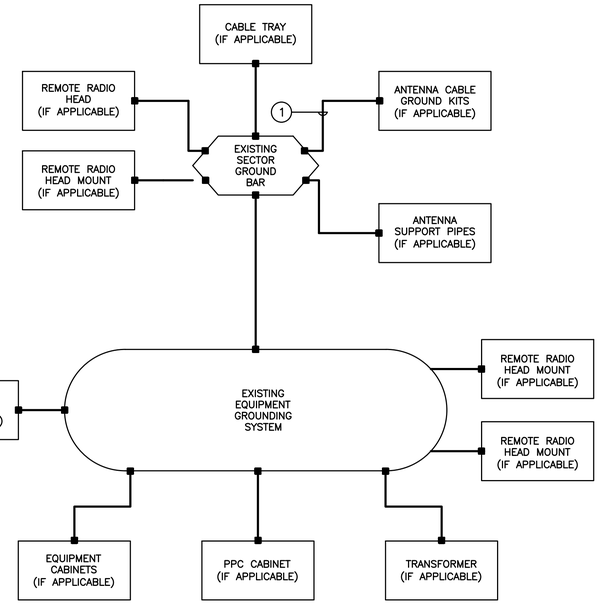


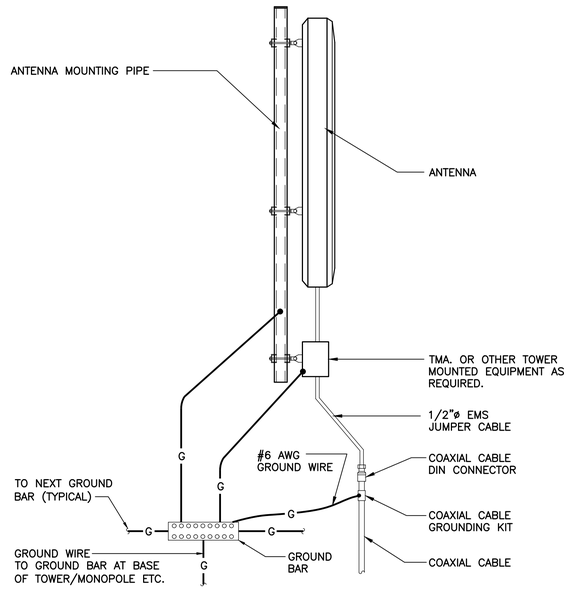
NOTES:

1. DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO GROUND BAR.

3 E-2 ANTENNA CABLE GROUNDING DETAIL

SCALE: NOT TO SCALE

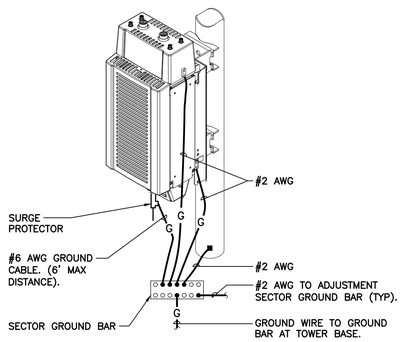




4 E-2 TYPICAL ANTENNA GROUNDING DETAIL

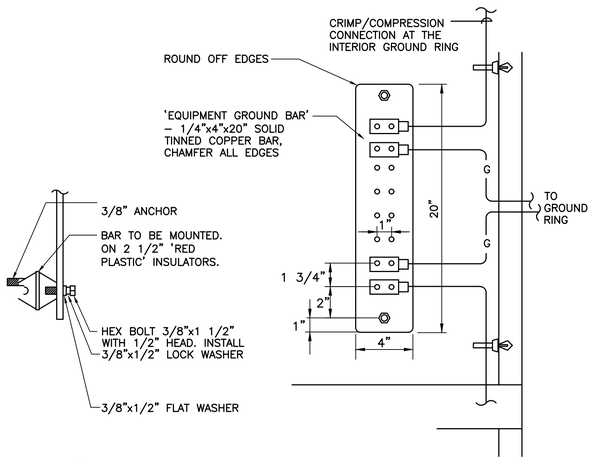
SCALE: NOT TO SCALE

EACH RRH CABINET SHALL BE GROUNDED IN THE FOLLOWING MANNER:
1. AT TOP OF THE CABINET
2. AT RIGHT SIDE OF THE CABINET.



5 E-2 RRH POLE MOUNT GROUNDING

SCALE: NOT TO SCALE



6 E-2 EQUIPMENT GROUND BAR DETAIL

SCALE: NOT TO SCALE

GROUNDING SCHEMATIC NOTES

(1) #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. BOND CABLE TRAY SECTIONS TOGETHER WITH #6 AWG STRANDED GREEN INSULATED JUMPERS.
4. ALL SECTOR GROUND BARS SHALL BE BONDED TOGETHER WITH #2 AWG SOLID TINNED BCW.
5. BOND ALL EQUIPMENT CABINETS AND BATTERY CABINETS TO GROUND PER MANUFACTURER'S SPECIFICATIONS.
6. REFER TO ALL ELECTRICAL AND GROUNDING DETAILS.
7. COORDINATE ALL ROOF MOUNTED EQUIPMENT WITH OWNER.
8. ALL ROOF MOUNTED AMPLIFIERS AND ASSOCIATED EQUIPMENT SHALL BE BONDED TO THE SECTOR GROUND BAR PER MANUFACTURER'S SPECIFICATIONS.
9. ALL GROUNDING SHALL BE IN ACCORDANCE WITH NEC AND OWNER'S REQUIREMENTS.

7 E-2 ELECTRICAL SCHEMATIC DIAGRAM

SCALE: NOT TO SCALE

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
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TYPICAL ELECTRICAL DETAILS

E-2

Sheet No. 8 of 9

ELECTRICAL SPECIFICATIONS

SECTION 16010

1.02. GENERAL REQUIREMENTS

A. THE ENTIRE ELECTRICAL INSTALLATION SHALL BE MADE IN STRICT ACCORDANCE WITH ALL LOCAL, STATE AND NATIONAL CODES AND REGULATIONS WHICH MAY APPLY AND NOTHING IN THE DRAWINGS OR SPECIFICATIONS SHALL BE INTERPRETED AS AN INFRINGEMENT OF SUCH CODES OR REGULATIONS.

B. THE ELECTRICAL CONTRACTOR IS TO BE RESPONSIBLE FOR THE COMPLETE INSTALLATION AND COORDINATION OF THE ENTIRE ELECTRICAL SERVICE. ALL ACTIVITIES TO BE COORDINATED THROUGH OWNERS REPRESENTATIVE, DESIGN ENGINEER AND OTHER AUTHORITIES HAVING JURISDICTION OF TRADES.

C. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL PERMITS AND PAY ALL FEES THAT MAY BE REQUIRED FOR THE ELECTRICAL WORK AND FOR THE SCHEDULING OF ALL INSPECTIONS THAT MAY BE REQUIRED BY THE LOCAL AUTHORITY.

D. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATION WITH THE BUILDING OWNER FOR NEW AND/OR DEMOLITION WORK INVOLVED.

E. NO MATERIAL OTHER THAN THAT CONTAINED IN THE "LATEST LIST OF ELECTRICAL FITTINGS" APPROVED BY THE UNDERWRITERS' LABORATORIES, SHALL BE USED IN ANY PART OF THE WORK. ALL MATERIAL FOR WHICH LABEL SERVICE HAS BEEN ESTABLISHED SHALL BEAR THE U.L. LABEL.

F. THE CONTRACTOR SHALL GUARANTEE ALL NEW WORK FOR A PERIOD OF ONE YEAR FROM THE ACCEPTANCE DATE BY THE OWNER. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING WARRANTIES FROM ALL EQUIPMENT MANUFACTURERS FOR SUBMISSION TO THE OWNER.

G. DRAWINGS INDICATE GENERAL ARRANGEMENT OF WORK INCLUDED IN CONTRACT. CONTRACTOR SHALL, WITHOUT EXTRA CHARGE, MAKE MODIFICATIONS TO THE LAYOUT OF THE WORK TO PREVENT CONFLICT WITH WORK OF OTHER TRADES AND FOR THE PROPER INSTALLATION OF WORK. CHECK ALL DRAWINGS AND VISIT JOB SITE TO VERIFY SPACE AND TYPE OF EXISTING CONDITIONS IN WHICH WORK WILL BE DONE, PRIOR TO SUBMITTAL OF BID.

H. THE ELECTRICAL CONTRACTOR SHALL SUPPLY THREE (3) COMPLETE SETS OF APPROVED DRAWINGS, ENGINEERING DATA SHEETS, MAINTENANCE AND OPERATING INSTRUCTION MANUALS FOR ALL SYSTEMS AND THEIR RESPECTIVE EQUIPMENT. THESE MANUALS SHALL BE INSERTED IN VINYL COVERED 3-RING BINDERS AND TURNED OVER TO OWNER'S REPRESENTATIVE ONE (1) WEEK PRIOR TO FINAL PUNCH LIST.

I. ALL WORK SHALL BE INSTALLED IN A NEAT AND WORKMAN LIKE MANNER AND WILL BE SUBJECT TO THE APPROVAL OF THE OWNER'S REPRESENTATIVE.

J. ALL EQUIPMENT AND MATERIALS TO BE INSTALLED SHALL BE NEW, UNLESS OTHERWISE NOTED.

K. BEFORE FINAL PAYMENT, THE CONTRACTOR SHALL PROVIDE A COMPLETE SET OF PRINTS (AS-BUILTS), LEGIBLY MARKED IN RED PENCIL TO SHOW ALL CHANGES FROM THE ORIGINAL PLANS.

L. PROVIDE TEMPORARY POWER AND LIGHTING IN WORK AREAS AS REQUIRED.

M. SHOP DRAWINGS:

1. CONTRACTOR SHALL SUBMIT SIX (6) COPIES OF SHOP DRAWINGS ON ALL EQUIPMENT AND MATERIALS PROPOSED FOR USE ON THIS PROJECT, GIVING ALL DETAILS, WHICH INCLUDE DIMENSIONS, CAPACITIES, ETC.

2. CONTRACTOR SHALL SUBMIT SIX (6) COPIES OF ALL TEST REPORTS CALLED FOR IN THE SPECIFICATIONS AND DRAWINGS.

N. THE ENTIRE ELECTRICAL INSTALLATION SHALL BE IN ACCORDANCE WITH OWNER'S SPECIFICATIONS, AND REQUIREMENTS OF ALL LOCAL AUTHORITIES HAVING JURISDICTION. IT IS THE CONTRACTOR'S RESPONSIBILITY TO COORDINATE WITH APPROPRIATE INDIVIDUALS TO OBTAIN ALL SUCH SPECIFICATIONS AND REQUIREMENTS. NOTHING CONTAINED IN, OR OMITTED FROM, THESE DOCUMENTS SHALL RELIEVE CONTRACTOR FROM THIS OBLIGATION.

SECTION 16111

1.01. CONDUITS

A. MINIMUM CONDUIT SIZE FOR BRANCH CIRCUITS, LOW VOLTAGE CONTROL AND ALARM CIRCUITS SHALL BE 3/4". CONDUITS SHALL BE PROPERLY FASTENED AS REQUIRED BY THE N.E.C.

B. THE INTERIOR OF RACEWAYS/ENCLOSURES INSTALLED UNDERGROUND SHALL BE CONSIDERED TO BE WET LOCATION, INSULATED CONDUCTORS SHALL BE LISTED FOR USE IN WET LOCATIONS. PROVIDE WEATHERPROOF CONSTRUCTION IN WET LOCATIONS.

C. CONDUIT INSTALLED UNDERGROUND SHALL BE INSTALLED TO MEET MINIMUM COVER REQUIREMENTS OF TABLE 300.5.

D. PROVIDE RIGID GALVANIZED STEEL CONDUIT (RMC) FOR THE FIRST 10 FOOT SECTION WHEN LEAVING A BUILDING OR SECTIONS PASSING THROUGH FLOOR SLABS

E. ONLY LISTED PVC CONDUIT AND FITTINGS ARE PERMITTED FOR THE INSTALLATION OF ELECTRICAL CONDUCTORS, SUITABLE FOR UNDERGROUND APPLICATIONS.

CONDUIT SCHEDULE SECTION 16111

CONDUIT TYPE	NEC REFERENCE	APPLICATION	MIN. BURIAL DEPTH (PER NEC TABLE 300.5) [2][3]
EMT	ARTICLE 358	INTERIOR CIRCUITING, EQUIPMENT ROOMS, SHELTERS	N/A
RMC, RIGID GALV. STEEL	ARTICLE 344, 300.5, 300.50	ALL INTERIOR/ EXTERIOR CIRCUITING, ALL UNDERGROUND INSTALLATIONS.	6 INCHES
PVC, SCHEDULE 40	ARTICLE 352, 300.5, 300.50	INTERIOR/ EXTERIOR CIRCUITING AND GROUNDING SYSTEMS, UNDERGROUND INSTALLATIONS, WHERE NOT SUBJECT TO PHYSICAL DAMAGE. [1]	18 INCHES
PVC, SCHEDULE 80	ARTICLE 352, 300.5, 300.50	INTERIOR/ EXTERIOR CIRCUITING AND GROUNDING SYSTEMS, UNDERGROUND INSTALLATIONS, WHERE SUBJECT TO PHYSICAL DAMAGE. [1]	18 INCHES
LIQUID TIGHT FLEX. METAL	ARTICLE 350	SHORT LENGTHS (MAX. 3FT.) WIRING TO VIBRATING EQUIPMENT IN WET LOCATIONS.	N/A
FLEX. METAL	ARTICLE 348	SHORT LENGTHS (MAX. 3FT.) WIRING TO VIBRATING EQUIPMENT IN WET LOCATIONS.	N/A

[1] PHYSICAL DAMAGE IS SUBJECT TO THE AUTHORITY HAVING JURISDICTION.

[2] UNDERGROUND CONDUIT INSTALLED UNDER ROADS, HIGHWAYS, DRIVEWAYS, PARKING LOTS SHALL HAVE MINIMUM DEPTH OF 24".

[3] WHERE SOLID ROCK PREVENTS COMPLIANCE WITH MINIMUM COVER DEPTHS, WIRING SHALL BE INSTALLED IN PERMITTED RACEWAY FOR DIRECT BURIAL. THE RACEWAY SHALL BE COVERED BY A MINIMUM OF 2" OF CONCRETE EXTENDING DOWN TO ROCK.

SECTION 16123

1.01. CONDUCTORS

A. ALL CONDUCTORS SHALL BE TYPE THWN (INT. APPLICATION) AND XHHW (EXT. APPLICATION), 75 DEGREE C, 600 VOLT INSULATION, SOFT ANNEALED STRANDED COPPER. #10 AWG AND SMALLER SHALL BE SPLICED USING ACCEPTABLE SOLDERLESS PRESSURE CONNECTORS. #8 AWG AND LARGER SHALL BE SPLICED USING COMPRESSION SPLIT-BOLT TYPE CONNECTORS. #12 AWG SHALL BE THE MINIMUM SIZE CONDUCTOR FOR LINE VOLTAGE BRANCH CIRCUITS. REFER TO PANEL SCHEDULE FOR BRANCH CIRCUIT CONDUCTOR SIZE(S). CONDUCTORS SHALL BE COLOR CODED FOR CONSISTENT PHASE IDENTIFICATION:

	120/208/240V	277/480V
LINE	COLOR	COLOR
A	BLACK	BROWN
B	RED	ORANGE
C	BLUE	YELLOW
N	CONTINUOUS WHITE	GREY
G	CONTINUOUS GREEN	GREEN WITH YELLOW STRIPE

B. MINIMUM BENDING RADIUS FOR CONDUCTORS SHALL BE 12 TIMES THE LARGEST DIAMETER OF BRANCH CIRCUIT CONDUCTOR.

SECTION 16130

1.01. BOXES

A. FURNISH AND INSTALL OUTLET BOXES FOR ALL DEVICES, SWITCHES, RECEPTACLES, ETC.. BOXES TO BE ZINC COATED STEEL.

B. FURNISH AND INSTALL PULL BOXES IN MAIN FEEDERS RUNS WHERE REQUIRED. PULL BOXES SHALL BE GALVANIZED STEEL WITH SCREW REMOVABLE COVERS, SIZE AND QUANTITY AS REQUIRED. PROVIDE WEATHERPROOF CONSTRUCTION IN WET LOCATIONS.

SECTION 16140

1.01. WIRING DEVICES

A. THE FOLLOWING LIST IS PROVIDED TO CONVEY THE QUALITY AND RATING OF WIRING DEVICES WHICH ARE TO BE INSTALLED. A COMPLETE LIST OF ALL DEVICES MUST BE SUBMITTED BEFORE INSTALLATION FOR APPROVAL.

1. 15 MINUTE TIMER SWITCH – INTERMATIC #FF15M (INTERIOR LIGHTS)

2. DUPLEX RECEPTACLE – P&S #2095 (GFCI) SPECIFICATION GRADE

3. SINGLE POLE SWITCH – P&S #CSB20AC2 (20A-120V HARD USE) SPECIFICATION GRADE

4. DUPLEX RECEPTACLE – P&S #5362 (20A-120V HARD USE) SPECIFICATION GRADE

B. PLATES – ALL PLATES USED SHALL BE CORROSION RESISTANT TYPE 304 STAINLESS STEEL. PLATES SHALL BE FROM SAME MANUFACTURER AS SWITCHES AND RECEPTACLES. PROVIDE WEATHERPROOF HOUSING FOR DEVICES LOCATED IN WET LOCATIONS.

C. OTHER MANUFACTURERS OF THE SWITCHES, RECEPTACLES AND PLATES MAY BE SUBMITTED FOR APPROVAL BY THE ENGINEER.

SECTION 16170

1.01. DISCONNECT SWITCHES

A. FUSIBLE AND NON-FUSIBLE, 600V, HEAVY DUTY DISCONNECT SWITCHES SHALL BE AS MANUFACTURED BY SQUARE "D". PROVIDE FUSES AS CALLED FOR ON THE CONTRACT DRAWINGS. AMPERE RATING SHALL BE CONSISTENT WITH LOAD BEING SERVED. DISCONNECT SWITCH COVER SHALL BE MECHANICALLY INTERLOCKED TO PREVENT COVER FROM OPENING WHEN THE SWITCH IS IN THE "ON" POSITION. EXTERIOR APPLICATIONS SHALL BE NEMA 3R CONSTRUCTION WITH PADLOCK FEATURE.

SECTION 16190

1.01. SEISMIC RESTRAINT

A. ALL DEVICES SHALL BE INSTALLED IN ACCORDANCE WITH ZONE 2 SEISMIC REQUIREMENTS.

SECTION 16195

1.01. LABELING AND IDENTIFICATION NOMENCLATURE FOR ELECTRICAL EQUIPMENT

A. CONTRACTOR SHALL FURNISH AND INSTALL NON-METALLIC ENGRAVED BACK-LIT NAMEPLATES ON ALL PANELS AND MAJOR ITEMS OF ELECTRICAL EQUIPMENT.

