INDUSTRIAL AVE,
TTE 3
AHWAH NJ 07430

ONE: 201.684.0055
X: 201.684.0066

Transcend Wireless

August 13, 2021

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

RE: Notice of Exempt Modification
100 Filley Street, Bloomfield, CT 06002
Latitude: 41.5163684
Longitude: -72.425463
T-Mobile Site#: CT11000A - Anchor

Dear Ms. Bachman:

T-Mobile currently maintains six (6) antennas at the 95' level and three (3) antennas at the 93' level of the 93' monopole located at 100 Filley Street in Bloomfield, CT. The monopole is owned by T-Mobile and the property is owned by FJS Properties LLC. T-Mobile now intends to replace three (3) of its existing antennas with three (3) L2500/N2500 antennas. The new antennas would be installed at the same 95' level of the tower. The new antennas support 5G services.

Planned Modifications:
Tower:
Install New:
(3) Ericsson AIR6449 B41 Antennas
(3) Radio 4460 B25/B66
(3) 6 x 24 HCS Cables

Existing to Remain:
(3) APXVAARR24-43-U-NA20 Antennas
(3) Ericsson AIR 32 KRD901146-1 B66A B2A Antennas
(3) Radio 4449 B71 B85

To Be Removed:
(3) RFS APX16DWV S E A20 Antennas
(6) TMAs

(3) Existing HCS Cables
(6) Existing Coax Cables

Ground Work:
Install (1) 6160 Equipment Cabinet, (1) Battery Cabinet B160, (2) 3' x 2' Concrete Pads, (1) Emerson Cabinet
Remove (1) RBS 3106 Equipment Cabinet

This tower was originally approved by the Town of Bloomfield Zoning Board of Appeals on June 2, 1997. The approval was given without 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 Mayor Suzette Debeatham-Brown, Elected Official, and Jose Giner, Director of Planning and Zoning, as well as the property and tower 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: Suzette Debeatham-Brown - Mayor of Bloomfield
Jose Giner - Director of Planning and Zoning
FJS Properties LLC - Property Owner
T-Mobile Northeast LLC - Tower Owner

ERIC BREUN
2016587728
10 INDUSTRIAL AVE
MAHWAH NJ 07430

1 LBS

1 OF 1

SHIP TO:
DIRECTOR OF PLANNING AND ZONING
JOSE GINER
800 BLOOMFIELD AVENUE
BLOOMFIELD CT 06002

CT 060 9-02

UPS GROUND

TRACKING #: 1Z V25 742 03 9605 5095

BILLING: P/P

Reference #1: CT11000A

XOL 21.07.05 NV45 32.0A 08/2021*

ERIC BREUN
2016587728
10 INDUSTRIAL AVE
MAHWAH NJ 07430

1 LBS

1 OF 1

SHIP TO:
MAYOR SUZETTE DEBEATHAM-BROWN
800 BLOOMFIELD AVENUE
BLOOMFIELD CT 06002

CT 060 9-02

UPS GROUND

TRACKING #: 1Z V25 742 03 9158 1838

BILLING: P/P

Reference #1: CT11000A

XOL 21.07.05 NV45 32.0A 08/2021*

ERIC BREUN
2016587728
10 INDUSTRIAL AVE
MAHWAH NJ 07430

1 LBS

1 OF 1

SHIP TO:
T-MOBILE LEASING
35 GRIFFIN ROAD SOUTH
BLOOMFIELD CT 06002

CT 060 9-02

UPS GROUND

TRACKING #: 1Z V25 742 03 9226 1851

BILLING: P/P

Reference #1: CT11000A

XOL 21.07.05 NV45 32.0A 08/2021*

ERIC BREUN
2016587728
10 INDUSTRIAL AVE
MAHWAH NJ 07430

1 LBS

1 OF 1

SHIP TO:
FJS PROPERTIES LLC
19 EAST DUDLEY TOWN ROAD
BLOOMFIELD CT 06002

CT 060 9-02

UPS GROUND

TRACKING #: 1Z V25 742 03 9431 9849

BILLING: P/P

Reference #1: CT11000A

XOL 21.07.05 NV45 32.0A 08/2021*

Hello, your package has been delivered.

Delivery Date: Thursday, 08/12/2021

Delivery Time: 10:03 AM

Left At: RECEIVER

Signed by: TEUBNER

TRANSCEND WIRELESS

Tracking Number:	1ZV257420391581838
Ship To:	MAYOR SUZETTE DEBEATHAM-BROWN 800 BLOOMFIELD AVENUE BLOOMFIELD, CT 06002 US
Number of Packages:	1
UPS Service:	UPS Ground
Package Weight:	1.0 LBS
Reference Number:	CT11000A

Hello, your package has been delivered.

Delivery Date: Thursday, 08/12/2021

Delivery Time: 10:04 AM

Left At: RECEIVER

Signed by: TEUBNER

TRANSCEND WIRELESS

Tracking Number:	1ZV257420396055095
Ship To:	JOSE GINER 800 BLOOMFIELD AVENUE BLOOMFIELD, CT 06002 US
Number of Packages:	1
UPS Service:	UPS Ground
Package Weight:	1.0 LBS
Reference Number:	CT11000A

Hello, your package has been delivered.

Delivery Date: Thursday, 08/12/2021

Delivery Time: 11:23 AM

Left At: RECEIVER

Signed by: SPONZO

TRANSCEND WIRELESS

Tracking Number:	1ZV257420394319849
Ship To:	FJS PROPERTIES LLC 19 EAST DUDLEY TOWN ROAD BLOOMFIELD, CT 06002 US
Number of Packages:	1
UPS Service:	UPS Ground
Package Weight:	1.0 LBS
Reference Number:	CT11000A

Hello, your package has been delivered.

Delivery Date: Thursday, 08/12/2021

Delivery Time: 11:22 AM

Left At: FRONT DESK

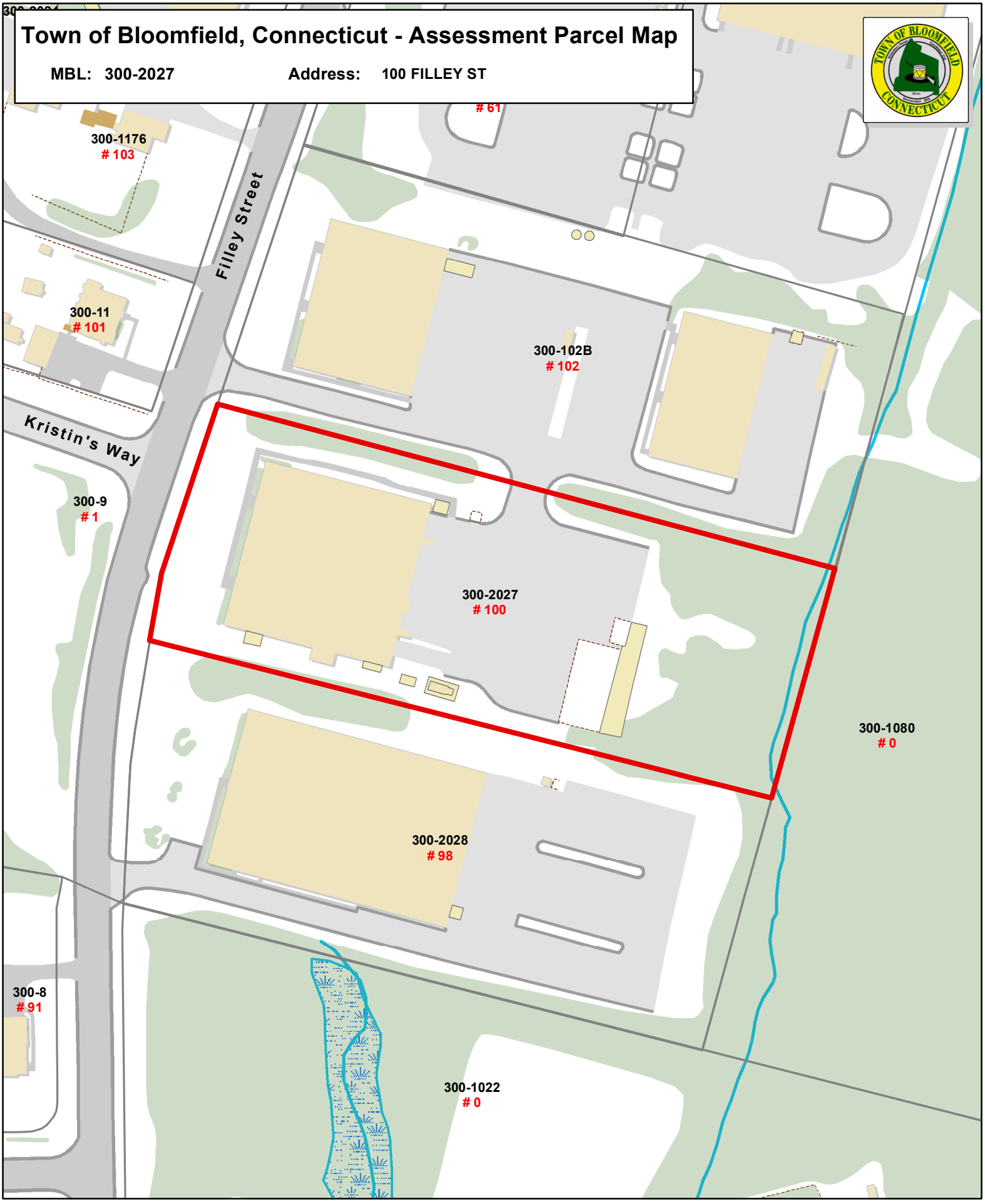
Signed by: KAREN

TRANSCEND WIRELESS

Tracking Number:	1ZV257420392261851
Ship To:	T-MOBILE LEASING 35 GRIFFIN ROAD SOUTH BLOOMFIELD, CT 06002 US
Number of Packages:	1
UPS Service:	UPS Ground
Package Weight:	1.0 LBS
Reference Number:	CT11000A

Town of Bloomfield, Connecticut - Assessment Parcel Map

MBL: 300-2027 **Address:** 100 FILLEY ST



N W E S

Approximate Scale:

1 inch = 100 feet

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

Map Produced October 2019

Parcels labeled by Unique ID

Town of Bloomfield, CT

Property Listing Report

Map Block Lot	300-2027	Building #	1	PID	2259	Account	R02311

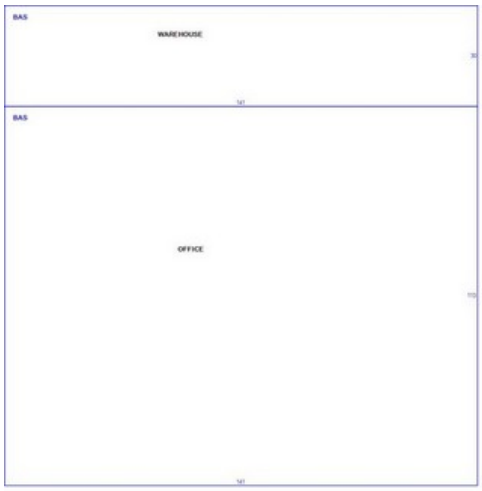
Property Information

Property Location	100 FILLEY ST
Owner	FJS PROPERTIES LLC
Co-Owner	
Mailing Address	19 E DUDLEY TOWN RD BLOOMFIELD CT 06002
Land Use	300 Industrial
Land Class	I
Zoning Code	I-2
Census Tract	4715

Site Index	C
Acreage	2.48
Utilities	
Lot Setting/Desc	
Fire District	C
Book / Page	1972/0069

Photo

Sketch



Primary Construction Details

Year Built	1990
Building Desc.	Commercial
Building Style	Flex Industrial
Building Grade	C
Stories	1
Occupancy	1.00
Exterior Walls	Brick Veneer
Exterior Walls 2	NA
Roof Style	Flat
Roof Cover	T&G/Rubber
Interior Walls	Drywall
Interior Walls 2	NA
Interior Floors 1	Carpet
Interior Floors 2	

Heating Fuel	Gas
Heating Type	Forced Air
AC Type	100
Bedrooms	0
Full Bathrooms	0
Half Bathrooms	0
Extra Fixtures	0
Total Rooms	0
Bath Style	NA
Kitchen Style	NA
Bsmt Fin Area	0
Rec Rm Area	0
Bsmt Gar	0
Fireplaces	0

(*Industrial / Commercial Details)

Building Use	Industrial
Building Condition	G
Sprinkler %	100
Heat / AC	Heat/AC Pkg
Frame Type	Masonry
Baths / Plumbing	Average
Ceiling / Wall	Sus Ceil & Wal
Rooms / Prtns	Average
Wall Height	8.00
First Floor Use	
Foundation	NA

Report Created On 8/11/2021

Town of Bloomfield, CT

Property Listing Report

Map Block Lot	300-2027	Building #	1	PID	2259	Account	R02311

Valuation Summary

(Assessed value = 70% of Appraised Value)

Item	Appraised	Assessed
Buildings	746100	522270
Extras	6200	4340
Improvements		
Outbuildings	256700	179690
Land	231700	162190
Total	1240700	868490

Outbuilding and Extra Features

Type	Description
Paving	29440 S.F.
Fence	212 L.F.
Load Leveller	1 Units
Ovhd 14'	1 UNITS
Ovhd 10'	1 UNITS
Generator	1 UNITS
Cell Tower	1 UNITS

Sub Areas

Subarea Type	Gross Area (sq ft)	Living Area (sq ft)
First Floor	20304	20304
Total Area	20304	20304

Sales History

Owner of Record	Book/ Page	Sale Date	Sale Price
FJS PROPERTIES LLC	1972/0069	2018-12-26	0
FJS FAMILY LLC	0757/0001	1900-01-01	0

Report Created On 8/11/2021

ZONING BOARD OF APPEALS

TOWN OF BLOOMFIELD

LOCATION: 100 FILLEY ST. BLOOMFIELD, CT. 06002
Please type or print

OWNER OF RECORD: FRANK SPONZO SR.

The foregoing application for / / Variance; /X/ Special Exception pursuant to Section M4B of the Bloomfield Zoning Regulations, pertains to premises bounded and described as follows:
(Type or attach written legal boundary description)

NORTHERLY	:	**By land nor or formerly of Lewis Steinberg and by other land of Bennett Millstein, et al., partly by each, being Lots Nos. 2025 and 2024 on said map, in all, 523.88 feet;**
EASTERLY	:	**By land nor or formerly of Anthony Semenuk, 200 feet;**
SOUTHERLY	:	**By other land of Bennett Millstein, et al., being Lot No. 2027, on said map, 536.82 feet; and**
WESTERLY	:	**By Filley Street, 200.70 feet.**

5-6-97
Date

Frank Sponzo
Signature of Owner of Record

PLEASE NOTE REQUIREMENTS BELOW FOR RECORDING APPROVAL ON LAND RECORDS

To be completed by Zoning Board of Appeals following approval:

I hereby certify that the Zoning Board of Appeals, at a meeting held on June 2, 1997, approved / / Variance or /X/ Special Exception of Omnipoint Communications for 95-foot tower at 100 Filley Street, I-2 zone (property owner: Frank Sponzo).

at the above premises, pursuant to Section III.M. of the Bloomfield Zoning Regulations, subject to the following conditions (if any):

No delivery trucks to be parked overnight on the property.

Woodrow Weyon
Secretary - ZBA

NOTE: PURSUANT TO SECTION 8-3d OF THE CONN. GENERAL STATUTES, THIS VARIANCE/SPECIAL EXCEPTION WILL NOT BECOME EFFECTIVE UNTIL IT HAS BEEN RECORDED ON THE LAND RECORDS OF THE TOWN OF BLOOMFIELD. IT IS THE RESPONSIBILITY OF THE OWNER TO RECORD THIS FORM AND PAY THE RECORDING FEE. ($10.00 FOR THE FIRST PAGE, $5.00 EACH ADDITIONAL PAGE

NO BUILDING PERMITS REQUIRED IN CONNECTION WITH THE ABOVE VARIANCE OR SPECIAL EXCEPTION MAY BE ISSUED UNTIL THIS APPROVAL HAS BEEN RECORDED.

Rev. 1/91

242 580

BLOOMFIELD/ W DUDLEY_1
SITE ID: CT11000A
100 FILLEY ST
BLOOMFIELD, CT 06002

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

67D5997DB_2xAIR+1OP

T-MOBILE RAN TEMPLATE (PROVIDED BY RFDS)

67D5A997DB HYBRID

GENERAL NOTES

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

SITE DIRECTIONS

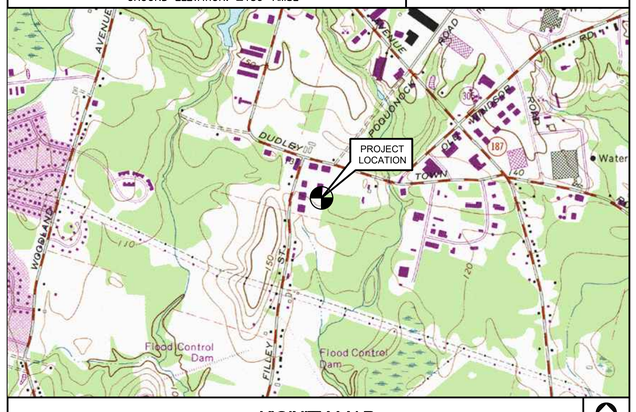
FROM: 35 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002

TO: 100 FILLEY ST.
BLOOMFIELD, CT 06002

1.	HEAD NORTHEAST TOWARD GRIFFIN RD S	0.01 MI.
2.	TURN LEFT ONTO GRIFFIN RD S	0.20 MI.
3.	TURN RIGHT ONTO DAY HILL RD	0.10 MI.
4.	TURN RIGHT ONTO CT–187 S	1.10 MI.
5.	TURN RIGHT ONTO W DUDLEY TOWN RD	0.90 MI.
6.	TURN RIGHT ONTO FILLEY ST	0.10 MI.
7.	DESTINATION WILL BE ON THE LEFT	

SITE COORDINATES: LATITUDE: 41° 51' 6.3684" N
LONGITUDE: 72° 42' 54.63" W
GROUND ELEVATION: ±130' AMSL

COORDINATES AND GROUND ELEVATION ARE REFERENCED FROM GOOGLE EARTH



VICINITY MAP — NORTH

PROJECT SUMMARY

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

1. REMOVE EXISTING RBS 3106 EQUIPMENT CABINET
2. REMOVE (3) EXISTING RFS – APX16DWV–16DWV–S–E–A20 ANTENNAS
3. REMOVE (6) EXISTING TMAs
4. REMOVE (3) EXISTING HCS AND (6) EXISTING COAXIAL CABLES
5. INSTALL (1) 6160 EQUIPMENT CABINET
6. INSTALL (1) B160 BATTERY CABINET
7. INSTALL (3) 6x24 HCS
8. INSTALL (3) ERICSSON – AIR6449 B41 ANTENNAS
9. INSTALL (3) 4460 B25+B66 RADIOS
10. INSTALL (1) 100A BREAKER TO SERVE NEW EQUIPMENT
11. INSTALL (2) 3' X 2' CONCRETE PADS (ANCHOR AND EMERSON)
12. INSTALL (1) EMERSON CABINET MOUNTED TO NEW 3' EQUIPMENT FRAME
13. INSTALL NEW 5' SWING GATE

PROJECT INFORMATION

SITE NAME:	BLOOMFIELD/ W DUDLEY_1
SITE ID:	CT11000A
SITE ADDRESS:	100 FILLEY ST. BLOOMFIELD, CT 06002
APPLICANT:	T–MOBILE NORTHEAST, LLC 35 GRIFFIN ROAD SOUTH BLOOMFIELD, CT 06002
CONTACT PERSON:	DAN REID (PROJECT MANAGER) TRANSCEND WIRELESS, LLC (203) 592–8291
ENGINEER OF RECORD:	CENTEK ENGINEERING, INC. 63–2 NORTH BRANFORD RD. BRANFORD, CT 06405 CARLO F. CENTORE, PE (203) 488–0580 EXT. 122
PROJECT COORDINATES:	LATITUDE: 41° 51' 6.3684" N LONGITUDE: 72° 42' 54.63" W GROUND ELEVATION: ±130' AMSL SITE COORDINATES AND GROUND ELEVATION REFERENCED FROM GOOGLE EARTH.

SHEET INDEX

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	08/02/21	RTS	TJR	CONSTRUCTION DRAWINGS – ISSUED FOR CONSTRUCTION

PROFESSIONAL ENGINEER SEAL

STATE OF CONNECTICUT — CARLO F. CENTORE — LICENSED PROFESSIONAL ENGINEER

T-Mobile — Transcend Wireless

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

T-MOBILE NORTHEAST LLC

BLOOMFIELD/ W DUDLEY_1
SITE ID: CT11000A
100 FILLEY ST.
BLOOMFIELD, CT 06002

DATE: 07/01/21
SCALE: AS NOTED
JOB NO. 21022.19

TITLE SHEET

T-1

Sheet No. 1 of 11

NOTES AND SPECIFICATIONS

DESIGN BASIS:

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

1. DESIGN CRITERIA:

- RISK CATEGORY II (BASED ON IBC TABLE 1604.5)
- NOMINAL DESIGN SPEED (OTHER STRUCTURE): 97 MPH (Vasd) (EXPOSURE 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.
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7. LOCATION OF EQUIPMENT AND WORK SUPPLIED BY OTHERS THAT IS DIAGRAMMATICALLY INDICATED ON THE DRAWINGS, SHALL BE DETERMINED BY THE CONTRACTOR. THE CONTRACTOR SHALL DETERMINE LOCATIONS AND DIMENSIONS SUBJECT TO STRUCTURAL CONDITIONS AND WORK OF THE SUBCONTRACTORS.
8. THE CONTRACTOR IS SOLELY RESPONSIBLE TO DETERMINE CONSTRUCTION PROCEDURE AND SEQUENCE, AND TO ENSURE THE SAFETY OF THE EXISTING STRUCTURES AND IT'S COMPONENT PARTS DURING CONSTRUCTION. THIS INCLUDES THE ADDITION OF WHATEVER SHORING, BRACING, UNDERPINNING, ETC. THAT MAY BE NECESSARY.
9. DRAWINGS INDICATE THE MINIMUM STANDARDS, BUT IF ANY WORK SHOULD BE INDICATED TO BE SUBSTANDARD TO ANY ORDINANCES, LAWS, CODES, RULES, OR REGULATIONS BEARING ON THE WORK, THE CONTRACTOR SHALL INCLUDE IN HIS WORK AND SHALL EXECUTE THE WORK CORRECTLY IN ACCORDANCE WITH SUCH ORDINANCES, LAWS, CODES, RULES OR REGULATIONS WITH NO INCREASE IN COSTS.
10. ALL UTILITY WORK SHALL BE IN ACCORDANCE WITH LOCAL UTILITY COMPANY REQUIREMENTS AND SPECIFICATIONS.
11. ALL EQUIPMENT AND PRODUCTS PURCHASED ARE TO BE REVIEWED BY CONTRACTOR AND ALL APPLICABLE SUBCONTRACTORS FOR ANY CONDITION PER MFR.'S RECOMMENDATIONS. CONTRACTOR TO SUPPLY THESE ITEMS AT NO COST TO OWNER OR CONSTRUCTION MANAGER.
12. ANY AND ALL ERRORS, DISCREPANCIES, AND "MISSED" ITEMS, ARE TO BE BROUGHT TO THE ATTENTION OF THE SITE OWNER'S CONSTRUCTION MANAGER DURING THE BIDDING PROCESS BY THE CONTRACTOR. ALL THESE ITEMS ARE TO BE INCLUDED IN THE BID. NO 'EXTRA' WILL BE ALLOWED FOR MISSED ITEMS.
13. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL ON-SITE SAFETY FROM THE TIME THE JOB IS AWARDED UNTIL ALL WORK IS COMPLETE AND ACCEPTED BY THE OWNER.
14. CONTRACTOR TO REVIEW ALL SHOP DRAWINGS AND SUBMIT COPY TO ENGINEER FOR APPROVAL. DRAWINGS MUST BEAR THE CHECKER'S INITIALS BEFORE SUBMITTING TO THE CONSTRUCTION MANAGER FOR REVIEW.
15. THE CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS, ELEVATIONS, ANGLES, AND EXISTING CONDITIONS AT THE SITE, PRIOR TO FABRICATION AND/OR INSTALLATION OF ANY WORK IN THE CONTRACT AREA.
16. COORDINATION, LAYOUT, FURNISHING AND INSTALLATION OF CONDUIT AND ALL APPURTENANCES REQUIRED FOR PROPER INSTALLATION OF ELECTRICAL AND TELECOMMUNICATION SERVICE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
17. ALL DAMAGE CAUSED TO ANY EXISTING STRUCTURE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR WILL BE HELD LIABLE FOR ALL REPAIRS REQUIRED FOR EXISTING STRUCTURES IF DAMAGED DURING CONSTRUCTION ACTIVITIES.
18. THE CONTRACTOR SHALL CONTACT 'CALL BEFORE YOU DIG' AT LEAST 48 HOURS PRIOR TO ANY EXCAVATIONS AT 1-800-922-4455. ALL UTILITIES SHALL BE IDENTIFIED AND CLEARLY MARKED. CONTRACTOR SHALL MAINTAIN AND PROTECT MARKED UTILITIES THROUGHOUT PROJECT COMPLETION.
18. CONTRACTOR SHALL COMPLY WITH OWNER'S ENVIRONMENTAL ENGINEER ON ALL METHODS AND PROVISIONS FOR ALL EXCAVATION ACTIVITIES INCLUDING SOIL DISPOSAL. ALL BACKFILL MATERIALS TO BE PROVIDED BY THE CONTRACTOR.
19. THE COUNTY/CITY/TOWN WILL MAKE PERIODIC FIELD OBSERVATION AND INSPECTIONS TO MONITOR THE INSTALLATION, MATERIALS, WORKMANSHIP AND EQUIPMENT INCORPORATED INTO THE PROJECT TO ENSURE COMPLIANCE WITH THE DESIGN PLANS, SPECIFICATIONS, CONTRACT DOCUMENTS AND APPROVED SHOP DRAWINGS.
20. THE COUNTY/CITY/TOWN MUST BE NOTIFIED (2) WORKING DAYS PRIOR TO CONCEALMENT/BURIAL OF ANY SYSTEM OR MATERIAL THAT WILL PREVENT THE DIRECT INSPECTION OF MATERIALS, METHODS OR WORKMANSHIP. EXAMPLES OF THESE PROCESSES ARE BACKFILLING A GROUND RING OR TOWER FOUNDATION, POURING TOWER FOUNDATIONS, BURYING GROUND RODS, PLATES OR GRIDS, ETC. THE CONTRACTOR MAY PROCEED WITH THE SCHEDULED PROCESS (2) WORKING DAYS AFTER PROVIDING NOTICE UNLESS NOTIFIED OTHERWISE BY THE COUNTY/CITY/TOWN.

