[redacted] Industrial Ave,
[redacted]te 3
[redacted]hwah NJ 07430

[redacted]one: 201.684.0055
[redacted]: 201.684.0066

Transcend Wireless

May 13th, 2022

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

RE: Notice of Exempt Modification
1542 Boston Post Road, Westbrook, CT 06498
Latitude: 41.28180000
Longitude: -72.437500
T-Mobile Site#: CTHA524A - Anchor

Dear Ms. Bachman:

T-Mobile currently maintains six (6) antennas at the 104-foot level of the existing 130-foot monopole 1542 Boston Post Road, Westbrook, CT. The 130-foot monopole is owned and operated by the MCM Communications LLC. The property is owned by the Connecticut Water Company. T-Mobile now intends to remove (6) antennas and add (3) antennas at the 104- foot level. The proposed antennas support 5G services.

Planned Modifications:
Tower:
<u>Install New:</u>
(3) Ericsson AIR6419 B41 antennas
(3) Ericsson Radio 4460 B25 B66 RRUs
(1) 6x24 Hybrid Cables

<u>To Be Removed:</u>
(3) RFS APX16DWV Antennas
(3) Existing TMAs
(3) Ericsson AIR 32 Antennas

This facility was approved by the Connecticut Siting Council in Docket No. 485 on August 15, 2019. The proposed modifications comply with existing conditions.

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies§ 16- SOj-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.SA. § 16-SOj-73, a copy of this letter is being sent to First Selectman John Hall, Elected Official, and Peter Gillespie, Town Planner, as well as the tower and property owner.

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

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

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

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

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

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

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

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

Sincerely,

Eric Breun
Transcend Wireless
Cell: 201-658-7728
Email: ebreun@transcendwireless.com

Attachments
cc: John Hall - First Selectman of Westbrook
Peter Gillespie - Town Planner
MCM Communications LLC - Tower Owner
Connecticut Water Company - Property Owner

ERIC BREUN
2016587728
1 INTERNATIONAL BLVD.
MAHWAH NJ 07495

1 LBS **1 OF 1**

SHIP TO:
PETER GILLESPIE
866 BOSTON POST ROAD
WESTBROOK CT 06498

CT 063 5-02

UPS GROUND
TRACKING #: 1Z V25 742 03 9601 8134

BILLING: P/P

Reference #1: CTHA524A

XOL 22.04.20 NV45 20.0A 05/2022*

TM

ERIC BREUN
2016587728
1 INTERNATIONAL BLVD.
MAHWAH NJ 07495

1 LBS **1 OF 1**

SHIP TO:
JOHN HALL
866 BOSTON POST ROAD
WESTBROOK CT 06498

CT 063 5-02

UPS GROUND
TRACKING #: 1Z V25 742 03 9974 8126

BILLING: P/P

Reference #1: CTHA524A

XOL 22.04.20 NV45 20.0A 05/2022*

TM

ERIC BREUN
2016587728
1 INTERNATIONAL BLVD.
MAHWAH NJ 07495

1 LBS **1 OF 1**

SHIP TO:
MCM COMMUNICATIONS LLC
40 WOODLAND STREET
HARTFORD CT 06105

CT 061 9-03

UPS GROUND
TRACKING #: 1Z V25 742 03 9372 0817

BILLING: P/P

Reference #1: CTHA524A

XOL 22.04.20 NV45 20.0A 05/2022*

ERIC BREUN
2016587728
1 INTERNATIONAL BLVD.
MAHWAH NJ 07495

1 LBS **1 OF 1**

SHIP TO:
CT WATER COMPANY
93 WEST MAIN STREET
CLINTON CT 06413

CT 065 2-01

UPS GROUND
TRACKING #: 1Z V25 742 03 9079 4806

BILLING: P/P

Reference #1: CTHA524A

XOL 22.04.20 NV45 20.0A 05/2022*

Hello, your package has been delivered.

Delivery Date: Tuesday, 05/10/2022

Delivery Time: 10:42 AM

Signed by: MCW

TRANSCEND WIRELESS

Tracking Number:	1ZV257420396018134
Ship To:	PETER GILLESPIE 866 BOSTON POST ROAD WESTBROOK, CT 06498 US
Number of Packages:	1
UPS Service:	UPS Ground
Package Weight:	1.0 LBS
Reference Number:	CTHA524A

Hello, your package has been delivered.

Delivery Date: Tuesday, 05/10/2022

Delivery Time: 10:43 AM

Signed by: MCW

TRANSCEND WIRELESS

Tracking Number:	1ZV257420399748126
Ship To:	JOHN HALL 866 BOSTON POST ROAD WESTBROOK, CT 06498 US
Number of Packages:	1
UPS Service:	UPS Ground
Package Weight:	1.0 LBS
Reference Number:	CTHA524A

Hello, your package has been delivered.

Delivery Date: Tuesday, 05/10/2022

Delivery Time: 12:24 PM

Signed by: JULIAN

TRANSCEND WIRELESS

Tracking Number:	1ZV257420390794806
Ship To:	CT WATER COMPANY 93 WEST MAIN STREET CLINTON, CT 06413 US
Number of Packages:	1
UPS Service:	UPS Ground
Package Weight:	1.0 LBS
Reference Number:	CTHA524A

Hello, your package has been delivered.

Delivery Date: Tuesday, 05/10/2022

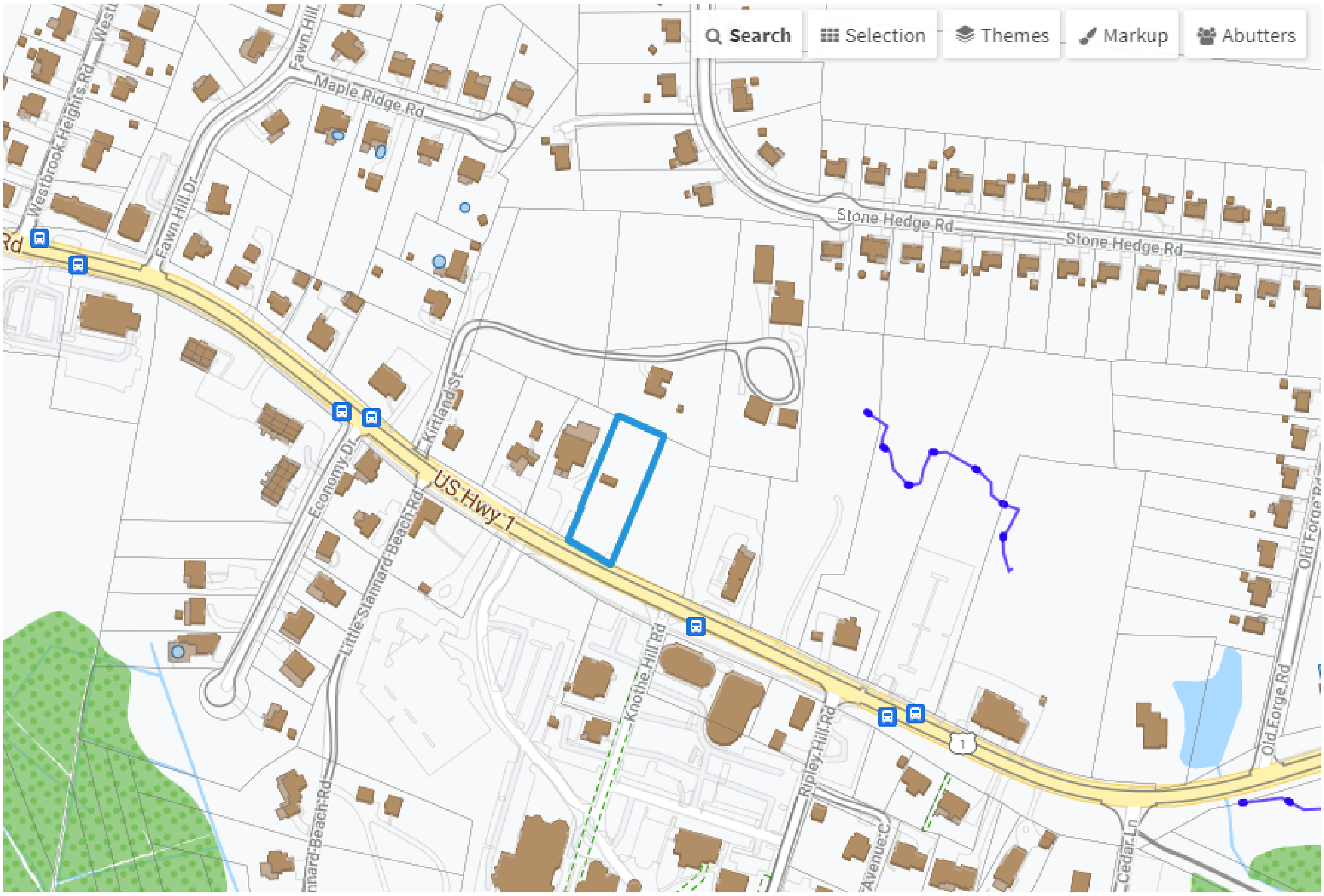
Delivery Time: 2:47 PM

Left At: INSIDE DELIV

Signed by: ZACHS

TRANSCEND WIRELESS

Tracking Number:	1ZV257420393720817
Ship To:	MCM COMMUNICATIONS LLC 40 WOODLAND STREET HARTFORD, CT 06105 US
Number of Packages:	1
UPS Service:	UPS Ground
Package Weight:	1.0 LBS
Reference Number:	CTHA524A


Search
Selection
Themes
Markup
Abutters
Maple Ridge Rd
Stone Hedge Rd
Stone Hedge Rd
Westbrook Heights Rd
Fawn Hill Dr
Kirtland St
Economy Dr
US Hwy 1
Little Stannard Beach Rd
Knothe Hill Rd
Ripley Hill Rd
Avenue C
1
Cedar Ln
Old Forge Rd

Location	1542 BOSTON POST RD	**Mblu**	182/ / 007/ /
Acct#	C0071600	**Owner**	CONN WATER CO
Assessment	$462,160	**Appraisal**	$660,210
PID	770	**Building Count**	1

Current Value

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2021	$114,670	$545,540	$660,210
Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2021	$80,280	$381,880	$462,160

Owner of Record

Owner CONN WATER CO
Co-Owner
Address 93 W MAIN ST
CLINTON, CT 06413

Sale Price $0
Certificate
Book & Page 15/287
Sale Date 09/17/1932
Instrument 25

Ownership History

Ownership History					
Owner	**Sale Price**	**Certificate**	**Book & Page**	**Instrument**	**Sale Date**
CONN WATER CO	$0		15/287	25	09/17/1932

Building Information

Building 1 : Section 1

Year Built:
Living Area: 0
Replacement Cost: $0
Building Percent Good:
Replacement Cost
Less Depreciation: $0

Building Attributes	
Field	**Description**
Style	Vacant Commercial
Model	
Grade:	
Stories	
Occupancy	
Exterior Wall 1	

Building Photo

Building Layout

Exterior Wall 2	
Roof Structure	
Roof Cover	
Interior Wall 1	
Interior Wall 2	
Interior Flr 1	
Interior Flr 2	
Heat Fuel	
Heat Type:	
AC Type:	
Total Bedrooms:	
Full Bthrms:	
Half Baths:	
Extra Fixtures	
Total Rooms:	
Bath Style:	
Kitchen Style:	
Extra Kitchens	
Fireplace(s)	
Gas Fireplace(s)	
Stacks	
Bsmt Garage(s)	
Callback	

Building Sub-Areas (sq ft)	Legend
No Data for Building Sub-Areas	

Extra Features

Extra Features	Legend
No Data for Extra Features	

Land

Land Use

Use Code	200
Description	Comm Land
Zone	NCD
Neighborhood	BP
Alt Land Appr	No
Category	

Land Line Valuation

Size (Acres)	0.61
Depth	
Assessed Value	$381,880
Appraised Value	$545,540

Outbuildings

Outbuildings							Legend
Code	Description	Sub Code	Sub Description	Size	Value	Bldg #	Comment
TCM	Telecomm			360.00 S.F.&HGT	$11,320	1	
TCS	Telecomm Site			1.00 UNITS	$550	1	
TCS	Telecomm Site			1.00 UNITS	$550	1	
TCS	Telecomm Site			1.00 UNITS	$550	1	
TCM	Telecomm			1.00 S.F.&HGT	$30	1	
TCS	Telecomm Site			0.00 UNITS	$51,670	1	
TCS	Telecomm Site			0.00 UNITS	$50,000	1	

Valuation History

Appraisal			
Valuation Year	Improvements	Land	Total
2020	$114,020	$401,280	$515,300
2019	$64,020	$401,280	$465,300
2018	$64,020	$401,280	$465,300

Assessment			
Valuation Year	Improvements	Land	Total
2020	$79,820	$280,900	$360,720
2019	$44,820	$280,900	$325,720
2018	$44,820	$280,900	$325,720

DOCKET NO. 485 – MCM Holdings, LLC and Cellco Partnership d/b/a Verizon Wireless application for a Certificate of Environmental Compatibility and Public Need for the construction, maintenance, and operation of a telecommunications facility at one of two sites: 1542 Boston Post Road or at the end of Kirtland Street, Westbrook, Connecticut.	} } }	Connecticut Siting Council August 15, 2019

Decision and Order

Pursuant to Connecticut General Statutes §16-50p, and the foregoing Findings of Fact and Opinion, the Connecticut Siting Council (Council) finds that the effects associated with the construction, maintenance, and operation of a telecommunications facility, including effects on the natural environment, ecological balance, public health and safety, scenic, historic, and recreational values, agriculture, forests and parks, air and water purity, and fish, aquaculture and wildlife are not disproportionate, either alone or cumulatively with other effects, when compared to need, are not in conflict with the policies of the State concerning such effects, and are not sufficient reason to deny the application, and therefore directs that a Certificate of Environmental Compatibility and Public Need, as provided by General Statutes § 16-50k, be issued to MCM Holdings, LLC, hereinafter referred to as the Certificate Holder, for a telecommunications facility at Site A, located at 1542 Boston Post Road, Westbrook, Connecticut. The Council denies certification of Site B, located at the end of Kirtland Street, Westbrook, Connecticut.

Unless otherwise approved by the Council, the Site A facility shall be constructed, operated, and maintained substantially as specified in the Council's record in this matter, and subject to the following conditions:

1. The tower shall be constructed as a monopole at a height of 130 feet above ground level to provide the proposed wireless services, sufficient to accommodate the antennas of Cellco Partnership d/b/a Verizon Wireless and other entities, both public and private. The height of the tower may be extended after the date of this Decision and Order pursuant to regulations of the Federal Communications Commission.

2. The Certificate Holder shall prepare a Development and Management (D&M) Plan for this site in compliance with Sections 16-50j-75 through 16-50j-77 of the Regulations of Connecticut State Agencies. The D&M Plan shall be submitted to and approved by the Council prior to the commencement of facility construction and shall include:
   a) final site plan(s) for development of the facility that employ the governing standard in the State of Connecticut for tower design in accordance with the currently adopted International Building Code and include specifications for the tower, tower foundation, antennas and any modifications to the equipment compound including, but not limited to, fencing, radio equipment, access road, utility installation and emergency backup generator;
   b) the tower shall be designed with a yield point to ensure that the tower setback radius remains within the boundaries of the subject property;
   c) construction plans for site clearing, grading, water drainage and stormwater control, and erosion and sedimentation controls consistent with the <u>2002 Connecticut Guidelines for Soil Erosion and Sediment Control</u>, as amended;
   d) provisions for landscaping;
   e) proposed hours and days of the week for construction activities; and
   f) a schedule for the removal of the existing temporary tower.

3. Prior to the commencement of operation, the Certificate Holder shall provide the Council worst-case modeling of the electromagnetic radio frequency power density of all proposed entities' antennas at the closest point of uncontrolled access to the tower base, consistent with Federal Communications Commission, Office of Engineering and Technology, Bulletin No. 65, August 1997. The Certificate Holder shall ensure a recalculated report of the electromagnetic radio frequency power density be submitted to the Council if and when circumstances in operation cause a change in power density above the levels calculated and provided pursuant to this Decision and Order.

4. Upon the establishment of any new federal radio frequency standards applicable to frequencies of this facility, the facility granted herein shall be brought into compliance with such standards.

5. The Certificate Holder shall provide the Council with a copy of necessary permits from any other state or federal agency with concurrent jurisdiction prior to the commencement of construction.

6. The Certificate Holder shall permit public or private entities to share space on the proposed tower for fair consideration, or shall provide any requesting entity with specific legal, technical, environmental, or economic reasons precluding such tower sharing.

7. Unless otherwise approved by the Council, if the facility authorized herein is not fully constructed with at least one fully operational wireless telecommunications carrier providing wireless service within eighteen months from the date of the mailing of the Council's Findings of Fact, Opinion, and Decision and Order (collectively called "Final Decision"), this Decision and Order shall be void, and the Certificate Holder shall dismantle the tower and remove all associated equipment or reapply for any continued or new use to the Council before any such use is made. The time between the filing and resolution of any appeals of the Council's Final Decision shall not be counted in calculating this deadline. Authority to monitor and modify this schedule, as necessary, is delegated to the Executive Director. The Certificate Holder shall provide written notice to the Executive Director of any schedule changes as soon as is practicable.

8. Any request for extension of the time period referred to in Condition 7 shall be filed with the Council not later than 60 days prior to the expiration date of this Certificate and shall be served on all parties and intervenors, as listed in the service list, and the Town of Westbrook.

9. If the facility ceases to provide wireless services for a period of one year, this Decision and Order shall be void, and the Certificate Holder shall dismantle the tower and remove all associated equipment or reapply for any continued or new use to the Council within 90 days from the one year period of cessation of service. The Certificate Holder may submit a written request to the Council for an extension of the 90 day period not later than 60 days prior to the expiration of the 90 day period.

10. Any nonfunctioning antenna, and associated antenna mounting equipment, on this facility shall be removed within 60 days of the date the antenna ceased to function.

11. In accordance with Section 16-50j-77 of the Regulations of Connecticut State Agencies, the Certificate Holder shall provide the Council with written notice two weeks prior to the commencement of site construction activities. In addition, the Certificate Holder shall provide the Council with written notice of the completion of site construction, and the commencement of site operation.

12. The Certificate Holder shall remit timely payments associated with annual assessments and invoices submitted by the Council for expenses attributable to the facility under Conn. Gen. Stat. §16-50v.

13. This Certificate may be transferred in accordance with Conn. Gen. Stat. §16-50k(b), provided both the Certificate Holder/transferor and the transferee are current with payments to the Council for their respective annual assessments and invoices under Conn. Gen. Stat. §16-50v. In addition, both the Certificate Holder/transferor and the transferee shall provide the Council a written agreement as to the entity responsible for any quarterly assessment charges under Conn. Gen. Stat. §16-50v(b)(2) that may be associated with this facility.

14. The Certificate Holder shall maintain the facility and associated equipment, including but not limited to, the tower, tower foundation, antennas, equipment compound, radio equipment, access road, utility line and landscaping in a reasonable physical and operational condition that is consistent with this Decision and Order and a Development and Management Plan to be approved by the Council.

15. If the Certificate Holder is a wholly-owned subsidiary of a corporation or other entity and is sold/transferred to another corporation or other entity, the Council shall be notified of such sale and/or transfer and of any change in contact information for the individual or representative responsible for management and operations of the Certificate Holder within 30 days of the sale and/or transfer.

16. This Certificate may be surrendered by the Certificate Holder upon written notification and acknowledgment by the Council.

We hereby direct that a copy of the Findings of Fact, Opinion, and Decision and Order be served on each person listed in the Service List, dated April 4, 2019, and notice of issuance published in the *Harbor News*.

By this Decision and Order, the Council disposes of the legal rights, duties, and privileges of each party named or admitted to the proceeding in accordance with Section 16-50j-17 of the Regulations of Connecticut State Agencies.

T-Mobile

SITE NAME: CTHA524A
SITE ID: CTHA524A
1542 BOSTON POST RD
WESTBROOK, CT 06498

T-MOBILE A/L TEMPLATE (PROVIDED BY RFDS)
67D5998E_1xAIR+1OP

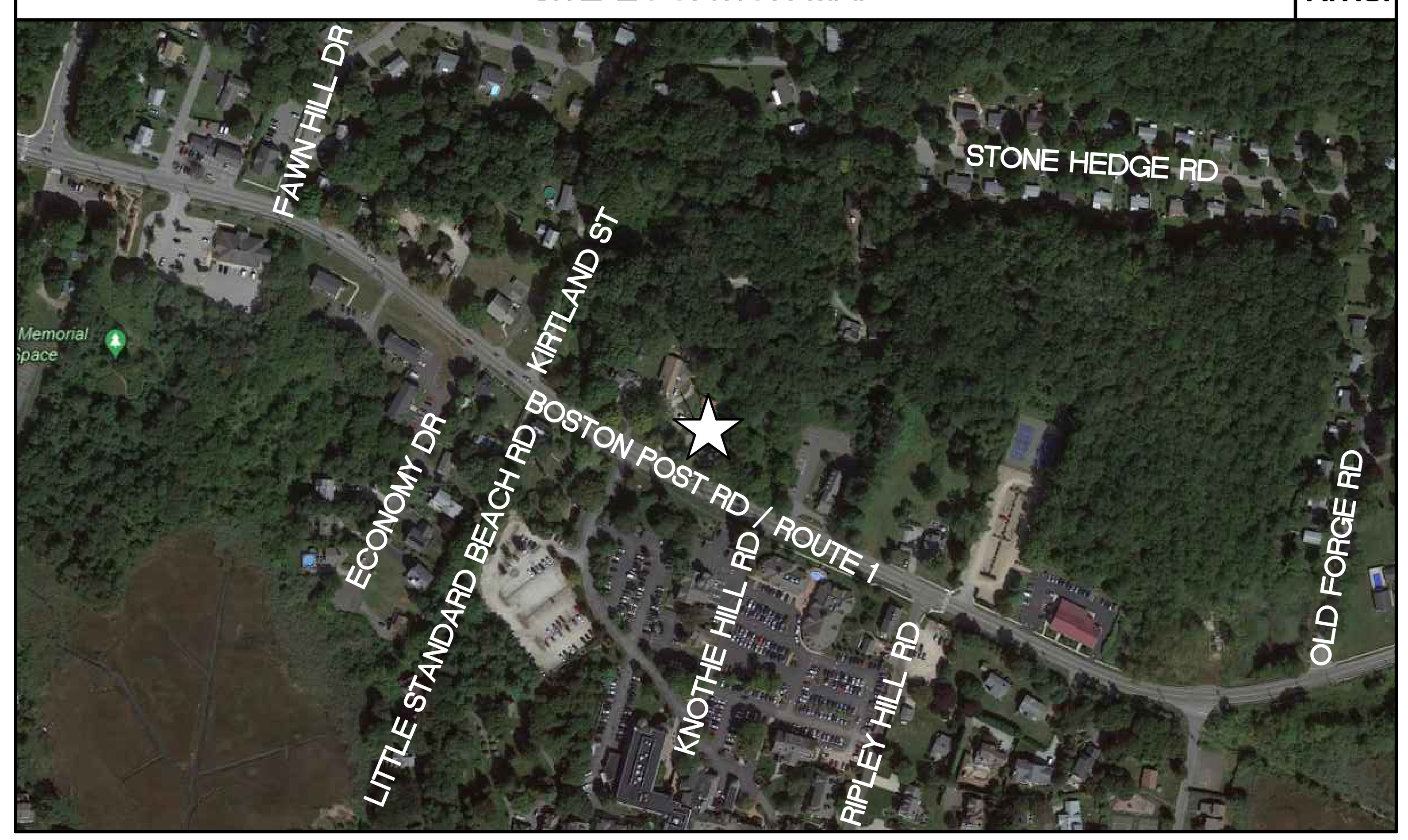
T-MOBILE RAN TEMPLATE (PROVIDED BY RFDS)
67D5D998E 6160

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. SHOULD ANY FIELD CONDITIONS PRECLUDE COMPLIANCE WITH THE DRAWINGS, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER AND SHALL NOT PROCEED WITH ANY AFFECTED WORK.
3. 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.
4. BEFORE BEGINNING THE WORK, THE CONTRACTOR IS RESPONSIBLE FOR MAKING SUCH INVESTIGATIONS CONCERNING PHYSICAL CONDITIONS (SURFACE AND SUBSURFACE) AT OR CONTIGUOUS TO THE SITE, WHICH MAY AFFECT PERFORMANCE AND COST OF THE WORK.
5. ALL DIMENSIONS, ELEVATIONS, AND OTHER REFERENCES TO EXISTING STRUCTURES, SURFACE, AND SUBSURFACE CONDITIONS ARE APPROXIMATE. NO GUARANTEE IS MADE FOR THE ACCURACY OR COMPLETENESS OF THE INFORMATION SHOWN. THE CONTRACTOR SHALL VERIFY AND COORDINATE ALL DIMENSIONS, ELEVATIONS AND ANGLES WITH EXISTING CONDITIONS AND WITH ARCHITECTURAL AND SITE DRAWINGS BEFORE PROCEEDING WITH ANY WORK.
6. AS THE WORK PROGRESSES, THE CONTRACTOR SHALL NOTIFY THE OWNER OF ANY CONDITIONS WHICH ARE IN CONFLICT OR OTHERWISE NOT CONSISTENT WITH THE CONSTRUCTION DOCUMENTS, AND SHALL NOT PROCEED WITH SUCH WORK UNTIL THE CONFLICT IS SATISFACTORILY RESOLVED.
7. 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.
8. 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.
9. 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.
10. 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.
11. 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.
12. 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.
13. ALL EQUIPMENT AND PRODUCTS PURCHASED ARE TO BE REVIEWED BY CONTRACTOR AND ALL APPLICABLE SUB–CONTRACTORS FOR ANY CONDITION PER THE MANUFACTURER'S RECOMMENDATIONS. CONTRACTOR TO SUPPLY THESE ITEMS AT NO COST TO OWNER OR CONSTRUCTION MANAGER.
14. 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.
15. ALL UTILITY WORK SHALL BE IN ACCORDANCE WITH LOCAL UTILITY COMPANY REQUIREMENTS AND SPECIFICATIONS.
16. 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.
17. 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.
18. 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.
19. 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.
20. 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.
21. 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 AND CONFIRMED WITH THE PROJECT MANAGER AND OWNER PRIOR TO THE COMMENCEMENT OF ANY WORK
22. 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.
23. 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.
24. 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.
25. THE COUNTY/CITY/TOWN MAY MAKE PERIODIC FIELD INSPECTIONS TO ENSURE COMPLIANCE WITH THE DESIGN PLANS, SPECIFICATIONS, AND CONTRACT DOCUMENTS.
26. 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.
27. PRIOR TO THE SUBMISSION OF BIDS, THE CONTRACTOR SHALL VISIT THE SITE TO FAMILIARIZE WITH THE EXISTING CONDITIONS AND TO CONFIRM THAT THE WORK CAN BE ACCOMPLISHED AS SHOWN ON THE CONSTRUCTION DRAWINGS. ANY DISCREPANCY FOUND SHALL BE BROUGHT TO THE ATTENTION OF ENGINEER ON RECORD, PRIOR TO THE COMMENCEMENT OF ANY WORK.

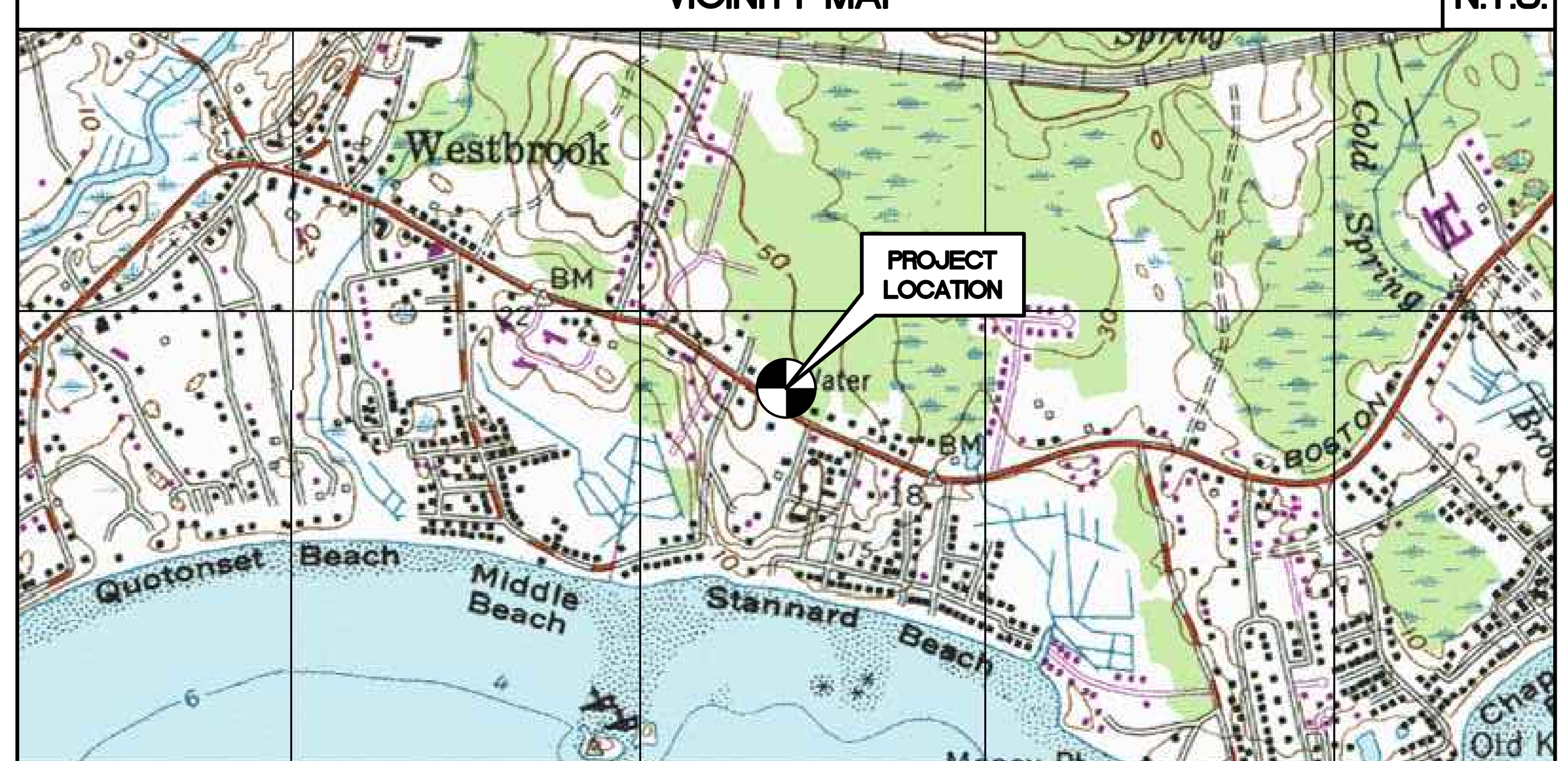
SITE LOCATION MAP

N.T.S.



VICINITY MAP

N.T.S.



COORDINATES AND GROUND ELEVATION ARE REFERENCED FROM GOOGLE EARTH.

SITE COORDINATES: LATITUDE: 41°–16'–55" N
LONGITUDE: 72°–26'–14" W
GROUND ELEVATION: ±62' AMSL

NORTH

PROJECT SUMMARY

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

1. REMOVE EXISTING COAX CABLES
2. REMOVE EXISTING RFS: APX16DWV–16DWV–S–E–A20 ANTENNAS, TYP. (1) PER SECTOR, TOTAL OF (3)
3. REMOVE EXISTING TMAS
4. REMOVE EXISTING DIPLEXERS
5. REMOVE EXISTING AIR 32 ANTENNA, TYP. (1) PER SECTOR, TOTAL OF (3)
6. INSTALL (1) 6x24 HYBRID CABLES
7. INSTALL ERICSSON: AIR6419 B41 ANTENNA, TYP. (1) PER SECTOR, TOTAL OF (3)
8. INSTALL ERICSSON: RADIO 4460 B25+B66, TYP. (1) PER SECTOR, TOTAL OF (3)
9. UPRGRADE 100A CIRCUIT BREAKER TO 150A CIRCUIT BREAKER

PROJECT INFORMATION

SITE NAME:	CTHA524A
SITE ID:	CTHA524A
SITE ADDRESS:	1542 BOSTON POST RD WESTBROOK, CT 06498
APPLICANT:	T–MOBILE NORTHEAST, LLC 35 GRIFFIN ROAD SOUTH BLOOMFIELD, CT. 06002
CONTACT PERSON:	DAN REID (PROJECT MANAGER) TRANSCEND WIRELESS, LLC (203) 592–8291
ENGINEER OF RECORD:	CENTEK ENGINEERING, INC. 63–2 NORTH BRANFORD ROAD BRANFORD, CT. 06405 CARLO F. CENTORE, PE (203) 488–0580 EXT. 122
SITE COORDINATES:	LATITUDE: 41°–16'–55" N LONGITUDE: 72°–26'–14" W GROUND ELEVATION: ±62' AMSL SITE COORDINATES AND GROUND ELEVATION REFERENCED FROM GOOGLE EARTH.

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T-MOBILE NORTHEAST LLC

SITE NAME: CTHA524A
SITE ID: CTHA524A
1542 BOSTON POST RD
WESTBROOK, CT 06498

DATE: 03/16/22
SCALE: AS NOTED
JOB NO. 22022.15

TITLE SHEET

T–1

SHEET NO. 1 OF 8

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: 130 MPH (Vasd)
  (EXPOSURE B/ 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. SHOULD ANY FIELD CONDITIONS PRECLUDE COMPLIANCE WITH THE DRAWINGS, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER AND SHALL NOT PROCEED WITH ANY AFFECTED WORK.
3. 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.
4. BEFORE BEGINNING THE WORK, THE CONTRACTOR IS RESPONSIBLE FOR MAKING SUCH INVESTIGATIONS CONCERNING PHYSICAL CONDITIONS (SURFACE AND SUBSURFACE) AT OR CONTIGUOUS TO THE SITE, WHICH MAY AFFECT PERFORMANCE AND COST OF THE WORK.
5. ALL DIMENSIONS, ELEVATIONS, AND OTHER REFERENCES TO EXISTING STRUCTURES, SURFACE, AND SUBSURFACE CONDITIONS ARE APPROXIMATE. NO GUARANTEE IS MADE FOR THE ACCURACY OR COMPLETENESS OF THE INFORMATION SHOWN. THE CONTRACTOR SHALL VERIFY AND COORDINATE ALL DIMENSIONS, ELEVATIONS AND ANGLES WITH EXISTING CONDITIONS AND WITH ARCHITECTURAL AND SITE DRAWINGS BEFORE PROCEEDING WITH ANY WORK.
6. AS THE WORK PROGRESSES, THE CONTRACTOR SHALL NOTIFY THE OWNER OF ANY CONDITIONS WHICH ARE IN CONFLICT OR OTHERWISE NOT CONSISTENT WITH THE CONSTRUCTION DOCUMENTS, AND SHALL NOT PROCEED WITH SUCH WORK UNTIL THE CONFLICT IS SATISFACTORILY RESOLVED.
7. 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.
8. 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.
9. 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.
10. 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.
11. 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.
12. 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.
13. ALL EQUIPMENT AND PRODUCTS PURCHASED ARE TO BE REVIEWED BY CONTRACTOR AND ALL APPLICABLE SUB–CONTRACTORS FOR ANY CONDITION PER THE MANUFACTURER'S RECOMMENDATIONS. CONTRACTOR TO SUPPLY THESE ITEMS AT NO COST TO OWNER OR CONSTRUCTION MANAGER.
14. 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.
15. ALL UTILITY WORK SHALL BE IN ACCORDANCE WITH LOCAL UTILITY COMPANY REQUIREMENTS AND SPECIFICATIONS.
16. 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.
17. 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.
18. 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.
19. 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.
20. 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.
21. 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 AND CONFIRMED WITH THE PROJECT MANAGER AND OWNER PRIOR TO THE COMMENCEMENT OF ANY WORK
22. 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.
23. 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.
24. 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.
25. THE COUNTY/CITY/TOWN MAY MAKE PERIODIC FIELD INSPECTIONS TO ENSURE COMPLIANCE WITH THE DESIGN PLANS, SPECIFICATIONS, AND CONTRACT DOCUMENTS.
26. 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.
27. PRIOR TO THE SUBMISSION OF BIDS, THE CONTRACTOR SHALL VISIT THE SITE TO FAMILIARIZE WITH THE EXISTING CONDITIONS AND TO CONFIRM THAT THE WORK CAN BE ACCOMPLISHED AS SHOWN ON THE CONSTRUCTION DRAWINGS. ANY DISCREPANCY FOUND SHALL BE BROUGHT TO THE ATTENTION OF ENGINEER ON RECORD, PRIOR TO THE COMMENCEMENT OF ANY WORK.

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.

ANTENNA/APPURTENANCE 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 HYBRID/COAX
A1	PROPOSED	ERICSSON (AIR6419 B41)	33 x 16 x 9	104'	85°			
A2	EXISTING	RFS (APXVAARR24_43–U_NA20)	95.9 x 24 x 8.7	104'	85°	(E) RADIO 4449 B71+B12 (1), (P) RADIO 4460 B25+B66 (1)		(1) 6x24 HYBRID CABLE
B1	PROPOSED	ERICSSON (AIR6419 B41)	33 x 16 x 9	104'	260°			
B2	EXISTING	RFS (APXVAARR24_43–U_NA20)	95.9 x 24 x 8.7	104'	260°	(E) RADIO 4449 B71+B12 (1), (P) RADIO 4460 B25+B66 (1)		
C1	PROPOSED	ERICSSON (AIR6419 B41)	33 x 16 x 9	104'	325°			
C2	EXISTING	RFS (APXVAARR24_43–U_NA20)	95.9 x 24 x 8.7	104'	325°	(E) RADIO 4449 B71+B12 (1), (P) RADIO 4460 B25+B66 (1)		

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

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SITE ID: CTHA524A
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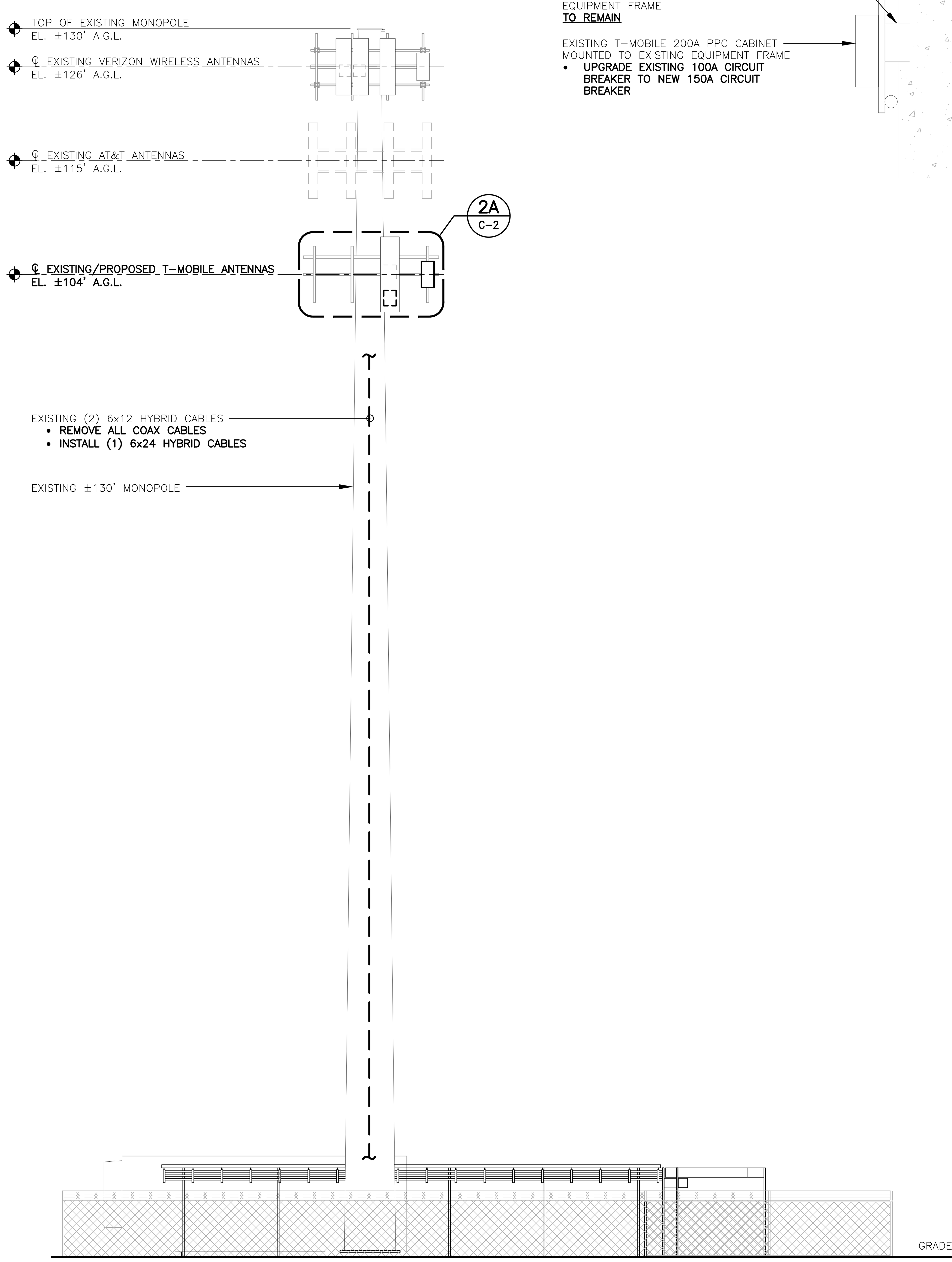
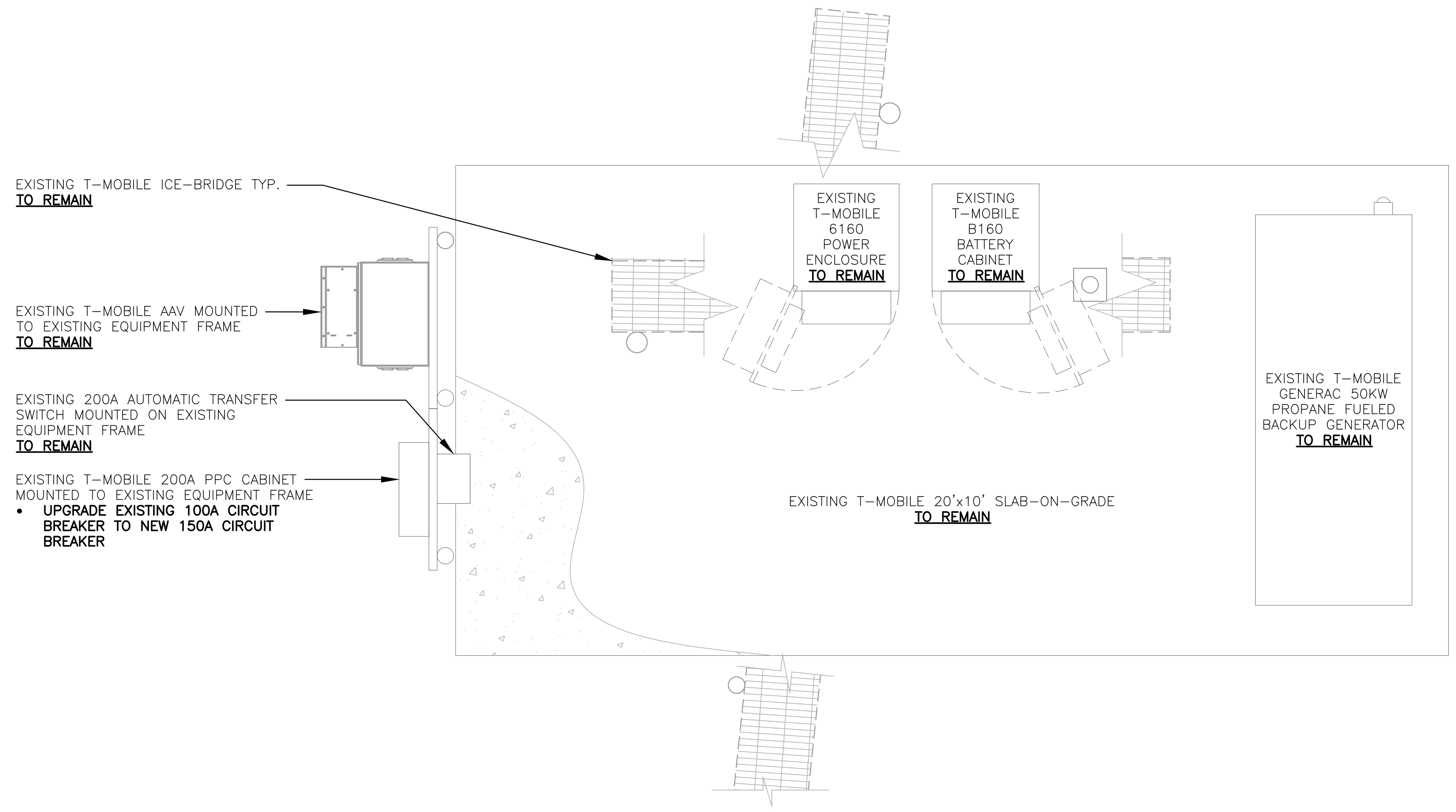
DATE: 03/16/22
SCALE: AS NOTED
JOB NO. 22022.15

NOTES AND SPECIFICATIONS ANT. SCHEDULE

N–1



1 C-1 SOUTH ELEVATION - PROPOSED
SCALE: 1" = 8'



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

STRUCTURAL COMPLIANCE

ANTENNA MOUNTS

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

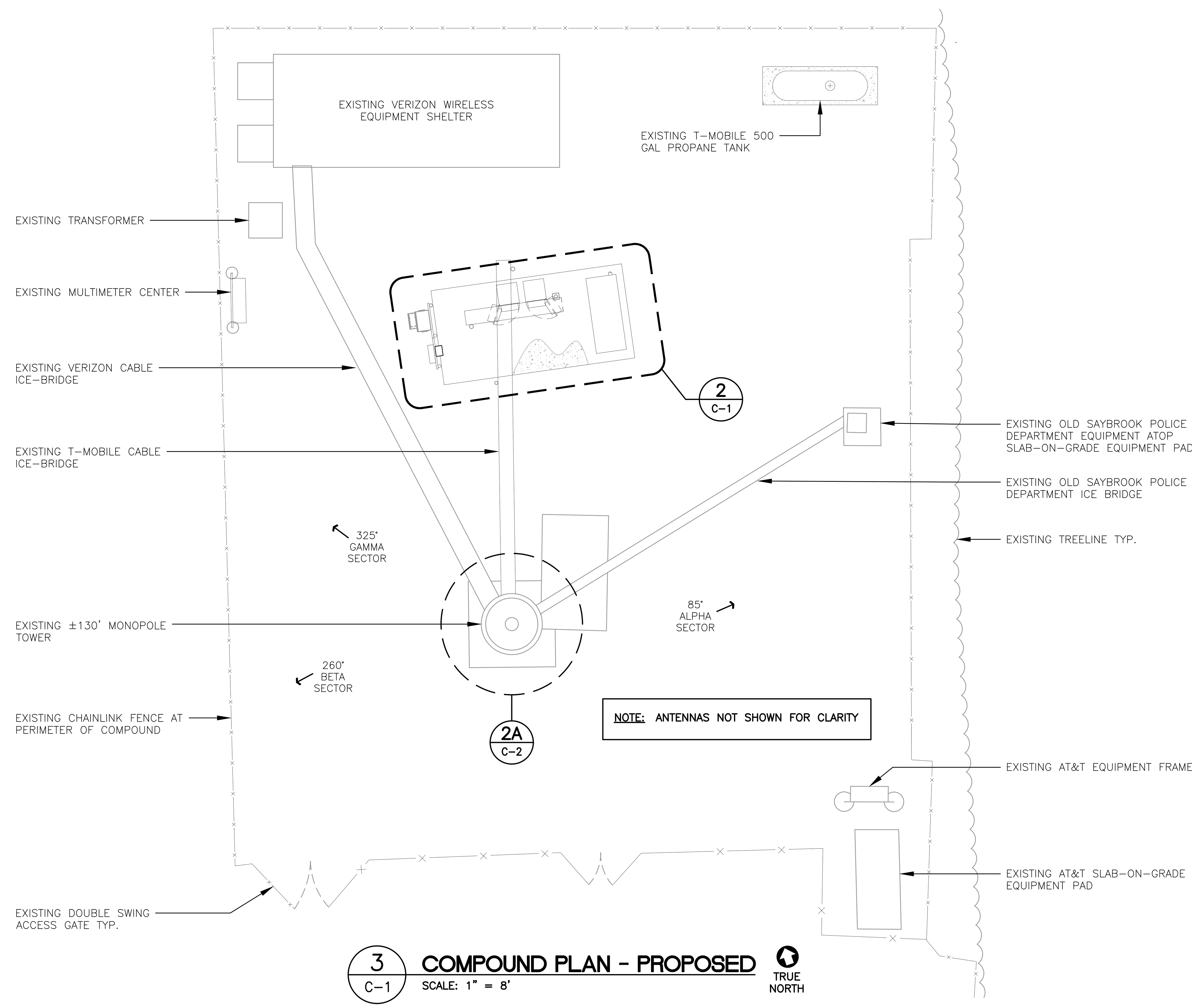
REFER TO THE ANTENNA MOUNT ANALYSIS REPORT PREPARED BY CENTEK ENGINEERING (PROJECT # 22022.15) DATED 04/20/22 FOR ADDITIONAL INFORMATION AND REQUIREMENTS.