B. LETTERS TO BE WHITE ON BLACK BACKGROUND WITH LETTERS 1-1/2 INCH HIGH WITH 1/4 INCH MARGIN.

C. IDENTIFICATION NOMENCLATURE SHALL BE IN ACCORDANCE WITH OWNER'S STANDARDS.

SECTION 16450

1.01. GROUNDING

A. ALL NON-CURRENT CARRYING PARTS OF THE ELECTRICAL AND TELEPHONE CONDUIT SYSTEMS SHALL BE MECHANICALLY AND ELECTRICALLY CONNECTED TO PROVIDE AN INDEPENDENT RETURN PATH TO THE EQUIPMENT GROUNDING SOURCES.

B. GROUNDING SYSTEM WILL BE IN ACCORDANCE WITH THE LATEST ACCEPTABLE EDITION OF THE NATIONAL ELECTRICAL CODE AND REQUIREMENTS PER LOCAL INSPECTOR HAVING JURISDICTION.

C. GROUNDING OF PANELBOARDS:

1. PANELBOARD SHALL BE GROUNDED BY TERMINATING THE PANELBOARD FEEDER'S EQUIPMENT GROUND CONDUCTOR TO THE EQUIPMENT GROUND BAR KIT(S) LUGGED TO THE CABINET. ENSURE THAT THE SURFACE BETWEEN THE KIT AND CABINET ARE BARE METAL TO BARE METAL. PRIME AND PAINT OVER TO PREVENT CORROSION.

2. CONDUIT(S) TERMINATING INTO THE PANELBOARD SHALL HAVE GROUNDING TYPE BUSHINGS. THE BUSHINGS SHALL BE BONDED TOGETHER WITH BARE #10 AWG COPPER CONDUCTOR WHICH IN TURN IS TERMINATED INTO THE PANELBOARD'S EQUIPMENT GROUND BAR KIT(S).

D. EQUIPMENT GROUNDING CONDUCTOR:

1. EACH EQUIPMENT GROUND CONDUCTOR SHALL BE SIZED IN ACCORDANCE WITH THE N.E.C. ARTICLE 250-122.

2. THE MINIMUM SIZE OF EQUIPMENT GROUND CONDUCTOR SHALL BE #12 AWG COPPER.

3. EACH FEEDER OR BRANCH CIRCUIT SHALL HAVE EQUIPMENT GROUND CONDUCTOR(S) INSTALLED IN THE SAME RACEWAY(S).

E. CELLULAR GROUNDING SYSTEM:

CONTRACTOR SHALL PROVIDE A CELLULAR GROUNDING SYSTEM WITH THE MAXIMUM AC RESISTANCE TO GROUND OF 10 OHM BETWEEN ANY POINT ON THE GROUNDING SYSTEM AS MEASURED BY 3-POINT GROUNDING TEST. (REFER TO SECTION 16960).

PROVIDE THE CELLULAR GROUNDING SYSTEM AS SPECIFIED ON DRAWINGS, INCLUDING, BUT NOT LIMITED TO:

1. GROUND BARS

2. EXTERIOR GROUNDING (WHERE REQUIRED DUE TO MEASURED AC RESISTANCE GREATER THAN SPECIFIED).

3. ANTENNA GROUND CONNECTIONS AND PLATES.

F. CONTRACTOR, AFTER COMPLETION OF THE COMPLETE GROUNDING SYSTEM BUT PRIOR TO CONCEALMENT/BURIAL OF SAME, SHALL NOTIFY OWNER'S PROJECT ENGINEER WHO WILL HAVE A DESIGN ENGINEER VISIT SITE AND MAKE A VISUAL INSPECTION OF THE GROUNDING GRID AND CONNECTIONS OF THE SYSTEM.

G. ALL EQUIPMENT SHALL BE BONDED TO GROUND AS REQUIRED BY N.E.C., MFG. SPECIFICATIONS, AND OWNER'S SPECIFICATIONS.

SECTION 16470

1.01. DISTRIBUTION EQUIPMENT

A. REFER TO CONTRACT DRAWINGS FOR DETAILS AND SCHEDULES.

SECTION 16477

1.01. FUSES

A. FUSES SHALL BE NONRENEWABLE TYPE AS MANUFACTURED BY "BUSSMAN" OR APPROVED EQUAL. FUSES RATED TO 1/10 AMPERE UP TO 600 AMPERES SHALL BE EQUIVALENT TO BUSSMAN TYPE LPN-RK (250V) UL CLASS RK1, LOW PEAK, DUAL ELEMENT, TIME-DELAY FUSES. FUSES SHALL HAVE SEPARATE SHORT CIRCUIT AND OVERLOAD ELEMENTS AND HAVE AN INTERRUPTING RATING OF 200 KAIC. UPON COMPLETION OF WORK, PROVIDE ONE SPARE SET OF FUSES FOR EACH TYPE INSTALLED.

SECTION 16960

1.01. TESTS BY INDEPENDENT ELECTRICAL TESTING FIRM

A. CONTRACTOR SHALL RETAIN THE SERVICES OF A LOCAL INDEPENDENT ELECTRICAL TESTING FIRM (WITH MINIMUM 5 YEARS COMMERCIAL EXPERIENCE IN THE ELECTRICAL TESTING INDUSTRY) AS SPECIFIED BY OWNER TO PERFORM:

TEST 1: THERMAL OVERLOAD AND MAGNETIC TRIP TEST, AND CABLE INSULATION TEST FOR ALL CIRCUIT BREAKERS RATED 100 AMPS OR GREATER.

TEST 2: RESISTANCE TO GROUND TEST ON THE CELLULAR GROUNDING SYSTEM.

THE TESTING FIRM SHALL INCLUDE THE FOLLOWING INFORMATION WITH THE REPORT:

1. TESTING PROCEDURE INCLUDING THE MAKE AND MODEL OF TEST EQUIPMENT.

2. CERTIFICATION OF TESTING EQUIPMENT CALIBRATION WITHIN SIX (6) MONTHS OF DATE OF TESTING. INCLUDE CERTIFICATION LAB ADDRESS AND TELEPHONE NUMBER.

3. GRAPHICAL DESCRIPTION OF TESTING METHOD ACTUALLY IMPLEMENTED.

B. THESE TESTS SHALL BE PERFORMED IN THE PRESENCE AND TO THE SATISFACTION OF OWNER'S CONSTRUCTION REPRESENTATIVE. TESTING DATA SHALL BE INITIALED AND DATED BY THE CONSTRUCTION REPRESENTATIVE AND INCLUDED WITH THE WRITTEN REPORT/ANALYSIS.

C. THE CONTRACTOR SHALL FORWARD SIX (6) COPIES OF THE INDEPENDENT ELECTRICAL TESTING FIRM'S REPORT/ANALYSIS TO ENGINEER A MINIMUM OF TEN (10) WORKING DAYS PRIOR TO THE JOB TURNOVER.

D. CONTRACTOR TO PROVIDE A MINIMUM OF ONE (1) WEEK NOTICE TO OWNER AND ENGINEER FOR ALL TESTS REQUIRING WITNESSING.

SECTION 16961

1.01. TESTS BY CONTRACTOR

A. ALL TESTS AS REQUIRED UPON COMPLETION OF WORK, SHALL BE MADE BY THIS CONTRACTOR. THESE SHALL BE CONTINUITY AND INSULATION TESTS; TEST TO DETERMINE THE QUALITY OF MATERIALS, ETC. AND SHALL BE MADE IN ACCORDANCE WITH N.E.C. RECOMMENDATIONS. ALL FEEDERS AND BRANCH CIRCUIT WIRING (EXCEPT CLASS 2 SIGNAL CIRCUITS) MUST BE TESTED FREE FROM SHORT CIRCUIT AND GROUND FAULT CONDITIONS AT 500V IN A REASONABLY DRY AMBIENT OF APPROXIMATELY 70 DEGREES F.

B. CONTRACTOR SHALL PERFORM LOAD PHASE BALANCING TESTS. CIRCUITS SHALL BE CONNECTED TO THE PANELBOARDS SO THAT THE NEW LOAD IS DISTRIBUTED AS EQUALLY AS POSSIBLE BETWEEN EACH LOAD AND NEUTRAL. 10% SHALL BE CONSIDERED AS A REASONABLE AND ACCEPTABLE ALLOWANCE. BRANCH CIRCUITS SHALL BE BALANCED ON THEIR OWN PANELBOARDS; FEEDER LOADS SHALL, IN TURN, BE BALANCED ON THE SERVICE EQUIPMENT. REASONABLE LOAD TEST SHALL BE ARRANGED TO VERIFY LOAD BALANCE IF REQUESTED BY THE ENGINEER.

C. ALL TESTS, UPON REQUEST, SHALL BE REPEATED IN THE PRESENCE OF OWNER'S REPRESENTATIVE. ALL TESTS SHALL BE DOCUMENTED AND TURNED OVER TO OWNER. OWNER SHALL HAVE THE AUTHORITY TO STOP ANY OF THE WORK NOT BEING PROPERLY INSTALLED. ALL SUCH DETECTED WORK SHALL BE REPAIRED OR REPLACED AT NO ADDITIONAL EXPENSE TO THE OWNER AND THE TESTS SHALL BE REPEATED.

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	06/03/21	JLW	TJR	CONSTRUCTION DRAWINGS - ISSUED FOR CONSTRUCTION
1	06/15/21	JLW	TJR	CONSTRUCTION DRAWINGS - REVISED PER CLIENT COMMENTS
2	08/03/21	RTS	TJR	CONSTRUCTION DRAWINGS - REVISED PER NEW RFDS

PROFESSIONAL ENGINEER SEAL

Sprint T-Mobile Transcend Wireless

CENTEK engineering
Centered on Solutions
(203) 488-0580
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Branford, CT 06405
www.CentekEng.com

T-MOBILE NORTHEAST LLC

SPRINT ID: CT03XC162
SITE ID: CTHA838A
6 MAIN ST
CENTERBROOK, CT 06409

DATE: 04/14/21
SCALE: AS NOTED
JOB NO. 21005.25

ELECTRICAL SPECIFICATIONS

E-3

Sheet No. 9 of 9

CENTEK engineering

Centered on Solutions℠

Structural Analysis Report

124 Existing Water Tower

Proposed T-Mobile
Antenna Upgrade (Sprint Keep)

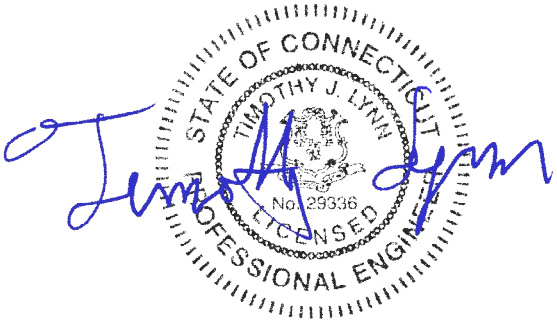
Site Ref: CTHA838A

6 Main Street
Essex, CT

CENTEK Project No. 21005.25

~~Date: April 28, 2021~~
Rev 1: August 16, 2021

Max Stress Ratio = 83.3%



Prepared for:
T-Mobile USA
35 Griffin Road
Bloomfield, CT 06002

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Introduction

The purpose of this report is to summarize the results of the non-linear, P-Δ structural analysis of the antenna upgrade proposed by T-Mobile on the existing water tower located in Essex, Connecticut.

The host tower is a 124-ft, four legged, water tower. The tower geometry and structure member sizes information were taken from the a tower mapping report prepared by Infinigy job no. 173586E dated 12/12/2017.

Existing antenna and appurtenance inventory was taken from a previous structural analysis report prepared by Fullerton Engineering Consultants dated August 13, 2020.

Proposed antenna and appurtenance inventory for T-Mobile was taken from an RF data sheet dated 4/6/21.

Antenna and Appurtenance Summary

The existing and proposed loads considered in the analysis consist of the following:

- Sprint (Existing to Remove):
  Antenna: Three (3) RFS ETCR-654L12H6 panel antennas, three (3) 1900MHz 4X45W RRHs, six (6) 800MHz 2X50W RRHs and three (3) TD-RRR8x20 RRHs pipe mounted to the tank façade with a RAD center elevation of ±118-ft above grade level.
  Coax Cable: Six (6) 1-5/8"∅ cables running on a leg/face of the existing tower as specified in Section 3 of this report.
- **T-MOBILE (Proposed Final Configuration):**
  Antennas: Three (3) Ericsson AIR6449 panel antennas, three (3) RFS APXVAALL24_43 panel antennas, three (3) Ericsson 4460 remote radio heads and three (3) Ericsson 4480 remote radio heads pipe mounted to the tank façade with a RAD center elevation of ±118-ft above grade level.
  Coax Cables: Three (3) 6x24 ∅ fiber cable running on a face of the existing tower as specified in Section 3 of this report.
- AT&T (Existing Configuration):
  Antenna: Three (3) Powerwave 7770 panel antennas, two (2) Commscope NNHH-65C panel antennas panel antennas, one (1) Commscope NNHH-65A panel antennas, two (2) CCI DMP65R-BU8DA panel antennas, one (1) CCI DMP65R-BU4DA panel antennas, six (6) Powerwave LGP21401 TMAs, three (3) Ericsson 4415 B30 remote radio heads, three (3) Ericsson 4449 B5/B12 remote radio heads, three (3) Ericsson 8843 B2/B66A remote radio heads and three (3) Raycap DC6-48-60-18-8F surge arrestors pipe mounted to the tank handrail with a RAD center elevation of ±108-ft above grade level.
  Coax Cable: Twelve (12) 1-5/8" ∅ coax cables, one (1) 2-1/4" conduit running on a leg/face of the existing tower as specified in Section 3 of this report.

- Verizon (Existing Configuration):
  Antennas: Three (3) Antel LPA-80080/6CF panel antennas, three (3) Antel LPA-80063-6CF panel antennas, six (6) Commscope SBNHH-1D65B panel antennas, twelve (12) RFS diplexers, three (3) Alcatel-Lucent RRH4x45 B66A remote radio heads, three (3) Alcatle-Lucent RRH4x30 B13 remote radio heads and two (2) main distribution boxes pipe mounted to the tank handrail with a RAD center elevation of ±107-ft above grade level
  Coax Cable: Six (6) 1-5/8" ∅ coax cables and two (2) 1-5/8" ∅ fiber cable running on a leg/face of the existing tower as specified in Section 3 of this report.

Primary Assumptions Used in the Analysis

- The tower structure's theoretical capacity not including any assessment of the condition of the tower.
- The tower carries the horizontal and vertical loads due to the weight of antennas, ice load and wind.
- Tower is properly installed and maintained.
- Tower is in plumb condition.
- Tower loading for antennas and mounts as listed in this report.
- All bolts are appropriately tightened providing the necessary connection continuity.
- All welds are fabricated with ER-70S-6 electrodes.
- All members are assumed to be as specified in the original tower design documents.
- All members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards.
- All member protective coatings are in good condition.
- All tower members were properly designed, detailed, fabricated, installed and have been properly maintained since erection.
- Any deviation from the analyzed antenna loading will require a new analysis for verification of structural adequacy.
- All coax cables should be routed as specified in section 3 of this report.

Analysis

The existing tower was analyzed using a comprehensive computer program entitled tnxTower. The program analyzes the tower, considering the worst case loading condition. The tower is considered as loaded by concentric forces along the tower, and the model assumes that the tower members are subjected to bending, axial, and shear forces.

The existing tower was analyzed for the controlling basic wind speed to determine stresses in members as per guidelines of AWWA-D100, TIA-222-G-2005 entitled "Structural Standard for Antenna Support Structures and Antennas", the American Institute of Steel Construction (AISC) and the Manual of Steel Construction; Load and Resistance Factor Design (LRFD).

The controlling wind speed is determined by evaluating the local available wind speed data as provided in Appendix N of the CSBC[1].

Tower Loading

Tower loading was determined by the basic wind speed as applied to projected surface areas with modification factors per AWWA-D100 and ASCE 7-10, gravity loads of the tower structure and its components.

Load Cases:	Load Case 1; 135 mph wind speed w/ no ice plus gravity load – used in calculation of tower stresses and rotation.	*[Appendix N of the 2018 CT Building Code]*

[1] The 2015 International Building Code as amended by the 2018 Connecticut State Building Code (CSBC).

Tower Capacity

Tower stresses were calculated utilizing the structural analysis software tnxTower.

- Calculated stresses **were found to be within allowable limits**.

Tower Section	Elevation	Stress Ratio (percentage of capacity)	Result
Diagonal (T1)	70'-0"-160'-0"	83.3%	**PASS**
Leg (T3)	0'-0"-36'-0"	69.6%	**PASS**

Foundation and Anchors

The existing foundation consists of a four (4) 3-ft square tapering to 7.5-ft square x 5.25-ft long reinforced concrete piers and four (4) 13-ft square concrete pads. Pad thickness was unablibe to be verified. The base of the tower is connected to the foundation by means of (2) 1.75"∅, anchor bolts per leg embedded into the concrete foundation structure.

- The tower reactions developed from the governing Load Case were used in the verification of the foundation:

Load Effect	Proposed Tower Reactions
Leg Shear	12 kips
Leg Compression	379 kips
Leg Tension	0 kips
Base Moment	4586 ft-kips
Base Shear	55 kips

- The foundation was found to be within allowable limits based on the tank being in use and full of water. With the tank full there is no uplift at the tower legs and therefore the foundations were evaluated for bearing only. If the tank is decommissioned and the water is removed the foundation and anchorage will need to be re-evaluated for uplift.

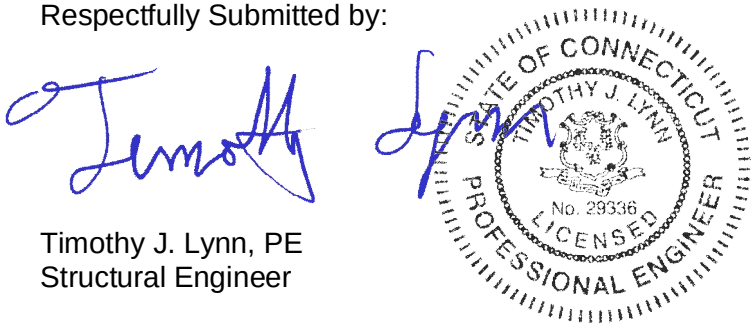
C o n c l u s i o n

This analysis shows that the subject tower **is adequate** to support the proposed antenna configuration with the below recommendations.

The analysis is based, in part, on the information provided to this office by T-Mobile. If the existing conditions are different than the information in this report, Centek Engineering, Inc. must be contacted for resolution of any potential issues.

Please feel free to call with any questions or comments.