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GENERAL NOTES AND SPECIFICATIONS

N-1

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

ANTENNA SCHEDULE

SECTOR	EXISTING/ PROPOSED	ANTENNA	SIZE (INCHES) (L x W x H)	ANTENNA ℄ HEIGHT	AZIMUTH	(E/P) RRU (QTY)	(E/P) TMA (QTY)	(QTY) PROPOSED COAX (LENGTH)
A1	EXISTING	ERICSSON - AIR32 - KRD901146-1_B66A_B2A	56.6 x 12.9 x 8.70	95	50			(1) 6X24 HYBRID CABLE (115')
A2	EXISTING	RFS - APXVAARR24_43-U-N-NA20	95.9 x 24.0 x 8.70	93	50	(E) RRU 4449 B71+B85 (1), (P) RRU 4460 B25+B66 (1)		
A3	PROPOSED	ERICSSON - AIR6449 B41	33.1 x 20.6 x 8.60	95	50			
B1	EXISTING	ERICSSON - AIR32 - KRD901146-1_B66A_B2A	56.6 x 12.9 x 8.70	95	180			(1) 6X24 HYBRID CABLE (115')
B2	EXISTING	RFS - APXVAARR24_43-U-N-NA20	95.9 x 24.0 x 8.70	93	180	(E) RRU 4449 B71+B85 (1), (P) RRU 4460 B25+B66 (1)		
B3	PROPOSED	ERICSSON - AIR6449 B41	33.1 x 20.6 x 8.60	95	180			
C1	EXISTING	ERICSSON - AIR32 - KRD901146-1_B66A_B2A	56.6 x 12.9 x 8.70	95	280			(1) 6X24 HYBRID CABLE (115')
C2	EXISTING	RFS - APXVAARR24_43-U-N-NA20	95.9 x 24.0 x 8.70	93	280	(E) RRU 4449 B71+B85 (1), (P) RRU 4460 B25+B66 (1)		
C3	PROPOSED	ERICSSON - AIR6449 B41	33.1 x 20.6 x 8.60	95	280			

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

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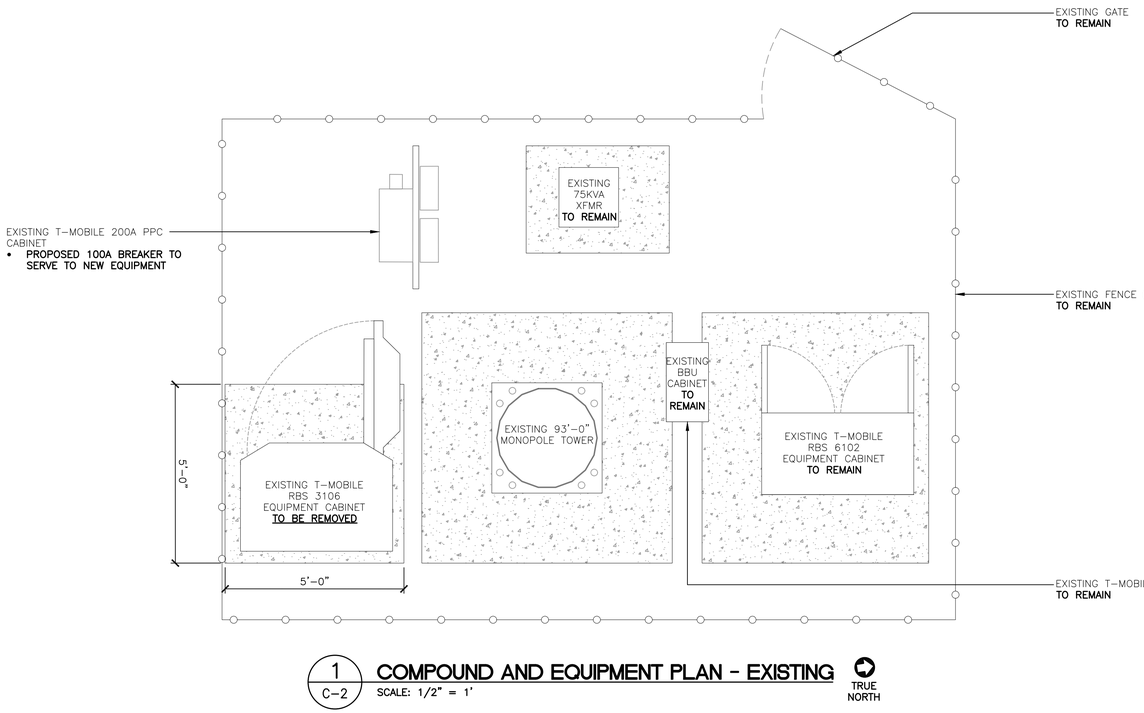
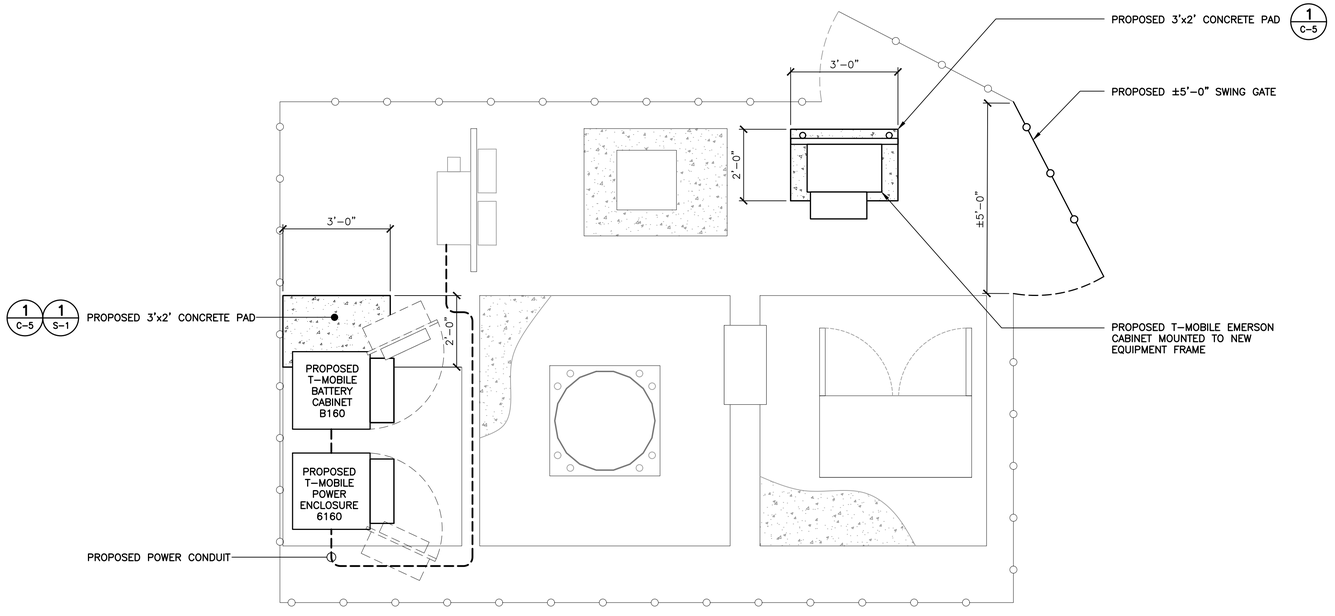
SITE LOCATION PLAN

C-1

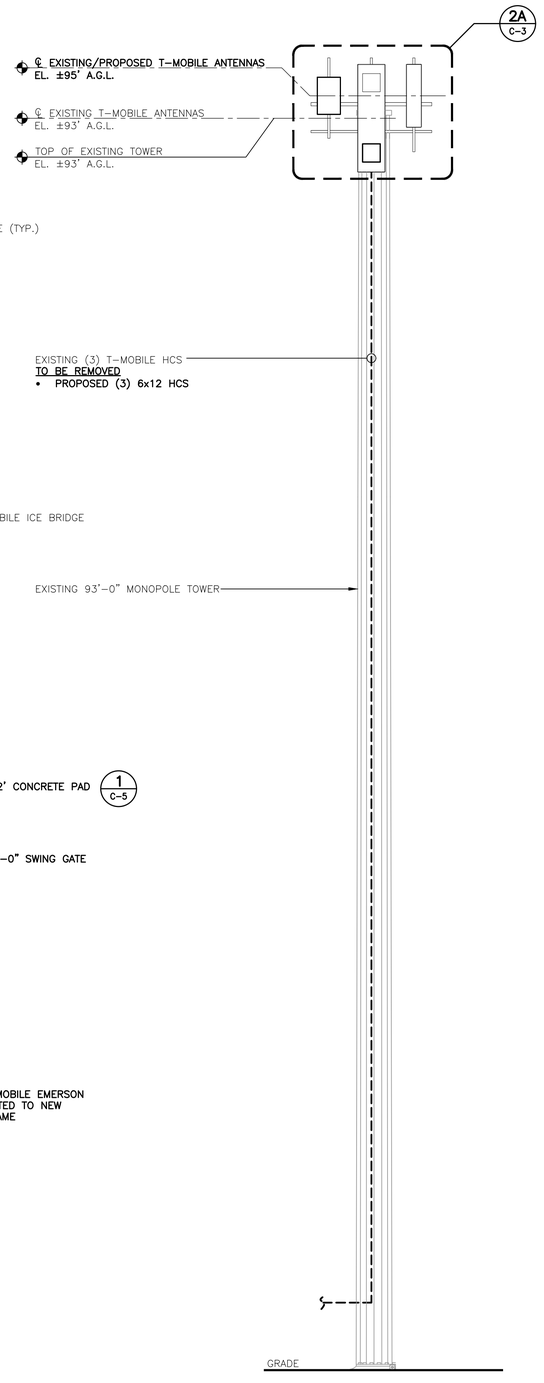
Sheet No. 3 of 11



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



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



3 / C-2 **MONOPOLE ELEVATION - PROPOSED**
SCALE: 3/16" = 1'

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 # 21022.19) DATED 07/05/21 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 # 21022.19) DATED 07/05/21 FOR ADDITIONAL INFORMATION AND REQUIREMENTS.

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

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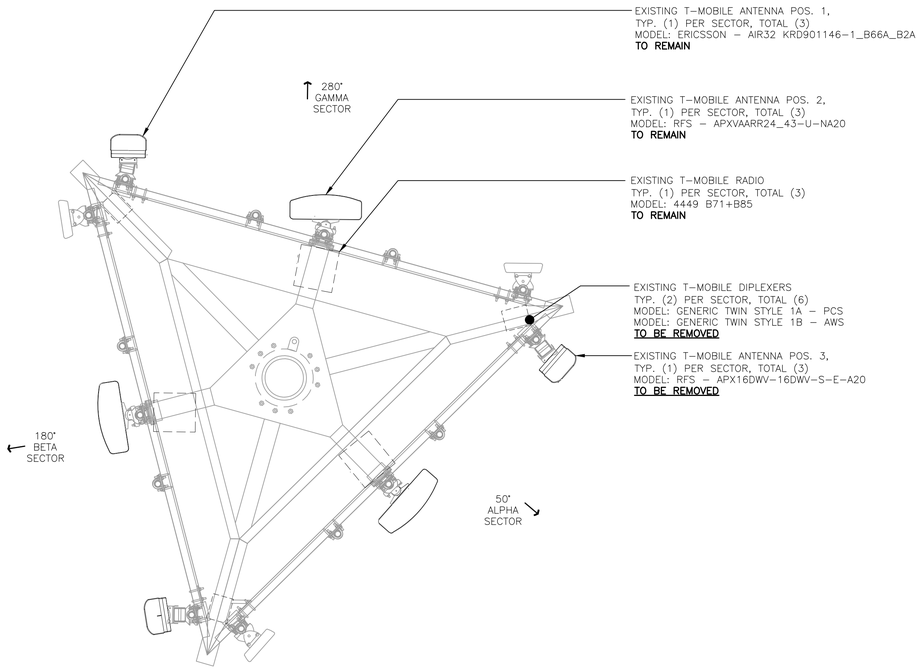
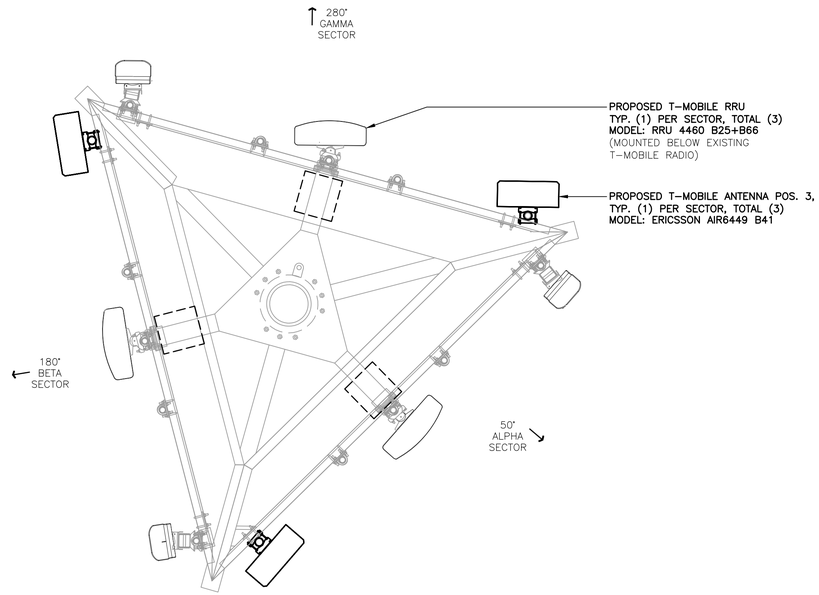
COMPOUND PLAN, EQUIPMENT PLAN, AND ELEVATION

C-2

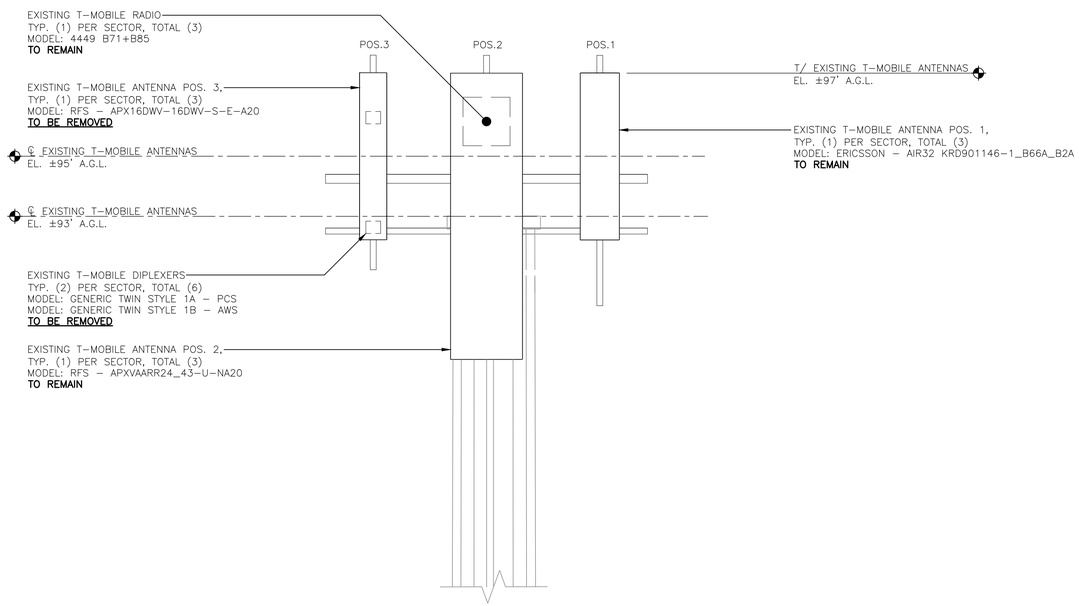
Sheet No. 4 of 11



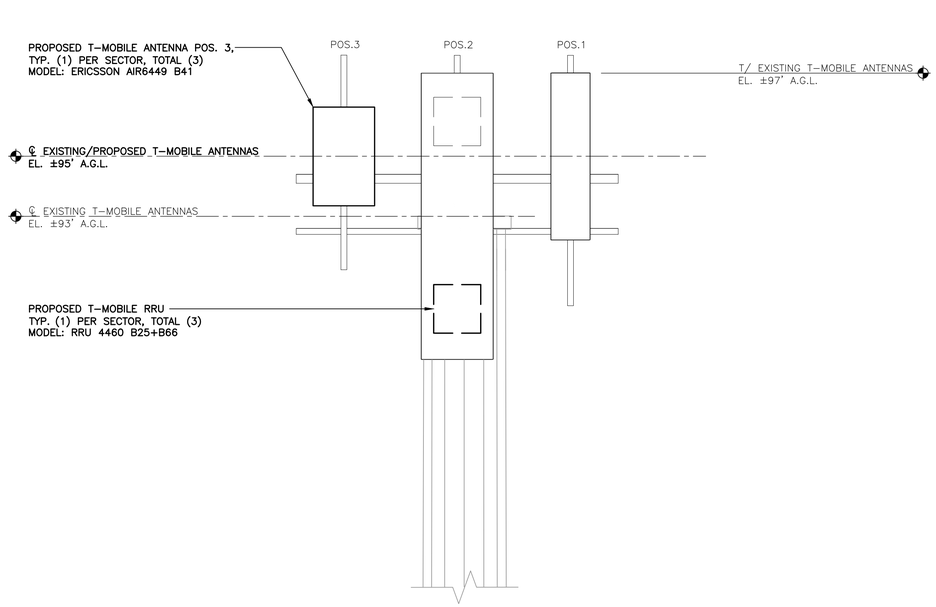
1 C–3 **ANTENNA PLAN – EXISTING**
SCALE: 1/2" = 1'
TRUE NORTH



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



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



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

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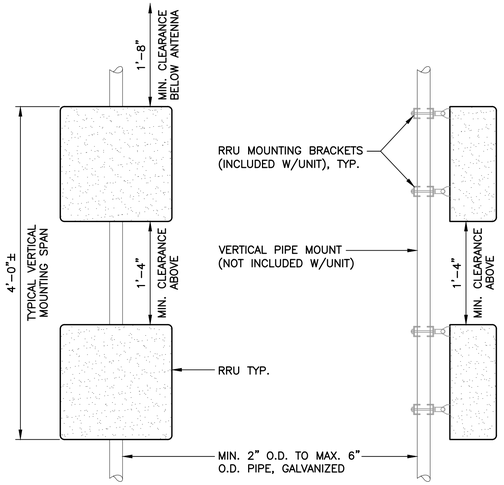
ANTENNA PLANS AND ELEVATIONS

C-3

Sheet No. 5 of 11



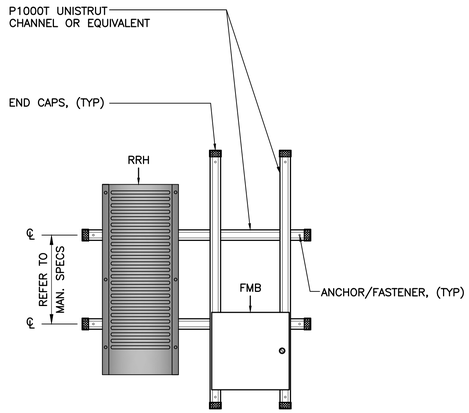
FRONT ELEVATION SIDE ELEVATION

1 C-4 TYPICAL RRU MOUNTING DETAIL

SCALE: NOT TO SCALE

NOTES: (PIPE MOUNTING)

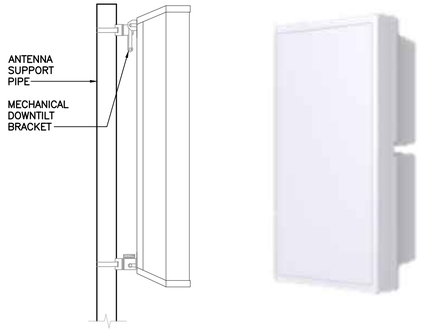
1. T–MOBILE SHALL SUPPLY RRU, AND RRU POLE–MOUNTING BRACKET. CONTRACTOR SHALL SUPPLY POLE/PIPE AND INSTALL ALL MOUNTING HARDWARE INCLUDING ERICSSON RRU POLE–MOUNTING BRACKET.
2. NO PAINTING OF THE RRU OR SOLAR SHIELD IS ALLOWED.



FRONT ELEVATION

NOTES: (UNISTRUT MOUNTING)

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



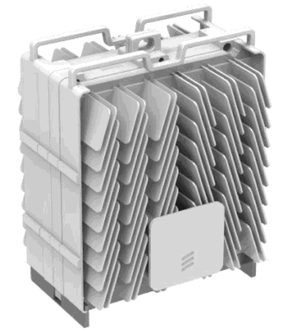
SIDE

FRONT

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

2 C-4 PROPOSED ANTENNA DETAIL

SCALE: NOT TO SCALE

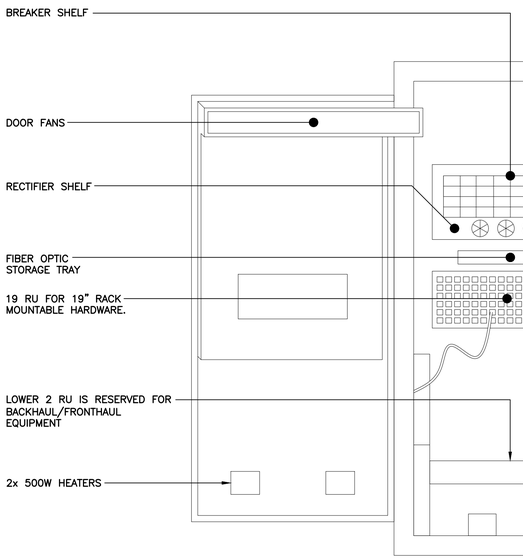


FRONT VIEW

RRU (REMOTE RADIO UNIT)			
EQUIPMENT	DIMENSIONS	WEIGHT	CLEARANCES
MAKE: ERICSSON MODEL: RADIO 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-4 PROPOSED RRU DETAIL

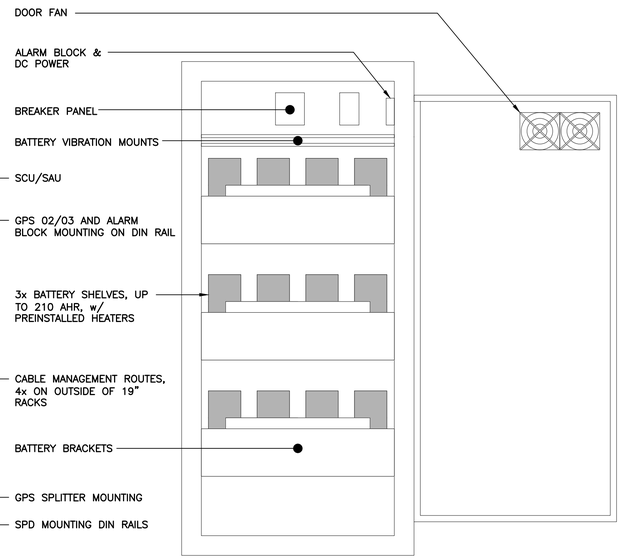
SCALE: NOT TO SCALE



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

4 C-4 ENCLOSURE 6160 CABINET DETAIL

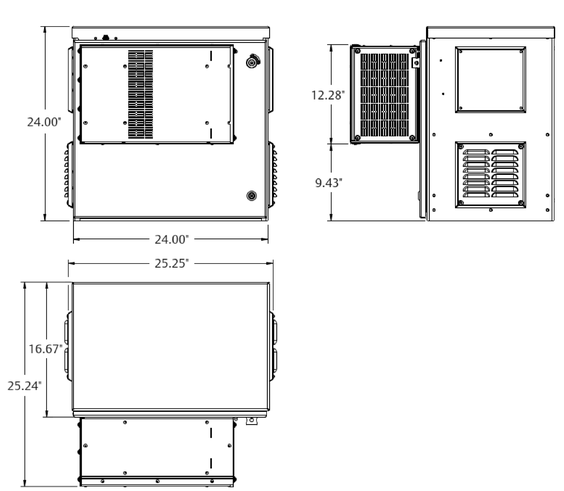
SCALE: NOT TO SCALE



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

5 C-4 BATTERY B160 CABINET DETAIL

SCALE: NOT TO SCALE



EMERSON CABINET		
EQUIPMENT	DIMENSIONS	WEIGHT
MAKE: EMERSON MODEL: COMPACT 2416	24"L x 24"W x 16"D	±64 LBS.
NOTES: 1. CONTRACTOR TO COORDINATE FINAL EQUIPMENT MODEL SELECTION WITH T–MOBILE CONSTRUCTION MANAGER PRIOR TO ORDERING.		

6 C-4 PROPOSED EMERSON CABINET DETAIL

SCALE: NOT TO SCALE

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TYPICAL EQUIPMENT DETAILS

C-4

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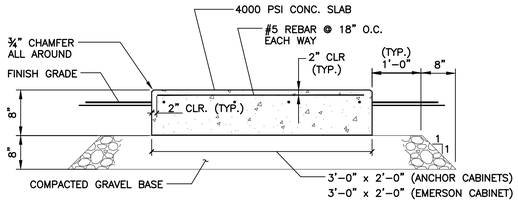
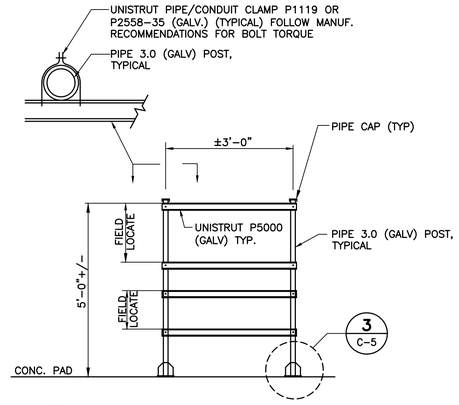


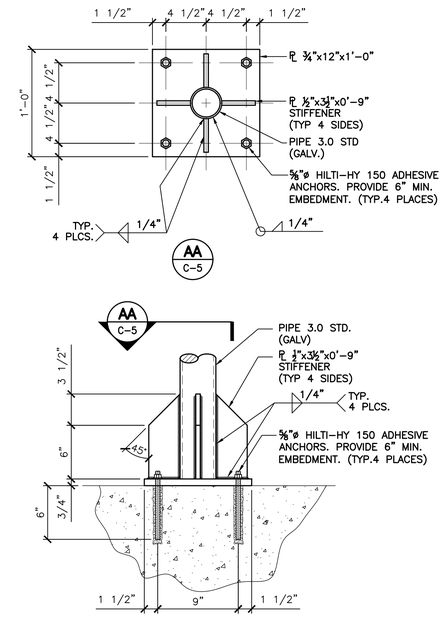
1 / C-5 **TYPICAL CONCRETE PAD DETAIL**

NOT TO SCALE



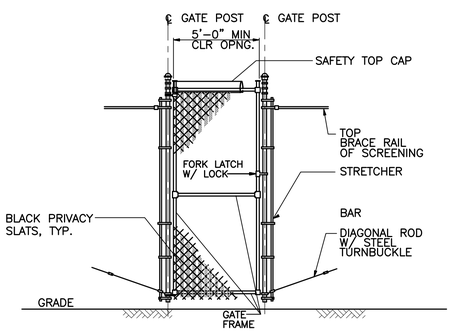
2 / C-5 **EQUIPMENT MOUNTING FRAME DETAIL**

SCALE: NOT TO SCALE



3 / C-5 **FRAME TO CONCRETE CONNECTION DETAIL**

SCALE: NOT TO SCALE



4 / C-5 **TYP. WOVEN WIRE SINGLE SWING GATE**

SCALE: NOT TO SCALE

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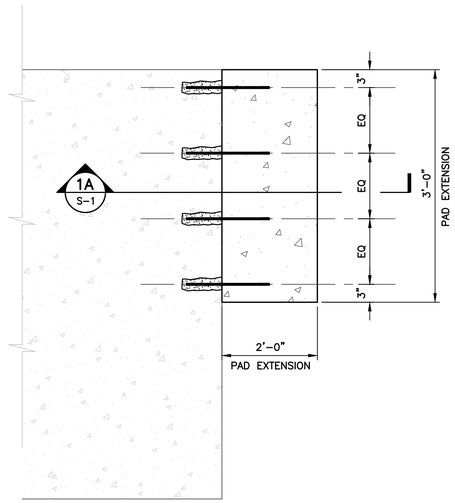
TYPICAL EQUIPMENT DETAILS

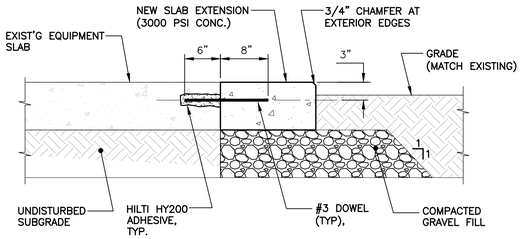
C-5

Sheet No. 7 of 11



1 S-1 **EQUIPMENT PAD EXTENSION PLAN** NORTH

SCALE: 1" = 1'- 0"



NOTE:

1. COORDINATE EQUIPMENT CABINET HOLD-DOWN HARDWARE WITH EQUIPMENT MANUFACTURER.

1A S-1 **EQUIPMENT PAD EXTENSION SECTION**

SCALE: 1" = 1'- 0"

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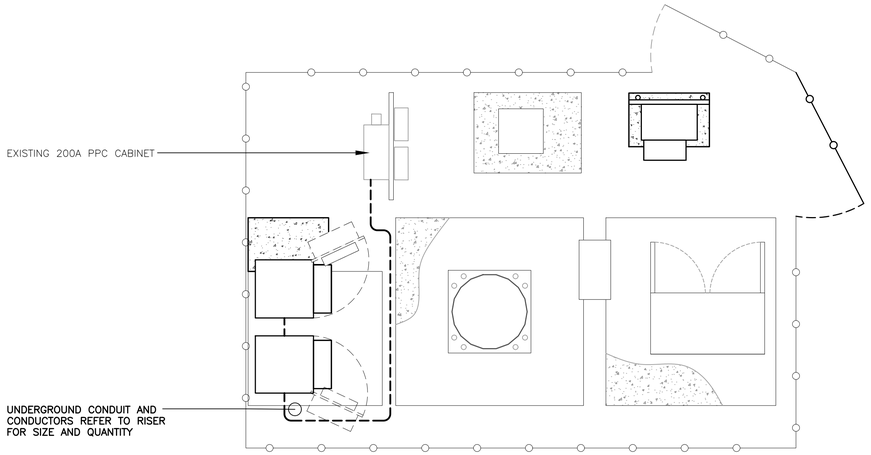
STRUCTURAL DETAILS

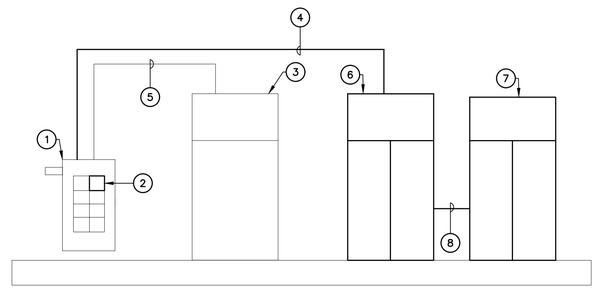
S-1



1 E-1 **ELECTRICAL CONDUIT ROUTING PLAN**
SCALE: 1/4" = 1'

RISER DIAGRAM NOTES

1. EXISTING 200A, PPC CABINET TO REMAIN.
2. NEW 100A/2P CIRCUIT BREAKER TO SERVE NEW EQUIPMENT CABINET.
3. EXISTING CABINETS TO REMAIN.
4. (3) #1 AWG, (1) #8 AWG GROUND, 1-1/4" CONDUIT.
5. EXISTING CONDUITS AND CONDUCTORS TO REMAIN.
6. NEW T-MOBILE EQUIPMENT CABINET
7. NEW T-MOBILE BATTERY CABINET
8. DC CONDUIT AND CONDUCTORS FOR BATTERY CABINET CONNECTION PER MANUFACTURERS SPECIFICATIONS.