TOWER AND TOWER FOUNDATION

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

REFER TO THE STRUCTURAL ANALYSIS REPORT PREPARED BY CENTEK ENGINEERING (PROJECT # 22022.15) DATED 04/20/22 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-1 COMPOUND PLAN - PROPOSED
SCALE: 1" = 8'
TRUE NORTH

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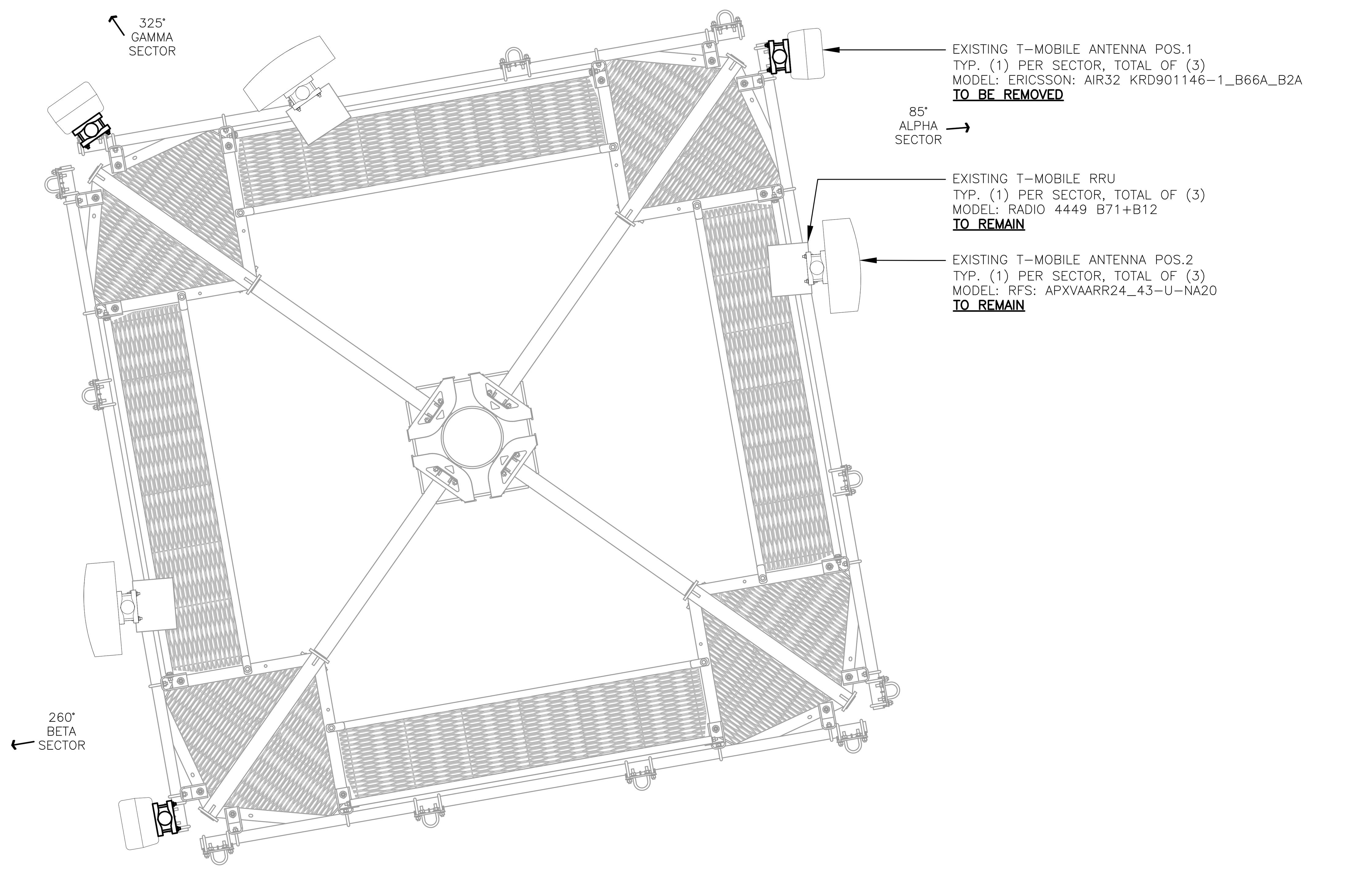
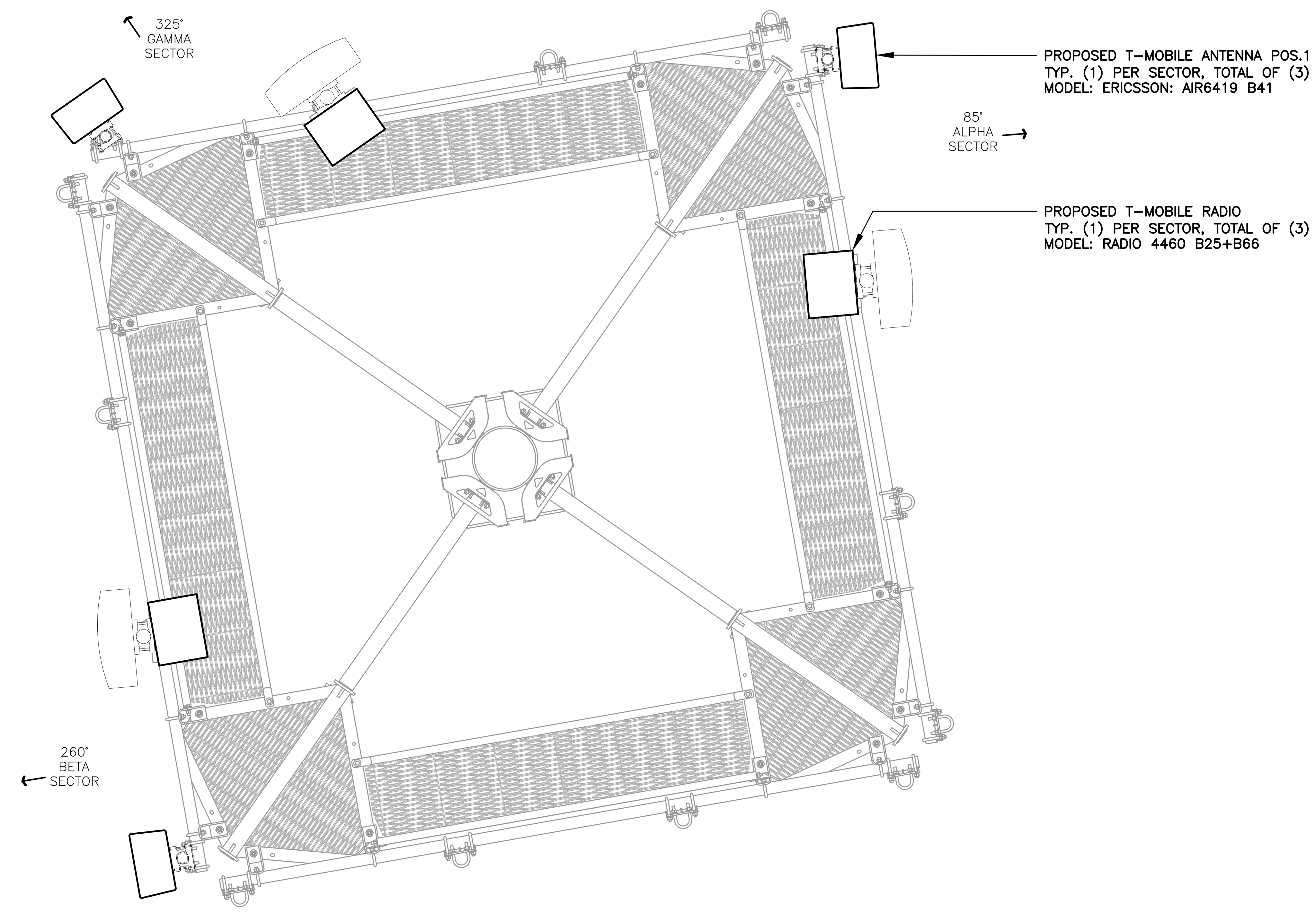
COMPOUND PLAN, EQUIPMENT PLAN, AND ELEVATION

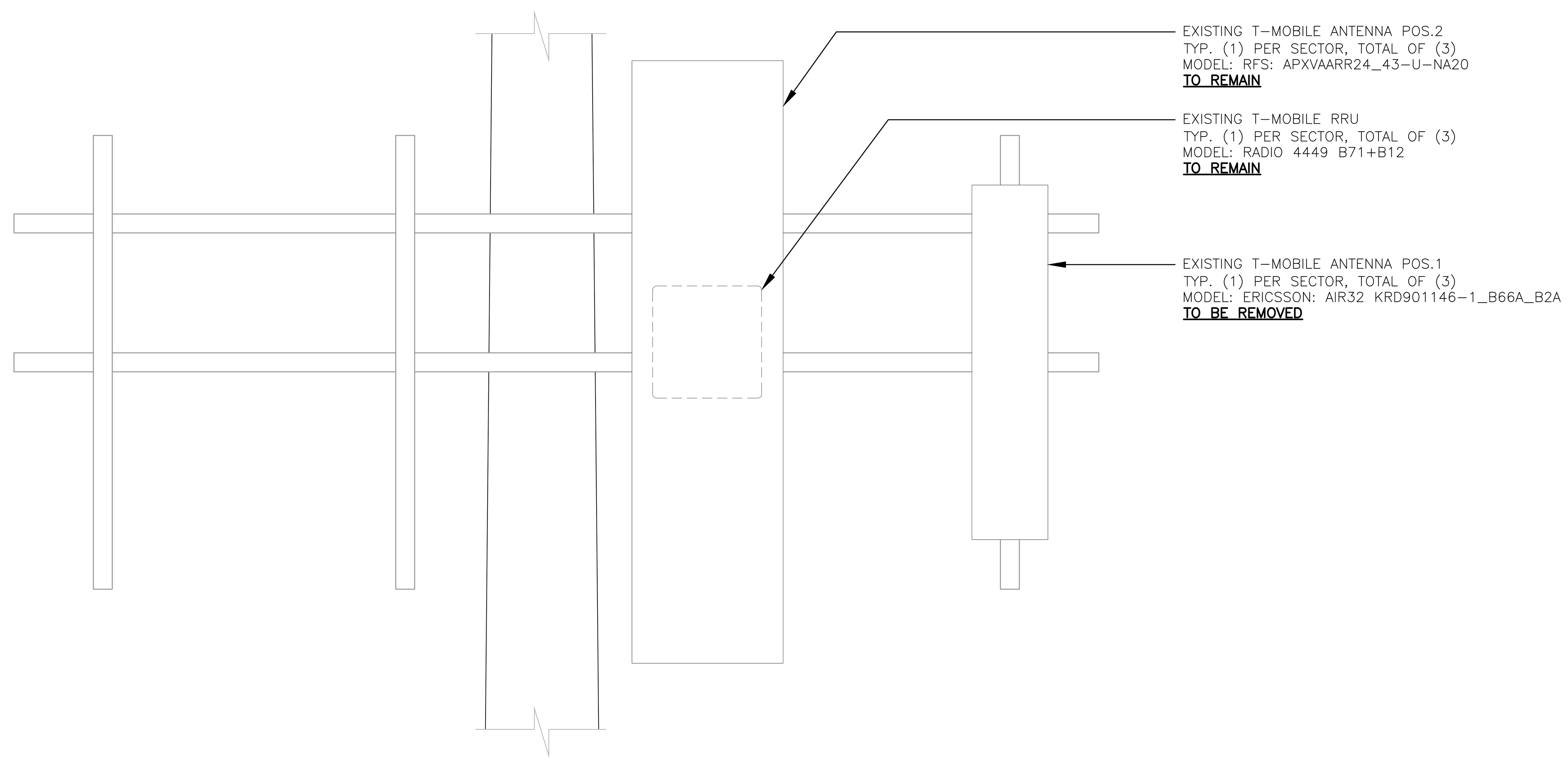
C-1



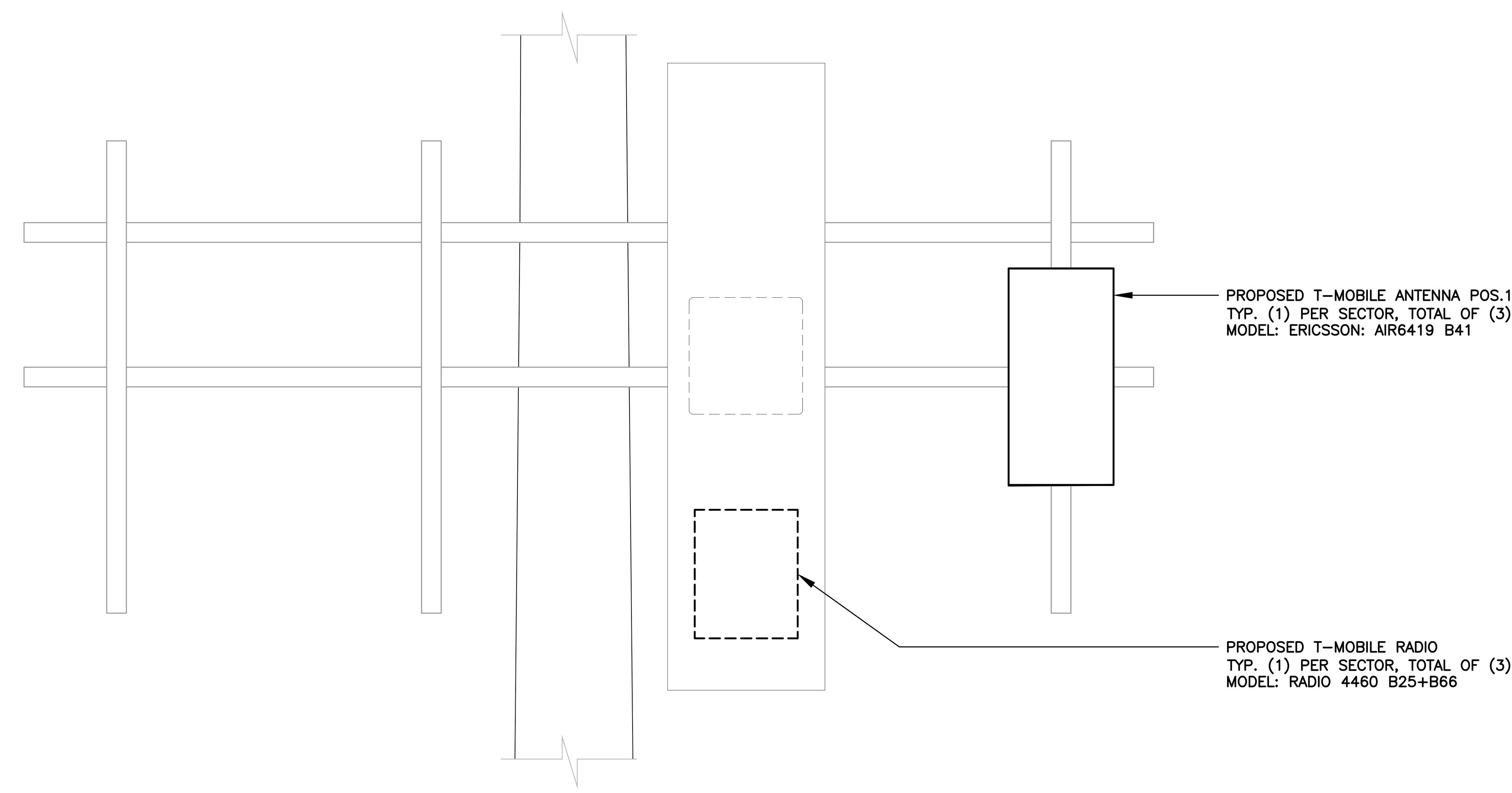
1 C-2 **ANTENNA PLAN - EXISTING**
SCALE: 1/2" = 1'



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



1A C-2 **ANTENNA ELEVATION - EXISTING**
SCALE: 3/4" = 1'



2A C-2 **ANTENNA ELEVATION - PROPOSED**
SCALE: 3/4" = 1'

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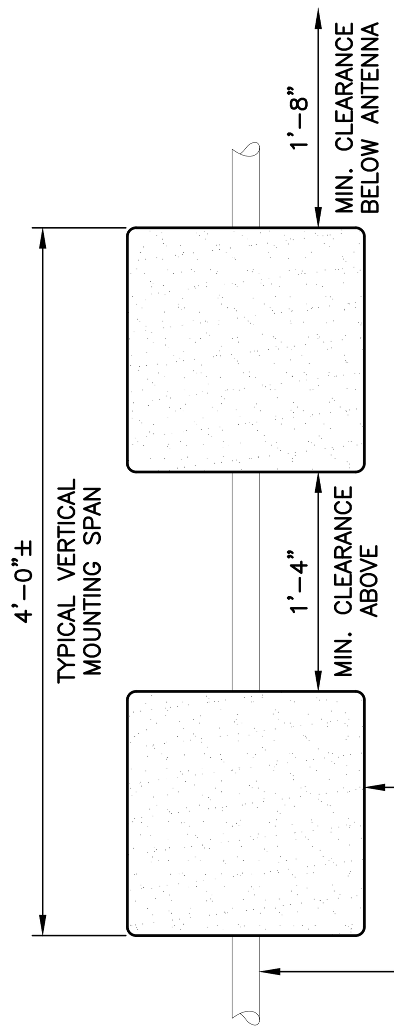
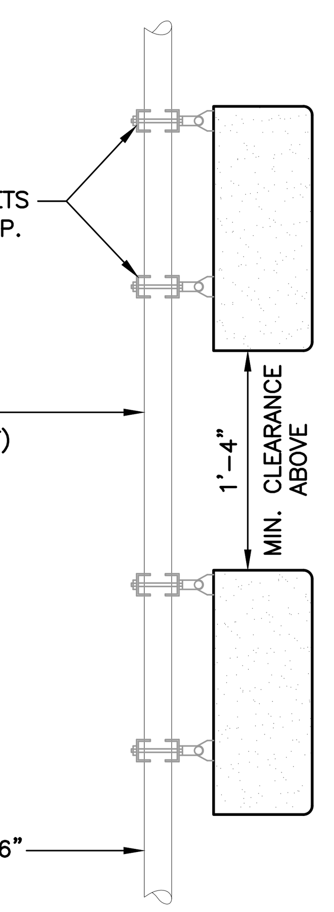
ANTENNA PLANS AND ELEVATIONS

C-2

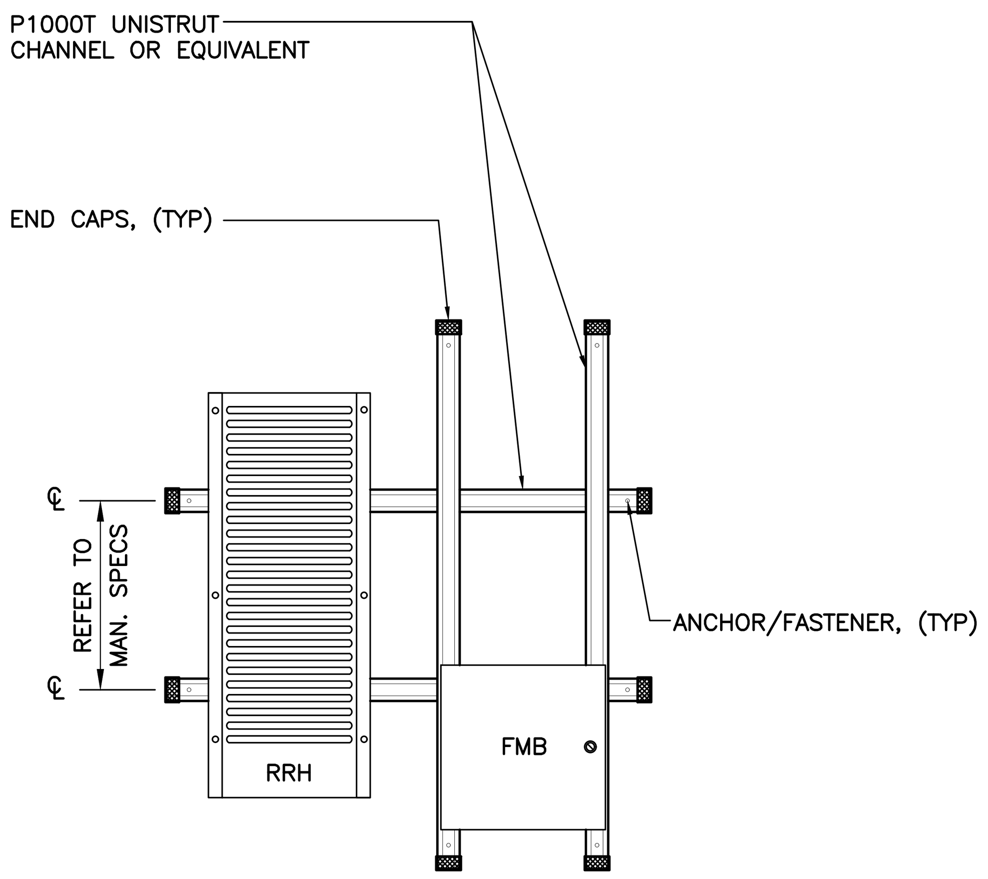
SHEET NO. 4 OF 8



FRONT ELEVATION



SIDE ELEVATION



FRONT ELEVATION

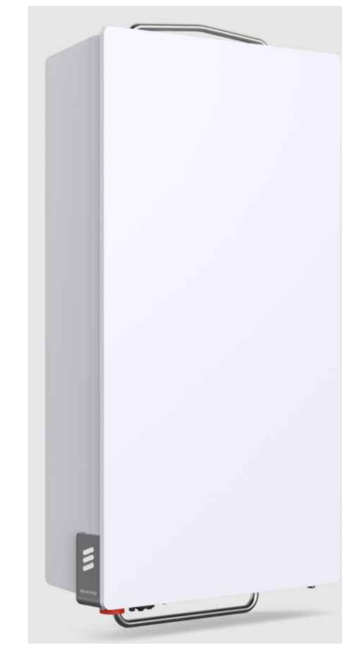
NOTES: (PIPE MOUNTING)

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.

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.

1 (C-3) TYPICAL RRU MOUNTING DETAILS
SCALE: NOT TO SCALE



AIR6419 B41

ALPHA/BETA/GAMMA ANTENNA		
EQUIPMENT	DIMENSIONS	WEIGHT
MAKE: ERICSSON MODEL: AIR6419 B41	33"L x 16"W x 9"D	±41 LBS.

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

2 (C-3) PROPOSED ANTENNA DETAIL
SCALE: NOT TO SCALE

RADIO 4460 B25+B66

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.

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

3 (C-3) PROPOSED RRU DETAIL
SCALE: NOT TO SCALE

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DATE: 03/16/22
SCALE: AS NOTED
JOB NO. 22022.15

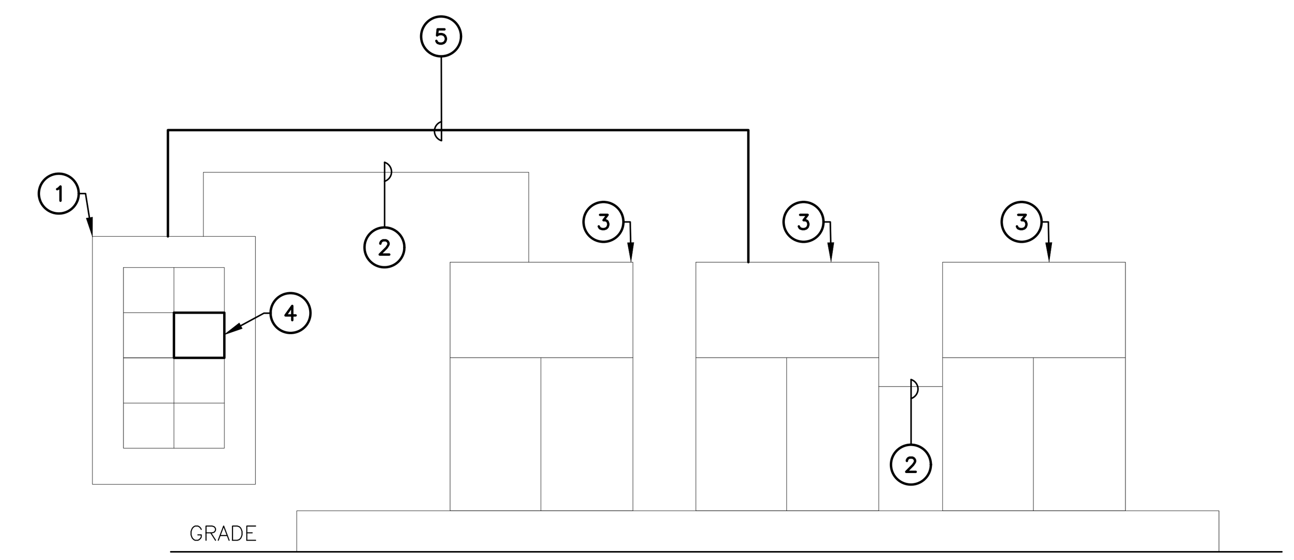
TYPICAL EQUIPMENT DETAILS

C-3

SHEET NO. 5 OF 8

RISER DIAGRAM NOTES

1. EXISTING 200A, 120/240V, SINGLE PHASE PPC CABINET TO REMAIN.
2. EXISTING CONDUITS AND CONDUCTORS TO REMAIN.
3. EXISTING EQUIPMENT CABINETS TO REMAIN.
4. EXISTING 100A/2P CIRCUIT BREAKER TO BE REMOVED AND REPLACED WITH NEW 150A/2P CIRCUIT BREAKER TO SERVE EXISTING EQUIPMENT CABINET.
5. EXISTING 1-1/2" CONDUIT TO REMAIN. REMOVE EXISTING CONDUCTORS AND REPLACE WITH NEW (3) 1/0 AWG, (1) #6 AWG GROUND.



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

REV.	DATE	DRAWN BY	CHECKED BY	DESCRIPTION
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PROFESSIONAL ENGINEER SEAL

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T-MOBILE NORTHEAST LLC
SITE NAME: CTHA524A
SITE ID: CTHA524A
1542 BOSTON POST RD
WESTBROOK, CT 06498

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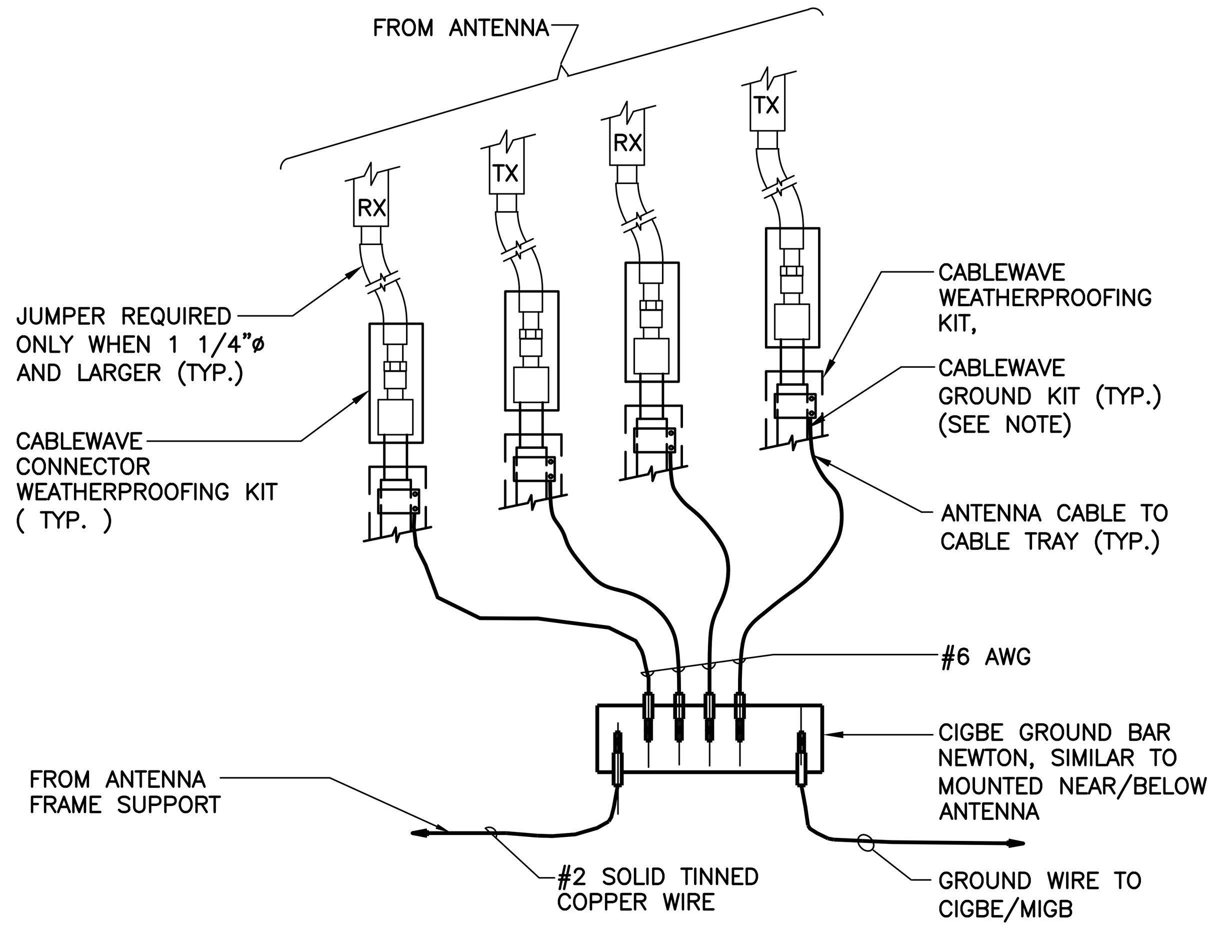
ELECTRICAL RISER DIAGRAM

E-1

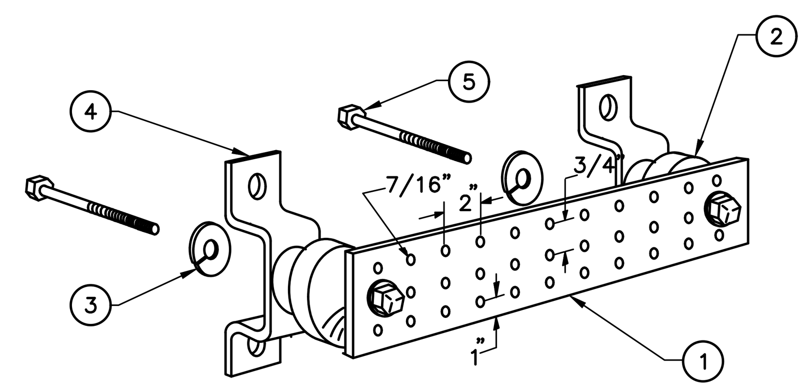
SHEET NO. 6 OF 8



NOTES:

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

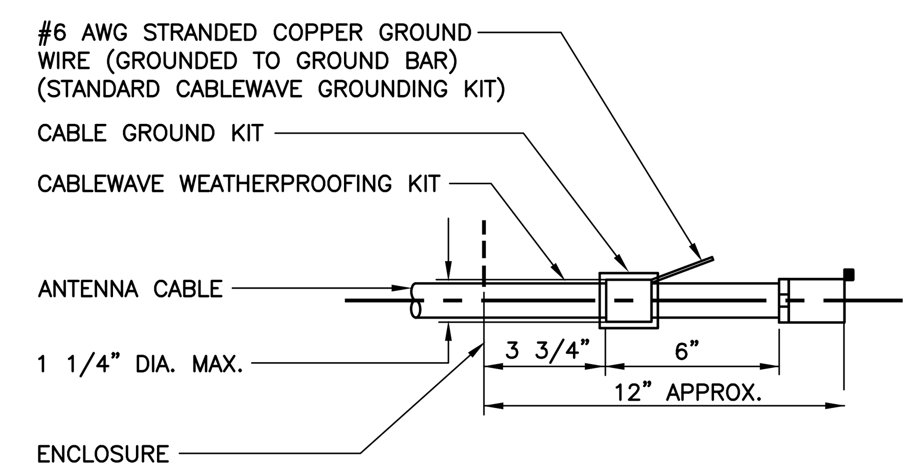
1 / E-2 CONNECTION OF GROUND WIRES TO GROUND BAR
SCALE: NOT TO SCALE



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.

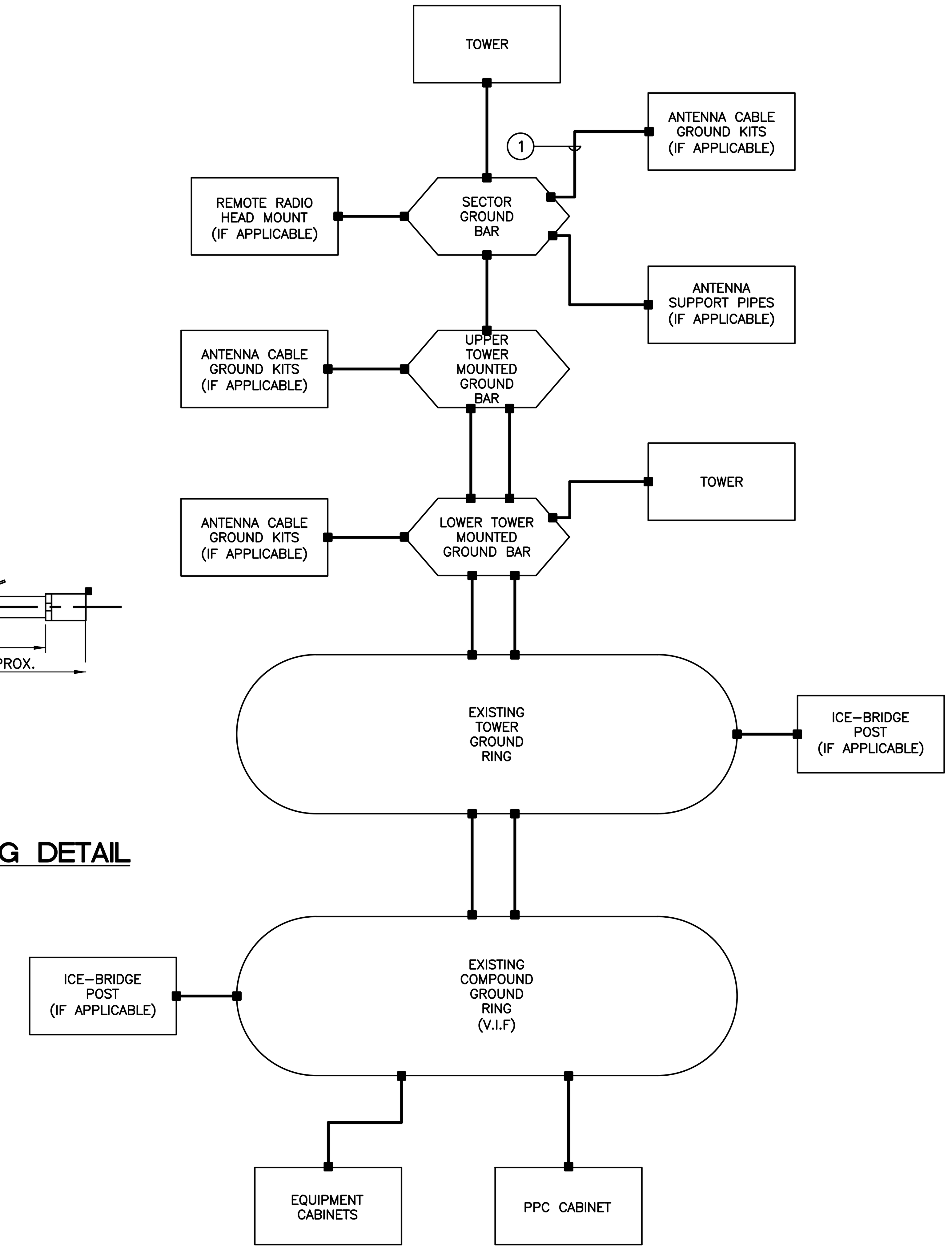
2 / E-2 GROUND BAR DETAIL
SCALE: NOT TO SCALE

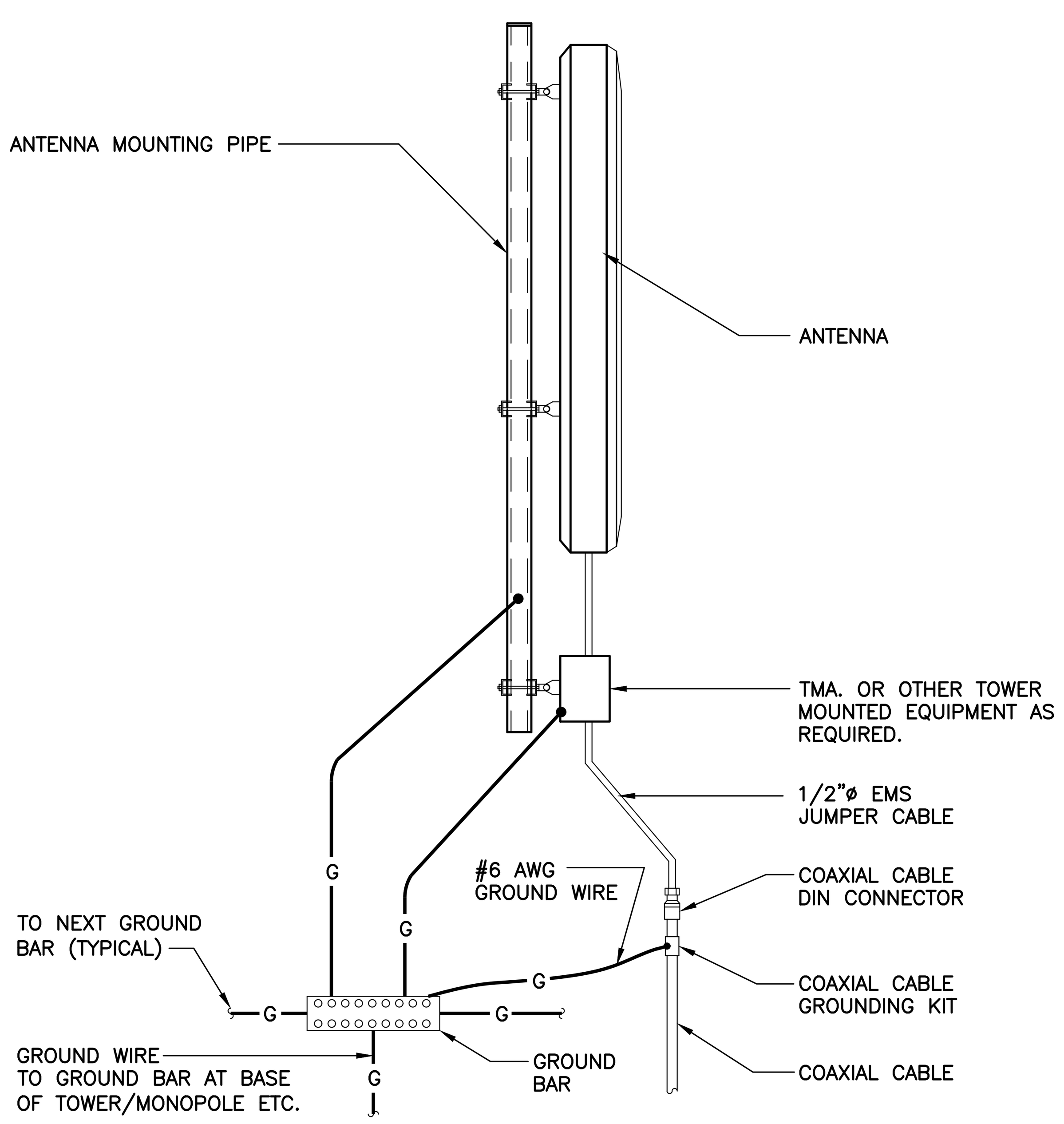


NOTES:

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

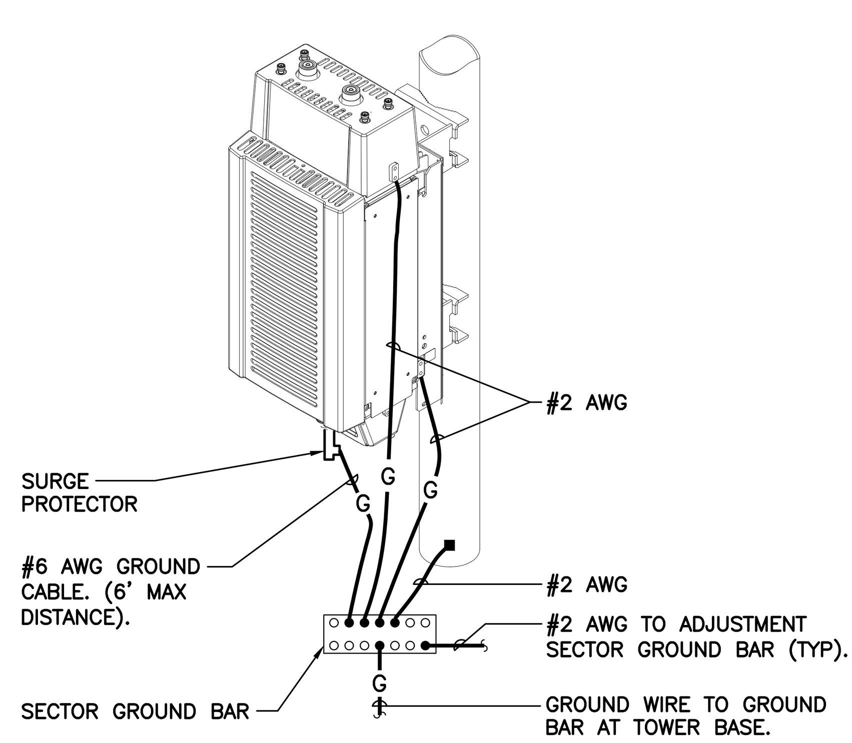
3 / E-2 ANTENNA CABLE GROUNDING DETAIL
SCALE: NOT TO SCALE



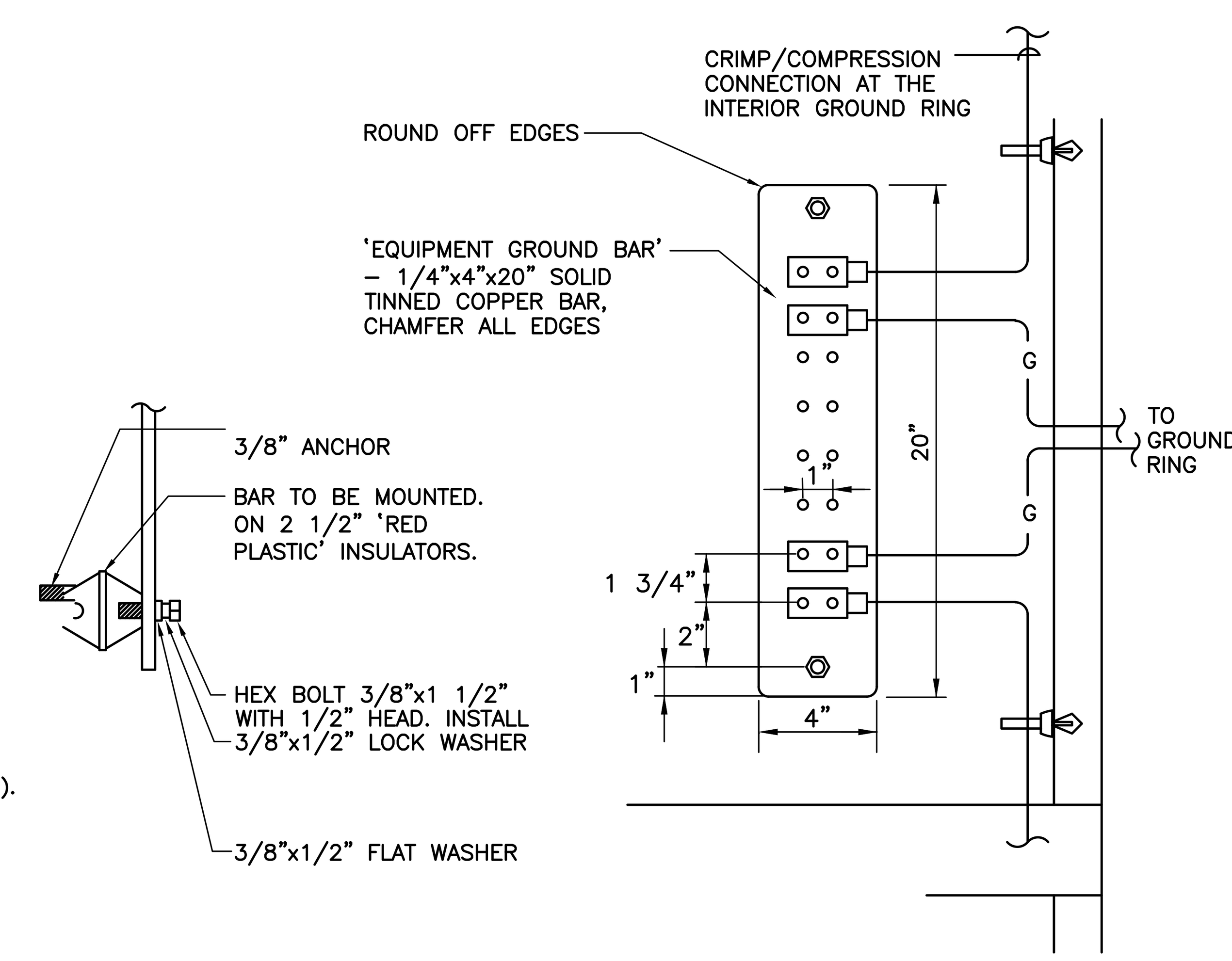


4 / E-2 TYPICAL ANTENNA GROUNDING DETAIL
SCALE: NOT TO SCALE

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

#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 TOWER 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

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TYPICAL ELECTRICAL DETAILS

E-2

SHEET NO. 7 OF 8

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.