Respectfully Submitted by:



Timothy J. Lynn, PE
Structural Engineer

Standard Conditions for Furnishing of Professional Engineering Services on Existing Structures

All engineering services are performed on the basis that the information used is current and correct. This information may consist of, but is not necessarily limited to:

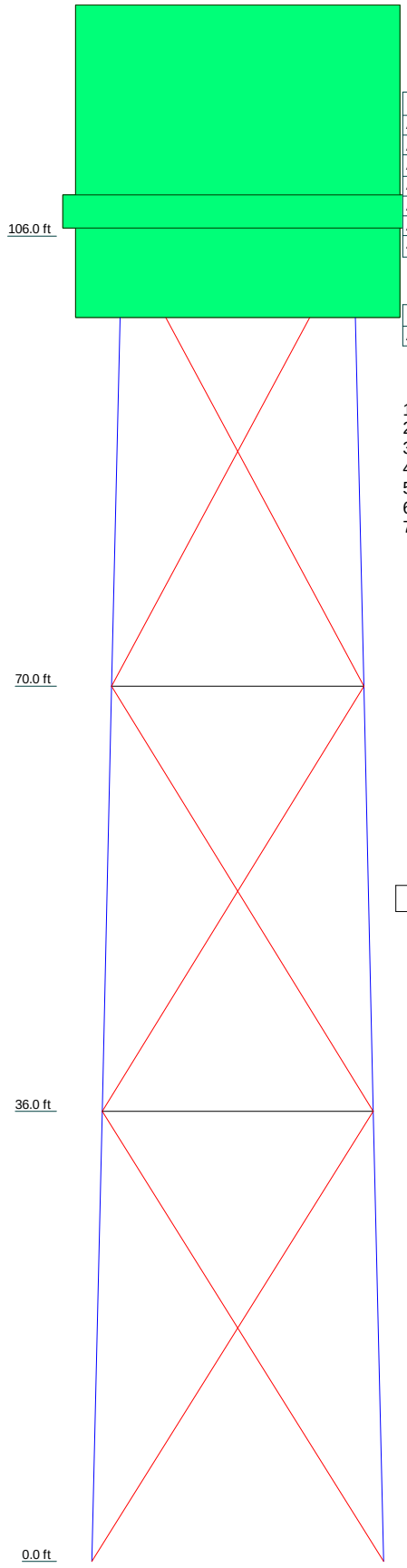
- Information supplied by the client regarding the structure itself, its foundations, the soil conditions, the antenna and feed line loading on the structure and its components, or other relevant information.
- Information from the field and/or drawings in the possession of Centek Engineering, Inc. or generated by field inspections or measurements of the structure.
- It is the responsibility of the client to ensure that the information provided to Centek Engineering, Inc. and used in the performance of our engineering services is correct and complete. In the absence of information to the contrary, we assume that all structures were constructed in accordance with the drawings and specifications and are in an un-corroded condition and have not deteriorated. It is therefore assumed that its capacity has not significantly changed from the “as new” condition.
- All services will be performed to the codes specified by the client, and we do not imply to meet any other codes or requirements unless explicitly agreed in writing. If wind and ice loads or other relevant parameters are to be different from the minimum values recommended by the codes, the client shall specify the exact requirement. In the absence of information to the contrary, all work will be performed in accordance with the latest revision of ANSI/ASCE10 & ANSI/EIA-222
- All services performed, results obtained, and recommendations made are in accordance with generally accepted engineering principles and practices. Centek Engineering, Inc. is not responsible for the conclusions, opinions and recommendations made by others based on the information we supply.

GENERAL DESCRIPTION OF STRUCTURAL ANALYSIS PROGRAM

tnxTower, is an integrated structural analysis and design software package for Designed specifically for the telecommunications industry, tnxTower, formerly RISA Tower, automates much of the tower analysis and design required by the TIA/EIA 222 Standard.

tnxTower Features:

- tnxTower can analyze and design 3- and 4-sided guyed towers, 3- and 4-sided self-supporting towers and either round or tapered ground mounted poles with or without guys.
- The program analyzes towers using the TIA-222-G (2005) standard or any of the previous TIA/EIA standards back to RS-222 (1959). Steel design is checked using the AISC ASD 9th Edition or the AISC LRFD specifications.
- Linear and non-linear (P-delta) analyses can be used in determining displacements and forces in the structure. Wind pressures and forces are automatically calculated.
- Extensive graphics plots include material take-off, shear-moment, leg compression, displacement, twist, feed line, guy anchor and stress plots.
- tnxTower contains unique features such as True Cable behavior, hog rod take-up, foundation stiffness and much more.



Section	Legs	Leg Grade	Diagonals	Diagonal Grade	Top Girts	Face Width (ft)	# Panels @ (ft)	Weight (K)
T1	P19x0.36"	A36	SR 1	A572-50	W8x24	18.5	1 @ 36	13.0
T2			SR 1 1/4			20.12	1 @ 34	13.0
T3			SR 1 3/8			21.64	1 @ 36	14.1
						23.25		40.2

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
APXVAALL24-43 (T-Mobile)	118	4480 B71+B85 (T-Mobile)	118
AIR6449 (T-Mobile)	118	4460 B25+B66 (T-Mobile)	118
APXVAALL24-43 (T-Mobile)	118	4480 B71+B85 (T-Mobile)	118
AIR6449 (T-Mobile)	118	4460 B25+B66 (T-Mobile)	118
APXVAALL24-43 (T-Mobile)	118	4480 B71+B85 (T-Mobile)	118
AIR6449 (T-Mobile)	118	Essex Tank	112
4460 B25+B66 (T-Mobile)	118	Essex Handrail	108

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower designed for Exposure C to the TIA-222-G Standard.
2. Tower designed for a 135 mph basic wind in accordance with the TIA-222-G Standard.
3. Deflections are based upon a 60 mph wind.
4. Tower Risk Category II.
5. Topographic Category 1 with Crest Height of 0.00 ft
6. Loading for ATI and Verizon Antennas attached to handrail is included in the handrail input.
7. TOWER RATING: 83.3%

ALL REACTIONS ARE FACTORED

MAX. CORNER REACTIONS AT BASE:
DOWN: 379 K
SHEAR: 12 K

UPLIFT: 0 K
SHEAR: 0 K

AXIAL 958 K

SHEAR 55 K

MOMENT 4586 kip-ft

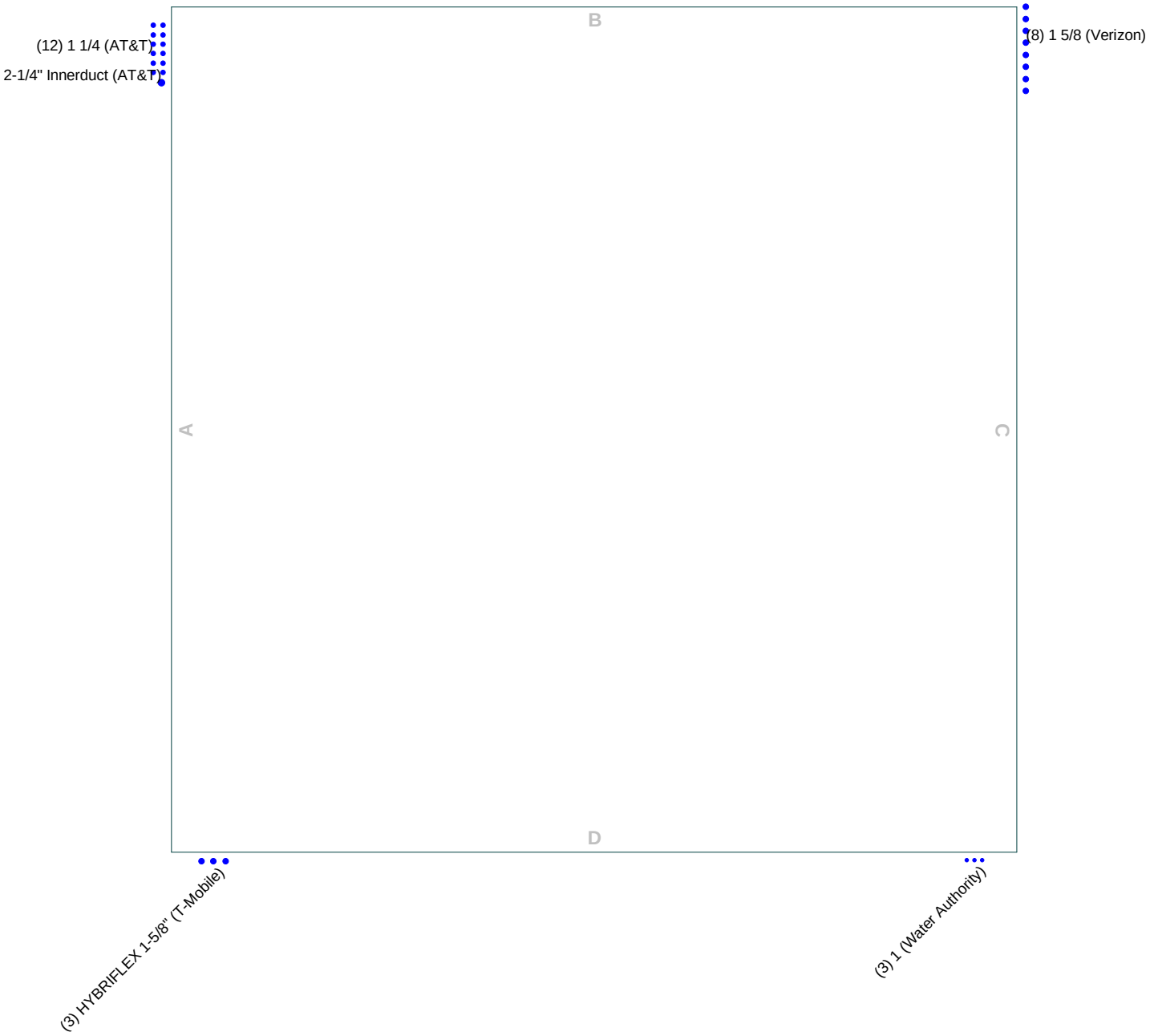
TORQUE 60 kip-ft
REACTIONS - 135 mph WIND

Centek Engineering Inc.
63-2 North Branford Rd.
Branford, CT 06405
Phone: (203) 488-0580
FAX: (203) 488-8587

Job:	***21005.25 - CTHA838A***		
Project:	***124' WaterTower - Essex, CT***		
Client: T-Mobile	Drawn by: TJL	App'd:	
Code: TIA-222-G	Date: 08/16/21	Scale: NTS	
Path: J:\Jobs\2100500\Wk25_CTHA838A_CT03XC105\05_Structural\Structural Analysis Report\Backup Documentation\Rev (1)\Water Tower.eri		Dwg No. E-1	

Feed Line Plan

Round Flat App In Face App Out Face



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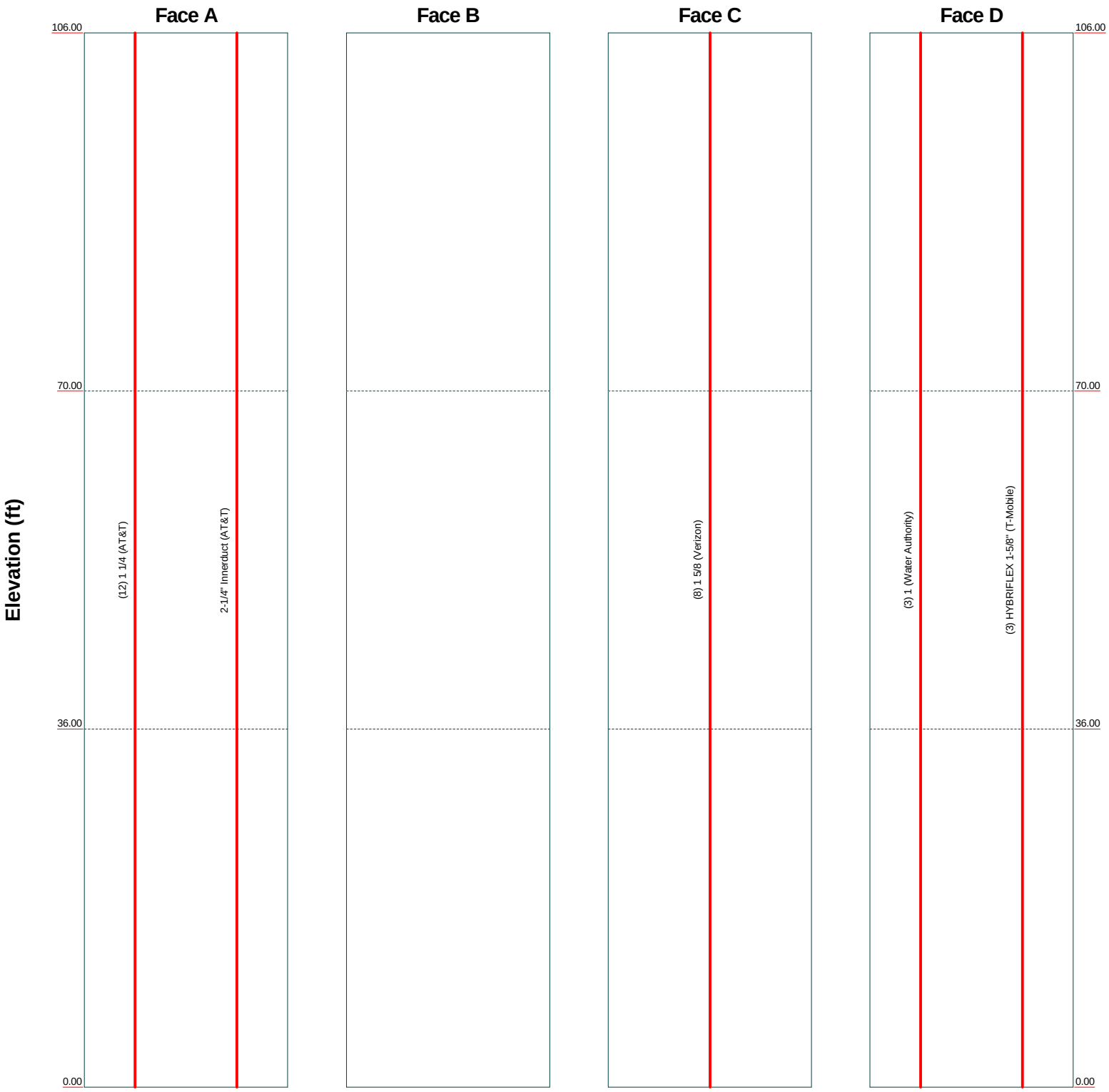
Path: J:\Jobs\2100500\Jl\25_CTHA838A_CT03XC105\05_Structural\Structural Analysis\Report\Backup Documentation\Rev (1)\Water Tower.eri		Dwg No. E-7	

Feed Line Distribution Chart
0' - 106'

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



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Code: TIA-222-G	Date: 08/16/21	Scale: NTS	
Path: J:\Jobs\2100500.WI\25_CTHA838A_CT03XC105\05_Structural\Structural Analysis Report\Backup Documentation\Rev (1)\Water Tower.eri		Dwg No. E-7	

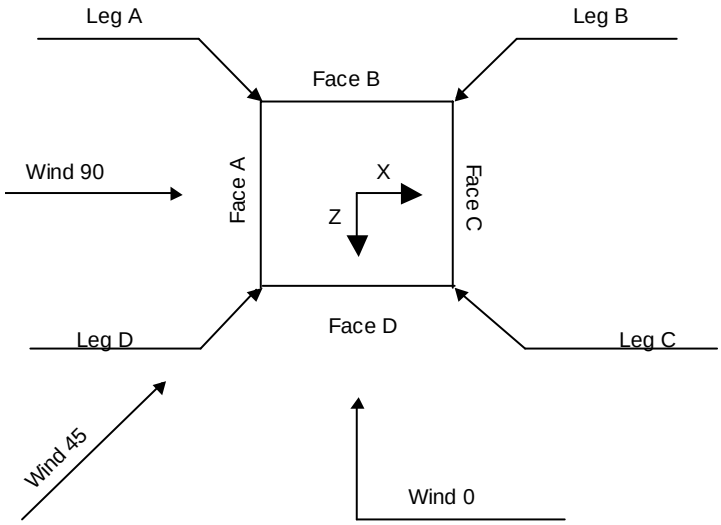
Tower Input Data

The main tower is a 4x free standing tower with an overall height of 106.00 ft above the ground line.
The base of the tower is set at an elevation of 0.00 ft above the ground line.
The face width of the tower is 18.50 ft at the top and 23.25 ft at the base.
This tower is designed using the TIA-222-G standard.
The following design criteria apply:

ASCE 7-10 Wind Data is used.
Basic wind speed of 135 mph.
Risk Category II.
Exposure Category C.
Topographic Category 1.
Crest Height 0.00 ft.
Deflections calculated using a wind speed of 60 mph.
Loading for AT&T and Verizon Antennas attached to handrail is included in the handrail input..
Tension only take-up is 0.0313 in.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in tower member design is 1.
Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

	Consider Moments - Legs		Distribute Leg Loads As Uniform		Use ASCE 10 X-Brace Ly Rules
	Consider Moments - Horizontals		Assume Legs Pinned	√	Calculate Redundant Bracing Forces
	Consider Moments - Diagonals	√	Assume Rigid Index Plate		Ignore Redundant Members in FEA
	Use Moment Magnification	√	Use Clear Spans For Wind Area	√	SR Leg Bolts Resist Compression
√	Use Code Stress Ratios	√	Use Clear Spans For KL/r	√	All Leg Panels Have Same Allowable
√	Use Code Safety Factors - Guys		Retension Guys To Initial Tension		Offset Girt At Foundation
	Escalate Ice		Bypass Mast Stability Checks	√	Consider Feed Line Torque
	Always Use Max Kz	√	Use Azimuth Dish Coefficients		Include Angle Block Shear Check
	Use Special Wind Profile	√	Project Wind Area of Appurt.		Use TIA-222-G Bracing Resist. Exemption
√	Include Bolts In Member Capacity		Autocalc Torque Arm Areas		Use TIA-222-G Tension Splice Exemption
	Leg Bolts Are At Top Of Section		Add IBC .6D+W Combination		Poles
	Secondary Horizontal Braces Leg	√	Sort Capacity Reports By Component		Include Shear-Torsion Interaction
	Use Diamond Inner Bracing (4 Sided)		Triangulate Diamond Inner Bracing		Always Use Sub-Critical Flow
√	SR Members Have Cut Ends		Treat Feed Line Bundles As Cylinder		Use Top Mounted Sockets
	SR Members Are Concentric		Ignore KL/ry For 60 Deg. Angle Legs		Pole Without Linear Attachments
					Pole With Shroud Or No Appurtenances
					Outside and Inside Corner Radii Are Known



Square Tower

Tower Section Geometry

Tower Section	Tower Elevation	Assembly Database	Description	Section Width	Number of Sections	Section Length
	ft			ft		ft
T1	106.00-70.00			18.50	1	36.00
T2	70.00-36.00			20.12	1	34.00
T3	36.00-0.00			21.64	1	36.00

Tower Section Geometry *(cont'd)*

Tower Section	Tower Elevation	Diagonal Spacing	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset	Bottom Girt Offset
	ft	ft				in	in
T1	106.00-70.00	36.00	TX Brace	No	Yes	0.0000	0.0000
T2	70.00-36.00	34.00	TX Brace	No	Yes	0.0000	0.0000
T3	36.00-0.00	36.00	TX Brace	No	Yes	0.0000	0.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 106.00-70.00	Pipe	P19x0.36"	A36 (36 ksi)	Solid Round	1	A572-50 (50 ksi)
T2 70.00-36.00	Pipe	P19x0.36"	A36 (36 ksi)	Solid Round	1 1/4	A572-50 (50 ksi)