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

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

T-MOBILE NORTHEAST LLC

BLOOMFIELD/ W DUDLEY_1

SITE ID: CT11000A

100 FILLEY ST.

BLOOMFIELD, CT 06002

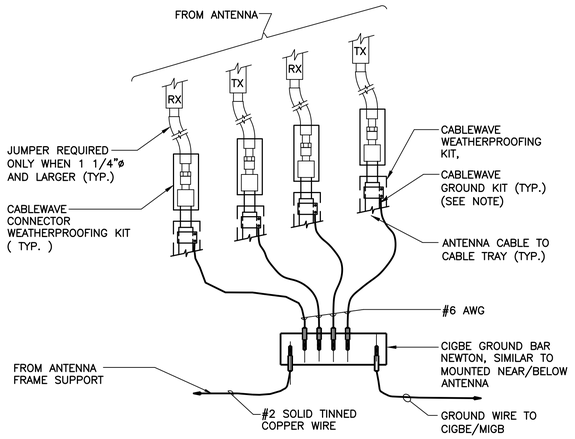
DATE: 07/01/21

SCALE: AS NOTED

JOB NO. 21022.19

ELECTRICAL RISER DIAGRAM AND CONDUIT ROUTING PLAN

E-1

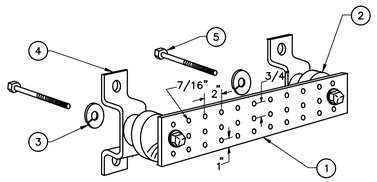


NOTES:

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

1 E-2 CONNECTION OF GROUND WIRES TO GROUND BAR

SCALE: NOT TO SCALE

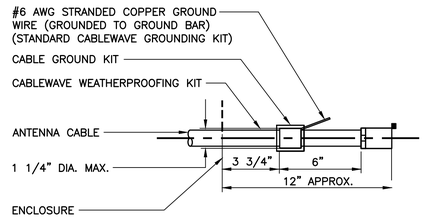


NOTES

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

2 E-2 GROUND BAR DETAIL

SCALE: NOT TO SCALE

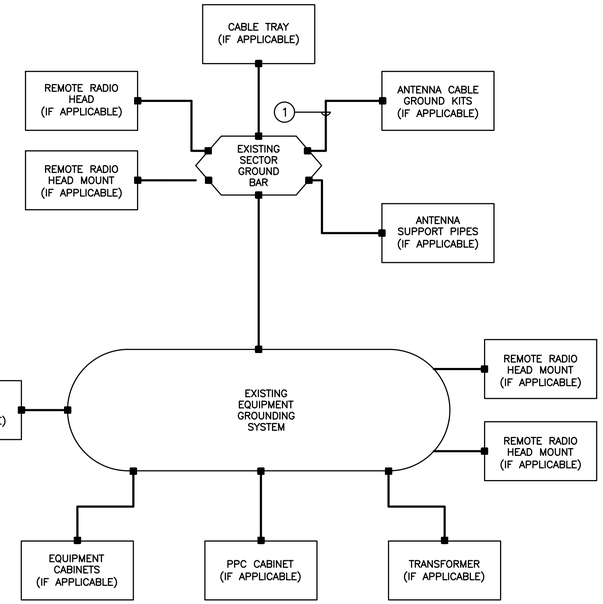


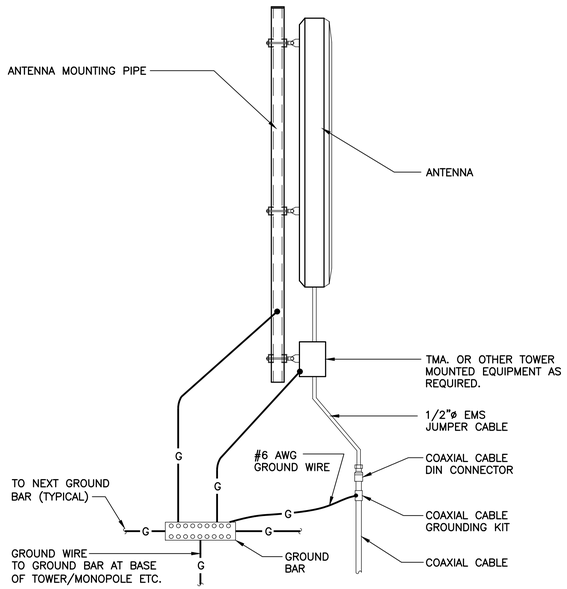
NOTES:

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

3 E-2 ANTENNA CABLE GROUNDING DETAIL

SCALE: NOT TO SCALE



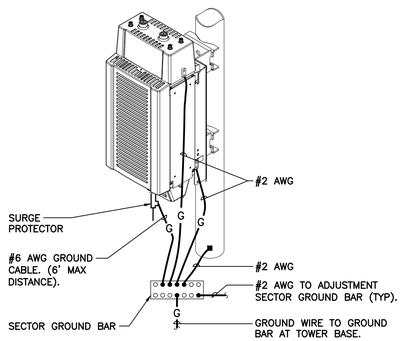


4 E-2 TYPICAL ANTENNA GROUNDING DETAIL

SCALE: NOT TO SCALE

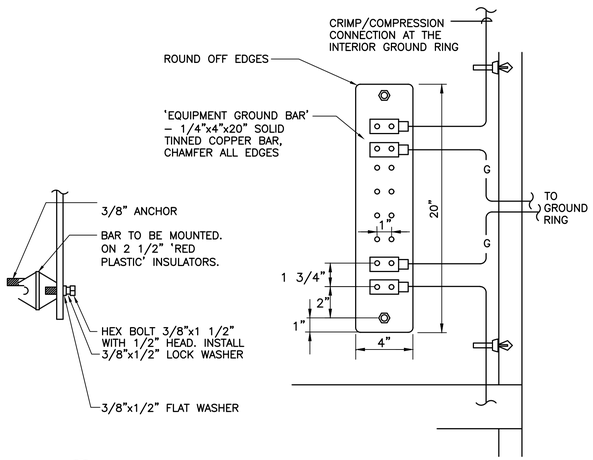
EACH RRH CABINET SHALL BE GROUNDED IN THE FOLLOWING MANNER:

1. AT TOP OF THE CABINET
2. AT RIGHT SIDE OF THE CABINET.



5 E-2 RRH POLE MOUNT GROUNDING

SCALE: NOT TO SCALE



6 E-2 EQUIPMENT GROUND BAR DETAIL

SCALE: NOT TO SCALE

GROUNDING SCHEMATIC NOTES

(1) #6 AWG

GENERAL NOTES:

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

7 E-2 ELECTRICAL SCHEMATIC DIAGRAM

SCALE: NOT TO SCALE

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BLOOMFIELD/ W DUDLEY_1

SITE ID: CT11000A

100 FILLEY ST.

BLOOMFIELD, CT 06002

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JOB NO.	21022.19

TYPICAL ELECTRICAL DETAILS

E-2

Sheet No. 10 of 11

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. 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. CONDUIT

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

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

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
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T-MOBILE NORTHEAST LLC

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SITE ID: CT11000A

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BLOOMFIELD, CT 06002

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JOB NO. 21022.19

ELECTRICAL SPECIFICATIONS

E-3

Sheet No. 11 of 11

CENTEK engineering
Centered on Solutions℠

Structural Analysis Report

Antenna Mount Analysis

Proposed T-Mobile Upgrade

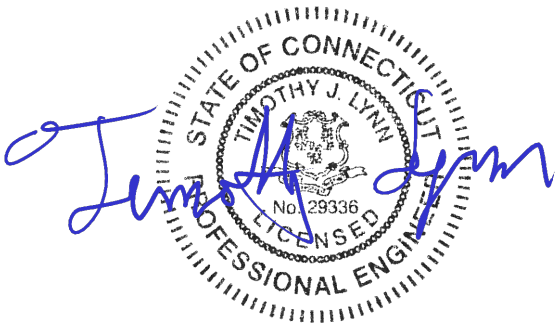
T-Mobile Site #: CT11000A

100 Filley Street
Bloomfield, CT

Centek Project No. 21022.19

Date: July 5, 2021

Max Stress Ratio = 95.6%



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

CENTEK engineering

Centered on Solutions℠

July 5, 2021

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

Re: Structural Letter ~ Antenna Mount
T-Mobile – Site Ref: CT11000A
100 Filley Street
Bloomfield, CT 06002

Centek Project No. 21022.19

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) low profile platform w/ handrail to support the proposed/existing 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:
  Three (3) RFS APXVAARR24_43 panel antennas, three (3) Ericsson AIR6449 panel antennas, three (3) Ericsson AIR32 panel antennas, three (3) Ericsson 4449 remote radio heads, three (3) Ericsson 4460 remote radio heads on the existing mount with a top of antenna elevation of 97-ft +/- AGL.

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

Based on our review of the installation, it is our opinion that the subject antenna mount has sufficient capacity to support the aforementioned antenna configuration.

If there are any questions regarding this matter, please feel free to call.

Respectfully Submitted by:

Timothy J. Lynn, PE
Structural Engineer

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

Prepared by:

Fernando J. Palacios
Engineer

Section 2 - Calculations

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: Loads on Equipment

Location: Bloomfield,CT

Rev. 0: 07/05/2021

Prepared by: F.J.P.. Checked by: T.J.L.
Job No. 21022.19

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

Wind Speeds

Basic Wind Speed	$V := 97$	mph	(User Input - 2018 CSBC Appendix N)
Basic Wind Speed with Ice	$V_i := 50$	mph	(User Input per Annex B of TIA-222-G)

Input

Structure Type =	$Structure\_Type := Pole$		(User Input)
Structure Category =	$SC := II$		(User Input)
Exposure Category =	$Exp := C$		(User Input)
Structure Height =	$h := 93.0$	ft	(User Input)
Height to Center of Antennas =	$z := 95$	ft	(User Input)
Radial Ice Thickness =	$t_i := 1.00$	in	(User Input per Annex B of TIA-222-G)
Radial Ice Density =	$Id := 56.00$	pcf	(User Input)
Topographic 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)

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

Importance Factors =

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

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

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

$$K_{iz} := \left(\frac{z}{33}\right)^{0.1} = 1.112$$

Velocity Pressure Coefficient Antennas =

$$t_{iz} := 2.0 \cdot t_i \cdot I_{ice} \cdot K_{iz} \cdot K_{zt}^{0.35} = 2.223$$

$$Kz := 2.01 \cdot \left(\left(\frac{z}{zg}\right)\right)^{\alpha} = 1.252$$

Velocity Pressure w/o Ice Antennas = $qz := 0.00256 \cdot K_d \cdot Kz \cdot V^2 \cdot I_{Wind} = 29$ psf

Velocity Pressure with Ice Antennas = $qz_{ice} := 0.00256 \cdot K_d \cdot Kz \cdot V_i^2 \cdot I_{Wind} = 8$ psf

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	Ericsson AIR32 B66A		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 55.9$	in	(User Input)
Antenna Width =	$W_{ant} := 13.0$	in	(User Input)
Antenna Thickness =	$T_{ant} := 3.2$	in	(User Input)
Antenna Weight =	$WT_{ant} := 41.8$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 1$		(User Input)
Antenna Aspect Ratio =	$Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 4.3$		
Antenna Force Coefficient =	$Ca_{ant} = 1.28$		

Wind Load (without ice)

Surface Area for One Antenna =	$SA_{antF} := \frac{L_{ant} \cdot W_{ant}}{144} = 5$	sf
Total Antenna Wind Force Front =	$F_{ant} := qz \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antF} = 204$	lbs
Surface Area for One Antenna =	$SA_{antS} := \frac{L_{ant} \cdot T_{ant}}{144} = 1.2$	sf
Total Antenna Wind Force Side =	$F_{ant} := qz \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antS} = 50$	lbs

Wind Load (with ice)

Surface Area for One Antenna w/ Ice =	$SA_{ICEantF} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (W_{ant} + 2 \cdot t_{iz})}{144} = 7.3$	sf
Total Antenna Wind Force w/ Ice Front =	$Fi_{ant} := qz_{ice} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantF} = 78$	lbs
Surface Area for One Antenna w/ Ice =	$SA_{ICEantS} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz})}{144} = 3.2$	sf
Total Antenna Wind Force w/ Ice Side =	$Fi_{ant} := qz_{ice} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantS} = 34$	lbs

Gravity Load (without ice)

Weight of All Antennas =	$WT_{ant} \cdot N_{ant} = 42$	lbs

Gravity Loads (ice only)

Volume of Each Antenna =	$V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 2325$	cu in
Volume of Ice on Each Antenna =	$V_{ice} := (L_{ant} + 2 \cdot t_{iz}) \cdot (W_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz}) - V_{ant} = 5724$	cu in
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 186$	lbs
Weight of Ice on All Antennas =	$W_{ICEant} \cdot N_{ant} = 186$	lbs

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	RFS APXVAALL24_43-U-NA20		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 95.9$	in	(User Input)
Antenna Width =	$W_{ant} := 24.0$	in	(User Input)
Antenna Thickness =	$T_{ant} := 8.5$	in	(User Input)
Antenna Weight =	$WT_{ant} := 149.$	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 Front =	$F_{ant} := qz \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antF} = 638$	lbs
Surface Area for One Antenna =	$SA_{antS} := \frac{L_{ant} \cdot T_{ant}}{144} = 5.7$	sf
Total Antenna Wind Force Side =	$F_{ant} := qz \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antS} = 226$	lbs

Wind Load (with ice)

Surface Area for One Antenna w/ Ice =	$SA_{ICEantF} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (W_{ant} + 2 \cdot t_{iz})}{144} = 19.8$	sf
Total Antenna Wind Force w/ Ice Front =	$Fi_{ant} := qz_{ice} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantF} = 210$	lbs
Surface Area for One Antenna w/ Ice =	$SA_{ICEantS} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz})}{144} = 9$	sf
Total Antenna Wind Force w/ Ice Side =	$Fi_{ant} := qz_{ice} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantS} = 96$	lbs

Gravity Load (without ice)

Weight of All Antennas =	$WT_{ant} \cdot N_{ant} = 149$	lbs

Gravity Loads (ice only)

Volume of Each Antenna =	$V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 2 \cdot 10^4$	cu in
Volume of Ice on Each Antenna =	$V_{ice} := (L_{ant} + 2 \cdot t_{iz}) \cdot (W_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz}) - V_{ant} = 2 \cdot 10^4$	cu in
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 564$	lbs
Weight of Ice on All Antennas =	$W_{ICEant} \cdot N_{ant} = 564$	lbs

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	Ericsson AIR6449 B41		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 33.1$	in	(User Input)
Antenna Width =	$W_{ant} := 20.5$	in	(User Input)
Antenna Thickness =	$T_{ant} := 8.3$	in	(User Input)
Antenna Weight =	$WT_{ant} := 103$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 1$		(User Input)
Antenna Aspect Ratio =	$Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 1.6$		
Antenna Force Coefficient =	$Ca_{ant} = 1.2$		

Wind Load (without ice)

Surface Area for One Antenna =	$SA_{antF} := \frac{L_{ant} \cdot W_{ant}}{144} = 4.7$	sf
Total Antenna Wind Force Front =	$F_{ant} := qz \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antF} = 178$	lbs
Surface Area for One Antenna =	$SA_{antS} := \frac{L_{ant} \cdot T_{ant}}{144} = 1.9$	sf
Total Antenna Wind Force Side =	$F_{ant} := qz \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antS} = 72$	lbs

Wind Load (with ice)

Surface Area for One Antenna w/ Ice =	$SA_{ICEantF} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (W_{ant} + 2 \cdot t_{iz})}{144} = 6.5$	sf
Total Antenna Wind Force w/ Ice Front =	$Fi_{ant} := qz_{ice} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantF} = 65$	lbs
Surface Area for One Antenna w/ Ice =	$SA_{ICEantS} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz})}{144} = 3.3$	sf
Total Antenna Wind Force w/ Ice Side =	$Fi_{ant} := qz_{ice} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantS} = 33$	lbs

Gravity Load (without ice)

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

Gravity Loads (ice only)

Volume of Each Antenna =	$V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 5632$	cu in
Volume of Ice on Each Antenna =	$V_{ice} := (L_{ant} + 2 \cdot t_{iz}) \cdot (W_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz}) - V_{ant} = 6306$	cu in
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 204$	lbs
Weight of Ice on All Antennas =	$W_{ICEant} \cdot N_{ant} = 204$	lbs

Development of Wind & Ice Load on RRUS's

RRUS Data:

RRUS Model =	Ericsson 4449 B71+B85		
RRUS Shape =	Flat		(User Input)
RRUS Height =	$L_{RRUS} := 14.9$	in	(User Input)
RRUS Width =	$W_{RRUS} := 13.2$	in	(User Input)
RRUS Thickness =	$T_{RRUS} := 5.4$	in	(User Input)
RRUS Weight =	$WT_{RRUS} := 74$	lbs	(User Input)
Number of RRUS's =	$N_{RRUS} := 1$		
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 =	$F_{RRUS} := qz \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{RRUSF} = 52$	lbs
Surface Area for One RRUS =	$SA_{RRUSS} := \frac{L_{RRUS} \cdot T_{RRUS}}{144} = 0.6$	sf
Total RRUS Wind Force =	$F_{RRUS} := qz \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{RRUSS} = 21$	lbs

Wind Load (with ice)

Surface Area for One RRUS w/ Ice =	$SA_{ICERRUSF} := \frac{(L_{RRUS} + 2 \cdot t_{iz}) \cdot (W_{RRUS} + 2 \cdot t_{iz})}{144} = 2.4$	sf
Total RRUS Wind Force w/ Ice =	$Fi_{RRUS} := qz_{ice} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{ICERRUSF} = 24$	lbs
Surface Area for One RRUS w/ Ice =	$SA_{ICERRUSS} := \frac{(L_{RRUS} + 2 \cdot t_{iz}) \cdot (T_{RRUS} + 2 \cdot t_{iz})}{144} = 1.3$	sf
Total RRUS Wind Force w/ Ice =	$Fi_{RRUS} := qz_{ice} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{ICERRUSS} = 13$	lbs

Gravity Load (without ice)

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

Gravity Loads (ice only)

Volume of Each RRUS =	$V_{RRUS} := L_{RRUS} \cdot W_{RRUS} \cdot T_{RRUS} = 1062$	cu in
Volume of Ice on Each RRUS =	$V_{ice} := (L_{RRUS} + 2 \cdot t_{iz}) \cdot (W_{RRUS} + 2 \cdot t_{iz}) \cdot (T_{RRUS} + 2 \cdot t_{iz}) - V_{RRUS} = 2299$	cu in
Weight of Ice on Each RRUS =	$W_{ICERRUS} := \frac{V_{ice}}{1728} \cdot Id = 75$	lbs
Weight of Ice on All RRUSs =	$W_{ICERRUS} \cdot N_{RRUS} = 75$	lbs

CENTEK engineering
Centered on Solutions℠ www.centekeng.com
63-2 North Branford Road P: (203) 488-0580
Branford, CT 06405 F: (203) 488-8587

Development of Wind & Ice Load on RRUS's

RRUS Data:

RRUS Model =	Ericsson 4460 B25+B66		
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 =	$N_{RRUS} := 1$		
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 =	$F_{RRUS} := qz \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{RRUSF} = 81$	lbs
Surface Area for One RRUS =	$SA_{RRUSS} := \frac{L_{RRUS} \cdot T_{RRUS}}{144} = 1.6$	sf
Total RRUS Wind Force =	$F_{RRUS} := qz \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{RRUSS} = 62$	lbs

Wind Load (with ice)

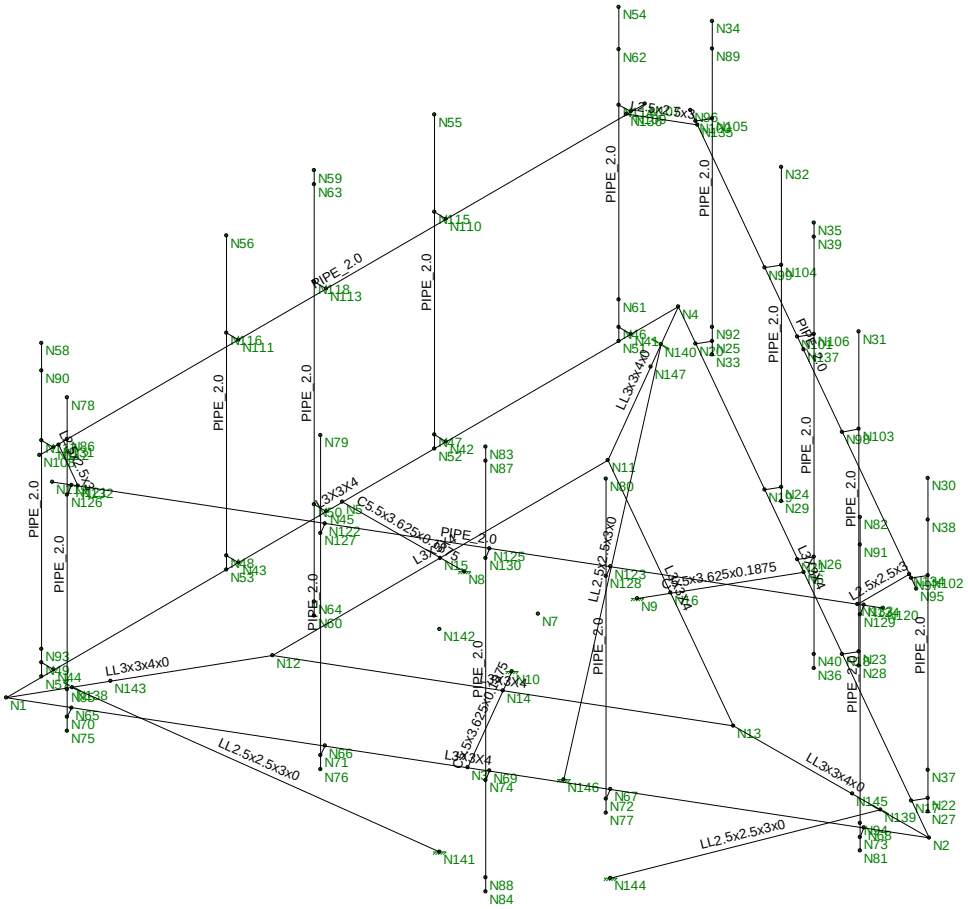
Surface Area for One RRUS w/ Ice =	$SA_{ICERRUSF} := \frac{(L_{RRUS} + 2 \cdot t_{iz}) \cdot (W_{RRUS} + 2 \cdot t_{iz})}{144} = 3.4$	sf
Total RRUS Wind Force w/ Ice =	$Fi_{RRUS} := qz_{ice} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{ICERRUSF} = 34$	lbs
Surface Area for One RRUS w/ Ice =	$SA_{ICERRUSS} := \frac{(L_{RRUS} + 2 \cdot t_{iz}) \cdot (T_{RRUS} + 2 \cdot t_{iz})}{144} = 2.8$	sf
Total RRUS Wind Force w/ Ice =	$Fi_{RRUS} := qz_{ice} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{ICERRUSS} = 28$	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 =	$V_{ice} := (L_{RRUS} + 2 \cdot t_{iz}) \cdot (W_{RRUS} + 2 \cdot t_{iz}) \cdot (T_{RRUS} + 2 \cdot t_{iz}) - V_{RRUS} = 4292$	cu in
Weight of Ice on Each RRUS =	$W_{ICERRUS} := \frac{V_{ice}}{1728} \cdot Id = 139$	lbs
Weight of Ice on All RRUSs =	$W_{ICERRUS} \cdot N_{RRUS} = 139$	lbs



Envelope Only Solution

Centek Engineering Inc.		SK - 1
FJP	CT11000A - AMA	July 4, 2021 at 11:35 PM
21022.19	Member Framing	CT11000A_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 15th(360-16): 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	C5.5x3.625x0.1875	C5.5x3.625x0.1875	Column	Pipe	A53 Gr.B	Typical	2.32	3.154	11.699	.026

Hot Rolled Steel Design Parameters

	Label	Shape	Length[ft]	Lbyy[ft]	Lbzz[ft]	Lcomp top[...	Lcomp bot[...	L-torq...	Kyy	Kzz	Cb	Functi...
1	1	L3X3X4	14	Segment		Lbyy						Lateral
2	2	L3X3X4	14	Segment		Lbyy		Segm...				Lateral
3	3	L3X3X4	14	Segment		Lbyy						Lateral
4	4	C5.5x3.625x0.1875	2.526			Lbyy						Lateral
5	5	C5.5x3.625x0.1875	2.526			Lbyy						Lateral
6	6	C5.5x3.625x0.1875	2.526			Lbyy						Lateral
7	7	L3X3X4	7			Lbyy						Lateral
8	8	L3X3X4	7			Lbyy						Lateral
9	9	L3X3X4	7			Lbyy						Lateral
10	10	LL3x3x4x0	4.041			Lbyy						Lateral
11	11	LL3x3x4x0	4.041			Lbyy						Lateral
12	12	LL3x3x4x0	4.041			Lbyy						Lateral
13	M20	PIPE_2.0	6			Lbyy						Lateral
14	M29	PIPE_2.0	6			Lbyy						Lateral
15	M30	PIPE_2.0	6			Lbyy						Lateral
16	M39	PIPE_2.0	6			Lbyy						Lateral
17	M40	PIPE_2.0	6			Lbyy						Lateral
18	M43	PIPE_2.0	12.605			Lbyy						Lateral
19	M49	PIPE_2.0	12.605			Lbyy						Lateral
20	M55	PIPE_2.0	12.605			Lbyy						Lateral
21	M61	L2.5x2.5x3	1.095			Lbyy						Lateral
22	M62	L2.5x2.5x3	1.075			Lbyy						Lateral
23	M63	L2.5x2.5x3	1.075			Lbyy						Lateral
24	M64	LL2.5x2.5x3x0	6.868			Lbyy						Lateral
25	M65	LL2.5x2.5x3x0	6.868			Lbyy						Lateral
26	M66	LL2.5x2.5x3x0	6.868			Lbyy						Lateral
27	PSA.1	PIPE_2.0	6			Lbyy						Lateral
28	PSA.2	PIPE_2.0	8			Lbyy						Lateral
29	PSA.3	PIPE_2.0	6			Lbyy						Lateral
30	PSB.1	PIPE_2.0	6			Lbyy						Lateral
31	PSB.2	PIPE_2.0	8			Lbyy						Lateral
32	PSB.3	PIPE_2.0	6			Lbyy						Lateral
33	PSC.1	PIPE_2.0	6			Lbyy						Lateral
34	PSC.2	PIPE_2.0	8			Lbyy						Lateral
35	PSC.3	PIPE_2.0	6			Lbyy						Lateral
36	m19	PIPE_2.0	6			Lbyy						Lateral

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(...	Section/Shape	Type	Design List	Material	Design R...
1	1	N4	N1		270	L3X3X4	None	None	A53 Gr.B	Typical
2	2	N1	N2		270	L3X3X4	None	None	A53 Gr.B	Typical
3	3	N2	N4		270	L3X3X4	None	None	A53 Gr.B	Typical
4	4	N3	N10		90	C5.5x3.625x0.1875	Column	Pipe	A53 Gr.B	Typical
5	5	N5	N8		90	C5.5x3.625x0.1875	Column	Pipe	A53 Gr.B	Typical

Member Primary Data (Continued)

	Label	I Joint	J Joint	K Joint	Rotate(...	Section/Shape	Type	Design List	Material	Design R...
6	6	N6	N9		90	C5.5x3.625x0.1875	Column	Pipe	A53 Gr.B	Typical
7	7	N11	N12			L3X3X4	None	None	A53 Gr.B	Typical
8	8	N12	N13			L3X3X4	None	None	A53 Gr.B	Typical
9	9	N13	N11			L3X3X4	None	None	A53 Gr.B	Typical
10	10	N2	N13		180	LL3x3x4x0	None	None	A53 Gr.B	Typical
11	11	N1	N12		180	LL3x3x4x0	None	None	A53 Gr.B	Typical
12	12	N4	N11		180	LL3x3x4x0	None	None	A53 Gr.B	Typical
13	M13	N17	N22			RIGID	None	None	RIGID	Typical
14	M14	N18	N23			RIGID	None	None	RIGID	Typical
15	M15	N21	N26			RIGID	None	None	RIGID	Typical
16	M16	N19	N24			RIGID	None	None	RIGID	Typical
17	M17	N20	N25			RIGID	None	None	RIGID	Typical
18	M20	N31	N28			PIPE_2.0	None	None	A53 Gr.B	Typical
19	M23	N41	N46			RIGID	None	None	RIGID	Typical
20	M24	N42	N47			RIGID	None	None	RIGID	Typical
21	M25	N45	N50			RIGID	None	None	RIGID	Typical
22	M26	N43	N48			RIGID	None	None	RIGID	Typical
23	M27	N44	N49			RIGID	None	None	RIGID	Typical
24	M29	N56	N53			PIPE_2.0	None	None	A53 Gr.B	Typical
25	M30	N55	N52			PIPE_2.0	None	None	A53 Gr.B	Typical
26	M33	N65	N70			RIGID	None	None	RIGID	Typical
27	M34	N66	N71			RIGID	None	None	RIGID	Typical
28	M35	N69	N74			RIGID	None	None	RIGID	Typical
29	M36	N67	N72			RIGID	None	None	RIGID	Typical
30	M37	N68	N73			RIGID	None	None	RIGID	Typical
31	M39	N80	N77			PIPE_2.0	None	None	A53 Gr.B	Typical
32	M40	N79	N76			PIPE_2.0	None	None	A53 Gr.B	Typical
33	M43	N95	N96		270	PIPE_2.0	None	None	A53 Gr.B	Typical
34	M44	N97	N102			RIGID	None	None	RIGID	Typical
35	M45	N98	N103			RIGID	None	None	RIGID	Typical
36	M46	N101	N106			RIGID	None	None	RIGID	Typical
37	M47	N99	N104			RIGID	None	None	RIGID	Typical
38	M48	N100	N105			RIGID	None	None	RIGID	Typical
39	M49	N107	N108		270	PIPE_2.0	None	None	A53 Gr.B	Typical
40	M50	N109	N114			RIGID	None	None	RIGID	Typical
41	M51	N110	N115			RIGID	None	None	RIGID	Typical
42	M52	N113	N118			RIGID	None	None	RIGID	Typical
43	M53	N111	N116			RIGID	None	None	RIGID	Typical
44	M54	N112	N117			RIGID	None	None	RIGID	Typical
45	M55	N119	N120		270	PIPE_2.0	None	None	A53 Gr.B	Typical
46	M56	N121	N126			RIGID	None	None	RIGID	Typical
47	M57	N122	N127			RIGID	None	None	RIGID	Typical
48	M58	N125	N130			RIGID	None	None	RIGID	Typical
49	M59	N123	N128			RIGID	None	None	RIGID	Typical
50	M60	N124	N129			RIGID	None	None	RIGID	Typical
51	M61	N132	N131			L2.5x2.5x3	None	None	A53 Gr.B	Typical
52	M62	N134	N133			L2.5x2.5x3	None	None	A53 Gr.B	Typical
53	M63	N136	N135			L2.5x2.5x3	None	None	A53 Gr.B	Typical
54	M64	N138	N141			LL2.5x2.5x3x0	None	None	A53 Gr.B	Typical
55	M65	N139	N144			LL2.5x2.5x3x0	None	None	A53 Gr.B	Typical
56	M66	N140	N146			LL2.5x2.5x3x0	None	None	A53 Gr.B	Typical
57	PSA.1	N81	N82			PIPE_2.0	None	None	A53 Gr.B	Typical