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ELECTRICAL SPECIFICATIONS

E-3

CENTEK engineering

Centered on Solutions℠

Structural Analysis Report

Antenna Mount Analysis

T-Mobile Site #: CTHA524A

1542 Boston Post Road
Westbrook, CT

Centek Project No. 22022.15

Date: April 20, 2022

Max Stress Ratio = 68%

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

Prepared for:

T-Mobile USA
35 Griffin Road
Bloomfield, CT 06002

Table of Contents

CENTEK engineering

Centered on Solutions℠

April 20, 2022

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

Re: Structural Letter ~ Antenna Mount
T-Mobile – Site Ref: CTHA524A
1542 Boston Post Road
Westbrook, CT

Centek Project No. 22022.15

Dear Mr. Reid,

Centek Engineering, Inc. has reviewed the T-Mobile antenna installation at the above referenced site. The purpose of the review is to determine the structural adequacy of the **existing mount, consisting of one (1) 12-ft Quad Platform (SitePro P/N F4P-12W) and handrail (P/N F4P-HRK12)** to support the proposed equipment configuration. The review considered the effects of wind load, dead load and ice load in accordance with the 2015 International Building Code as modified by the 2018 Connecticut State Building Code (CTBC) including ASCE 7-10 and ANSI/TIA-222-G *Structural Standards for Steel Antenna Towers and Supporting Structures*.

The loads considered in this analysis consist of the following:

- **T-Mobile:**
  Platform: Three (3) Ericsson AIR6419 panel antennas, three (3) RFS APXVAARR24_43-U-NA20 panel antennas, three (3) Ericsson 4449 remote radio heads and three (3) Ericsson 4460 remote radio heads mounted on one (1) quad platform with a RAD center elevation of 104-ft +/- AGL.

The antenna mount was analyzed per the requirements of the 2015 International Building Code as modified by the 2018 Connecticut State Building Code considering a nominal design wind speed of 105 mph for Westbrook as required in Appendix N of the 2018 Connecticut State Building Code.

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

Based on our review of the installation, it is our opinion that the **subject antenna mount with the replacement of the existing 2 Std. antenna pipes with 2.5 Std. antenna pipes (at position 2 / typ. each sector) has sufficient capacity** to support the aforementioned antenna configuration. If there are any questions regarding this matter, please feel free to call.

Respectfully Submitted by:

Timothy J. Lynn, PE
Structural Engineer

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

Section 2 - Calculations

CENTEK engineering
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Subject: TIA-222-G Loads

Location: Westbrook, CT

Rev. 0: 4/20/22

Prepared by: T.J.L. Checked by: C.F.C.
Job No. 22022.15

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

Wind Speeds

Basic Wind Speed	$V := 105$	mph	(User Input - 2018 CSBC Appendix N)
Basic Wind Speed with Ice	$V_i := 50$	mph	(User Input per Annex B of TIA-222-G)

Input

Structure Type =	Structure_Type := Pole		(User Input)
Structure Category =	SC := II		(User Input)
Exposure Category =	Exp := D		(User Input)
Structure Height =	$h := 130$	ft	(User Input)
Height to Center of Antennas =	$z_{Ant} := 104$	ft	(User Input)
Radial Ice Thickness =	$t_i := 0.75$	in	(User Input per Annex B of TIA-222-G)
Radial Ice Density =	$Id := 56.00$	pcf	(User Input)
Topograpic Factor =	$K_{zt} := 1.0$		(User Input)
	$K_a := 1.0$		(User Input)
Gust Response Factor =	$G_H = 1.1$		(User Input)

Output

Wind Direction Probability Factor =

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

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

Importance Factors =

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

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

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

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

$$K_{iz} := \left(\frac{z_{Ant}}{33}\right)^{0.1} = 1.122$$

$$t_{iz} := 2.0 \cdot t_i \cdot I_{ice} \cdot K_{iz} \cdot K_{zt}^{0.35} = 1.682$$

Velocity Pressure Coefficient Antennas =

$$Kz_{Ant} := 2.01\left(\left(\frac{z_{Ant}}{zg}\right)\right)^{\frac{2}{\alpha}} = 1.443$$

Velocity Pressure w/o Ice Antennas =

$$qz_{Ant} := 0.00256 \cdot K_d \cdot Kz_{Ant} \cdot V^2 \cdot I_{Wind} = 38.684$$

Velocity Pressure with Ice Antennas =

$$qz_{ice.Ant} := 0.00256 \cdot K_d \cdot Kz_{Ant} \cdot V_i^2 \cdot I_{Wind} = 8.772$$

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	RFSAPXVAARR24-43		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 95.9$	in	(User Input)
Antenna Width =	$W_{ant} := 24$	in	(User Input)
Antenna Thickness =	$T_{ant} := 8.7$	in	(User Input)
Antenna Weight =	$WT_{ant} := 154$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 1$		(User Input)
Antenna Aspect Ratio =	$Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 4.0$		
Antenna Force Coefficient =	$Ca_{ant} = 1.27$		

Wind Load (without ice)

Surface Area for One Antenna =	$SA_{antF} := \frac{L_{ant} \cdot W_{ant}}{144} = 16$	sf
Total Antenna Wind Force =	$F_{ant} := qz_{Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antF} = 861$	lbs
Surface Area for One Antenna =	$SA_{antS} := \frac{L_{ant} \cdot T_{ant}}{144} = 5.8$	sf
Total Antenna Wind Force =	$F_{ant} := qz_{Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antS} = 312$	lbs

Wind Load (with ice)

Surface Area for One Antenna w/ Ice =	$SA_{ICEantF} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (W_{ant} + 2 \cdot t_{iz})}{144} = 18.9$	sf
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := qz_{ice.Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantF} = 231$	lbs
Surface Area for One Antenna w/ Ice =	$SA_{ICEantS} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz})}{144} = 8.3$	sf
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := qz_{ice.Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantS} = 102$	lbs

Gravity Load (without ice)

Weight of All Antennas =	$WT_{ant} \cdot N_{ant} = 154$	lbs

Gravity Loads (ice only)

Volume of Each Antenna =	$V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 2 \times 10^4$	cu in
Volume of Ice on Each Antenna =	$V_{ice} := (L_{ant} + 2 \cdot t_{iz})(W_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz}) - V_{ant} = 1 \times 10^4$	cu in
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 413$	lbs
Weight of Ice on All Antennas =	$W_{ICEant} \cdot N_{ant} = 413$	lbs

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	Ericsson AIR6419		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 36.3$	in	(User Input)
Antenna Width =	$W_{ant} := 20.9$	in	(User Input)
Antenna Thickness =	$T_{ant} := 9.0$	in	(User Input)
Antenna Weight =	$WT_{ant} := 83$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 1$		(User Input)
Antenna Aspect Ratio =	$Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 1.7$		
Antenna Force Coefficient =	$Ca_{ant} = 1.2$		

Wind Load (without ice)

Surface Area for One Antenna =	$SA_{antF} := \frac{L_{ant} \cdot W_{ant}}{144} = 5.3$	sf
Total Antenna Wind Force =	$F_{ant} := qz_{Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antF} = 269$	lbs
Surface Area for One Antenna =	$SA_{antS} := \frac{L_{ant} \cdot T_{ant}}{144} = 2.3$	sf
Total Antenna Wind Force =	$F_{ant} := qz_{Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antS} = 116$	lbs

Wind Load (with ice)

Surface Area for One Antenna w/ Ice =	$SA_{ICEantF} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (W_{ant} + 2 \cdot t_{iz})}{144} = 6.7$	sf
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := qz_{ice.Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantF} = 77$	lbs
Surface Area for One Antenna w/ Ice =	$SA_{ICEantS} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz})}{144} = 3.4$	sf
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := qz_{ice.Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantS} = 39$	lbs

Gravity Load (without ice)

Weight of All Antennas =	$WT_{ant} \cdot N_{ant} = 83$	lbs

Gravity Loads (ice only)

Volume of Each Antenna =	$V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 6828$	cu in
Volume of Ice on Each Antenna =	$V_{ice} := (L_{ant} + 2 \cdot t_{iz})(W_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz}) - V_{ant} = 5073$	cu in
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 164$	lbs
Weight of Ice on All Antennas =	$W_{ICEant} \cdot N_{ant} = 164$	lbs

Development of Wind & Ice Load on RRUS

RRUS Data:

RRUS Model = Ericsson 4460

RRUS Shape = Flat (User Input)

RRUS Height = $L_{RRUS} := 19.6$ in (User Input)

RRUS Width = $W_{RRUS} := 15.7$ in (User Input)

RRUS Thickness = $T_{RRUS} := 12.1$ in (User Input)

RRUS Weight = $WT_{RRUS} := 109$ lbs (User Input)

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

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

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

Wind Load (without ice)

Surface Area for One RRUS = $SA_{RRUSF} := \frac{L_{RRUS} \cdot W_{RRUS}}{144} = 2.1$ sf

Total RRUS Wind Force = $F_{RRUS} := qz_{Ant} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{RRUSF} = 109$ lbs

Surface Area for One RRUS = $SA_{RRUSS} := \frac{L_{RRUS} \cdot T_{RRUS}}{144} = 1.6$ sf

Total RRUS Wind Force = $F_{RRUS} := qz_{Ant} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{RRUSS} = 84$ lbs

Wind Load (with ice)

Surface Area for One RRUS w/ Ice = $SA_{ICERRUSF} := \frac{(L_{RRUS} + 2 \cdot t_{iz}) \cdot (W_{RRUS} + 2 \cdot t_{iz})}{144} = 3$ sf

Total RRUS Wind Force w/ Ice = $Fi_{RRUS} := qz_{ice.Ant} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{ICERRUSF} = 35$ lbs

Surface Area for One RRUS w/ Ice = $SA_{ICERRUSS} := \frac{(L_{RRUS} + 2 \cdot t_{iz}) \cdot (T_{RRUS} + 2 \cdot t_{iz})}{144} = 2.5$ sf

Total RRUS Wind Force w/ Ice = $Fi_{RRUS} := qz_{ice.Ant} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{ICERRUSS} = 29$ lbs

Gravity Load (without ice)

Weight of All RRUSs = $WT_{RRUS} \cdot N_{RRUS} = 109$ lbs

Gravity Loads (ice only)

Volume of Each RRUS = $V_{RRUS} := L_{RRUS} \cdot W_{RRUS} \cdot T_{RRUS} = 3723$ cu in

Volume of Ice on Each RRUS = $V_{ice} := (L_{RRUS} + 2 \cdot t_{iz})(W_{RRUS} + 2 \cdot t_{iz}) \cdot (T_{RRUS} + 2 \cdot t_{iz}) - V_{RRUS} = 3047$ cu in

Weight of Ice on Each RRUS = $W_{ICERRUS} := \frac{V_{ice}}{1728} \cdot Id = 99$ lbs

Weight of Ice on All RRUSs = $W_{ICERRUS} \cdot N_{RRUS} = 99$ lbs

Development of Wind & Ice Load on RRUS

RRUS Data:

RRUS Model = Ericsson 4449

RRUS Shape = Flat (User Input)

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

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

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

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

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

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

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

Wind Load (without ice)

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

Total RRUS Wind Force = $F_{RRUS} := qz_{Ant} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{RRUSF} = 70$ lbs

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

Total RRUS Wind Force = $F_{RRUS} := qz_{Ant} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{RRUSS} = 55$ lbs

Wind Load (with ice)

Surface Area for One RRUS w/ Ice = $SA_{ICERRUSF} := \frac{(L_{RRUS} + 2 \cdot t_{iz}) \cdot (W_{RRUS} + 2 \cdot t_{iz})}{144} = 2.1$ sf

Total RRUS Wind Force w/ Ice = $Fi_{RRUS} := qz_{ice.Ant} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{ICERRUSF} = 24$ lbs

Surface Area for One RRUS w/ Ice = $SA_{ICERRUSS} := \frac{(L_{RRUS} + 2 \cdot t_{iz}) \cdot (T_{RRUS} + 2 \cdot t_{iz})}{144} = 1.7$ sf

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

Gravity Load (without ice)

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

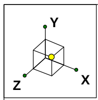
Gravity Loads (ice only)

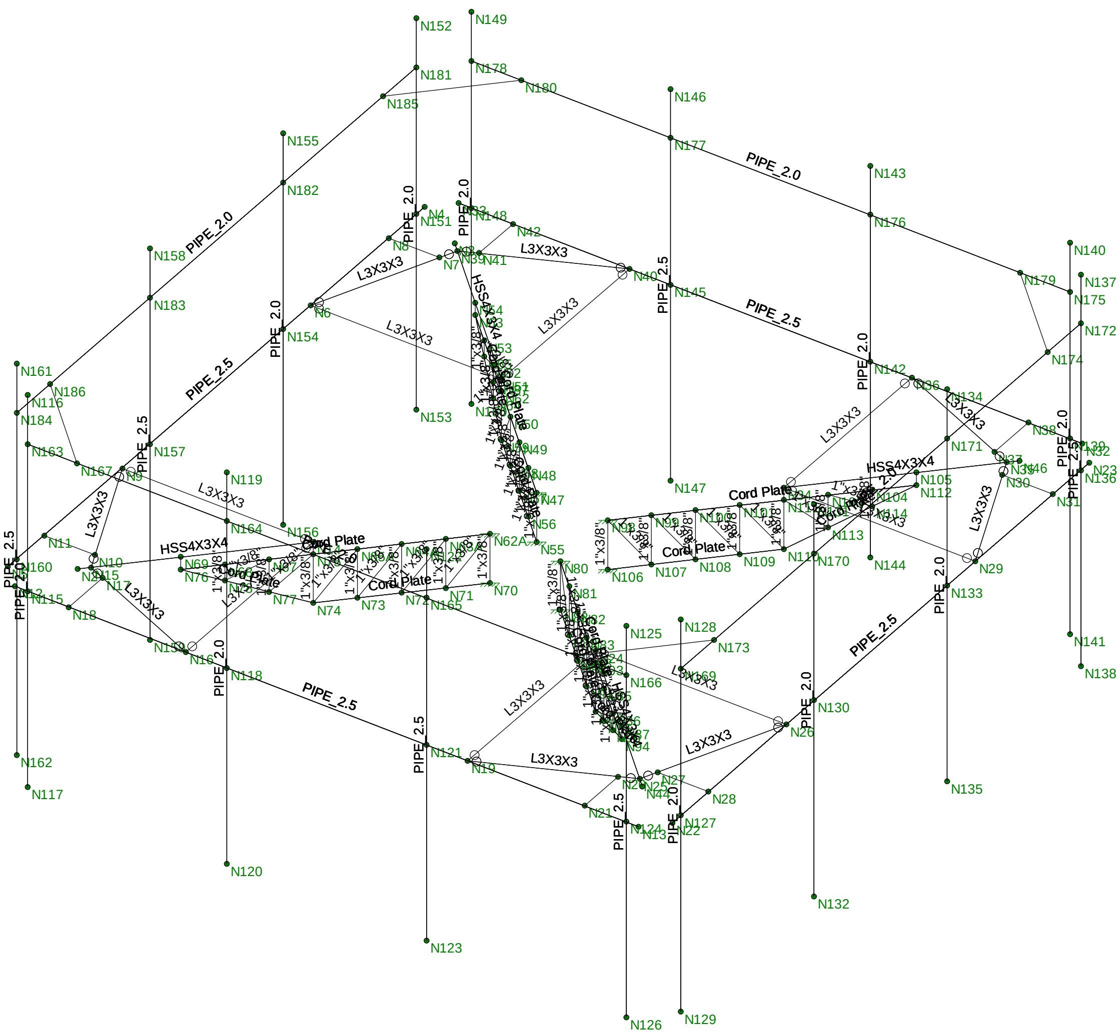
Volume of Each RRUS = $V_{RRUS} := L_{RRUS} \cdot W_{RRUS} \cdot T_{RRUS} = 2045$ cu in

Volume of Ice on Each RRUS = $V_{ice} := (L_{RRUS} + 2 \cdot t_{iz})(W_{RRUS} + 2 \cdot t_{iz}) \cdot (T_{RRUS} + 2 \cdot t_{iz}) - V_{RRUS} = 2119$ cu in

Weight of Ice on Each RRUS = $W_{ICERRUS} := \frac{V_{ice}}{1728} \cdot Id = 69$ lbs

Weight of Ice on All RRUSs = $W_{ICERRUS} \cdot N_{RRUS} = 69$ lbs





Envelope Only Solution

Centek	CTHA524A - Mount Member Framing	
TJL		Apr 20, 2022 at 1:21 PM
22022.15		CTHA524A_AMA.r3d

(Global) Model Settings

Display Sections for Member Calcs	5
Max Internal Sections for Member Calcs	97
Include Shear Deformation?	Yes
Increase Nailing Capacity for Wind?	Yes
Include Warping?	Yes
Trans Load Btwn Intersecting Wood Wall?	Yes
Area Load Mesh (in^2)	144
Merge Tolerance (in)	.12
P-Delta Analysis Tolerance	0.50%
Include P-Delta for Walls?	Yes
Automatically Iterate Stiffness for Walls?	Yes
Max Iterations for Wall Stiffness	3
Gravity Acceleration (ft/sec^2)	32.2
Wall Mesh Size (in)	24
Eigensolution Convergence Tol. (1.E-)	4
Vertical Axis	Y
Global Member Orientation Plane	XZ
Static Solver	Sparse Accelerated
Dynamic Solver	Accelerated Solver

Hot Rolled Steel Code	AISC 14th(360-10): LRFD
Adjust Stiffness?	Yes(Iterative)
RISAConnection Code	AISC 14th(360-10): ASD
Cold Formed Steel Code	AISI S100-12: ASD
Wood Code	AWC NDS-15: ASD
Wood Temperature	< 100F
Concrete Code	ACI 318-14
Masonry Code	ACI 530-13: ASD
Aluminum Code	AA ADM1-15: 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
Footing Overturning Safety Factor	1
Optimize for OTM/Sliding	No
Check Concrete Bearing	No
Footing Concrete Weight (k/ft^3)	.145
Footing Concrete f'c (ksi)	4
Footing Concrete Ec (ksi)	3644
Lambda	1
Footing Steel fy (ksi)	60
Minimum Steel	0.0018
Maximum Steel	0.0075
Footing Top Bar	#6
Footing Top Bar Cover (in)	1.5
Footing Bottom Bar	#6
Footing Bottom Bar Cover (in)	3
Pedestal Bar	#6
Pedestal Bar Cover (in)	1.5
Pedestal Ties	#4

Hot Rolled Steel Properties

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

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design Ru...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	2.5" Std. Pipe	PIPE_2.5	Beam	None	A53 Gr.B	Typical	1.61	1.45	1.45	2.89
2	2.0" Std. Pipe	PIPE_2.0	Beam	None	A53 Gr.B	Typical	1.02	.627	.627	1.25
3	HSS4x3	HSS4X3X4	Beam	None	A500 Gr.B ...	Typical	2.91	3.91	6.15	7.96
4	L3x3	L3X3X3	Beam	None	A36 Gr.36	Typical	1.09	.948	.948	.014
5	Cord Plate	Cord Plate	Beam	None	A36 Gr.36	Typical	2.25	2.668	.188	.158
6	Web Plate	1"x3/8"	Beam	None	A36 Gr.36	Typical	.375	.004	.031	.013
7	Handrail	PIPE_2.0	Beam	None	A53 Gr.B	Typical	1.02	.627	.627	1.25

Hot Rolled Steel Design Parameters

	Label	Shape	Length[ft]	Lbyy[ft]	Lbzz[ft]	Lcomp top[...	Lcomp bot[...	L-torq...	Kyy	Kzz	Cb	Functi...
1	M1	2.5" Std. Pipe	12.5			Lbyy						Lateral
2	M2	L3x3	3.828			Lbyy						Lateral
3	M3	L3x3	2.911			Lbyy						Lateral
4	M5	L3x3	3.828			Lbyy						Lateral
5	M6	L3x3	2.911			Lbyy						Lateral
6	M8	2.5" Std. Pipe	12.5			Lbyy						Lateral
7	M9	L3x3	3.828			Lbyy						Lateral
8	M10	L3x3	2.911			Lbyy						Lateral
9	M12	L3x3	3.828			Lbyy						Lateral
10	M13	L3x3	2.911			Lbyy						Lateral
11	M15	2.5" Std. Pipe	12.5			Lbyy						Lateral
12	M16	L3x3	3.828			Lbyy						Lateral
13	M17	L3x3	2.911			Lbyy						Lateral
14	M19	L3x3	3.828			Lbyy						Lateral
15	M20	L3x3	2.911			Lbyy						Lateral
16	M22	2.5" Std. Pipe	12.5			Lbyy						Lateral
17	M23	L3x3	3.828			Lbyy						Lateral
18	M24	L3x3	2.911			Lbyy						Lateral
19	M26	L3x3	3.828			Lbyy						Lateral
20	M27	L3x3	2.911			Lbyy						Lateral
21	M29	HSS4x3	4			Lbyy						Lateral
22	M30	Cord Plate	5.25	Segment	Segment	Segment	Segment	Segm...				Lateral
23	M31	Cord Plate	2.462	Segment	Segment	Segment	Segment	Segm...				Lateral
24	M32	Cord Plate	3	Segment	Segment	Segment	Segment	Segm...				Lateral
25	M33	Web Plate	1			Lbyy						Lateral
26	M34	Web Plate	1			Lbyy						Lateral
27	M35	Web Plate	1			Lbyy						Lateral
28	M36	Web Plate	1			Lbyy						Lateral
29	M37	Web Plate	1			Lbyy						Lateral
30	M38	Web Plate	.667			Lbyy						Lateral
31	M39	Web Plate	.333			Lbyy						Lateral
32	M40	Web Plate	1.25			Lbyy						Lateral
33	M41	Web Plate	1.25			Lbyy						Lateral
34	M42	Web Plate	1.25			Lbyy						Lateral
35	M43	Web Plate	1.25			Lbyy						Lateral
36	M44	Web Plate	1.003			Lbyy						Lateral
37	M45	Web Plate	.821			Lbyy						Lateral
38	M48	HSS4x3	4			Lbyy						Lateral
39	M49	Cord Plate	5.25	Segment	Segment	Segment	Segment	Segm...				Lateral

Hot Rolled Steel Design Parameters (Continued)

	Label	Shape	Length[ft]	Lbyy[ft]	Lbzz[ft]	Lcomp top[...	Lcomp bot[...	L-torq...	Kyy	Kzz	Cb	Functi...
40	M50	Cord Plate	2.462	Segment	Segment	Segment	Segment	Segm...				Lateral
41	M51	Cord Plate	3	Segment	Segment	Segment	Segment	Segm...				Lateral
42	M52	Web Plate	1			Lbyy						Lateral
43	M53	Web Plate	1			Lbyy						Lateral
44	M54	Web Plate	1			Lbyy						Lateral
45	M55	Web Plate	1			Lbyy						Lateral
46	M56	Web Plate	1			Lbyy						Lateral
47	M57	Web Plate	.667			Lbyy						Lateral
48	M58	Web Plate	.333			Lbyy						Lateral
49	M59	Web Plate	1.25			Lbyy						Lateral
50	M60	Web Plate	1.25			Lbyy						Lateral
51	M61	Web Plate	1.25			Lbyy						Lateral
52	M62	Web Plate	1.25			Lbyy						Lateral
53	M63	Web Plate	1.003			Lbyy						Lateral
54	M64	Web Plate	.821			Lbyy						Lateral
55	M67	HSS4x3	4			Lbyy						Lateral
56	M68	Cord Plate	5.25	Segment	Segment	Segment	Segment	Segm...				Lateral
57	M69	Cord Plate	2.462	Segment	Segment	Segment	Segment	Segm...				Lateral
58	M70	Cord Plate	3	Segment	Segment	Segment	Segment	Segm...				Lateral
59	M71	Web Plate	1			Lbyy						Lateral
60	M72	Web Plate	1			Lbyy						Lateral
61	M73	Web Plate	1			Lbyy						Lateral
62	M74	Web Plate	1			Lbyy						Lateral
63	M75	Web Plate	1			Lbyy						Lateral
64	M76	Web Plate	.667			Lbyy						Lateral
65	M77	Web Plate	.333			Lbyy						Lateral
66	M78	Web Plate	1.25			Lbyy						Lateral
67	M79	Web Plate	1.25			Lbyy						Lateral
68	M80	Web Plate	1.25			Lbyy						Lateral
69	M81	Web Plate	1.25			Lbyy						Lateral
70	M82	Web Plate	1.003			Lbyy						Lateral
71	M83	Web Plate	.821			Lbyy						Lateral
72	M86	HSS4x3	4			Lbyy						Lateral
73	M87	Cord Plate	5.25	Segment	Segment	Segment	Segment	Segm...				Lateral
74	M88	Cord Plate	2.462	Segment	Segment	Segment	Segment	Segm...				Lateral
75	M89	Cord Plate	3	Segment	Segment	Segment	Segment	Segm...				Lateral
76	M90	Web Plate	1			Lbyy						Lateral
77	M91	Web Plate	1			Lbyy						Lateral
78	M92	Web Plate	1			Lbyy						Lateral
79	M93	Web Plate	1			Lbyy						Lateral
80	M94	Web Plate	1			Lbyy						Lateral
81	M95	Web Plate	.667			Lbyy						Lateral
82	M96	Web Plate	.333			Lbyy						Lateral
83	M97	Web Plate	1.25			Lbyy						Lateral
84	M98	Web Plate	1.25			Lbyy						Lateral
85	M99	Web Plate	1.25			Lbyy						Lateral
86	M100	Web Plate	1.25			Lbyy						Lateral
87	M101	Web Plate	1.003			Lbyy						Lateral
88	M102	Web Plate	.821			Lbyy						Lateral
89	M105	2.0" Std. Pipe	8			Lbyy						Lateral
90	M106	2.0" Std. Pipe	8			Lbyy						Lateral
91	M107	2.5" Std. Pipe	8			Lbyy						Lateral

Hot Rolled Steel Design Parameters (Continued)

	Label	Shape	Length[ft]	Lbyy[ft]	Lbzz[ft]	Lcomp top[...	Lcomp bot[...	L-torq...	Kyy	Kzz	Cb	Functi...
92	M108	2.5" Std. Pipe	8			Lbyy						Lateral
93	M109	2.0" Std. Pipe	8			Lbyy						Lateral
94	M110	2.0" Std. Pipe	8			Lbyy						Lateral
95	M111	2.0" Std. Pipe	8			Lbyy						Lateral
96	M112	2.5" Std. Pipe	8			Lbyy						Lateral
97	M113	2.0" Std. Pipe	8			Lbyy						Lateral
98	M114	2.0" Std. Pipe	8			Lbyy						Lateral
99	M115	2.5" Std. Pipe	8			Lbyy						Lateral
100	M116	2.0" Std. Pipe	8			Lbyy						Lateral
101	M117	2.0" Std. Pipe	8			Lbyy						Lateral
102	M118	2.0" Std. Pipe	8			Lbyy						Lateral
103	M119	2.5" Std. Pipe	8			Lbyy						Lateral
104	M120	2.5" Std. Pipe	8			Lbyy						Lateral
105	M121	Handrail	12			Lbyy						Lateral
106	M122	Handrail	12			Lbyy						Lateral
107	M123	Handrail	12			Lbyy						Lateral
108	M124	Handrail	12			Lbyy						Lateral

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(...	Section/Shape	Type	Design List	Material	Design ...
1	M1	N4	N5			2.5" Std. Pipe	Beam	None	A53 Gr.B	Typical
2	M2	N51	N6			L3x3	Beam	None	A36 Gr.36	Typical
3	M3	N39	N6			L3x3	Beam	None	A36 Gr.36	Typical
4	M4	N7	N8			RIGID	None	None	RIGID	Typical
5	M5	N14	N9			L3x3	Beam	None	A36 Gr.36	Typical
6	M6	N15	N9			L3x3	Beam	None	A36 Gr.36	Typical
7	M7	N10	N11			RIGID	None	None	RIGID	Typical
8	M8	N12	N13			2.5" Std. Pipe	Beam	None	A53 Gr.B	Typical
9	M9	N14	N16			L3x3	Beam	None	A36 Gr.36	Typical
10	M10	N15	N16			L3x3	Beam	None	A36 Gr.36	Typical
11	M11	N17	N18			RIGID	None	None	RIGID	Typical
12	M12	N24	N19			L3x3	Beam	None	A36 Gr.36	Typical
13	M13	N25	N19			L3x3	Beam	None	A36 Gr.36	Typical
14	M14	N20	N21			RIGID	None	None	RIGID	Typical
15	M15	N22	N23			2.5" Std. Pipe	Beam	None	A53 Gr.B	Typical
16	M16	N24	N26			L3x3	Beam	None	A36 Gr.36	Typical
17	M17	N25	N26			L3x3	Beam	None	A36 Gr.36	Typical
18	M18	N27	N28			RIGID	None	None	RIGID	Typical
19	M19	N34	N29			L3x3	Beam	None	A36 Gr.36	Typical
20	M20	N35	N29			L3x3	Beam	None	A36 Gr.36	Typical
21	M21	N30	N31			RIGID	None	None	RIGID	Typical
22	M22	N32	N33			2.5" Std. Pipe	Beam	None	A53 Gr.B	Typical
23	M23	N34	N36			L3x3	Beam	None	A36 Gr.36	Typical
24	M24	N35	N36			L3x3	Beam	None	A36 Gr.36	Typical
25	M25	N37	N38			RIGID	None	None	RIGID	Typical
26	M26	N51	N40			L3x3	Beam	None	A36 Gr.36	Typical
27	M27	N39	N40			L3x3	Beam	None	A36 Gr.36	Typical
28	M28	N41	N42			RIGID	None	None	RIGID	Typical
29	M29	N51	N3		90	HSS4x3	Beam	None	A500 Gr.B Rect	Typical
30	M30	N63	N47			Cord Plate	Beam	None	A36 Gr.36	Typical

Member Primary Data (Continued)

	Label	I Joint	J Joint	K Joint	Rotate(...	Section/Shape	Type	Design List	Material	Design ...
31	M31	N63	N59			Cord Plate	Beam	None	A36 Gr.36	Typical
32	M32	N59	N55			Cord Plate	Beam	None	A36 Gr.36	Typical
33	M33	N47	N55			Web Plate	Beam	None	A36 Gr.36	Typical
34	M34	N48	N56			Web Plate	Beam	None	A36 Gr.36	Typical
35	M35	N49	N57			Web Plate	Beam	None	A36 Gr.36	Typical
36	M36	N50	N58			Web Plate	Beam	None	A36 Gr.36	Typical
37	M37	N62	N59			Web Plate	Beam	None	A36 Gr.36	Typical
38	M38	N52	N64			Web Plate	Beam	None	A36 Gr.36	Typical
39	M39	N53	N65			Web Plate	Beam	None	A36 Gr.36	Typical
40	M40	N47	N56			Web Plate	Beam	None	A36 Gr.36	Typical
41	M41	N48	N57			Web Plate	Beam	None	A36 Gr.36	Typical
42	M42	N49	N58			Web Plate	Beam	None	A36 Gr.36	Typical
43	M43	N50	N59			Web Plate	Beam	None	A36 Gr.36	Typical
44	M44	N62	N64			Web Plate	Beam	None	A36 Gr.36	Typical
45	M45	N52	N65			Web Plate	Beam	None	A36 Gr.36	Typical
46	M46	N54	N63			RIGID	None	None	RIGID	Typical
47	M47	N51	N62			RIGID	None	None	RIGID	Typical
48	M48	N14	N2		90	HSS4x3	Beam	None	A500 Gr.B Rect	Typical
49	M49	N76	N62A			Cord Plate	Beam	None	A36 Gr.36	Typical
50	M50	N76	N74			Cord Plate	Beam	None	A36 Gr.36	Typical
51	M51	N74	N70			Cord Plate	Beam	None	A36 Gr.36	Typical
52	M52	N62A	N70			Web Plate	Beam	None	A36 Gr.36	Typical
53	M53	N63A	N71			Web Plate	Beam	None	A36 Gr.36	Typical
54	M54	N64A	N72			Web Plate	Beam	None	A36 Gr.36	Typical
55	M55	N65A	N73			Web Plate	Beam	None	A36 Gr.36	Typical
56	M56	N75	N74			Web Plate	Beam	None	A36 Gr.36	Typical
57	M57	N67	N77			Web Plate	Beam	None	A36 Gr.36	Typical
58	M58	N68	N78			Web Plate	Beam	None	A36 Gr.36	Typical
59	M59	N62A	N71			Web Plate	Beam	None	A36 Gr.36	Typical
60	M60	N63A	N72			Web Plate	Beam	None	A36 Gr.36	Typical
61	M61	N64A	N73			Web Plate	Beam	None	A36 Gr.36	Typical
62	M62	N65A	N74			Web Plate	Beam	None	A36 Gr.36	Typical
63	M63	N75	N77			Web Plate	Beam	None	A36 Gr.36	Typical
64	M64	N67	N78			Web Plate	Beam	None	A36 Gr.36	Typical
65	M65	N69	N76			RIGID	None	None	RIGID	Typical
66	M66	N14	N75			RIGID	None	None	RIGID	Typical
67	M67	N24	N44		90	HSS4x3	Beam	None	A500 Gr.B Rect	Typical
68	M68	N94	N80			Cord Plate	Beam	None	A36 Gr.36	Typical
69	M69	N94	N92			Cord Plate	Beam	None	A36 Gr.36	Typical
70	M70	N92	N88			Cord Plate	Beam	None	A36 Gr.36	Typical
71	M71	N80	N88			Web Plate	Beam	None	A36 Gr.36	Typical
72	M72	N81	N89			Web Plate	Beam	None	A36 Gr.36	Typical
73	M73	N82	N90			Web Plate	Beam	None	A36 Gr.36	Typical
74	M74	N83	N91			Web Plate	Beam	None	A36 Gr.36	Typical
75	M75	N93	N92			Web Plate	Beam	None	A36 Gr.36	Typical
76	M76	N85	N95			Web Plate	Beam	None	A36 Gr.36	Typical
77	M77	N86	N96			Web Plate	Beam	None	A36 Gr.36	Typical
78	M78	N80	N89			Web Plate	Beam	None	A36 Gr.36	Typical
79	M79	N81	N90			Web Plate	Beam	None	A36 Gr.36	Typical
80	M80	N82	N91			Web Plate	Beam	None	A36 Gr.36	Typical
81	M81	N83	N92			Web Plate	Beam	None	A36 Gr.36	Typical
82	M82	N93	N95			Web Plate	Beam	None	A36 Gr.36	Typical

Member Primary Data (Continued)

	Label	I Joint	J Joint	K Joint	Rotate(...	Section/Shape	Type	Design List	Material	Design ...
83	M83	N85	N96			Web Plate	Beam	None	A36 Gr.36	Typical
84	M84	N87	N94			RIGID	None	None	RIGID	Typical
85	M85	N24	N93			RIGID	None	None	RIGID	Typical
86	M86	N34	N46		90	HSS4x3	Beam	None	A500 Gr.B Rect	Typical
87	M87	N112	N98			Cord Plate	Beam	None	A36 Gr.36	Typical
88	M88	N112	N110			Cord Plate	Beam	None	A36 Gr.36	Typical
89	M89	N110	N106			Cord Plate	Beam	None	A36 Gr.36	Typical
90	M90	N98	N106			Web Plate	Beam	None	A36 Gr.36	Typical
91	M91	N99	N107			Web Plate	Beam	None	A36 Gr.36	Typical
92	M92	N100	N108			Web Plate	Beam	None	A36 Gr.36	Typical
93	M93	N101	N109			Web Plate	Beam	None	A36 Gr.36	Typical
94	M94	N111	N110			Web Plate	Beam	None	A36 Gr.36	Typical
95	M95	N103	N113			Web Plate	Beam	None	A36 Gr.36	Typical
96	M96	N104	N114			Web Plate	Beam	None	A36 Gr.36	Typical
97	M97	N98	N107			Web Plate	Beam	None	A36 Gr.36	Typical
98	M98	N99	N108			Web Plate	Beam	None	A36 Gr.36	Typical
99	M99	N100	N109			Web Plate	Beam	None	A36 Gr.36	Typical
100	M100	N101	N110			Web Plate	Beam	None	A36 Gr.36	Typical
101	M101	N111	N113			Web Plate	Beam	None	A36 Gr.36	Typical
102	M102	N103	N114			Web Plate	Beam	None	A36 Gr.36	Typical
103	M103	N105	N112			RIGID	None	None	RIGID	Typical
104	M104	N34	N111			RIGID	None	None	RIGID	Typical
105	M105	N116	N117			2.0" Std. Pipe	Beam	None	A53 Gr.B	Typical
106	M106	N119	N120			2.0" Std. Pipe	Beam	None	A53 Gr.B	Typical
107	M107	N122	N123			2.5" Std. Pipe	Beam	None	A53 Gr.B	Typical
108	M108	N125	N126			2.5" Std. Pipe	Beam	None	A53 Gr.B	Typical
109	M109	N128	N129			2.0" Std. Pipe	Beam	None	A53 Gr.B	Typical
110	M110	N131	N132			2.0" Std. Pipe	Beam	None	A53 Gr.B	Typical
111	M111	N134	N135			2.0" Std. Pipe	Beam	None	A53 Gr.B	Typical
112	M112	N137	N138			2.5" Std. Pipe	Beam	None	A53 Gr.B	Typical
113	M113	N140	N141			2.0" Std. Pipe	Beam	None	A53 Gr.B	Typical
114	M114	N143	N144			2.0" Std. Pipe	Beam	None	A53 Gr.B	Typical
115	M115	N146	N147			2.5" Std. Pipe	Beam	None	A53 Gr.B	Typical
116	M116	N149	N150			2.0" Std. Pipe	Beam	None	A53 Gr.B	Typical
117	M117	N152	N153			2.0" Std. Pipe	Beam	None	A53 Gr.B	Typical
118	M118	N155	N156			2.0" Std. Pipe	Beam	None	A53 Gr.B	Typical
119	M119	N158	N159			2.5" Std. Pipe	Beam	None	A53 Gr.B	Typical
120	M120	N161	N162			2.5" Std. Pipe	Beam	None	A53 Gr.B	Typical
121	M121	N163	N166			Handrail	Beam	None	A53 Gr.B	Typical
122	M122	N169	N172			Handrail	Beam	None	A53 Gr.B	Typical
123	M123	N175	N178			Handrail	Beam	None	A53 Gr.B	Typical
124	M124	N181	N184			Handrail	Beam	None	A53 Gr.B	Typical
125	M125	N186	N167			RIGID	None	None	RIGID	Typical
126	M126	N185	N180			RIGID	None	None	RIGID	Typical
127	M127	N179	N174			RIGID	None	None	RIGID	Typical
128	M128	N168	N173			RIGID	None	None	RIGID	Typical