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T3 36.00-0.00	Pipe	P19x0.36"	A36 (36 ksi)	Solid Round	1 3/8	A572-50 (50 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Top Girt Type	Top Girt Size	Top Girt Grade	Bottom Girt Type	Bottom Girt Size	Bottom Girt Grade
T1 106.00-70.00	Wide Flange	W8x24	A36 (36 ksi)	Solid Round		A36 (36 ksi)
T2 70.00-36.00	Wide Flange	W8x24	A36 (36 ksi)	Single Angle		A36 (36 ksi)
T3 36.00-0.00	Wide Flange	W8x24	A36 (36 ksi)	Single Angle		A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	No. of Mid Girts	Mid Girt Type	Mid Girt Size	Mid Girt Grade	Horizontal Type	Horizontal Size	Horizontal Grade
T1 106.00-70.00	None	Single Angle		A36 (36 ksi)	Wide Flange	W8x24	A36 (36 ksi)
T2 70.00-36.00	None	Solid Round		A572-50 (50 ksi)	Wide Flange	W8x24	A36 (36 ksi)
T3 36.00-0.00	None	Single Angle		A36 (36 ksi)	Wide Flange	W8x24	A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
T1 106.00-70.00	0.00	0.0000	A36 (36 ksi)	1	1	1	30.0000	30.0000	36.0000
T2 70.00-36.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T3 36.00-0.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	K Factors[1] Legs	X Brace Diags X	X Brace Diags Y	K Brace Diags X	K Brace Diags Y	Single Diags X	Single Diags Y	Girts X	Girts Y	Horiz. X	Horiz. Y	Sec. Horiz. X	Sec. Horiz. Y	Inner Brace X	Inner Brace Y
T1	Yes	Yes	1	1		1		1		1		1		1		1	
106.00-70.00				1		1		1		1		1		1		1	
T2	Yes	Yes	1	1		1		1		1		1		1		1	
70.00-36.00				1		1		1		1		1		1		1	
T3 36.00-0.00	Yes	Yes	1	1		1		1		1		1		1		1	
				1		1		1		1		1		1		1	

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

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Net Width Deduct in	Leg U	Diagonal Net Width Deduct in	Diagonal U	Top Girt Net Width Deduct in	Top Girt U	Bottom Girt Net Width Deduct in	Bottom Girt U	Mid Girt Net Width Deduct in	Mid Girt U	Long Horizontal Net Width Deduct in	Long Horizontal U	Short Horizontal Net Width Deduct in	Short Horizontal U
T1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	0.75	0.0000	1	0.0000	0.75
106.00-70.00														
T2 70.00-36.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T3 36.00-0.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1

Tower Elevation ft	Redundant Horizontal Net Width Deduct in	Redundant Horizontal U	Redundant Diagonal Net Width Deduct in	Redundant Diagonal U	Redundant Sub-Diagonal Net Width Deduct in	Redundant Sub-Diagonal U	Redundant Sub-Horizontal Net Width Deduct in	Redundant Sub-Horizontal U	Redundant Vertical Net Width Deduct in	Redundant Vertical U	Redundant Hip Net Width Deduct in	Redundant Hip U	Redundant Hip Diagonal Net Width Deduct in	Redundant Hip Diagonal U
T1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
106.00-70.00														
T2 70.00-36.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T3 36.00-0.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
1 1/4 (AT&T)	A	No	No	Ar (CaAa)	106.00 - 0.00	2.0000	0.45	12	6	1.5500	1.5500		0.66
2-1/4" Innerduct (AT&T)	A	No	No	Ar (CaAa)	106.00 - 0.00	2.0000	0.41	1	1	2.2500	2.2500		4.00
1 5/8	C	No	No	Ar (CaAa)	106.00 -	2.0000	-0.45	8	8	1.9800	1.9800		1.04

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
(Verizon) 1	D	No	No	Ar (CaAa)	0.00 106.00 - 0.00	2.0000	-0.45	3	3	1.2500	1.2500		0.58
(Water Authority) HYBRIFLEX 1-5/8" (T-Mobile)	D	No	No	Ar (CaAa)	106.00 - 0.00	2.0000	0.45	3	3	1.9800	1.9800		1.90

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
T1	106.00-70.00	A	0.000	0.000	75.060	0.000	0.43
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	57.024	0.000	0.30
		D	0.000	0.000	34.884	0.000	0.27
T2	70.00-36.00	A	0.000	0.000	70.890	0.000	0.41
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	53.856	0.000	0.28
		D	0.000	0.000	32.946	0.000	0.25
T3	36.00-0.00	A	0.000	0.000	75.060	0.000	0.43
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	57.024	0.000	0.30
		D	0.000	0.000	34.884	0.000	0.27

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
T1	106.00-70.00	-6.1542	-19.2446	-5.2861	-16.5301
T2	70.00-36.00	-6.4221	-20.1697	-5.5153	-17.3216
T3	36.00-0.00	-6.8028	-21.4454	-5.8180	-18.3407

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T1	1	1 1/4	70.00 - 106.00	0.6000	0.6000
T1	2	2-1/4" Innerduct	70.00 - 106.00	0.6000	0.6000
T1	3	1 5/8	70.00 - 106.00	0.6000	0.6000
T1	4	1	70.00 - 106.00	0.6000	0.6000
T1	5	HYBRIFLEX 1-5/8"	70.00 - 106.00	0.6000	0.6000
T2	1	1 1/4	36.00 - 70.00	0.6000	0.6000
T2	2	2-1/4" Innerduct	36.00 - 70.00	0.6000	0.6000
T2	3	1 5/8	36.00 - 70.00	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T2	4	1	36.00 - 70.00	0.6000	0.6000
T2	5	HYBRIFLEX 1-5/8"	36.00 - 70.00	0.6000	0.6000
T3	1	1 1/4	0.00 - 36.00	0.6000	0.6000
T3	2	2-1/4" Innerduct	0.00 - 36.00	0.6000	0.6000
T3	3	1 5/8	0.00 - 36.00	0.6000	0.6000
T3	4	1	0.00 - 36.00	0.6000	0.6000
T3	5	HYBRIFLEX 1-5/8"	0.00 - 36.00	0.6000	0.6000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Essex Tank	C	None		0.0000	112.00	No Ice	325.00	325.00	750.00
Essex Handrail	C	None		0.0000	108.00	No Ice	89.60	89.60	3.60
APXVAALL24-43 (T-Mobile)	A	From Face	2.00 0.00 0.00	0.0000	118.00	No Ice	20.24	8.89	0.15
AIR6449 (T-Mobile)	A	From Face	2.00 3.00 0.00	0.0000	118.00	No Ice	5.65	2.42	0.10
APXVAALL24-43 (T-Mobile)	B	From Face	2.00 0.00 0.00	0.0000	118.00	No Ice	20.24	8.89	0.15
AIR6449 (T-Mobile)	B	From Face	2.00 3.00 0.00	0.0000	118.00	No Ice	5.65	2.42	0.10
APXVAALL24-43 (T-Mobile)	C	From Face	2.00 0.00 0.00	0.0000	118.00	No Ice	20.24	8.89	0.15
AIR6449 (T-Mobile)	C	From Face	2.00 3.00 0.00	0.0000	118.00	No Ice	5.65	2.42	0.10
4460 B25+B66 (T-Mobile)	A	From Face	2.00 0.00 0.00	0.0000	118.00	No Ice	2.56	1.98	0.11
4480 B71+B85 (T-Mobile)	A	From Face	2.00 0.00 0.00	0.0000	118.00	No Ice	2.85	1.38	0.08
4460 B25+B66 (T-Mobile)	B	From Face	2.00 0.00 0.00	0.0000	118.00	No Ice	2.56	1.98	0.11
4480 B71+B85 (T-Mobile)	B	From Face	2.00 0.00 0.00	0.0000	118.00	No Ice	2.85	1.38	0.08
4460 B25+B66 (T-Mobile)	C	From Face	2.00 0.00 0.00	0.0000	118.00	No Ice	2.56	1.98	0.11
4480 B71+B85 (T-Mobile)	C	From Face	2.00 0.00 0.00	0.0000	118.00	No Ice	2.85	1.38	0.08

Tower Pressures - No Ice

G_H = 0.850

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
T1	88.00	1.232	49	752.174	A	11.179	120.310	114.058	86.74	75.060	0.000
106.00-70.00					B	11.179	120.310		86.74	0.000	0.000
					C	11.179	120.310		86.74	57.024	0.000
					D	11.179	120.310		86.74	34.884	0.000
T2 70.00-36.00	53.00	1.107	44	763.767	A	12.250	115.404	107.720	84.38	70.890	0.000
					B	12.250	115.404		84.38	0.000	0.000
					C	12.250	115.404		84.38	53.856	0.000
					D	12.250	115.404		84.38	32.946	0.000
T3 36.00-0.00	18.00	0.882	35	865.034	A	13.254	123.095	114.057	83.65	75.060	0.000
					B	13.254	123.095		83.65	0.000	0.000
					C	13.254	123.095		83.65	57.024	0.000
					D	13.254	123.095		83.65	34.884	0.000

Tower Pressure - Service

G_H = 0.850

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
T1	88.00	1.232	10	752.174	A	11.179	120.310	114.058	86.74	75.060	0.000
106.00-70.00					B	11.179	120.310		86.74	0.000	0.000
					C	11.179	120.310		86.74	57.024	0.000
					D	11.179	120.310		86.74	34.884	0.000
T2 70.00-36.00	53.00	1.107	9	763.767	A	12.250	115.404	107.720	84.38	70.890	0.000
					B	12.250	115.404		84.38	0.000	0.000
					C	12.250	115.404		84.38	53.856	0.000
					D	12.250	115.404		84.38	32.946	0.000
T3 36.00-0.00	18.00	0.882	7	865.034	A	13.254	123.095	114.057	83.65	75.060	0.000
					B	13.254	123.095		83.65	0.000	0.000
					C	13.254	123.095		83.65	57.024	0.000
					D	13.254	123.095		83.65	34.884	0.000

Tower Forces - No Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	1.00	12.99	A	0.175	3.091	49	1	1	63.988	12.37	343.73	D
106.00-70.00			B	0.175	3.091		1	1	63.988			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
			C	0.175	3.091		1	1	63.988			
			D	0.175	3.091		1	1	63.988			
T2	0.94	13.03	A	0.167	3.126	44	1	1	62.688	10.84	318.97	D
70.00-36.00			B	0.167	3.126		1	1	62.688			
			C	0.167	3.126		1	1	62.688			
			D	0.167	3.126		1	1	62.688			
T3 36.00-0.00	1.00	14.14	A	0.158	3.169	35	1	1	66.593	9.25	257.07	D
			B	0.158	3.169		1	1	66.593			
			C	0.158	3.169		1	1	66.593			
			D	0.158	3.169		1	1	66.593			
Sum Weight:	2.93	40.16						OTM	1830.29 kip-ft	32.47		

Tower Forces - No Ice - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	1.00	12.99	A	0.175	3.091	49	1.131	1.131	72.377	13.45	373.64	D
106.00-70.00			B	0.175	3.091		1.131	1.131	72.377			
			C	0.175	3.091		1.131	1.131	72.377			
			D	0.175	3.091		1.131	1.131	72.377			
T2	0.94	13.03	A	0.167	3.126	44	1.125	1.125	70.546	11.76	345.93	D
70.00-36.00			B	0.167	3.126		1.125	1.125	70.546			
			C	0.167	3.126		1.125	1.125	70.546			
			D	0.167	3.126		1.125	1.125	70.546			
T3 36.00-0.00	1.00	14.14	A	0.158	3.169	35	1.118	1.118	74.466	10.00	277.68	D
			B	0.158	3.169		1.118	1.118	74.466			
			C	0.158	3.169		1.118	1.118	74.466			
			D	0.158	3.169		1.118	1.118	74.466			
Sum Weight:	2.93	40.16						OTM	1987.00 kip-ft	35.21		

Tower Forces - Service - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	1.00	12.99	A	0.175	3.091	10	1	1	63.988	2.44	67.90	D
106.00-70.00			B	0.175	3.091		1	1	63.988			
			C	0.175	3.091		1	1	63.988			
			D	0.175	3.091		1	1	63.988			
T2	0.94	13.03	A	0.167	3.126	9	1	1	62.688	2.14	63.01	D
70.00-36.00			B	0.167	3.126		1	1	62.688			
			C	0.167	3.126		1	1	62.688			
			D	0.167	3.126		1	1	62.688			
T3 36.00-0.00	1.00	14.14	A	0.158	3.169	7	1	1	66.593	1.83	50.78	D

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
			B	0.158	3.169		1	1	66.593			
			C	0.158	3.169		1	1	66.593			
			D	0.158	3.169		1	1	66.593			
Sum Weight:	2.93	40.16						OTM	361.54 kip-ft	6.41		

Tower Forces - Service - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T1	1.00	12.99	A	0.175	3.091	10	1.131	1.131	72.377	2.66	73.81	D
106.00-70.00			B	0.175	3.091		1.131	1.131	72.377			
			C	0.175	3.091		1.131	1.131	72.377			
			D	0.175	3.091		1.131	1.131	72.377			
T2	0.94	13.03	A	0.167	3.126	9	1.125	1.125	70.546	2.32	68.33	D
70.00-36.00			B	0.167	3.126		1.125	1.125	70.546			
			C	0.167	3.126		1.125	1.125	70.546			
			D	0.167	3.126		1.125	1.125	70.546			
T3 36.00-0.00	1.00	14.14	A	0.158	3.169	7	1.118	1.118	74.466	1.97	54.85	D
			B	0.158	3.169		1.118	1.118	74.466			
			C	0.158	3.169		1.118	1.118	74.466			
			D	0.158	3.169		1.118	1.118	74.466			
Sum Weight:	2.93	40.16						OTM	392.49 kip-ft	6.95		

Force Totals

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Leg Weight	30.43					
Bracing Weight	9.73					
Total Member Self-Weight	40.16			-16.33	7.82	
Total Weight	798.01			-16.33	7.82	
Wind 0 deg - No Ice		0.00	-52.17	-4046.28	7.82	-16.95
Wind 30 deg - No Ice		27.67	-47.55	-3642.09	-2111.55	-44.17
Wind 45 deg - No Ice		39.13	-38.82	-2976.75	-2989.42	-53.69
Wind 60 deg - No Ice		47.93	-27.45	-2109.66	-3663.04	-59.56
Wind 90 deg - No Ice		52.61	0.00	-16.33	-4074.21	-58.98
Wind 120 deg - No Ice		47.93	27.45	2077.00	-3663.04	-42.61
Wind 135 deg - No Ice		39.13	38.82	2944.09	-2989.42	-29.73
Wind 150 deg - No Ice		27.67	47.55	3609.43	-2111.55	-14.82
Wind 180 deg - No Ice		0.00	52.17	4013.63	7.82	16.95
Wind 210 deg - No Ice		-27.67	47.55	3609.43	2127.19	44.17
Wind 225 deg - No Ice		-39.13	38.82	2944.09	3005.06	53.69
Wind 240 deg - No Ice		-47.93	27.45	2077.00	3678.68	59.56

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Wind 270 deg - No Ice		-52.61	0.00	-16.33	4089.85	58.98
Wind 300 deg - No Ice		-47.93	-27.45	-2109.66	3678.68	42.61
Wind 315 deg - No Ice		-39.13	-38.82	-2976.75	3005.06	29.73
Wind 330 deg - No Ice		-27.67	-47.55	-3642.09	2127.19	14.82
Total Weight	798.01			-16.33	7.82	
Wind 0 deg - Service		0.00	-10.30	-800.99	-0.30	-3.35
Wind 30 deg - Service		5.47	-9.39	-721.15	-418.94	-8.72
Wind 45 deg - Service		7.73	-7.67	-589.72	-592.35	-10.61
Wind 60 deg - Service		9.47	-5.42	-418.45	-725.41	-11.76
Wind 90 deg - Service		10.39	0.00	-4.95	-806.63	-11.65
Wind 120 deg - Service		9.47	5.42	408.55	-725.41	-8.42
Wind 135 deg - Service		7.73	7.67	579.82	-592.35	-5.87
Wind 150 deg - Service		5.47	9.39	711.25	-418.94	-2.93
Wind 180 deg - Service		0.00	10.30	791.09	-0.30	3.35
Wind 210 deg - Service		-5.47	9.39	711.25	418.34	8.72
Wind 225 deg - Service		-7.73	7.67	579.82	591.75	10.61
Wind 240 deg - Service		-9.47	5.42	408.55	724.81	11.76
Wind 270 deg - Service		-10.39	0.00	-4.95	806.03	11.65
Wind 300 deg - Service		-9.47	-5.42	-418.45	724.81	8.42
Wind 315 deg - Service		-7.73	-7.67	-589.72	591.75	5.87
Wind 330 deg - Service		-5.47	-9.39	-721.15	418.34	2.93

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.0 Wind 0 deg - No Ice
3	0.9 Dead+1.0 Wind 0 deg - No Ice
4	1.2 Dead+1.0 Wind 30 deg - No Ice
5	0.9 Dead+1.0 Wind 30 deg - No Ice
6	1.2 Dead+1.0 Wind 45 deg - No Ice
7	0.9 Dead+1.0 Wind 45 deg - No Ice
8	1.2 Dead+1.0 Wind 60 deg - No Ice
9	0.9 Dead+1.0 Wind 60 deg - No Ice
10	1.2 Dead+1.0 Wind 90 deg - No Ice
11	0.9 Dead+1.0 Wind 90 deg - No Ice
12	1.2 Dead+1.0 Wind 120 deg - No Ice
13	0.9 Dead+1.0 Wind 120 deg - No Ice
14	1.2 Dead+1.0 Wind 135 deg - No Ice
15	0.9 Dead+1.0 Wind 135 deg - No Ice
16	1.2 Dead+1.0 Wind 150 deg - No Ice
17	0.9 Dead+1.0 Wind 150 deg - No Ice
18	1.2 Dead+1.0 Wind 180 deg - No Ice
19	0.9 Dead+1.0 Wind 180 deg - No Ice
20	1.2 Dead+1.0 Wind 210 deg - No Ice
21	0.9 Dead+1.0 Wind 210 deg - No Ice
22	1.2 Dead+1.0 Wind 225 deg - No Ice
23	0.9 Dead+1.0 Wind 225 deg - No Ice
24	1.2 Dead+1.0 Wind 240 deg - No Ice
25	0.9 Dead+1.0 Wind 240 deg - No Ice
26	1.2 Dead+1.0 Wind 270 deg - No Ice
27	0.9 Dead+1.0 Wind 270 deg - No Ice
28	1.2 Dead+1.0 Wind 300 deg - No Ice
29	0.9 Dead+1.0 Wind 300 deg - No Ice
30	1.2 Dead+1.0 Wind 315 deg - No Ice