Member Primary Data (Continued)

	Label	I Joint	J Joint	K Joint	Rotate(...	Section/Shape	Type	Design List	Material	Design R...
58	PSA.2	N83	N84			PIPE_2.0	None	None	A53 Gr.B	Typical
59	PSA.3	N78	N75			PIPE_2.0	None	None	A53 Gr.B	Typical
60	PSB.1	N57	N58			PIPE_2.0	None	None	A53 Gr.B	Typical
61	PSB.2	N59	N60			PIPE_2.0	None	None	A53 Gr.B	Typical
62	PSB.3	N54	N51			PIPE_2.0	None	None	A53 Gr.B	Typical
63	PSC.1	N33	N34			PIPE_2.0	None	None	A53 Gr.B	Typical
64	PSC.2	N35	N36			PIPE_2.0	None	None	A53 Gr.B	Typical
65	PSC.3	N30	N27			PIPE_2.0	None	None	A53 Gr.B	Typical
66	m19	N32	N29			PIPE_2.0	None	None	A53 Gr.B	Typical

Joint Coordinates and Temperatures

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Diap...
1	N1	-2.005507	-16.999998	13.633101	0	
2	N2	10.088312	-16.999998	6.580476	0	
3	N3	4.041402	-16.999998	10.106789	0	
4	N4	-2.066351	-16.999998	-0.366767	0	
5	N5	-2.035929	-16.999998	6.633167	0	
6	N6	4.01098	-16.999998	3.106854	0	
7	N8	0.489954	-16.999998	6.622189	0	
8	N9	2.757545	-16.999998	5.299822	0	
9	N10	2.768953	-16.999998	7.924798	0	
10	N11	-0.030433	-16.999998	3.124418	0	
11	N12	-0.000002	-16.999998	10.124312	0	
12	N13	6.046898	-16.999998	6.59804	0	
13	N14	3.023443	-16.999998	8.361196	0	
14	N15	-0.015223	-16.999998	6.624385	0	
15	N16	3.008232	-16.999998	4.861229	0	
16	N17	9.238209	-16.999998	6.094583	0	
17	N18	5.892059	-16.999998	4.182023	0	
18	N19	2.129902	-16.999998	2.031686	0	
19	N20	-1.216248	-16.999998	0.119126	0	
20	N21	3.721584	-16.999998	2.941444	0	
21	N22	9.362267	-16.999998	5.877535	0	
22	N23	6.016117	-16.999998	3.964975	0	
23	N24	2.25396	-16.999998	1.814638	0	
24	N25	-1.09219	-16.999998	-0.097921	0	
25	N26	3.845642	-16.999998	2.724396	0	
26	N27	9.362267	-17.249998	5.877535	-3	
27	N28	6.016117	-17.249998	3.964975	-3	
28	N29	2.25396	-17.249998	1.814638	-3	
29	N30	9.362267	-11.249998	5.877535	69	
30	N31	6.016117	-11.249998	3.964975	69	
31	N32	2.25396	-11.249998	1.814638	69	
32	N33	-1.09219	-17.249998	-0.097921	-3	
33	N34	-1.09219	-11.249998	-0.097921	69	
34	N35	3.845642	-10.999998	2.724396	72	
35	N36	3.845642	-18.999998	2.724396	-24	
36	N37	9.362267	-16.499998	5.877535	6	
37	N38	9.362267	-11.999998	5.877535	60	
38	N39	3.845642	-11.249998	2.724396	69	

Joint Coordinates and Temperatures (Continued)

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Diap...
39	N40	3.845642	-18.749998	2.724396	-21	
40	N41	-2.062066	-16.999998	0.619071	0	
41	N42	-2.045345	-16.999998	4.466524	0	
42	N43	-2.026513	-16.999998	8.799816	0	
43	N44	-2.009792	-16.999998	12.647269	0	
44	N45	-2.03448	-16.999998	6.9665	0	
45	N46	-2.303891	-16.999998	0.620122	0	
46	N47	-2.295343	-16.999998	4.46761	0	
47	N48	-2.276511	-16.999998	8.800903	0	
48	N49	-2.267963	-16.999998	12.648391	0	
49	N50	-2.284479	-16.999998	6.967587	0	
50	N51	-2.303891	-17.249998	0.620122	-3	
51	N52	-2.295343	-17.249998	4.46761	-3	
52	N53	-2.276511	-17.249998	8.800903	-3	
53	N54	-2.303891	-11.249998	0.620122	69	
54	N55	-2.295343	-11.249998	4.46761	69	
55	N56	-2.276511	-11.249998	8.800903	69	
56	N57	-2.267963	-17.249998	12.648391	-3	
57	N58	-2.267963	-11.249998	12.648391	69	
58	N59	-2.284479	-10.999998	6.967587	72	
59	N60	-2.284479	-18.999998	6.967587	-24	
60	N61	-2.303891	-16.499998	0.620122	6	
61	N62	-2.303891	-11.999998	0.620122	60	
62	N63	-2.284479	-11.249998	6.967587	69	
63	N64	-2.284479	-18.749998	6.967587	-21	
64	N65	-1.153891	-16.999998	13.136473	0	
65	N66	2.169741	-16.999998	11.198266	0	
66	N67	5.913066	-16.999998	9.01531	0	
67	N68	9.236697	-16.999998	7.077103	0	
68	N69	4.329351	-16.999998	9.938868	0	
69	N70	-1.023833	-16.999998	13.359496	0	
70	N71	2.295681	-16.999998	11.414229	0	
71	N72	6.039007	-16.999998	9.231273	0	
72	N73	9.358521	-16.999998	7.286006	0	
73	N74	4.455292	-16.999998	10.154831	0	
74	N75	-1.023833	-17.249998	13.359496	-3	
75	N76	2.295681	-17.249998	11.414229	-3	
76	N77	6.039007	-17.249998	9.231273	-3	
77	N78	-1.023833	-11.249998	13.359496	69	
78	N79	2.295681	-11.249998	11.414229	69	
79	N80	6.039007	-11.249998	9.231273	69	
80	N81	9.358521	-17.249998	7.286006	-3	
81	N82	9.358521	-11.249998	7.286006	69	
82	N83	4.455292	-10.999998	10.154831	72	
83	N84	4.455292	-18.999998	10.154831	-24	
84	N85	-1.023833	-16.499998	13.359496	6	
85	N86	-1.023833	-11.999998	13.359496	60	
86	N87	4.455292	-11.249998	10.154831	69	
87	N88	4.455292	-18.749998	10.154831	-21	
88	N89	-1.09219	-11.749998	-0.097921	63	
89	N90	-2.267963	-11.749998	12.648391	63	
90	N91	9.358521	-11.749998	7.286006	63	

Joint Coordinates and Temperatures (Continued)

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Diap...
91	N92	-1.09219	-16.749998	-0.097921	3	
92	N93	-2.267963	-16.749998	12.648391	3	
93	N94	9.358521	-16.749998	7.286006	3	
94	N95	9.482568	-12.999998	6.234251	48	
95	N96	-1.460607	-12.999998	-0.020542	48	
96	N97	9.238209	-12.999998	6.094583	48	
97	N98	5.892059	-12.999998	4.182023	48	
98	N99	2.129902	-12.999998	2.031686	48	
99	N100	-1.216248	-12.999998	0.119126	48	
100	N101	3.721584	-12.999998	2.941444	48	
101	N102	9.362267	-12.999998	5.877535	48	
102	N103	6.016117	-12.999998	3.964975	48	
103	N104	2.25396	-12.999998	1.814638	48	
104	N105	-1.09219	-12.999998	-0.097921	48	
105	N106	3.845642	-12.999998	2.724396	48	
106	N107	-2.057189	-12.999998	0.330919	48	
107	N108	-2.01467	-12.999998	12.935421	48	
108	N109	-2.056217	-12.999998	0.619045	48	
109	N110	-2.043238	-12.999998	4.466515	48	
110	N111	-2.028621	-12.999998	8.799825	48	
111	N112	-2.015642	-12.999998	12.647295	48	
112	N113	-2.034805	-12.999998	6.966502	48	
113	N114	-2.303891	-12.999998	0.620122	48	
114	N115	-2.295343	-12.999998	4.46761	0	
115	N116	-2.276511	-12.999998	8.800903	0	
116	N117	-2.267963	-12.999998	12.648391	0	
117	N118	-2.284479	-12.999998	6.967587	0	
118	N119	-1.3997	-12.999998	13.286917	0	
119	N120	9.482508	-12.999998	6.926663	0	
120	N121	-1.150943	-12.999998	13.141528	0	
121	N122	2.170803	-12.999998	11.200088	0	
122	N123	5.912005	-12.999998	9.013492	0	
123	N124	9.233752	-12.999998	7.072052	0	
124	N125	4.329189	-12.999998	9.93859	0	
125	N126	-1.023833	-12.999998	13.359496	0	
126	N127	2.295681	-12.999998	11.414229	0	
127	N128	6.039007	-12.999998	9.231273	0	
128	N129	9.358521	-12.999998	7.286006	0	
129	N130	4.455292	-12.999998	10.154831	0	
130	N131	-2.015978	-12.999998	12.547903	0	
131	N132	-1.065135	-12.999998	13.091376	0	
132	N133	9.153679	-12.999998	7.118852	0	
133	N134	9.149006	-12.999998	6.043597	0	
134	N135	-1.127043	-12.999998	0.170113	0	
135	N136	-2.055904	-12.999998	0.711787	0	
136	N137	4.01098	-12.999998	3.106854	0	
137	N138	-1.509279	-16.999998	12.76491	0	
138	N139	9.088321	-16.999998	6.584822	0	
139	N140	-1.56259	-16.999998	0.49708	0	
140	N141	1.261137	-20.999998	7.917888	0	
141	N143	-1.22002	-16.999998	12.258839	0	
142	N144	3.505469	-20.999998	6.609086	0	

Joint Coordinates and Temperatures (Continued)

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Diap...
143	N145	8.505422	-16.999998	6.587357	0	
144	N146	1.249848	-20.999998	5.31984	0	
145	N147	-1.268947	-16.999998	1.000618	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	N10	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
2	N8	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
3	N9	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
4	N138						
5	N139						
6	N140						
7	N141	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
8	N144	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
9	N146	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
10	N1						
11	N44						
12	N49						
13	N57						
14	N65						
15	N70						
16	N75						
17	N85						
18	N93						
19	N143						
20	N2						
21	N17						
22	N22						
23	N27						
24	N37						
25	N68						
26	N73						
27	N81						
28	N94						
29	N145						
30	N20						
31	N25						
32	N33						
33	N41						
34	N46						
35	N51						
36	N92						
37	N147						

Member Point Loads (BLC 2 : Dead Load)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	PSA.2	Y	-.075	1.083
2	PSA.2	Y	-.075	5.917
3	PSA.3	Y	-.052	1.667

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

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
4	PSA.3	Y	-.052	4.417
5	PSA.1	Y	-.021	3.417
6	PSA.1	Y	-.021	5.333
7	PSA.2	Y	-.074	1
8	PSA.2	Y	-.109	7
9	PSC.2	Y	-.075	1.083
10	PSC.2	Y	-.075	5.917
11	PSC.3	Y	-.052	1.667
12	PSC.3	Y	-.052	4.417
13	PSC.1	Y	-.021	3.417
14	PSC.1	Y	-.021	5.333
15	PSC.2	Y	-.074	1
16	PSC.2	Y	-.109	7
17	PSB.2	Y	-.075	1.083
18	PSB.2	Y	-.075	5.917
19	PSB.3	Y	-.052	1.667
20	PSB.3	Y	-.052	4.417
21	PSB.1	Y	-.021	3.417
22	PSB.1	Y	-.021	5.333
23	PSB.2	Y	-.074	1
24	PSB.2	Y	-.109	7

Member Point Loads (BLC 3 : Ice Load)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	PSA.2	Y	-.282	1.083
2	PSA.2	Y	-.282	5.917
3	PSA.3	Y	-.102	1.667
4	PSA.3	Y	-.102	4.417
5	PSA.1	Y	-.093	3.417
6	PSA.1	Y	-.093	5.333
7	PSA.2	Y	-.075	1
8	PSA.2	Y	-.139	7
9	PSC.2	Y	-.282	1.083
10	PSC.2	Y	-.282	5.917
11	PSC.3	Y	-.102	1.667
12	PSC.3	Y	-.102	4.417
13	PSC.1	Y	-.093	3.417
14	PSC.1	Y	-.093	5.333
15	PSC.2	Y	-.075	1
16	PSC.2	Y	-.139	7
17	PSB.2	Y	-.282	1.083
18	PSB.2	Y	-.282	5.917
19	PSB.3	Y	-.102	1.667
20	PSB.3	Y	-.102	4.417
21	PSB.1	Y	-.093	3.417
22	PSB.1	Y	-.093	5.333
23	PSB.2	Y	-.075	1
24	PSB.2	Y	-.139	7

Member Point Loads (BLC 4 : (x) TIA Wind with Ice (8 psf))

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

Member Point Loads (BLC 4 : (x) TIA Wind with Ice (8 psf)) (Continued)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	PSA.2	X	.048	1.083
2	PSA.2	X	.048	5.917
3	PSA.3	X	.017	1.667
4	PSA.3	X	.017	4.417
5	PSA.1	X	.017	3.417
6	PSA.1	X	.017	5.333
7	PSA.2	X	.013	1
8	PSA.2	X	.028	7
9	PSC.2	X	.048	1.083
10	PSC.2	X	.048	5.917
11	PSC.3	X	.017	1.667
12	PSC.3	X	.017	4.417
13	PSC.1	X	.017	3.417
14	PSC.1	X	.017	5.333
15	PSC.2	X	.013	1
16	PSC.2	X	.028	7
17	PSB.2	X	.105	1.083
18	PSB.2	X	.105	5.917
19	PSB.3	X	.033	1.667
20	PSB.3	X	.033	4.417
21	PSB.1	X	.039	3.417
22	PSB.1	X	.039	5.333

Member Point Loads (BLC 5 : (x) TIA Wind (29 psf))

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	PSA.2	X	.113	1.083
2	PSA.2	X	.113	5.917
3	PSA.3	X	.036	1.667
4	PSA.3	X	.036	4.417
5	PSA.1	X	.025	3.417
6	PSA.1	X	.025	5.333
7	PSA.2	X	.021	1
8	PSA.2	X	.062	7
9	PSC.2	X	.113	1.083
10	PSC.2	X	.113	5.917
11	PSC.3	X	.036	1.667
12	PSC.3	X	.036	4.417
13	PSC.1	X	.025	3.417
14	PSC.1	X	.025	5.333
15	PSC.2	X	.021	1
16	PSC.2	X	.062	7
17	PSB.2	X	.319	1.083
18	PSB.2	X	.319	5.917
19	PSB.3	X	.089	1.667
20	PSB.3	X	.089	4.417
21	PSB.1	X	.102	3.417
22	PSB.1	X	.102	5.333

Member Point Loads (BLC 6 : (z) TIA Wind with Ice (8 psf))

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	PSA.2	Z	.105	1.083

Member Point Loads (BLC 6 : (z) TIA Wind with Ice (8 psf)) (Continued)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
2	PSA.2	Z	.105	5.917
3	PSA.3	Z	.033	1.667
4	PSA.3	Z	.033	4.417
5	PSA.1	Z	.039	3.417
6	PSA.1	Z	.039	5.333
7	PSC.2	Z	.105	1.083
8	PSC.2	Z	.105	5.917
9	PSC.3	Z	.033	1.667
10	PSC.3	Z	.033	4.417
11	PSC.1	Z	.039	3.417
12	PSC.1	Z	.039	5.333
13	PSB.2	Z	.048	1.083
14	PSB.2	Z	.048	5.917
15	PSB.3	Z	.017	1.667
16	PSB.3	Z	.017	4.417
17	PSB.1	Z	.017	3.417
18	PSB.1	Z	.017	5.333
19	PSB.2	Z	.013	1
20	PSB.2	Z	.028	7

Member Point Loads (BLC 7 : (z) TIA Wind (29 psf))

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	PSA.2	Z	.319	1.083
2	PSA.2	Z	.319	5.917
3	PSA.3	Z	.089	1.667
4	PSA.3	Z	.089	4.417
5	PSA.1	Z	.102	3.417
6	PSA.1	Z	.102	5.333
7	PSC.2	Z	.319	1.083
8	PSC.2	Z	.319	5.917
9	PSC.3	Z	.089	1.667
10	PSC.3	Z	.089	4.417
11	PSC.1	Z	.102	3.417
12	PSC.1	Z	.102	5.333
13	PSB.2	Z	.113	1.083
14	PSB.2	Z	.113	5.917
15	PSB.3	Z	.036	1.667
16	PSB.3	Z	.036	4.417
17	PSB.1	Z	.025	3.417
18	PSB.1	Z	.025	5.333
19	PSB.2	Z	.021	1
20	PSB.2	Z	.062	7

Member Distributed Loads (BLC 4 : (x) TIA Wind with Ice (8 psf))

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/f..	Start Location[ft,%]	End Location[ft,%]
1	1	X	.002	.002	0	0
2	M23	X	.002	.002	0	0
3	M24	X	.002	.002	0	0
4	M25	X	.002	.002	0	0
5	M26	X	.002	.002	0	0

Member Distributed Loads (BLC 4 : (x) TIA Wind with Ice (8 psf)) (Continued)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/f...	Start Location[ft,%]	End Location[ft,%]
6	M27	X	.002	.002	0	0
7	M29	X	.002	.002	0	0
8	M30	X	.002	.002	0	0
9	M49	X	.002	.002	0	0
10	M50	X	.002	.002	0	0
11	M51	X	.002	.002	0	0
12	M52	X	.002	.002	0	0
13	M53	X	.002	.002	0	0
14	M54	X	.002	.002	0	0
15	PSB.1	X	.002	.002	0	3.417
16	PSB.1	X	.002	.002	5.333	0
17	PSB.2	X	.002	.002	0	1.083
18	PSB.2	X	.002	.002	5.917	0
19	PSB.3	X	.002	.002	0	1.667
20	PSB.3	X	.002	.002	4.417	0
21	M64	X	.002	.002	0	0
22	M65	X	.002	.002	0	0
23	M66	X	.002	.002	0	0

Member Distributed Loads (BLC 5 : (x) TIA Wind (29 psf))

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/f...	Start Location[ft,%]	End Location[ft,%]
1	1	X	.007	.007	0	0
2	M23	X	.007	.007	0	0
3	M24	X	.007	.007	0	0
4	M25	X	.007	.007	0	0
5	M26	X	.007	.007	0	0
6	M27	X	.007	.007	0	0
7	M29	X	.006	.006	0	0
8	M30	X	.006	.006	0	0
9	M49	X	.007	.007	0	0
10	M50	X	.007	.007	0	0
11	M51	X	.007	.007	0	0
12	M52	X	.007	.007	0	0
13	M53	X	.007	.007	0	0
14	M54	X	.007	.007	0	0
15	PSB.1	X	.006	.006	0	3.417
16	PSB.1	X	.006	.006	5.333	0
17	PSB.2	X	.006	.006	0	1.083
18	PSB.2	X	.006	.006	5.917	0
19	PSB.3	X	.006	.006	0	1.667
20	PSB.3	X	.006	.006	4.417	0
21	M64	X	.006	.006	0	0
22	M65	X	.006	.006	0	0
23	M66	X	.006	.006	0	0

Member Distributed Loads (BLC 6 : (z) TIA Wind with Ice (8 psf))

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/f...	Start Location[ft,%]	End Location[ft,%]
1	2	Z	.002	.002	0	0
2	3	Z	.002	.002	0	0
3	M14	Z	.002	.002	0	0
4	M16	Z	.002	.002	0	0

Member Distributed Loads (BLC 6 : (z) TIA Wind with Ice (8 psf)) (Continued)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/f...	Start Location[ft,%]	End Location[ft,%]
5	M20	Z	.002	.002	0	0
6	M34	Z	.002	.002	0	0
7	M36	Z	.002	.002	0	0
8	M39	Z	.002	.002	0	0
9	M40	Z	.002	.002	0	0
10	M43	Z	.002	.002	0	0
11	M45	Z	.002	.002	0	0
12	M47	Z	.002	.002	0	0
13	M55	Z	.002	.002	0	0
14	M57	Z	.002	.002	0	0
15	M59	Z	.002	.002	0	0
16	M61	Z	.002	.002	0	0
17	M63	Z	.002	.002	0	0
18	PSA.1	Z	.002	.002	0	3.417
19	PSA.1	Z	.002	.002	5.333	0
20	PSA.2	Z	.002	.002	0	1.083
21	PSA.2	Z	.002	.002	5.917	0
22	PSA.3	Z	.002	.002	0	1.667
23	PSA.3	Z	.002	.002	4.417	0
24	PSC.1	Z	.002	.002	0	3.417
25	PSC.1	Z	.002	.002	5.333	0
26	PSC.2	Z	.002	.002	0	1.083
27	PSC.2	Z	.002	.002	5.917	0
28	PSC.3	Z	.002	.002	0	1.667
29	PSC.3	Z	.002	.002	4.417	0
30	m19	Z	.002	.002	0	0
31	M64	Z	.002	.002	0	0
32	M65	Z	.002	.002	0	0
33	M66	Z	.002	.002	0	0

Member Distributed Loads (BLC 7 : (z) TIA Wind (29 psf))

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/f...	Start Location[ft,%]	End Location[ft,%]
1	2	Z	.007	.007	0	0
2	3	Z	.007	.007	0	0
3	M14	Z	.006	.006	0	0
4	M16	Z	.006	.006	0	0
5	M20	Z	.006	.006	0	0
6	M34	Z	.006	.006	0	0
7	M36	Z	.006	.006	0	0
8	M39	Z	.006	.006	0	0
9	M40	Z	.006	.006	0	0
10	M43	Z	.007	.007	0	0
11	M45	Z	.006	.006	0	0
12	M47	Z	.006	.006	0	0
13	M55	Z	.007	.007	0	0
14	M57	Z	.006	.006	0	0
15	M59	Z	.006	.006	0	0
16	M61	Z	.006	.006	0	0
17	M63	Z	.006	.006	0	0
18	PSA.1	Z	.006	.006	0	3.417
19	PSA.1	Z	.006	.006	5.333	0

Member Distributed Loads (BLC 7 : (z) TIA Wind (29 psf)) (Continued)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/f...	Start Location[ft,%]	End Location[ft,%]
20	PSA.2	Z	.006	.006	0	1.083
21	PSA.2	Z	.006	.006	5.917	0
22	PSA.3	Z	.006	.006	0	1.667
23	PSA.3	Z	.006	.006	4.417	0
24	PSC.1	Z	.006	.006	0	3.417
25	PSC.1	Z	.006	.006	5.333	0
26	PSC.2	Z	.006	.006	0	1.083
27	PSC.2	Z	.006	.006	5.917	0
28	PSC.3	Z	.006	.006	0	1.667
29	PSC.3	Z	.006	.006	4.417	0
30	m19	Z	.006	.006	0	0
31	M64	Z	.006	.006	0	0
32	M65	Z	.006	.006	0	0
33	M66	Z	.006	.006	0	0

Basic Load Cases

	BLC Description	Category	X Gra...	Y Gra...	Z Gra...	Joint	Point	Distrib...	Area(...	Surfa...
1	Self Weight	None		-1						
2	Dead Load	None					24			
3	Ice Load	None					24			
4	(x) TIA Wind with Ice (8 psf)	None					22	23		
5	(x) TIA Wind (29 psf)	None					22	23		
6	(z) TIA Wind with Ice (8 psf)	None					20	33		
7	(z) TIA Wind (29 psf)	None					20	33		

Load Combinations

	Description	Solve	P...	S...	B...	Fa...	BLC	Fact...	BLC	Fa...	BLC	Fa...	BLC	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
1	1.2D + 1.6W (X-dir...	Yes	Y		1	1.2	2	1.2	5	1.6														
2	0.9D + 1.6W (X-dir...	Yes	Y		1	.9	2	.9	5	1.6														
3	1.2D + 1.0Di + 1.0...	Yes	Y		1	1.2	2	1.2	3	1	4	1												
4	1.2D + 1.6W (Z-dire...	Yes	Y		1	1.2	2	1.2	7	1.6														
5	0.9D + 1.6W (Z-dire...	Yes	Y		1	.9	2	.9	7	1.6														
6	1.2D + 1.0Di + 1.0...	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	N10	max	2.01	5	1.02	6	1.065	2	-.759	2	2.144	4	1.307	6
2		min	-2.33	1	.324	5	-2.134	4	-2.23	6	-1.372	2	.426	2
3	N8	max	.012	4	1.034	3	-.034	3	.031	5	.006	3	-.633	2
4		min	-.887	2	.321	5	-3.559	4	-.014	3	-1.091	5	-2.506	6
5	N9	max	-.412	6	1.036	6	-.236	3	2.225	3	2.136	4	1.263	3
6		min	-2.206	1	.366	2	-2.059	5	.551	5	.325	3	.306	5
7	N141	max	-.008	2	1.625	4	1.907	4	0	6	0	1	0	1
8		min	-1.109	4	-.017	2	-.043	2	0	1	0	6	0	6
9	N144	max	1.861	3	1.369	1	-.007	2	0	3	0	3	0	5
10		min	.505	5	.381	5	-.036	4	0	5	0	5	0	3
11	N146	max	.474	5	1.043	3	.78	5	0	2	0	4	0	2

Envelope Joint Reactions (Continued)

	Joint		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
12		min	-.721	3	-.655	5	-1.227	3	0	4	0	2	0	4
13	Totals:	max	0	6	6.534	6	0	3						
14		min	-3.754	2	2.272	2	-5.252	5						

Envelope Joint Displacements

	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [rad]	LC	Y Rotatio...	LC	Z Rotation [rad]	LC
1	N1	max	.01	2	.015	2	.003	1	3.008e-03	5	-2.212e-04	3	-2.775e-04	6
2		min	-.026	4	-.053	4	-.005	5	4.799e-05	3	-1.05e-03	4	-4.451e-03	1
3	N2	max	.007	1	-.004	5	.043	4	6.349e-03	5	5.139e-04	5	2.22e-04	6
4		min	0	5	-.042	1	-.003	2	2.105e-04	3	-6.73e-05	3	-1.441e-03	2
5	N3	max	.007	2	-.046	2	.011	4	5.265e-03	6	2.607e-04	2	-1.074e-03	5
6		min	-.018	4	-.133	6	-.004	2	1.405e-03	2	-8.914e-04	4	-4.122e-03	3
7	N4	max	.025	4	.043	5	0	2	3.858e-03	4	6.989e-04	2	2.151e-03	4
8		min	.002	3	-.01	3	-.006	4	-1.015e-03	2	-1.102e-03	4	-3.615e-03	1
9	N5	max	0	2	-.025	2	.002	2	1.851e-03	4	1.138e-04	2	6.157e-03	6
10		min	0	4	-.127	6	-.003	4	2.346e-04	2	-3.032e-04	4	9.006e-04	2
11	N6	max	.018	4	-.025	5	.011	4	-3.96e-04	5	-1.211e-04	3	-1.057e-03	5
12		min	.002	3	-.131	3	.001	3	-5.826e-03	3	-7.88e-04	4	-2.573e-03	3
13	N8	max	0	6	0	6	0	6	0	6	0	6	0	6
14		min	0	1	0	1	0	1	0	1	0	1	0	1
15	N9	max	0	6	0	6	0	6	0	6	0	6	0	6
16		min	0	1	0	1	0	1	0	1	0	1	0	1
17	N10	max	0	6	0	6	0	6	0	6	0	6	0	6
18		min	0	1	0	1	0	1	0	1	0	1	0	1
19	N11	max	.003	5	-.005	3	.005	5	8.847e-05	6	-1.179e-05	6	-4.054e-05	5
20		min	0	6	-.022	4	0	3	-2.072e-04	2	-2.988e-04	1	-4.439e-04	1
21	N12	max	.004	2	.015	5	.005	4	2.646e-04	2	4.121e-04	2	1.213e-05	5
22		min	-.004	4	-.011	1	0	2	-1.088e-04	6	-1.384e-04	4	-5.153e-04	1
23	N13	max	.005	1	.011	2	.007	4	1.293e-03	4	4.8e-05	2	1.162e-04	6
24		min	0	5	-.004	6	0	2	-4.873e-05	2	-9.765e-04	4	3.489e-06	2
25	N14	max	.002	1	-.003	2	.002	4	1.969e-03	6	1.954e-04	2	-2.483e-04	2
26		min	-.003	4	-.008	6	-.001	1	7.611e-04	2	-3.845e-04	4	-1.216e-03	6
27	N15	max	0	2	-.002	2	.003	4	5.144e-05	3	5.194e-05	5	2.236e-03	6
28		min	0	6	-.008	6	0	3	-3.936e-04	5	-4.026e-06	3	5.274e-04	2
29	N16	max	.003	4	-.002	5	.002	4	-5.001e-04	5	-4.665e-05	3	-1.788e-04	5
30		min	0	3	-.008	3	0	3	-2.027e-03	3	-3.871e-04	4	-1.058e-03	3
31	N17	max	.007	1	.033	5	.059	5	1.55e-02	5	2.297e-03	5	5.597e-03	4
32		min	-.009	5	-.035	1	-.003	1	-3.086e-03	1	-2.801e-04	3	-2.517e-03	2
33	N18	max	.008	1	-.028	5	.033	5	2.517e-02	5	6.016e-04	1	1.387e-02	4
34		min	.006	6	-.116	3	-.006	3	-6.104e-03	1	-1.3e-04	5	-4.579e-03	1
35	N19	max	.017	4	.012	5	.012	5	2.398e-02	4	1.706e-04	5	1.137e-02	5
36		min	.006	3	-.124	3	-.007	3	-8.854e-03	1	-2.684e-04	3	-6.686e-03	1
37	N20	max	.018	4	.045	5	.008	5	8.106e-03	4	1.707e-03	1	4.088e-03	5
38		min	.004	6	-.032	3	-.013	1	-5.054e-03	1	-1.334e-03	5	-6.284e-03	1
39	N21	max	.019	4	-.021	5	.01	5	2.527e-02	5	-1.706e-04	5	1.272e-02	5
40		min	.003	3	-.134	3	0	3	-9.045e-03	1	-3.564e-04	1	-6.257e-03	1
41	N22	max	.007	1	.082	5	.056	5	1.55e-02	5	2.297e-03	5	5.597e-03	4
42		min	-.015	5	-.047	1	-.003	1	-3.086e-03	1	-2.801e-04	3	-2.517e-03	2
43	N23	max	.007	4	.059	5	.033	5	2.517e-02	5	6.016e-04	1	1.387e-02	4
44		min	.005	6	-.125	3	-.007	3	-6.104e-03	1	-1.3e-04	5	-4.579e-03	1