Joint Coordinates and Temperatures

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Diap...
1	N2	-5.656854	0	5.656854	0	
2	N3	-5.656854	0	-5.656854	0	
3	N4	-6.656854	0	-6.25	0	
4	N5	-6.656854	0	6.25	0	
5	N6	-6.656854	0	-2.828427	0	
6	N7	-5.644341	0	-5.166667	0	
7	N8	-6.656854	0	-5.166667	0	
8	N9	-6.656854	0	2.828427	0	
9	N10	-5.644341	0	5.166667	0	
10	N11	-6.656854	0	5.166667	0	
11	N12	-6.25	0	6.656854	0	
12	N13	6.25	0	6.656854	0	
13	N14	-2.828427	0	2.828427	0	
14	N15	-5.5	0	5.5	0	
15	N16	-2.828427	0	6.656854	0	
16	N17	-5.166667	0	5.644341	0	
17	N18	-5.166667	0	6.656854	0	
18	N19	2.828427	0	6.656854	0	
19	N20	5.166667	0	5.644341	0	
20	N21	5.166667	0	6.656854	0	
21	N22	6.656854	0	6.25	0	
22	N23	6.656854	0	-6.25	0	
23	N24	2.828427	0	2.828427	0	
24	N25	5.5	0	5.5	0	
25	N26	6.656854	0	2.828427	0	
26	N27	5.644341	0	5.166667	0	
27	N28	6.656854	0	5.166667	0	
28	N29	6.656854	0	-2.828427	0	
29	N30	5.644341	0	-5.166667	0	
30	N31	6.656854	0	-5.166667	0	
31	N32	6.25	0	-6.656854	0	
32	N33	-6.25	0	-6.656854	0	
33	N34	2.828427	0	-2.828427	0	
34	N35	5.5	0	-5.5	0	
35	N36	2.828427	0	-6.656854	0	
36	N37	5.166667	0	-5.644341	0	
37	N38	5.166667	0	-6.656854	0	
38	N39	-5.5	0	-5.5	0	
39	N40	-2.828427	0	-6.656854	0	
40	N41	-5.166667	0	-5.644341	0	
41	N42	-5.166667	0	-6.656854	0	
42	N44	5.656854	0	5.656854	0	
43	N46	5.656854	0	-5.656854	0	
44	N47	-0.707107	-.25	-0.707107	0	
45	N48	-1.237437	-.25	-1.237437	0	
46	N49	-1.767767	-.25	-1.767767	0	
47	N50	-2.298097	-.25	-2.298097	0	
48	N51	-2.828427	0	-2.828427	0	
49	N52	-3.358757	-.25	-3.358757	0	
50	N53	-3.889087	-.25	-3.889087	0	
51	N54	-4.419417	0	-4.419417	0	
52	N55	-0.707107	-1.25	-0.707107	0	

Joint Coordinates and Temperatures (Continued)

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Diap...
53	N56	-1.237437	-1.25	-1.237437	0	
54	N57	-1.767767	-1.25	-1.767767	0	
55	N58	-2.298097	-1.25	-2.298097	0	
56	N59	-2.828427	-1.25	-2.828427	0	
57	N62	-2.828427	-.25	-2.828427	0	
58	N63	-4.419417	-.25	-4.419417	0	
59	N64	-3.358757	-0.916667	-3.358757	0	
60	N65	-3.889087	-0.583333	-3.889087	0	
61	N62A	-0.707107	-.25	0.707107	0	
62	N63A	-1.237437	-.25	1.237437	0	
63	N64A	-1.767767	-.25	1.767767	0	
64	N65A	-2.298097	-.25	2.298097	0	
65	N67	-3.358757	-.25	3.358757	0	
66	N68	-3.889087	-.25	3.889087	0	
67	N69	-4.419417	0	4.419417	0	
68	N70	-0.707107	-1.25	0.707107	0	
69	N71	-1.237437	-1.25	1.237437	0	
70	N72	-1.767767	-1.25	1.767767	0	
71	N73	-2.298097	-1.25	2.298097	0	
72	N74	-2.828427	-1.25	2.828427	0	
73	N75	-2.828427	-.25	2.828427	0	
74	N76	-4.419417	-.25	4.419417	0	
75	N77	-3.358757	-0.916667	3.358757	0	
76	N78	-3.889087	-0.583333	3.889087	0	
77	N80	0.707107	-.25	0.707107	0	
78	N81	1.237437	-.25	1.237437	0	
79	N82	1.767767	-.25	1.767767	0	
80	N83	2.298097	-.25	2.298097	0	
81	N85	3.358757	-.25	3.358757	0	
82	N86	3.889087	-.25	3.889087	0	
83	N87	4.419417	0	4.419417	0	
84	N88	0.707107	-1.25	0.707107	0	
85	N89	1.237437	-1.25	1.237437	0	
86	N90	1.767767	-1.25	1.767767	0	
87	N91	2.298097	-1.25	2.298097	0	
88	N92	2.828427	-1.25	2.828427	0	
89	N93	2.828427	-.25	2.828427	0	
90	N94	4.419417	-.25	4.419417	0	
91	N95	3.358757	-0.916667	3.358757	0	
92	N96	3.889087	-0.583333	3.889087	0	
93	N98	0.707107	-.25	-0.707107	0	
94	N99	1.237437	-.25	-1.237437	0	
95	N100	1.767767	-.25	-1.767767	0	
96	N101	2.298097	-.25	-2.298097	0	
97	N103	3.358757	-.25	-3.358757	0	
98	N104	3.889087	-.25	-3.889087	0	
99	N105	4.419417	0	-4.419417	0	
100	N106	0.707107	-1.25	-0.707107	0	
101	N107	1.237437	-1.25	-1.237437	0	
102	N108	1.767767	-1.25	-1.767767	0	
103	N109	2.298097	-1.25	-2.298097	0	
104	N110	2.828427	-1.25	-2.828427	0	

Joint Coordinates and Temperatures (Continued)

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Diap...
105	N111	2.828427	-.25	-2.828427	0	
106	N112	4.419417	-.25	-4.419417	0	
107	N113	3.358757	-0.916667	-3.358757	0	
108	N114	3.889087	-0.583333	-3.889087	0	
109	N115	-6	0	6.656854	0	
110	N116	-6	4	6.656854	0	
111	N117	-6	-4	6.656854	0	
112	N118	-2	0	6.656854	0	
113	N119	-2	4	6.656854	0	
114	N120	-2	-4	6.656854	0	
115	N121	2	0	6.656854	0	
116	N122	2	4	6.656854	0	
117	N123	2	-4	6.656854	0	
118	N124	6	0	6.656854	0	
119	N125	6	4	6.656854	0	
120	N126	6	-4	6.656854	0	
121	N127	6.656854	0	6	0	
122	N128	6.656854	4	6	0	
123	N129	6.656854	-4	6	0	
124	N130	6.656854	0	2	0	
125	N131	6.656854	4	2	0	
126	N132	6.656854	-4	2	0	
127	N133	6.656854	0	-2	0	
128	N134	6.656854	4	-2	0	
129	N135	6.656854	-4	-2	0	
130	N136	6.656854	0	-6	0	
131	N137	6.656854	4	-6	0	
132	N138	6.656854	-4	-6	0	
133	N139	6	0	-6.656854	0	
134	N140	6	4	-6.656854	0	
135	N141	6	-4	-6.656854	0	
136	N142	2	0	-6.656854	0	
137	N143	2	4	-6.656854	0	
138	N144	2	-4	-6.656854	0	
139	N145	-2	0	-6.656854	0	
140	N146	-2	4	-6.656854	0	
141	N147	-2	-4	-6.656854	0	
142	N148	-6	0	-6.656854	0	
143	N149	-6	4	-6.656854	0	
144	N150	-6	-4	-6.656854	0	
145	N151	-6.656854	0	-6	0	
146	N152	-6.656854	4	-6	0	
147	N153	-6.656854	-4	-6	0	
148	N154	-6.656854	0	-2	0	
149	N155	-6.656854	4	-2	0	
150	N156	-6.656854	-4	-2	0	
151	N157	-6.656854	0	2	0	
152	N158	-6.656854	4	2	0	
153	N159	-6.656854	-4	2	0	
154	N160	-6.656854	0	6	0	
155	N161	-6.656854	4	6	0	
156	N162	-6.656854	-4	6	0	

Joint Coordinates and Temperatures (Continued)

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Diap...
157	N163	-6	3	6.656854	0	
158	N164	-2	3	6.656854	0	
159	N165	2	3	6.656854	0	
160	N166	6	3	6.656854	0	
161	N167	-5	3	6.656854	0	
162	N168	5	3	6.656854	0	
163	N169	6.656854	3	6	0	
164	N170	6.656854	3	2	0	
165	N171	6.656854	3	-2	0	
166	N172	6.656854	3	-6	0	
167	N173	6.656854	3	5	0	
168	N174	6.656854	3	-5	0	
169	N175	6	3	-6.656854	0	
170	N176	2	3	-6.656854	0	
171	N177	-2	3	-6.656854	0	
172	N178	-6	3	-6.656854	0	
173	N179	5	3	-6.656854	0	
174	N180	-5	3	-6.656854	0	
175	N181	-6.656854	3	-6	0	
176	N182	-6.656854	3	-2	0	
177	N183	-6.656854	3	2	0	
178	N184	-6.656854	3	6	0	
179	N185	-6.656854	3	-5	0	
180	N186	-6.656854	3	5	0	
181	N187	-3.358757	-0.583333	-3.358757	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	N47	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
2	N55	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
3	N62A	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
4	N70	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
5	N80	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
6	N88	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
7	N98	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
8	N106	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction

Member Point Loads (BLC 2 : Dead Load)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M107	Y	-.077	.5
2	M115	Y	-.077	.5
3	M119	Y	-.077	.5
4	M107	Y	-.077	7.5
5	M115	Y	-.077	7.5
6	M119	Y	-.077	7.5
7	M108	Y	-.042	.5
8	M116	Y	-.042	.5
9	M120	Y	-.042	.5
10	M108	Y	-.042	3.5

Member Point Loads (BLC 2 : Dead Load) (Continued)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
11	M116	Y	-.042	3.5
12	M120	Y	-.042	3.5
13	M107	Y	-.074	2
14	M115	Y	-.074	2
15	M119	Y	-.074	2
16	M107	Y	-.109	6
17	M115	Y	-.109	6
18	M119	Y	-.109	6

Member Point Loads (BLC 3 : Ice Load)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M107	Y	-.207	.5
2	M115	Y	-.207	.5
3	M119	Y	-.207	.5
4	M107	Y	-.207	7.5
5	M115	Y	-.207	7.5
6	M119	Y	-.207	7.5
7	M108	Y	-.082	.5
8	M116	Y	-.082	.5
9	M120	Y	-.082	.5
10	M108	Y	-.082	3.5
11	M116	Y	-.082	3.5
12	M120	Y	-.082	3.5
13	M107	Y	-.069	2
14	M115	Y	-.069	2
15	M119	Y	-.069	2
16	M107	Y	-.099	6
17	M115	Y	-.099	6
18	M119	Y	-.099	6

Member Point Loads (BLC 4 : Wind with Ice X)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M107	X	-.051	.5
2	M115	X	-.051	.5
3	M107	X	-.051	7.5
4	M115	X	-.051	7.5
5	M119	X	-.116	.5
6	M119	X	-.116	7.5
7	M108	X	-.02	.5
8	M116	X	-.02	.5
9	M108	X	-.02	3.5
10	M116	X	-.02	3.5
11	M120	X	-.039	.5
12	M120	X	-.039	3.5
13	M107	X	-.02	2
14	M115	X	-.02	2
15	M107	X	-.029	6
16	M115	X	-.029	6

Member Point Loads (BLC 5 : Wind X)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]

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

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M107	X	-.156	.5
2	M115	X	-.156	.5
3	M107	X	-.156	7.5
4	M115	X	-.156	7.5
5	M119	X	-.431	.5
6	M119	X	-.431	7.5
7	M108	X	-.058	.5
8	M116	X	-.058	.5
9	M108	X	-.058	3.5
10	M116	X	-.058	3.5
11	M120	X	-.135	.5
12	M120	X	-.135	3.5
13	M107	X	-.055	2
14	M115	X	-.055	2
15	M107	X	-.084	6
16	M115	X	-.084	6

Member Point Loads (BLC 6 : Wind with Ice Z)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M107	Z	-.116	.5
2	M115	Z	-.116	.5
3	M107	Z	-.116	7.5
4	M115	Z	-.116	7.5
5	M119	Z	-.051	.5
6	M119	Z	-.051	7.5
7	M108	Z	-.039	.5
8	M116	Z	-.039	.5
9	M108	Z	-.039	3.5
10	M116	Z	-.039	3.5
11	M120	Z	-.02	.5
12	M120	Z	-.02	3.5
13	M119	Z	-.02	2
14	M119	Z	-.029	6

Member Point Loads (BLC 7 : Wind Z)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M107	Z	-.431	.5
2	M115	Z	-.431	.5
3	M107	Z	-.431	7.5
4	M115	Z	-.431	7.5
5	M119	Z	-.156	.5
6	M119	Z	-.156	7.5
7	M108	Z	-.135	.5
8	M116	Z	-.135	.5
9	M108	Z	-.135	3.5
10	M116	Z	-.135	3.5
11	M120	Z	-.058	.5
12	M120	Z	-.058	3.5
13	M119	Z	-.055	2
14	M119	Z	-.084	6

Member Distributed Loads (BLC 4 : Wind with Ice X)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/ft,F,k...	Start Location[ft...	End Location[ft,...
1	M30	X	.003	.003	0	0
2	M31	X	.003	.003	0	0
3	M32	X	.003	.003	0	0
4	M33	X	.003	.003	0	0
5	M34	X	.003	.003	0	0
6	M35	X	-.003	-.003	0	0
7	M36	X	-.003	-.003	0	0
8	M37	X	-.003	-.003	0	0
9	M38	X	-.003	-.003	0	0
10	M39	X	-.003	-.003	0	0
11	M40	X	-.003	-.003	0	0
12	M41	X	-.003	-.003	0	0
13	M42	X	-.003	-.003	0	0
14	M43	X	-.003	-.003	0	0
15	M44	X	-.003	-.003	0	0
16	M45	X	-.003	-.003	0	0
17	M49	X	-.003	-.003	0	0
18	M50	X	-.003	-.003	0	0
19	M51	X	-.003	-.003	0	0
20	M52	X	-.003	-.003	0	0
21	M53	X	-.003	-.003	0	0
22	M54	X	-.003	-.003	0	0
23	M55	X	-.003	-.003	0	0
24	M56	X	-.003	-.003	0	0
25	M57	X	-.003	-.003	0	0
26	M58	X	-.003	-.003	0	0
27	M59	X	-.003	-.003	0	0
28	M60	X	-.003	-.003	0	0
29	M61	X	-.003	-.003	0	0
30	M62	X	-.003	-.003	0	0
31	M63	X	-.003	-.003	0	0
32	M64	X	-.003	-.003	0	0
33	M68	X	-.003	-.003	0	0
34	M69	X	-.003	-.003	0	0
35	M70	X	-.003	-.003	0	0
36	M71	X	-.003	-.003	0	0
37	M72	X	-.003	-.003	0	0
38	M73	X	-.003	-.003	0	0
39	M74	X	-.003	-.003	0	0
40	M75	X	-.003	-.003	0	0
41	M76	X	-.003	-.003	0	0
42	M77	X	-.003	-.003	0	0
43	M78	X	-.003	-.003	0	0
44	M79	X	-.003	-.003	0	0
45	M80	X	-.003	-.003	0	0
46	M81	X	-.003	-.003	0	0
47	M82	X	-.003	-.003	0	0
48	M83	X	-.003	-.003	0	0
49	M87	X	-.003	-.003	0	0
50	M88	X	-.003	-.003	0	0
51	M89	X	-.003	-.003	0	0

Member Distributed Loads (BLC 4 : Wind with Ice X) (Continued)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/ft,F,k...	Start Location[ft...	End Location[ft,...
52	M90	X	-.003	-.003	0	0
53	M91	X	-.003	-.003	0	0
54	M92	X	-.003	-.003	0	0
55	M93	X	-.003	-.003	0	0
56	M94	X	-.003	-.003	0	0
57	M95	X	-.003	-.003	0	0
58	M96	X	-.003	-.003	0	0
59	M97	X	-.003	-.003	0	0
60	M98	X	-.003	-.003	0	0
61	M99	X	-.003	-.003	0	0
62	M100	X	-.003	-.003	0	0
63	M101	X	-.003	-.003	0	0
64	M102	X	-.003	-.003	0	0
65	M1	X	-.009	-.009	0	0
66	M15	X	-.009	-.009	0	0
67	M113	X	-.009	-.009	0	0
68	M124	X	-.009	-.009	0	0
69	M122	X	-.009	-.009	0	0
70	M106	X	-.009	-.009	0	0
71	M107	X	-.009	-.009	0	0
72	M114	X	-.009	-.009	0	0
73	M115	X	-.009	-.009	0	0
74	M116	X	-.009	-.009	0	0
75	M110	X	-.009	-.009	0	0
76	M111	X	-.009	-.009	0	0
77	M118	X	-.009	-.009	0	0
78	M105	X	-.009	-.009	0	0
79	M108	X	-.009	-.009	0	0

Member Distributed Loads (BLC 5 : Wind X)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/ft,F,k...	Start Location[ft...	End Location[ft,...
1	M31	X	-.008	-.008	0	0
2	M32	X	-.008	-.008	0	0
3	M33	X	-.008	-.008	0	0
4	M34	X	-.008	-.008	0	0
5	M35	X	-.008	-.008	0	0
6	M36	X	-.008	-.008	0	0
7	M37	X	-.008	-.008	0	0
8	M38	X	-.008	-.008	0	0
9	M39	X	-.008	-.008	0	0
10	M40	X	-.008	-.008	0	0
11	M41	X	-.008	-.008	0	0
12	M42	X	-.008	-.008	0	0
13	M43	X	-.008	-.008	0	0
14	M44	X	-.008	-.008	0	0
15	M45	X	-.008	-.008	0	0
16	M50	X	-.008	-.008	0	0
17	M51	X	-.008	-.008	0	0
18	M52	X	-.008	-.008	0	0
19	M53	X	-.008	-.008	0	0
20	M54	X	-.008	-.008	0	0

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

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/ft,F,k...	Start Location[ft...	End Location[ft,...
21	M55	X	-.008	-.008	0	0
22	M56	X	-.008	-.008	0	0
23	M57	X	-.008	-.008	0	0
24	M58	X	-.008	-.008	0	0
25	M59	X	-.008	-.008	0	0
26	M60	X	-.008	-.008	0	0
27	M61	X	-.008	-.008	0	0
28	M62	X	-.008	-.008	0	0
29	M63	X	-.008	-.008	0	0
30	M64	X	-.008	-.008	0	0
31	M68	X	-.008	-.008	0	0
32	M69	X	-.008	-.008	0	0
33	M70	X	-.008	-.008	0	0
34	M71	X	-.008	-.008	0	0
35	M72	X	-.008	-.008	0	0
36	M73	X	-.008	-.008	0	0
37	M74	X	-.008	-.008	0	0
38	M75	X	-.008	-.008	0	0
39	M76	X	-.008	-.008	0	0
40	M77	X	-.008	-.008	0	0
41	M78	X	-.008	-.008	0	0
42	M79	X	-.008	-.008	0	0
43	M80	X	-.008	-.008	0	0
44	M81	X	-.008	-.008	0	0
45	M82	X	-.008	-.008	0	0
46	M83	X	-.008	-.008	0	0
47	M87	X	-.008	-.008	0	0
48	M88	X	-.008	-.008	0	0
49	M89	X	-.008	-.008	0	0
50	M90	X	-.008	-.008	0	0
51	M91	X	-.008	-.008	0	0
52	M92	X	-.008	-.008	0	0
53	M93	X	-.008	-.008	0	0
54	M94	X	-.008	-.008	0	0
55	M95	X	-.008	-.008	0	0
56	M96	X	-.008	-.008	0	0
57	M97	X	-.008	-.008	0	0
58	M98	X	-.008	-.008	0	0
59	M99	X	-.008	-.008	0	0
60	M100	X	-.008	-.008	0	0
61	M101	X	-.008	-.008	0	0
62	M102	X	-.008	-.008	0	0
63	M1	X	-.002	-.002	0	0
64	M15	X	-.002	-.002	0	0
65	M124	X	-.002	-.002	0	0
66	M122	X	-.002	-.002	0	0
67	M105	X	-.002	-.002	0	0
68	M106	X	-.002	-.002	0	0
69	M107	X	-.002	-.002	0	0
70	M108	X	-.002	-.002	0	0
71	M110	X	-.002	-.002	0	0
72	M111	X	-.002	-.002	0	0

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

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/ft,F,k...	Start Location[ft...	End Location[ft,...
73	M113	X	-.002	-.002	0	0
74	M114	X	-.002	-.002	0	0
75	M115	X	-.002	-.002	0	0
76	M116	X	-.002	-.002	0	0
77	M118	X	-.002	-.002	0	0

Member Distributed Loads (BLC 6 : Wind with Ice Z)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/ft,F,k...	Start Location[ft...	End Location[ft,...
1	M30	Z	-.003	-.003	0	0
2	M31	Z	-.003	-.003	0	0
3	M32	Z	-.003	-.003	0	0
4	M33	Z	-.003	-.003	0	0
5	M34	Z	-.003	-.003	0	0
6	M35	Z	-.003	-.003	0	0
7	M36	Z	-.003	-.003	0	0
8	M37	Z	-.003	-.003	0	0
9	M38	Z	-.003	-.003	0	0
10	M39	Z	-.003	-.003	0	0
11	M40	Z	-.003	-.003	0	0
12	M41	Z	-.003	-.003	0	0
13	M42	Z	-.003	-.003	0	0
14	M43	Z	-.003	-.003	0	0
15	M44	Z	-.003	-.003	0	0
16	M45	Z	-.003	-.003	0	0
17	M49	Z	-.003	-.003	0	0
18	M50	Z	-.003	-.003	0	0
19	M51	Z	-.003	-.003	0	0
20	M52	Z	-.003	-.003	0	0
21	M53	Z	-.003	-.003	0	0
22	M54	Z	-.003	-.003	0	0
23	M55	Z	-.003	-.003	0	0
24	M56	Z	-.003	-.003	0	0
25	M57	Z	-.003	-.003	0	0
26	M58	Z	-.003	-.003	0	0
27	M59	Z	-.003	-.003	0	0
28	M60	Z	-.003	-.003	0	0
29	M61	Z	-.003	-.003	0	0
30	M62	Z	-.003	-.003	0	0
31	M63	Z	-.003	-.003	0	0
32	M64	Z	-.003	-.003	0	0
33	M68	Z	-.003	-.003	0	0
34	M69	Z	-.003	-.003	0	0
35	M70	Z	-.003	-.003	0	0
36	M71	Z	-.003	-.003	0	0
37	M72	Z	-.003	-.003	0	0
38	M73	Z	-.003	-.003	0	0
39	M74	Z	-.003	-.003	0	0
40	M75	Z	-.003	-.003	0	0
41	M76	Z	-.003	-.003	0	0
42	M77	Z	-.003	-.003	0	0
43	M78	Z	-.003	-.003	0	0

Member Distributed Loads (BLC 6 : Wind with Ice Z) (Continued)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/ft,F,k...	Start Location[ft...	End Location[ft,...
44	M79	Z	-.003	-.003	0	0
45	M80	Z	-.003	-.003	0	0
46	M81	Z	-.003	-.003	0	0
47	M82	Z	-.003	-.003	0	0
48	M83	Z	-.003	-.003	0	0
49	M87	Z	-.003	-.003	0	0
50	M88	Z	-.003	-.003	0	0
51	M89	Z	-.003	-.003	0	0
52	M90	Z	-.003	-.003	0	0
53	M91	Z	-.003	-.003	0	0
54	M92	Z	-.003	-.003	0	0
55	M93	Z	-.003	-.003	0	0
56	M94	Z	-.003	-.003	0	0
57	M95	Z	-.003	-.003	0	0
58	M96	Z	-.003	-.003	0	0
59	M97	Z	-.003	-.003	0	0
60	M98	Z	-.003	-.003	0	0
61	M99	Z	-.003	-.003	0	0
62	M100	Z	-.003	-.003	0	0
63	M101	Z	-.003	-.003	0	0
64	M102	Z	-.003	-.003	0	0
65	M8	Z	-.009	-.009	0	0
66	M22	Z	-.009	-.009	0	0
67	M121	Z	-.009	-.009	0	0
68	M123	Z	-.009	-.009	0	0
69	M106	Z	-.009	-.009	0	0
70	M109	Z	-.009	-.009	0	0
71	M110	Z	-.009	-.009	0	0
72	M111	Z	-.009	-.009	0	0
73	M113	Z	-.009	-.009	0	0
74	M114	Z	-.009	-.009	0	0
75	M116	Z	-.009	-.009	0	0
76	M117	Z	-.009	-.009	0	0
77	M118	Z	-.009	-.009	0	0
78	M119	Z	-.009	-.009	0	0

Member Distributed Loads (BLC 7 : Wind Z)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/ft,F,k...	Start Location[ft...	End Location[ft,...
1	M30	Z	-.008	-.008	0	0
2	M31	Z	-.008	-.008	0	0
3	M32	Z	-.008	-.008	0	0
4	M33	Z	-.008	-.008	0	0
5	M34	Z	-.008	-.008	0	0
6	M35	Z	-.008	-.008	0	0
7	M36	Z	-.008	-.008	0	0
8	M37	Z	-.008	-.008	0	0
9	M38	Z	-.008	-.008	0	0
10	M39	Z	-.008	-.008	0	0
11	M40	Z	-.008	-.008	0	0
12	M41	Z	-.008	-.008	0	0
13	M42	Z	-.008	-.008	0	0

Member Distributed Loads (BLC 7 : Wind Z) (Continued)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/ft,F,k...	Start Location[ft...	End Location[ft,...
14	M43	Z	-.008	-.008	0	0
15	M44	Z	-.008	-.008	0	0
16	M45	Z	-.008	-.008	0	0
17	M49	Z	-.008	-.008	0	0
18	M50	Z	-.008	-.008	0	0
19	M51	Z	-.008	-.008	0	0
20	M52	Z	-.008	-.008	0	0
21	M53	Z	-.008	-.008	0	0
22	M54	Z	-.008	-.008	0	0
23	M55	Z	-.008	-.008	0	0
24	M56	Z	-.008	-.008	0	0
25	M57	Z	-.008	-.008	0	0
26	M58	Z	-.008	-.008	0	0
27	M59	Z	-.008	-.008	0	0
28	M60	Z	-.008	-.008	0	0
29	M61	Z	-.008	-.008	0	0
30	M62	Z	-.008	-.008	0	0
31	M63	Z	-.008	-.008	0	0
32	M64	Z	-.008	-.008	0	0
33	M68	Z	-.008	-.008	0	0
34	M69	Z	-.008	-.008	0	0
35	M70	Z	-.008	-.008	0	0
36	M71	Z	-.008	-.008	0	0
37	M72	Z	-.008	-.008	0	0
38	M73	Z	-.008	-.008	0	0
39	M74	Z	-.008	-.008	0	0
40	M75	Z	-.008	-.008	0	0
41	M76	Z	-.008	-.008	0	0
42	M77	Z	-.008	-.008	0	0
43	M78	Z	-.008	-.008	0	0
44	M79	Z	-.008	-.008	0	0
45	M80	Z	-.008	-.008	0	0
46	M81	Z	-.008	-.008	0	0
47	M82	Z	-.008	-.008	0	0
48	M83	Z	-.008	-.008	0	0
49	M87	Z	-.008	-.008	0	0
50	M88	Z	-.008	-.008	0	0
51	M89	Z	-.008	-.008	0	0
52	M90	Z	-.008	-.008	0	0
53	M91	Z	-.008	-.008	0	0
54	M92	Z	-.008	-.008	0	0
55	M93	Z	-.008	-.008	0	0
56	M94	Z	-.008	-.008	0	0
57	M95	Z	-.008	-.008	0	0
58	M96	Z	-.008	-.008	0	0
59	M97	Z	-.008	-.008	0	0
60	M98	Z	-.008	-.008	0	0
61	M99	Z	-.008	-.008	0	0
62	M100	Z	-.008	-.008	0	0
63	M101	Z	-.008	-.008	0	0
64	M102	Z	-.008	-.008	0	0
65	M8	Z	-.002	-.002	0	0

Member Distributed Loads (BLC 7 : Wind Z) (Continued)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/ft,F,k...	Start Location[ft...	End Location[ft,...
66	M22	Z	-.002	-.002	0	0
67	M121	Z	-.002	-.002	0	0
68	M123	Z	-.002	-.002	0	0
69	M106	Z	-.002	-.002	0	0
70	M109	Z	-.002	-.002	0	0
71	M110	Z	-.002	-.002	0	0
72	M111	Z	-.002	-.002	0	0
73	M112	Z	-.002	-.002	0	0
74	M113	Z	-.002	-.002	0	0
75	M114	Z	-.002	-.002	0	0
76	M116	Z	-.002	-.002	0	0
77	M117	Z	-.002	-.002	0	0
78	M118	Z	-.002	-.002	0	0
79	M119	Z	-.002	-.002	0	0
80	M120	Z	-.002	-.002	0	0

Member Distributed Loads (BLC 8 : BLC 2 Transient Area Loads)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/ft,F,k...	Start Location[ft...	End Location[ft,...
1	M2	Y	-.004	-.004	0	3.063
2	M3	Y	-.007	-.007	.174	2.721
3	M29	Y	-.012	-.012	.989	2.609
4	M26	Y	-.003	-.006	0	3.063
5	M27	Y	-.007	-.007	.174	2.721
6	M23	Y	-.003	-.006	0	3.063
7	M24	Y	-.007	-.007	.174	2.721
8	M86	Y	-.012	-.012	.989	2.609
9	M19	Y	-.003	-.006	0	3.063
10	M20	Y	-.007	-.007	.174	2.721
11	M12	Y	-.003	-.006	0	3.063
12	M13	Y	-.007	-.007	.174	2.721
13	M67	Y	-.012	-.012	.989	2.609
14	M16	Y	-.003	-.006	0	3.063
15	M17	Y	-.007	-.007	.174	2.721
16	M9	Y	-.003	-.006	0	3.063
17	M10	Y	-.007	-.007	.174	2.721
18	M48	Y	-.012	-.012	.989	2.609
19	M5	Y	-.003	-.006	0	3.063
20	M6	Y	-.007	-.007	.174	2.721

Basic Load Cases

	BLC Description	Category	X Gra...	Y Gra...	Z Gra...	Joint	Point	Distrib..	Area(...	Surfa...
1	Self Weight	None		-1						
2	Dead Load	None					18		8	
3	Ice Load	None					18			
4	Wind with Ice X	None					16	79		
5	Wind X	None					16	77		
6	Wind with Ice Z	None					14	78		
7	Wind Z	None					14	80		
8	BLC 2 Transient Area Loads	None						20		

Load Combinations

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

Envelope Joint Reactions

	Joint		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	N47	max	7.179	3	1.902	6	7.469	6	.096	6	2.197	4	-.018	5
2		min	3.825	2	.854	2	3.787	2	.044	2	-.076	3	-.085	3
3	N55	max	-3.662	2	.083	3	-3.795	2	.063	6	.075	5	-.002	5
4		min	-8.521	6	.034	5	-8.536	6	.03	2	.006	6	-.05	3
5	N62A	max	7.497	3	1.907	3	-.508	5	-.027	2	1.907	1	-.042	5
6		min	1.338	5	.716	5	-7.14	3	-.088	3	.409	6	-.088	3
7	N70	max	-2.813	5	.085	3	8.538	3	-.009	5	.301	5	-.033	5
8		min	-8.579	3	.044	5	2.832	5	-.055	3	0	3	-.055	3
9	N80	max	-.138	2	1.405	6	.145	5	-.027	5	.795	1	.063	6
10		min	-3.8	6	.587	2	-3.754	3	-.07	3	-.181	5	.024	2
11	N88	max	5.919	6	.068	6	5.924	6	-.017	5	.317	5	.037	6
12		min	2.214	5	.032	2	2.124	2	-.046	3	.028	3	.007	2
13	N98	max	-.136	2	.849	6	2.848	4	.041	6	.708	4	.041	4
14		min	-3.025	4	.469	2	-.066	2	.016	2	-.01	3	.03	2
15	N106	max	3.348	6	.044	6	-1.566	2	.026	6	.111	5	.028	4
16		min	1.748	2	.031	5	-3.318	6	.009	2	.013	1	.019	2
17	Totals:	max	5.179	1	6.24	3	6.245	5						
18		min	0	5	3.002	5	0	1						

Envelope Joint Displacements

	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [rad]	LC	Y Rotation [rad]	LC	Z Rotation [rad]	LC
1	N2	max	-.042	3	-.05	5	-.025	3	2.391e-03	3	-2.257e-04	3	1.024e-02	1
2		min	-.209	4	-.185	3	-.206	4	-5.709e-03	2	-3.559e-03	4	5.04e-03	6
3	N3	max	.209	4	-.083	2	-.03	3	-3.232e-03	2	-4.707e-04	6	4.257e-03	3
4		min	.014	3	-.185	6	-.222	4	-1.139e-02	4	-3.187e-03	1	-6.895e-03	5
5	N4	max	.229	4	-.129	2	-.035	3	9.331e-04	3	-4.696e-04	6	7.435e-03	3
6		min	.019	3	-.287	3	-.255	4	-7.022e-04	5	-2.915e-03	1	1.947e-03	5
7	N5	max	-.044	3	-.059	5	-.032	3	-4.927e-04	2	-3.422e-04	3	6.656e-03	3
8		min	-.236	4	-.289	3	-.253	4	-2.902e-03	6	-3.745e-03	4	1.536e-03	5
9	N6	max	.119	5	-.143	5	-.035	3	3.239e-03	3	-5.864e-04	6	6.231e-03	3
10		min	-.006	3	-.4	3	-.255	4	4.075e-04	5	-3.273e-03	1	1.23e-03	5
11	N7	max	.195	4	-.089	2	-.029	3	2.621e-03	3	-4.633e-04	6	9.123e-03	3
12		min	.011	3	-.196	6	-.223	4	1.992e-04	5	-2.907e-03	2	2.649e-03	5
13	N8	max	.195	4	-.129	5	-.035	3	2.621e-03	3	-4.633e-04	6	9.123e-03	3
14		min	.011	3	-.306	3	-.255	4	1.992e-04	5	-2.907e-03	2	2.649e-03	5
15	N9	max	-.027	6	-.168	5	-.032	3	-1.431e-03	5	-1.624e-05	3	5.795e-03	3
16		min	-.111	1	-.479	3	-.253	4	-4.429e-03	6	-3.476e-03	4	-8.717e-04	2
17	N10	max	-.04	3	-.062	5	-.026	3	-1.525e-03	2	-5.15e-04	3	9.795e-03	3
18		min	-.188	4	-.208	3	-.206	4	-5.261e-03	6	-3.84e-03	4	2.514e-03	5

Envelope Joint Displacements (Continued)

	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [rad]	LC	Y Rotation [rad]	LC	Z Rotation [rad]	LC
19	N11	max	-.04	3	-.093	5	-.032	3	-1.525e-03	2	-5.15e-04	3	9.795e-03	3
20		min	-.188	4	-.327	3	-.253	4	-5.261e-03	6	-3.84e-03	4	2.514e-03	5
21	N12	max	-.044	3	-.056	5	-.029	3	4.661e-03	3	-3.417e-04	3	9.141e-04	2
22		min	-.25	4	-.261	3	-.232	4	2.03e-04	5	-3.579e-03	4	-7.496e-04	4
23	N13	max	-.039	3	-.032	2	.216	4	4.768e-03	3	-2.949e-04	3	3.564e-03	3
24		min	-.246	4	-.183	6	.039	3	9.395e-04	5	-4.569e-03	4	1.055e-03	5
25	N14	max	-.029	6	-.015	5	-.015	3	-3.555e-04	3	-5.635e-04	3	8.955e-03	1
26		min	-.109	1	-.047	3	-.098	2	-7.1e-03	2	-3.778e-03	4	2.398e-03	6
27	N15	max	-.041	3	-.045	5	-.025	3	2.391e-03	3	-2.257e-04	3	1.024e-02	1
28		min	-.203	4	-.17	3	-.199	4	-5.709e-03	2	-3.559e-03	4	5.04e-03	6
29	N16	max	-.043	3	-.113	5	-.016	3	4.196e-03	3	-3.285e-04	6	-2.736e-04	2
30		min	-.25	4	-.355	3	-.098	2	9.489e-04	2	-2.066e-03	4	-3.123e-03	6
31	N17	max	-.041	3	-.054	5	-.025	3	6.619e-03	3	-2.293e-04	3	-4.339e-05	2
32		min	-.208	4	-.192	3	-.186	4	1.181e-03	5	-3.443e-03	4	-2.516e-03	6
33	N18	max	-.044	3	-.068	5	-.025	3	6.619e-03	3	-2.293e-04	3	-4.339e-05	2
34		min	-.25	4	-.272	3	-.186	4	1.181e-03	5	-3.443e-03	4	-2.516e-03	6
35	N19	max	-.04	3	-.145	5	.052	1	6.323e-03	4	-5.296e-04	3	4.884e-03	3
36		min	-.246	4	-.413	3	.006	6	8.915e-04	2	-5.144e-03	4	1.59e-03	2
37	N20	max	-.031	3	-.047	5	.156	4	7.53e-03	3	-7.323e-04	3	5.806e-03	3
38		min	-.184	4	-.146	3	.034	3	1.782e-03	2	-5.055e-03	4	1.978e-03	5
39	N21	max	-.039	3	-.07	2	.156	4	7.53e-03	3	-7.323e-04	3	5.806e-03	3
40		min	-.246	4	-.238	3	.034	3	1.782e-03	2	-5.055e-03	4	1.978e-03	5
41	N22	max	-.031	3	-.019	2	.242	4	8.358e-04	3	-1.766e-04	3	1.394e-03	2
42		min	-.218	4	-.129	6	.039	3	-6.345e-04	5	-4.82e-03	5	-1.359e-03	4
43	N23	max	.226	4	-.012	2	.24	4	9.74e-04	3	-1.078e-03	3	1.941e-03	3
44		min	.033	3	-.084	4	.036	3	-5.029e-04	5	-4.054e-03	4	-5.296e-04	4
45	N24	max	-.001	6	-.012	2	.054	1	2.44e-03	1	-5.966e-04	3	2.182e-03	2
46		min	-.053	2	-.032	6	.008	6	-1.513e-03	5	-3.596e-03	4	-1.585e-03	4
47	N25	max	-.029	3	-.032	2	.176	4	3.809e-03	3	-4.285e-04	3	1.431e-03	2
48		min	-.175	4	-.109	6	.036	3	-3.666e-04	5	-5.565e-03	4	-2.838e-03	6
49	N26	max	-.003	6	-.037	2	.242	4	1.685e-04	3	-1.804e-04	3	1.554e-03	3
50		min	-.054	1	-.128	6	.039	3	-7.644e-04	4	-3.487e-03	4	-8.62e-04	4
51	N27	max	-.028	3	-.033	2	.184	4	2.858e-04	3	-2.557e-04	3	8.894e-04	2
52		min	-.156	4	-.111	6	.036	3	-9.03e-04	4	-4.736e-03	5	-1.918e-03	4
53	N28	max	-.028	3	-.022	2	.242	4	2.858e-04	3	-2.557e-04	3	8.894e-04	2
54		min	-.156	4	-.124	6	.039	3	-9.03e-04	4	-4.736e-03	5	-1.918e-03	4
55	N29	max	.063	4	-.034	2	.24	4	1.18e-03	3	-6.515e-04	6	2.227e-03	3
56		min	.001	3	-.1	4	.036	3	3.827e-04	5	-2.766e-03	4	-8.807e-04	4
57	N30	max	.173	4	-.024	2	.191	4	1.198e-03	3	-8.863e-04	3	1.243e-03	3
58		min	.02	3	-.065	4	.025	3	1.075e-04	5	-4.049e-03	4	-1.458e-03	4
59	N31	max	.173	4	-.016	2	.24	4	1.198e-03	3	-8.863e-04	3	1.243e-03	3
60		min	.02	3	-.083	4	.036	3	1.075e-04	5	-4.049e-03	4	-1.458e-03	4
61	N32	max	.244	4	-.026	2	.22	4	-1.099e-03	2	-7.156e-04	3	3.799e-03	3
62		min	.028	3	-.095	4	.03	3	-3.01e-03	6	-3.996e-03	4	1.054e-03	5
63	N33	max	.243	4	-.14	2	-.033	3	-3.152e-03	2	-5.085e-04	3	4.426e-04	2
64		min	.024	3	-.316	6	-.246	4	-8.682e-03	6	-2.951e-03	4	-1.424e-03	6
65	N34	max	.063	4	-.009	2	.057	4	2.74e-03	2	-4.664e-04	3	9.02e-05	3
66		min	.003	3	-.018	6	.003	3	-3.133e-04	6	-3.563e-03	4	-3.337e-03	4
67	N35	max	.19	4	-.022	2	.184	4	2.185e-03	2	-7.207e-04	3	-9.466e-04	3
68		min	.023	3	-.061	4	.023	3	-1.336e-03	6	-4.243e-03	4	-4.294e-03	4
69	N36	max	.244	4	-.126	2	.057	4	-1.156e-03	2	-5.017e-04	3	5.211e-03	3
70		min	.028	3	-.287	6	.005	3	-3.826e-03	6	-4.197e-03	4	1.724e-03	5

Envelope Joint Displacements (Continued)

	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [rad]	LC	Y Rotation [rad]	LC	Z Rotation [rad]	LC
71	N37	max	.196	4	-.035	2	.168	4	-1.568e-03	2	-4.273e-04	3	5.087e-03	3
72		min	.023	3	-.087	6	.022	3	-4.379e-03	6	-3.946e-03	5	1.641e-03	5
73	N38	max	.244	4	-.054	2	.168	4	-1.568e-03	2	-4.273e-04	3	5.087e-03	3
74		min	.028	3	-.14	6	.022	3	-4.379e-03	6	-3.946e-03	5	1.641e-03	5
75	N39	max	.205	5	-.077	2	-.029	3	-3.232e-03	2	-4.707e-04	6	4.257e-03	3
76		min	.013	3	-.17	6	-.218	4	-1.139e-02	4	-3.187e-03	1	-6.895e-03	5
77	N40	max	.243	4	-.178	2	-.006	3	9.327e-04	5	-2.452e-04	6	-1.161e-03	5
78		min	.024	3	-.471	6	-.132	4	-6.321e-03	6	-2.324e-03	1	-2.965e-03	6
79	N41	max	.21	4	-.088	2	-.026	3	-4.259e-03	2	-7.769e-04	6	-7.422e-04	2
80		min	.014	3	-.208	6	-.208	4	-1.131e-02	6	-2.985e-03	1	-3.957e-03	6
81	N42	max	.243	4	-.14	2	-.026	3	-4.259e-03	2	-7.769e-04	6	-7.422e-04	2
82		min	.024	3	-.345	6	-.208	4	-1.131e-02	6	-2.985e-03	1	-3.957e-03	6
83	N44	max	-.03	3	-.035	2	.187	4	3.809e-03	3	-4.285e-04	3	1.431e-03	2
84		min	-.186	4	-.119	6	.037	3	-3.666e-04	5	-5.565e-03	4	-2.838e-03	6
85	N46	max	.198	4	-.024	2	.192	4	2.185e-03	2	-7.207e-04	3	-9.466e-04	3
86		min	.024	3	-.066	4	.025	3	-1.336e-03	6	-4.243e-03	4	-4.294e-03	4
87	N47	max	0	6	0	6	0	6	0	6	0	6	0	6
88		min	0	1	0	1	0	1	0	1	0	1	0	1
89	N48	max	.01	5	-.004	2	0	3	-7.27e-04	2	6.77e-05	3	7.242e-04	3
90		min	-.001	3	-.009	6	-.012	4	-2.128e-03	4	-3.076e-03	4	-1.031e-03	5
91	N49	max	.035	5	-.009	2	-.001	3	-1.072e-03	2	1.253e-05	3	8.811e-04	3
92		min	-.003	3	-.021	6	-.038	4	-4.217e-03	4	-4.685e-03	4	-2.951e-03	5
93	N50	max	.066	5	-.016	2	-.002	3	-8.585e-04	3	-1.585e-04	3	9.978e-04	3
94		min	-.003	3	-.034	6	-.071	4	-6.633e-03	4	-4.892e-03	4	-5.452e-03	5
95	N51	max	.119	5	-.021	2	-.007	3	-8.895e-04	3	-4.427e-04	3	1.573e-03	3
96		min	-.006	3	-.047	6	-.13	4	-1.017e-02	4	-3.743e-03	4	-8.253e-03	5
97	N52	max	.116	5	-.027	2	-.008	3	-3.894e-04	3	-5.336e-04	3	1.055e-03	3
98		min	.001	3	-.057	6	-.122	4	-8.939e-03	4	-3.265e-03	4	-7.901e-03	5
99	N53	max	.135	4	-.032	2	-.012	3	-6.731e-04	3	-6.053e-04	3	1.268e-03	3
100		min	.005	3	-.068	6	-.142	4	-9.291e-03	4	-2.829e-03	1	-7.885e-03	5
101	N54	max	.176	5	-.039	2	-.02	3	-1.288e-03	3	-5.357e-04	6	1.923e-03	3
102		min	.003	3	-.084	6	-.189	4	-1.004e-02	4	-2.989e-03	1	-7.965e-03	5
103	N55	max	0	6	0	6	0	6	0	6	0	6	0	6
104		min	0	1	0	1	0	1	0	1	0	1	0	1
105	N56	max	.002	3	-.003	2	.001	6	-7.14e-04	2	-1.911e-05	6	5.502e-04	3
106		min	.001	2	-.006	6	0	2	-1.992e-03	4	-1.865e-04	5	-1.029e-03	5
107	N57	max	.004	4	-.008	2	.003	6	-1.192e-03	3	-5.731e-05	6	7.226e-04	3
108		min	.003	6	-.018	6	-.001	2	-4.041e-03	4	-4.734e-04	5	-2.809e-03	5
109	N58	max	.009	4	-.014	2	.003	6	-1.424e-03	3	-1.177e-04	6	9.628e-04	3
110		min	.005	6	-.032	6	-.005	2	-6.528e-03	4	-8.443e-04	5	-4.982e-03	5
111	N59	max	.016	4	-.022	2	.003	6	-1.172e-03	3	-2.007e-04	6	7.186e-04	3
112		min	.007	6	-.048	6	-.011	5	-9.271e-03	4	-1.284e-03	5	-7.82e-03	5
113	N62	max	.094	5	-.021	2	-.005	3	-8.895e-04	3	-4.427e-04	3	1.573e-03	3
114		min	-.002	3	-.047	6	-.1	4	-1.017e-02	4	-3.743e-03	4	-8.253e-03	5
115	N63	max	.152	4	-.039	2	-.016	3	-1.288e-03	3	-5.357e-04	6	1.923e-03	3
116		min	.009	3	-.084	6	-.158	4	-1.004e-02	4	-2.989e-03	1	-7.965e-03	5
117	N64	max	.059	4	-.026	2	-.004	3	-5.787e-04	3	-4.431e-04	6	7.739e-04	3
118		min	.009	3	-.057	6	-.056	5	-8.607e-03	4	-2.211e-03	1	-7.589e-03	5
119	N65	max	.104	4	-.032	2	-.009	3	-7.002e-04	3	-5.122e-04	6	1.162e-03	3
120		min	.01	3	-.068	6	-.105	4	-9.151e-03	4	-2.744e-03	1	-7.8e-03	5
121	N62A	max	0	6	0	6	0	6	0	6	0	6	0	6
122		min	0	1	0	1	0	1	0	1	0	1	0	1