Comb. No.	Description
31	0.9 Dead+1.0 Wind 315 deg - No Ice
32	1.2 Dead+1.0 Wind 330 deg - No Ice
33	0.9 Dead+1.0 Wind 330 deg - No Ice
34	Dead+Wind 0 deg - Service
35	Dead+Wind 30 deg - Service
36	Dead+Wind 45 deg - Service
37	Dead+Wind 60 deg - Service
38	Dead+Wind 90 deg - Service
39	Dead+Wind 120 deg - Service
40	Dead+Wind 135 deg - Service
41	Dead+Wind 150 deg - Service
42	Dead+Wind 180 deg - Service
43	Dead+Wind 210 deg - Service
44	Dead+Wind 225 deg - Service
45	Dead+Wind 240 deg - Service
46	Dead+Wind 270 deg - Service
47	Dead+Wind 300 deg - Service
48	Dead+Wind 315 deg - Service
49	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T1	106 - 70	Leg	Max Tension	1	0.00	0.00	0.00
			Max. Compression	30	-271.66	11.45	-0.56
			Max. Mx	14	-226.43	-13.15	0.60
			Max. My	6	-249.19	-0.15	13.14
			Max. Vy	14	-1.58	0.00	-0.00
			Max. Vx	22	-1.75	-0.00	0.00
		Diagonal	Max Tension	10	29.45	0.00	0.00
		Top Girt	Max Tension	1	0.00	0.00	0.00
			Max. Compression	10	-12.36	0.00	0.00
			Max. Mx	26	-11.98	1.24	0.00
			Max. My	26	-5.56	0.00	-0.03
			Max. Vy	26	-0.27	0.00	0.00
			Max. Vx	26	0.01	0.00	0.00
T2	70 - 36	Leg	Max Tension	1	0.00	0.00	0.00
			Max. Compression	30	-321.18	4.75	-0.36
			Max. Mx	14	-191.64	-13.15	0.60
			Max. My	6	-255.06	-0.15	13.14
			Max. Vy	14	-1.13	-13.15	0.60
			Max. Vx	22	-1.23	0.03	-13.13
		Diagonal	Max Tension	10	37.71	0.00	0.00
		Top Girt	Max Tension	1	0.00	0.00	0.00
			Max. Compression	10	-16.94	0.00	0.00
			Max. Mx	12	-8.98	1.46	0.00
			Max. My	26	-15.71	0.00	-0.03
			Max. Vy	12	0.29	0.00	0.00
			Max. Vx	26	0.01	0.00	0.00
T3	36 - 0	Leg	Max Tension	1	0.00	0.00	0.00
			Max. Compression	30	-378.84	0.00	0.00
			Max. Mx	14	-151.14	-6.05	0.40
			Max. My	7	-204.14	0.79	6.15
			Max. Vy	14	-0.96	-6.05	0.40
			Max. Vx	7	1.03	0.79	6.15
		Diagonal	Max Tension	10	44.37	0.00	0.00
		Top Girt	Max Tension	1	0.00	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Compression	10	-21.69	0.00	0.00
			Max. Mx	12	-11.71	1.69	0.00
			Max. My	26	-19.61	0.00	-0.04
			Max. Vy	12	-0.31	0.00	0.00
			Max. Vx	26	0.01	0.00	0.00

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Leg D	Max. Vert	22	378.22	8.29	-8.36
	Max. H_x	22	378.22	8.29	-8.36
	Max. H_z	3	88.76	1.92	20.07
	Min. Vert	7	44.28	-14.33	16.41
	Min. H_x	11	86.00	-18.76	-0.65
	Min. H_z	22	378.22	8.29	-8.36
Leg C	Max. Vert	14	377.81	-8.30	-8.34
	Max. H_x	27	85.69	18.75	-0.65
	Max. H_z	3	86.91	-1.54	19.42
	Min. Vert	31	43.98	14.82	15.92
	Min. H_x	14	377.81	-8.30	-8.34
	Min. H_z	14	377.81	-8.30	-8.34
Leg B	Max. Vert	6	378.67	-8.36	8.30
	Max. H_x	27	87.95	21.14	1.94
	Max. H_z	6	378.67	-8.36	8.30
	Min. Vert	23	44.60	16.53	-14.21
	Min. H_x	6	378.67	-8.36	8.30
	Min. H_z	19	87.54	-1.55	-19.43
Leg A	Max. Vert	30	379.09	8.35	8.33
	Max. H_x	30	379.09	8.35	8.33
	Max. H_z	30	379.09	8.35	8.33
	Min. Vert	15	44.90	-16.04	-14.69
	Min. H_x	11	88.25	-21.15	1.95
	Min. H_z	19	89.39	1.94	-20.08

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	798.01	0.00	0.00	14.65	-23.55	0.00
1.2 Dead+1.0 Wind 0 deg - No Ice	957.62	-0.00	-52.17	-4360.48	-1.97	-16.48
0.9 Dead+1.0 Wind 0 deg - No Ice	718.21	0.00	-52.17	-4264.95	-1.37	-16.48
1.2 Dead+1.0 Wind 30 deg - No Ice	957.62	27.67	-47.54	-3930.58	-2296.92	-43.45
0.9 Dead+1.0 Wind 30 deg - No Ice	718.21	27.67	-47.54	-3841.97	-2241.61	-43.61
1.2 Dead+1.0 Wind 45 deg - No Ice	957.62	39.13	-38.82	-3222.54	-3231.61	-53.75
0.9 Dead+1.0 Wind 45 deg - No	718.21	39.13	-38.82	-3145.21	-3161.27	-53.74

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Ice						
1.2 Dead+1.0 Wind 60 deg - No Ice	957.62	47.93	-27.46	-2299.95	-3948.78	-60.30
0.9 Dead+1.0 Wind 60 deg - No Ice	718.21	47.93	-27.45	-2236.85	-3866.71	-60.19
1.2 Dead+1.0 Wind 90 deg - No Ice	957.62	52.61	0.00	-8.64	-4387.11	-58.54
0.9 Dead+1.0 Wind 90 deg - No Ice	718.21	52.61	0.00	-6.67	-4297.91	-58.54
1.2 Dead+1.0 Wind 120 deg - No Ice	957.62	47.93	27.45	2258.89	-3949.55	-41.86
0.9 Dead+1.0 Wind 120 deg - No Ice	718.21	47.93	27.45	2206.61	-3867.46	-42.04
1.2 Dead+1.0 Wind 135 deg - No Ice	957.62	39.13	38.82	3182.27	-3232.43	-29.72
0.9 Dead+1.0 Wind 135 deg - No Ice	718.21	39.13	38.82	3115.11	-3161.85	-29.73
1.2 Dead+1.0 Wind 150 deg - No Ice	957.62	27.68	47.55	3890.80	-2298.13	-15.49
0.9 Dead+1.0 Wind 150 deg - No Ice	718.21	27.67	47.54	3812.02	-2242.01	-15.40
1.2 Dead+1.0 Wind 180 deg - No Ice	957.62	-0.00	52.17	4321.08	-1.66	16.49
0.9 Dead+1.0 Wind 180 deg - No Ice	718.21	0.00	52.17	4235.44	-1.20	16.48
1.2 Dead+1.0 Wind 210 deg - No Ice	957.62	-27.68	47.55	3890.53	2317.30	44.87
0.9 Dead+1.0 Wind 210 deg - No Ice	718.21	-27.67	47.54	3811.81	2256.35	44.77
1.2 Dead+1.0 Wind 225 deg - No Ice	957.62	-39.13	38.82	3182.07	3251.57	53.71
0.9 Dead+1.0 Wind 225 deg - No Ice	718.21	-39.13	38.82	3114.96	3176.16	53.71
1.2 Dead+1.0 Wind 240 deg - No Ice	957.62	-47.93	27.45	2258.75	3968.62	58.79
0.9 Dead+1.0 Wind 240 deg - No Ice	718.21	-47.93	27.45	2206.52	3881.73	58.97
1.2 Dead+1.0 Wind 270 deg - No Ice	957.62	-52.61	0.00	-8.53	4406.00	58.54
0.9 Dead+1.0 Wind 270 deg - No Ice	718.21	-52.61	0.00	-6.61	4312.05	58.54
1.2 Dead+1.0 Wind 300 deg - No Ice	957.62	-47.93	-27.46	-2299.80	3967.83	43.34
0.9 Dead+1.0 Wind 300 deg - No Ice	718.21	-47.93	-27.45	-2236.74	3880.97	43.23
1.2 Dead+1.0 Wind 315 deg - No Ice	957.62	-39.13	-38.82	-3222.31	3250.72	29.76
0.9 Dead+1.0 Wind 315 deg - No Ice	718.21	-39.13	-38.82	-3145.05	3175.57	29.75
1.2 Dead+1.0 Wind 330 deg - No Ice	957.62	-27.68	-47.55	-3930.51	2316.76	14.16
0.9 Dead+1.0 Wind 330 deg - No Ice	718.21	-27.67	-47.54	-3841.76	2255.96	14.25
Dead+Wind 0 deg - Service	798.01	0.00	-10.31	-886.81	5.84	-3.35
Dead+Wind 30 deg - Service	798.01	5.47	-9.39	-802.83	-465.00	-8.62
Dead+Wind 45 deg - Service	798.01	7.73	-7.67	-664.44	-647.68	-10.62
Dead+Wind 60 deg - Service	798.01	9.47	-5.42	-484.01	-787.80	-11.90
Dead+Wind 90 deg - Service	798.01	10.39	0.00	-14.57	-873.43	-11.63
Dead+Wind 120 deg - Service	798.01	9.47	5.42	451.04	-787.97	-8.30
Dead+Wind 135 deg - Service	798.01	7.73	7.67	631.49	-647.81	-5.89
Dead+Wind 150 deg - Service	798.01	5.47	9.39	769.92	-465.09	-3.04

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
Dead+Wind 180 deg - Service	798.01	0.00	10.31	854.01	6.04	3.35
Dead+Wind 210 deg - Service	798.01	-5.47	9.39	769.87	480.86	8.86
Dead+Wind 225 deg - Service	798.01	-7.73	7.67	631.46	663.58	10.61
Dead+Wind 240 deg - Service	798.01	-9.47	5.42	450.99	803.72	11.65
Dead+Wind 270 deg - Service	798.01	-10.39	0.00	-14.51	889.15	11.63
Dead+Wind 300 deg - Service	798.01	-9.47	-5.42	-483.98	803.53	8.56
Dead+Wind 315 deg - Service	798.01	-7.73	-7.67	-664.40	663.43	5.89
Dead+Wind 330 deg - Service	798.01	-5.47	-9.39	-802.78	480.76	2.83

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
1	0.00	-798.01	0.00	-0.00	798.01	-0.00	0.000%
2	0.00	-957.62	-52.17	0.00	957.62	52.17	0.000%
3	0.00	-718.21	-52.17	-0.00	718.21	52.17	0.000%
4	27.67	-957.62	-47.55	-27.67	957.62	47.54	0.000%
5	27.67	-718.21	-47.55	-27.67	718.21	47.54	0.000%
6	39.13	-957.62	-38.82	-39.13	957.62	38.82	0.000%
7	39.13	-718.21	-38.82	-39.13	718.21	38.82	0.000%
8	47.93	-957.62	-27.45	-47.93	957.62	27.46	0.001%
9	47.93	-718.21	-27.45	-47.93	718.21	27.45	0.000%
10	52.61	-957.62	0.00	-52.61	957.62	-0.00	0.000%
11	52.61	-718.21	0.00	-52.61	718.21	-0.00	0.000%
12	47.93	-957.62	27.45	-47.93	957.62	-27.45	0.000%
13	47.93	-718.21	27.45	-47.93	718.21	-27.45	0.000%
14	39.13	-957.62	38.82	-39.13	957.62	-38.82	0.000%
15	39.13	-718.21	38.82	-39.13	718.21	-38.82	0.000%
16	27.67	-957.62	47.55	-27.68	957.62	-47.55	0.001%
17	27.67	-718.21	47.55	-27.67	718.21	-47.54	0.000%
18	0.00	-957.62	52.17	0.00	957.62	-52.17	0.000%
19	0.00	-718.21	52.17	-0.00	718.21	-52.17	0.000%
20	-27.67	-957.62	47.55	27.68	957.62	-47.55	0.001%
21	-27.67	-718.21	47.55	27.67	718.21	-47.54	0.000%
22	-39.13	-957.62	38.82	39.13	957.62	-38.82	0.000%
23	-39.13	-718.21	38.82	39.13	718.21	-38.82	0.000%
24	-47.93	-957.62	27.45	47.93	957.62	-27.45	0.000%
25	-47.93	-718.21	27.45	47.93	718.21	-27.45	0.000%
26	-52.61	-957.62	0.00	52.61	957.62	-0.00	0.000%
27	-52.61	-718.21	0.00	52.61	718.21	-0.00	0.000%
28	-47.93	-957.62	-27.45	47.93	957.62	27.46	0.001%
29	-47.93	-718.21	-27.45	47.93	718.21	27.45	0.000%
30	-39.13	-957.62	-38.82	39.13	957.62	38.82	0.000%
31	-39.13	-718.21	-38.82	39.13	718.21	38.82	0.000%
32	-27.67	-957.62	-47.55	27.68	957.62	47.55	0.001%
33	-27.67	-718.21	-47.55	27.67	718.21	47.54	0.000%
34	0.00	-798.01	-10.30	-0.00	798.01	10.31	0.000%
35	5.47	-798.01	-9.39	-5.47	798.01	9.39	0.000%
36	7.73	-798.01	-7.67	-7.73	798.01	7.67	0.000%
37	9.47	-798.01	-5.42	-9.47	798.01	5.42	0.000%
38	10.39	-798.01	0.00	-10.39	798.01	-0.00	0.000%
39	9.47	-798.01	5.42	-9.47	798.01	-5.42	0.000%
40	7.73	-798.01	7.67	-7.73	798.01	-7.67	0.000%
41	5.47	-798.01	9.39	-5.47	798.01	-9.39	0.000%
42	0.00	-798.01	10.30	-0.00	798.01	-10.31	0.000%
43	-5.47	-798.01	9.39	5.47	798.01	-9.39	0.000%
44	-7.73	-798.01	7.67	7.73	798.01	-7.67	0.000%

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
45	-9.47	-798.01	5.42	9.47	798.01	-5.42	0.000%
46	-10.39	-798.01	0.00	10.39	798.01	-0.00	0.000%
47	-9.47	-798.01	-5.42	9.47	798.01	5.42	0.000%
48	-7.73	-798.01	-7.67	7.73	798.01	7.67	0.000%
49	-5.47	-798.01	-9.39	5.47	798.01	9.39	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	11	0.00000001	0.00030434
2	Yes	6	0.00000001	0.00035858
3	Yes	6	0.00000001	0.00014580
4	Yes	5	0.00000001	0.00029345
5	Yes	5	0.00000001	0.00021230
6	Yes	5	0.00000001	0.00029382
7	Yes	5	0.00000001	0.00020895
8	Yes	6	0.00000001	0.00046106
9	Yes	5	0.00000001	0.00021249
10	Yes	6	0.00000001	0.00039578
11	Yes	6	0.00000001	0.00035122
12	Yes	5	0.00000001	0.00029476
13	Yes	5	0.00000001	0.00020987
14	Yes	5	0.00000001	0.00029553
15	Yes	5	0.00000001	0.00021032
16	Yes	6	0.00000001	0.00050965
17	Yes	5	0.00000001	0.00020865
18	Yes	6	0.00000001	0.00035917
19	Yes	6	0.00000001	0.00014565
20	Yes	6	0.00000001	0.00048020
21	Yes	5	0.00000001	0.00020839
22	Yes	5	0.00000001	0.00029390
23	Yes	5	0.00000001	0.00020913
24	Yes	5	0.00000001	0.00029543
25	Yes	5	0.00000001	0.00021066
26	Yes	6	0.00000001	0.00039565
27	Yes	6	0.00000001	0.00035110
28	Yes	6	0.00000001	0.00047784
29	Yes	5	0.00000001	0.00020925
30	Yes	5	0.00000001	0.00029595
31	Yes	5	0.00000001	0.00021057
32	Yes	6	0.00000001	0.00053897
33	Yes	5	0.00000001	0.00020936
34	Yes	7	0.00000001	0.00023523
35	Yes	7	0.00000001	0.00013614
36	Yes	7	0.00000001	0.00013670
37	Yes	7	0.00000001	0.00013558
38	Yes	7	0.00000001	0.00012778
39	Yes	7	0.00000001	0.00013746
40	Yes	7	0.00000001	0.00013746
41	Yes	7	0.00000001	0.00013762
42	Yes	7	0.00000001	0.00023581
43	Yes	7	0.00000001	0.00013581
44	Yes	7	0.00000001	0.00013701
45	Yes	7	0.00000001	0.00013766
46	Yes	7	0.00000001	0.00012756

47	Yes	7	0.00000001	0.00013618
48	Yes	7	0.00000001	0.00013701
49	Yes	7	0.00000001	0.00013600

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	106 - 70	1.388	48	0.0082	0.1389
T2	70 - 36	0.867	48	0.0043	0.0839
T3	36 - 0	0.446	40	0.0024	0.0420

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
118.00	APXVAALL24-43	48	1.388	0.0082	0.1389	936195
112.00	Essex Tank	48	1.388	0.0082	0.1389	936195
108.00	Essex Handrail	48	1.388	0.0082	0.1389	936195

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	106 - 70	4.462	30	0.0101	0.2269
T2	70 - 36	2.726	30	0.0147	0.1418
T3	36 - 0	1.365	14	0.0123	0.0721

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
118.00	APXVAALL24-43	30	4.462	0.0101	0.2269	239314
112.00	Essex Tank	30	4.462	0.0101	0.2269	239314
108.00	Essex Handrail	30	4.462	0.0101	0.2269	239314

Compression Checks

Leg Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	106 - 70	P19x0.36"	36.02	36.02	65.6 K=1.00	21.0813	-271.66	544.67	0.499 [1] ✔
T2	70 - 36	P19x0.36"	34.02	34.02	61.9 K=1.00	21.0813	-321.18	558.16	0.575 [1] ✔
T3	36 - 0	P19x0.36"	36.02	36.02	65.6 K=1.00	21.0813	-378.84	544.68	0.696 [1] ✔

[1] P_u / ϕP_n controls

Top Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	106 - 70	W8x24	18.50	16.92	126.1 K=1.00	7.0800	-12.36	99.33	0.124 [1] ✔
T2	70 - 36	W8x24	20.12	18.54	138.2 K=1.00	7.0800	-16.94	83.79	0.202 [1] ✔
T3	36 - 0	W8x24	21.64	20.06	149.5 K=1.00	7.0800	-21.69	71.57	0.303 [1] ✔

[1] P_u / ϕP_n controls

Tension Checks

Diagonal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	106 - 70	1	40.86	37.51	1800.6	0.7854	29.45	35.34	0.833 [1] ✔
T2	70 - 36	1 1/4	39.91	36.88	1416.3	1.2272	37.71	55.22	0.683 [1] ✔
T3	36 - 0	1 3/8	42.43	39.44	1376.8	1.4849	44.37	66.82	0.664 [1] ✔

[1] P_u / ϕP_n controls

Top Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T2	70 - 36	W8x24	20.12	18.54	138.2	7.0800	4.82	229.39	0.021 [1] ✔
T3	36 - 0	W8x24	21.64	20.06	149.5	7.0800	5.68	229.39	0.025 [1] ✔

[1] P_u / ϕP_n controls

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
T1	106 - 70	Leg	P19x0.36"	4	-271.66	544.67	49.9	Pass
T2	70 - 36	Leg	P19x0.36"	20	-321.18	558.16	57.5	Pass
T3	36 - 0	Leg	P19x0.36"	36	-378.84	544.68	69.6	Pass
T1	106 - 70	Diagonal	1	14	29.45	35.34	83.3	Pass
T2	70 - 36	Diagonal	1 1/4	30	37.71	55.22	68.3	Pass
T3	36 - 0	Diagonal	1 3/8	46	44.37	66.82	66.4	Pass
T1	106 - 70	Top Girt	W8x24	7	-12.36	99.33	12.4	Pass
T2	70 - 36	Top Girt	W8x24	23	-16.94	83.79	20.2	Pass
T3	36 - 0	Top Girt	W8x24	39	-21.69	71.57	30.3	Pass
							Summary	
						Leg (T3)	69.6	Pass
						Diagonal (T1)	83.3	Pass
						Top Girt (T3)	30.3	Pass
						RATING =	**83.3**	**Pass**

CENTEK engineering

Centered on Solutions℠

Structural Analysis Report

Antenna Mounts

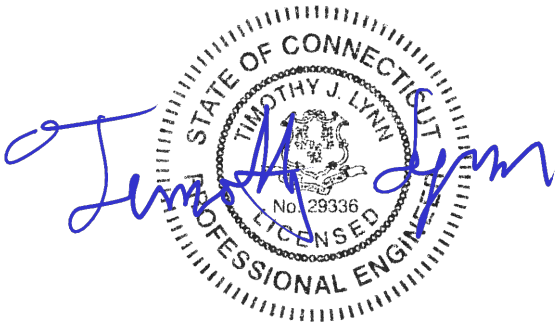
Proposed T-Mobile
Antenna Upgrade (Sprint Keep)

Site Ref: CTHA838A

6 Main Street
Essex, CT

CENTEK Project No. 21005.25

~~Date: April 28, 2021~~
Rev 1: August 13, 2021



Prepared for:

T-Mobile USA
35 Griffin Road
Bloomfield, CT 06002

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Introduction

The purpose of this report is to summarize the results of the antenna mount analysis of the equipment upgrade proposed by T-Mobile on the existing host water tank located in Essex, CT.