Envelope Joint Displacements (Continued)

	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [rad]	LC	Y Rotatio...	LC	Z Rotation [rad]	LC
45	N24	max	.017	4	.091	5	.012	5	2.398e-02	4	1.706e-04	5	1.137e-02	5
46		min	.007	3	-.135	3	-.006	3	-8.854e-03	1	-2.684e-04	3	-6.686e-03	1
47	N25	max	.021	4	.072	5	.01	5	8.106e-03	4	1.707e-03	1	4.088e-03	5
48		min	.004	3	-.044	1	-.015	1	-5.054e-03	1	-1.334e-03	5	-6.284e-03	1
49	N26	max	.019	4	.064	5	.01	4	2.527e-02	5	-1.706e-04	5	1.272e-02	5
50		min	.003	3	-.154	3	0	3	-9.045e-03	1	-3.564e-04	1	-6.257e-03	1
51	N27	max	.006	6	.082	5	.009	4	1.55e-02	5	2.297e-03	5	5.597e-03	4
52		min	-.001	2	-.047	1	.004	6	-3.086e-03	1	-2.801e-04	3	-2.517e-03	2
53	N28	max	.048	4	.059	5	.015	2	2.517e-02	5	6.016e-04	1	1.387e-02	4
54		min	-.008	2	-.125	3	-.043	4	-6.104e-03	1	-1.3e-04	5	-4.579e-03	1
55	N29	max	.051	4	.091	5	.022	2	2.398e-02	4	1.706e-04	5	1.137e-02	5
56		min	-.011	2	-.135	3	-.061	4	-8.854e-03	1	-2.684e-04	3	-6.686e-03	1
57	N30	max	.333	2	.083	5	.891	4	9.464e-03	4	1.909e-02	4	5.143e-03	4
58		min	-.278	4	-.048	1	-.041	1	-1.256e-03	1	-1.498e-03	1	-3.406e-03	2
59	N31	max	.472	1	.058	5	1.815	5	2.333e-02	5	8.401e-03	5	1.307e-02	4
60		min	-.77	4	-.125	3	-.318	1	-5.698e-03	1	-5.089e-03	1	-4.468e-03	2
61	N32	max	.574	1	.091	5	1.73	4	2.337e-02	4	1.159e-03	3	1.058e-02	5
62		min	-.595	5	-.135	3	-.508	1	-7.54e-03	2	-1.356e-02	5	-6.025e-03	1
63	N33	max	.033	5	.072	5	0	2	8.106e-03	4	1.707e-03	1	4.088e-03	5
64		min	-.011	1	-.044	1	-.015	4	-5.054e-03	1	-1.334e-03	5	-6.284e-03	1
65	N34	max	.371	1	.073	5	.738	4	1.181e-02	4	1.062e-02	1	9.082e-04	5
66		min	.014	6	-.045	1	-.197	2	-2.148e-03	2	-1.635e-02	4	-3.363e-03	1
67	N35	max	.623	1	.064	5	2.139	5	3.066e-02	4	-5.521e-04	3	1.322e-02	4
68		min	-.819	5	-.155	3	-.501	1	-7.461e-03	1	-4.339e-03	5	-7.593e-03	1
69	N36	max	.324	5	.064	5	.219	1	2.512e-02	5	-1.706e-04	5	1.271e-02	5
70		min	-.133	1	-.154	3	-.594	5	-9.035e-03	1	-3.564e-04	1	-5.76e-03	1
71	N37	max	.027	1	.082	5	.149	5	1.557e-02	5	4.394e-03	5	4.161e-03	4
72		min	-.043	5	-.047	1	-.017	1	-1.596e-03	1	-3.314e-04	3	-4.274e-03	2
73	N38	max	.303	2	.083	5	.806	4	9.458e-03	4	1.909e-02	4	5.142e-03	4
74		min	-.232	4	-.048	1	-.029	1	-1.256e-03	1	-1.498e-03	1	-3.406e-03	2
75	N39	max	.6	1	.064	5	2.048	5	3.066e-02	4	-5.521e-04	3	1.322e-02	4
76		min	-.779	5	-.155	3	-.479	1	-7.461e-03	1	-4.339e-03	5	-7.593e-03	1
77	N40	max	.286	5	.064	5	.192	1	2.513e-02	5	-1.706e-04	5	1.271e-02	5
78		min	-.116	1	-.154	3	-.519	5	-9.035e-03	1	-3.564e-04	1	-5.76e-03	1
79	N41	max	.02	2	.028	2	0	2	3.875e-03	4	1.551e-03	2	2.931e-03	4
80		min	-.003	6	-.027	6	-.005	4	-7.649e-04	2	-2.125e-03	4	-9.62e-03	2
81	N42	max	.009	2	-.01	5	.001	2	1.87e-03	4	3.987e-04	3	3.61e-03	4
82		min	-.008	6	-.104	3	-.004	4	4.858e-04	2	-4.164e-04	5	-2.536e-02	2
83	N43	max	.012	2	-.021	2	.002	2	1.686e-03	5	-1.658e-05	2	9.401e-04	6
84		min	-.013	4	-.137	6	-.003	4	-9.475e-04	3	-7.861e-04	4	-2.7e-02	2
85	N44	max	.025	2	.031	2	.003	1	2.05e-03	5	-1.905e-04	6	5.809e-04	6
86		min	-.011	4	-.034	6	-.004	5	-1.319e-03	3	-1.669e-03	5	-1.029e-02	2
87	N45	max	.002	2	-.026	2	.002	2	2.473e-03	4	4.484e-04	2	4.663e-03	6
88		min	-.002	4	-.133	6	-.003	4	-3.385e-05	2	-5.008e-04	4	-2.766e-02	2
89	N46	max	.02	2	.056	2	.005	2	3.875e-03	4	1.551e-03	2	2.931e-03	4
90		min	-.003	6	-.032	6	-.011	4	-7.649e-04	2	-2.125e-03	4	-9.62e-03	2
91	N47	max	.009	2	.063	2	.002	1	1.87e-03	4	3.987e-04	3	3.61e-03	4
92		min	-.008	6	-.109	6	-.005	5	4.858e-04	2	-4.164e-04	5	-2.536e-02	2
93	N48	max	.012	2	.06	2	.002	2	1.686e-03	5	-1.658e-05	2	9.401e-04	6
94		min	-.013	4	-.14	6	-.006	4	-9.475e-04	3	-7.861e-04	4	-2.7e-02	2
95	N49	max	.025	2	.063	2	0	3	2.05e-03	5	-1.905e-04	6	5.809e-04	6
96		min	-.011	4	-.036	6	-.009	5	-1.319e-03	3	-1.669e-03	5	-1.029e-02	2

Envelope Joint Displacements (Continued)

	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [rad]	LC	Y Rotatio...	LC	Z Rotation [rad]	LC
97	N50	max	.002	2	.057	2	.003	2	2.473e-03	4	4.484e-04	2	4.663e-03	6
98		min	-.002	4	-.147	6	-.005	4	-3.385e-05	2	-5.008e-04	4	-2.766e-02	2
99	N51	max	.014	5	.056	2	.007	2	3.875e-03	4	1.551e-03	2	2.931e-03	4
100		min	-.009	1	-.032	6	-.023	4	-7.649e-04	2	-2.125e-03	4	-9.62e-03	2
101	N52	max	.011	5	.063	2	0	2	1.87e-03	4	3.987e-04	3	3.61e-03	4
102		min	-.068	1	-.109	6	-.01	4	4.858e-04	2	-4.164e-04	5	-2.536e-02	2
103	N53	max	-.007	6	.06	2	.004	1	1.686e-03	5	-1.658e-05	2	9.401e-04	6
104		min	-.07	1	-.14	6	-.01	5	-9.475e-04	3	-7.861e-04	4	-2.7e-02	2
105	N54	max	.591	1	.056	2	.38	4	3.371e-03	4	1.608e-02	1	1.421e-05	5
106		min	-.068	4	-.032	6	.034	3	1.059e-03	3	-8.771e-03	4	-8.588e-03	1
107	N55	max	1.736	2	.062	2	.394	4	2.491e-03	4	1.293e-02	2	2.003e-03	4
108		min	-.195	4	-.109	6	.036	3	9.402e-04	2	-3.625e-04	6	-2.432e-02	1
109	N56	max	1.844	2	.06	2	.381	5	1.859e-03	5	3.255e-03	4	2.596e-04	6
110		min	-.043	6	-.14	6	-.048	1	-1.196e-03	3	-1.167e-02	2	-2.591e-02	1
111	N57	max	-.003	3	.063	2	.004	3	2.05e-03	5	-1.905e-04	6	5.809e-04	6
112		min	-.015	4	-.036	6	-.016	5	-1.319e-03	3	-1.669e-03	5	-1.029e-02	2
113	N58	max	.705	1	.064	2	.377	5	3.108e-03	5	-9.376e-04	6	-8.916e-06	5
114		min	.023	6	-.036	6	-.08	1	-1.9e-03	1	-1.737e-02	1	-1.126e-02	1
115	N59	max	2.234	2	.057	2	.442	4	4.137e-03	4	4.147e-03	4	4.117e-04	4
116		min	-.08	6	-.148	6	.002	2	-1.71e-04	2	-4.344e-04	2	-3.308e-02	1
117	N60	max	.111	6	.057	2	.004	2	1.98e-03	4	4.484e-04	2	4.653e-03	6
118		min	-.659	2	-.147	6	-.054	4	-3.382e-05	2	-5.008e-04	4	-2.752e-02	2
119	N61	max	.076	2	.056	2	.019	4	5.909e-03	4	3.365e-03	2	2.616e-03	4
120		min	-.012	6	-.032	6	.003	2	-4.007e-05	2	-2.956e-03	4	-9.196e-03	2
121	N62	max	.513	1	.056	2	.35	4	3.371e-03	4	1.608e-02	1	1.421e-05	5
122		min	-.068	4	-.032	6	.024	3	1.059e-03	3	-8.771e-03	4	-8.582e-03	1
123	N63	max	2.135	2	.057	2	.43	4	4.137e-03	4	4.147e-03	4	4.117e-04	4
124		min	-.079	6	-.148	6	.003	3	-1.71e-04	2	-4.344e-04	2	-3.308e-02	1
125	N64	max	.097	6	.057	2	.004	2	1.98e-03	4	4.484e-04	2	4.653e-03	6
126		min	-.576	2	-.147	6	-.048	4	-3.382e-05	2	-5.008e-04	4	-2.752e-02	2
127	N65	max	.019	1	-.026	2	.018	1	8.518e-03	4	-6.094e-04	6	-2.936e-03	6
128		min	-.017	5	-.061	4	.006	6	1.701e-03	3	-1.945e-03	1	-7.803e-03	1
129	N66	max	.015	1	-.03	2	.016	4	2.31e-02	4	5.204e-04	4	-2.956e-03	3
130		min	-.015	5	-.119	6	.008	2	3.064e-03	3	1.839e-04	2	-1.191e-02	4
131	N67	max	.01	1	-.039	5	.037	4	2.691e-02	4	-3.35e-04	5	-1.217e-03	3
132		min	-.004	5	-.137	3	0	2	3.052e-03	3	-4.888e-04	1	-1.42e-02	4
133	N68	max	.01	4	-.035	2	.06	4	1.579e-02	4	2.415e-03	4	3.556e-04	3
134		min	.004	3	-.052	4	-.003	2	2.102e-03	3	-2.095e-04	2	-4.874e-03	5
135	N69	max	.007	2	-.052	2	.015	4	2.815e-02	4	-1.287e-05	2	-4.388e-03	3
136		min	-.016	4	-.136	6	-.004	2	5.392e-03	3	-1.177e-03	4	-1.523e-02	4
137	N70	max	.014	2	-.042	3	.021	1	8.518e-03	4	-6.094e-04	6	-2.936e-03	6
138		min	-.021	4	-.092	4	.007	6	1.701e-03	3	-1.945e-03	1	-7.803e-03	1
139	N71	max	.016	1	-.066	2	.016	4	2.31e-02	4	5.204e-04	4	-2.956e-03	3
140		min	-.014	5	-.172	4	.008	3	3.064e-03	3	1.839e-04	2	-1.191e-02	4
141	N72	max	.009	1	-.101	2	.038	4	2.691e-02	4	-3.35e-04	5	-1.217e-03	3
142		min	-.005	5	-.15	6	0	2	3.052e-03	3	-4.888e-04	1	-1.42e-02	4
143	N73	max	.016	4	-.041	3	.057	4	1.579e-02	4	2.415e-03	4	3.556e-04	3
144		min	.004	3	-.099	4	-.003	2	2.102e-03	3	-2.095e-04	2	-4.874e-03	5
145	N74	max	.007	2	-.083	2	.017	4	2.815e-02	4	-1.287e-05	2	-4.388e-03	3
146		min	-.019	4	-.169	6	-.004	2	5.392e-03	3	-1.177e-03	4	-1.523e-02	4
147	N75	max	-.008	3	-.042	3	.003	3	8.518e-03	4	-6.094e-04	6	-2.936e-03	6
148		min	-.037	4	-.092	4	-.013	5	1.701e-03	3	-1.945e-03	1	-7.803e-03	1

Envelope Joint Displacements (Continued)

	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [rad]	LC	Y Rotatio...	LC	Z Rotation [rad]	LC
149	N76	max	-.002	3	-.066	2	-.001	3	2.31e-02	4	5.204e-04	4	-2.956e-03	3
150		min	-.049	5	-.172	4	-.054	5	3.064e-03	3	1.839e-04	2	-1.191e-02	4
151	N77	max	0	3	-.101	2	-.002	3	2.691e-02	4	-3.35e-04	5	-1.217e-03	3
152		min	-.047	5	-.15	6	-.043	5	3.052e-03	3	-4.888e-04	1	-1.42e-02	4
153	N78	max	.428	1	-.043	3	.658	4	8.884e-03	5	-2.877e-03	3	-5.991e-04	6
154		min	-.046	5	-.094	4	.04	3	-1.077e-04	3	-1.471e-02	4	-3.41e-03	1
155	N79	max	.639	1	-.066	2	1.668	4	2.166e-02	4	-2.383e-05	2	-2.656e-03	3
156		min	.168	6	-.172	4	.163	3	1.626e-03	3	-1.491e-02	4	-1.091e-02	4
157	N80	max	.817	4	-.101	2	1.899	4	2.47e-02	4	8.837e-03	4	-6.725e-04	3
158		min	.147	3	-.15	6	.144	3	2.414e-03	3	2.276e-03	3	-1.309e-02	5
159	N81	max	.005	6	-.041	3	.009	5	1.579e-02	4	2.415e-03	4	3.556e-04	3
160		min	0	2	-.099	4	-.01	1	2.102e-03	3	-2.095e-04	2	-4.874e-03	5
161	N82	max	.357	2	-.042	3	.922	4	1.117e-02	4	1.998e-02	4	-2.095e-05	6
162		min	.038	6	-.101	4	-.002	1	3.91e-04	3	1.14e-03	3	-4.836e-03	5
163	N83	max	.881	4	-.084	2	2.188	4	3.048e-02	4	4.071e-03	1	-2.28e-03	3
164		min	.204	3	-.17	6	.182	3	2.133e-03	3	-2.84e-03	5	-1.372e-02	4
165	N84	max	-.102	3	-.083	2	-.129	3	2.8e-02	4	-1.287e-05	2	-4.24e-03	3
166		min	-.384	4	-.169	6	-.656	4	5.381e-03	3	-1.177e-03	4	-1.521e-02	4
167	N85	max	.063	1	-.042	3	.068	4	9.466e-03	4	-9.409e-04	6	-1.414e-03	6
168		min	0	5	-.093	4	.018	3	1.414e-03	3	-3.111e-03	1	-8.369e-03	1
169	N86	max	.398	1	-.043	3	.579	4	8.878e-03	5	-2.877e-03	3	-5.991e-04	6
170		min	-.055	5	-.094	4	.041	3	-1.077e-04	3	-1.471e-02	4	-3.41e-03	1
171	N87	max	.84	4	-.084	2	2.097	4	3.048e-02	4	4.071e-03	1	-2.28e-03	3
172		min	.197	3	-.17	6	.175	3	2.133e-03	3	-2.84e-03	5	-1.372e-02	4
173	N88	max	-.089	3	-.083	2	-.113	3	2.8e-02	4	-1.287e-05	2	-4.24e-03	3
174		min	-.339	4	-.169	6	-.572	4	5.381e-03	3	-1.177e-03	4	-1.521e-02	4
175	N89	max	.351	1	.073	5	.667	4	1.18e-02	4	1.062e-02	1	9.082e-04	5
176		min	.012	6	-.045	1	-.185	2	-2.148e-03	2	-1.635e-02	4	-3.363e-03	1
177	N90	max	.638	1	.064	2	.358	5	3.108e-03	5	-9.376e-04	6	-8.916e-06	5
178		min	.021	6	-.036	6	-.069	1	-1.9e-03	1	-1.737e-02	1	-1.125e-02	1
179	N91	max	.333	2	-.042	3	.855	4	1.117e-02	4	1.998e-02	4	-2.095e-05	6
180		min	.038	6	-.101	4	-.009	1	3.91e-04	3	1.14e-03	3	-4.836e-03	5
181	N92	max	.028	1	.072	5	.035	5	8.569e-03	4	2.264e-03	1	2.714e-03	5
182		min	.007	6	-.044	1	-.03	1	-4.627e-03	1	-2.272e-03	5	-6.586e-03	1
183	N93	max	.055	2	.063	2	0	2	3.585e-03	5	-2.372e-04	6	3.604e-04	6
184		min	-.007	4	-.036	6	-.003	3	-9.141e-04	3	-2.622e-03	2	-1.004e-02	2
185	N94	max	.03	4	-.041	3	.104	4	1.56e-02	4	3.513e-03	4	-2.157e-04	3
186		min	.004	3	-.099	4	.003	2	1.458e-03	2	-1.71e-05	2	-4.344e-03	5
187	N95	max	.256	1	.05	5	.665	4	9.377e-03	4	1.909e-02	4	5.141e-03	4
188		min	-.088	4	-.047	1	-.012	1	-1.255e-03	1	-1.498e-03	1	-3.403e-03	2
189	N96	max	.312	1	.059	5	.422	4	1.079e-02	4	1.062e-02	1	9.082e-04	5
190		min	.004	6	-.034	3	-.106	2	-2.148e-03	2	-1.635e-02	4	-3.13e-03	1
191	N97	max	.259	1	.051	5	.721	4	9.377e-03	4	1.909e-02	4	5.141e-03	4
192		min	-.12	4	-.04	3	-.016	1	-1.255e-03	1	-1.498e-03	1	-3.403e-03	2
193	N98	max	.367	1	-.022	5	1.338	5	2.325e-02	5	8.401e-03	5	1.307e-02	4
194		min	-.474	5	-.119	3	-.206	1	-5.698e-03	1	-5.089e-03	1	-4.468e-03	2
195	N99	max	.449	1	.015	5	1.22	5	2.328e-02	4	1.159e-03	3	1.058e-02	5
196		min	-.408	5	-.127	3	-.349	1	-7.54e-03	2	-1.356e-02	5	-6.025e-03	1
197	N100	max	.329	1	.044	5	.47	4	1.079e-02	4	1.062e-02	1	9.081e-04	5
198		min	0	6	-.039	3	-.137	2	-2.148e-03	2	-1.635e-02	4	-3.13e-03	1
199	N101	max	.436	1	-.029	5	1.407	5	2.839e-02	4	-5.521e-04	3	1.32e-02	4
200		min	-.514	5	-.147	3	-.327	1	-7.45e-03	1	-4.339e-03	5	-6.665e-03	1

Envelope Joint Displacements (Continued)

	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [rad]	LC	Y Rotatio...	LC	Z Rotation [rad]	LC
201	N102	max	.262	1	.083	5	.693	4	9.377e-03	4	1.909e-02	4	5.141e-03	4
202		min	-.17	4	-.048	1	-.014	1	-1.255e-03	1	-1.498e-03	1	-3.403e-03	2
203	N103	max	.38	1	.058	5	1.325	5	2.325e-02	5	8.401e-03	5	1.307e-02	4
204		min	-.496	5	-.125	3	-.198	1	-5.698e-03	1	-5.089e-03	1	-4.468e-03	2
205	N104	max	.448	1	.091	5	1.241	5	2.328e-02	4	1.159e-03	3	1.058e-02	5
206		min	-.373	5	-.135	3	-.35	1	-7.54e-03	2	-1.356e-02	5	-6.025e-03	1
207	N105	max	.302	2	.073	5	.494	4	1.079e-02	4	1.062e-02	1	9.081e-04	5
208		min	.007	6	-.045	1	-.152	1	-2.148e-03	2	-1.635e-02	4	-3.13e-03	1
209	N106	max	.444	1	.064	5	1.413	5	2.839e-02	4	-5.521e-04	3	1.32e-02	4
210		min	-.503	5	-.155	3	-.322	1	-7.45e-03	1	-4.339e-03	5	-6.665e-03	1
211	N107	max	.355	1	.037	2	.335	4	3.369e-03	4	1.608e-02	1	1.42e-05	5
212		min	-.038	4	-.028	6	.003	3	1.058e-03	3	-8.771e-03	4	-8.501e-03	1
213	N108	max	.413	1	.039	2	.334	4	2.876e-03	5	-9.376e-04	6	-8.915e-06	5
214		min	.01	6	-.037	6	.003	3	-1.9e-03	1	-1.737e-02	1	-1.025e-02	1
215	N109	max	.411	1	.031	2	.335	4	3.369e-03	4	1.608e-02	1	1.42e-05	5
216		min	-.068	4	-.033	6	.003	3	1.058e-03	3	-8.771e-03	4	-8.501e-03	1
217	N110	max	1.226	2	-.011	2	.334	4	2.491e-03	4	1.293e-02	2	2.003e-03	4
218		min	-.152	4	-.107	6	.002	3	9.401e-04	2	-3.625e-04	6	-2.424e-02	1
219	N111	max	1.301	2	-.017	2	.333	4	1.859e-03	5	3.255e-03	4	2.595e-04	6
220		min	-.038	6	-.14	6	.002	3	-1.195e-03	3	-1.167e-02	2	-2.583e-02	1
221	N112	max	.473	1	.033	2	.334	4	2.876e-03	5	-9.376e-04	6	-8.915e-06	5
222		min	.014	6	-.038	6	.003	3	-1.9e-03	1	-1.737e-02	1	-1.025e-02	1
223	N113	max	1.45	2	-.035	2	.334	4	3.213e-03	4	4.147e-03	4	4.111e-04	4
224		min	-.071	6	-.147	6	.002	3	-1.708e-04	2	-4.344e-04	2	-3.081e-02	1
225	N114	max	.411	1	.056	2	.309	4	3.369e-03	4	1.608e-02	1	1.42e-05	5
226		min	-.068	4	-.032	6	.012	3	1.058e-03	3	-8.771e-03	4	-8.501e-03	1
227	N115	max	1.226	2	.062	2	.342	4	2.491e-03	4	1.293e-02	2	2.003e-03	4
228		min	-.152	4	-.109	6	.008	3	9.401e-04	2	-3.625e-04	6	-2.424e-02	1
229	N116	max	1.301	2	.06	2	.343	4	1.859e-03	5	3.255e-03	4	2.595e-04	6
230		min	-.038	6	-.14	6	-.026	2	-1.195e-03	3	-1.167e-02	2	-2.583e-02	1
231	N117	max	.473	1	.064	2	.313	4	2.876e-03	5	-9.376e-04	6	-8.915e-06	5
232		min	.014	6	-.036	6	-.04	2	-1.9e-03	1	-1.737e-02	1	-1.025e-02	1
233	N118	max	1.45	2	.057	2	.346	4	3.213e-03	4	4.147e-03	4	4.111e-04	4
234		min	-.071	6	-.148	6	.002	3	-1.708e-04	2	-4.344e-04	2	-3.081e-02	1
235	N119	max	.367	1	-.038	3	.407	4	8.798e-03	5	-2.877e-03	3	-5.987e-04	6
236		min	-.055	5	-.081	4	.029	3	-1.076e-04	3	-1.471e-02	4	-3.407e-03	1
237	N120	max	.263	1	-.04	3	.662	4	1.016e-02	4	1.998e-02	4	7.062e-06	3
238		min	.018	6	-.064	4	-.029	1	3.907e-04	3	1.14e-03	3	-4.835e-03	5
239	N121	max	.386	1	-.041	3	.451	4	8.798e-03	5	-2.877e-03	3	-5.988e-04	6
240		min	-.03	5	-.069	4	.038	3	-1.077e-04	3	-1.471e-02	4	-3.407e-03	1
241	N122	max	.503	1	-.036	2	1.191	4	2.157e-02	4	-2.383e-05	2	-2.656e-03	3
242		min	.107	6	-.123	6	.127	3	1.626e-03	3	-1.491e-02	4	-1.091e-02	4
243	N123	max	.52	4	-.045	5	1.394	4	2.461e-02	4	8.837e-03	4	-6.725e-04	3
244		min	.127	3	-.139	3	.097	3	2.414e-03	3	2.276e-03	3	-1.308e-02	5
245	N124	max	.268	1	-.036	2	.721	4	1.016e-02	4	1.998e-02	4	7.204e-06	3
246		min	.026	6	-.067	4	-.021	1	3.908e-04	3	1.14e-03	3	-4.835e-03	5
247	N125	max	.56	4	-.053	2	1.461	4	2.82e-02	4	4.071e-03	1	-2.007e-03	3
248		min	.147	6	-.149	6	.132	3	2.124e-03	3	-2.84e-03	5	-1.37e-02	4
249	N126	max	.357	1	-.043	3	.473	4	8.798e-03	5	-2.877e-03	3	-5.988e-04	6
250		min	-.068	5	-.094	4	.042	3	-1.077e-04	3	-1.471e-02	4	-3.407e-03	1
251	N127	max	.503	1	-.066	2	1.214	4	2.157e-02	4	-2.383e-05	2	-2.656e-03	3
252		min	.097	6	-.172	4	.128	3	1.626e-03	3	-1.491e-02	4	-1.091e-02	4

Envelope Joint Displacements (Continued)