Envelope Joint Displacements (Continued)

	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [rad]	LC	Y Rotation [rad]	LC	Z Rotation [rad]	LC
123	N63A	max	-.003	6	-.003	5	0	3	8.806e-04	3	-5.797e-04	6	1.638e-03	1
124		min	-.01	1	-.009	3	-.009	2	-6.754e-04	2	-2.634e-03	1	8.205e-04	6
125	N64A	max	-.008	6	-.007	5	-.005	3	6.543e-04	3	-8.559e-04	3	3.462e-03	1
126		min	-.033	1	-.021	3	-.03	2	-2.319e-03	2	-3.925e-03	1	1.168e-03	6
127	N65A	max	-.015	6	-.011	5	-.01	3	1.417e-04	6	-8.45e-04	3	5.641e-03	1
128		min	-.06	1	-.034	3	-.055	2	-4.614e-03	2	-3.93e-03	1	1.597e-03	6
129	N67	max	-.024	3	-.017	5	-.017	3	-7.307e-04	6	-4.526e-04	3	7.822e-03	1
130		min	-.098	1	-.057	3	-.095	4	-6.906e-03	2	-3.688e-03	4	1.988e-03	6
131	N68	max	-.026	3	-.019	5	-.02	3	-5.319e-04	3	-3.593e-04	3	8.139e-03	1
132		min	-.119	4	-.068	3	-.118	4	-6.752e-03	2	-3.602e-03	4	2.181e-03	6
133	N69	max	-.038	3	-.022	5	-.021	3	4.238e-05	3	-2.921e-04	3	8.868e-03	1
134		min	-.157	4	-.084	3	-.153	5	-6.801e-03	2	-3.566e-03	4	2.817e-03	6
135	N70	max	0	6	0	6	0	6	0	6	0	6	0	6
136		min	0	1	0	1	0	1	0	1	0	1	0	1
137	N71	max	.001	3	-.002	5	0	2	7.64e-04	3	-1.879e-05	3	1.471e-03	1
138		min	-.001	5	-.006	3	-.002	4	-6.387e-04	2	-5.195e-04	5	7.165e-04	6
139	N72	max	.003	3	-.006	5	-.002	2	6.933e-04	3	-7.04e-05	3	3.164e-03	1
140		min	-.006	5	-.018	3	-.008	4	-2.06e-03	2	-1.026e-03	5	1.163e-03	6
141	N73	max	.003	3	-.01	5	-.005	3	5.048e-04	3	-1.433e-04	3	5.278e-03	1
142		min	-.013	5	-.032	3	-.016	4	-3.83e-03	2	-1.513e-03	4	1.822e-03	6
143	N74	max	.003	3	-.015	5	-.007	3	-3.758e-04	3	-2.294e-04	3	7.445e-03	1
144		min	-.024	5	-.048	3	-.028	4	-6.284e-03	2	-1.974e-03	4	2.271e-03	3
145	N75	max	-.021	3	-.015	5	-.014	3	-3.555e-04	3	-5.635e-04	3	8.955e-03	1
146		min	-.082	1	-.047	3	-.076	2	-7.1e-03	2	-3.778e-03	4	2.398e-03	6
147	N76	max	-.029	3	-.022	5	-.021	3	4.238e-05	3	-2.921e-04	3	8.868e-03	1
148		min	-.141	4	-.084	3	-.141	4	-6.801e-03	2	-3.566e-03	4	2.817e-03	6
149	N77	max	-.006	3	-.017	5	-.012	3	-7.255e-04	3	-2.788e-04	3	7.312e-03	1
150		min	-.06	5	-.057	3	-.064	4	-6.353e-03	2	-2.951e-03	4	1.958e-03	6
151	N78	max	-.017	3	-.019	5	-.017	3	-5.476e-04	3	-3.017e-04	3	7.951e-03	1
152		min	-.1	4	-.068	3	-.102	4	-6.609e-03	2	-3.397e-03	4	2.17e-03	6
153	N80	max	0	6	0	6	0	6	0	6	0	6	0	6
154		min	0	1	0	1	0	1	0	1	0	1	0	1
155	N81	max	0	6	-.003	2	.004	1	9.998e-04	3	2.222e-05	6	6.884e-05	2
156		min	-.004	2	-.006	6	0	5	3.351e-05	5	-1.194e-03	1	-5.674e-04	4
157	N82	max	0	6	-.006	2	.015	1	1.312e-03	3	-1.16e-04	6	5.455e-04	2
158		min	-.015	2	-.015	6	0	5	-3.919e-04	5	-2.024e-03	1	-9.455e-04	4
159	N83	max	0	6	-.009	2	.029	1	1.831e-03	1	-4.06e-04	6	1.137e-03	2
160		min	-.029	2	-.024	6	.003	6	-8.057e-04	5	-2.522e-03	1	-1.404e-03	4
161	N85	max	-.01	6	-.013	2	.064	1	2.355e-03	1	-5.48e-04	3	1.998e-03	2
162		min	-.064	1	-.038	6	.012	6	-1.067e-03	5	-4.147e-03	4	-1.306e-03	4
163	N86	max	-.017	6	-.014	5	.081	1	2.406e-03	1	-4.967e-04	3	2.096e-03	2
164		min	-.081	1	-.044	6	.019	6	-1.026e-03	5	-4.644e-03	4	-1.195e-03	4
165	N87	max	-.021	6	-.015	5	.106	1	2.675e-03	1	-4.569e-04	3	2.023e-03	2
166		min	-.105	4	-.053	6	.029	6	-1.011e-03	5	-5.087e-03	4	-1.577e-03	4
167	N88	max	0	6	0	6	0	6	0	6	0	6	0	6
168		min	0	1	0	1	0	1	0	1	0	1	0	1
169	N89	max	-.001	3	-.002	2	.001	5	9.102e-04	3	-4.608e-05	3	3.182e-04	2
170		min	-.002	4	-.004	6	0	3	2.649e-04	5	-5.672e-04	5	-3.666e-04	6
171	N90	max	-.002	3	-.005	2	.007	5	1.589e-03	1	-9.118e-05	3	9.278e-04	2
172		min	-.008	4	-.013	6	-.001	3	4.232e-04	5	-1.15e-03	5	-4.097e-04	6
173	N91	max	-.004	3	-.008	2	.015	5	2.509e-03	1	-1.406e-04	3	1.756e-03	2
174		min	-.018	4	-.022	6	-.001	3	1.004e-03	5	-1.721e-03	5	-4.216e-04	6

Envelope Joint Displacements (Continued)

	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [rad]	LC	Y Rotation [rad]	LC	Z Rotation [rad]	LC
175	N92	max	-.006	3	-.012	2	.028	5	3.628e-03	1	-1.979e-04	3	3.06e-03	2
176		min	-.031	4	-.032	6	0	3	1.253e-03	6	-2.234e-03	5	4.686e-05	6
177	N93	max	-.004	6	-.012	2	.046	1	2.44e-03	1	-5.966e-04	3	2.182e-03	2
178		min	-.046	1	-.032	6	.007	6	-1.513e-03	5	-3.596e-03	4	-1.585e-03	4
179	N94	max	-.022	3	-.015	5	.108	4	2.675e-03	1	-4.569e-04	3	2.023e-03	2
180		min	-.109	4	-.053	6	.025	3	-1.011e-03	5	-5.087e-03	4	-1.577e-03	4
181	N95	max	-.011	3	-.013	2	.052	5	2.791e-03	1	-3.714e-04	3	2.512e-03	2
182		min	-.055	4	-.038	6	.007	3	5.261e-04	5	-3.795e-03	4	-2.176e-04	6
183	N96	max	-.017	3	-.014	5	.08	4	2.574e-03	1	-4.344e-04	3	2.263e-03	2
184		min	-.082	4	-.044	6	.015	3	-4.616e-04	5	-4.669e-03	4	-6.526e-04	4
185	N98	max	0	6	0	6	0	6	0	6	0	6	0	6
186		min	0	1	0	1	0	1	0	1	0	1	0	1
187	N99	max	.004	4	-.002	2	.003	5	1.773e-04	2	-1.596e-05	3	-2.076e-04	3
188		min	0	3	-.004	6	0	3	-4.961e-04	6	-1.146e-03	4	-6.825e-04	4
189	N100	max	.015	4	-.004	2	.013	4	7.635e-04	2	-9.913e-05	3	-1.281e-04	3
190		min	0	3	-.009	6	0	3	-5.279e-04	6	-2.118e-03	4	-1.287e-03	4
191	N101	max	.032	4	-.007	2	.029	4	1.495e-03	2	-2.49e-04	3	-1.251e-04	3
192		min	.001	3	-.014	6	.001	3	-5.387e-04	3	-2.92e-03	4	-2.06e-03	4
193	N103	max	.076	4	-.009	2	.073	4	2.566e-03	5	-5.339e-04	3	-3.66e-05	3
194		min	.006	3	-.022	4	.007	3	-2.669e-04	3	-3.717e-03	4	-3.071e-03	4
195	N104	max	.1	4	-.01	2	.097	4	2.65e-03	2	-5.988e-04	3	-2.772e-05	3
196		min	.01	3	-.026	4	.011	3	-2.194e-04	3	-3.868e-03	4	-3.283e-03	4
197	N105	max	.136	4	-.011	2	.129	4	2.631e-03	2	-6.578e-04	3	-1.737e-04	3
198		min	.014	3	-.032	4	.014	3	-4.471e-04	6	-4.029e-03	4	-3.529e-03	4
199	N106	max	0	6	0	6	0	6	0	6	0	6	0	6
200		min	0	1	0	1	0	1	0	1	0	1	0	1
201	N107	max	0	5	-.001	2	.001	4	1.865e-04	2	-6.211e-05	3	-1.754e-04	3
202		min	0	3	-.003	6	0	2	-3.949e-04	6	-2.737e-04	5	-6.885e-04	4
203	N108	max	.003	5	-.004	2	.005	4	9.316e-04	5	-1.4e-04	3	-2.124e-04	3
204		min	0	3	-.007	6	.002	3	-4.208e-04	3	-6.818e-04	4	-1.574e-03	4
205	N109	max	.008	5	-.006	2	.011	4	2.212e-03	5	-2.235e-04	3	-3.479e-04	3
206		min	0	3	-.013	6	.003	3	-3.55e-04	3	-1.179e-03	4	-3.018e-03	4
207	N110	max	.017	5	-.009	2	.02	4	4.58e-03	5	-3.01e-04	3	-5.019e-04	3
208		min	.002	3	-.019	6	.005	3	7.602e-05	3	-1.706e-03	4	-5.167e-03	4
209	N111	max	.053	4	-.009	2	.05	4	2.74e-03	2	-4.664e-04	3	9.02e-05	3
210		min	.003	3	-.018	6	.004	3	-3.133e-04	6	-3.563e-03	4	-3.337e-03	4
211	N112	max	.125	4	-.011	2	.122	4	2.631e-03	2	-6.578e-04	3	-1.737e-04	3
212		min	.014	3	-.032	4	.015	3	-4.471e-04	6	-4.029e-03	4	-3.529e-03	4
213	N113	max	.05	4	-.009	2	.052	4	3.418e-03	5	-4.969e-04	3	-1.897e-04	3
214		min	.006	3	-.022	4	.008	3	-8.242e-06	3	-3.042e-03	4	-3.906e-03	4
215	N114	max	.086	4	-.01	2	.086	4	2.871e-03	5	-6.045e-04	3	-9.079e-05	3
216		min	.01	3	-.026	4	.012	3	-1.408e-04	3	-3.731e-03	4	-3.551e-03	4
217	N115	max	-.044	3	-.058	5	-.028	3	4.661e-03	3	-3.417e-04	3	9.14e-04	2
218		min	-.25	4	-.261	3	-.221	4	2.03e-04	5	-3.579e-03	4	-7.497e-04	4
219	N116	max	-.113	6	-.058	5	-.107	3	-1.439e-03	2	6.982e-04	3	2.08e-03	2
220		min	-.305	1	-.262	3	-.345	4	-4.635e-03	6	-3.186e-03	5	-2.889e-04	4
221	N117	max	-.093	3	-.058	5	-.217	6	4.657e-03	3	-3.417e-04	3	5.42e-04	2
222		min	-.286	4	-.261	3	-.264	1	2.029e-04	5	-3.579e-03	4	-1.263e-03	3
223	N118	max	-.043	3	-.126	5	-.012	3	3.335e-03	3	-1.152e-05	6	2.732e-04	2
224		min	-.249	4	-.379	3	-.081	2	4.63e-04	2	-1.879e-03	1	-2.148e-03	6
225	N119	max	-.1	6	-.126	5	-.008	3	-1.162e-03	3	-1.359e-03	5	1.617e-04	2
226		min	-.28	1	-.379	3	-.213	5	-4.267e-03	4	-3.021e-03	1	-1.152e-03	6

Envelope Joint Displacements (Continued)

	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [rad]	LC	Y Rotation [rad]	LC	Z Rotation [rad]	LC
227	N120	max	-.164	6	-.126	5	-.103	2	3.547e-03	6	-1.152e-05	6	-9.853e-05	2
228		min	-.31	4	-.379	3	-.178	6	4.628e-04	2	-1.879e-03	1	-2.847e-03	3
229	N121	max	-.04	3	-.158	5	.026	1	7.109e-03	4	-5.974e-04	3	2.088e-03	3
230		min	-.247	4	-.45	3	-.032	5	5.756e-04	2	-4.074e-03	4	-1.068e-04	2
231	N122	max	-.135	6	-.158	5	.134	3	1.821e-03	3	-8.765e-04	3	3.081e-03	1
232		min	-.317	1	-.45	3	-.168	5	-6.475e-03	5	-3.624e-03	4	4.974e-04	5
233	N123	max	.039	6	-.158	5	-.002	2	2.51e-02	4	-5.974e-04	3	2.012e-03	6
234		min	-.462	2	-.45	3	-.988	4	5.738e-04	2	-4.074e-03	4	-7.944e-03	2
235	N124	max	-.039	3	-.041	2	.202	4	4.768e-03	3	-2.949e-04	3	3.564e-03	3
236		min	-.246	4	-.192	3	.038	3	9.395e-04	5	-4.569e-03	4	1.055e-03	5
237	N125	max	-.141	6	-.041	2	.164	1	2.783e-04	3	-1.139e-04	3	3.071e-03	3
238		min	-.314	1	-.192	3	.067	6	-2.446e-03	4	-5.009e-03	4	5.857e-04	5
239	N126	max	.116	3	-.041	2	.155	5	4.766e-03	3	-2.949e-04	3	3.134e-03	3
240		min	-.194	5	-.192	3	-.191	3	9.392e-04	5	-4.569e-03	4	1.054e-03	5
241	N127	max	-.031	3	-.02	2	.242	4	8.357e-04	3	-1.765e-04	3	1.394e-03	2
242		min	-.204	4	-.128	6	.039	3	-6.345e-04	5	-4.82e-03	5	-1.359e-03	4
243	N128	max	-.163	6	-.02	2	.194	4	5.015e-04	3	1.089e-03	3	5.021e-03	3
244		min	-.301	1	-.128	6	.066	6	-1.399e-03	5	-5.356e-03	5	1.487e-03	5
245	N129	max	-.008	3	-.02	2	.257	4	1.531e-03	6	-1.765e-04	3	1.393e-03	2
246		min	-.269	4	-.128	6	-.004	6	-2.627e-04	5	-4.82e-03	5	-1.358e-03	4
247	N130	max	.005	5	-.04	2	.241	4	4.331e-04	3	7.01e-05	3	2.223e-03	3
248		min	-.036	2	-.127	6	.039	3	-4.859e-04	4	-1.977e-03	4	-5.104e-04	5
249	N131	max	-.025	5	-.04	2	.206	4	5.533e-04	3	1.912e-04	3	5.655e-03	3
250		min	-.246	3	-.127	6	.071	6	-4.137e-04	5	-2.196e-03	4	1.07e-03	5
251	N132	max	.061	6	-.04	2	.251	4	1.273e-03	6	7.01e-05	3	1.397e-03	1
252		min	-.02	5	-.127	6	.008	6	-2.026e-04	1	-1.977e-03	4	-5.102e-04	5
253	N133	max	.042	4	-.038	2	.24	4	9.978e-04	3	-2.933e-04	6	2.578e-03	3
254		min	-.006	3	-.105	4	.036	3	1.345e-04	5	-1.747e-03	1	-7.376e-04	5
255	N134	max	.046	5	-.038	2	.211	4	1.054e-03	3	-1.271e-04	6	5.334e-03	3
256		min	-.228	3	-.105	4	.076	6	-1.525e-04	5	-2.064e-03	2	3.809e-04	5
257	N135	max	.082	3	-.038	2	.219	5	1.877e-03	6	-2.933e-04	6	1.617e-03	6
258		min	.006	5	-.105	4	-.023	6	3.274e-04	2	-1.747e-03	1	-7.372e-04	5
259	N136	max	.214	4	-.013	2	.24	4	9.741e-04	3	-1.079e-03	3	1.941e-03	3
260		min	.03	3	-.083	4	.036	3	-5.028e-04	5	-4.054e-03	4	-5.296e-04	4
261	N137	max	.183	5	-.013	2	.203	4	1.235e-03	3	-1.95e-03	3	3.937e-03	3
262		min	-.126	3	-.083	4	.074	6	-8.123e-04	5	-4.438e-03	4	1.039e-03	5
263	N138	max	.203	1	-.013	2	.257	5	9.736e-04	3	-1.079e-03	3	1.94e-03	3
264		min	.099	6	-.083	4	-.011	3	-3.42e-04	5	-4.054e-03	4	-5.294e-04	4
265	N139	max	.244	4	-.032	2	.208	4	-1.099e-03	2	-7.156e-04	3	3.799e-03	3
266		min	.028	3	-.099	6	.028	3	-3.01e-03	6	-3.996e-03	4	1.054e-03	5
267	N140	max	.217	5	-.032	2	.173	4	1.53e-03	3	-1.603e-03	3	3.296e-03	3
268		min	-.095	3	-.099	6	.048	6	-3.267e-04	5	-4.071e-03	4	8.806e-04	5
269	N141	max	.315	4	-.032	2	.322	4	-1.098e-03	2	-7.156e-04	3	3.449e-03	6
270		min	.175	3	-.099	6	.14	3	-2.323e-03	3	-3.996e-03	4	1.053e-03	5
271	N142	max	.244	4	-.148	2	.031	1	-1.009e-03	2	-3.139e-04	3	4.351e-03	3
272		min	.028	3	-.332	6	-.005	6	-3.629e-03	6	-4.313e-03	4	1.365e-03	5
273	N143	max	.214	5	-.148	2	.024	2	1.237e-04	2	-1.571e-03	3	3.616e-03	3
274		min	-.099	3	-.332	6	-.139	6	-3.195e-03	4	-5.918e-03	4	1.098e-03	5
275	N144	max	.332	4	-.148	2	.143	3	-6.728e-04	5	-3.139e-04	3	4.126e-03	6
276		min	.2	3	-.333	6	.051	5	-2.954e-03	3	-4.313e-03	4	1.364e-03	5
277	N145	max	.243	4	-.193	2	-.003	3	2.785e-03	5	-2.713e-05	6	1.574e-04	6
278		min	.025	3	-.486	6	-.127	4	-4.548e-03	6	-1.602e-03	1	-1.376e-03	1

Envelope Joint Displacements (Continued)

	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [rad]	LC	Y Rotation [rad]	LC	Z Rotation [rad]	LC
279	N146	max	.225	5	-.193	2	-.06	2	-4.292e-04	2	4.498e-04	3	1.8e-03	1
280		min	-.073	3	-.487	6	-.403	4	-8.559e-03	4	-1.767e-03	5	1.998e-04	5
281	N147	max	.239	5	-.193	2	.203	3	2.081e-02	5	-2.713e-05	6	1.559e-04	6
282		min	-.176	1	-.487	6	-.876	5	-4.278e-03	3	-1.602e-03	1	-9.201e-03	1
283	N148	max	.243	4	-.139	2	-.032	3	-3.152e-03	2	-5.085e-04	3	4.425e-04	2
284		min	.024	3	-.32	6	-.237	4	-8.682e-03	6	-2.951e-03	4	-1.424e-03	6
285	N149	max	.233	5	-.139	2	-.041	3	2.35e-03	3	-5.381e-04	6	6.628e-04	2
286		min	-.057	3	-.32	6	-.368	4	-2.364e-03	5	-3.267e-03	1	-5.54e-04	4
287	N150	max	.223	5	-.139	2	.367	3	-3.151e-03	2	-5.085e-04	3	7.077e-05	2
288		min	-.063	3	-.32	6	-.055	5	-8.297e-03	3	-2.951e-03	4	-2.053e-03	3
289	N151	max	.222	4	-.131	2	-.035	3	9.332e-04	3	-4.696e-04	6	7.435e-03	3
290		min	.017	3	-.29	3	-.255	4	-7.022e-04	5	-2.915e-03	1	1.947e-03	5
291	N152	max	.236	4	-.131	2	-.052	3	7.752e-04	3	9.963e-04	6	-1.222e-04	2
292		min	-.037	3	-.29	3	-.356	4	-1.782e-03	5	-2.772e-03	2	-2.566e-03	6
293	N153	max	.374	3	-.131	2	-.08	3	1.565e-03	6	-4.696e-04	6	7.43e-03	3
294		min	.31	2	-.29	3	-.242	4	-3.303e-04	5	-2.915e-03	1	1.947e-03	5
295	N154	max	.092	5	-.145	5	-.035	3	2.372e-03	3	-6.5e-04	6	5.202e-03	3
296		min	-.014	3	-.428	3	-.255	4	-1.061e-04	5	-3.538e-03	1	7.257e-04	5
297	N155	max	.129	5	-.145	5	-.044	3	1.407e-03	3	-1.93e-03	6	3.001e-03	2
298		min	-.139	1	-.428	3	-.333	4	2.261e-05	5	-4.923e-03	1	-1.236e-03	4
299	N156	max	.223	6	-.145	5	-.148	3	3.093e-03	6	-6.5e-04	6	4.317e-03	6
300		min	.063	2	-.428	3	-.277	4	2.655e-04	5	-3.538e-03	1	7.254e-04	5
301	N157	max	-.019	6	-.174	5	-.032	3	3.109e-04	5	1.729e-04	3	4.373e-03	3
302		min	-.114	1	-.509	3	-.254	4	-1.581e-03	6	-3.34e-03	4	-2.684e-03	2
303	N158	max	-.06	5	-.174	5	-.075	3	-2.802e-04	2	5.744e-04	3	8.524e-03	1
304		min	-.389	1	-.509	3	-.368	4	-2.72e-03	4	-3.52e-03	5	-1.586e-04	5
305	N159	max	.174	6	-.174	5	.042	3	8.147e-03	5	1.729e-04	3	3.998e-03	6
306		min	-.859	2	-.51	3	-.543	5	-1.555e-03	3	-3.34e-03	4	-2.071e-02	2
307	N160	max	-.043	3	-.066	5	-.032	3	-4.927e-04	2	-3.421e-04	3	6.656e-03	3
308		min	-.225	4	-.295	3	-.253	4	-2.902e-03	6	-3.745e-03	4	1.536e-03	5
309	N161	max	-.111	6	-.066	5	-.08	3	-5.215e-04	2	-8.203e-04	3	2.687e-03	2
310		min	-.324	1	-.296	3	-.366	4	-2.495e-03	4	-3.947e-03	4	-6.629e-04	4
311	N162	max	.276	3	-.066	5	.083	6	-4.925e-04	2	-3.421e-04	3	6.653e-03	3
312		min	-.149	5	-.295	3	-.148	2	-2.901e-03	6	-3.745e-03	4	1.536e-03	5
313	N163	max	-.113	6	-.058	5	-.059	3	-1.439e-03	2	6.982e-04	3	2.074e-03	2
314		min	-.28	1	-.262	3	-.303	4	-4.635e-03	6	-3.186e-03	5	-2.889e-04	4
315	N164	max	-.114	6	-.126	5	.006	3	-1.162e-03	3	-1.359e-03	5	1.559e-04	2
316		min	-.28	1	-.379	3	-.164	5	-4.262e-03	4	-3.021e-03	1	-1.152e-03	6
317	N165	max	-.114	6	-.158	5	.112	3	1.82e-03	3	-8.765e-04	3	2.945e-03	1
318		min	-.28	1	-.45	3	-.09	5	-6.106e-03	5	-3.624e-03	4	4.973e-04	5
319	N166	max	-.115	6	-.041	2	.168	1	2.782e-04	3	-1.139e-04	3	3.053e-03	3
320		min	-.28	1	-.192	3	.076	6	-2.33e-03	4	-5.009e-03	4	5.856e-04	5
321	N167	max	-.114	6	-.068	5	-.066	3	-1.406e-03	2	2.559e-04	3	1.128e-03	2
322		min	-.28	1	-.268	3	-.264	4	-5.078e-03	6	-3.597e-03	4	-1.852e-03	6
323	N168	max	-.115	6	-.07	2	.135	1	7.153e-04	3	1.315e-03	3	5.989e-03	3
324		min	-.28	1	-.247	3	.064	6	-1.353e-03	4	-5.603e-03	5	2.167e-03	5
325	N169	max	-.114	6	-.02	2	.211	4	5.015e-04	3	1.089e-03	3	5.021e-03	3
326		min	-.259	1	-.128	6	.068	6	-1.394e-03	5	-5.356e-03	5	1.487e-03	5
327	N170	max	-.012	5	-.04	2	.211	4	5.533e-04	3	1.912e-04	3	5.64e-03	3
328		min	-.178	3	-.127	6	.068	6	-4.079e-04	5	-2.196e-03	4	1.07e-03	5
329	N171	max	.05	5	-.038	2	.211	4	1.054e-03	3	-1.271e-04	6	5.319e-03	3
330		min	-.164	3	-.105	4	.068	6	-1.467e-04	5	-2.064e-03	2	3.809e-04	5

Envelope Joint Displacements (Continued)

	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [rad]	LC	Y Rotation [rad]	LC	Z Rotation [rad]	LC
331	N172	max	.196	5	-.013	2	.211	4	1.235e-03	3	-1.95e-03	3	3.937e-03	3
332		min	-.079	3	-.083	4	.067	6	-8.098e-04	5	-4.438e-03	4	1.039e-03	5
333	N173	max	-.111	6	-.024	2	.211	4	7.153e-04	3	1.315e-03	3	5.989e-03	3
334		min	-.231	1	-.13	6	.068	6	-1.353e-03	4	-5.603e-03	5	2.167e-03	5
335	N174	max	.144	5	-.018	2	.211	4	9.283e-04	3	-2.505e-03	3	5.209e-03	3
336		min	-.106	3	-.081	4	.067	6	-1.535e-04	5	-4.398e-03	4	1.41e-03	5
337	N175	max	.228	5	-.032	2	.173	4	1.53e-03	3	-1.603e-03	3	3.281e-03	3
338		min	-.056	3	-.099	6	.037	6	-3.209e-04	5	-4.071e-03	4	8.806e-04	5
339	N176	max	.228	5	-.148	2	.023	2	1.237e-04	2	-1.571e-03	3	3.601e-03	3
340		min	-.056	3	-.332	6	-.112	6	-3.189e-03	4	-5.918e-03	4	1.098e-03	5
341	N177	max	.228	5	-.193	2	-.055	2	-4.292e-04	2	4.498e-04	3	1.663e-03	1
342		min	-.055	3	-.487	6	-.3	4	-8.189e-03	4	-1.767e-03	5	1.998e-04	5
343	N178	max	.228	5	-.139	2	-.069	3	2.35e-03	3	-5.381e-04	6	5.421e-04	2
344		min	-.054	3	-.32	6	-.344	4	-2.09e-03	5	-3.267e-03	1	-5.539e-04	4
345	N179	max	.228	5	-.06	2	.123	4	9.283e-04	3	-2.505e-03	3	5.209e-03	3
346		min	-.056	3	-.144	6	.011	6	-1.535e-04	5	-4.398e-03	4	1.41e-03	5
347	N180	max	.228	5	-.145	2	-.058	3	2.115e-03	3	8.799e-04	6	-1.119e-03	2
348		min	-.055	3	-.349	6	-.321	4	-9.374e-04	5	-2.818e-03	2	-3.951e-03	6
349	N181	max	.222	5	-.131	2	-.061	3	7.751e-04	3	9.963e-04	6	-1.222e-04	2
350		min	-.058	3	-.29	3	-.336	4	-1.777e-03	5	-2.772e-03	2	-2.566e-03	6
351	N182	max	.115	5	-.145	5	-.061	3	1.407e-03	3	-1.93e-03	6	2.996e-03	2
352		min	-.124	3	-.428	3	-.336	4	2.841e-05	5	-4.923e-03	1	-1.236e-03	4
353	N183	max	-.062	5	-.174	5	-.061	3	-2.802e-04	2	5.744e-04	3	8.154e-03	1
354		min	-.287	1	-.509	3	-.336	4	-2.584e-03	4	-3.52e-03	5	-1.586e-04	5
355	N184	max	-.119	6	-.066	5	-.062	3	-5.215e-04	2	-8.203e-04	3	2.572e-03	2
356		min	-.294	1	-.296	3	-.336	4	-2.443e-03	4	-3.947e-03	4	-6.629e-04	4
357	N185	max	.211	5	-.117	5	-.061	3	2.115e-03	3	8.799e-04	6	-1.119e-03	2
358		min	-.057	3	-.312	3	-.336	4	-9.374e-04	5	-2.818e-03	2	-3.951e-03	6
359	N186	max	-.106	6	-.094	5	-.061	3	-1.406e-03	2	2.559e-04	3	1.128e-03	2
360		min	-.28	1	-.335	3	-.336	4	-5.078e-03	6	-3.597e-03	4	-1.852e-03	6
361	N187	max	.087	4	-.026	2	-.006	3	-5.669e-04	3	-5.153e-04	3	1.047e-03	3
362		min	.006	3	-.057	6	-.089	4	-8.094e-03	4	-2.698e-03	4	-6.993e-03	5

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

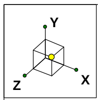
	Memb...	Shape	Code Check	L...	LC	Sh...	L...	Dir	...	phi*P...	phi*Pn...	phi*Mn y-y [k-ft]	phi*...	Cb	Eqn
1	M1	PIPE_2.5	.351	1...	3	.305	1...		3	14.559	50.715	3.596	3.596	2....	H3...
2	M2	L3X3X3	.039	1...	6	.023	0	y	4	23.991	35.316	1.32	2.598	1....	H2...
3	M3	L3X3X3	.229	.3...	6	.131	0	y	4	27.173	35.316	1.32	2.833	1....	H2...
4	M5	L3X3X3	.050	1...	1	.012	0	y	2	23.991	35.316	1.32	2.6	1....	H2...
5	M6	L3X3X3	.298	.3...	6	.126	0	y	1	27.173	35.316	1.32	2.833	3....	H2...
6	M8	PIPE_2.5	.325	1...	6	.297	1...		6	14.559	50.715	3.596	3.596	2....	H3...
7	M9	L3X3X3	.069	1...	4	.020	0	y	1	23.991	35.316	1.32	2.6	1....	H2...
8	M10	L3X3X3	.228	.3...	6	.108	0	y	1	27.173	35.316	1.32	2.833	1....	H2...
9	M12	L3X3X3	.087	1...	4	.012	0	y	6	23.991	35.316	1.32	2.6	1....	H2...
10	M13	L3X3X3	.270	.3...	6	.108	0	y	6	27.173	35.316	1.32	2.833	3....	H2...
11	M15	PIPE_2.5	.146	3...	4	.089	1...		4	14.559	50.715	3.596	3.596	2....	H1...
12	M16	L3X3X3	.057	1...	3	.007	0	y	1	23.991	35.316	1.32	2.6	1....	H2...
13	M17	L3X3X3	.148	.3...	3	.081	0	y	3	27.173	35.316	1.32	2.833	1....	H2...
14	M19	L3X3X3	.056	1...	3	.005	0	y	2	23.991	35.316	1.32	2.6	1....	H2...
15	M20	L3X3X3	.126	.3...	3	.086	0	y	1	27.173	35.316	1.32	2.833	2....	H2...

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

	Memb...	Shape	Code Check	L...	LC	Sh...	L...	Dir	...	phi*P...	phi*Pn...	phi*Mn y-y [k-ft]	phi*...	Cb	Eqn
16	M22	PIPE_2.5	.334	1...	3	.272	1...		3	14.559	50.715	3.596	3.596	2....	H3...
17	M23	L3X3X3	.052	1...	3	.013	0	y	1	23.991	35.316	1.32	2.6	1....	H2...
18	M24	L3X3X3	.156	.3...	3	.068	0	y	4	27.173	35.316	1.32	2.833	1....	H2...
19	M26	L3X3X3	.051	1...	4	.015	0	y	5	23.991	35.316	1.32	2.6	1....	H2...
20	M27	L3X3X3	.293	.3...	6	.174	0	y	3	27.173	35.316	1.32	2.833	3....	H2...
21	M29	HSS4X3X4	.280	2...	6	.070	2....	z	6	107.3...	120.474	10.764	13....	1....	H1...
22	M30	Cord Plate	.526	5...	4	.036	2....	z	5	69.264	72.9	5.442	1.08	1....	H1...
23	M31	Cord Plate	.127	2...	4	.009	1....	y	1	68.567	72.9	5.442	1.08	1....	H1...
24	M32	Cord Plate	.174	2...	6	.019	.75	y	4	69.264	72.9	5.442	1.08	1....	H1...
25	M33	1"x3/8"	.011	1	4	.001	0	y	2	6.363	12.15	.095	.252	1	H1...
26	M34	1"x3/8"	.345	0	3	.054	0	y	5	6.363	12.15	.095	.253	2.2	H1...
27	M35	1"x3/8"	.369	0	3	.077	0	y	5	6.363	12.15	.095	.253	2....	H1...
28	M36	1"x3/8"	.325	1	6	.076	0	y	4	6.363	12.15	.095	.253	2....	H1...
29	M37	1"x3/8"	.319	0	4	.062	0	y	4	6.363	12.15	.095	.253	2....	H1...
30	M38	1"x3/8"	.147	0	4	.044	.3...	y	4	9.114	12.15	.095	.253	2....	H1...
31	M39	1"x3/8"	.042	0	4	.026	0	y	4	11.307	12.15	.095	.253	2....	H1...
32	M40	1"x3/8"	.134	1...	6	.021	0	y	4	4.412	12.15	.095	.253	1....	H1...
33	M41	1"x3/8"	.183	1...	6	.012	0	y	4	4.412	12.15	.095	.253	2....	H1...
34	M42	1"x3/8"	.182	1...	6	.022	0	y	4	4.412	12.15	.095	.253	2....	H1...
35	M43	1"x3/8"	.142	1...	6	.021	0	y	1	4.412	12.15	.095	.253	2....	H1...
36	M44	1"x3/8"	.119	0	4	.042	0	y	4	6.334	12.15	.095	.253	2....	H1...
37	M45	1"x3/8"	.033	0	3	.011	.8...	y	1	7.858	12.15	.095	.253	1....	H1...
38	M48	HSS4X3X4	.280	2...	3	.069	2....	z	3	107.3...	120.474	10.764	13....	1....	H1...
39	M49	Cord Plate	.476	5...	1	.033	2....	z	1	69.264	72.9	5.442	1.08	1....	H1...
40	M50	Cord Plate	.116	0	3	.006	1....	y	4	68.567	72.9	5.442	1.08	1....	H1...
41	M51	Cord Plate	.175	2...	3	.018	.75	y	1	69.264	72.9	5.442	1.08	1....	H1...
42	M52	1"x3/8"	.011	1	4	.001	1	y	2	6.363	12.15	.095	.252	1	H1...
43	M53	1"x3/8"	.354	0	3	.054	0	y	1	6.363	12.15	.095	.253	2....	H1...
44	M54	1"x3/8"	.378	0	3	.072	0	y	1	6.363	12.15	.095	.253	2.3	H1...
45	M55	1"x3/8"	.336	1	3	.068	0	y	1	6.363	12.15	.095	.253	2....	H1...
46	M56	1"x3/8"	.309	0	1	.055	0	y	1	6.363	12.15	.095	.253	2....	H1...
47	M57	1"x3/8"	.116	0	2	.033	0	y	2	9.114	12.15	.095	.253	2....	H1...
48	M58	1"x3/8"	.042	0	1	.025	0	y	1	11.307	12.15	.095	.253	2....	H1...
49	M59	1"x3/8"	.125	1...	3	.016	1....	y	5	4.412	12.15	.095	.253	1....	H1...
50	M60	1"x3/8"	.169	1...	3	.013	0	y	1	4.412	12.15	.095	.253	2....	H1...
51	M61	1"x3/8"	.170	1...	3	.023	0	y	1	4.412	12.15	.095	.253	2....	H1...
52	M62	1"x3/8"	.124	0	3	.015	0	y	2	4.412	12.15	.095	.253	2....	H1...
53	M63	1"x3/8"	.103	0	1	.041	0	y	1	6.334	12.15	.095	.253	2....	H1...
54	M64	1"x3/8"	.035	0	3	.011	.8...	y	1	7.858	12.15	.095	.253	1....	H1...
55	M67	HSS4X3X4	.205	2...	6	.051	2....	z	6	107.3...	120.474	10.764	13....	1....	H1...
56	M68	Cord Plate	.254	2...	5	.012	2....	z	5	69.264	72.9	5.442	1.08	1....	H1...
57	M69	Cord Plate	.096	2...	4	.013	1....	y	4	68.567	72.9	5.442	1.08	1....	H1...
58	M70	Cord Plate	.125	3	6	.010	.75	y	4	69.264	72.9	5.442	1.08	1....	H1...
59	M71	1"x3/8"	.011	1	4	.001	0	y	2	6.363	12.15	.095	.252	1	H1...
60	M72	1"x3/8"	.257	0	6	.014	1	y	1	6.363	12.15	.095	.253	2....	H1...
61	M73	1"x3/8"	.270	0	6	.022	0	y	2	6.363	12.15	.095	.253	2....	H1...
62	M74	1"x3/8"	.246	1	3	.025	0	y	1	6.363	12.15	.095	.253	2....	H1...
63	M75	1"x3/8"	.222	1	4	.032	0	y	4	6.363	12.15	.095	.253	1....	H1...
64	M76	1"x3/8"	.116	.6...	4	.018	0	y	1	9.114	12.15	.095	.253	1....	H1...
65	M77	1"x3/8"	.055	.3...	4	.009	0	y	1	11.307	12.15	.095	.253	1....	H1...
66	M78	1"x3/8"	.098	1...	6	.014	1....	y	1	4.412	12.15	.095	.253	1....	H1...
67	M79	1"x3/8"	.135	1...	6	.021	1....	y	4	4.412	12.15	.095	.253	2....	H1...