The host structure is a 124-ft tall water tank. The antennas are mounted on structural steel support masts attached to the water tank facade.

Antenna and Appurtenance Summary

The existing, proposed and future loads considered in this analysis consist of the following:

- Sprint (Existing to Remove):
  Antenna: Three (3) RFS ETCR-654L12H6 panel antennas, three (3) 1900MHz 4X45W RRHs, six (6) 800MHz 2X50W RRHs and three (3) TD-RRR8x20 RRHs pipe mounted to the tank façade with a RAD center elevation of ±118-ft above grade level.
  Coax Cable: Six (6) 1-5/8"∅ cables running on a leg/face of the existing tower as specified in Section 3 of this report.
- **T-MOBILE (Proposed Final Configuration):**
  Antennas: Three (3) Ericsson AIR6449 panel antennas, three (3) RFS APXVAALL24_43 panel antennas, three (3) Ericsson 4480 b71+ b85 remote radio heads, and three (3) Ericsson 4460 b25+b66 remote radio heads pipe mounted to the tank façade with a RAD center elevation of ±118-ft above grade level.
  Coax Cables: Three (3) 6x24 ∅ fiber cable running on a face of the existing tower as specified in Section 3 of this report.

Design Loading

Loading was determined per the requirements of the 2015 International Building Code and ASCE 7-10 "Minimum Design Loads for Buildings and Other Structures".

Wind Speed:	Vult = 135 mph (Risk Cat 2)	*[Appendix N of the 2018 CT Building Code]*

Results

Antenna Mounts:

Sector	Component	Stress Ratio (percentage of capacity)	Result
Alpha/Beta Gamma	Pipe	80.1%	**PASS**
	Connection	32.6%	**PASS**

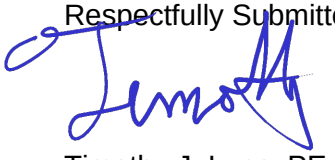
Conclusion

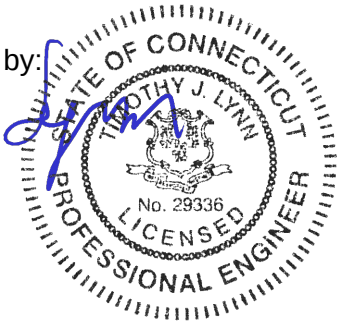
This analysis shows that the subject antenna mounts **are adequate** to support the proposed modified antenna configuration.

The analysis is based, in part, on the information provided to this office by T-Mobile. If the existing conditions are different than the information in this report, Centek Engineering, Inc. must be contacted for resolution of any potential issues.

Please feel free to call with any questions or comments.

Respectfully Submitted by:





Timothy J. Lynn, PE
Structural Engineer

Prepared by:

Fernando J. Palacios
Engineer

Standard Conditions for Furnishing of Professional Engineering Services on Existing Structures

All engineering services are performed on the basis that the information used is current and correct. This information may consist of, but is not necessarily limited to:

- Information supplied by the client regarding the structure itself, its foundations, the soil conditions, the antenna and feed line loading on the structure and its components, or other relevant information.
- Information from the field and/or drawings in the possession of Centek Engineering, Inc. or generated by field inspections or measurements of the structure.
- It is the responsibility of the client to ensure that the information provided to Centek Engineering, Inc. and used in the performance of our engineering services is correct and complete. In the absence of information to the contrary, we assume that all structures were constructed in accordance with the drawings and specifications and are in an un-corroded condition and have not deteriorated. It is therefore assumed that its capacity has not significantly changed from the “as new” condition.
- All services will be performed to the codes specified by the client, and we do not imply to meet any other codes or requirements unless explicitly agreed in writing. If wind and ice loads or other relevant parameters are to be different from the minimum values recommended by the codes, the client shall specify the exact requirement. In the absence of information to the contrary, all work will be performed in accordance with the latest revision of ANSI/ASCE10 & ANSI/EIA-222
- All services performed, results obtained, and recommendations made are in accordance with generally accepted engineering principles and practices. Centek Engineering, Inc. is not responsible for the conclusions, opinions and recommendations made by others based on the information we supply.

GENERAL DESCRIPTION OF STRUCTURAL ANALYSIS PROGRAM

tnxTower, is an integrated structural analysis and design software package for Designed specifically for the telecommunications industry, tnxTower, formerly ERITower, automates much of the tower analysis and design required by the TIA/EIA 222 Standard.

tnxTower Features:

- tnxTower can analyze and design 3- and 4-sided guyed towers, 3- and 4-sided self-supporting towers and either round or tapered ground mounted poles with or without guys.
- The program analyzes towers using the TIA-222-G (2005) standard or any of the previous TIA/EIA standards back to RS-222 (1959). Steel design is checked using the AISC ASD 9th Edition or the AISC LRFD specifications.
- Linear and non-linear (P-delta) analyses can be used in determining displacements and forces in the structure. Wind pressures and forces are automatically calculated.
- Extensive graphics plots include material take-off, shear-moment, leg compression, displacement, twist, feed line, guy anchor and stress plots.
- tnxTower contains unique features such as True Cable behavior, hog rod take-up, foundation stiffness and much more.

CENTEK engineering
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Branford, CT 06405 F: (203) 488-8587

Subject: Wind Load on Equipment per ASCE 7-10

Location: Essex, CT

Rev. 0: 08/13/2021

Prepared by: F.J.P; Checked by: T.J.L.
Job No. 21005.25

Design Wind Load on Other Structures:

(Based on IBC 2015, CSBC 2018 and ASCE 7-10)

Wind Speed =	$V := 135$	mph	(User Input)	(CSBC Appendix-N)
Risk Category =	$BC := II$		(User Input)	(IBC Table 1604.5)
Exposure Category =	$Exp := C$		(User Input)	
Height Above Grade =	$Z := 118$	ft	(User Input)	
Structure Type =	$Structuretype := Square\_Chimney$			
Structure Height =	$Height := 8$	ft	(User Input)	
Horizontal Dimension of Structure =	$Width := 2$	ft	(User Input)	

Terrain Exposure Constants:

Nominal Height of the Atmospheric Boundary Layer =

$$zg := \begin{cases} 1200 & \text{if } Exp = B \\ 900 & \text{if } Exp = C \\ 700 & \text{if } Exp = D \end{cases} = 900$$

(Table 26.9-1)

3-Sec Gust Speed Power Law Exponent =

$$\alpha := \begin{cases} 7 & \text{if } Exp = B \\ 9.5 & \text{if } Exp = C \\ 11.5 & \text{if } Exp = D \end{cases} = 9.5$$

(Table 26.9-1)

Integral Length Scale Factor =

$$l := \begin{cases} 320 & \text{if } Exp = B \\ 500 & \text{if } Exp = C \\ 650 & \text{if } Exp = D \end{cases} = 500$$

(Table 26.9-1)

Integral Length Scale Power Law Exponent =

$$\varepsilon := \begin{cases} \frac{1}{3} & \text{if } Exp = B \\ \frac{1}{5} & \text{if } Exp = C \\ \frac{1}{8} & \text{if } Exp = D \end{cases} = 0.2$$

(Table 26.9-1)

Turbulence Intensity Factor =

$$c := \begin{cases} 0.3 & \text{if } Exp = B \\ 0.2 & \text{if } Exp = C \\ 0.15 & \text{if } Exp = D \end{cases} = 0.2$$

(Table 26.9-1)

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Location: Essex, CT

Rev. 0: 08/13/2021

Prepared by: F.J.P; Checked by: T.J.L.
Job No. 21005.25

Exposure Constant =	$Z_{min} := \begin{cases} 30 & \text{if } Exp = B \\ 15 & \text{if } Exp = C \\ 7 & \text{if } Exp = D \end{cases} = 15$	(Table 26.9-1)
Exposure Coefficient =	$K_z := \begin{cases} 2.01 \cdot \left(\frac{Z}{zg}\right)^{\left(\frac{2}{\alpha}\right)} & \text{if } 15 \le Z \le zg \\ 2.01 \cdot \left(\frac{15}{zg}\right)^{\left(\frac{2}{\alpha}\right)} & \text{if } Z < 15 \end{cases} = 1.31$	(Table 29.3-1)
Topographic Factor =	$K_{zt} := 1$	(Eq. 26.8-2)
Wind Directionality Factor =	$K_d = 0.9$	(Table 26.6-1)
Velocity Pressure =	$q_z := 0.00256 \cdot K_z \cdot K_{zt} \cdot K_d \cdot V^2 = 55.03$	(Eq. 29.3-1)
Peak Factor for Background Response =	$g_Q := 3.4$	(Sec 26.9.4)
Peak Factor for Wind Response =	$g_v := 3.4$	(Sec 26.9.4)
Equivalent Height of Structure =	$z := \begin{cases} Z_{min} & \text{if } Z_{min} > 0.6 \cdot Height \\ 0.6 \cdot Height & \text{else} \end{cases} = 15$	(Sec 26.9.4)
Intensity of Turbulence =	$I_z := c \cdot \left(\frac{33}{z}\right)^{\left(\frac{1}{6}\right)} = 0.228$	(Eq. 26.9-7)
Integral Length Scale of Turbulence =	$L_Z := l \cdot \left(\frac{z}{33}\right)^{E} = 427.057$	(Eq. 26.9-9)
Background Response Factor =	$Q := \sqrt{\frac{1}{1 + 0.63 \cdot \left(\frac{Width + Height}{L_Z}\right)^{0.63}}} = 0.972$	(Eq. 26.9-8)
Gust Response Factor =	$G := 0.925 \cdot \left(\frac{\left(1 + 1.7 \cdot g_Q \cdot I_z \cdot Q\right)}{1 + 1.7 \cdot g_v \cdot I_z}\right) = 0.91$	(Eq. 26.9-6)
Force Coefficient =	$C_f = 1.35$	(Fig 29.5-1 - 29.5-3)
Wind Force =	$F := q_z \cdot G \cdot C_f = 68$	psf

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Development of Wind on Antennas

Antenna Data:

Antenna Model =	Ericsson AIR6449 B41		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 33.1$	in	(User Input)
Antenna Width =	$W_{ant} := 20.6$	in	(User Input)
Antenna Thickness =	$T_{ant} := 8.6$	in	(User Input)
Antenna Weight =	$WT_{ant} := 104$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 1$		(User Input)

Wind Load (Front)

Surface Area for One Antenna =	$SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 4.7$	sf
Antenna Projected Surface Area =	$A_{ant} := SA_{ant} \cdot N_{ant} = 4.7$	sf
Total Antenna Wind Force =	$F_{ant} := F \cdot A_{ant} = 320$	lbs

Wind Load (Side)

Surface Area for One Antenna =	$SA_{ant} := \frac{L_{ant} \cdot T_{ant}}{144} = 2$	sf
Antenna Projected Surface Area =	$A_{ant} := SA_{ant} \cdot N_{ant} = 2$	sf
Total Antenna Wind Force =	$F_{ant} := F \cdot A_{ant} = 134$	lbs

Gravity Load (without ice)

Weight of All Antennas =	$WT_{ant} \cdot N_{ant} = 104$	lbs

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Development of Wind on Antennas

Antenna Data:

Antenna Model =	RFS APXVAARR24-43		
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)

Wind Load (Front)

Surface Area for One Antenna =	$SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 16$	sf
Antenna Projected Surface Area =	$A_{ant} := SA_{ant} \cdot N_{ant} = 16$	sf
Total Antenna Wind Force =	$F_{ant} := F \cdot A_{ant} = 1081$	lbs

Wind Load (Side)

Surface Area for One Antenna =	$SA_{ant} := \frac{L_{ant} \cdot T_{ant}}{144} = 5.8$	sf
Antenna Projected Surface Area =	$A_{ant} := SA_{ant} \cdot N_{ant} = 5.8$	sf
Total Antenna Wind Force =	$F_{ant} := F \cdot A_{ant} = 392$	lbs

Gravity Load (without ice)

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

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Development of Wind & Ice Load on RRHs

RRH Data:

RRH Model =	Ericsson 4480 B71B85		
RRH Shape =	Flat		(User Input)
RRH Height =	$L_{RRH} := 21.8$	in	(User Input)
RRH Width =	$W_{RRH} := 15.7$	in	(User Input)
RRH Thickness =	$T_{RRH} := 7.5$	in	(User Input)
RRH Weight =	$WT_{RRH} := 84$	lbs	(User Input)
Number of RRHs =	$N_{RRH} := 1$		(User Input)

Wind Load (Front)

Surface Area for One RRH =	$SA_{RRH} := \frac{L_{RRH} \cdot W_{RRH}}{144} = 2.4$	sf
RRH Projected Surface Area =	$A_{RRH} := SA_{RRH} \cdot N_{RRH} = 2.4$	sf
Total RRH Wind Force =	$F_{RRH} := F \cdot A_{RRH} = 161$	lbs

Wind Load (Side)

Surface Area for One RRH =	$SA_{RRH} := \frac{L_{RRH} \cdot T_{RRH}}{144} = 1.1$	sf
RRH Projected Surface Area =	$A_{RRH} := SA_{RRH} \cdot N_{RRH} = 1.1$	sf
Total RRH Wind Force =	$F_{RRH} := F \cdot A_{RRH} = 77$	lbs

Gravity Load (without ice)

Weight of All RRHs =	$WT_{RRH} \cdot N_{RRH} = 84$	lbs

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Development of Wind & Ice Load on RRHs

RRH Data:

RRH Model =	Ericsson 4460 B25+B66		
RRH Shape =	Flat		(User Input)
RRH Height =	$L_{RRH} := 19.6$	in	(User Input)
RRH Width =	$W_{RRH} := 15.7$	in	(User Input)
RRH Thickness =	$T_{RRH} := 12.1$	in	(User Input)
RRH Weight =	$WT_{RRH} := 109$	lbs	(User Input)
Number of RRHs =	$N_{RRH} := 1$		(User Input)

Wind Load (Front)

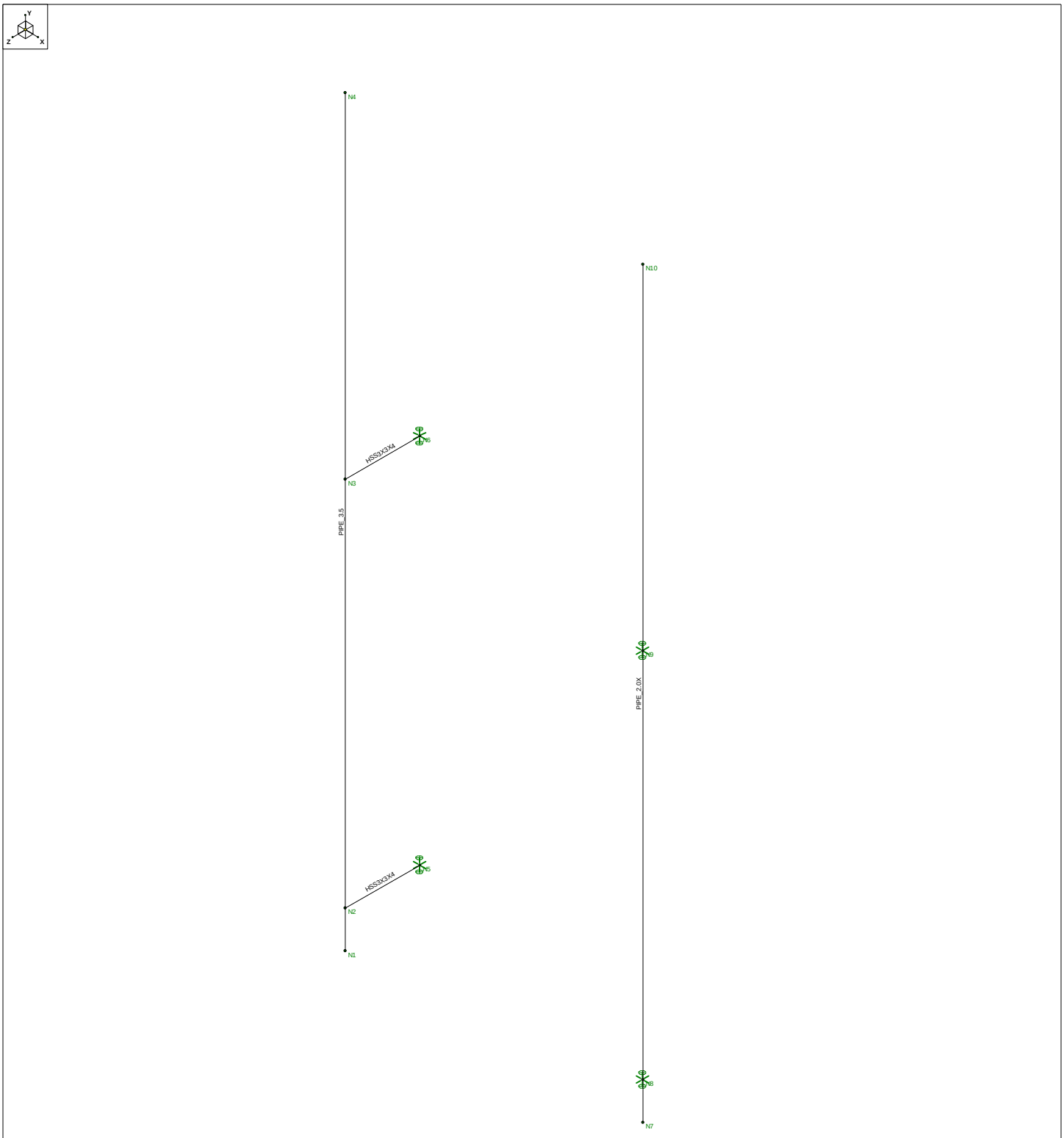
Surface Area for One RRH =	$SA_{RRH} := \frac{L_{RRH} \cdot W_{RRH}}{144} = 2.1$	sf
RRH Projected Surface Area =	$A_{RRH} := SA_{RRH} \cdot N_{RRH} = 2.1$	sf
Total RRH Wind Force =	$F_{RRH} := F \cdot A_{RRH} = 144$	lbs