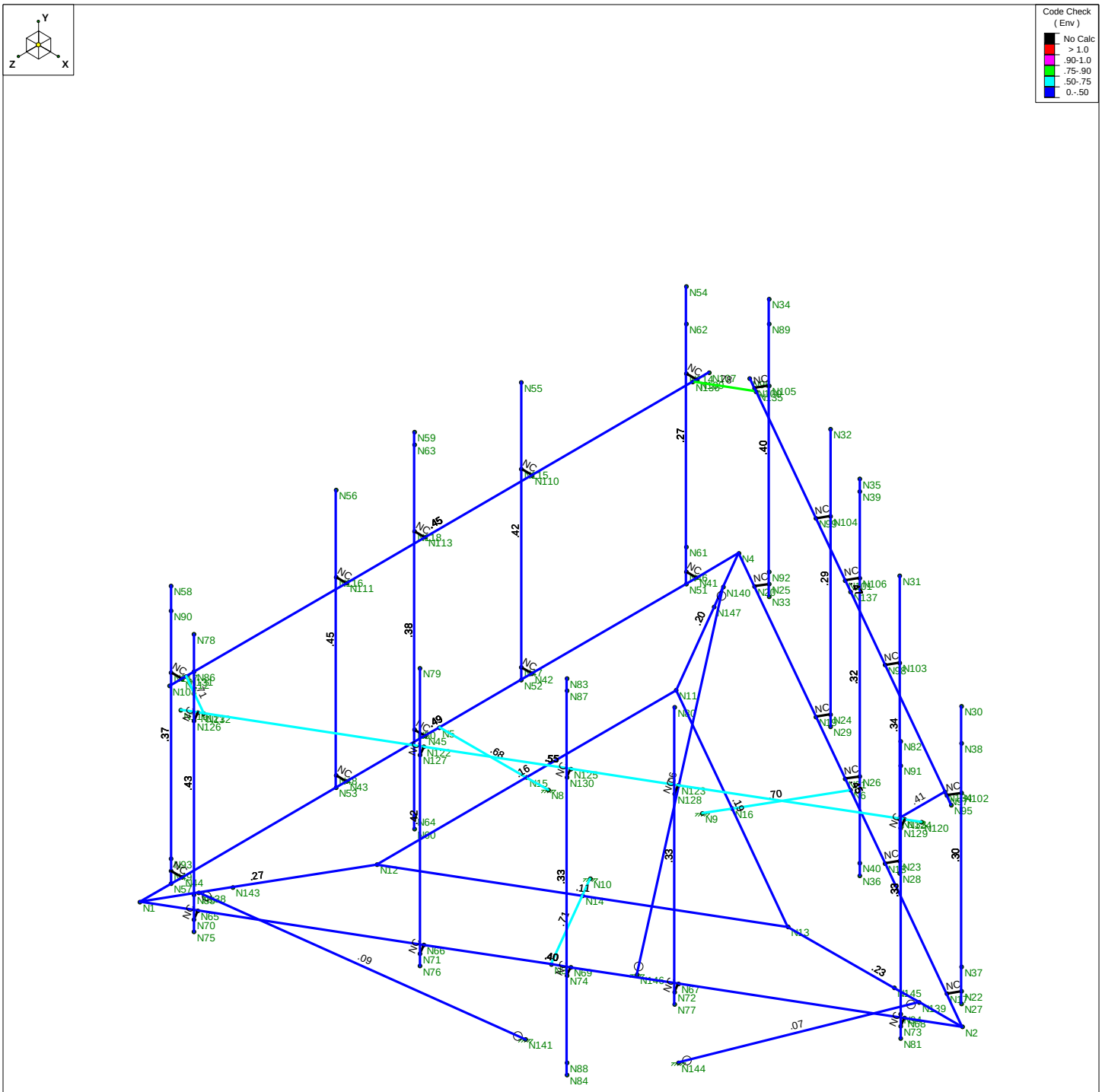
	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [rad]	LC	Y Rotatio...	LC	Z Rotation [rad]	LC
253	N128	max	.543	4	-.101	2	1.38	4	2.461e-02	4	8.837e-03	4	-6.725e-04	3
254		min	.133	3	-.15	6	.094	3	2.414e-03	3	2.276e-03	3	-1.308e-02	5
255	N129	max	.275	1	-.042	3	.692	4	1.016e-02	4	1.998e-02	4	7.204e-06	3
256		min	.037	6	-.101	4	-.025	1	3.908e-04	3	1.14e-03	3	-4.835e-03	5
257	N130	max	.552	4	-.083	2	1.465	4	2.82e-02	4	4.071e-03	1	-2.007e-03	3
258		min	.145	6	-.17	6	.131	3	2.124e-03	3	-2.84e-03	5	-1.37e-02	4
259	N131	max	.494	1	.031	2	.334	4	2.252e-03	5	-9.205e-04	6	1.071e-04	5
260		min	.015	6	-.038	6	.003	3	-1.961e-03	1	-1.777e-02	1	-1.041e-02	1
261	N132	max	.393	1	-.043	3	.466	4	8.819e-03	5	-2.943e-03	3	-8.37e-04	6
262		min	-.021	5	-.065	4	.041	3	-1.046e-04	3	-1.509e-02	4	-3.112e-03	1
263	N133	max	.269	1	-.033	2	.741	4	1.004e-02	4	2.04e-02	4	1.995e-04	3
264		min	.028	6	-.069	4	-.018	1	5.751e-04	3	1.194e-03	3	-5.146e-03	5
265	N134	max	.259	1	.051	5	.742	4	9.224e-03	5	1.95e-02	4	5.559e-03	4
266		min	-.132	4	-.04	3	-.018	1	-1.549e-03	1	-1.586e-03	1	-3.115e-03	2
267	N135	max	.336	1	.039	5	.487	4	1.081e-02	4	1.083e-02	1	1.388e-03	5
268		min	-.003	6	-.041	3	-.148	1	-2.257e-03	2	-1.676e-02	5	-2.837e-03	1
269	N136	max	.429	1	.029	2	.335	4	2.944e-03	4	1.642e-02	1	-4.836e-05	5
270		min	-.078	4	-.035	6	.003	3	1.173e-03	3	-8.883e-03	4	-8.718e-03	1
271	N137	max	.43	1	-.036	5	1.418	5	2.712e-02	4	-5.54e-04	6	1.42e-02	4
272		min	-.521	5	-.147	3	-.315	1	-7.594e-03	1	-3.625e-03	1	-5.714e-03	2
273	N138	max	.014	2	.004	2	.005	1	3.092e-03	4	-7.236e-05	3	2.73e-04	6
274		min	-.017	4	-.021	4	0	5	6.554e-04	3	-7.257e-04	4	-3.377e-03	2
275	N139	max	.007	1	-.003	5	.043	4	4.972e-03	5	5.54e-05	2	-1.857e-04	5
276		min	0	5	-.017	1	-.003	2	1.513e-04	1	-4.e-04	4	-1.905e-03	1
277	N140	max	.015	5	.014	5	0	5	3.23e-03	5	2.058e-04	2	1.338e-03	4
278		min	.002	6	-.007	3	-.002	1	-7.599e-04	1	-7.434e-04	4	-2.788e-03	2
279	N141	max	0	6	0	6	0	6	0	6	0	6	0	6
280		min	0	1	0	1	0	1	0	1	0	1	0	1
281	N143	max	.014	2	-.001	2	.005	1	2.309e-03	4	1.384e-04	2	1.475e-04	6
282		min	-.012	4	-.007	4	.002	3	4.434e-04	3	-5.63e-04	4	-2.822e-03	1
283	N144	max	0	6	0	6	0	6	0	6	0	6	0	6
284		min	0	1	0	1	0	1	0	1	0	1	0	1
285	N145	max	.006	1	-.002	5	.039	4	4.266e-03	5	6.275e-05	2	-9.501e-05	5
286		min	0	5	-.006	1	-.002	2	1.145e-04	1	-7.723e-04	4	-1.36e-03	1
287	N146	max	0	6	0	6	0	6	0	6	0	6	0	6
288		min	0	1	0	1	0	1	0	1	0	1	0	1
289	N147	max	.011	5	.001	5	.002	5	2.529e-03	5	-1.385e-05	2	1.117e-03	4
290		min	.002	6	-.005	3	-.003	1	-6.532e-04	1	-5.649e-04	4	-2.329e-03	2

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

	Member	Shape	Code Check	Lo...	LC	She...	Lo...	Dir	...	phi*...	phi*...	phi*...	phi*...	Cb	Eqn
1	3	L3X3X4	.448	1....	4	.956	7	y	4	15.746	45.36	1.641	2.988	2.2..	H2-1
2	1	L3X3X4	.491	12...	4	.939	7	y	1	15.746	45.36	1.641	2.977	2.2..	H2-1
3	2	L3X3X4	.405	0	4	.910	7	y	5	15.746	45.36	1.641	2.954	2.1..	H2-1
4	M55	PIPE_2.0	.549	8....	4	.288	.394		4	6.191	32.13	1.872	1.872	1.3..	H3-6
5	M43	PIPE_2.0	.470	8....	5	.281	12...		5	6.191	32.13	1.872	1.872	1.3..	H3-6
6	PSA.1	PIPE_2.0	.330	.25	1	.274	3....		4	20.867	32.13	1.872	1.872	2.4..	H1-...
7	M49	PIPE_2.0	.453	6....	2	.271	12...		2	6.191	32.13	1.872	1.872	1.4..	H1-...
8	PSC.3	PIPE_2.0	.298	5.75	1	.270	5.75		4	20.867	32.13	1.872	1.872	2.7..	H1-...
9	M40	PIPE_2.0	.416	5.75	4	.260	5.75		4	20.867	32.13	1.872	1.872	2.5..	H3-6

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

	Member	Shape	Code Check	Lo...	LC	She...	Lo...	Dir	...	phi*...	phi*...	phi*...	phi*...	Cb	Eqn
10	PSB.1	PIPE_2.0	.370	.25	4	.252	3....		1	20.867	32.13	1.872	1.872	2.5..	H1-...
11	PSC.1	PIPE_2.0	.401	.25	5	.247	3....		5	20.867	32.13	1.872	1.872	2.7..	H3-6
12	PSA.3	PIPE_2.0	.431	5.75	4	.231	5.25		4	20.867	32.13	1.872	1.872	2.7..	H1-...
13	PSB.3	PIPE_2.0	.273	5.75	5	.228	1.75		1	20.867	32.13	1.872	1.872	1.5..	H1-...
14	m19	PIPE_2.0	.289	5.75	5	.228	5.75		5	20.867	32.13	1.872	1.872	2.5..	H1-...
15	M30	PIPE_2.0	.418	5.75	5	.194	5.75		2	20.867	32.13	1.872	1.872	2.2..	H1-...
16	5	C5.5x3.625x0....	.679	2....	6	.192	2....	y	4	63.992	73.09	3.86	12.71	1.9..	H1-...
17	M29	PIPE_2.0	.452	5.75	4	.175	5.75		2	20.867	32.13	1.872	1.872	2.5..	H1-...
18	M62	L2.5x2.5x3	.407	0	4	.171	.011	z	4	27.184	28.381	.848	1.917	2.2..	H2-1
19	M39	PIPE_2.0	.327	5.75	1	.160	5.75		4	20.867	32.13	1.872	1.872	2.4..	H1-...
20	M20	PIPE_2.0	.336	1.75	4	.157	5.75		5	20.867	32.13	1.872	1.872	2.5..	H1-...
21	4	C5.5x3.625x0....	.714	2....	6	.146	2....	y	4	63.992	73.09	3.86	12.71	2.1..	H1-...
22	6	C5.5x3.625x0....	.702	2....	3	.143	2....	y	4	63.992	73.09	3.86	12.71	2.7..	H1-...
23	PSC.2	PIPE_2.0	.318	2	4	.135	6		4	14.916	32.13	1.872	1.872	1.4..	H1-...
24	M61	L2.5x2.5x3	.708	1....	4	.129	0	z	1	27.162	28.381	.848	1.917	1.5..	H2-1
25	PSB.2	PIPE_2.0	.385	6	4	.121	6		4	14.916	32.13	1.872	1.872	1.6..	H1-...
26	M63	L2.5x2.5x3	.777	0	5	.107	0	z	4	27.184	28.381	.848	1.917	1.8..	H2-1
27	PSA.2	PIPE_2.0	.331	2	4	.101	6		1	14.916	32.13	1.872	1.872	1.5..	H1-...
28	11	LL3x3x4x0	.268	0	4	.058	.968	y	4	74.543	90.72	6.3	4.255	1.3..	H1-...
29	10	LL3x3x4x0	.230	0	3	.044	.968	y	3	74.543	90.72	6.3	4.255	1.6..	H1-...
30	12	LL3x3x4x0	.201	0	3	.035	.968	y	3	74.543	90.72	6.3	4.255	1.9..	H1-...
31	9	L3X3X4	.189	3.5	5	.011	1.75	z	4	15.778	45.36	1.641	3.295	1.6..	H2-1
32	8	L3X3X4	.107	0	4	.009	0	y	6	15.778	45.36	1.641	3.288	1.6..	H2-1
33	7	L3X3X4	.165	0	5	.009	7	y	6	15.778	45.36	1.641	3.427	2.0..	H2-1
34	M65	LL2.5x2.5x3x0	.073	0	1	.006	0	z	5	31.594	56.7	3.209	2.429	1.1..	H1-...
35	M64	LL2.5x2.5x3x0	.087	0	4	.005	0	z	1	31.593	56.7	3.209	2.429	1.1..	H1-...
36	M66	LL2.5x2.5x3x0	.056	6....	3	.004	6....	z	2	31.594	56.7	3.209	2.429	1.1..	H1-...



Member Code Checks Displayed (Enveloped)
Envelope Only Solution

Centek Engineering Inc.		
FJP	CT11000A - AMA	July 5, 2021 at 10:28 AM
21022.19	Unity Check	CT11000A_AMA.R3D

CENTEK engineering

Centered on Solutions℠

Structural Analysis Report

93-ft Existing Monopole

Proposed T-Mobile
Antenna Upgrade

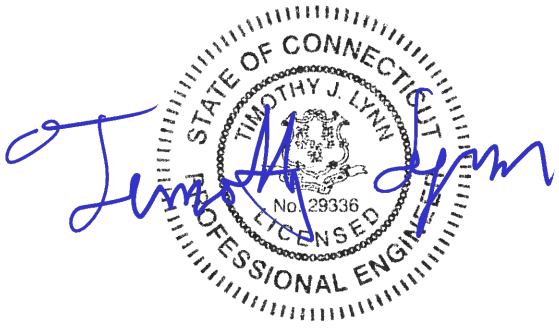
T-Mobile Site Ref: CT11000A

100 Filley Street
Bloomfield, CT

Centek Project No. 21022.19

Date: July 5, 2021

Max Stress Ratio = 65.5%



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 existing monopole (tower) located in Bloomfield, Connecticut.

The host tower is a 93-ft tall, two-section, eighteen sided, tapered monopole. The tower geometry and structure member sizes were obtained from a previous structural analysis report prepared by Destek Engineering; job no. 1978008 dated July 22, 2019.

Antenna and appurtenance information were obtained from the aforementioned structural analysis report and a T-Mobile RF data sheet.

The tower is made up of two (2) tapered vertical sections consisting of A607-60 pole sections. The vertical tower sections are slip joint connected. The diameter of the pole (flat-flat) is 19.56-in at the top and 33.35-in at the base.

Antenna and Appurtenance Summary

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

- TOWN (EXISTING):
  Antennas: One (1) lighting rod mounted with an elevation of 93-ft above grade level.
- T-MOBILE (EXISTING TO REMAIN):
  Antennas: Three (3) Ericsson AIR32 panel antennas, three (3) RFS APXVAARR24_43 panel antennas and three (3) Ericsson 4449 remote radio heads mounted to the tower with a top of antenna elevation of ±97-ft above grade level.
  Cables: Three (3) 6x12 ∅ fiber cable running inside the monopole.
- **T-MOBILE (EXISTING TO REMOVE):**
  Antennas: Three (3) RFS APX16DWV-16DWVS panel antennas and six (6) TMAs mounted to the tower with a top of antenna elevation of ±97-ft above grade level.
  Cables: Twelve (12) 1-1/4" ∅ coax cables running inside the monopole.
- **T-MOBILE (Proposed):**
  Antennas: Three (3) Ericsson AIR6449 panel antennas and three (3) Ericsson 4460 remote radio heads mounted to the tower with a top of antenna elevation of ±97-ft above grade level.
  Cables: Three (3) 6x24 ∅ fiber cable running inside the monopole.

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 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 1.00" radial ice on the tower structure and its components.

Basic Wind Speed:	Bloomfield; v = 97 mph (Vasd – Risk Cat II)	*[Appendix N of the 2018 CT Building Code]*
Load Cases:	Load Case 1; 97 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/ 1.00" 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.

Tower Section	Elevation	Stress Ratio (percentage of capacity)	Result
Pole Shaft (L2)	0.0'-44.75'	65.5%	**PASS**

Foundation and Anchors

- The foundation was found to be within allowable limits.

Foundation	Design Limit	Original Design Reactions[1]	Modified Original Reactions[2]	Proposed Reactions	Result
Tower Base	Compression	13 kips	17.6 kips	13 kips	**PASS**
	Shear	12 kips	16.2 kips	10 kips	**PASS**
	Moment	800 ft-kips	1080 ft-kips	726 ft-kips	**PASS**

Note 1: Original design reactions taken from a previous structural report prepared by EBI dated 8/11/2014.
Note 2: Original design reactions multiplied by 1.35 for comparison to proposed reactions per section 15.5 of TIA-222-G

- 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 Bending	43.6%	**PASS**
Base Plate	Bending	44.4%	**PASS**

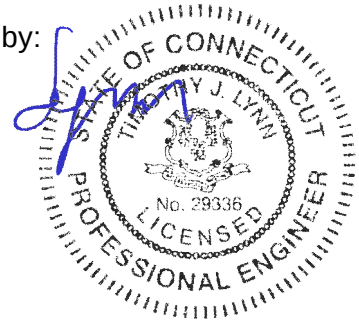
Conclusion

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:

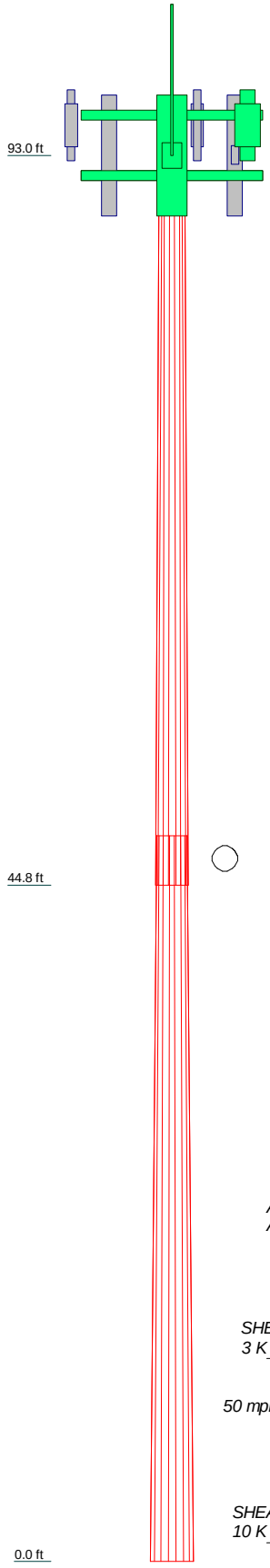
- Information supplied by the client regarding the structure itself, its foundations, the soil conditions, the antenna and feed line loading on the structure and its components, or other relevant information.
- Information from the field and/or drawings in the possession of Centek Engineering, Inc. or 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	48.25	18	0.1875	3.25	19.5625	25.4500	A607-60	2.2
2	48.00	18	0.2500		24.6784	33.3500		3.7
								5.9

ALL REACTIONS ARE FACTORED

AXIAL 27 K

SHEAR 3 K — *MOMENT 235 kip-ft*

TORQUE 0 kip-ft
50 mph WIND - 1.0000 in ICE

AXIAL 13 K

SHEAR 10 K — *MOMENT 726 kip-ft*

TORQUE 0 kip-ft
REACTIONS - 97 mph WIND

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Lightning Rod 1"x10'	98	APXVAALL24-43 (T-Mobile)	93
SitePro 12' Handrail Kit HRK12 (T-Mobile)	96	4449 B12,B71 (T-Mobile)	93
		4449 B12,B71 (T-Mobile)	93
AIR32 (T-Mobile)	95	4449 B12,B71 (T-Mobile)	93
AIR6449 (T-Mobile)	95	4460 B25+B66 (T-Mobile)	93
AIR32 (T-Mobile)	95	4460 B25+B66 (T-Mobile)	93
AIR6449 (T-Mobile)	95	4460 B25+B66 (T-Mobile)	93
AIR32 (T-Mobile)	95	APXVAALL24-43 (T-Mobile)	93
AIR6449 (T-Mobile)	95	EEI Low Profile Platform (T-Mobile)	92
APXVAALL24-43 (T-Mobile)	93		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A607-60	60 ksi	75 ksi			

TOWER DESIGN NOTES

1. Tower designed for Exposure C to the TIA-222-G Standard.
2. Tower designed for a 97 mph basic wind in accordance with the TIA-222-G Standard.
3. Tower is also designed for a 50 mph basic wind with 1.00 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 0.00 ft
7. TOWER RATING: 65.5%

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

Job:	***21022.19 - CT11000A***		
Project:	***93' Monopole - 100 Filley Street Bloomfield, CT***		
Client: T-Mobile	Drawn by: TJL		App'd:
Code: TIA-222-G	Date: 07/05/21		Scale: NTS
Path: J:\Jobs\21022\200.W\19_CT11000A\05_Structural\Tower\Backup Documentation\Calcs\ERI Files\93-ft Monopole.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 97 mph.
Structure Class II.
Exposure Category C.
Topographic Category 1.
Crest Height 0.00 ft.
Nominal ice thickness of 1.0000 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		Distribute Leg Loads As Uniform		Use ASCE 10 X-Brace Ly Rules
	Consider Moments - Horizontals		Assume Legs Pinned		Calculate Redundant Bracing Forces
	Consider Moments - Diagonals	√	Assume Rigid Index Plate		Ignore Redundant Members in FEA
	Use Moment Magnification		Use Clear Spans For Wind Area		SR Leg Bolts Resist Compression
√	Use Code Stress Ratios		Use Clear Spans For KL/r		All Leg Panels Have Same Allowable
√	Use Code Safety Factors - Guys		Retension Guys To Initial Tension		Offset Girt At Foundation
	Escalate Ice		Bypass Mast Stability Checks	√	Consider Feed Line Torque
	Always Use Max Kz		Use Azimuth Dish Coefficients		Include Angle Block Shear Check
	Use Special Wind Profile	√	Project Wind Area of Appurt.		Use TIA-222-G Bracing Resist. Exemption
	Include Bolts In Member Capacity		Autocalc Torque Arm Areas		Use TIA-222-G Tension Splice Exemption
	Leg Bolts Are At Top Of Section		Add IBC .6D+W Combination		Poles
	Secondary Horizontal Braces Leg	√	Sort Capacity Reports By Component		Include Shear-Torsion Interaction
	Use Diamond Inner Bracing (4 Sided)		Triangulate Diamond Inner Bracing		Always Use Sub-Critical Flow
	SR Members Have Cut Ends		Treat Feed Line Bundles As Cylinder		Use Top Mounted Sockets
	SR Members Are Concentric		Ignore KL/ry For 60 Deg. Angle Legs		Pole Without Linear Attachments
					Pole With Shroud Or No Appurtenances
					Outside and Inside Corner Radii Are Known

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	93.00-44.75	48.25	3.25	18	19.5625	25.4500	0.1875	0.7500	A607-60 (60 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	44.75-0.00	48.00		18	24.6784	33.3500	0.2500	1.0000	A607-60 (60 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	19.8354	11.5305	546.8532	6.8781	9.9377	55.0279	1094.4260	5.7664	3.1130	16.603
	25.8137	15.0343	1212.2010	8.9682	12.9286	93.7612	2425.9970	7.5186	4.1492	22.129
L2	25.6168	19.3840	1461.4070	8.6721	12.5366	116.5708	2924.7370	9.6938	3.9034	15.614
	33.8259	26.2648	3635.5353	11.7505	16.9418	214.5897	7275.8543	13.1349	5.4296	21.718

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 93.00-44.75				1	1	1			
L2 44.75-0.00				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 plf
HYBRIFLEX 1-5/8" (T-Mobile)	C	No	No	Inside Pole	93.00 - 0.00	3	No Ice	0.00	1.90
							1/2" Ice	0.00	1.90
							1" Ice	0.00	1.90
HYBRIFLEX 1-5/8" (T-Mobile)	C	No	No	Inside Pole	93.00 - 0.00	3	No Ice	0.00	1.90
							1/2" Ice	0.00	1.90
							1" Ice	0.00	1.90

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	93.00-44.75	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.55
L2	44.75-0.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.51

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	93.00-44.75	A	2.151	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.55
L2	44.75-0.00	A	1.923	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.51

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	93.00-44.75	0.0000	0.0000	0.0000	0.0000
L2	44.75-0.00	0.0000	0.0000	0.0000	0.0000

Note: For pole sections, center of pressure calculations do not consider feed line shielding.

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Lightning Rod 1"x10'	C	None		0.0000	98.00	No Ice	1.00	1.00	0.04
						1/2" Ice	2.02	2.02	0.05
						1" Ice	3.05	3.05	0.06
AIR6449	A	From Face	4.00	0.0000	95.00	No Ice	5.65	2.42	0.10
(T-Mobile)			-5.00			1/2" Ice	5.96	2.64	0.14
			0.00			1" Ice	6.26	2.87	0.18
APXVAALL24-43	A	From Face	4.00	0.0000	93.00	No Ice	20.24	8.89	0.15
(T-Mobile)			0.00			1/2" Ice	20.89	9.49	0.27
			0.00			1" Ice	21.54	10.09	0.39
AIR32	A	From Face	4.00	0.0000	95.00	No Ice	6.51	4.71	0.13
(T-Mobile)			-5.00			1/2" Ice	6.89	5.07	0.18
			0.00			1" Ice	7.27	5.43	0.23
AIR6449	B	From Face	4.00	0.0000	95.00	No Ice	5.65	2.42	0.10
(T-Mobile)			-5.00			1/2" Ice	5.96	2.64	0.14
			0.00			1" Ice	6.26	2.87	0.18
APXVAALL24-43	B	From Face	4.00	0.0000	93.00	No Ice	20.24	8.89	0.15
(T-Mobile)			0.00			1/2" Ice	20.89	9.49	0.27
			0.00			1" Ice	21.54	10.09	0.39
AIR32	B	From Face	4.00	0.0000	95.00	No Ice	6.51	4.71	0.13
(T-Mobile)			-5.00			1/2" Ice	6.89	5.07	0.18

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00			1" Ice	7.27	5.43	0.23
AIR6449	C	From Face	4.00	0.0000	95.00	No Ice	5.65	2.42	0.10
(T-Mobile)			-5.00			1/2" Ice	5.96	2.64	0.14
			0.00			1" Ice	6.26	2.87	0.18
APXVAALL24-43	C	From Face	4.00	0.0000	93.00	No Ice	20.24	8.89	0.15
(T-Mobile)			0.00			1/2" Ice	20.89	9.49	0.27
			0.00			1" Ice	21.54	10.09	0.39
AIR32	C	From Face	4.00	0.0000	95.00	No Ice	6.51	4.71	0.13
(T-Mobile)			-5.00			1/2" Ice	6.89	5.07	0.18
			0.00			1" Ice	7.27	5.43	0.23
4449 B12,B71	A	From Face	4.00	0.0000	93.00	No Ice	1.65	1.16	0.08
(T-Mobile)			0.00			1/2" Ice	1.81	1.29	0.10
			0.00			1" Ice	1.98	1.44	0.11
4449 B12,B71	B	From Face	4.00	0.0000	93.00	No Ice	1.65	1.16	0.08
(T-Mobile)			0.00			1/2" Ice	1.81	1.29	0.10
			0.00			1" Ice	1.98	1.44	0.11
4449 B12,B71	C	From Face	4.00	0.0000	93.00	No Ice	1.65	1.16	0.08
(T-Mobile)			0.00			1/2" Ice	1.81	1.29	0.10
			0.00			1" Ice	1.98	1.44	0.11
4460 B25+B66	A	From Face	4.00	0.0000	93.00	No Ice	2.56	1.98	0.11
(T-Mobile)			0.00			1/2" Ice	2.76	2.16	0.13
			0.00			1" Ice	2.97	2.34	0.16
4460 B25+B66	B	From Face	4.00	0.0000	93.00	No Ice	2.56	1.98	0.11
(T-Mobile)			0.00			1/2" Ice	2.76	2.16	0.13
			0.00			1" Ice	2.97	2.34	0.16
4460 B25+B66	C	From Face	4.00	0.0000	93.00	No Ice	2.56	1.98	0.11
(T-Mobile)			0.00			1/2" Ice	2.76	2.16	0.13
			0.00			1" Ice	2.97	2.34	0.16
EEI Low Profile Platform	C	None		0.0000	92.00	No Ice	22.50	22.50	1.50
(T-Mobile)						1/2" Ice	28.20	28.20	2.25
						1" Ice	33.90	33.90	3.00
SitePro 12' Handrail Kit	C	From Face	0.00	0.0000	96.00	No Ice	5.00	5.00	0.27
HRK12			0.00			1/2" Ice	8.00	8.00	0.35
(T-Mobile)			0.00			1" Ice	11.00	11.00	0.44

Tower Pressures - No Ice

G_H = 1.100

Section Elevation ft	z ft	K_Z	q_z psf	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 93.00-44.75	68.27	1.168	27	91.774	A	0.000	91.774	91.774	100.00	0.000	0.000
					B	0.000	91.774		100.00	0.000	0.000
					C	0.000	91.774		100.00	0.000	0.000
L2 44.75-0.00	22.27	0.923	21	110.836	A	0.000	110.836	110.836	100.00	0.000	0.000
					B	0.000	110.836		100.00	0.000	0.000
					C	0.000	110.836		100.00	0.000	0.000

Tower Pressure - With Ice

G_H = 1.100

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1 93.00-44.75	68.27	1.168	7	2.1508	109.070	A	0.000	109.070	109.070	100.00	0.000	0.000
						B	0.000	109.070		100.00	0.000	0.000
						C	0.000	109.070		100.00	0.000	0.000
L2 44.75-0.00	22.27	0.923	6	1.9229	126.877	A	0.000	126.877	126.877	100.00	0.000	0.000
						B	0.000	126.877		100.00	0.000	0.000
						C	0.000	126.877		100.00	0.000	0.000

Tower Pressure - Service

G_H = 1.100

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1 93.00-44.75	68.27	1.168	9	91.774	A	0.000	91.774	91.774	100.00	0.000	0.000
					B	0.000	91.774		100.00	0.000	0.000
					C	0.000	91.774		100.00	0.000	0.000
L2 44.75-0.00	22.27	0.923	7	110.836	A	0.000	110.836	110.836	100.00	0.000	0.000
					B	0.000	110.836		100.00	0.000	0.000
					C	0.000	110.836		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 psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L1	0.55	2.18	A	1	0.65	27	1	1	91.774	1.75	36.20	C
93.00-44.75			B	1	0.65		1	1	91.774			
			C	1	0.65		1	1	91.774			
L2 44.75-0.00	0.51	3.73	A	1	0.65	21	1	1	110.836	1.67	37.35	C
			B	1	0.65		1	1	110.836			
			C	1	0.65		1	1	110.836			
Sum Weight:	1.06	5.91						OTM	156.47 kip-ft	3.42		

Tower Forces - No Ice - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
L1	0.55	2.18	A	1	0.65	27	1	1	91.774	1.75	36.20	C
93.00-44.75			B	1	0.65		1	1	91.774			
			C	1	0.65		1	1	91.774			
L2 44.75-0.00	0.51	3.73	A	1	0.65	21	1	1	110.836	1.67	37.35	C
			B	1	0.65		1	1	110.836			
			C	1	0.65		1	1	110.836			
Sum Weight:	1.06	5.91						OTM	156.47 kip-ft	3.42		

Tower Forces - No Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
L1	0.55	2.18	A	1	0.65	27	1	1	91.774	1.75	36.20	C
93.00-44.75			B	1	0.65		1	1	91.774			
			C	1	0.65		1	1	91.774			
L2 44.75-0.00	0.51	3.73	A	1	0.65	21	1	1	110.836	1.67	37.35	C
			B	1	0.65		1	1	110.836			
			C	1	0.65		1	1	110.836			
Sum Weight:	1.06	5.91						OTM	156.47 kip-ft	3.42		

Tower Forces - No Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
L1	0.55	2.18	A	1	0.65	27	1	1	91.774	1.75	36.20	C
93.00-44.75			B	1	0.65		1	1	91.774			
			C	1	0.65		1	1	91.774			
L2 44.75-0.00	0.51	3.73	A	1	0.65	21	1	1	110.836	1.67	37.35	C
			B	1	0.65		1	1	110.836			
			C	1	0.65		1	1	110.836			
Sum Weight:	1.06	5.91						OTM	156.47 kip-ft	3.42		