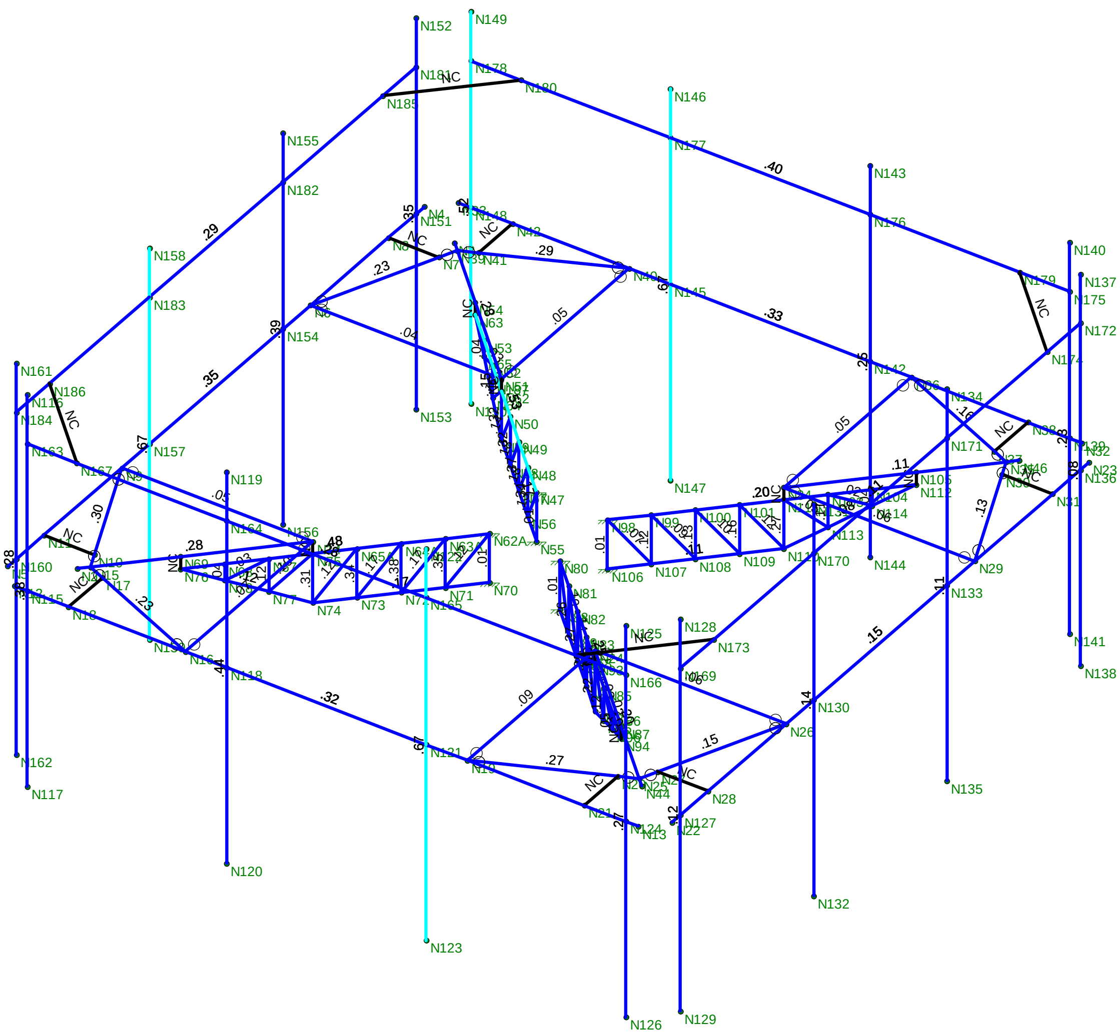
Envelope AISC 14th(360-10): LRFD Steel Code Checks (Continued)

	Memb...	Shape	Code Check	L...	LC	Sh...	L...	Dir	...	phi*P...	phi*Pn...	phi*Mn y-y [k-ft]	phi*...	Cb	Eqn
68	M80	1"x3/8"	.140	1...	6	.032	1...	y	4	4.412	12.15	.095	.253	2...	H1...
69	M81	1"x3/8"	.144	1...	4	.046	1...	y	4	4.412	12.15	.095	.253	2...	H1...
70	M82	1"x3/8"	.031	1...	4	.040	0	y	5	6.334	12.15	.095	.253	2...	H1...
71	M83	1"x3/8"	.023	0	6	.023	0	y	4	7.858	12.15	.095	.253	2...	H1...
72	M86	HSS4X3X4	.111	2...	4	.028	2...	z	6	107.3...	120.474	10.764	13....	1...	H1...
73	M87	Cord Plate	.202	5...	4	.008	2...	y	4	69.264	72.9	5.442	1.08	1...	H1...
74	M88	Cord Plate	.080	2...	4	.009	1...	y	4	68.567	72.9	5.442	1.08	1...	H1...
75	M89	Cord Plate	.108	0	4	.016	.75	y	4	69.264	72.9	5.442	1.08	1...	H1...
76	M90	1"x3/8"	.011	1	4	.001	0	y	2	6.363	12.15	.095	.252	1	H1...
77	M91	1"x3/8"	.121	1	6	.020	1	y	1	6.363	12.15	.095	.253	2...	H1...
78	M92	1"x3/8"	.134	1	6	.030	0	y	4	6.363	12.15	.095	.253	2...	H1...
79	M93	1"x3/8"	.165	1	4	.038	0	y	4	6.363	12.15	.095	.253	2...	H1...
80	M94	1"x3/8"	.269	1	4	.048	0	y	4	6.363	12.15	.095	.253	2...	H1...
81	M95	1"x3/8"	.112	.6...	4	.025	0	y	4	9.114	12.15	.095	.253	2...	H1...
82	M96	1"x3/8"	.040	.3...	4	.011	0	y	5	11.307	12.15	.095	.253	1...	H1...
83	M97	1"x3/8"	.067	1...	4	.009	0	y	5	4.412	12.15	.095	.253	1...	H1...
84	M98	1"x3/8"	.091	1...	4	.008	0	y	4	4.412	12.15	.095	.253	2...	H1...
85	M99	1"x3/8"	.104	1...	4	.012	0	y	4	4.412	12.15	.095	.253	2...	H1...
86	M100	1"x3/8"	.118	1...	4	.025	0	y	4	4.412	12.15	.095	.253	2...	H1...
87	M101	1"x3/8"	.047	1...	4	.010	0	y	4	6.334	12.15	.095	.253	2...	H1...
88	M102	1"x3/8"	.017	.8...	1	.012	.8...	y	4	7.858	12.15	.095	.253	1...	H1...
89	M105	PIPE_2.0	.382	4	3	.054	4		3	14.916	32.13	1.872	1.872	1...	H1...
90	M106	PIPE_2.0	.437	4	3	.096	4		3	14.916	32.13	1.872	1.872	1...	H1...
91	M107	PIPE_2.5	.672	4	4	.056	1		4	30.038	50.715	3.596	3.596	1...	H1...
92	M108	PIPE_2.5	.273	4	6	.039	3.5		4	30.038	50.715	3.596	3.596	1...	H1...
93	M109	PIPE_2.0	.125	4	3	.031	1		3	14.916	32.13	1.872	1.872	1...	H1...
94	M110	PIPE_2.0	.139	4	3	.017	4		1	14.916	32.13	1.872	1.872	1...	H1...
95	M111	PIPE_2.0	.111	4	4	.015	4		4	14.916	32.13	1.872	1.872	1...	H1...
96	M112	PIPE_2.5	.085	4	4	.024	1		6	30.038	50.715	3.596	3.596	1...	H1...
97	M113	PIPE_2.0	.233	4	6	.040	1		6	14.916	32.13	1.872	1.872	1...	H1...
98	M114	PIPE_2.0	.246	4	6	.063	4		6	14.916	32.13	1.872	1.872	1...	H1...
99	M115	PIPE_2.5	.675	4	4	.068	1		5	30.038	50.715	3.596	3.596	1...	H1...
100	M116	PIPE_2.0	.517	4	3	.060	4		3	14.916	32.13	1.872	1.872	1...	H1...
101	M117	PIPE_2.0	.346	4	6	.058	4		6	14.916	32.13	1.872	1.872	1...	H1...
102	M118	PIPE_2.0	.390	4	6	.071	4		6	14.916	32.13	1.872	1.872	1...	H1...
103	M119	PIPE_2.5	.673	4	1	.067	1		2	30.038	50.715	3.596	3.596	1...	H1...
104	M120	PIPE_2.5	.281	4	3	.037	1		3	30.038	50.715	3.596	3.596	1...	H1...
105	M121	PIPE_2.0	.277	8	6	.105	11		5	6.831	32.13	1.872	1.872	2...	H1...
106	M122	PIPE_2.0	.112	11	4	.095	12		6	6.831	32.13	1.872	1.872	2...	H1...
107	M123	PIPE_2.0	.404	8	3	.184	11		4	6.831	32.13	1.872	1.872	2...	H1...
108	M124	PIPE_2.0	.293	8	3	.180	11		1	6.831	32.13	1.872	1.872	2...	H1...



Code Check
(Env)

- No Calc
- > 1.0
- .90-1.0
- .75-.90
- .50-.75
- 0.-.50



Member Code Checks Displayed (Enveloped)
Envelope Only Solution

Centek	CTHA524A - Mount Unity Check	
TJL		Apr 20, 2022 at 1:20 PM
22022.15		CTHA524A_AMA.r3d

Antenna Mast Connection:

Anchor Data:

A325 Bolt =

Number of Anchor Bolts =	$N := 4$	(User Input)
Diameter of Bolts =	$D := 0.625\text{in}$	(User Input)
Bolt Spacing Horz =	$Sp_H := 6\text{in}$	(User Input)
Bolt Spacing Vertical =	$Sp_V := 6\text{in}$	(User Input)
Design Tension =	$R_{nt} := 20.7 \cdot \text{kips}$	(User Input)
Design Shear =	$R_{nv} := 12.4 \cdot \text{kips}$	(User Input)

Design Reactions:

FX =	$F_x := 8.5 \cdot \text{kips}$	(User Input)
FY =	$F_y := 2.0 \cdot \text{kips}$	(User Input)
FZ =	$F_z := 8.5 \cdot \text{kips}$	(User Input)
Moment X =	$Mx := 0.1 \cdot \text{ft} \cdot \text{kips}$	(User Input)
Moment Y =	$My := 2.2 \cdot \text{ft} \cdot \text{kips}$	(User Input)
Moment Z =	$Mz := 0.1 \cdot \text{ft} \cdot \text{kips}$	(User Input)

Anchor Check:

Max Tension Force =

$$T_{Max} := \frac{F_x}{N} + \frac{My}{Sp_H \cdot \frac{N}{2}} + \frac{Mz}{Sp_V \cdot \frac{N}{2}} = 4425\,\text{lb}$$

Max Shear Force =

$$V_{Max} := \frac{F_y + F_z}{N} + \frac{Mx}{Sp_H \cdot \frac{N}{2}} = 2725\,\text{lb}$$

Condition 1 =

$$\text{Condition1} := \text{if}\left(\frac{T_{Max}}{R_{nt}} + \frac{V_{Max}}{R_{nv}} \le 1.0, \text{"OK"}, \text{"NG"}\right) = \text{"OK"}$$

% of Capacity =

$$\max\left[\frac{T_{Max}}{R_{nt}}, \frac{V_{Max}}{R_{nv}}, \left(\frac{\frac{T_{Max}}{R_{nt}} + \frac{V_{Max}}{R_{nv}}}{1.0}\right)\right] = 43.4 \cdot \%$$

CENTEK engineering

Centered on Solutions℠

Structural Analysis Report

130-ft Rohn Monopole

Proposed T-Mobile
Antenna Upgrade

Site Ref: CTHA524A

1542 Boston Post Road
Westbrook, CT

Centek Project No. 22022.15

Date: April 20, 2022

Max Stress Ratio = 61.0%

Prepared for:

T-Mobile USA
35 Griffin Road
Bloomfield, CT 06002

63-2 North Branford Road, Branford, CT 06405 203.488.0580 Fax 203.488.8587 www.CentekEng.com

Table of Contents

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 monopole (tower) located in Westbrook, CT.

The host tower is a 130-ft tall, three-section, eighteen sided, tapered monopole, originally designed and manufactured by Rohn job no; 231452, dated November 18, 2019. The tower geometry, structure member sizes and foundation system information were obtained from the original design documents.

Antenna and appurtenance information were obtained from a previous structural analysis report prepared by Centek job no; 21007.64 dated October 13, 2021.

The tower is made up of three (3) tapered vertical sections consisting of A572-65 pole sections. The vertical tower sections are slip joint connected. The diameter of the pole (flat-flat) is 28.0-in at the top and 65.0-in at the base.

Antenna and Appurtenance Summary

- VERIZON (Existing):
  Antennas: Three (3) Samsung MT6407-77A panel antennas and nine (9) JMA MX06FRO660-03 panel antennas, three (3) Samsung B2/B66 Remote Radio Heads, three (3) Samsung B5/B13 Remote Radio Heads and one (1) OVP box mounted on a 13-ft platform with rails with a RAD center elevation of 126-ft above the existing tower base plate.
  Coax Cables: Six (6) 1-5/8" ∅ coax cables and two (2) 6x12 fiber cables running on the inside of the existing tower.

- AT&T (Existing):
  Antennas: Six (6) KMW EPBQ-654L8H8-L2 panel antennas, three (3) CCI HPA-65R-BU8A panel antennas, three (3) Ericsson 4415 B25 remote radio heads, three (3) Ericsson 4449 B5 remote radio heads, three (3) Ericsson 4426 B66 remote radio heads, three (3) Ericsson 4415 B30 remote radio heads and three (3) surge arrestors mounted on (3) 12-ft V-frames with a RAD center elevation of 115-ft above grade.
  Coax Cables: Two (2) fiber trunk and six (6) DC trunks running on the inside of the existing tower.

- T-MOBILE (Existing to Remain):
  Antennas: Three (3) RFS APXVAARR24_43 panel antennas and three (3) Ericsson 4449 B71 B12 remote radio heads mounted on a 14-ft platform with rails with a RAD center elevation of 104-ft above the existing tower base plate.
  Coax Cables: Two (2) 6x12 fiber cables running on the inside of the existing tower.

- **T-MOBILE (Existing to Remove):**
  Antennas: Three (3) Ericsson AIR32 panel antennas mounted on a 14-ft platform with rails with a RAD center elevation of 104-ft above the existing tower base plate.

- **T-MOBILE (Proposed):**
  <u>Antennas</u>: Three (3) Ericsson AIR6419 panel antennas and three (3) Ericsson 4460 remote radio heads mounted on a 14-ft platform with rails with a RAD center elevation of 104-ft above the existing tower base plate.
  <u>Coax Cables:</u> One (1) 6x24 fiber cable running on the inside of the existing tower.

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 or reinforcement drawings.
- 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 existing coax cables to be installed as indicated in 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 (3-second gust) with no ice and the applicable wind and ice combination to determine stresses in members as per guidelines of 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] and the wind speed data available in the TIA-222-G-2005 Standard.

Tower Loading

Tower loading was determined by the basic wind speed as applied to projected surface areas with modification factors per TIA-222-G-2005, gravity loads of the tower structure and its components, and the application of 0.75" radial ice on the tower structure and its components.

Basic Wind Speed:	Westbrook; v = 105 mph (V_{asd})	*[Appendix N of the 2018 CT Building Code]*
Load Cases:	Load Case 1; 105 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]*
	Load Case 2; 50 mph wind speed w/ 0.75" radial ice plus gravity load – used in calculation of tower stresses.	*[Annex B of TIA-222-G-2005]*

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

Tower Capacity

- Calculated stresses were found to be within allowable limits. This tower was found to be at **34.3%** of its total capacity.

Tower Section	Elevation	Stress Ratio (percentage of capacity)	Result
Pole Shaft (L1)	83.71'-130.00'	34.3%	**PASS**

Foundation and Anchors

The foundation consists of an 8.25-ft diameter x 4.5-ft long reinforced concrete pier on a 32.0-ft x 2.0-ft thick reinforce concrete pad. The sub-grade conditions used in the analysis of the foundation were obtained from the aforementioned original design documents. The base of the tower is connected to the foundation by means of (22) 2.25"∅, ASTM A615-75 anchor bolts embedded approximately 6-ft into the concrete foundation structure.

- The tower base reactions developed from the governing Load Case 1 were used in the verification of the foundation and its anchors:

Location	Vector	Proposed Reactions
Base	Shear	43 kips
	Compression	64 kips
	Moment	3990 kip-ft

- The foundation was found to be within allowable limits.

Foundation	Design Limit	TIA-222-G Section 9.4 FS(1)	Proposed Loading (FS)(1)	Result
Reinforced Concrete Pad and Pier	OTM(2)	1.0	2.83	**PASS**

Note 1: FS denotes Factor of Safety.
Note 2: OTM denotes Overturning Moment.

- The anchor bolts and base plate were found to be within allowable limits.

Tower Component	Design Limit	Stress Ratio (percentage of capacity)	Result
Anchor Bolts	Combined Axial and Shear	39.4%	**PASS**
Base Plate	Bending	61.0%	**PASS**

Conclusion

This analysis shows that the subject tower **is 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

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.

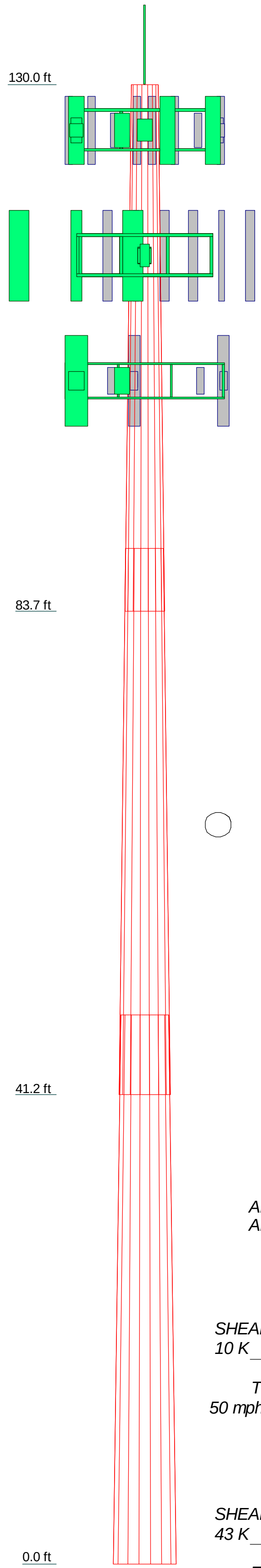
GENERAL DESCRIPTION OF STRUCTURAL ANALYSIS PROGRAM

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.

Section	Length (ft)	Number of Sides	Thickness (in)	Socket Length (ft)	Top Dia (in)	Bot Dia (in)	Grade	Weight (K)
1	46.290	18	0.313	5.500	28.000	41.530	A572-65	5.4
2	48.000	18	0.625	7.000	39.297	53.780		14.9
3	48.210	18	0.750		50.418	65.000		22.2
								42.5



DESIGNED APPURTENANCE LOADING

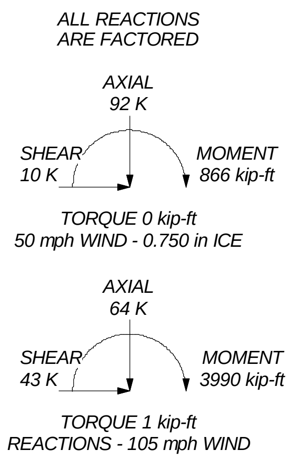
TYPE	ELEVATION	TYPE	ELEVATION
BOA4357	130	4415 B25 (ATT)	115
MX06FRO660 (Verizon)	126	4415 B25 (ATT)	115
MX06FRO660 (Verizon)	126	4415 B25 (ATT)	115
MT6407-77A (Verizon)	126	4426 B66 (ATT)	115
MX06FRO660 (Verizon)	126	4426 B66 (ATT)	115
MX06FRO660 (Verizon)	126	4426 B66 (ATT)	115
MX06FRO660 (Verizon)	126	4415 B30 (ATT)	115
MT6407-77A (Verizon)	126	4415 B30 (ATT)	115
MX06FRO660 (Verizon)	126	4415 B30 (ATT)	115
MX06FRO660 (Verizon)	126	DC6-48-60-18-8F Surge Arrestor (ATT)	115
MX06FRO660 (Verizon)	126	DC6-48-60-18-8F Surge Arrestor (ATT)	115
MT6407-77A (Verizon)	126	DC6-48-60-18-8F Surge Arrestor (ATT)	115
MX06FRO660 (Verizon)	126	12' V-Frame (ATT)	115
B2/B66A RRH (Verizon)	126	12' V-Frame (ATT)	115
B2/B66A RRH (Verizon)	126	12' V-Frame (ATT)	115
B2/B66A RRH (Verizon)	126	AIR6419 (T-Mobile - Proposed)	104
B5/B13 RRH (Verizon)	126	APXVAARR24-43 (T-Mobile)	104
B5/B13 RRH (Verizon)	126	AIR6419 (T-Mobile - Proposed)	104
B5/B13 RRH (Verizon)	126	APXVAARR24-43 (T-Mobile)	104
RC2DC-3315-PF-48 (Verizon)	126	AIR6419 (T-Mobile - Proposed)	104
13' Platform w/Rails (Verizon)	126	APXVAARR24-43 (T-Mobile)	104
(2) EPBQ-654L8H8-L2 (ATT)	115	Radio 4449 B71 B12 (T-Mobile)	104
(2) EPBQ-654L8H8-L2 (ATT)	115	Radio 4449 B71 B12 (T-Mobile)	104
(2) EPBQ-654L8H8-L2 (ATT)	115	Radio 4449 B71 B12 (T-Mobile)	104
HPA65R-BU8A (ATT)	115	4460 B25+B66 (T-Mobile - Proposed)	104
HPA65R-BU8A (ATT)	115	4460 B25+B66 (T-Mobile - Proposed)	104
HPA65R-BU8A (ATT)	115	4460 B25+B66 (T-Mobile - Proposed)	104
4449 B5/B12 (ATT)	115	F4P-12W Quad Platform w/ Handrail (T-Mobile)	104
4449 B5/B12 (ATT)	115		
4449 B5/B12 (ATT)	115		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-65	65 ksi	80 ksi			

TOWER DESIGN NOTES

1. Tower designed for Exposure D to the TIA-222-G Standard.
2. Tower designed for a 105 mph basic wind in accordance with the TIA-222-G Standard.
3. Tower is also designed for a 50 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 60 mph wind.
5. Tower Structure Class II.
6. Topographic Category 1 with Crest Height of 0.000 ft
7. TOWER RATING: 34.3%



Centek Engineering Inc.	Job: 22022.15 - CTHA524A		
63-2 North Branford Rd.	Project: 130-ft Rohn Monopole - Westbrook, CT		
Branford, CT 06405	Client: T-Mobile	Drawn by: TJL	App'd:
Phone: (203) 488-0580	Code: TIA-222-G	Date: 04/20/22	Scale: NTS
FAX: (203) 488-8587	Path: J:\Jobs\2202200.WI\15_CTHA524A\05_Structural\Tower\Backup Documentation\Calcs\ERI Files\130' Monopole_ Westbrook_CT.eri		Dwg No. E-1

Tower Input Data

The tower is a monopole.
This tower is designed using the TIA-222-G standard.
The following design criteria apply:

- Basic wind speed of 105 mph.
- Structure Class II.
- Exposure Category D.
- Topographic Category 1.
- Crest Height 0.000 ft.
- Nominal ice thickness of 0.750 in.
- Ice thickness is considered to increase with height.
- Ice density of 56 pcf.
- A wind speed of 50 mph is used in combination with ice.
- Temperature drop of 50 °F.
- Deflections calculated using a wind speed of 60 mph.
- A non-linear (P-delta) analysis was used.
- Pressures are calculated at each section.
- Stress ratio used in pole design is 1.
- Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

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

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

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

Poles

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

Tapered Pole Section Geometry

Section	*Elevation* *ft*	*Section Length* *ft*	*Splice Length* *ft*	*Number of Sides*	*Top Diameter* *in*	*Bottom Diameter* *in*	*Wall Thickness* *in*	*Bend Radius* *in*	*Pole Grade*
L1	130.000-83.710	46.290	5.500	18	28.000	41.530	0.313	1.250	A572-65 (65 ksi)

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L2	83.710-41.210	48.000	7.000	18	39.297	53.780	0.625	2.500	A572-65 (65 ksi)
L3	41.210-0.000	48.210		18	50.418	65.000	0.750	3.000	A572-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	28.384	27.463	2659.779	9.829	14.224	186.992	5323.059	13.734	4.378	14.01
	42.122	40.883	8774.843	14.632	21.097	415.924	17561.231	20.445	6.759	21.63
L2	41.492	76.716	14495.338	13.729	19.963	726.107	29009.749	38.365	5.816	9.306
	54.513	105.446	37640.619	18.870	27.320	1377.756	75330.767	52.733	8.365	13.384
L3	53.230	118.235	36849.748	17.632	25.612	1438.751	73747.984	59.129	7.554	10.071
	65.887	152.947	79767.326	22.809	33.020	2415.728	159639.611	76.488	10.120	13.493

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
L1 130.000-83.710				1	1	1			
L2 83.710-41.210				1	1	1			
L3 41.210-0.000				1	1	1			

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight klf
7/8	C	No	Yes	Inside Pole	130.000 - 0.000	1	No Ice	0.000	0.001
							1/2" Ice	0.000	0.001
							1" Ice	0.000	0.001
1 5/8 (Verizon)	B	No	Yes	Inside Pole	126.000 - 3.000	8	No Ice	0.000	0.001
							1/2" Ice	0.000	0.001
							1" Ice	0.000	0.001
RG6-Fiber (AT&T)	C	No	Yes	Inside Pole	116.000 - 3.000	2	No Ice	0.000	0.001
							1/2" Ice	0.000	0.001
							1" Ice	0.000	0.001
#8 AWG Copper WIre (AT&T)	C	No	Yes	Inside Pole	116.000 - 3.000	6	No Ice	0.000	0.000
							1/2" Ice	0.000	0.000
							1" Ice	0.000	0.000
HYBRIFLEX 1-5/8" (T-Mobile)	A	No	Yes	Inside Pole	104.000 - 3.000	3	No Ice	0.000	0.002
							1/2" Ice	0.000	0.002
							1" Ice	0.000	0.002

Feed Line/Linear Appurtenances Section Areas

Tower Section	*Tower Elevation ft*	*Face*	A_R *ft²*	A_F *ft²*	C_AA_A *In Face ft²*	C_AA_A *Out Face ft²*	*Weight K*
L1	130.000-83.710	A	0.000	0.000	0.000	0.000	0.116
		B	0.000	0.000	0.000	0.000	0.352
		C	0.000	0.000	0.000	0.000	0.099
L2	83.710-41.210	A	0.000	0.000	0.000	0.000	0.242
		B	0.000	0.000	0.000	0.000	0.354
		C	0.000	0.000	0.000	0.000	0.121
L3	41.210-0.000	A	0.000	0.000	0.000	0.000	0.218
		B	0.000	0.000	0.000	0.000	0.318
		C	0.000	0.000	0.000	0.000	0.110

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	*Tower Elevation ft*	*Face or Leg*	*Ice Thickness in*	A_R *ft²*	A_F *ft²*	C_AA_A *In Face ft²*	C_AA_A *Out Face ft²*	*Weight K*
L1	130.000-83.710	A	1.685	0.000	0.000	0.000	0.000	0.116
		B		0.000	0.000	0.000	0.000	0.352
		C		0.000	0.000	0.000	0.000	0.099
L2	83.710-41.210	A	1.597	0.000	0.000	0.000	0.000	0.242
		B		0.000	0.000	0.000	0.000	0.354
		C		0.000	0.000	0.000	0.000	0.121
L3	41.210-0.000	A	1.430	0.000	0.000	0.000	0.000	0.218
		B		0.000	0.000	0.000	0.000	0.318
		C		0.000	0.000	0.000	0.000	0.110

Discrete Tower Loads

Description	*Face or Leg*	*Offset Type*	*Offsets: Horz Lateral Vert ft ft ft*	*Azimuth Adjustment °*	*Placement ft*		C_AA_A *Front ft²*	C_AA_A *Side ft²*	*Weight K*
BOA4357	C	From Face	1.000	0.000	130.000	No Ice	1.383	1.383	0.007
			0.000			1/2" Ice	2.100	2.100	0.018
			3.500			1" Ice	2.637	2.637	0.033
MX06FRO660 (Verizon)	A	From Face	3.000	0.000	126.000	No Ice	9.872	7.338	0.057
			-6.000			1/2" Ice	10.342	7.784	0.126
			0.000			1" Ice	10.819	8.237	0.201
MX06FRO660 (Verizon)	A	From Face	3.000	0.000	126.000	No Ice	9.872	7.338	0.057
			-2.000			1/2" Ice	10.342	7.784	0.126
			0.000			1" Ice	10.819	8.237	0.201
MT6407-77A (Verizon)	A	From Face	3.000	0.000	126.000	No Ice	4.709	1.840	0.087
			2.000			1/2" Ice	4.997	2.063	0.116
			0.000			1" Ice	5.293	2.292	0.149
MX06FRO660	A	From Face	3.000	0.000	126.000	No Ice	9.872	7.338	0.057

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)
(Verizon)			6.000			1/2" Ice	10.342	7.784	0.126
			0.000			1" Ice	10.819	8.237	0.201
MX06FRO660	B	From Face	3.000	0.000	126.000	No Ice	9.872	7.338	0.057
(Verizon)			-6.000			1/2" Ice	10.342	7.784	0.126
			0.000			1" Ice	10.819	8.237	0.201
MX06FRO660	B	From Face	3.000	0.000	126.000	No Ice	9.872	7.338	0.057
(Verizon)			-2.000			1/2" Ice	10.342	7.784	0.126
			0.000			1" Ice	10.819	8.237	0.201
MT6407-77A	B	From Face	3.000	0.000	126.000	No Ice	4.709	1.840	0.087
(Verizon)			2.000			1/2" Ice	4.997	2.063	0.116
			0.000			1" Ice	5.293	2.292	0.149
MX06FRO660	B	From Face	3.000	0.000	126.000	No Ice	9.872	7.338	0.057
(Verizon)			6.000			1/2" Ice	10.342	7.784	0.126
			0.000			1" Ice	10.819	8.237	0.201
MX06FRO660	C	From Face	3.000	0.000	126.000	No Ice	9.872	7.338	0.057
(Verizon)			-6.000			1/2" Ice	10.342	7.784	0.126
			0.000			1" Ice	10.819	8.237	0.201
MX06FRO660	C	From Face	3.000	0.000	126.000	No Ice	9.872	7.338	0.057
(Verizon)			-2.000			1/2" Ice	10.342	7.784	0.126
			0.000			1" Ice	10.819	8.237	0.201
MT6407-77A	C	From Face	3.000	0.000	126.000	No Ice	4.709	1.840	0.087
(Verizon)			2.000			1/2" Ice	4.997	2.063	0.116
			0.000			1" Ice	5.293	2.292	0.149
MX06FRO660	C	From Face	3.000	0.000	126.000	No Ice	9.872	7.338	0.057
(Verizon)			6.000			1/2" Ice	10.342	7.784	0.126
			0.000			1" Ice	10.819	8.237	0.201
B2/B66A RRH	A	From Face	3.000	0.000	126.000	No Ice	2.537	1.610	0.060
(Verizon)			6.000			1/2" Ice	2.750	1.791	0.080
			0.000			1" Ice	2.970	1.978	0.103
B2/B66A RRH	B	From Face	3.000	0.000	126.000	No Ice	2.537	1.610	0.060
(Verizon)			6.000			1/2" Ice	2.750	1.791	0.080
			0.000			1" Ice	2.970	1.978	0.103
B2/B66A RRH	C	From Face	3.000	0.000	126.000	No Ice	2.537	1.610	0.060
(Verizon)			6.000			1/2" Ice	2.750	1.791	0.080
			0.000			1" Ice	2.970	1.978	0.103
B5/B13 RRH	A	From Face	3.000	0.000	126.000	No Ice	1.865	1.016	0.070
(Verizon)			6.000			1/2" Ice	2.035	1.148	0.086
			0.000			1" Ice	2.212	1.288	0.106
B5/B13 RRH	B	From Face	3.000	0.000	126.000	No Ice	1.865	1.016	0.070
(Verizon)			6.000			1/2" Ice	2.035	1.148	0.086
			0.000			1" Ice	2.212	1.288	0.106
B5/B13 RRH	C	From Face	3.000	0.000	126.000	No Ice	1.865	1.016	0.070
(Verizon)			6.000			1/2" Ice	2.035	1.148	0.086
			0.000			1" Ice	2.212	1.288	0.106
RC2DC-3315-PF-48	C	From Face	3.000	0.000	126.000	No Ice	3.015	1.965	0.025
(Verizon)			0.000			1/2" Ice	3.234	2.153	0.051
			0.000			1" Ice	3.460	2.349	0.081
13' Platform w/Rails	C	None		0.000	126.000	No Ice	31.300	31.300	1.822
(Verizon)						1/2" Ice	40.200	40.200	2.452
						1" Ice	49.100	49.100	3.082
(2) EPBQ-654L8H8-L2	A	From Face	3.000	0.000	115.000	No Ice	18.089	7.033	0.095
(AT&T)			6.000			1/2" Ice	18.722	7.619	0.188
			0.000			1" Ice	19.362	8.213	0.290
(2) EPBQ-654L8H8-L2	B	From Face	3.000	0.000	115.000	No Ice	18.089	7.033	0.095
(AT&T)			6.000			1/2" Ice	18.722	7.619	0.188
			0.000			1" Ice	19.362	8.213	0.290
(2) EPBQ-654L8H8-L2	C	From Face	3.000	0.000	115.000	No Ice	18.089	7.033	0.095

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)
(AT&T)			6.000			1/2" Ice	18.722	7.619	0.188
			0.000			1" Ice	19.362	8.213	0.290
HPA65R-BU8A	A	From Face	3.000	0.000	115.000	No Ice	11.233	10.022	0.088
(AT&T)			6.000			1/2" Ice	11.848	11.444	0.176
			0.000			1" Ice	12.471	12.717	0.274
HPA65R-BU8A	B	From Face	3.000	0.000	115.000	No Ice	11.233	10.022	0.088
(AT&T)			6.000			1/2" Ice	11.848	11.444	0.176
			0.000			1" Ice	12.471	12.717	0.274
HPA65R-BU8A	C	From Face	3.000	0.000	115.000	No Ice	11.233	10.022	0.088
(AT&T)			6.000			1/2" Ice	11.848	11.444	0.176
			0.000			1" Ice	12.471	12.717	0.274
4449 B5/B12	A	From Face	0.500	0.000	115.000	No Ice	1.968	1.408	0.071
(AT&T)			0.000			1/2" Ice	2.144	1.564	0.090
			0.000			1" Ice	2.328	1.727	0.111
4449 B5/B12	B	From Face	0.500	0.000	115.000	No Ice	1.968	1.408	0.071
(AT&T)			0.000			1/2" Ice	2.144	1.564	0.090
			0.000			1" Ice	2.328	1.727	0.111
4449 B5/B12	C	From Face	0.500	0.000	115.000	No Ice	1.968	1.408	0.071
(AT&T)			0.000			1/2" Ice	2.144	1.564	0.090
			0.000			1" Ice	2.328	1.727	0.111
4415 B25	A	From Face	0.500	0.000	115.000	No Ice	1.843	0.820	0.046
(AT&T)			0.000			1/2" Ice	2.012	0.943	0.060
			0.000			1" Ice	2.190	1.075	0.077
4415 B25	B	From Face	0.500	0.000	115.000	No Ice	1.843	0.820	0.046
(AT&T)			0.000			1/2" Ice	2.012	0.943	0.060
			0.000			1" Ice	2.190	1.075	0.077
4415 B25	C	From Face	0.500	0.000	115.000	No Ice	1.843	0.820	0.046
(AT&T)			0.000			1/2" Ice	2.012	0.943	0.060
			0.000			1" Ice	2.190	1.075	0.077
4426 B66	A	From Face	0.500	0.000	115.000	No Ice	1.650	0.727	0.049
(AT&T)			0.000			1/2" Ice	1.810	0.844	0.062
			0.000			1" Ice	1.978	0.971	0.077
4426 B66	B	From Face	0.500	0.000	115.000	No Ice	1.650	0.727	0.049
(AT&T)			0.000			1/2" Ice	1.810	0.844	0.062
			0.000			1" Ice	1.978	0.971	0.077
4426 B66	C	From Face	0.500	0.000	115.000	No Ice	1.650	0.727	0.049
(AT&T)			0.000			1/2" Ice	1.810	0.844	0.062
			0.000			1" Ice	1.978	0.971	0.077
4415 B30	A	From Face	0.500	0.000	115.000	No Ice	1.843	0.820	0.046
(AT&T)			0.000			1/2" Ice	2.012	0.943	0.060
			0.000			1" Ice	2.190	1.075	0.077
4415 B30	B	From Face	0.500	0.000	115.000	No Ice	1.843	0.820	0.046
(AT&T)			0.000			1/2" Ice	2.012	0.943	0.060
			0.000			1" Ice	2.190	1.075	0.077
4415 B30	C	From Face	0.500	0.000	115.000	No Ice	1.843	0.820	0.046
(AT&T)			0.000			1/2" Ice	2.012	0.943	0.060
			0.000			1" Ice	2.190	1.075	0.077
DC6-48-60-18-8F Surge	A	From Face	0.500	0.000	115.000	No Ice	1.909	1.909	0.020
Arrestor			0.000			1/2" Ice	2.098	2.098	0.039
(AT&T)			0.000			1" Ice	2.294	2.294	0.062
DC6-48-60-18-8F Surge	B	From Face	0.500	0.000	115.000	No Ice	1.909	1.909	0.020
Arrestor			0.000			1/2" Ice	2.098	2.098	0.039
(AT&T)			0.000			1" Ice	2.294	2.294	0.062
DC6-48-60-18-8F Surge	C	From Face	0.500	0.000	115.000	No Ice	1.909	1.909	0.020
Arrestor			0.000			1/2" Ice	2.098	2.098	0.039
(AT&T)			0.000			1" Ice	2.294	2.294	0.062
12' V-Frame	A	None		0.000	115.000	No Ice	9.220	12.970	0.300

Description	*Face or Leg*	*Offset Type*	*Offsets: Horz Lateral Vert*	*Azimuth Adjustment*	*Placement*		C_AA_A *Front*	C_AA_A *Side*	*Weight*
			ft ft ft	*°*	*ft*		*ft²*	*ft²*	*K*
(AT&T)						1/2" Ice	9.220	12.970	0.400
						1" Ice	9.220	12.970	0.500
12' V-Frame	B	None		0.000	115.000	No Ice	9.220	12.970	0.300
(AT&T)						1/2" Ice	9.220	12.970	0.400
						1" Ice	9.220	12.970	0.500
12' V-Frame	C	None		0.000	115.000	No Ice	9.220	12.970	0.300
(AT&T)						1/2" Ice	9.220	12.970	0.400
						1" Ice	9.220	12.970	0.500
AIR6419	A	From Face	3.000	0.000	104.000	No Ice	3.663	1.661	0.066
(T-Mobile - Proposed)			2.000			1/2" Ice	3.910	1.851	0.091
			0.000			1" Ice	4.164	2.047	0.120
APXVAARR24-43	A	From Face	3.000	0.000	104.000	No Ice	20.243	8.889	0.153
(T-Mobile)			6.000			1/2" Ice	20.890	9.487	0.266
			0.000			1" Ice	21.544	10.092	0.387
AIR6419	B	From Face	3.000	0.000	104.000	No Ice	3.663	1.661	0.066
(T-Mobile - Proposed)			2.000			1/2" Ice	3.910	1.851	0.091
			0.000			1" Ice	4.164	2.047	0.120
APXVAARR24-43	B	From Face	3.000	0.000	104.000	No Ice	20.243	8.889	0.153
(T-Mobile)			6.000			1/2" Ice	20.890	9.487	0.266
			0.000			1" Ice	21.544	10.092	0.387
AIR6419	C	From Face	3.000	0.000	104.000	No Ice	3.663	1.661	0.066
(T-Mobile - Proposed)			2.000			1/2" Ice	3.910	1.851	0.091
			0.000			1" Ice	4.164	2.047	0.120
APXVAARR24-43	C	From Face	3.000	0.000	104.000	No Ice	20.243	8.889	0.153
(T-Mobile)			6.000			1/2" Ice	20.890	9.487	0.266
			0.000			1" Ice	21.544	10.092	0.387
Radio 4449 B71 B12	A	From Face	3.000	0.000	104.000	No Ice	1.639	1.291	0.074
(T-Mobile)			6.000			1/2" Ice	1.799	1.436	0.091
			0.000			1" Ice	1.966	1.587	0.111
Radio 4449 B71 B12	B	From Face	3.000	0.000	104.000	No Ice	1.639	1.291	0.074
(T-Mobile)			6.000			1/2" Ice	1.799	1.436	0.091
			0.000			1" Ice	1.966	1.587	0.111
Radio 4449 B71 B12	C	From Face	3.000	0.000	104.000	No Ice	1.639	1.291	0.074
(T-Mobile)			6.000			1/2" Ice	1.799	1.436	0.091
			0.000			1" Ice	1.966	1.587	0.111
4460 B25+B66	A	From Face	3.000	0.000	104.000	No Ice	2.564	1.976	0.109
(T-Mobile - Proposed)			6.000			1/2" Ice	2.764	2.156	0.134
			0.000			1" Ice	2.971	2.343	0.163
4460 B25+B66	B	From Face	3.000	0.000	104.000	No Ice	2.564	1.976	0.109
(T-Mobile - Proposed)			6.000			1/2" Ice	2.764	2.156	0.134
			0.000			1" Ice	2.971	2.343	0.163
4460 B25+B66	C	From Face	3.000	0.000	104.000	No Ice	2.564	1.976	0.109
(T-Mobile - Proposed)			6.000			1/2" Ice	2.764	2.156	0.134
			0.000			1" Ice	2.971	2.343	0.163
F4P-12W Quad Platform w/	C	None		0.000	104.000	No Ice	35.000	35.000	2.500
Handrail						1/2" Ice	41.000	41.000	3.100
(T-Mobile)						1" Ice	47.000	47.000	3.700

Tower Pressures - No Ice

$G_H = 1.100$

Section Elevation ft	z ft	K_Z	q_z ksf	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg %	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
L1 130.000-83.710	105.568	1.446	0.039	135.989	A	0.000	135.989	135.989	100.00	0.000	0.000
					B	0.000	135.989		100.00	0.000	0.000
					C	0.000	135.989		100.00	0.000	0.000
L2 83.710-41.210	61.816	1.318	0.035	170.010	A	0.000	170.010	170.010	100.00	0.000	0.000
					B	0.000	170.010		100.00	0.000	0.000
					C	0.000	170.010		100.00	0.000	0.000
L3 41.210-0.000	20.517	1.088	0.029	204.534	A	0.000	204.534	204.534	100.00	0.000	0.000
					B	0.000	204.534		100.00	0.000	0.000
					C	0.000	204.534		100.00	0.000	0.000

Tower Pressure - With Ice

$G_H = 1.100$

Section Elevation ft	z ft	K_Z	q_z ksf	t_Z in	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg %	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
L1 130.000-83.710	105.568	1.446	0.009	1.685	148.988	A	0.000	148.988	148.988	100.00	0.000	0.000
						B	0.000	148.988		100.00	0.000	0.000
						C	0.000	148.988		100.00	0.000	0.000
L2 83.710-41.210	61.816	1.318	0.008	1.597	181.945	A	0.000	181.945	181.945	100.00	0.000	0.000
						B	0.000	181.945		100.00	0.000	0.000
						C	0.000	181.945		100.00	0.000	0.000
L3 41.210-0.000	20.517	1.088	0.007	1.430	215.504	A	0.000	215.504	215.504	100.00	0.000	0.000
						B	0.000	215.504		100.00	0.000	0.000
						C	0.000	215.504		100.00	0.000	0.000

Tower Pressure - Service

$G_H = 1.100$

Section Elevation ft	z ft	K_Z	q_z ksf	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg %	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
L1 130.000-83.710	105.568	1.446	0.011	135.989	A	0.000	135.989	135.989	100.00	0.000	0.000
					B	0.000	135.989		100.00	0.000	0.000
					C	0.000	135.989		100.00	0.000	0.000
L2 83.710-41.210	61.816	1.318	0.010	170.010	A	0.000	170.010	170.010	100.00	0.000	0.000
					B	0.000	170.010		100.00	0.000	0.000
					C	0.000	170.010		100.00	0.000	0.000
L3 41.210-0.000	20.517	1.088	0.009	204.534	A	0.000	204.534	204.534	100.00	0.000	0.000
					B	0.000	204.534		100.00	0.000	0.000
					C	0.000	204.534		100.00	0.000	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 ksf	D_F	D_R	A_E ft^2	F K	w klf	Ctrl. Face
L1 130.000-83.710	0.567	5.383	A	1	0.65	0.039	1	1	135.989	3.767	0.081	C
			B	1	0.65		1	1	135.989			
			C	1	0.65		1	1	135.989			
L2 83.710-41.210	0.717	14.877	A	1	0.65	0.035	1	1	170.010	4.283	0.101	C
			B	1	0.65		1	1	170.010			
			C	1	0.65		1	1	170.010			
L3 41.210-0.000	0.646	22.243	A	1	0.65	0.029	1	1	204.534	4.293	0.104	C
			B	1	0.65		1	1	204.534			
			C	1	0.65		1	1	204.534			
Sum Weight:	1.929	42.503						OTM	750.441 kip-ft	12.342		

Tower Forces - No Ice - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z ksf	D_F	D_R	A_E ft^2	F K	w klf	Ctrl. Face
L1 130.000-83.710	0.567	5.383	A	1	0.65	0.039	1	1	135.989	3.767	0.081	C
			B	1	0.65		1	1	135.989			
			C	1	0.65		1	1	135.989			
L2 83.710-41.210	0.717	14.877	A	1	0.65	0.035	1	1	170.010	4.283	0.101	C
			B	1	0.65		1	1	170.010			
			C	1	0.65		1	1	170.010			
L3 41.210-0.000	0.646	22.243	A	1	0.65	0.029	1	1	204.534	4.293	0.104	C
			B	1	0.65		1	1	204.534			
			C	1	0.65		1	1	204.534			
Sum Weight:	1.929	42.503						OTM	750.441 kip-ft	12.342		

Tower Forces - No Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z ksf	D_F	D_R	A_E ft^2	F K	w klf	Ctrl. Face
L1 130.000-83.710	0.567	5.383	A	1	0.65	0.039	1	1	135.989	3.767	0.081	C
			B	1	0.65		1	1	135.989			
			C	1	0.65		1	1	135.989			
L2 83.710-41.210	0.717	14.877	A	1	0.65	0.035	1	1	170.010	4.283	0.101	C
			B	1	0.65		1	1	170.010			
			C	1	0.65		1	1	170.010			
L3 41.210-0.000	0.646	22.243	A	1	0.65	0.029	1	1	204.534	4.293	0.104	C
			B	1	0.65		1	1	204.534			
			C	1	0.65		1	1	204.534			
Sum Weight:	1.929	42.503						OTM	750.441 kip-ft	12.342		

Tower Forces - No Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z ksf	D_F	D_R	A_E ft^2	F K	w klf	Ctrl. Face
L1 130.000-83.710	0.567	5.383	A	1	0.65	0.039	1	1	135.989	3.767	0.081	C
			B	1	0.65		1	1	135.989			
			C	1	0.65		1	1	135.989			
L2 83.710-41.210	0.717	14.877	A	1	0.65	0.035	1	1	170.010	4.283	0.101	C
			B	1	0.65		1	1	170.010			
			C	1	0.65		1	1	170.010			
L3 41.210-0.000	0.646	22.243	A	1	0.65	0.029	1	1	204.534	4.293	0.104	C
			B	1	0.65		1	1	204.534			
			C	1	0.65		1	1	204.534			
Sum Weight:	1.929	42.503						OTM	750.441 kip-ft	12.342		

Tower Forces - With Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z ksf	D_F	D_R	A_E ft^2	F K	w klf	Ctrl. Face
L1 130.000-83.710	0.567	8.892	A	1	1.2	0.009	1	1	148.988	1.728	0.037	C
			B	1	1.2		1	1	148.988			
			C	1	1.2		1	1	148.988			
L2 83.710-41.210	0.717	18.979	A	1	1.2	0.008	1	1	181.323	1.912	0.045	C
			B	1	1.2		1	1	181.323			
			C	1	1.2		1	1	181.323			
L3 41.210-0.000	0.646	26.623	A	1	1.2	0.007	1	1	214.358	1.884	0.046	C
			B	1	1.2		1	1	214.358			
			C	1	1.2		1	1	214.358			
Sum Weight:	1.929	54.495						OTM	339.214 kip-ft	5.523		

Tower Forces - With Ice - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z ksf	D_F	D_R	A_E ft^2	F K	w klf	Ctrl. Face
L1 130.000-83.710	0.567	8.892	A	1	1.2	0.009	1	1	148.988	1.728	0.037	C
			B	1	1.2		1	1	148.988			
			C	1	1.2		1	1	148.988			
L2 83.710-41.210	0.717	18.979	A	1	1.2	0.008	1	1	181.323	1.912	0.045	C
			B	1	1.2		1	1	181.323			
			C	1	1.2		1	1	181.323			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z ksf	D_F	D_R	A_E ft^2	F K	w klf	Ctrl. Face
L3 41.210-0.000	0.646	26.623	A	1	1.2	0.007	1	1	214.358	1.884	0.046	C
			B	1	1.2		1	1	214.358			
			C	1	1.2		1	1	214.358			
Sum Weight:	1.929	54.495						OTM	339.214 kip-ft	5.523		