Wind Load (Side)

Surface Area for One RRH =	$SA_{RRH} := \frac{L_{RRH} \cdot T_{RRH}}{144} = 1.6$	sf
RRH Projected Surface Area =	$A_{RRH} := SA_{RRH} \cdot N_{RRH} = 1.6$	sf
Total RRH Wind Force =	$F_{RRH} := F \cdot A_{RRH} = 111$	lbs

Gravity Load (without ice)

Weight of All RRHs =	$WT_{RRH} \cdot N_{RRH} = 109$	lbs



Envelope Only Solution

Centek Engineering		
FJP	CTHA838A - Antenna Mount	Aug 13, 2021 at 11:19 AM
21005.25	Member Framing	Antenna Mount.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): ASD
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	4
Cd X	4
Rho Z	1
Rho X	1

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (/1...	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 Ru...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	Pipe Mast 2	PIPE_2.0X	Column	Pipe	A53 Grad...	Typical	1.4	.827	.827	1.65
2	Pipe Mast	PIPE_3.5	Column	Pipe	A53 Grad...	Typical	2.5	4.52	4.52	9.04
3	Outrigger	HSS3X3X4	Beam	Pipe	A500 Gr.46	Typical	2.44	3.02	3.02	5.08

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	Pipe Mast	10			Lbyy						Lateral
2	M2	Outrigger	1			Lbyy						Lateral
3	M3	Outrigger	1			Lbyy						Lateral
4	M4	Pipe Mast 2	10			Lbyy						Lateral

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(...	Section/Shape	Type	Design List	Material	Design ...
1	M1	N4	N1			Pipe Mast	Colu...	Pipe	A53 Gr...	Typical
2	M2	N6	N3			Outrigger	Beam	Pipe	A500 ...	Typical
3	M3	N5	N2			Outrigger	Beam	Pipe	A500 ...	Typical
4	M4	N10	N7			Pipe Mast 2	Colu...	Pipe	A53 Gr...	Typical

Joint Coordinates and Temperatures

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Diaphragm
1	N1	0	0	0	0	
2	N2	0	.5	0	0	
3	N3	0	5.5	0	0	
4	N4	0	10	0	0	
5	N5	0	.5	-1	0	
6	N6	0	5.5	-1	0	
7	N7	4	0	0	0	
8	N8	4	.5	0	0	
9	N9	4	5.5	0	0	
10	N10	4	10	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	N2						
2	N3						
3	N5	Reaction	Reaction	Reaction		Reaction	
4	N6	Reaction	Reaction	Reaction		Reaction	
5	N8	Reaction	Reaction	Reaction		Reaction	
6	N9	Reaction	Reaction	Reaction		Reaction	

Member Point Loads (BLC 2 : Weight of Equipment)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	Y	-.075	.5
2	M1	Y	-.075	7.5
3	M1	Y	-.109	2
4	M1	Y	-.084	2
5	M4	Y	-.075	.5
6	M4	Y	-.075	7.5
7	M4	Y	-.109	2
8	M4	Y	-.084	2

Member Point Loads (BLC 3 : Wind X-Direction)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	X	.196	.5
2	M1	X	.196	7.5
3	M1	X	.161	2
4	M4	X	.196	.5
5	M4	X	.196	7.5
6	M4	X	.161	2

Member Point Loads (BLC 4 : Wind Z-Direction)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	Z	.541	.5
2	M1	Z	.541	7.5
3	M4	Z	.541	.5
4	M4	Z	.541	7.5

Member Distributed Loads (BLC 3 : Wind X-Direction)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/ft,F,ksf]	Start Location[ft,%]	End Location[ft,%]
1	M1	X	.017	.017	0	0
2	M4	X	.017	.017	0	0

Member Distributed Loads (BLC 4 : Wind Z-Direction)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/ft,F,ksf]	Start Location[ft,%]	End Location[ft,%]
1	M1	Z	.017	.017	8	18
2	M4	Z	.017	.017	8	18

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	J...	Point	Distribu...	Area(M...	Surface...
1	Self Weight	DL		-1						
2	Weight of Equipment	DL					8			
3	Wind X-Direction	WLX					6	2		
4	Wind Z-Direction	WLZ					4	2		

Load Combinations

	Description	Solve	PDelta	...	B...	Fa...	BLC	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
1	IBC 16-8	Yes	Y		DL	1																				
2	IBC 16-9	Yes	Y		DL	1	LL	1	L...	1																
3	IBC 16-10 (a)	Yes	Y		DL	1	RLL	1																		
4	IBC 16-10 (b)	Yes	Y		DL	1	SL	1	S...	1																
5	IBC 16-10 (c)	Yes	Y		DL	1	RL	1																		
6	IBC 16-11 (a)	Yes	Y		DL	1	LL	.75	L...	.75	R...	.75														
7	IBC 16-11 (b)	Yes	Y		DL	1	LL	.75	L...	.75	SL	.75	S...	.75												
8	IBC 16-11 (c)	Yes	Y		DL	1	LL	.75	L...	.75	RL	.75														
9	IBC 16-12 (a) (a)	Yes	Y		DL	1	WLX	.6																		
10	IBC 16-12 (a) (b)	Yes	Y		DL	1	WLZ	.6																		
11	IBC 16-12 (a) (c)	Yes	Y		DL	1	WLX	-.6																		
12	IBC 16-12 (a) (d)	Yes	Y		DL	1	WLZ	-.6																		
13	IBC 16-13 (a) (a)	Yes	Y		DL	1	WLX	.45	LL	.75	L...	.75	R...	.75												
14	IBC 16-13 (a) (b)	Yes	Y		DL	1	WLZ	.45	LL	.75	L...	.75	R...	.75												
15	IBC 16-13 (a) (c)	Yes	Y		DL	1	WLX	-.45	LL	.75	L...	.75	R...	.75												
16	IBC 16-13 (a) (d)	Yes	Y		DL	1	WLZ	-.45	LL	.75	L...	.75	R...	.75												
17	IBC 16-13 (b) (a)	Yes	Y		DL	1	WLX	.45	LL	.75	L...	.75	SL	.75	S...	.75										
18	IBC 16-13 (b) (b)	Yes	Y		DL	1	WLZ	.45	LL	.75	L...	.75	SL	.75	S...	.75										
19	IBC 16-13 (b) (c)	Yes	Y		DL	1	WLX	-.45	LL	.75	L...	.75	SL	.75	S...	.75										
20	IBC 16-13 (b) (d)	Yes	Y		DL	1	WLZ	-.45	LL	.75	L...	.75	SL	.75	S...	.75										
21	IBC 16-13 (c) (a)	Yes	Y		DL	1	WLX	.45	LL	.75	L...	.75	RL	.75												
22	IBC 16-13 (c) (b)	Yes	Y		DL	1	WLZ	.45	LL	.75	L...	.75	RL	.75												
23	IBC 16-13 (c) (c)	Yes	Y		DL	1	WLX	-.45	LL	.75	L...	.75	RL	.75												

Load Combinations (Continued)

	Description	Solve	PDelta	...	B...	Fa...	BLC	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
24	IBC 16-13 (c) (d)	Yes	Y		DL	1	WLZ	-.45	LL	.75	L...	.75	RL	.75										
25	IBC 16-15 (a)	Yes	Y		DL	.6	WLX	.6																
26	IBC 16-15 (b)	Yes	Y		DL	.6	WLZ	.6																
27	IBC 16-15 (c)	Yes	Y		DL	.6	WLX	-.6																
28	IBC 16-15 (d)	Yes	Y		DL	.6	WLZ	-.6																

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	N5	max	.062	9	.587	10	.134	10	0	28	.011	9	0	28
2		min	-.062	11	-.234	28	.005	28	0	1	-.011	11	0	1
3	N6	max	.496	11	.591	12	.664	28	0	28	.445	11	0	28
4		min	-.496	9	-.231	26	-.804	10	0	1	-.445	9	0	1
5	N8	max	.065	9	.059	24	.052	10	0	28	0	28	0	28
6		min	-.065	11	.036	25	-.052	12	0	1	0	1	0	1
7	N9	max	.499	11	.331	24	.722	12	0	28	0	28	0	28
8		min	-.499	9	.199	25	-.722	10	0	1	0	1	0	1
9	Totals:	max	.868	27	.835	24	1.339	28						
10		min	-.868	9	.501	25	-1.339	10						

Envelope Joint Displacements

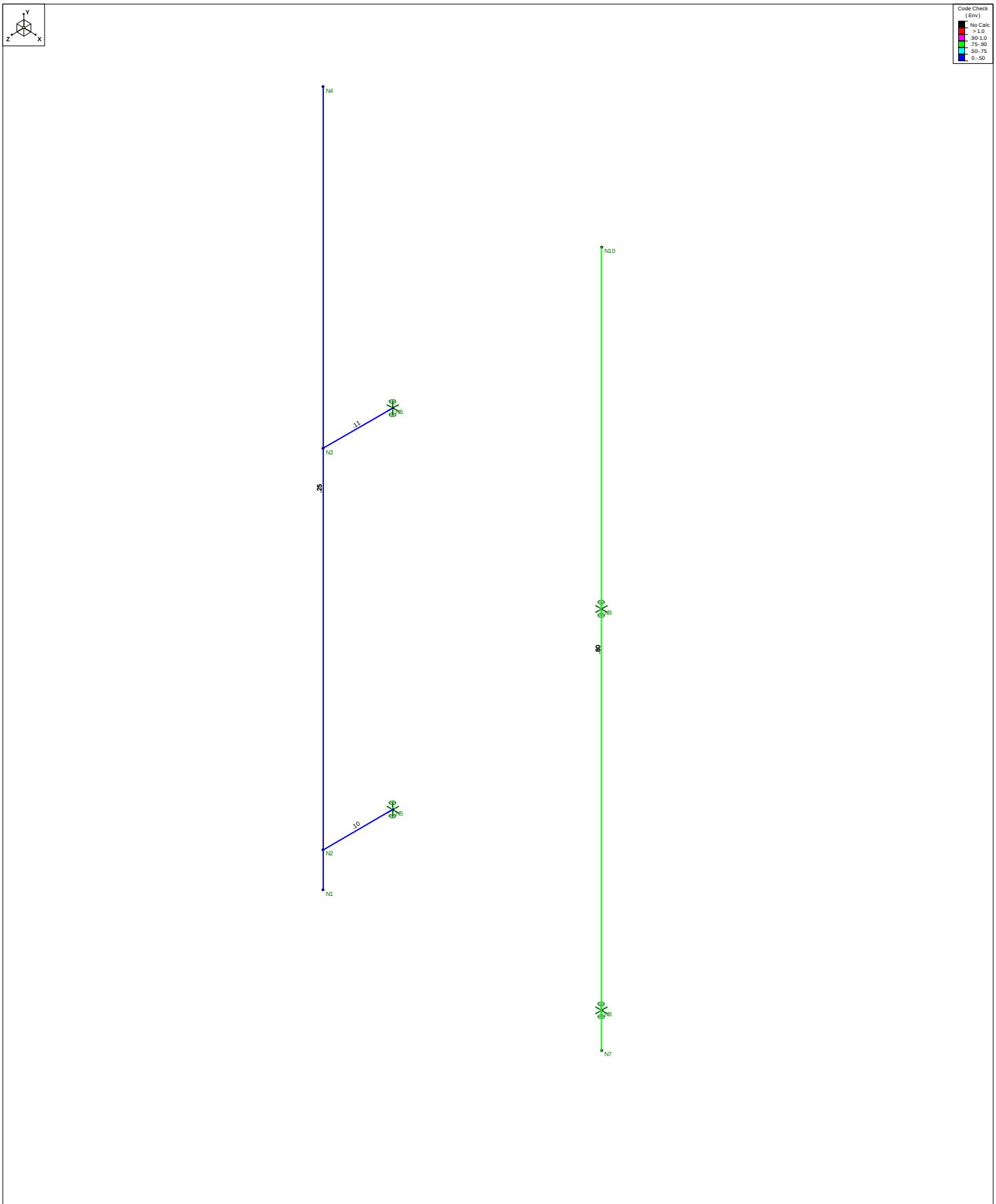
	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [...	LC	Y Rotation [...	LC	Z Rotation [...	LC
1	N1	max	.003	9	.007	28	.002	28	7.69e-4	10	4.097e-5	25	5.332e-4	9
2		min	-.003	11	-.015	10	-.005	10	-3.678e-4	28	-4.097e-5	27	-5.332e-4	11
3	N2	max	0	25	.007	28	0	28	7.693e-4	10	4.097e-5	25	5.329e-4	9
4		min	0	27	-.015	10	0	10	-3.681e-4	28	-4.097e-5	27	-5.329e-4	11
5	N3	max	.004	9	.007	28	0	10	1.369e-3	10	4.05e-4	9	1.651e-3	11
6		min	-.004	11	-.015	10	0	28	-9.504e-4	28	-4.05e-4	11	-1.651e-3	9
7	N4	max	.17	9	.007	28	.211	10	4.948e-3	10	4.05e-4	9	3.581e-3	11
8		min	-.17	11	-.015	10	-.188	28	-4.523e-3	28	-4.05e-4	11	-3.581e-3	9
9	N5	max	0	28	0	28	0	28	1.37e-3	10	0	28	5.329e-4	9
10		min	0	1	0	1	0	1	-6.1e-4	28	0	1	-5.329e-4	11
11	N6	max	0	28	0	28	0	28	1.218e-3	10	0	28	1.651e-3	11
12		min	0	1	0	1	0	1	-4.384e-4	28	0	1	-1.651e-3	9
13	N7	max	.02	9	0	28	.026	10	4.28e-3	12	0	28	3.393e-3	9
14		min	-.02	11	0	1	-.026	12	-4.28e-3	10	0	1	-3.393e-3	11
15	N8	max	0	28	0	28	0	28	4.279e-3	12	0	28	3.392e-3	9
16		min	0	1	0	1	0	1	-4.279e-3	10	0	1	-3.392e-3	11
17	N9	max	0	28	0	28	0	28	1.316e-2	10	0	28	8.809e-3	11
18		min	0	1	0	1	0	1	-1.316e-2	12	0	1	-8.809e-3	9
19	N10	max	.903	9	0	28	1.47	10	3.313e-2	10	0	28	1.959e-2	11
20		min	-.903	11	0	1	-1.47	12	-3.313e-2	12	0	1	-1.959e-2	9

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

	Me...	Sha...	Code C...	Lo...	LC	Shea...	Loc...	Dir	LC	Pnc/om [k]	Pnt/om [k]	Mnyy/o...	Mnzz/o...	Cb	Eqn
1	M1	PIP...	.249	4.4...	10	.031	4.5...		10	34.854	52.395	5.292	5.292	1	H1-1b
2	M2	HS...	.108	1	12	.033	0	y	12	66.686	67.21	5.693	5.693	1.663	H1-1b
3	M3	HS...	.103	1	10	.033	0	y	10	66.686	67.21	5.693	5.693	1.663	H1-1b

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

	Me...	Sha...	Code C...	Lo...	LC	Shea...	Loc...	Dir	LC	Pnc/om [k]	Pnt/om [k]	Mnyy/o...	Mnzz/o...	Cb	Eqn
4	M4	PIP...	.801	4.4...	12	.045	4.5...		12	8.632	29.341	1.684	1.684	1	H1-1b



Member Code Checks Displayed (Enveloped)
Envelope Only Solution

Centek Engineering		
FJP	CTHA838A - Antenna Mount	Aug 13, 2021 at 11:19 AM
21005.25	Member Unity of Check	Antenna Mount.r3d

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Branford, CT 06405 F: (203) 488-8587

Subject: Proposed Connection to Water Tank

Location: Essex, CT

Rev. 0: 08/13/2021

Prepared by: F.J.P; Checked by: T.J.L.
Job No. 21005.25

Connection to Tank:

Reactions at Tank Wall Connection : Wind X-Direction

Horizontal X = $Horizontal_x := 0.496 \cdot kip$

Vertical = $Vertical := 0.224\ kip$

Horizontal Z = $Horizontal_z := 0.087\ kip$

Moment X = $Mx := 0 \cdot ft \cdot kip$

Moment Y = $My := .445 \cdot ft \cdot kip$

Moment Z = $Mz := 0 \cdot ft \cdot kip$

Stud Data: 1/4-20 Mild Steel Stud

Number of Studs= $n_b := 12$

Yield Load in Tension = $T_{yield} := 1553\ lbf$

Shear Strength = $V_U := 1450\ lbf$

Allowable Load in Tension = $T_{all} := 0.6 \cdot T_{yield} = 931.8\ lbf$

Allowable Load in Shear = $V_{all} := 0.6 \cdot 0.75 \cdot V_U = 652.5\ lbf$

Distance to Studs 1= $D_1 := 1\ in$

Distance to Studs 2= $D_2 := 3\ in$

Number of Studs 1= $N_1 := 4$

Number of Studs 2= $N_2 := 8$

Polar Moment of Inertia= $I_p := \left(D_1^{\,2} \cdot N_1\right) + \left(D_2^{\,2} \cdot N_2\right) = 76\ in^2$

Check Studs:

Tension Force Each Stud = $T_{Act} := \frac{Horizontal_z}{n_b} + \frac{My \cdot D_2}{I_p} = 218.04\ lbf$

Condition 1 = $Condition1 := \text{if}\left(T_{Act} \le T_{all}, \text{“OK”}, \text{“NG”}\right) = \text{“OK”}$

Condition1 = “OK”

Shear Force Each Stud $V_{Act} := \frac{Horizontal_x + Vertical}{n_b} = 60\ lbf$

Condition 2 = $Condition2 := \text{if}\left(V_{Act} \le V_{all}, \text{“OK”}, \text{“NG”}\right) = \text{“OK”}$