Tower Forces - With Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
L1	0.55	5.34	A	1	1.2	7	1	1	109.070	1.02	21.10	C
93.00-44.75			B	1	1.2		1	1	109.070			
			C	1	1.2		1	1	109.070			
L2 44.75-0.00	0.51	7.05	A	1	1.2	6	1	1	125.177	0.93	20.69	C
			B	1	1.2		1	1	125.177			
			C	1	1.2		1	1	125.177			
Sum Weight:	1.06	12.38						OTM	90.14 kip-ft	1.94		

Tower Forces - With Ice - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
L1	0.55	5.34	A	1	1.2	7	1	1	109.070	1.02	21.10	C
93.00-44.75			B	1	1.2		1	1	109.070			
			C	1	1.2		1	1	109.070			
L2 44.75-0.00	0.51	7.05	A	1	1.2	6	1	1	125.177	0.93	20.69	C
			B	1	1.2		1	1	125.177			
			C	1	1.2		1	1	125.177			
Sum Weight:	1.06	12.38						OTM	90.14 kip-ft	1.94		

Tower Forces - With Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
L1	0.55	5.34	A	1	1.2	7	1	1	109.070	1.02	21.10	C
93.00-44.75			B	1	1.2		1	1	109.070			
			C	1	1.2		1	1	109.070			
L2 44.75-0.00	0.51	7.05	A	1	1.2	6	1	1	125.177	0.93	20.69	C
			B	1	1.2		1	1	125.177			
			C	1	1.2		1	1	125.177			
Sum Weight:	1.06	12.38						OTM	90.14 kip-ft	1.94		

Tower Forces - With Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
L1	0.55	5.34	A	1	1.2	7	1	1	109.070	1.02	21.10	C
93.00-44.75			B	1	1.2		1	1	109.070			
			C	1	1.2		1	1	109.070			
L2 44.75-0.00	0.51	7.05	A	1	1.2	6	1	1	125.177	0.93	20.69	C
			B	1	1.2		1	1	125.177			
			C	1	1.2		1	1	125.177			
Sum Weight:	1.06	12.38						OTM	90.14 kip-ft	1.94		

Tower Forces - Service - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
L1	0.55	2.18	A	1	0.65	9	1	1	91.774	0.60	12.39	C
93.00-44.75			B	1	0.65		1	1	91.774			
			C	1	0.65		1	1	91.774			
L2 44.75-0.00	0.51	3.73	A	1	0.65	7	1	1	110.836	0.57	12.79	C
			B	1	0.65		1	1	110.836			
			C	1	0.65		1	1	110.836			
Sum Weight:	1.06	5.91						OTM	53.57 kip-ft	1.17		

Tower Forces - Service - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
L1	0.55	2.18	A	1	0.65	9	1	1	91.774	0.60	12.39	C
93.00-44.75			B	1	0.65		1	1	91.774			
			C	1	0.65		1	1	91.774			
L2 44.75-0.00	0.51	3.73	A	1	0.65	7	1	1	110.836	0.57	12.79	C
			B	1	0.65		1	1	110.836			
			C	1	0.65		1	1	110.836			
Sum Weight:	1.06	5.91						OTM	53.57 kip-ft	1.17		

Tower Forces - Service - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
L1	0.55	2.18	A	1	0.65	9	1	1	91.774	0.60	12.39	C
93.00-44.75			B	1	0.65		1	1	91.774			
			C	1	0.65		1	1	91.774			
L2 44.75-0.00	0.51	3.73	A	1	0.65	7	1	1	110.836	0.57	12.79	C
			B	1	0.65		1	1	110.836			
			C	1	0.65		1	1	110.836			
Sum Weight:	1.06	5.91						OTM	53.57 kip-ft	1.17		

Tower Forces - Service - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
L1	0.55	2.18	A	1	0.65	9	1	1	91.774	0.60	12.39	C
93.00-44.75			B	1	0.65		1	1	91.774			
			C	1	0.65		1	1	91.774			
L2 44.75-0.00	0.51	3.73	A	1	0.65	7	1	1	110.836	0.57	12.79	C
			B	1	0.65		1	1	110.836			
			C	1	0.65		1	1	110.836			
Sum Weight:	1.06	5.91						OTM	53.57 kip-ft	1.17		

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	5.91					
Bracing Weight	0.00					
Total Member Self-Weight	5.91			0.22	0.00	
Total Weight	10.48			0.22	0.00	
Wind 0 deg - No Ice		0.00	-6.41	-436.35	0.00	0.00
Wind 30 deg - No Ice		3.21	-5.56	-377.86	-218.28	0.06
Wind 45 deg - No Ice		4.54	-4.54	-308.48	-308.70	0.09
Wind 60 deg - No Ice		5.56	-3.21	-218.07	-378.08	0.11
Wind 90 deg - No Ice		6.41	0.00	0.22	-436.57	0.13
Wind 120 deg - No Ice		5.56	3.21	218.50	-378.08	0.11
Wind 135 deg - No Ice		4.54	4.54	308.92	-308.70	0.09
Wind 150 deg - No Ice		3.21	5.56	378.29	-218.28	0.06
Wind 180 deg - No Ice		0.00	6.41	436.78	0.00	0.00
Wind 210 deg - No Ice		-3.21	5.56	378.29	218.28	-0.06
Wind 225 deg - No Ice		-4.54	4.54	308.92	308.70	-0.09
Wind 240 deg - No Ice		-5.56	3.21	218.50	378.08	-0.11
Wind 270 deg - No Ice		-6.41	0.00	0.22	436.57	-0.13
Wind 300 deg - No Ice		-5.56	-3.21	-218.07	378.08	-0.11
Wind 315 deg - No Ice		-4.54	-4.54	-308.48	308.70	-0.09

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 330 deg - No Ice		-3.21	-5.56	-377.86	218.28	-0.06
Member Ice	6.48					
Total Weight Ice	24.59			0.52	0.00	
Wind 0 deg - Ice		0.00	-3.25	-211.66	0.00	0.00
Wind 30 deg - Ice		1.62	-2.81	-183.23	-106.09	0.06
Wind 45 deg - Ice		2.30	-2.30	-149.51	-150.03	0.09
Wind 60 deg - Ice		2.81	-1.62	-105.57	-183.75	0.11
Wind 90 deg - Ice		3.25	0.00	0.52	-212.18	0.13
Wind 120 deg - Ice		2.81	1.62	106.61	-183.75	0.11
Wind 135 deg - Ice		2.30	2.30	150.56	-150.03	0.09
Wind 150 deg - Ice		1.62	2.81	184.28	-106.09	0.06
Wind 180 deg - Ice		0.00	3.25	212.70	0.00	0.00
Wind 210 deg - Ice		-1.62	2.81	184.28	106.09	-0.06
Wind 225 deg - Ice		-2.30	2.30	150.56	150.03	-0.09
Wind 240 deg - Ice		-2.81	1.62	106.61	183.75	-0.11
Wind 270 deg - Ice		-3.25	0.00	0.52	212.18	-0.13
Wind 300 deg - Ice		-2.81	-1.62	-105.57	183.75	-0.11
Wind 315 deg - Ice		-2.30	-2.30	-149.51	150.03	-0.09
Wind 330 deg - Ice		-1.62	-2.81	-183.23	106.09	-0.06
Total Weight	10.48			0.22	0.00	
Wind 0 deg - Service		0.00	-2.20	-149.24	0.00	0.00
Wind 30 deg - Service		1.10	-1.90	-129.21	-74.73	0.02
Wind 45 deg - Service		1.55	-1.55	-105.46	-105.68	0.03
Wind 60 deg - Service		1.90	-1.10	-74.51	-129.43	0.04
Wind 90 deg - Service		2.20	0.00	0.22	-149.45	0.04
Wind 120 deg - Service		1.90	1.10	74.94	-129.43	0.04
Wind 135 deg - Service		1.55	1.55	105.90	-105.68	0.03
Wind 150 deg - Service		1.10	1.90	129.65	-74.73	0.02
Wind 180 deg - Service		0.00	2.20	149.67	0.00	0.00
Wind 210 deg - Service		-1.10	1.90	129.65	74.73	-0.02
Wind 225 deg - Service		-1.55	1.55	105.90	105.68	-0.03
Wind 240 deg - Service		-1.90	1.10	74.94	129.43	-0.04
Wind 270 deg - Service		-2.20	0.00	0.22	149.45	-0.04
Wind 300 deg - Service		-1.90	-1.10	-74.51	129.43	-0.04
Wind 315 deg - Service		-1.55	-1.55	-105.46	105.68	-0.03
Wind 330 deg - Service		-1.10	-1.90	-129.21	74.73	-0.02

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

Comb. No.	Description
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
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	93 - 44.75	Pole	Max Tension	34	0.00	0.00	0.00
			Max. Compression	34	-17.83	0.00	-0.64

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Mx	10	-6.88	-291.35	-0.27
			Max. My	18	-6.88	0.00	-291.63
			Max. Vy	10	7.73	-291.35	-0.27
			Max. Vx	18	7.73	0.00	-291.63
			Max. Torque	10			-0.23
L2	44.75 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	34	-26.93	0.00	-0.64
			Max. Mx	10	-12.57	-725.26	-0.28
			Max. My	18	-12.57	0.00	-725.54
			Max. Vy	10	10.28	-725.26	-0.28
			Max. Vx	18	10.28	0.00	-725.54
			Max. Torque	10			-0.23

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	43	26.93	0.00	-3.25
	Max. H_x	26	12.58	10.26	-0.00
	Max. H_z	2	12.58	0.00	10.26
	Max. M_x	2	724.99	0.00	10.26
	Max. M_z	10	725.26	-10.26	-0.00
	Max. Torsion	26	0.22	10.26	-0.00
	Min. Vert	7	9.44	-7.26	7.26
	Min. H_x	10	12.58	-10.26	-0.00
	Min. H_z	18	12.58	0.00	-10.26
	Min. M_x	18	-725.54	0.00	-10.26
	Min. M_z	26	-725.26	10.26	-0.00
	Min. Torsion	10	-0.22	-10.26	-0.00

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	10.48	0.00	0.00	0.22	0.00	0.00
1.2 Dead+1.6 Wind 0 deg - No Ice	12.58	0.00	-10.26	-724.99	0.00	0.00
0.9 Dead+1.6 Wind 0 deg - No Ice	9.44	0.00	-10.26	-717.93	0.00	0.00
1.2 Dead+1.6 Wind 30 deg - No Ice	12.58	5.13	-8.89	-627.82	-362.63	0.11
0.9 Dead+1.6 Wind 30 deg - No Ice	9.44	5.13	-8.89	-621.72	-359.07	0.11
1.2 Dead+1.6 Wind 45 deg - No Ice	12.58	7.26	-7.26	-512.56	-512.84	0.16
0.9 Dead+1.6 Wind 45 deg - No Ice	9.44	7.26	-7.26	-507.59	-507.80	0.16
1.2 Dead+1.6 Wind 60 deg - No Ice	12.58	8.89	-5.13	-362.36	-628.10	0.19
0.9 Dead+1.6 Wind 60 deg - No Ice	9.44	8.89	-5.13	-358.86	-621.92	0.19

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 90 deg - No Ice	12.58	10.26	0.00	0.28	-725.26	0.22
0.9 Dead+1.6 Wind 90 deg - No Ice	9.44	10.26	0.00	0.20	-718.13	0.22
1.2 Dead+1.6 Wind 120 deg - No Ice	12.58	8.89	5.13	362.91	-628.10	0.19
0.9 Dead+1.6 Wind 120 deg - No Ice	9.44	8.89	5.13	359.27	-621.92	0.19
1.2 Dead+1.6 Wind 135 deg - No Ice	12.58	7.26	7.26	513.12	-512.84	0.16
0.9 Dead+1.6 Wind 135 deg - No Ice	9.44	7.26	7.26	508.00	-507.80	0.16
1.2 Dead+1.6 Wind 150 deg - No Ice	12.58	5.13	8.89	628.38	-362.63	0.11
0.9 Dead+1.6 Wind 150 deg - No Ice	9.44	5.13	8.89	622.13	-359.07	0.11
1.2 Dead+1.6 Wind 180 deg - No Ice	12.58	0.00	10.26	725.54	0.00	0.00
0.9 Dead+1.6 Wind 180 deg - No Ice	9.44	0.00	10.26	718.34	0.00	0.00
1.2 Dead+1.6 Wind 210 deg - No Ice	12.58	-5.13	8.89	628.38	362.63	-0.11
0.9 Dead+1.6 Wind 210 deg - No Ice	9.44	-5.13	8.89	622.13	359.07	-0.11
1.2 Dead+1.6 Wind 225 deg - No Ice	12.58	-7.26	7.26	513.12	512.84	-0.16
0.9 Dead+1.6 Wind 225 deg - No Ice	9.44	-7.26	7.26	508.00	507.80	-0.16
1.2 Dead+1.6 Wind 240 deg - No Ice	12.58	-8.89	5.13	362.91	628.10	-0.19
0.9 Dead+1.6 Wind 240 deg - No Ice	9.44	-8.89	5.13	359.27	621.92	-0.19
1.2 Dead+1.6 Wind 270 deg - No Ice	12.58	-10.26	0.00	0.28	725.26	-0.22
0.9 Dead+1.6 Wind 270 deg - No Ice	9.44	-10.26	0.00	0.20	718.13	-0.22
1.2 Dead+1.6 Wind 300 deg - No Ice	12.58	-8.89	-5.13	-362.36	628.10	-0.19
0.9 Dead+1.6 Wind 300 deg - No Ice	9.44	-8.89	-5.13	-358.86	621.92	-0.19
1.2 Dead+1.6 Wind 315 deg - No Ice	12.58	-7.26	-7.26	-512.56	512.84	-0.16
0.9 Dead+1.6 Wind 315 deg - No Ice	9.44	-7.26	-7.26	-507.59	507.80	-0.16
1.2 Dead+1.6 Wind 330 deg - No Ice	12.58	-5.13	-8.89	-627.82	362.63	-0.11
0.9 Dead+1.6 Wind 330 deg - No Ice	9.44	-5.13	-8.89	-621.72	359.07	-0.11
1.2 Dead+1.0 Ice+1.0 Temp	26.93	0.00	0.00	0.64	0.00	0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	26.93	0.00	-3.25	-233.84	0.00	0.00
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	26.93	1.62	-2.81	-202.42	-117.26	0.07
1.2 Dead+1.0 Wind 45 deg+1.0 Ice+1.0 Temp	26.93	2.30	-2.30	-165.15	-165.84	0.10
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	26.93	2.81	-1.62	-116.58	-203.11	0.12
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	26.93	3.25	0.00	0.69	-234.53	0.14
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	26.93	2.81	1.62	117.95	-203.11	0.12

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
1.2 Dead+1.0 Wind 135 deg+1.0 Ice+1.0 Temp	26.93	2.30	2.30	166.53	-165.84	0.10
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	26.93	1.62	2.81	203.80	-117.26	0.07
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	26.93	0.00	3.25	235.22	0.00	0.00
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	26.93	-1.62	2.81	203.80	117.26	-0.07
1.2 Dead+1.0 Wind 225 deg+1.0 Ice+1.0 Temp	26.93	-2.30	2.30	166.53	165.84	-0.10
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	26.93	-2.81	1.62	117.95	203.11	-0.12
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	26.93	-3.25	0.00	0.69	234.53	-0.14
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	26.93	-2.81	-1.62	-116.58	203.11	-0.12
1.2 Dead+1.0 Wind 315 deg+1.0 Ice+1.0 Temp	26.93	-2.30	-2.30	-165.15	165.84	-0.10
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	26.93	-1.62	-2.81	-202.42	117.26	-0.07
Dead+Wind 0 deg - Service	10.48	0.00	-2.20	-154.09	0.00	0.00
Dead+Wind 30 deg - Service	10.48	1.10	-1.90	-133.42	-77.16	0.02
Dead+Wind 45 deg - Service	10.48	1.55	-1.55	-108.89	-109.12	0.03
Dead+Wind 60 deg - Service	10.48	1.90	-1.10	-76.93	-133.65	0.04
Dead+Wind 90 deg - Service	10.48	2.20	0.00	0.23	-154.32	0.05
Dead+Wind 120 deg - Service	10.48	1.90	1.10	77.39	-133.65	0.04
Dead+Wind 135 deg - Service	10.48	1.55	1.55	109.35	-109.12	0.03
Dead+Wind 150 deg - Service	10.48	1.10	1.90	133.88	-77.16	0.02
Dead+Wind 180 deg - Service	10.48	0.00	2.20	154.55	0.00	0.00
Dead+Wind 210 deg - Service	10.48	-1.10	1.90	133.88	77.16	-0.02
Dead+Wind 225 deg - Service	10.48	-1.55	1.55	109.35	109.12	-0.03
Dead+Wind 240 deg - Service	10.48	-1.90	1.10	77.39	133.65	-0.04
Dead+Wind 270 deg - Service	10.48	-2.20	0.00	0.23	154.32	-0.05
Dead+Wind 300 deg - Service	10.48	-1.90	-1.10	-76.93	133.65	-0.04
Dead+Wind 315 deg - Service	10.48	-1.55	-1.55	-108.89	109.12	-0.03
Dead+Wind 330 deg - Service	10.48	-1.10	-1.90	-133.42	77.16	-0.02

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX	PY	PZ	PX	PY	PZ	% Error
	K	K	K	K	K	K	
1	0.00	-10.48	0.00	0.00	10.48	0.00	0.000%
2	0.00	-12.58	-10.26	0.00	12.58	10.26	0.000%
3	0.00	-9.44	-10.26	0.00	9.44	10.26	0.000%
4	5.13	-12.58	-8.89	-5.13	12.58	8.89	0.000%
5	5.13	-9.44	-8.89	-5.13	9.44	8.89	0.000%
6	7.26	-12.58	-7.26	-7.26	12.58	7.26	0.000%
7	7.26	-9.44	-7.26	-7.26	9.44	7.26	0.000%
8	8.89	-12.58	-5.13	-8.89	12.58	5.13	0.000%
9	8.89	-9.44	-5.13	-8.89	9.44	5.13	0.000%
10	10.26	-12.58	0.00	-10.26	12.58	-0.00	0.000%
11	10.26	-9.44	0.00	-10.26	9.44	-0.00	0.000%
12	8.89	-12.58	5.13	-8.89	12.58	-5.13	0.000%
13	8.89	-9.44	5.13	-8.89	9.44	-5.13	0.000%
14	7.26	-12.58	7.26	-7.26	12.58	-7.26	0.000%
15	7.26	-9.44	7.26	-7.26	9.44	-7.26	0.000%
16	5.13	-12.58	8.89	-5.13	12.58	-8.89	0.000%

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
17	5.13	-9.44	8.89	-5.13	9.44	-8.89	0.000%
18	0.00	-12.58	10.26	0.00	12.58	-10.26	0.000%
19	0.00	-9.44	10.26	0.00	9.44	-10.26	0.000%
20	-5.13	-12.58	8.89	5.13	12.58	-8.89	0.000%
21	-5.13	-9.44	8.89	5.13	9.44	-8.89	0.000%
22	-7.26	-12.58	7.26	7.26	12.58	-7.26	0.000%
23	-7.26	-9.44	7.26	7.26	9.44	-7.26	0.000%
24	-8.89	-12.58	5.13	8.89	12.58	-5.13	0.000%
25	-8.89	-9.44	5.13	8.89	9.44	-5.13	0.000%
26	-10.26	-12.58	0.00	10.26	12.58	-0.00	0.000%
27	-10.26	-9.44	0.00	10.26	9.44	-0.00	0.000%
28	-8.89	-12.58	-5.13	8.89	12.58	5.13	0.000%
29	-8.89	-9.44	-5.13	8.89	9.44	5.13	0.000%
30	-7.26	-12.58	-7.26	7.26	12.58	7.26	0.000%
31	-7.26	-9.44	-7.26	7.26	9.44	7.26	0.000%
32	-5.13	-12.58	-8.89	5.13	12.58	8.89	0.000%
33	-5.13	-9.44	-8.89	5.13	9.44	8.89	0.000%
34	0.00	-26.93	0.00	0.00	26.93	-0.00	0.000%
35	0.00	-26.93	-3.25	0.00	26.93	3.25	0.000%
36	1.62	-26.93	-2.81	-1.62	26.93	2.81	0.000%
37	2.30	-26.93	-2.30	-2.30	26.93	2.30	0.000%
38	2.81	-26.93	-1.62	-2.81	26.93	1.62	0.000%
39	3.25	-26.93	0.00	-3.25	26.93	-0.00	0.000%
40	2.81	-26.93	1.62	-2.81	26.93	-1.62	0.000%
41	2.30	-26.93	2.30	-2.30	26.93	-2.30	0.000%
42	1.62	-26.93	2.81	-1.62	26.93	-2.81	0.000%
43	0.00	-26.93	3.25	0.00	26.93	-3.25	0.000%
44	-1.62	-26.93	2.81	1.62	26.93	-2.81	0.000%
45	-2.30	-26.93	2.30	2.30	26.93	-2.30	0.000%
46	-2.81	-26.93	1.62	2.81	26.93	-1.62	0.000%
47	-3.25	-26.93	0.00	3.25	26.93	-0.00	0.000%
48	-2.81	-26.93	-1.62	2.81	26.93	1.62	0.000%
49	-2.30	-26.93	-2.30	2.30	26.93	2.30	0.000%
50	-1.62	-26.93	-2.81	1.62	26.93	2.81	0.000%
51	0.00	-10.48	-2.20	0.00	10.48	2.20	0.000%
52	1.10	-10.48	-1.90	-1.10	10.48	1.90	0.000%
53	1.55	-10.48	-1.55	-1.55	10.48	1.55	0.000%
54	1.90	-10.48	-1.10	-1.90	10.48	1.10	0.000%
55	2.20	-10.48	0.00	-2.20	10.48	0.00	0.000%
56	1.90	-10.48	1.10	-1.90	10.48	-1.10	0.000%
57	1.55	-10.48	1.55	-1.55	10.48	-1.55	0.000%
58	1.10	-10.48	1.90	-1.10	10.48	-1.90	0.000%
59	0.00	-10.48	2.20	0.00	10.48	-2.20	0.000%
60	-1.10	-10.48	1.90	1.10	10.48	-1.90	0.000%
61	-1.55	-10.48	1.55	1.55	10.48	-1.55	0.000%
62	-1.90	-10.48	1.10	1.90	10.48	-1.10	0.000%
63	-2.20	-10.48	0.00	2.20	10.48	0.00	0.000%
64	-1.90	-10.48	-1.10	1.90	10.48	1.10	0.000%
65	-1.55	-10.48	-1.55	1.55	10.48	1.55	0.000%
66	-1.10	-10.48	-1.90	1.10	10.48	1.90	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	0.00028095
3	Yes	4	0.00000001	0.00007879
4	Yes	5	0.00000001	0.00032828
5	Yes	5	0.00000001	0.00014463
6	Yes	5	0.00000001	0.00036510
7	Yes	5	0.00000001	0.00015889
8	Yes	5	0.00000001	0.00032019
9	Yes	5	0.00000001	0.00014084
10	Yes	4	0.00000001	0.00037203
11	Yes	4	0.00000001	0.00016869
12	Yes	5	0.00000001	0.00033168
13	Yes	5	0.00000001	0.00014605
14	Yes	5	0.00000001	0.00036629
15	Yes	5	0.00000001	0.00015926
16	Yes	5	0.00000001	0.00032343
17	Yes	5	0.00000001	0.00014218
18	Yes	4	0.00000001	0.00028190
19	Yes	4	0.00000001	0.00007901
20	Yes	5	0.00000001	0.00032343
21	Yes	5	0.00000001	0.00014218
22	Yes	5	0.00000001	0.00036629
23	Yes	5	0.00000001	0.00015926
24	Yes	5	0.00000001	0.00033168
25	Yes	5	0.00000001	0.00014605
26	Yes	4	0.00000001	0.00037203
27	Yes	4	0.00000001	0.00016869
28	Yes	5	0.00000001	0.00032019
29	Yes	5	0.00000001	0.00014084
30	Yes	5	0.00000001	0.00036510
31	Yes	5	0.00000001	0.00015889
32	Yes	5	0.00000001	0.00032828
33	Yes	5	0.00000001	0.00014463
34	Yes	4	0.00000001	0.00001106
35	Yes	5	0.00000001	0.00020793
36	Yes	5	0.00000001	0.00030280
37	Yes	5	0.00000001	0.00032585
38	Yes	5	0.00000001	0.00029732
39	Yes	5	0.00000001	0.00021050
40	Yes	5	0.00000001	0.00030938
41	Yes	5	0.00000001	0.00033095
42	Yes	5	0.00000001	0.00030313
43	Yes	5	0.00000001	0.00021050
44	Yes	5	0.00000001	0.00030313
45	Yes	5	0.00000001	0.00033095
46	Yes	5	0.00000001	0.00030938
47	Yes	5	0.00000001	0.00021050
48	Yes	5	0.00000001	0.00029732
49	Yes	5	0.00000001	0.00032585
50	Yes	5	0.00000001	0.00030280
51	Yes	4	0.00000001	0.00000001
52	Yes	4	0.00000001	0.00008715
53	Yes	4	0.00000001	0.00009690
54	Yes	4	0.00000001	0.00007883
55	Yes	4	0.00000001	0.00001727
56	Yes	4	0.00000001	0.00009106
57	Yes	4	0.00000001	0.00009832
58	Yes	4	0.00000001	0.00008208
59	Yes	4	0.00000001	0.00000001
60	Yes	4	0.00000001	0.00008208
61	Yes	4	0.00000001	0.00009832
62	Yes	4	0.00000001	0.00009106
63	Yes	4	0.00000001	0.00001727
64	Yes	4	0.00000001	0.00007883
65	Yes	4	0.00000001	0.00009690

66	Yes	4	0.00000001	0.00008715

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	93 - 44.75	10.882	59	0.9909	0.0013
L2	48 - 0	2.978	59	0.5770	0.0004

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
98.00	Lightning Rod 1"x10'	59	10.882	0.9909	0.0013	29484
96.00	SitePro 12' Handrail Kit HRK12	59	10.882	0.9909	0.0013	29484
95.00	AIR6449	59	10.882	0.9909	0.0013	29484
93.00	APXVAALL24-43	59	10.882	0.9909	0.0013	29484
92.00	EEI Low Profile Platform	59	10.679	0.9824	0.0013	29484

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	93 - 44.75	51.076	18	4.6487	0.0062
L2	48 - 0	13.987	18	2.7108	0.0017

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
98.00	Lightning Rod 1"x10'	18	51.076	4.6487	0.0062	6343
96.00	SitePro 12' Handrail Kit HRK12	18	51.076	4.6487	0.0062	6343
95.00	AIR6449	18	51.076	4.6487	0.0062	6343
93.00	APXVAALL24-43	18	51.076	4.6487	0.0062	6343
92.00	EEI Low Profile Platform	18	50.123	4.6089	0.0061	6343

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	93 - 44.75 (1)	TP25.45x19.5625x0.1875	48.25	93.00	126.4	14.7983	-6.88	209.17	0.033
L2	44.75 - 0 (2)	TP33.35x24.6784x0.25	48.00	93.00	95.0	26.2649	-12.57	657.84	0.019

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	93 - 44.75 (1)	TP25.45x19.5625x0.1875	291.63	483.03	0.604	0.00	483.03	0.000
L2	44.75 - 0 (2)	TP33.35x24.6784x0.25	725.54	1141.82	0.635	0.00	1141.82	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	93 - 44.75 (1)	TP25.45x19.5625x0.1875	7.73	468.56	0.017	0.00	968.34	0.000
L2	44.75 - 0 (2)	TP33.35x24.6784x0.25	10.28	831.39	0.012	0.00	2289.04	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	93 - 44.75 (1)	0.033	0.604	0.000	0.017	0.000	0.637 ✔	1.000	4.8.2 ✔
L2	44.75 - 0 (2)	0.019	0.635	0.000	0.012	0.000	0.655 ✔	1.000	4.8.2 ✔

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L1	93 - 44.75	Pole	TP25.45x19.5625x0.1875	1	-6.88	209.17	63.7	Pass
L2	44.75 - 0	Pole	TP33.35x24.6784x0.25	2	-12.57	657.84	65.5	Pass
							Summary	

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$øP_{allow}$ K	% Capacity	Pass Fail
						Pole (L2)	65.5	Pass
						RATING =	**65.5**	**Pass**

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63-2 North Branford Road P: (203) 488-0580
Branford, CT 06405 F: (203) 488-8587

Subject:	Anchor Bolt and Baseplate Analysis
Location:	93-FT Monopole Bloomfield, CT
Rev. 0: 7/5/21	Prepared by: T.J.L. Checked by: C.F.C. Job No. 21022.19

Anchor Bolt and Base Plate Analysis:

Input Data:

Tower Reactions:

Overturning Moment =	OM := 726·ft·kips	(Input From tnxTower)
Shear Force =	Shear := 10·kips	(Input From tnxTower)
Axial Force =	Axial := 13·kips	(Input From tnxTower)

Anchor Bolt Data:

ASTMA615 Grade 75

Number of Anchor Bolts =	N := 8	(User Input)
Bolt "Column" Distance =	l := 3.0·in	(User Input)
Bolt Ultimate Strength =	F_u := 100·ksi	(User Input)
Bolt Yield Strength =	F_y := 75·ksi	(User Input)
Bolt Modulus =	E := 29000·ksi	(User Input)
Diameter of Anchor Bolts =	D := 2.25·in	(User Input)
Threads per Inch =	n := 4.5	(User Input)
Top of Concrete to Bot Leveling Nut =	l_{ar} := 2·in	(User Input)

Base Plate Data:

Use AST MA572 Grade 50

Plate Yield Strength =	Fy_{bp} := 50·ksi	(User Input)
Base Plate Thickness =	t_{bp} := 2.5·in	(User Input)
Base Plate Diameter =	D_{bp} := 37·in	(User Input)
Outer Pole Diameter =	D_{pole} := 33.35·in	(User Input)
	η := 0.5	per TIA-222-G Section 4.9.9