Tower Forces - With Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z ksf	D_F	D_R	A_E ft^2	F K	w klf	Ctrl. Face
L1 130.000-83.710	0.567	8.892	A	1	1.2	0.009	1	1	148.988	1.728	0.037	C
			B	1	1.2		1	1	148.988			
			C	1	1.2		1	1	148.988			
L2 83.710-41.210	0.717	18.979	A	1	1.2	0.008	1	1	181.323	1.912	0.045	C
			B	1	1.2		1	1	181.323			
			C	1	1.2		1	1	181.323			
L3 41.210-0.000	0.646	26.623	A	1	1.2	0.007	1	1	214.358	1.884	0.046	C
			B	1	1.2		1	1	214.358			
			C	1	1.2		1	1	214.358			
Sum Weight:	1.929	54.495						OTM	339.214 kip-ft	5.523		

Tower Forces - With Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z ksf	D_F	D_R	A_E ft^2	F K	w klf	Ctrl. Face
L1 130.000-83.710	0.567	8.892	A	1	1.2	0.009	1	1	148.988	1.728	0.037	C
			B	1	1.2		1	1	148.988			
			C	1	1.2		1	1	148.988			
L2 83.710-41.210	0.717	18.979	A	1	1.2	0.008	1	1	181.323	1.912	0.045	C
			B	1	1.2		1	1	181.323			
			C	1	1.2		1	1	181.323			
L3 41.210-0.000	0.646	26.623	A	1	1.2	0.007	1	1	214.358	1.884	0.046	C
			B	1	1.2		1	1	214.358			
			C	1	1.2		1	1	214.358			
Sum Weight:	1.929	54.495						OTM	339.214 kip-ft	5.523		

Tower Forces - Service - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z ksf	D_F	D_R	A_E ft^2	F K	w klf	Ctrl. Face
L1 130.000-83.710	0.567	5.383	A	1	0.65	0.011	1	1	135.989	1.100	0.024	C
			B	1	0.65		1	1	135.989			
			C	1	0.65		1	1	135.989			
L2 83.710-41.210	0.717	14.877	A	1	0.65	0.010	1	1	170.010	1.251	0.029	C
			B	1	0.65		1	1	170.010			
			C	1	0.65		1	1	170.010			
L3 41.210-0.000	0.646	22.243	A	1	0.65	0.009	1	1	204.534	1.254	0.030	C
			B	1	0.65		1	1	204.534			
			C	1	0.65		1	1	204.534			
Sum Weight:	1.929	42.503						OTM	219.248 kip-ft	3.606		

Tower Forces - Service - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z ksf	D_F	D_R	A_E ft^2	F K	w klf	Ctrl. Face
L1 130.000-83.710	0.567	5.383	A	1	0.65	0.011	1	1	135.989	1.100	0.024	C
			B	1	0.65		1	1	135.989			
			C	1	0.65		1	1	135.989			
L2 83.710-41.210	0.717	14.877	A	1	0.65	0.010	1	1	170.010	1.251	0.029	C
			B	1	0.65		1	1	170.010			
			C	1	0.65		1	1	170.010			
L3 41.210-0.000	0.646	22.243	A	1	0.65	0.009	1	1	204.534	1.254	0.030	C
			B	1	0.65		1	1	204.534			
			C	1	0.65		1	1	204.534			
Sum Weight:	1.929	42.503						OTM	219.248 kip-ft	3.606		

Tower Forces - Service - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z ksf	D_F	D_R	A_E ft^2	F K	w klf	Ctrl. Face
L1 130.000-83.710	0.567	5.383	A	1	0.65	0.011	1	1	135.989	1.100	0.024	C
			B	1	0.65		1	1	135.989			
			C	1	0.65		1	1	135.989			
L2 83.710-41.210	0.717	14.877	A	1	0.65	0.010	1	1	170.010	1.251	0.029	C
			B	1	0.65		1	1	170.010			
			C	1	0.65		1	1	170.010			
L3 41.210-0.000	0.646	22.243	A	1	0.65	0.009	1	1	204.534	1.254	0.030	C
			B	1	0.65		1	1	204.534			
			C	1	0.65		1	1	204.534			
Sum Weight:	1.929	42.503						OTM	219.248 kip-ft	3.606		

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Tower Forces - Service - Wind 90 To Face

Section Elevation *ft*	Add Weight *K*	Self Weight *K*	Face	e	C_F	q_z *ksf*	D_F	D_R	A_E *ft²*	F *K*	w *klf*	Ctrl. Face
L1 130.000-83.710	0.567	5.383	A	1	0.65	0.011	1	1	135.989	1.100	0.024	C
			B	1	0.65		1	1	135.989			
			C	1	0.65		1	1	135.989			
L2 83.710-41.210	0.717	14.877	A	1	0.65	0.010	1	1	170.010	1.251	0.029	C
			B	1	0.65		1	1	170.010			
			C	1	0.65		1	1	170.010			
L3 41.210-0.000	0.646	22.243	A	1	0.65	0.009	1	1	204.534	1.254	0.030	C
			B	1	0.65		1	1	204.534			
			C	1	0.65		1	1	204.534			
Sum Weight:	1.929	42.503						OTM	219.248 kip-ft	3.606		

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	42.503					
Bracing Weight	0.000					
Total Member Self-Weight	42.503			0.121	0.000	
Total Weight	53.586			0.121	0.000	
Wind 0 deg - No Ice		0.000	-27.134	-2466.768	0.000	0.000
Wind 30 deg - No Ice		13.549	-23.499	-2136.268	-1231.115	0.212
Wind 45 deg - No Ice		19.160	-19.187	-1744.233	-1741.060	0.300
Wind 60 deg - No Ice		23.467	-13.567	-1233.324	-2132.354	0.368
Wind 90 deg - No Ice		27.097	0.000	0.121	-2462.231	0.425
Wind 120 deg - No Ice		23.467	13.567	1233.565	-2132.354	0.368
Wind 135 deg - No Ice		19.160	19.187	1744.474	-1741.060	0.300
Wind 150 deg - No Ice		13.549	23.499	2136.509	-1231.115	0.212
Wind 180 deg - No Ice		0.000	27.134	2467.009	0.000	0.000
Wind 210 deg - No Ice		-13.549	23.499	2136.509	1231.115	-0.212
Wind 225 deg - No Ice		-19.160	19.187	1744.474	1741.060	-0.300
Wind 240 deg - No Ice		-23.467	13.567	1233.565	2132.354	-0.368
Wind 270 deg - No Ice		-27.097	0.000	0.121	2462.231	-0.425
Wind 300 deg - No Ice		-23.467	-13.567	-1233.324	2132.354	-0.368
Wind 315 deg - No Ice		-19.160	-19.187	-1744.233	1741.060	-0.300
Wind 330 deg - No Ice		-13.549	-23.499	-2136.268	1231.115	-0.212
Member Ice	11.992					
Total Weight Ice	80.377			0.694	0.000	
Wind 0 deg - Ice		0.000	-9.905	-848.382	0.000	0.000
Wind 30 deg - Ice		4.948	-8.578	-734.628	-423.958	0.080
Wind 45 deg - Ice		6.998	-7.004	-599.693	-599.567	0.113
Wind 60 deg - Ice		8.570	-4.953	-423.844	-734.316	0.139
Wind 90 deg - Ice		9.896	0.000	0.694	-847.915	0.160
Wind 120 deg - Ice		8.570	4.953	425.233	-734.316	0.139
Wind 135 deg - Ice		6.998	7.004	601.082	-599.567	0.113
Wind 150 deg - Ice		4.948	8.578	736.016	-423.958	0.080

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 180 deg - Ice		0.000	9.905	849.771	0.000	0.000
Wind 210 deg - Ice		-4.948	8.578	736.016	423.958	-0.080
Wind 225 deg - Ice		-6.998	7.004	601.082	599.567	-0.113
Wind 240 deg - Ice		-8.570	4.953	425.233	734.316	-0.139
Wind 270 deg - Ice		-9.896	0.000	0.694	847.915	-0.160
Wind 300 deg - Ice		-8.570	-4.953	-423.844	734.316	-0.139
Wind 315 deg - Ice		-6.998	-7.004	-599.693	599.567	-0.113
Wind 330 deg - Ice		-4.948	-8.578	-734.628	423.958	-0.080
Total Weight	53.586			0.121	0.000	
Wind 0 deg - Service		0.000	-7.927	-720.603	0.000	0.000
Wind 30 deg - Service		3.958	-6.865	-624.044	-359.681	0.062
Wind 45 deg - Service		5.598	-5.606	-509.508	-508.666	0.088
Wind 60 deg - Service		6.856	-3.964	-360.241	-622.986	0.107
Wind 90 deg - Service		7.917	0.000	0.121	-719.363	0.124
Wind 120 deg - Service		6.856	3.964	360.482	-622.986	0.107
Wind 135 deg - Service		5.598	5.606	509.749	-508.666	0.088
Wind 150 deg - Service		3.958	6.865	624.286	-359.681	0.062
Wind 180 deg - Service		0.000	7.927	720.844	0.000	0.000
Wind 210 deg - Service		-3.958	6.865	624.286	359.681	-0.062
Wind 225 deg - Service		-5.598	5.606	509.749	508.666	-0.088
Wind 240 deg - Service		-6.856	3.964	360.482	622.986	-0.107
Wind 270 deg - Service		-7.917	0.000	0.121	719.363	-0.124
Wind 300 deg - Service		-6.856	-3.964	-360.241	622.986	-0.107
Wind 315 deg - Service		-5.598	-5.606	-509.508	508.666	-0.088
Wind 330 deg - Service		-3.958	-6.865	-624.044	359.681	-0.062

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.6 Wind 0 deg - No Ice
3	0.9 Dead+1.6 Wind 0 deg - No Ice
4	1.2 Dead+1.6 Wind 30 deg - No Ice
5	0.9 Dead+1.6 Wind 30 deg - No Ice
6	1.2 Dead+1.6 Wind 45 deg - No Ice
7	0.9 Dead+1.6 Wind 45 deg - No Ice
8	1.2 Dead+1.6 Wind 60 deg - No Ice
9	0.9 Dead+1.6 Wind 60 deg - No Ice
10	1.2 Dead+1.6 Wind 90 deg - No Ice
11	0.9 Dead+1.6 Wind 90 deg - No Ice
12	1.2 Dead+1.6 Wind 120 deg - No Ice
13	0.9 Dead+1.6 Wind 120 deg - No Ice
14	1.2 Dead+1.6 Wind 135 deg - No Ice
15	0.9 Dead+1.6 Wind 135 deg - No Ice
16	1.2 Dead+1.6 Wind 150 deg - No Ice
17	0.9 Dead+1.6 Wind 150 deg - No Ice
18	1.2 Dead+1.6 Wind 180 deg - No Ice
19	0.9 Dead+1.6 Wind 180 deg - No Ice
20	1.2 Dead+1.6 Wind 210 deg - No Ice
21	0.9 Dead+1.6 Wind 210 deg - No Ice
22	1.2 Dead+1.6 Wind 225 deg - No Ice
23	0.9 Dead+1.6 Wind 225 deg - No Ice
24	1.2 Dead+1.6 Wind 240 deg - No Ice
25	0.9 Dead+1.6 Wind 240 deg - No Ice
26	1.2 Dead+1.6 Wind 270 deg - No Ice

Comb. No.	Description
27	0.9 Dead+1.6 Wind 270 deg - No Ice
28	1.2 Dead+1.6 Wind 300 deg - No Ice
29	0.9 Dead+1.6 Wind 300 deg - No Ice
30	1.2 Dead+1.6 Wind 315 deg - No Ice
31	0.9 Dead+1.6 Wind 315 deg - No Ice
32	1.2 Dead+1.6 Wind 330 deg - No Ice
33	0.9 Dead+1.6 Wind 330 deg - No Ice
34	1.2 Dead+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 45 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
39	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
40	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
41	1.2 Dead+1.0 Wind 135 deg+1.0 Ice+1.0 Temp
42	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
43	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
44	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
45	1.2 Dead+1.0 Wind 225 deg+1.0 Ice+1.0 Temp
46	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
47	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
48	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
49	1.2 Dead+1.0 Wind 315 deg+1.0 Ice+1.0 Temp
50	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
51	Dead+Wind 0 deg - Service
52	Dead+Wind 30 deg - Service
53	Dead+Wind 45 deg - Service
54	Dead+Wind 60 deg - Service
55	Dead+Wind 90 deg - Service
56	Dead+Wind 120 deg - Service
57	Dead+Wind 135 deg - Service
58	Dead+Wind 150 deg - Service
59	Dead+Wind 180 deg - Service
60	Dead+Wind 210 deg - Service
61	Dead+Wind 225 deg - Service
62	Dead+Wind 240 deg - Service
63	Dead+Wind 270 deg - Service
64	Dead+Wind 300 deg - Service
65	Dead+Wind 315 deg - Service
66	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
L1	130 - 83.71	Pole	Max Tension	34	0.000	0.000	0.000
			Max. Compression	34	-35.035	0.000	-0.718
			Max. Mx	10	-16.447	-744.541	-0.138
			Max. My	18	-16.444	0.000	-746.889
			Max. Vy	10	29.216	-744.541	-0.138
			Max. Vx	18	29.276	0.000	-746.889
			Max. Torque	26			0.681
L2	83.71 - 41.21	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	34	-56.007	0.000	-0.718
			Max. Mx	10	-33.308	-2072.767	-0.146
			Max. My	18	-33.307	0.000	-2077.579
			Max. Vy	10	35.680	-2072.767	-0.146
			Max. Vx	18	35.740	0.000	-2077.579

Section No.	*Elevation ft*	*Component Type*	*Condition*	*Gov. Load Comb.*	*Axial K*	*Major Axis Moment kip-ft*	*Minor Axis Moment kip-ft*
			Max. Torque	10			-0.681
L3	41.21 - 0	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	34	-92.369	0.000	-0.718
			Max. Mx	10	-64.291	-3981.828	-0.147
			Max. My	18	-64.291	0.000	-3989.519
			Max. Vy	10	43.373	-3981.828	-0.147
			Max. Vx	18	43.432	0.000	-3989.519
			Max. Torque	10			-0.680

Maximum Reactions

Location	*Condition*	*Gov. Load Comb.*	*Vertical K*	*Horizontal, X K*	*Horizontal, Z K*
Pole	Max. Vert	34	92.369	0.000	0.000
	Max. H_x	26	64.303	43.355	0.000
	Max. H_z	2	64.303	0.000	43.414
	Max. M_x	2	3989.223	0.000	43.414
	Max. M_z	10	3981.828	-43.355	0.000
	Max. Torsion	26	0.680	43.355	0.000
	Min. Vert	31	48.227	30.657	30.699
	Min. H_x	10	64.303	-43.355	0.000
	Min. H_z	18	64.303	0.000	-43.414
	Min. M_x	18	-3989.519	0.000	-43.414
	Min. M_z	26	-3981.828	43.355	0.000
	Min. Torsion	10	-0.680	-43.355	0.000

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	53.586	0.000	0.000	0.121	0.000	0.000
1.2 Dead+1.6 Wind 0 deg - No Ice	64.303	0.000	-43.414	-3989.223	0.000	0.000
0.9 Dead+1.6 Wind 0 deg - No Ice	48.227	0.000	-43.414	-3978.428	0.000	0.000
1.2 Dead+1.6 Wind 30 deg - No Ice	64.303	21.678	-37.598	-3454.750	-1990.913	0.340
0.9 Dead+1.6 Wind 30 deg - No Ice	48.227	21.678	-37.598	-3445.406	-1985.509	0.340
1.2 Dead+1.6 Wind 45 deg - No Ice	64.303	30.657	-30.699	-2820.765	-2815.577	0.481
0.9 Dead+1.6 Wind 45 deg - No Ice	48.227	30.657	-30.699	-2813.142	-2807.934	0.481
1.2 Dead+1.6 Wind 60 deg - No Ice	64.303	37.547	-21.707	-1994.539	-3448.364	0.589
0.9 Dead+1.6 Wind 60 deg - No Ice	48.227	37.547	-21.707	-1989.160	-3439.003	0.589
1.2 Dead+1.6 Wind 90 deg - No Ice	64.303	43.355	0.000	0.147	-3981.828	0.680
0.9 Dead+1.6 Wind 90 deg - No Ice	48.227	43.355	0.000	0.110	-3971.020	0.680

Load Combination	*Vertical* *K*	*Shear$_x$* *K*	*Shear$_z$* *K*	*Overturning Moment, M_x* *kip-ft*	*Overturning Moment, M_z* *kip-ft*	*Torque* *kip-ft*
1.2 Dead+1.6 Wind 120 deg - No Ice	64.303	37.547	21.707	1994.834	-3448.364	0.589
0.9 Dead+1.6 Wind 120 deg - No Ice	48.227	37.547	21.707	1989.380	-3439.003	0.589
1.2 Dead+1.6 Wind 135 deg - No Ice	64.303	30.657	30.699	2821.060	-2815.577	0.481
0.9 Dead+1.6 Wind 135 deg - No Ice	48.227	30.657	30.699	2813.362	-2807.934	0.481
1.2 Dead+1.6 Wind 150 deg - No Ice	64.303	21.678	37.598	3455.045	-1990.913	0.340
0.9 Dead+1.6 Wind 150 deg - No Ice	48.227	21.678	37.598	3445.626	-1985.509	0.340
1.2 Dead+1.6 Wind 180 deg - No Ice	64.303	0.000	43.414	3989.519	0.000	0.000
0.9 Dead+1.6 Wind 180 deg - No Ice	48.227	0.000	43.414	3978.649	0.000	0.000
1.2 Dead+1.6 Wind 210 deg - No Ice	64.303	-21.678	37.598	3455.045	1990.913	-0.340
0.9 Dead+1.6 Wind 210 deg - No Ice	48.227	-21.678	37.598	3445.626	1985.509	-0.340
1.2 Dead+1.6 Wind 225 deg - No Ice	64.303	-30.657	30.699	2821.060	2815.577	-0.481
0.9 Dead+1.6 Wind 225 deg - No Ice	48.227	-30.657	30.699	2813.362	2807.934	-0.481
1.2 Dead+1.6 Wind 240 deg - No Ice	64.303	-37.547	21.707	1994.834	3448.364	-0.589
0.9 Dead+1.6 Wind 240 deg - No Ice	48.227	-37.547	21.707	1989.380	3439.003	-0.589
1.2 Dead+1.6 Wind 270 deg - No Ice	64.303	-43.355	0.000	0.147	3981.828	-0.680
0.9 Dead+1.6 Wind 270 deg - No Ice	48.227	-43.355	0.000	0.110	3971.020	-0.680
1.2 Dead+1.6 Wind 300 deg - No Ice	64.303	-37.547	-21.707	-1994.539	3448.364	-0.589
0.9 Dead+1.6 Wind 300 deg - No Ice	48.227	-37.547	-21.707	-1989.160	3439.003	-0.589
1.2 Dead+1.6 Wind 315 deg - No Ice	64.303	-30.657	-30.699	-2820.765	2815.577	-0.481
0.9 Dead+1.6 Wind 315 deg - No Ice	48.227	-30.657	-30.699	-2813.142	2807.934	-0.481
1.2 Dead+1.6 Wind 330 deg - No Ice	64.303	-21.678	-37.598	-3454.750	1990.913	-0.340
0.9 Dead+1.6 Wind 330 deg - No Ice	48.227	-21.678	-37.598	-3445.406	1985.509	-0.340
1.2 Dead+1.0 Ice+1.0 Temp	92.369	0.000	0.000	0.718	0.000	0.000
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	92.369	0.000	-9.905	-864.946	0.000	0.000
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	92.369	4.948	-8.578	-748.965	-432.253	0.081
1.2 Dead+1.0 Wind 45 deg+1.0 Ice+1.0 Temp	92.369	6.998	-7.004	-611.389	-611.298	0.115
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	92.369	8.570	-4.953	-432.098	-748.685	0.141
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	92.369	9.896	0.000	0.749	-864.507	0.162
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	92.369	8.570	4.953	433.597	-748.685	0.141
1.2 Dead+1.0 Wind 135 deg+1.0 Ice+1.0 Temp	92.369	6.998	7.004	612.888	-611.298	0.115
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	92.369	4.948	8.578	750.464	-432.253	0.081

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	92.369	0.000	9.905	866.445	0.000	0.000
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	92.369	-4.948	8.578	750.464	432.253	-0.081
1.2 Dead+1.0 Wind 225 deg+1.0 Ice+1.0 Temp	92.369	-6.998	7.004	612.888	611.298	-0.115
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	92.369	-8.570	4.953	433.597	748.685	-0.141
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	92.369	-9.896	0.000	0.749	864.507	-0.162
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	92.369	-8.570	-4.953	-432.098	748.685	-0.141
1.2 Dead+1.0 Wind 315 deg+1.0 Ice+1.0 Temp	92.369	-6.998	-7.004	-611.389	611.298	-0.115
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	92.369	-4.948	-8.578	-748.965	432.253	-0.081
Dead+Wind 0 deg - Service	53.586	0.000	-7.927	-727.110	0.000	0.000
Dead+Wind 30 deg - Service	53.586	3.958	-6.865	-629.679	-362.929	0.062
Dead+Wind 45 deg - Service	53.586	5.598	-5.606	-514.108	-513.259	0.088
Dead+Wind 60 deg - Service	53.586	6.856	-3.964	-363.494	-628.611	0.108
Dead+Wind 90 deg - Service	53.586	7.917	0.000	0.123	-725.858	0.124
Dead+Wind 120 deg - Service	53.586	6.856	3.964	363.739	-628.611	0.108
Dead+Wind 135 deg - Service	53.586	5.598	5.606	514.354	-513.259	0.088
Dead+Wind 150 deg - Service	53.586	3.958	6.865	629.925	-362.929	0.062
Dead+Wind 180 deg - Service	53.586	0.000	7.927	727.355	0.000	0.000
Dead+Wind 210 deg - Service	53.586	-3.958	6.865	629.925	362.929	-0.062
Dead+Wind 225 deg - Service	53.586	-5.598	5.606	514.354	513.259	-0.088
Dead+Wind 240 deg - Service	53.586	-6.856	3.964	363.739	628.611	-0.108
Dead+Wind 270 deg - Service	53.586	-7.917	0.000	0.123	725.858	-0.124
Dead+Wind 300 deg - Service	53.586	-6.856	-3.964	-363.494	628.611	-0.108
Dead+Wind 315 deg - Service	53.586	-5.598	-5.606	-514.108	513.259	-0.088
Dead+Wind 330 deg - Service	53.586	-3.958	-6.865	-629.679	362.929	-0.062

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	0.000	-53.586	0.000	0.000	53.586	0.000	0.000%
2	0.000	-64.303	-43.414	0.000	64.303	43.414	0.000%
3	0.000	-48.227	-43.414	0.000	48.227	43.414	0.000%
4	21.678	-64.303	-37.598	-21.678	64.303	37.598	0.000%
5	21.678	-48.227	-37.598	-21.678	48.227	37.598	0.000%
6	30.657	-64.303	-30.699	-30.657	64.303	30.699	0.000%
7	30.657	-48.227	-30.699	-30.657	48.227	30.699	0.000%
8	37.547	-64.303	-21.707	-37.547	64.303	21.707	0.000%
9	37.547	-48.227	-21.707	-37.547	48.227	21.707	0.000%
10	43.355	-64.303	0.000	-43.355	64.303	0.000	0.000%
11	43.355	-48.227	0.000	-43.355	48.227	0.000	0.000%
12	37.547	-64.303	21.707	-37.547	64.303	-21.707	0.000%
13	37.547	-48.227	21.707	-37.547	48.227	-21.707	0.000%
14	30.657	-64.303	30.699	-30.657	64.303	-30.699	0.000%
15	30.657	-48.227	30.699	-30.657	48.227	-30.699	0.000%
16	21.678	-64.303	37.598	-21.678	64.303	-37.598	0.000%
17	21.678	-48.227	37.598	-21.678	48.227	-37.598	0.000%
18	0.000	-64.303	43.414	0.000	64.303	-43.414	0.000%
19	0.000	-48.227	43.414	0.000	48.227	-43.414	0.000%
20	-21.678	-64.303	37.598	21.678	64.303	-37.598	0.000%

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	*PX K*	*PY K*	*PZ K*	*PX K*	*PY K*	*PZ K*	*% Error*
21	-21.678	-48.227	37.598	21.678	48.227	-37.598	0.000%
22	-30.657	-64.303	30.699	30.657	64.303	-30.699	0.000%
23	-30.657	-48.227	30.699	30.657	48.227	-30.699	0.000%
24	-37.547	-64.303	21.707	37.547	64.303	-21.707	0.000%
25	-37.547	-48.227	21.707	37.547	48.227	-21.707	0.000%
26	-43.355	-64.303	0.000	43.355	64.303	0.000	0.000%
27	-43.355	-48.227	0.000	43.355	48.227	0.000	0.000%
28	-37.547	-64.303	-21.707	37.547	64.303	21.707	0.000%
29	-37.547	-48.227	-21.707	37.547	48.227	21.707	0.000%
30	-30.657	-64.303	-30.699	30.657	64.303	30.699	0.000%
31	-30.657	-48.227	-30.699	30.657	48.227	30.699	0.000%
32	-21.678	-64.303	-37.598	21.678	64.303	37.598	0.000%
33	-21.678	-48.227	-37.598	21.678	48.227	37.598	0.000%
34	0.000	-92.369	0.000	0.000	92.369	0.000	0.000%
35	0.000	-92.369	-9.905	0.000	92.369	9.905	0.000%
36	4.948	-92.369	-8.578	-4.948	92.369	8.578	0.000%
37	6.998	-92.369	-7.004	-6.998	92.369	7.004	0.000%
38	8.570	-92.369	-4.953	-8.570	92.369	4.953	0.000%
39	9.896	-92.369	0.000	-9.896	92.369	-0.000	0.000%
40	8.570	-92.369	4.953	-8.570	92.369	-4.953	0.000%
41	6.998	-92.369	7.004	-6.998	92.369	-7.004	0.000%
42	4.948	-92.369	8.578	-4.948	92.369	-8.578	0.000%
43	0.000	-92.369	9.905	0.000	92.369	-9.905	0.000%
44	-4.948	-92.369	8.578	4.948	92.369	-8.578	0.000%
45	-6.998	-92.369	7.004	6.998	92.369	-7.004	0.000%
46	-8.570	-92.369	4.953	8.570	92.369	-4.953	0.000%
47	-9.896	-92.369	0.000	9.896	92.369	-0.000	0.000%
48	-8.570	-92.369	-4.953	8.570	92.369	4.953	0.000%
49	-6.998	-92.369	-7.004	6.998	92.369	7.004	0.000%
50	-4.948	-92.369	-8.578	4.948	92.369	8.578	0.000%
51	0.000	-53.586	-7.927	0.000	53.586	7.927	0.000%
52	3.958	-53.586	-6.865	-3.958	53.586	6.865	0.000%
53	5.598	-53.586	-5.606	-5.598	53.586	5.606	0.000%
54	6.856	-53.586	-3.964	-6.856	53.586	3.964	0.000%
55	7.917	-53.586	0.000	-7.917	53.586	0.000	0.000%
56	6.856	-53.586	3.964	-6.856	53.586	-3.964	0.000%
57	5.598	-53.586	5.606	-5.598	53.586	-5.606	0.000%
58	3.958	-53.586	6.865	-3.958	53.586	-6.865	0.000%
59	0.000	-53.586	7.927	0.000	53.586	-7.927	0.000%
60	-3.958	-53.586	6.865	3.958	53.586	-6.865	0.000%
61	-5.598	-53.586	5.606	5.598	53.586	-5.606	0.000%
62	-6.856	-53.586	3.964	6.856	53.586	-3.964	0.000%
63	-7.917	-53.586	0.000	7.917	53.586	0.000	0.000%
64	-6.856	-53.586	-3.964	6.856	53.586	3.964	0.000%
65	-5.598	-53.586	-5.606	5.598	53.586	5.606	0.000%
66	-3.958	-53.586	-6.865	3.958	53.586	6.865	0.000%

Non-Linear Convergence Results

Load Combination	*Converged?*	*Number of Cycles*	*Displacement Tolerance*	*Force Tolerance*
1	Yes	4	0.00000001	0.00000001
2	Yes	4	0.00000001	0.00000549
3	Yes	4	0.00000001	0.00000271
4	Yes	4	0.00000001	0.00009717
5	Yes	4	0.00000001	0.00006047

6	Yes	4	0.00000001	0.00010990
7	Yes	4	0.00000001	0.00006819
8	Yes	4	0.00000001	0.00009361
9	Yes	4	0.00000001	0.00005818
10	Yes	4	0.00000001	0.00000773
11	Yes	4	0.00000001	0.00000440
12	Yes	4	0.00000001	0.00009813
13	Yes	4	0.00000001	0.00006109
14	Yes	4	0.00000001	0.00010992
15	Yes	4	0.00000001	0.00006820
16	Yes	4	0.00000001	0.00009459
17	Yes	4	0.00000001	0.00005879
18	Yes	4	0.00000001	0.00000549
19	Yes	4	0.00000001	0.00000271
20	Yes	4	0.00000001	0.00009459
21	Yes	4	0.00000001	0.00005879
22	Yes	4	0.00000001	0.00010992
23	Yes	4	0.00000001	0.00006820
24	Yes	4	0.00000001	0.00009813
25	Yes	4	0.00000001	0.00006109
26	Yes	4	0.00000001	0.00000773
27	Yes	4	0.00000001	0.00000440
28	Yes	4	0.00000001	0.00009361
29	Yes	4	0.00000001	0.00005818
30	Yes	4	0.00000001	0.00010990
31	Yes	4	0.00000001	0.00006819
32	Yes	4	0.00000001	0.00009717
33	Yes	4	0.00000001	0.00006047
34	Yes	4	0.00000001	0.00000001
35	Yes	4	0.00000001	0.00013761
36	Yes	4	0.00000001	0.00013964
37	Yes	4	0.00000001	0.00014030
38	Yes	4	0.00000001	0.00013962
39	Yes	4	0.00000001	0.00013769
40	Yes	4	0.00000001	0.00013998
41	Yes	4	0.00000001	0.00014077
42	Yes	4	0.00000001	0.00014019
43	Yes	4	0.00000001	0.00013823
44	Yes	4	0.00000001	0.00014019
45	Yes	4	0.00000001	0.00014077
46	Yes	4	0.00000001	0.00013998
47	Yes	4	0.00000001	0.00013769
48	Yes	4	0.00000001	0.00013962
49	Yes	4	0.00000001	0.00014030
50	Yes	4	0.00000001	0.00013964
51	Yes	4	0.00000001	0.00000001
52	Yes	4	0.00000001	0.00000001
53	Yes	4	0.00000001	0.00000001
54	Yes	4	0.00000001	0.00000001
55	Yes	4	0.00000001	0.00000001
56	Yes	4	0.00000001	0.00000001
57	Yes	4	0.00000001	0.00000001
58	Yes	4	0.00000001	0.00000001
59	Yes	4	0.00000001	0.00000001
60	Yes	4	0.00000001	0.00000001
61	Yes	4	0.00000001	0.00000001
62	Yes	4	0.00000001	0.00000001
63	Yes	4	0.00000001	0.00000001
64	Yes	4	0.00000001	0.00000001
65	Yes	4	0.00000001	0.00000001
66	Yes	4	0.00000001	0.00000001

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	130 - 83.71	4.947	59	0.340	0.000
L2	89.21 - 41.21	2.279	59	0.246	0.000
L3	48.21 - 0	0.656	59	0.124	0.000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
130.000	BOA4357	59	4.947	0.340	0.000	126972
126.000	MX06FRO660	59	4.664	0.332	0.000	126972
115.000	(2) EPBQ-654L8H8-L2	59	3.898	0.308	0.000	42324
104.000	AIR6419	59	3.166	0.283	0.000	24418

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	130 - 83.71	27.132	18	1.867	0.003
L2	89.21 - 41.21	12.505	18	1.348	0.001
L3	48.21 - 0	3.597	18	0.682	0.000

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
130.000	BOA4357	18	27.132	1.867	0.003	23206
126.000	MX06FRO660	18	25.583	1.820	0.002	23206
115.000	(2) EPBQ-654L8H8-L2	18	21.380	1.690	0.002	7735
104.000	AIR6419	18	17.365	1.553	0.001	4462

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
L1	130 - 83.71 (1)	TP41.53x28x0.313	46.290	0.000	0.0	39.288	-16.444	2723.550	0.006
L2	83.71 - 41.21 (2)	TP53.78x39.297x0.625	48.000	0.000	0.0	101.256	-33.307	7522.850	0.004
L3	41.21 - 0 (3)	TP65x50.418x0.75	48.210	0.000	0.0	152.947	-64.291	11363.200	0.006

Pole Bending Design Data

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L1	130 - 83.71 (1)	TP41.53x28x0.313	746.888	2218.300	0.337	0.000	2218.300	0.000
L2	83.71 - 41.21 (2)	TP53.78x39.297x0.625	2077.575	7861.858	0.264	0.000	7861.858	0.000
L3	41.21 - 0 (3)	TP65x50.418x0.75	3989.517	14956.333	0.267	0.000	14956.333	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	130 - 83.71 (1)	TP41.53x28x0.313	29.276	1361.780	0.021	0.000	4447.308	0.000
L2	83.71 - 41.21 (2)	TP53.78x39.297x0.625	35.740	3761.420	0.010	0.000	15771.916	0.000
L3	41.21 - 0 (3)	TP65x50.418x0.75	43.432	5681.600	0.008	0.000	30001.917	0.000

Pole Interaction Design Data

Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	130 - 83.71 (1)	0.006	0.337	0.000	0.021	0.000	0.343 ✓	1.000	4.8.2 ✓
L2	83.71 - 41.21 (2)	0.004	0.264	0.000	0.010	0.000	0.269 ✓	1.000	4.8.2 ✓
L3	41.21 - 0 (3)	0.006	0.267	0.000	0.008	0.000	0.272 ✓	1.000	4.8.2 ✓

Section Capacity Table

Section No.	*Elevation ft*	*Component Type*	*Size*	*Critical Element*	*P K*	*øP$_{allow}$ K*	*% Capacity*	*Pass Fail*
L1	130 - 83.71	Pole	TP41.53x28x0.313	1	-16.444	2723.550	34.3	Pass
L2	83.71 - 41.21	Pole	TP53.78x39.297x0.625	2	-33.307	7522.850	26.9	Pass
L3	41.21 - 0	Pole	TP65x50.418x0.75	3	-64.291	11363.200	27.2	Pass
							Summary	
						Pole (L1)	34.3	Pass
						RATING =	**34.3**	**Pass**

Anchor Bolt and Base Plate Analysis:

Input Data:

Tower Reactions:

Overturning Moment =	$M_u := 3990 \cdot ft \cdot kips$	(Input From tnxTower)
Shear Force =	$Shear := 43 \cdot kips$	(Input From tnxTower)
Axial Force =	$R_u := 64 \cdot kips$	(Input From tnxTower)

Anchor Bolt Data:

ASTM A615 Grade 75

Number of Anchor Bolts =	$N := 22$	(User Input)
Diameter of Bolt Circle =	$D_{BC} := 71.5 \cdot in$	(User Input)
Bolt "Column" Distance =	$l := 3.0 \cdot in$	(User Input)
Bolt Ultimate Strength =	$F_u := 100 \cdot ksi$	(User Input)
Bolt Yield Strength =	$F_y := 75 \cdot ksi$	(User Input)
Bolt Modulus =	$E := 29000 \cdot ksi$	(User Input)
Diameter of Anchor Bolts =	$D := 2.25 \cdot in$	(User Input)
Threads per Inch =	$n := 4.5$	(User Input)
Top of Concrete to Bot Leveling Nut =	$l_{ar} := 2 \cdot in$	(User Input)
Anchor Rod Force Correction Factor =	$n_c = 1$	Table 2-1 Addendum 3

Base Plate Data:

Use ASTM A572 Grade 50

Plate Yield Strength =	$F_{yf} := 50 \cdot ksi$	(User Input)
Base Plate Thickness =	$t_{TP} := 2.5 \cdot in$	(User Input)
Base Plate Diameter =	$D_{OD} := 76.5 \cdot in$	(User Input)
Outer Pole Diameter =	$D_T := 65 \cdot in$	(User Input)
Pole Wall Thickness =	$t_T := 0.75 \cdot in$	(User Input)
Pole Design Yield Strength =	$F_{yp} := 65 \cdot ksi$	(User Input)
	$\eta := 0.5$	For Ungrouted Base Plate per TIA-222-G Section 4.9.9

Anchor Bolt Analysis:

Gross Area of Bolt = $A_g := \frac{\pi}{4} \cdot D^2 = 3.976 \cdot in^2$

Net Area of Bolt = $A_n := \frac{\pi}{4} \cdot \left(D - \frac{0.9743 \cdot in}{n}\right)^2 = 3.248 \cdot in^2$

Tensile Root Diameter = $d_{rt} := D - \frac{0.9743 \cdot in}{n} = 2.033 \cdot in$

Plastic Section Modulus = $Z := \frac{d_{rt}^3}{6} = 1.401 \cdot in^3$

Maximum Anchor Rod Force = $P_u := \frac{n_c \cdot \pi \cdot M_u}{N \cdot D_{BC}} + \frac{R_u}{N} = 98.5 \cdot kips$

Maximum Shear Force = $V_u := \frac{Shear}{N} = 2 \cdot kips$

Design Tensile Strength = $\Phi R_{nt} := 0.8 \cdot F_u \cdot A_n = 259.815 \cdot k$

Bolt % of Capacity = $\frac{\left(P_u + \frac{V_u}{\eta}\right)}{\Phi R_{nt}} \cdot 100 = 39.4$

Condition1 = $Condition1 := if\left[\frac{\left(P_u + \frac{V_u}{\eta}\right)}{\Phi R_{nt}} \le 1.00, \text{"OK"}, \text{"Overstressed"}\right]$

Condition1 = "OK"

Design Shear Strength = $\Phi R_{nv} := 0.75 \cdot 0.45 \cdot F_u \cdot A_g = 134.193 \cdot k$

Design Flexural Strength = $\Phi R_{nm} := 0.9 \cdot F_y \cdot Z = 94.597 \cdot in \cdot k$

$M_u := \begin{cases} 0 & \text{if } l_{ar} < D \\ 0.65 \cdot l_{ar} \cdot V_u & \text{otherwise} \end{cases} = 0 \cdot in \cdot k$

Bolt % of Capacity = $\left[\left(\frac{V_u}{\Phi R_{nv}}\right)^2 + \left(\frac{P_u}{\Phi R_{nt}} + \frac{M_u}{\Phi R_{nm}}\right)^2\right] \cdot 100 = 14.4$

Condition2 = $Condition2 := if\left[\left(\frac{V_u}{\Phi R_{nv}}\right)^2 + \left(\frac{P_u}{\Phi R_{nt}} + \frac{M_u}{\Phi R_{nm}}\right)^2 \le 1.00, \text{"OK"}, \text{"Overstressed"}\right]$

Condition2 = "OK"

Base Plate Analysis:

Strength Resistance Factor for Yielding due to Bending = $\phi_b := 0.9$

Strength Resistance Factor for Yielding due to Shear = $\phi_v := 1.0$

Outside Fillet Horizontal Leg Dimension = $w_1 := 0.25 \cdot in$

Effective Pole Outside Diameter = $D_e := D_T + w_1 = 65.25 \cdot in$

Effective Base Plate Outside Diameter = $D_{oe} := \begin{cases} D_{OD} & \text{if } D_{OD} \le (D_{BC} + 6 \cdot t_{TP}) \\ (D_{BC} + 6 \cdot t_{TP}) & \text{otherwise} \end{cases} = 76.5 \cdot in$

Half-Angle Between Radial Lines Extending from Pole Centerline Through Midpoints Between Adjacent Anchor Rods = $\theta_1 := \frac{\pi}{N} = 0.143$

Angle Defining Limiting Effective Base Plate Width Based on Plate Thickness = $\theta_2 := asin\left(\frac{12 \cdot t_{TP}}{D_{BC}}\right) = 0.433$

Angle Defining Limiting Effective Base Plate Width Based on Distance Between Anchor Rod Bolt Circle and Effective Pole Outside Diameter = $\theta_3 := acos\left(\frac{D_{BC} + D_e}{2 \cdot D_{BC}}\right) = 0.297$

Governing Angle Defining Effective Base Plate Width Resisting Bending = $\theta := min(\theta_1, \theta_2, \theta_3) = 0.143$

Effective Moment Arm of Anchor Rod Force = $x := 0.5 \cdot (D_{BC} - D_e) = 3.125 \cdot in$

Effective Base Plate Width Resisting Bending from Transverse Bend Line = $B_{et} := D_{BC} \cdot sin(\theta) = 10.176 \cdot in$

Effective Base Plate Width Resisting Bending from Radial Bend Lines = $B_{er} := (D_{oe} - D_e) \cdot sin(\theta) = 1.601 \cdot in$

Total Effective Base Plate Width Resisting Bending = $B_{eff} := B_{et} + B_{er} = 11.777 \cdot in$

Required Base Plate Thickness = $t_{TP.Req} := \sqrt{\frac{4 \cdot P_u \cdot x}{\phi_b \cdot F_{yf} \cdot B_{eff}}} = 1.525 \cdot in$

Plate Bending Stress % of Capacity = $\frac{t_{TP.Req}}{t_{TP}} = 61.0 \cdot \%$

Condition2 = $Condition3 := if\left(\frac{t_{TP.Req}}{t_{TP}} < 1.00, \text{"Ok"}, \text{"Overstressed"}\right)$

Condition3 = "Ok"

Required Base Plate Thickness = $t_{TP.Req} := \frac{\phi_b \cdot t_T \cdot F_{yp}}{\phi_v \cdot 0.6 \cdot F_{yf}} = 1.463 \cdot in$

Plate Bending Stress % of Capacity = $\frac{t_{TP.Req}}{t_{TP}} = 58.5 \cdot \%$

Condition2 = $Condition4 := if\left(\frac{t_{TP.Req}}{t_{TP}} < 1.00, \text{"Ok"}, \text{"Overstressed"}\right)$

Condition4 = "Ok"

CENTEK engineering Centered on Solutions™ www.centekeng.com 63-2 North Branford Road P: (203) 488-0580 Branford, CT 06405 F: (203) 488-8587	Subject: Location: Rev. 0: 4/20/22	FOUNDATION ANALYSIS 130-ft Rohn Monopole Westbrook, CT Prepared by: T.J.L Checked by: C.F.C. Job no. 22022.15

Standard Monopole Foundation:

Input Data:

Tower Data

Overturning Moment =	$OM := 3990 \cdot ft \cdot kips$	(User Input)	
Shear Force =	$Shear := 43 \cdot kip$	(User Input)	
Axial Force =	$Axial := 64 \cdot kip$	(User Input)	
Tower Height =	$H_t := 130 \cdot ft$	(User Input)	

Footing Data:

Overall Depth of Footing =	$D_f := 6 \cdot ft$	(User Input)	
Length of Pier =	$L_p := 4.5 \cdot ft$	(User Input)	
Extension of Pier Above Grade =	$L_{pag} := 0.5 \cdot ft$	(User Input)	
Diameter of Pier =	$d_p := 8.25 \cdot ft$	(User Input)	
Thickness of Footing =	$T_f := 2 \cdot ft$	(User Input)	
Width of Footing =	$W_f := 32 \cdot ft$	(User Input)	

Anchor Bolt Data:

Length of Anchor Bolts=	$L_{st} := 84 \cdot in$	(User Input)	
Projection of Anchor Bolts Above Pier =	$A_{BP} := 12 \cdot in$	(User Input)	
Anchor Bolt Diameter =	$d_{anchor} := 2.25 \cdot in$	(User Input)	
Base Plate Bolt Circle =	$MP := 71.5 \cdot in$	(User Input)	

Material Properties:

Concrete Compressive Strength =	$f_c := 4500 \cdot psi$	(User Input)	
Steel Reinforcment Yield Strength =	$f_y := 60000 \cdot psi$	(User Input)	
Anchor Bolt Yield Strength =	$f_{ya} := 75000 \cdot psi$	(User Input)	
Internal Friction Angle of Soil =	$\Phi_s := 30 \cdot deg$	(User Input)	
Ultimate Soil Bearing Capacity =	$q_u := 12000 \cdot psf$	(User Input)	
Allowable Soil Bearing Capacity =	$q_a := \frac{q_u}{2} = 6000 \cdot psf$	(User Input)	
Unit Weight of Soil =	$\gamma_{soil} := 110 \cdot pcf$	(User Input)	
Unit Weight of Concrete =	$\gamma_{conc} := 150 \cdot pcf$	(User Input)	
Foundation Bouyancy =	$Bouyancy := 0$	(User Input)	(Yes=1 / No=0)
Depth to Neglect =	$n := 0 \cdot ft$	(User Input)	
Cohesion of Clay Type Soil =	$c := 0 \cdot ksf$	(User Input)	(Use 0 for Sandy Soil)
Seismic Zone Factor =	$Z := 2$	(User Input)	(UBC-1997 Fig 23-2)
Coefficient of Friction Between Concrete =	$\mu := 0.45$	(User Input)	