Condition2 = “OK”

Combined = $Condition3 := \text{if}\left(\frac{T_{Act}}{T_{all}} + \frac{V_{Act}}{V_{all}} \le 1.0, \text{“OK”}, \text{“NG”}\right) = \text{“OK”}$

Condition3 = “OK”

$\frac{T_{Act}}{T_{all}} + \frac{V_{Act}}{V_{all}} = 32.6\%$

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Subject: Proposed Connection to Water Tank

Location: Essex, CT

Rev. 0: 08/13/2021

Prepared by: F.J.P; Checked by: T.J.L.
Job No. 21005.25

Connection to Tank:

Reactions at Tank Wall Connection : Wind Z-Direction

Horizontal X = $Horizontal_x := 0 \cdot kip$

Vertical = $Vertical := .331\ kip$

Horizontal Z = $Horizontal_z := .722\ kip$

Moment X = $Mx := 0 \cdot ft \cdot kip$

Moment Y = $My := 0 \cdot ft \cdot kip$

Moment Z = $Mz := 0 \cdot ft \cdot kip$

Check Studs:

Tension Force Each Stud = $T_{Act} := \frac{Horizontal_z}{n_b} + \frac{My \cdot D_2}{I_p} = 60.17\ lbf$

Condition 1 = $Condition1 := \text{if}\left(T_{Act} \le T_{all}, \text{“OK”}, \text{“NG”}\right) = \text{“OK”}$

$Condition1 = \text{“OK”}$

Shear Force Each Stud $V_{Act} := \frac{Horizontal_x + Vertical}{n_b} = 27.58\ lbf$

Condition 2 = $Condition2 := \text{if}\left(V_{Act} \le V_{all}, \text{“OK”}, \text{“NG”}\right) = \text{“OK”}$

$Condition2 = \text{“OK”}$

Combined = $Condition3 := \text{if}\left(\frac{T_{Act}}{T_{all}} + \frac{V_{Act}}{V_{all}} \le 1.0, \text{“OK”}, \text{“NG”}\right) = \text{“OK”}$

$Condition3 = \text{“OK”}$

$\frac{T_{Act}}{T_{all}} + \frac{V_{Act}}{V_{all}} = 10.7\%$

RAN Template:	A&L Template:
67E5A998E 6160	67E5998E_1xAIR+1OP

CTHA838A_Sprint Retain_1_draft

Print Name: Standard (2)
PORs: New Build_Sprint Keep

Section 1 - Site Information

Site ID: CTHA838A
Status: Draft
Version: 1
Project Type: Sprint Retain
Approved: Not Approved
Approved By: Not Approved
Last Modified: 7/9/2021 4:33:33 PM
Last Modified By: Michael.Low1@T-Mobile.com

Site Name: CTHA838A
Site Class: Watertank
Site Type: Structure Non Building
Plan Year:
Market: CONNECTICUT CT
Vendor: Ericsson
Landlord: Not Specified

Latitude: 41.35130200
Longitude: -72.40617300
Address: 6 Main St
City, State: Centerbrook, CT
Region: NORTHEAST

RAN Template: 67E5A998E 6160			AL Template: 67E5998E_1xAIR+1OP	
Sector Count: 3	**Antenna Count:** 6	**Coax Line Count:** 0	**TMA Count:** 0	**RRU Count:** 6

Section 2 - Existing Template Images

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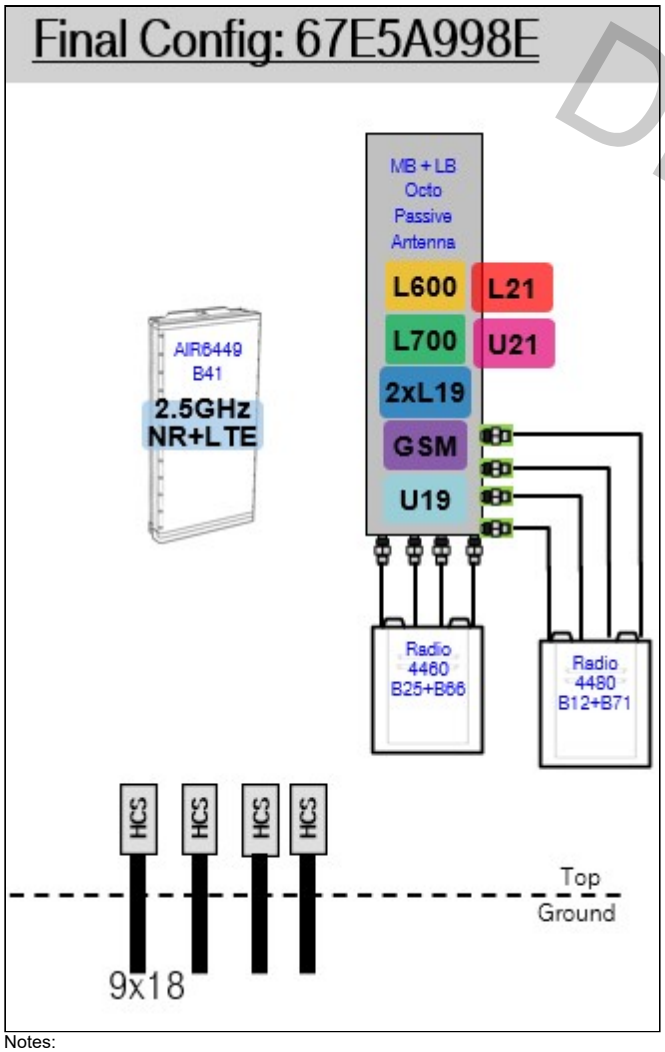
Section 3 - Proposed Template Images

67E5A998E.jpg



Notes:

Section 4 - Siteplan Images

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RAN Template:	A&L Template:
67E5A998E 6160	67E5998E_1xAIR+1OP

CTHA838A_Sprint Retain_1_draft

Print Name: Standard (2)
PORs: New Build_Sprint Keep

Section 5 - RAN Equipment

Existing RAN Equipment

----- This section is intentionally blank. -----

Proposed RAN Equipment

Template: 67E5A998E 6160

Enclosure	1	2	3
Enclosure Type	Enclosure 6160	RBS 6601	B160
Baseband	BB 6648 (L700, L600, N600); BB 6648 (L2500, N2500); BB 6648 (L2100, L1900)	DUG20 (G1900)	
Hybrid Cable System	Ericsson Hybrid Trunk 6/24 4AWG 50m Ericsson Hybrid Trunk 6/24 4AWG 70m **(x 2)**		
Transport System	CSR IXRe V2 (Gen2)		

RAN Scope of Work:

current 100 Amp, upgrade to 200 amp
no Generator
lengths as, Alpha – 50 meters and Beta/Gamma – 70 meters
upon completion, redesign CT11238A: A:30, B:115, G: 300_per RK

RAN Template:	A&L Template:
67E5A998E 6160	67E5998E_1xAIR+1OP

CTHA838A_Sprint Retain_1_draft

Print Name: Standard (2)
PORs: New Build_Sprint Keep

Section 6 - A&L Equipment

Existing Template: Custom
Proposed Template: 67E5998E_1xAIR+1OP

Sector 1 (Proposed) view from behind

Coverage Type	A - Outdoor Macro					
Antenna	1				2	
Antenna Model	RFS - APXVAALL24_43-U-NA20 (Octo)				Ericsson - AIR6449 B41 (Active Antenna - Massive MIMO)	
Azimuth	300				300	
M. Tilt	0				0	
Height	118				118	
Ports	**P1**	**P2**	**P3**	**P4**	**P5**	**P6**
Active Tech.	L700 L600 N600	L700 L600 N600	L2100 L1900 G1900	L2100 L1900 G1900	L2500 N2500	L2500 N2500
Dark Tech.						
Restricted Tech.						
Decomm. Tech.						
E. Tilt	2	2	2	2	2	2
Cables	Coax Jumper **(x2)**	Coax Jumper **(x2)**	Coax Jumper **(x2)**	Coax Jumper **(x2)**		
TMAs						
Diplexers / Combiners						
Radio	Radio 4480 B71+B85 (At Antenna)	SHARED Radio 4480 B71+B85 (At Antenna)	Radio 4460 B25+B66 (At Antenna)	SHARED Radio 4460 B25+B66 (At Antenna)		
Sector Equipment						

Unconnected Equipment:

Scope of Work:

*A dashed border indicates shared equipment. Any connected equipment is denoted with the SHARED keyword.

RAN Template:	A&L Template:
67E5A998E 6160	67E5998E_1xAIR+1OP

CTHA838A_Sprint Retain_1_draft

Print Name: Standard (2)
PORs: New Build_Sprint Keep

Sector 2 (Proposed) view from behind

Coverage Type	A - Outdoor Macro					
Antenna	1				2	
Antenna Model	RFS - APXVAALL24_43-U-NA20 (Octo)				Ericsson - AIR6449 B41 (Active Antenna - Massive MIMO)	
Azimuth	120				120	
M. Tilt	0				0	
Height	118				118	
Ports	**P1**	**P2**	**P3**	**P4**	**P5**	**P6**
Active Tech.	L700 L600 N600	L700 L600 N600	L2100 L1900 G1900	L2100 L1900 G1900	L2500 N2500	L2500 N2500
Dark Tech.						
Restricted Tech.						
Decomm. Tech.						
E. Tilt	2	2	2	2	2	2
Cables	Coax Jumper **(x2)**	Coax Jumper **(x2)**	Coax Jumper **(x2)**	Coax Jumper **(x2)**		
TMAs						
Diplexers / Combiners						
Radio	Radio 4480 B71+B85 (At Antenna)	SHARED Radio 4480 B71+B85 (At Antenna)	Radio 4460 B25+B66 (At Antenna)	SHARED Radio 4460 B25+B66 (At Antenna)		
Sector Equipment						

Unconnected Equipment:

Scope of Work:

*A dashed border indicates shared equipment. Any connected equipment is denoted with the SHARED keyword.

RAN Template:	A&L Template:
67E5A998E 6160	67E5998E_1xAIR+1OP

CTHA838A_Sprint Retain_1_draft

Print Name: Standard (2)
PORs: New Build_Sprint Keep

Sector 3 (Proposed) view from behind

Coverage Type	A - Outdoor Macro					
Antenna	1				2	
Antenna Model	RFS - APXVAALL24_43-U-NA20 (Octo)				Ericsson - AIR6449 B41 (Active Antenna - Massive MIMO)	
Azimuth	210				210	
M. Tilt	0				0	
Height	118				118	
Ports	**P1**	**P2**	**P3**	**P4**	**P5**	**P6**
Active Tech.	L700 L600 N600	L700 L600 N600	L2100 L1900 G1900	L2100 L1900 G1900	L2500 N2500	L2500 N2500
Dark Tech.						
Restricted Tech.						
Decomm. Tech.						
E. Tilt	2	2	2	2	2	2
Cables	Coax Jumper **(x2)**	Coax Jumper **(x2)**	Coax Jumper **(x2)**	Coax Jumper **(x2)**		
TMAs						
Diplexers / Combiners						
Radio	Radio 4480 B71+B85 (At Antenna)	SHARED Radio 4480 B71+B85 (At Antenna)	Radio 4460 B25+B66 (At Antenna)	SHARED Radio 4460 B25+B66 (At Antenna)		
Sector Equipment						

Unconnected Equipment:

Scope of Work:

*A dashed border indicates shared equipment. Any connected equipment is denoted with the SHARED keyword.

RAN Template:	A&L Template:
67E5A998E 6160	67E5998E_1xAIR+1OP

CTHA838A_Sprint Retain_1_draft

Print Name: Standard (2)
PORs: New Build_Sprint Keep

Section 7 - Power Systems Equipment

Existing Power Systems Equipment
----- This section is intentionally blank. -----

	Proposed Power Systems Equipment
Enclosure	1
Enclosure Type	Enclosure 6160

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: CTHA838A

6 Main Street
Centerbrook, Connecticut 06409

September 9, 2021

EBI Project Number: 6221005077

Site Compliance Summary	
Compliance Status:	**COMPLIANT**
Site total MPE% of FCC general population allowable limit:	**34.48%**

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

September 9, 2021

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

Emissions Analysis for Site: CTHA838A

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **6 Main Street** in **Centerbrook, 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 6 Main Street in Centerbrook, 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 power density calculations, the broadcast footprint of the AIR6449 antenna has been considered. Due to the beamforming nature of this antenna, the actual beam locations vary depending on demand and are narrow in nature. Using the broadcast footprint accounts for the potential location of beams at any given time.

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) 1 LTE Traffic channel (LTE 1C and 2C BRS Band - 2500 MHz) was considered for each sector of the proposed installation. This Channel has a transmit power of 60 Watts.

8) 1 LTE Broadcast channel (LTE 1C and 2C BRS Band - 2500 MHz) was considered for each sector of the proposed installation. This Channel has a transmit power of 20 Watts.

9) 1 NR Traffic channel (BRS Band - 2500 MHz) was considered for each sector of the proposed installation. This Channel has a transmit power of 120 Watts.

10) 1 NR Broadcast channel (BRS Band - 2500 MHz) was considered for each sector of the proposed installation. This Channel has a transmit power of 40 Watts.

11) 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.

12) 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.

13) The antennas used in this modeling are the RFS APXVAALL24_43-U-NA20 for the 600 MHz / 600 MHz / 700 MHz / 1900 MHz / 1900 MHz / 2100 MHz channel(s), the Ericsson AIR 6449 for the 2500 MHz / 2500 MHz / 2500 MHz / 2500 MHz channel(s) in Sector A, the RFS APXVAALL24_43-U-NA20 for the 600 MHz / 600 MHz / 700 MHz / 1900 MHz / 1900 MHz / 2100 MHz channel(s), the Ericsson AIR 6449 for the 2500 MHz / 2500 MHz / 2500 MHz / 2500 MHz channel(s) in Sector B, the RFS APXVAALL24_43-U-NA20 for the 600 MHz / 600 MHz / 700 MHz / 1900 MHz / 1900 MHz / 2100 MHz channel(s), the Ericsson AIR 6449 for the 2500 MHz / 2500 MHz / 2500 MHz / 2500 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.

14) The antenna mounting height centerline of the proposed antennas is 118 feet above ground level (AGL).

15) 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.

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

T-Mobile Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	1	Antenna #:	1	Antenna #:	1
Make / Model:	RFS APXVAALL24_43-U-NA20	Make / Model:	RFS APXVAALL24_43-U-NA20	Make / Model:	RFS APXVAALL24_43-U-NA20
Frequency Bands:	600 MHz / 600 MHz / 700 MHz / 1900 MHz / 1900 MHz / 2100 MHz	Frequency Bands:	600 MHz / 600 MHz / 700 MHz / 1900 MHz / 1900 MHz / 2100 MHz	Frequency Bands:	600 MHz / 600 MHz / 700 MHz / 1900 MHz / 1900 MHz / 2100 MHz
Gain:	12.95 dBd / 12.95 dBd / 13.65 dBd / 15.45 dBd / 15.45 dBd / 16.45 dBd	Gain:	12.95 dBd / 12.95 dBd / 13.65 dBd / 15.45 dBd / 15.45 dBd / 16.45 dBd	Gain:	12.95 dBd / 12.95 dBd / 13.65 dBd / 15.45 dBd / 15.45 dBd / 16.45 dBd
Height (AGL):	118 feet	Height (AGL):	118 feet	Height (AGL):	118 feet
Channel Count:	13	Channel Count:	13	Channel Count:	13
Total TX Power (W):	560 Watts	Total TX Power (W):	560 Watts	Total TX Power (W):	560 Watts
ERP (W):	17,868.72	ERP (W):	17,868.72	ERP (W):	17,868.72
Antenna A1 MPE %:	**6.76%**	Antenna B1 MPE %:	**6.76%**	Antenna C1 MPE %:	**6.76%**
Antenna #:	2	Antenna #:	2	Antenna #:	2
Make / Model:	Ericsson AIR 6449	Make / Model:	Ericsson AIR 6449	Make / Model:	Ericsson AIR 6449
Frequency Bands:	2500 MHz / 2500 MHz / 2500 MHz / 2500 MHz	Frequency Bands:	2500 MHz / 2500 MHz / 2500 MHz / 2500 MHz	Frequency Bands:	2500 MHz / 2500 MHz / 2500 MHz / 2500 MHz
Gain:	22.65 dBd / 17.3 dBd / 22.65 dBd / 17.3 dBd	Gain:	22.65 dBd / 17.3 dBd / 22.65 dBd / 17.3 dBd	Gain:	22.65 dBd / 17.3 dBd / 22.65 dBd / 17.3 dBd
Height (AGL):	118 feet	Height (AGL):	118 feet	Height (AGL):	118 feet
Channel Count:	4	Channel Count:	4	Channel Count:	4
Total TX Power (W):	240 Watts	Total TX Power (W):	240 Watts	Total TX Power (W):	240 Watts
ERP (W):	36,356.09	ERP (W):	36,356.09	ERP (W):	36,356.09
Antenna A2 MPE %:	**10.42%**	Antenna B2 MPE %:	**10.42%**	Antenna C2 MPE %:	**10.42%**

Site Composite MPE %	
Carrier	**MPE %**
T-Mobile (Max at Sector A):	17.18%
AT&T	9.62%
Verizon	7.68%
Site Total MPE % :	34.48%

T-Mobile MPE % Per Sector	
T-Mobile Sector A Total:	17.18%
T-Mobile Sector B Total:	17.18%
T-Mobile Sector C Total:	17.18%
Site Total MPE % :	34.48%

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 600 MHz LTE	2	591.73	118.0	3.39	600 MHz LTE	400	0.85%
T-Mobile 600 MHz NR	1	1577.94	118.0	4.52	600 MHz NR	400	1.13%
T-Mobile 700 MHz LTE	2	695.22	118.0	3.99	700 MHz LTE	467	0.85%
T-Mobile 1900 MHz GSM	4	1052.26	118.0	12.06	1900 MHz GSM	1000	1.21%
T-Mobile 1900 MHz LTE	2	2104.51	118.0	12.06	1900 MHz LTE	1000	1.21%
T-Mobile 2100 MHz LTE	2	2649.42	118.0	15.19	2100 MHz LTE	1000	1.52%
T-Mobile 2500 MHz LTE 1C & 2C Traffic	1	11044.63	118.0	31.65	2500 MHz LTE 1C & 2C Traffic	1000	3.17%
T-Mobile 2500 MHz LTE 1C & 2C Broadcast	1	1074.06	118.0	3.08	2500 MHz LTE 1C & 2C Broadcast	1000	0.31%
T-Mobile 2500 MHz NR Traffic	1	22089.26	118.0	63.31	2500 MHz NR Traffic	1000	6.33%
T-Mobile 2500 MHz NR Broadcast	1	2148.13	118.0	6.16	2500 MHz NR Broadcast	1000	0.62%
						Total:	**17.18%**

• 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:	17.18%
Sector B:	17.18%
Sector C:	17.18%
T-Mobile Maximum MPE % (Sector A):	17.18%
Site Total:	34.48%
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **34.48%** 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.