Geometric Layout Data:

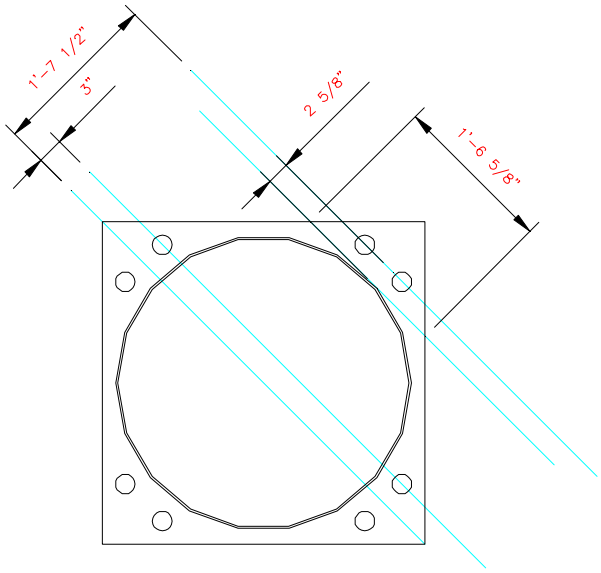
Distance from Bolts to Centroid of Pole:

$d_1 := 19.5in$ $d_2 := 3in$ (User Input)

Critical Distances For Bending in Plate: (User Input)

$ma_1 := 2.625in$

Effective Width of Baseplate for Bending = $B_{eff} := 18.625in$ (User Input)



Anchor Bolt Analysis:

Calculated Anchor Bolt Properties:

Polar Moment of Inertia = $I_p := \left[\left(d_1\right)^2 \cdot 4 + \left(d_2\right)^2 \cdot 4\right] = 1557 \cdot in^2$

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

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

Net Diameter = $D_n := \frac{2 \cdot \sqrt{A_n}}{\sqrt{\pi}} = 2.033 \cdot in$

Radius of Gyration of Bolt = $r := \frac{D_n}{4} = 0.508 \cdot in$

Section Modulus of Bolt = $S_x := \frac{\pi \cdot D_n^3}{32} = 0.826 \cdot in^3$

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

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

Check Anchor Bolt Tension Force:

Maximum Tensile Force = $T_{Max} := OM \cdot \frac{d_1}{I_p} - \frac{Axial}{N} = 107.5 \cdot kips$

Maximum Compressive Force = $P_u := OM \cdot \frac{d_1}{I_p} + \frac{Axial}{N} = 110.7 \cdot kips$

Maximum Shear Force = $V_u := \frac{Shear}{N} = 1.3 \cdot kips$

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

Bolt % of Capacity = $\frac{\left(P_u + \frac{V_u}{\eta}\right)}{\Phi R_{nt}} \cdot 100 = 43.6$

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

Condition1 = "OK"

Base Plate Analysis:

Force from Bolts =

$$C_1 := \frac{OM \cdot d_1}{I_p} + \frac{Axial}{N} = 110.735 \cdot kips$$

Applied Bending Stress in Plate =

$$f_{bp} := \frac{4 \cdot \left(2 \cdot C_1 \cdot ma_1\right)}{B_{eff} \, t_{bp}^{\,2}} = 19.98 \cdot ksi$$

Allowable Bending Stress in Plate =

$$F_{bp} := 0.9 \cdot Fy_{bp} = 45 \cdot ksi$$

Plate Bending Stress % of Capacity =

$$\frac{f_{bp}}{F_{bp}} = 44.4 \cdot \%$$

Condition2= =

$$Condition2 := if\left(\frac{f_{bp}}{F_{bp}} < 1.00, "Ok" , "Overstressed"\right)$$

Condition2 = "Ok"

RAN Template:	A&L Template:
67D5A997DB Hybrid	67D5997DB_2xAIR+1OP

CT11000A_Anchor_9_draft

Print Name: Preliminary (RFDS_for_Scoping)

Section 1 - Site Information

Site ID: CT11000A
Status: Draft
Version: 9
Project Type: Anchor
Approved: Not Approved
Approved By: Not Approved
Last Modified: 6/15/2021 2:43:27 PM
Last Modified By: Dominic.Kallas2@T-Mobile.com

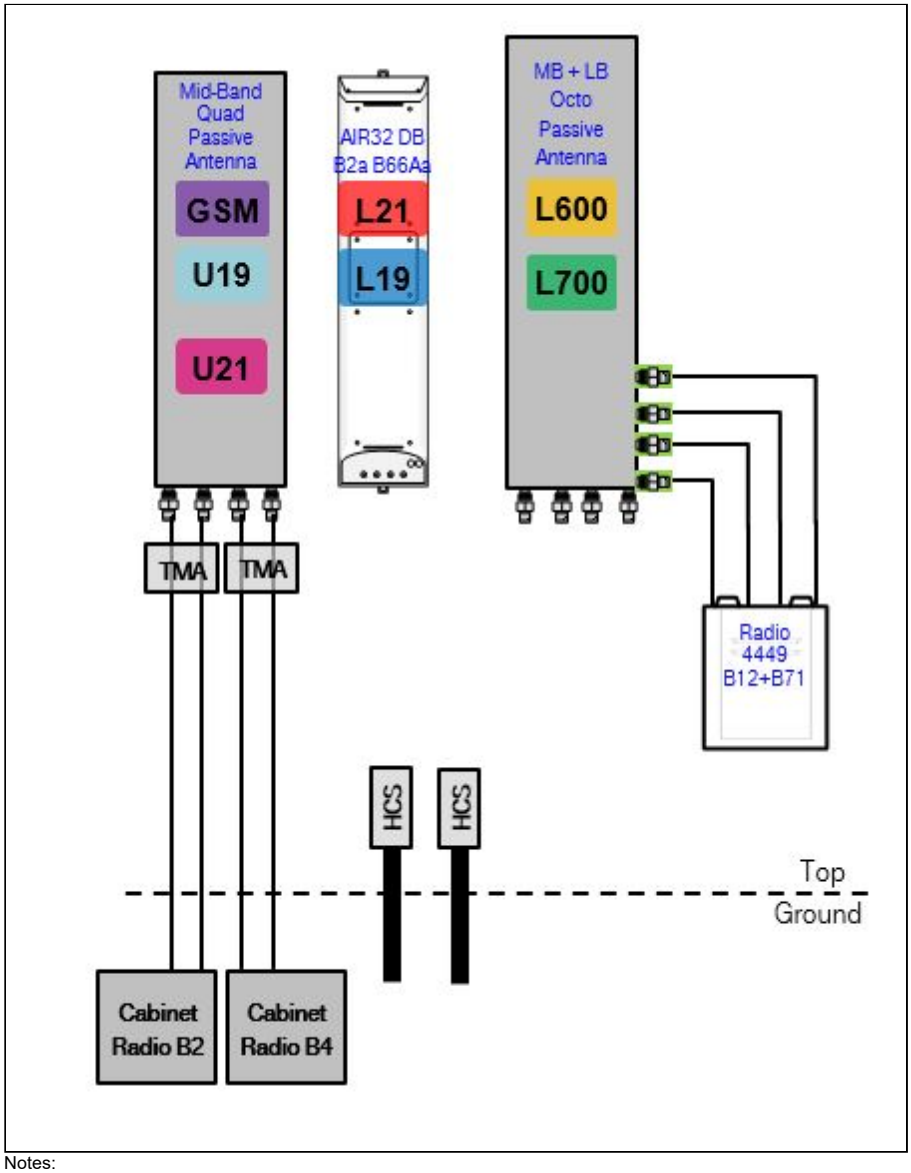
Site Name: Bloomfield/ W Dudley_1
Site Class: Monopole
Site Type: Structure Non Building
Plan Year: 2021
Market: CONNECTICUT CT
Vendor: Ericsson
Landlord: T-Mobile USA Inc

Latitude: 41.85176900
Longitude: -72.71517500
Address: 100 Filley St.
City, State: Bloomfield, CT
Region: NORTHEAST

RAN Template: 67D5A997DB Hybrid		AL Template: 67D5997DB_2xAIR+1OP		
Sector Count: 3	**Antenna Count:** 9	**Coax Line Count:** 0	**TMA Count:** 0	**RRU Count:** 6

Section 2 - Existing Template Images

67D94DB_1xAIR+1QP+1OP.JPG



Notes:

Section 3 - Proposed Template Images

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Section 4 - Siteplan Images

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RAN Template:	A&L Template:
67D5A997DB Hybrid	67D5997DB_2xAIR+1OP

CT11000A_Anchor_9_draft

Print Name: Preliminary (RFDS_for_Scoping)

Section 5 - RAN Equipment

Existing RAN Equipment

Template: 67D94DB Hybrid (evolved from 4B)

Enclosure	1	2
Enclosure Type	RBS 6102	RBS 3106
Baseband	DUW30 U2100; DUG20 G1900; BB 6630 L700 L600 N600; BB 6630 L2100 L1900	
Hybrid Cable System	Ericsson 6x12 HCS *Select Length & AWG* **(x 3)**	
Radio	RUS01 B2 **(x 3)** G1900; RUS01 B4 **(x 3)** U2100	

Proposed RAN Equipment

Template: 67D5A997DB Hybrid

Enclosure	1	2	3
Enclosure Type	RBS 6102	Enclosure 6160	B160
Baseband	DUW30 U2100; DUG20 G1900; BB 6630 L700 L600 N600; BB 6630 L2100 L1900	BB 6648 L2500 N2500	
Hybrid Cable System	Ericsson 6x12 HCS *Select Length & AWG* **(x 3)**	Ericsson Hybrid Trunk 6/24 4AWG 40m **(x 3)**; PSU 4813	
Transport System		CSR IXRe V2 (Gen2)	

RAN Scope of Work:

Remove RBS3106. Move AAV to a new Emerson cabinet.

Cabinet Radios will become unused. Remove and return all cabinet radios from existing base station cabinet.

Add (1) Enclosure 6160.

Add (1) Battery Cabinet B160.

Add (1) iXRe Router to new Enclosure 6160.

Add (1) BB6648 for L2500 and N2500 (MMBB - Mixed Mode Baseband) to new Enclosure 6160.

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

Remove all coaxial lines.

Add (3) 6X24 HCS ([1] per sector) terminating at the new Enclosure 6160. Connect DC for the AIR6449 B41 to the PSU4813 Voltage Booster.

RAN Template:	A&L Template:
67D5A997DB Hybrid	67D5997DB_2xAIR+1OP

CT11000A_Anchor_9_draft

Print Name: Preliminary (RFDS_for_Scoping)

Section 6 - A&L Equipment

Existing Template: 67D94DB_1xAIR+1QP+1OP
Proposed Template: 67D5997DB_2xAIR+1OP

Sector 1 (Existing) view from behind

Coverage Type	A - Outdoor Macro									
Antenna	1				2				3	
Antenna Model	Ericsson - AIR32 KRD901146-1_B66A_B2A (Octo)				RFS - APXVAARR24_43-U-NA20 (Octo)				RFS - APX16DWV-16DWV-S-E-A20 (Quad)	
Azimuth	50				50				50	
M. Tilt	0				0				0	
Height	95				93				95	
Ports	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10
Active Tech.	L2100	L2100	L1900	L1900	L700 L600 N600	L700 L600 N600			G1900	U2100
Dark Tech.										
Restricted Tech.										
Decomm. Tech.										
E. Tilt	3	3	3	3	2	2			3	3
Cables					Coax Jumper	Coax Jumper			1-1/4" Coax - 112 ft.	1-1/4" Coax - 112 ft.
TMAs									Generic Twin Style 1A - PCS (AtAntenna)	Generic Twin Style 1B - AWS (AtAntenna)
Diplexers / Combiners										
Radio					Radio 4449 B71+B85 (At Antenna)	SHARED Radio 4449 B71+B85 (At Antenna)				
Sector Equipment										

Unconnected Equipment:

Scope of Work:

Remove (2) Coax Lines and (1) Smart Bias-T (for L700).
Replace (1) LB Dual Port antenna with (1) LB+MB 8' Octa Port antenna at Position #2, add (1) Radio 4449 B71+B12 next to antenna, connect to LB ports.
Add (1) AIR32 B66A/B2A DB antenna at Position #1 empty mount, connect L2100 and L1900 fibers.

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

RAN Template:	A&L Template:
67D5A997DB Hybrid	67D5997DB_2xAIR+1OP

CT11000A_Anchor_9_draft

Print Name: Preliminary (RFDS_for_Scoping)

Sector 1 (Proposed) view from behind

Coverage Type	A - Outdoor Macro									
Antenna	1				2				3	
Antenna Model	Ericsson - AIR32 KRD901146-1_B66A_B2A (Octo)				RFS - APXVAARR24_43-U-NA20 (Octo)				Ericsson - AIR6449 B41 (Active Antenna - Massive MIMO)	
Azimuth	50				50				50	
M. Tilt	0				0				0	
Height	95				93				95	
Ports	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10
Active Tech.	L2100	L2100	G1900 L1900	G1900 L1900	L700 L600 N600	L700 L600 N600	U2100 L1900	U2100 L1900	L2500 N2500	L2500 N2500
Dark Tech.										
Restricted Tech.										
Decomm. Tech.										
E. Tilt	3	3	3	3	2	2	3	3	3	3
Cables	Fiber Jumper	Fiber Jumper	Fiber Jumper	Fiber Jumper	Coax Jumper **(x2)** Fiber Jumper	Coax Jumper **(x2)** Fiber Jumper	Coax Jumper **(x2)** Fiber Jumper **(x2)**	Coax Jumper **(x2)** Fiber Jumper **(x2)**	Fiber Jumper **(x2)**	Fiber Jumper **(x2)**
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:

Add (1) Radio 4460 B25+B66 for L1900 2nd Carrier and U2100 to Position 2 at antenna, and connect its ports to the Mid-Band ports of the Octo Antenna.

Remove Mid-Band Quad from Position 3.

Remove all TMAs

Remove all coaxial lines.

Move GSM to AIR32 Dual Band antenna in Position 1. GSM will share B2 radios with L1900 1st Carrier.

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:
67D5A997DB Hybrid	67D5997DB_2xAIR+1OP

CT11000A_Anchor_9_draft

Print Name: Preliminary (RFDS_for_Scoping)

Sector 2 (Existing) view from behind

Coverage Type	A - Outdoor Macro									
Antenna	1				2				3	
Antenna Model	Ericsson - AIR32 KRD901146-1_B66A_B2A (Octo)				RFS - APXVAARR24_43-U-NA20 (Octo)				RFS - APX16DWV-16DWV-S-E-A20 (Quad)	
Azimuth	180				180				180	
M. Tilt	0				0				0	
Height	95				93				95	
Ports	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10
Active Tech.	L2100	L2100	L1900	L1900	L700 L600 N600	L700 L600 N600			G1900	U2100
Dark Tech.										
Restricted Tech.										
Decomm. Tech.										
E. Tilt	3	3	3	3	2	2			3	3
Cables					Coax Jumper	Coax Jumper			1-1/4" Coax - 112 ft.	1-1/4" Coax - 112 ft.
TMAs									Generic Twin Style 1A - PCS (AtAntenna)	Generic Twin Style 1B - AWS (AtAntenna)
Diplexers / Combiners										
Radio					Radio 4449 B71+B85 (At Antenna)	SHARED Radio 4449 B71+B85 (At Antenna)				
Sector Equipment										

Unconnected Equipment:

Scope of Work:

Remove (2) Coax Lines and (1) Smart Bias-T (for L700).
Replace (1) LB Dual Port antenna with (1) LB+MB 8' Octa Port antenna at Position #2, add (1) Radio 4449 B71+B12 next to antenna, connect to LB ports.
Add (1) AIR32 B66A/B2A DB antenna at Position #1 empty mount, connect L2100 and L1900 fibers.

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

RAN Template:	A&L Template:
67D5A997DB Hybrid	67D5997DB_2xAIR+1OP

CT11000A_Anchor_9_draft

Print Name: Preliminary (RFDS_for_Scoping)

Sector 2 (Proposed) view from behind

Coverage Type	A - Outdoor Macro									
Antenna	1				2				3	
Antenna Model	Ericsson - AIR32 KRD901146-1_B66A_B2A (Octo)				RFS - APXVAARR24_43-U-NA20 (Octo)				Ericsson - AIR6449 B41 (Active Antenna - Massive MIMO)	
Azimuth	180				180				180	
M. Tilt	0				0				0	
Height	95				93				95	
Ports	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10
Active Tech.	L2100	L2100	G1900 L1900	G1900 L1900	L700 L600 N600	L700 L600 N600	L1900 U2100	L1900 U2100	L2500 N2500	L2500 N2500
Dark Tech.										
Restricted Tech.										
Decomm. Tech.										
E. Tilt	3	3	3	3	2	2	3	3	3	3
Cables	Fiber Jumper	Fiber Jumper	Fiber Jumper	Fiber Jumper	Coax Jumper **(x2)** Fiber Jumper	Coax Jumper **(x2)** Fiber Jumper	Coax Jumper **(x2)** Fiber Jumper **(x2)**	Coax Jumper **(x2)** Fiber Jumper **(x2)**	Fiber Jumper **(x2)**	Fiber Jumper **(x2)**
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:

Add (1) Radio 4460 B25+B66 for L1900 2nd Carrier and U2100 to Position 2 at antenna, and connect its ports to the Mid-Band ports of the Octo Antenna.

Remove Mid-Band Quad from Position 3.

Remove all TMAs

Remove all coaxial lines.

Move GSM to AIR32 Dual Band antenna in Position 1. GSM will share B2 radios with L1900 1st Carrier.

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:
67D5A997DB Hybrid	67D5997DB_2xAIR+1OP

CT11000A_Anchor_9_draft

Print Name: Preliminary (RFDS_for_Scoping)

Sector 3 (Existing) view from behind

Coverage Type	A - Outdoor Macro									
Antenna	1				2				3	
Antenna Model	Ericsson - AIR32 KRD901146-1_B66A_B2A (Octo)				RFS - APXVAARR24_43-U-NA20 (Octo)				RFS - APX16DWV-16DWV-S-E-A20 (Quad)	
Azimuth	280				280				280	
M. Tilt	0				0				0	
Height	95				93				95	
Ports	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10
Active Tech.	L2100	L2100	L1900	L1900	L700 L600 N600	L700 L600 N600			G1900	U2100
Dark Tech.										
Restricted Tech.										
Decomm. Tech.										
E. Tilt	3	3	3	3	2	2			3	3
Cables					Coax Jumper	Coax Jumper			1-1/4" Coax - 112 ft.	1-1/4" Coax - 112 ft.
TMAs									Generic Twin Style 1A - PCS (AtAntenna)	Generic Twin Style 1B - AWS (AtAntenna)
Diplexers / Combiners										
Radio					Radio 4449 B71+B85 (At Antenna)	SHARED Radio 4449 B71+B85 (At Antenna)				
Sector Equipment										

Unconnected Equipment:

Scope of Work:

Remove (2) Coax Lines and (1) Smart Bias-T (for L700).
Replace (1) LB Dual Port antenna with (1) LB+MB 8' Octa Port antenna at Position #2, add (1) Radio 4449 B71+B12 next to antenna, connect to LB ports.
Add (1) AIR32 B66A/B2A DB antenna at Position #1 empty mount, connect L2100 and L1900 fibers.

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

RAN Template:	A&L Template:
67D5A997DB Hybrid	67D5997DB_2xAIR+1OP

CT11000A_Anchor_9_draft

Print Name: Preliminary (RFDS_for_Scoping)

Sector 3 (Proposed) view from behind

Coverage Type	A - Outdoor Macro									
Antenna	1				2				3	
Antenna Model	Ericsson - AIR32 KRD901146-1_B66A_B2A (Octo)				RFS - APXVAARR24_43-U-NA20 (Octo)				Ericsson - AIR6449 B41 (Active Antenna - Massive MIMO)	
Azimuth	280				280				280	
M. Tilt	0				0				0	
Height	95				93				95	
Ports	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10
Active Tech.	L2100	L2100	G1900 L1900	G1900 L1900	L700 L600 N600	L700 L600 N600	L1900 U2100	L1900 U2100	L2500 N2500	L2500 N2500
Dark Tech.										
Restricted Tech.										
Decomm. Tech.										
E. Tilt	3	3	3	3	2	2	3	3	3	3
Cables	Fiber Jumper	Fiber Jumper	Fiber Jumper	Fiber Jumper	Coax Jumper **(x2)** Fiber Jumper	Coax Jumper **(x2)** Fiber Jumper	Coax Jumper **(x2)** Fiber Jumper **(x2)**	Coax Jumper **(x2)** Fiber Jumper **(x2)**	Fiber Jumper **(x2)**	Fiber Jumper **(x2)**
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:

Add (1) Radio 4460 B25+B66 for L1900 2nd Carrier and U2100 to Position 2 at antenna, and connect its ports to the Mid-Band ports of the Octo Antenna.

Remove Mid-Band Quad from Position 3.

Remove all TMAs

Remove all coaxial lines.

Move GSM to AIR32 Dual Band antenna in Position 1. GSM will share B2 radios with L1900 1st Carrier.

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:
67D5A997DB Hybrid	67D5997DB_2xAIR+1OP

CT11000A_Anchor_9_draft

Print Name: Preliminary (RFDS_for_Scoping)

Section 7 - Power Systems Equipment

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

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

EBI Consulting

environmental | engineering | due diligence

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

T-Mobile Existing Facility

Site ID: CT11000A

Bloomfield/ W Dudley_1
100 Filley Street
Bloomfield, Connecticut 06002

July 15, 2021

EBI Project Number: 6221003588

Site Compliance Summary	
Compliance Status:	**COMPLIANT**
Site total MPE% of FCC general population allowable limit:	**30.25%**

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

July 15, 2021

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

Emissions Analysis for Site: CT11000A - Bloomfield/ W Dudley_1

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **100 Filley Street** in **Bloomfield, 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 100 Filley Street in Bloomfield, Connecticut using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since T-Mobile is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufacturer's supplied specifications, minus 10 dB for directional panel antennas and 20 dB for highly focused parabolic microwave dishes, was focused at the base of the tower. For this report, the sample point is the top of a 6-foot person standing at the base of the tower. For power density calculations, the broadcast footprint of the AIR6449 antenna has been considered. Due to the beamforming nature of this antenna, the actual beam locations vary depending on demand and are narrow in nature. Using the broadcast footprint accounts for the potential location of beams at any given time.

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

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

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

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

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

5) 4 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 UMTS channels (AWS Band - 2100 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

7) 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.

8) 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.

9) 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.

10) 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.

11) 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.

12) 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.

13) 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.

14) The antennas used in this modeling are the Ericsson AIR 32 for the 1900 MHz / 1900 MHz / 2100 MHz channel(s), the RFS APXVAARR24_43-U-NA20 for the 600 MHz / 600 MHz / 700 MHz / 1900 MHz / 2100 MHz channel(s), the Ericsson AIR 6449 for the 2500 MHz / 2500 MHz / 2500 MHz / 2500 MHz channel(s) in Sector A, the Ericsson AIR 32 for the 1900 MHz / 1900 MHz / 2100 MHz channel(s), the RFS APXVAARR24_43-U-NA20 for the 600 MHz / 600 MHz / 700 MHz / 1900 MHz / 2100 MHz channel(s), the Ericsson AIR 6449 for the 2500 MHz / 2500 MHz / 2500 MHz / 2500 MHz channel(s) in Sector B, the Ericsson AIR 32 for the 1900 MHz / 1900 MHz / 2100 MHz channel(s), the RFS APXVAARR24_43-U-NA20 for the 600 MHz / 600 MHz / 700 MHz / 1900 MHz / 2100 MHz channel(s), the Ericsson AIR 6449

for the 2500 MHz / 2500 MHz / 2500 MHz / 2500 MHz channel(s) in Sector C. This is based on feedback from the carrier with regard to anticipated antenna selection. All Antenna gain values and associated transmit power levels are shown in the Site Inventory and Power Data table below. The maximum gain of the antenna per the antenna manufacturer's supplied specifications, minus 10 dB for directional panel antennas and 20 dB for highly focused parabolic microwave dishes, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

15) The antenna mounting height centerlines of the proposed antennas are 93 and 95 feet above ground level (AGL).

16) 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.

17) Emissions from additional carriers were not included because emissions data for the site location are not available.

18) 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 32	Make / Model:	Ericsson AIR 32	Make / Model:	Ericsson AIR 32
Frequency Bands:	1900 MHz / 1900 MHz / 2100 MHz	Frequency Bands:	1900 MHz / 1900 MHz / 2100 MHz	Frequency Bands:	1900 MHz / 1900 MHz / 2100 MHz
Gain:	15.35 dBd / 15.35 dBd / 15.85 dBd	Gain:	15.35 dBd / 15.35 dBd / 15.85 dBd	Gain:	15.35 dBd / 15.35 dBd / 15.85 dBd
Height (AGL):	95 feet	Height (AGL):	95 feet	Height (AGL):	95 feet
Channel Count:	8	Channel Count:	8	Channel Count:	8
Total TX Power (W):	360 Watts	Total TX Power (W):	360 Watts	Total TX Power (W):	360 Watts
ERP (W):	12,841.53	ERP (W):	12,841.53	ERP (W):	12,841.53
Antenna A1 MPE %:	**5.83%**	Antenna B1 MPE %:	**5.83%**	Antenna C1 MPE %:	**5.83%**
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 / 2100 MHz	Frequency Bands:	600 MHz / 600 MHz / 700 MHz / 1900 MHz / 2100 MHz	Frequency Bands:	600 MHz / 600 MHz / 700 MHz / 1900 MHz / 2100 MHz
Gain:	12.95 dBd / 12.95 dBd / 13.35 dBd / 15.65 dBd / 16.35 dBd	Gain:	12.95 dBd / 12.95 dBd / 13.35 dBd / 15.65 dBd / 16.35 dBd	Gain:	12.95 dBd / 12.95 dBd / 13.35 dBd / 15.65 dBd / 16.35 dBd
Height (AGL):	93 feet	Height (AGL):	93 feet	Height (AGL):	93 feet
Channel Count:	9	Channel Count:	9	Channel Count:	9
Total TX Power (W):	380 Watts	Total TX Power (W):	380 Watts	Total TX Power (W):	380 Watts
ERP (W):	11,055.53	ERP (W):	11,055.53	ERP (W):	11,055.53
Antenna A2 MPE %:	**7.92%**	Antenna B2 MPE %:	**7.92%**	Antenna C2 MPE %:	**7.92%**
Antenna #:	**3**	Antenna #:	**3**	Antenna #:	**3**
Make / Model:	Ericsson AIR 6449	Make / Model:	Ericsson AIR 6449	Make / Model:	Ericsson AIR 6449
Frequency Bands:	2500 MHz / 2500 MHz / 2500 MHz / 2500 MHz	Frequency Bands:	2500 MHz / 2500 MHz / 2500 MHz / 2500 MHz	Frequency Bands:	2500 MHz / 2500 MHz / 2500 MHz / 2500 MHz
Gain:	22.65 dBd / 17.3 dBd / 22.65 dBd / 17.3 dBd	Gain:	22.65 dBd / 17.3 dBd / 22.65 dBd / 17.3 dBd	Gain:	22.65 dBd / 17.3 dBd / 22.65 dBd / 17.3 dBd
Height (AGL):	95 feet	Height (AGL):	95 feet	Height (AGL):	95 feet
Channel Count:	4	Channel Count:	4	Channel Count:	4
Total TX Power (W):	240 Watts	Total TX Power (W):	240 Watts	Total TX Power (W):	240 Watts
ERP (W):	36,356.09	ERP (W):	36,356.09	ERP (W):	36,356.09
Antenna A3 MPE %:	**16.50%**	Antenna B3 MPE %:	**16.50%**	Antenna C3 MPE %:	**16.50%**

Site Composite MPE %	
Carrier	MPE %
T-Mobile (Max at Sector A):	30.25%
no additional carriers	N/A
Site Total MPE % :	30.25%

T-Mobile MPE % Per Sector	
T-Mobile Sector A Total:	30.25%
T-Mobile Sector B Total:	30.25%
T-Mobile Sector C Total:	30.25%
Site Total MPE % :	30.25%

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 1900 MHz GSM	4	1028.30	95.0	18.67	1900 MHz GSM	1000	1.87%
T-Mobile 1900 MHz LTE	2	2056.61	95.0	18.67	1900 MHz LTE	1000	1.87%
T-Mobile 2100 MHz LTE	2	2307.55	95.0	20.95	2100 MHz LTE	1000	2.09%
T-Mobile 600 MHz LTE	2	591.73	93.0	5.62	600 MHz LTE	400	1.41%
T-Mobile 600 MHz NR	1	1577.94	93.0	7.49	600 MHz NR	400	1.87%
T-Mobile 700 MHz LTE	2	648.82	93.0	6.16	700 MHz LTE	467	1.32%
T-Mobile 1900 MHz LTE	2	2203.69	93.0	20.93	1900 MHz LTE	1000	2.09%
T-Mobile 2100 MHz UMTS	2	1294.56	93.0	12.30	2100 MHz UMTS	1000	1.23%
T-Mobile 2500 MHz LTE 1C & 2C Traffic	1	11044.63	95.0	50.13	2500 MHz LTE 1C & 2C Traffic	1000	5.01%
T-Mobile 2500 MHz LTE 1C & 2C Broadcast	1	1074.06	95.0	4.87	2500 MHz LTE 1C & 2C Broadcast	1000	0.49%
T-Mobile 2500 MHz NR Traffic	1	22089.26	95.0	100.26	2500 MHz NR Traffic	1000	10.03%
T-Mobile 2500 MHz NR Broadcast	1	2148.13	95.0	9.75	2500 MHz NR Broadcast	1000	0.97%
						Total:	**30.25%**

• 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:	30.25%
Sector B:	30.25%
Sector C:	30.25%
T-Mobile Maximum MPE % (Sector A):	30.25%
Site Total:	30.25%
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **30.25%** 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.