Pier Reinforcement:

Bar Size =	$BS_{pier} := 11$	(User Input)	
Bar Diameter =	$d_{bpier} := 1.41 \cdot in$	(User Input)	
Number of Bars =	$NB_{pier} := 38$	(User Input)	
Clear Cover of Reinforcement =	$Cvr_{pier} := 3 \cdot in$	(User Input)	
Reinforcement Location Factor =	$\alpha_{pier} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Coating Factor =	$\beta_{pier} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Concrete Strength Factor =	$\lambda_{pier} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Reinforcement Size Factor =	$\gamma_{pier} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Diameter of Tie =	$d_{Tie} := 3 \cdot in$	(User Input)	

Pad Reinforcement:

Bar Size =	$BS_{top} := 10$	(User Input)	(Top of Pad)
Bar Diameter =	$d_{btop} := 1.27 \cdot in$	(User Input)	(Top of Pad)
Number of Bars =	$NB_{top} := 62$	(User Input)	(Top of Pad)
Bar Size =	$BS_{bot} := 10$	(User Input)	(Bottom of Pad)
Bar Diameter =	$d_{bbot} := 1.27 \cdot in$	(User Input)	(Bottom of Pad)
Number of Bars =	$NB_{bot} := 62$	(User Input)	(Bottom of Pad)
Clear Cover of Reinforcement =	$Cvr_{pad} := 3.0 \cdot in$	(User Input)	
Reinforcement Location Factor =	$\alpha_{pad} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Coating Factor =	$\beta_{pad} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Concrete Strength Factor =	$\lambda_{pad} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Reinforcement Size Factor =	$\gamma_{pad} := 1.0$	(User Input)	(ACI-2008 12.2.4)

Calculated Factors:

Pier Reinforcement Bar Area = $A_{bpier} := \frac{\pi \cdot d_{bpier}^2}{4} = 1.561 \cdot in^2$

Pad Top Reinforcement Bar Area = $A_{btop} := \frac{\pi \cdot d_{btop}^2}{4} = 1.267 \cdot in^2$

Pad Bottom Reinforcement Bar Area = $A_{bbot} := \frac{\pi \cdot d_{bbot}^2}{4} = 1.267 \cdot in^2$

Coefficient of Lateral Soil Pressure = $K_p := \frac{1 + \sin(\Phi_s)}{1 - \sin(\Phi_s)} = 3$

Stability of Footing:

Adjusted Concrete Unit Weight = $\gamma_c := \text{if}(\text{Bouyancy} = 1, \gamma_{conc} - 62.4\text{pcf}, \gamma_{conc}) = 150 \cdot \text{pcf}$

Adjusted Soil Unit Weight = $\gamma_s := \text{if}(\text{Bouyancy} = 1, \gamma_{soil} - 62.4\text{pcf}, \gamma_{soil}) = 110 \cdot \text{pcf}$

Passive Pressure = $P_{pn} := K_p \cdot \gamma_s \cdot n + c \cdot 2 \cdot \sqrt{K_p} = 0 \cdot \text{ksf}$

$P_{pt} := K_p \cdot \gamma_s \cdot (D_f - T_f) + c \cdot 2 \cdot \sqrt{K_p} = 1.32 \cdot \text{ksf}$

$P_{top} := \text{if}\left[n < (D_f - T_f), P_{pt}, P_{pn}\right] = 1.32 \cdot \text{ksf}$

$P_{bot} := K_p \cdot \gamma_s \cdot D_f + c \cdot 2 \cdot \sqrt{K_p} = 1.98 \cdot \text{ksf}$

$P_{ave} := \dfrac{P_{top} + P_{bot}}{2} = 1.65 \cdot \text{ksf}$

$T_p := \text{if}\left[n < (D_f - T_f), T_f, (D_f - n)\right] = 2$

$A_p := W_f \cdot T_p = 64$

Ultimate Shear = $S_u := P_{ave} \cdot A_p = 105.6 \cdot \text{kip}$

Weight of Concrete Pad = $WT_c := \left[\left(W_f^{\,2} \cdot T_f\right) + d_p^{\,2} L_p\right] \cdot \gamma_c = 353.142 \cdot \text{kip}$

Weight of Soil Above Footing = $WT_{s1} := \left[\left(W_f^{\,2} - d_p^{\,2}\right) \cdot \left(\left|L_p - L_{pag} - n\right|\right)\right] \cdot \gamma_s = 420.61 \cdot \text{kip}$

Weight of Soil Wedge at Back Face = $WT_{s2} := \left(\dfrac{D_f^{\,2} \cdot \tan(\Phi_s)}{2} \cdot W_f\right) \cdot \gamma_s = 36.581 \cdot \text{kip}$

Weight of Soil Wedge at back face Corners = $WT_{s3} := 2 \cdot \left[(D_f)^3 \cdot \dfrac{\tan(\Phi_s)}{3}\right] \cdot \gamma_s = 9.145 \cdot \text{kips}$

Total Weight = $WT_{tot} := WT_c + WT_{s1} + \text{Axial} = 837.755 \cdot \text{kip}$

Resisting Weight = $WT_R := 0.9 \cdot WT_c + 0.75 \cdot WT_{s1} + 0.75 \cdot \text{Axial} = 681.287 \cdot \text{kip}$

Resisting Moment = $M_r := (WT_R) \cdot \dfrac{W_f}{2} + 0.75 \cdot S_u \cdot \dfrac{T_f}{3} + 0.75 \cdot \left[(WT_{s2} + WT_{s3}) \cdot \left(W_f + \dfrac{D_f \cdot \tan(\Phi_s)}{3}\right)\right] = 12090 \cdot \text{kip} \cdot \text{ft}$

Overturning Moment = $M_{ot} := OM + \text{Shear} \cdot (L_p + T_f) = 4270 \cdot \text{kip} \cdot \text{ft}$

Factor of Safety Actual = $FS := \dfrac{M_r}{M_{ot}} = 2.83$

Factor of Safety Required = $FS_{req} := 1$

OverTurning_Moment_Check := if$(FS \ge FS_{req}$, "Okay", "No Good")

OverTurning_Moment_Check = "Okay"

Shear Capacity in Pier:

Shear Resistance of Pier = $S_p := \frac{P_{ave} \cdot A_p + \mu \cdot WT_{tot}}{FS_{req}} = 482.59 \cdot kips$

Shear_Check := if(S_p > Shear, "Okay", "No Good")

Shear_Check = "Okay"

Bearing Pressure Caused by Footing:

Area of the Mat = $A_{mat} := W_f^{\,2} = 1.024 \times 10^3$

Section Modulus of Mat = $S := \frac{W_f^{\,3}}{6} = 5461.33 \cdot ft^3$

Maximum Pressure in Mat = $P_{max} := \frac{WT_{tot}}{A_{mat}} + \frac{M_{ot}}{S} = 1.6 \cdot ksf$

Max_Pressure_Check := if($P_{max} < .75 \cdot q_u$, "Okay", "No Good")

Max_Pressure_Check = "Okay"

Minimum Pressure in Mat = $P_{min} := \frac{WT_{tot}}{A_{mat}} - \frac{M_{ot}}{S} = 0.036 \cdot ksf$

Min_Pressure_Check := if[($P_{min} \geq 0$)·($P_{min} < .75 \cdot q_u$), "Okay", "No Good"]

Min_Pressure_Check = "Okay"

Distance to Resultant of Pressure Distribution = $X_p := \frac{P_{max}}{\frac{P_{max} - P_{min}}{W_f}} \cdot \frac{1}{3} = 10.915$

Distance to Kern = $X_k := \frac{W_f}{6} = 5.333$

Since Resultant Force is Not in Kern, Area to which Pressure is Applied Must be Reduced.

Eccentricity = $e := \frac{\frac{M_{ot}}{1.6}}{WT_{tot}} = 3.185$

Adjusted Soil Pressure = $P_a := \frac{2 \cdot WT_{tot}}{3 \cdot W_f \cdot \left(\frac{W_f}{2} - e\right)} = 1.362 \cdot ksf$

$q_{adj} :=$ if($P_{min} < 0, P_a, P_{max}$) = 1.6·ksf

Pressure_Check := if($q_{adj} < q_a$, "Okay", "No Good")

Pressure_Check = "Okay"

Concrete Bearing Capacity:

Strength Reduction Factor = $\Phi_c := 0.65$ (ACI-2008 9.3.2.2)

Bearing Strength Between Pier and Pad = $P_b := \Phi_c \cdot 0.85 \cdot f_c \cdot \frac{\pi \cdot d_p^{\,2}}{4} = 1.914 \times 10^4 \cdot kips$ (ACI-2008 10.14)

$\text{Bearing\_Check} := \text{if}\left(P_b > \text{Axial}, \text{"Okay"}, \text{"No Good"}\right)$

$\text{Bearing\_Check} = \text{"Okay"}$

Shear Strength of Concrete:

Beam Shear: (Critical section located at a distance d from the face of Pier) (ACI 11.3.1.1)

$\phi_c := 0.85$ (ACI 9.3.2.5)

$d := T_f - Cvr_{pad} - d_{bbot} = 1.644$

$d_1 := \frac{W_f}{2} - \frac{d_p}{2}$

$d_2 := d_1 - d$

$L := \left(\frac{W_f}{2} - e\right) \cdot 3$

$\text{Slope} := \text{if}\left(L > W_f, \frac{P_{max} - P_{min}}{W_f}, \frac{q_{adj}}{L}\right)$

$V_{req} := \left[\left(q_{adj} - \text{Slope} \cdot d_1\right) + \left(\frac{\text{Slope} \cdot d_1}{2}\right)\right] \cdot W_f \cdot d_1$

$V_{Avail} := \phi_c \cdot 2 \cdot \sqrt{f_c \cdot psi} \cdot W_f \cdot d$ (ACI-2008 11.2.1.1)

$\text{Beam\_Shear\_Check} := \text{if}\left(V_{req} < V_{Avail}, \text{"Okay"}, \text{"No Good"}\right)$

$\text{Beam\_Shear\_Check} = \text{"Okay"}$

Punching Shear: (Critical Section Located at a distance of d/2 from the face of pier) (ACI 11.11.1.2)

Critical Perimeter of Punching Shear = $b_o := \left(d_p + d\right) \cdot \pi = 31.1$

Area Included Inside Perimeter = $A_{bo} := \frac{\pi \cdot \left(d_p + d\right)^2}{4} = 76.9$

Area Outside of Perimeter = $A_{out} := A_{mat} - A_{bo} = 947.1$

Guess Value = $v_u := 1ksf$ (From "Foundation Analysis and design", By Joseph Bowles, Eq. 8-9)

Given $d^2 + d_p \cdot d = \frac{WT_{tot}}{\pi \cdot v_u}$

$v_u := Find(v_u) = 16.4 \cdot ksf$

$V_u := v_u \cdot d \cdot W_f = 862.5 \cdot kips$

Required Shear Strength = $V_{req} := V_u = 862.5 \cdot kips$

Available Shear Strength = $V_{Avail} := \phi_c \cdot 4 \cdot \sqrt{f_c \cdot psi} \cdot b_o \cdot d = 1678.5 \cdot kip$ (ACI-2008 11.11.2.1)

Punching_Shear_Check := if($V_{req} < V_{Avail}$, "Okay", "No Good")

Punching_Shear_Check = "Okay"

Steel Reinforcement in Pad:

Required Reinforcement for Bending:

Strength Reduction Factor = $\phi_m := .90$ (ACI-2008 9.3.2.1)

$q_b := q_{adj} - d_1 \cdot Slope = 1.02 \cdot ksf$

Maximum Bending at Face of Pier = $M_n := \frac{1}{\phi_m} \cdot \left[(q_{adj} - q_b) \cdot \frac{d_1^{\,2}}{3} + q_b \cdot \frac{d_1^{\,2}}{2} \right] \cdot W_f = 3526 \cdot kip \cdot ft$

$$\beta := \begin{cases} 0.85 & \text{if } 2500 \cdot psi \le f_c \le 4000 \cdot psi \\ 0.65 & \text{if } f_c > 8000 \cdot psi \\ \left[0.85 - \left[\frac{\left(\frac{f_c}{psi} - 4000 \right)}{1000} \right] \cdot 0.5 \right] & \text{otherwise} \end{cases} = 0.6$$

(ACI-2008 10.2.7.3)

$R_n := \frac{M_n}{W_f \cdot d^2} = 283.1 \cdot psi$

$\rho := \frac{0.85 \cdot f_c}{f_y} \left(1 - \sqrt{1 - \frac{2 \cdot R_n}{0.85 \cdot f_c}} \right) = 0.0049$

$\rho_{min} := \rho = 0.00491$

Required Reinforcement for Temperature and Shrinkage:

$$\rho_{sh} := \begin{cases} .0018 & \text{if } f_y \ge 60000 \cdot psi \\ .0020 & \text{otherwise} \end{cases}$$ (ACI -2008 7.12.2.1)

Check Bottom Bars:

$$As := \begin{cases} \rho_{min} \cdot W_f \cdot d & \text{if } \rho_{min} > \frac{\rho_{sh}}{2} \\ \rho_{sh} \cdot W_f \cdot \frac{d}{2} & \text{otherwise} \end{cases} = 37.173 \cdot in^2$$

$$As_{prov.bot} := A_{bbot} \cdot NB_{bot} = 78.5 \cdot in^2$$

Pad_Reinforcement_Bot := if$(As_{prov.bot} > As, \text{"Okay"}, \text{"No Good"})$

Pad_Reinforcement_Bot = "Okay"

Check Temp Shrinkage Reinforcement:

$$As := \rho_{sh} \cdot (W_f \cdot T_f) = 16.6 \cdot in^2$$

$$As_{prov.top} := A_{btop} \cdot NB_{top} = 78.5 \cdot in^2$$

$$As_{prov.tot} := As_{prov.bot} + As_{prov.top} = 157.1 \cdot in^2$$

Pad_Reinforcement_Temp := if$(As_{prov.tot} > As, \text{"Okay"}, \text{"No Good"})$

Pad_Reinforcement_Temp = "Okay"

Developement Length Pad Reinforcement:

Bar Spacing =

$$B_{sPad} := \frac{W_f - 2 \cdot Cvr_{pad} - NB_{bot} \cdot d_{bbot}}{NB_{bot} - 1} = 4.91 \cdot in$$

Spacing or Cover Dimension =

$$c := if\left(Cvr_{pad} < \frac{B_{sPad}}{2}, Cvr_{pad}, \frac{B_{sPad}}{2}\right) = 2.453 \cdot in$$

Transverse Reinforcement Index =

$$k_{tr} := 0$$ (ACI-2008 12.2.3)

$$L_{dbt} := \frac{3 \cdot f_y \alpha_{pad} \cdot \beta_{pad} \cdot \gamma_{pad} \cdot \lambda_{pad}}{40 \cdot \sqrt{f_c \cdot psi} \cdot \frac{c + k_{tr}}{d_{bbot}}} \cdot d_{bbot} = 44.1 \cdot in$$

Minimum Development Length =

$$L_{dbmin} := 12 \cdot in$$ (ACI-2008 12.2.1)

$L_{dbtCheck}$:= if$(L_{dbt} \ge L_{dbmin}, \text{"Use L.dbt"}, \text{"Use L.dbmin"})$

Available Length in Pad =

$$L_{Pad} := \frac{W_f}{2} - \frac{d_p}{2} - Cvr_{pad} = 139.5 \cdot in$$

Lpad_Check := if$(L_{Pad} > L_{dbt}, \text{"Okay"}, \text{"No Good"})$

Lpad_Check = "Okay"

Steel Reinforcement in Pier:

Area of Pier = $A_p := d_p^2 = 9801 \cdot in^2$

$A_{smin} := 0.01 \cdot 0.5 \cdot A_p = 49.01 \cdot in^2$ (ACI-2008 10.8.4 & 10.9.1)

$A_{sprov} := NB_{pier} \cdot A_{bpier} = 59.34 \cdot in^2$

Steel_Area_Check := if($A_{sprov} > A_{smin}$, "Okay", "No Good")

Steel_Area_Check = "Okay"

NOTE: Anchor Bolts are not accounted for in reinforcement calculation and will provide additional reinforcement to satisfy minimum requirement of steel.

Bar Spacing In Pier = $B_{sPier} := \frac{d_p \cdot \pi}{NB_{pier}} - d_{bpier} = 6.775 \cdot in$

Diameter of Reinforcement Cage = $Diam_{cage} := d_p - 2 \cdot Cvr_{pier} = 93 \cdot in$

Maximum Moment in Pier = $M_p := \left[OM + Shear \cdot \left(L_p + \frac{A_{BP}}{2}\right)\right] = 50460 \cdot in \cdot kips$

Pier Check evaluated from outside program and results are listed below;

$$\left(D \;\; N \;\; n \;\; P_u \;\; M_{xu}\right) := \left(d_p \cdot 12 \;\; NB_{pier} \;\; BS_{pier} \;\; \frac{Axial \cdot 1.333}{kips} \;\; \frac{M_p}{in \cdot kips}\right)$$

$$\left(D \;\; N \;\; n \;\; P_u \;\; M_{xu}\right) = (99 \;\; 38 \;\; 11 \;\; 85.3 \;\; 50460)$$

$$\left(\phi P_n \;\; \phi M_{xn} \;\; f_{sp} \;\; \rho\right) := (0 \;\; 0 \;\; 0 \;\; 0)$$

$$\left(\phi P_n \;\; \phi M_{xn} \;\; f_{sp} \;\; \rho\right) := \phi P'_n\left(D, N, n, P_u, M_{xu}\right)^T$$

$$\left(\phi P_n \;\; \phi M_{xn} \;\; f_{sp} \;\; \rho\right) = \left(228.8 \;\; 1.4 \times 10^5 \;\; -60 \;\; 0\right)$$

Axial_Load_Check := if($\phi P_n \ge P_u$, "Okay", "No Good")

Axial_Load_Check = "Okay"

Bending_Check := if($\phi M_{xn} \ge M_{xu}$, "Okay", "No Good")

Bending_Check = "Okay"

Development Length Pier Reinforcement:

Available Length in Foundation:

$L_{pier} := L_p - Cvr_{pier} = 51 \cdot in$

$L_{pad} := T_f - Cvr_{pad} = 21 \cdot in$

Tension: (ACI-2008 12.2.3)

Spacing or Cover Dimension = $c := if\left(Cvr_{pier} < \frac{B_{sPier}}{2}, Cvr_{pier}, \frac{B_{sPier}}{2}\right) = 3 \cdot in$

Transverse Reinforcement = $k_{tr} := 0$ (ACI-2008 12.2.3)

$$L_{dbt} := \frac{3 \cdot f_y \alpha_{pier} \cdot \beta_{pier} \cdot \gamma_{pier} \cdot \lambda_{pier}}{40 \cdot \sqrt{f_c \cdot psi} \cdot \left(\frac{c + k_{tr}}{d_{bpier}}\right)} \cdot d_{bpier} = 44.46 \cdot in$$

Minimum Development Length = $L_{dh} := \frac{1200 \cdot d_{bpier}}{\sqrt{\frac{f_c}{psi}}} \cdot .7 = 17.656 \cdot in$ (ACI 12.2.1)

Pier reinforcement bars are standard 90 degree hooks and therefore developement in the pad is computed as follows:

$L_{db} := max(L_{dbt}, L_{dbmin})$

$L_{tension\_Check} := if(L_{pier} + L_{pad} > L_{dbt}, \text{"Okay"}, \text{"No Good"})$

$L_{tension\_Check} = \text{"Okay"}$

Compression: (ACI-2008 12.3.2)

$$L_{dbc1} := \frac{.02 \cdot d_{bpier} \cdot f_y}{\sqrt{f_c \cdot psi}} = 25.223 \cdot in$$

$L_{dbmin} := 0.0003 \cdot \frac{in^2}{lb} \cdot (d_{bpier} \cdot f_y) = 25.38 \cdot in$

$L_{dbc} := if(L_{dbc1} \geq L_{dbmin}, L_{dbc1}, L_{dbmin}) = 25.38 \cdot in$

$L_{compression\_Check} := if(L_{pier} + L_{pad} > L_{dbc}, \text{"Okay"}, \text{"No Good"})$

$L_{compression\_Check} = \text{"Okay"}$

RAN Template: 67D5D998E 6160	A&L Template: 67D5998E_1xAIR+1OP

CTHA524A_Anchor_4

Print Name: Preliminary (RFDS_For_Scoping)
PORs: Anchor_Phase 3

Section 1 - Site Information

Site ID: CTHA524A
Status: Final
Version: 4
Project Type: Anchor
Approved: 3/7/2022 8:36:48 AM
Approved By: Pratik.Patil30@T-Mobile.com
Last Modified: 3/7/2022 8:36:48 AM
Last Modified By: Pratik.Patil30@T-Mobile.com

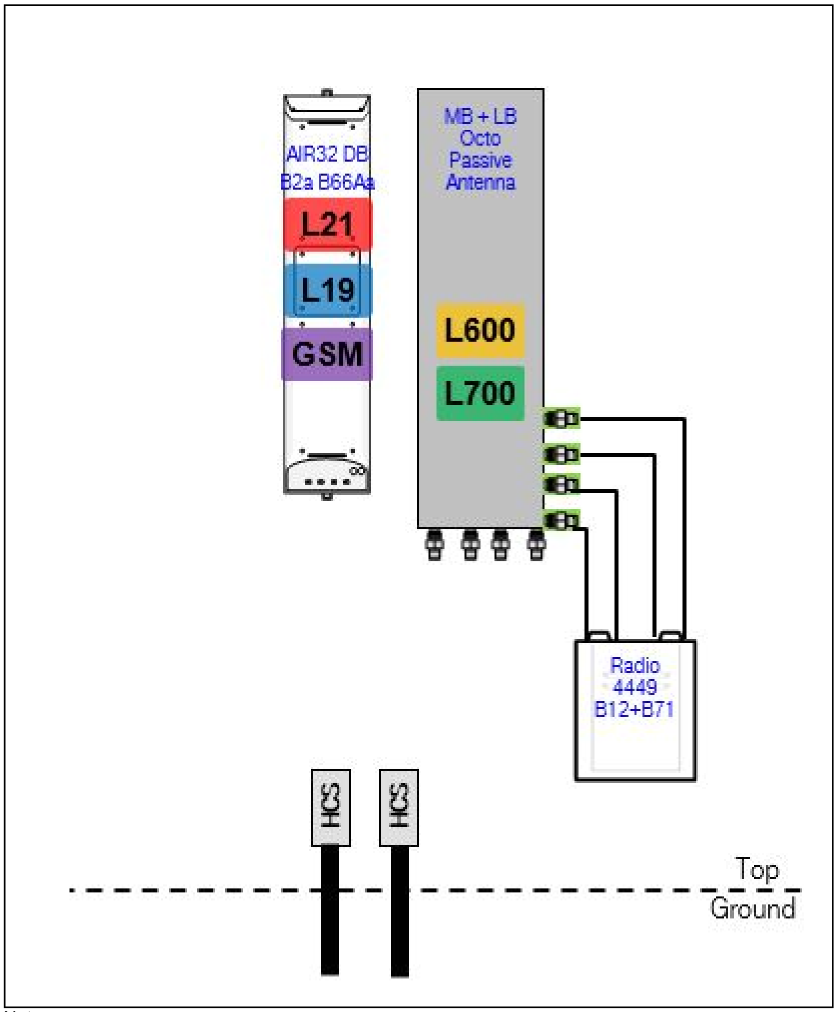
Site Name: CTHA524A
Site Class: Monopole
Site Type: Structure Non Building
Plan Year: 2022
Market: CONNECTICUT CT
Vendor: Ericsson
Landlord: <undefined>

Latitude: 41.28180000
Longitude: -72.43750000
Address: 1542 Boston Post Rd
City, State: Westbrook, CT
Region: NORTHEAST

RAN Template: 67D5D998E 6160	AL Template: 67D5998E_1xAIR+1OP			
Sector Count: 3	Antenna Count: 6	Coax Line Count: 0	TMA Count: 0	RRU Count: 6

Section 2 - Existing Template Images

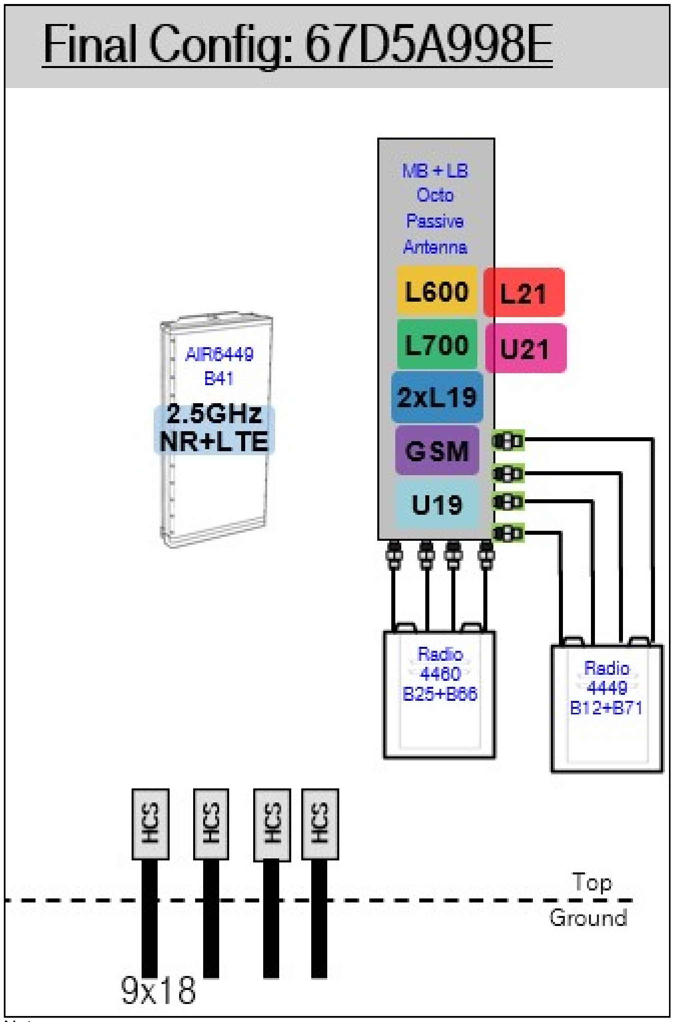
67D97DB.JPG



Notes:

Section 3 - Proposed Template Images

67D5A998E.jpg



Notes:

Section 4 - Siteplan Images

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

RAN Template:	A&L Template:
67D5D998E 6160	67D5998E_1xAIR+1OP

CTHA524A_Anchor_4

Print Name: Preliminary (RFDS_For_Scoping)
PORs: Anchor_Phase 3

Section 5 - RAN Equipment

Existing RAN Equipment

Template: 67D97DB3 6160

Enclosure	1	2
Enclosure Type	Enclosure 6160 AC V1	B160
Baseband	DUG20 (G1900); BB 6630 (L2100, L1900); BB 6630 (L700, L600, N600)	
Hybrid Cable System	Ericsson 6x12 HCS *Select Length & AWG* **(x 2)**	

Proposed RAN Equipment

Template: 67D5D998E 6160

Enclosure	1	2
Enclosure Type	Enclosure 6160 AC V1	B160
Baseband	BB 6630 (L700, L600, N600); RP 6651 (L2500, N2500); DUG20 (G1900); BB 6630 (L2100, L1900)	
Hybrid Cable System	PSU 4813 vR4A (Kit); Ericsson Hybrid Trunk 6/24 4AWG 50m; Ericsson 6x12 HCS *Select Length & AWG* **(x 2)**	
Transport System	CSR IXRe V2 (Gen2)	

RAN Scope of Work:

Upgrade breaker to 150A for 6160.

Add (1) iXRe Router to new Enclosure 6160.

Add (1) RP 6651 for L2500/N2500 to new Enclosure 6160.

Add (1) PSU4813 Voltage Booster to new Enclosure 6160.

Add (1) Battery Cabinet B160.

Existing : (2) 6x12,

Remove all Coax,

Add (1) 6X24 HCS terminating at the Enclosure 6160. Connect DC for the AIR6419 B41 to the PSU4813 Voltage Booster.

RAN Template:	A&L Template:
67D5D998E 6160	67D5998E_1xAIR+1OP

CTHA524A_Anchor_4

Print Name: Preliminary (RFDS_For_Scoping)
PORs: Anchor_Phase 3

Section 6 - A&L Equipment

Existing Template: 67D97DB_1xAIR+1OP
Proposed Template: 67D5998E_1xAIR+1OP

Sector 1 (Existing) view from behind

Coverage Type	A - Outdoor Macro							
Antenna	1				2			
Antenna Model	Ericsson - AIR32 KRD901146-1_B66A_B2A (Octo)				RFS - APXVAARR24_43-U-NA20 (Octo)			
Azimuth	85				85			
M. Tilt	0				0			
Height	110				110			
Ports	P1	P2	P3	P4	P5	P6	P7	P8
Active Tech.	L2100	L2100	L1900 G1900	L1900 G1900	L700 L600 N600	L700 L600 N600		
Dark Tech.								
Restricted Tech.								
Decomm. Tech.								
E. Tilt	2	2	2	2	2	2		
Cables					Coax Jumper **(x2)**	Coax Jumper **(x2)**		
TMAs								
Diplexers / Combiners								
Radio					Radio 4449 B71+B85 (At Antenna)	SHARED Radio 4449 B71+B85 (At Antenna)		
Sector Equipment								

Unconnected Equipment:

Scope of Work:

This is a new tower. Must order everything new.

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

RAN Template:	A&L Template:
67D5D998E 6160	67D5998E_1xAIR+1OP

CTHA524A_Anchor_4

Print Name: Preliminary (RFDS_For_Scoping)
PORs: Anchor_Phase 3

Sector 1 (Proposed) view from behind

Coverage Type	A - Outdoor Macro					
Antenna	1		2			
Antenna Model	AIR 6419 B41 (Active Antenna - Massive MIMO)		RFS - APXVAARR24_43-U-NA20 (Octo)			
Azimuth	85		85			
M. Tilt	0		0			
Height	110		110			
Ports	P1	P2	P3	P4	P5	P6
Active Tech.	L2500 N2500	L2500 N2500	L700 L600 N600	L700 L600 N600	L2100 L1900 G1900	L2100 L1900 G1900
Dark Tech.						
Restricted Tech.						
Decomm. Tech.						
E. Tilt	2	2	2	2	2	2
Cables	Fiber Jumper **(x4)**	Fiber Jumper **(x4)**	Coax Jumper **(x4)** Fiber Jumper	Coax Jumper **(x4)** Fiber Jumper	Coax Jumper **(x4)** Fiber Jumper	Coax Jumper **(x4)** Fiber Jumper
TMAs						
Diplexers / Combiners						
Radio			Radio 4449 B71+B85 (At Antenna)	SHARED Radio 4449 B71+B85 (At Antenna)	Radio 4460 B25+B66 (At Antenna)	SHARED Radio 4460 B25+B66 (At Antenna)
Sector Equipment						

Unconnected Equipment:

Scope of Work:

There will be two antennae per sector.

Remove all TMAs.

Remove all diplexers.

Remove all Coaxial Lines.

Replace AAIR32 with (1) AIR6419 B41 for L2500 and N2500 in Position 1.

Add (1) Radio 4460 B25+B66 for L2100, L1900 (Both carriers), and GSM to Position 2 at antenna.

Ensure RET control is enabled for all technology layers according to the Design Documents

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

RAN Template: 67D5D998E 6160	A&L Template: 67D5998E_1xAIR+1OP

CTHA524A_Anchor_4

Print Name: Preliminary (RFDS_For_Scoping)
PORs: Anchor_Phase 3

Sector 2 (Existing) view from behind

Coverage Type	A - Outdoor Macro							
Antenna	1				2			
Antenna Model	Ericsson - AIR32 KRD901146-1_B66A_B2A (Octo)				RFS - APXVAARR24_43-U-NA20 (Octo)			
Azimuth	260				260			
M. Tilt	0				0			
Height	110				110			
Ports	P1	P2	P3	P4	P5	P6	P7	P8
Active Tech.	L2100	L2100	L1900 G1900	L1900 G1900	L700 L600 N600	L700 L600 N600		
Dark Tech.								
Restricted Tech.								
Decomm. Tech.								
E. Tilt	2	2	2	2	2	2		
Cables					Coax Jumper **(x2)**	Coax Jumper **(x2)**		
TMAs								
Diplexers / Combiners								
Radio					Radio 4449 B71+B85 (At Antenna)	SHARED Radio 4449 B71+B85 (At Antenna)		
Sector Equipment								

Unconnected Equipment:

Scope of Work:

This is a new tower. Must order everything new.

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

RAN Template:	A&L Template:
67D5D998E 6160	67D5998E_1xAIR+1OP

CTHA524A_Anchor_4

Print Name: Preliminary (RFDS_For_Scoping)
PORs: Anchor_Phase 3

Sector 2 (Proposed) view from behind

Coverage Type	A - Outdoor Macro					
Antenna	1		2			
Antenna Model	AIR 6419 B41 (Active Antenna - Massive MIMO)		RFS - APXVAARR24_43-U-NA20 (Octo)			
Azimuth	260		260			
M. Tilt	0		0			
Height	110		110			
Ports	P1	P2	P3	P4	P5	P6
Active Tech.	L2500 N2500	L2500 N2500	L700 L600 N600	L700 L600 N600	L2100 L1900 G1900	L2100 L1900 G1900
Dark Tech.						
Restricted Tech.						
Decomm. Tech.						
E. Tilt	2	2	2	2	2	2
Cables	Fiber Jumper **(x4)**	Fiber Jumper **(x4)**	Coax Jumper **(x4)** Fiber Jumper	Coax Jumper **(x4)** Fiber Jumper	Coax Jumper **(x4)** Fiber Jumper	Coax Jumper **(x4)** Fiber Jumper
TMAs						
Diplexers / Combiners						
Radio			Radio 4449 B71+B85 (At Antenna)	SHARED Radio 4449 B71+B85 (At Antenna)	Radio 4460 B25+B66 (At Antenna)	SHARED Radio 4460 B25+B66 (At Antenna)
Sector Equipment						

Unconnected Equipment:

Scope of Work:

There will be two antennae per sector.

Remove all TMAs.

Remove all diplexers.

Remove all Coaxial Lines.

Replace AAIR32 with (1) AIR6419 B41 for L2500 and N2500 in Position 1.

Add (1) Radio 4460 B25+B66 for L2100, L1900 (Both carriers), and GSM to Position 2 at antenna.

Ensure RET control is enabled for all technology layers according to the Design Documents

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

RAN Template: 67D5D998E 6160	A&L Template: 67D5998E_1xAIR+1OP

CTHA524A_Anchor_4

Print Name: Preliminary (RFDS_For_Scoping)
PORs: Anchor_Phase 3

Sector 3 (Existing) view from behind								
Coverage Type	A - Outdoor Macro							
Antenna	1				2			
Antenna Model	Ericsson - AIR32 KRD901146-1_B66A_B2A (Octo)				RFS - APXVAARR24_43-U-NA20 (Octo)			
Azimuth	325				325			
M. Tilt	0				0			
Height	110				110			
Ports	P1	P2	P3	P4	P5	P6	P7	P8
Active Tech.	L2100	L2100	L1900 G1900	L1900 G1900	L700 L600 N600	L700 L600 N600		
Dark Tech.								
Restricted Tech.								
Decomm. Tech.								
E. Tilt	2	2	2	2	2	2		
Cables					Coax Jumper **(x2)**	Coax Jumper **(x2)**		
TMAs								
Diplexers / Combiners								
Radio					Radio 4449 B71+B85 (At Antenna)	SHARED Radio 4449 B71+B85 (At Antenna)		
Sector Equipment								

Unconnected Equipment:

Scope of Work:

This is a new tower. Must order everything new.

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

RAN Template:	A&L Template:
67D5D998E 6160	67D5998E_1xAIR+1OP

CTHA524A_Anchor_4

Print Name: Preliminary (RFDS_For_Scoping)
PORs: Anchor_Phase 3

Sector 3 (Proposed) view from behind

Coverage Type	A - Outdoor Macro					
Antenna	1		2			
Antenna Model	AIR 6419 B41 (Active Antenna - Massive MIMO)		RFS - APXVAARR24_43-U-NA20 (Octo)			
Azimuth	325		325			
M. Tilt	0		0			
Height	110		110			
Ports	P1	P2	P3	P4	P5	P6
Active Tech.	L2500 N2500	L2500 N2500	L700 L600 N600	L700 L600 N600	L2100 L1900 G1900	L2100 L1900 G1900
Dark Tech.						
Restricted Tech.						
Decomm. Tech.						
E. Tilt	2	2	2	2	2	2
Cables	Fiber Jumper **(x4)**	Fiber Jumper **(x4)**	Coax Jumper **(x4)** Fiber Jumper	Coax Jumper **(x4)** Fiber Jumper	Coax Jumper **(x4)** Fiber Jumper	Coax Jumper **(x4)** Fiber Jumper
TMAs						
Diplexers / Combiners						
Radio			Radio 4449 B71+B85 (At Antenna)	SHARED Radio 4449 B71+B85 (At Antenna)	Radio 4460 B25+B66 (At Antenna)	SHARED Radio 4460 B25+B66 (At Antenna)
Sector Equipment						

Unconnected Equipment:

Scope of Work:

There will be two antennae per sector.

Remove all TMAs.

Remove all diplexers.

Remove all Coaxial Lines.

Replace AAIR32 with (1) AIR6419 B41 for L2500 and N2500 in Position 1.

Add (1) Radio 4460 B25+B66 for L2100, L1900 (Both carriers), and GSM to Position 2 at antenna.

Ensure RET control is enabled for all technology layers according to the Design Documents

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

RAN Template:	A&L Template:
67D5D998E 6160	67D5998E_1xAIR+1OP

CTHA524A_Anchor_4

Print Name: Preliminary (RFDS_For_Scoping)
PORs: Anchor_Phase 3

Section 7 - Power Systems Equipment

	Existing Power Systems Equipment
Enclosure	**1**
Enclosure Type	Enclosure 6160 AC V1
Baseband	DUG20 (G1900); BB 6630 (L2100, L1900); BB 6630 (L700, L600, N600)
Hybrid Cable System	Ericsson 6x12 HCS *Select Length & AWG* **(x 2)**

	Proposed Power Systems Equipment
Enclosure	**1**
Enclosure Type	Enclosure 6160 AC V1

EBI Consulting

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

T-Mobile Existing Facility

Site ID: CTHA524A

1542 Boston Post Road
Westbrook, Connecticut 06498

May 5, 2022

EBI Project Number: 6222002980

Site Compliance Summary	
Compliance Status:	**COMPLIANT**
Site total MPE% of FCC general population allowable limit:	**43.66%**

May 5, 2022

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

Emissions Analysis for Site: CTHA524A

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **1542 Boston Post Road** in **Westbrook, 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 1542 Boston Post Road in Westbrook, Connecticut using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since T-Mobile is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufacturer's supplied specifications, minus 10 dB for directional panel antennas and 20 dB for highly focused parabolic microwave dishes, was focused at the base of the tower. For this report, the sample point is the top of a 6-foot person standing at the base of the tower.

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

1) 2 LTE channels (600 MHz Band) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

2) 1 NR channel (600 MHz Band) was considered for each sector of the proposed installation. This Channel has a transmit power of 80 Watts.

3) 2 LTE channels (700 MHz Band) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

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

5) 2 LTE channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.

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

7) 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 Ericsson AIR 6419 for the 2500 MHz / 2500 MHz / 2500 MHz / 2500 MHz channel(s), the RFS APXVAARR24_43-U-NA20 for the 600 MHz / 600 MHz / 700 MHz / 1900 MHz / 1900 MHz / 2100 MHz channel(s) in Sector A, the Ericsson AIR 6419 for the 2500 MHz / 2500 MHz / 2500 MHz / 2500 MHz channel(s), the RFS APXVAARR24_43-U-NA20 for the 600 MHz / 600 MHz / 700 MHz / 1900 MHz / 1900 MHz / 2100 MHz channel(s) in Sector B, the Ericsson AIR 6419 for the 2500 MHz / 2500 MHz / 2500 MHz / 2500 MHz channel(s), the RFS APXVAARR24_43-U-NA20 for the 600 MHz / 600 MHz / 700 MHz / 1900 MHz / 1900 MHz / 2100 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 104 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:	Ericsson AIR 6419	Make / Model:	Ericsson AIR 6419	Make / Model:	Ericsson AIR 6419
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:	22.05 dBd / 15.55 dBd / 22.05 dBd / 15.55 dBd	Gain:	22.05 dBd / 15.55 dBd / 22.05 dBd / 15.55 dBd	Gain:	22.05 dBd / 15.55 dBd / 22.05 dBd / 15.55 dBd
Height (AGL):	104 feet	Height (AGL):	104 feet	Height (AGL):	104 feet
Channel Count:	4	Channel Count:	4	Channel Count:	4
Total TX Power (W):	240.00 Watts	Total TX Power (W):	240.00 Watts	Total TX Power (W):	240.00 Watts
ERP (W):	31,011.95	ERP (W):	31,011.95	ERP (W):	31,011.95
Antenna A1 MPE %:	**11.61%**	Antenna B1 MPE %:	**11.61%**	Antenna C1 MPE %:	**11.61%**
Antenna #:	**2**	Antenna #:	**2**	Antenna #:	**2**
Make / Model:	RFS APXVAARR24_43-U-NA20	Make / Model:	RFS APXVAARR24_43-U-NA20	Make / Model:	RFS APXVAARR24_43-U-NA20
Frequency Bands:	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 / 13.35 dBd / 15.65 dBd / 15.65 dBd / 16.35 dBd	Gain:	12.95 dBd / 12.95 dBd / 13.35 dBd / 15.65 dBd / 15.65 dBd / 16.35 dBd	Gain:	12.95 dBd / 12.95 dBd / 13.35 dBd / 15.65 dBd / 15.65 dBd / 16.35 dBd
Height (AGL):	104 feet	Height (AGL):	104 feet	Height (AGL):	104 feet
Channel Count:	13	Channel Count:	13	Channel Count:	13
Total TX Power (W):	560.00 Watts	Total TX Power (W):	560.00 Watts	Total TX Power (W):	560.00 Watts
ERP (W):	18,052.03	ERP (W):	18,052.03	ERP (W):	18,052.03
Antenna A2 MPE %:	**8.86%**	Antenna B2 MPE %:	**8.86%**	Antenna C2 MPE %:	**8.86%**

Site Composite MPE %	
Carrier	**MPE %**
T-Mobile (Max at Sector A):	20.47%
AT&T	6.85%
Verizon	16.34%
Site Total MPE % :	43.66%

T-Mobile MPE % Per Sector	
T-Mobile Sector A Total:	20.47%
T-Mobile Sector B Total:	20.47%
T-Mobile Sector C Total:	20.47%
Site Total MPE % :	43.66%

T-Mobile Maximum MPE Power Values (Sector A)

T-Mobile Frequency Band / Technology (Sector A)	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density (µW/cm²)	Frequency (MHz)	Allowable MPE (µW/cm²)	Calculated % MPE
T-Mobile 2500 MHz LTE 1C & 2C Traffic	1	9619.47	104.0	36.01	2500 MHz LTE 1C & 2C Traffic	1000	3.60%
T-Mobile 2500 MHz LTE 1C & 2C Broadcast	1	717.84	104.0	2.69	2500 MHz LTE 1C & 2C Broadcast	1000	0.27%
T-Mobile 2500 MHz NR Traffic	1	19238.94	104.0	72.02	2500 MHz NR Traffic	1000	7.20%
T-Mobile 2500 MHz NR Broadcast	1	1435.69	104.0	5.37	2500 MHz NR Broadcast	1000	0.54%
T-Mobile 600 MHz LTE	2	591.73	104.0	4.43	600 MHz LTE	400	1.11%
T-Mobile 600 MHz NR	1	1577.94	104.0	5.91	600 MHz NR	400	1.48%
T-Mobile 700 MHz LTE	2	648.82	104.0	4.86	700 MHz LTE	467	1.04%
T-Mobile 1900 MHz GSM	4	1101.85	104.0	16.50	1900 MHz GSM	1000	1.65%
T-Mobile 1900 MHz LTE	2	2203.69	104.0	16.50	1900 MHz LTE	1000	1.65%
T-Mobile 2100 MHz LTE	2	2589.11	104.0	19.38	2100 MHz LTE	1000	1.94%
						Total:	**20.47%**

• 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:	20.47%
Sector B:	20.47%
Sector C:	20.47%
T-Mobile Maximum MPE % (Sector A):	20.47%
Site Total:	43.66%
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **43.66%** 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.