INDUSTRIAL AVE,
TE 3
AHWAH NJ 07430

ONE: 201.684.0055
K: 201.684.0066

Transcend Wireless

August 19, 2021

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

RE: Notice of Exempt Modification
79 Putnam Pike, Killingly (Dayville), CT 06241
Latitude: 41.8474360000
Longitude: -71.878883000
T-Mobile Site#: CT11396B - Anchor

Dear Ms. Bachman:

T-Mobile currently maintains six (6) antennas at the 148' level of the 150' monopole located at 79 Putnam Pike, Killingly, CT. The monopole and property are owned by the Town of Killingly. T-Mobile now intends to add three (3) L2500/N2500 antennas. The new antennas would be installed at the same 148' 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
(2) 6 x 24 Hybrid Cables

Existing to Remain:
(3) APXVALL24-43-U-NA20 Antennas
(3) APX16DWV-16DWV-S-E-A20 Antennas
(3) Radio 4449 B71 B85

To Be Removed:
Existing Coax Cables

Ground Work:
Install (1) 6160 Equipment Cabinet, (1) Battery Cabinet B160, (1) 4' x 6' Concrete Pads, New 200 AMP service upgrade

This tower was originally approved by the Town of Killingly Zoning Department on June 18, 1998. 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 Town Manager Mary Calorio, Elected Official, and Ann-Marie Aubrey, Director of Planning and Development.

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: Mary Calorio - Town Manager of Killingly
Ann-Marie Aubrey - Director of Planning and Development

ERIC BREUN
2016587728
10 INDUSTRIAL AVE
MAHWAH NJ 07430

1 LBS

1 OF 1

SHIP TO:
KILLINGLY TOWN HALL
ANN-MARIE AUBREY
172 MAIN STREET
KILLINGLY CT 06239

CT 063 0-01

UPS GROUND

TRACKING #: 1Z V25 742 03 9407 0090

BILLING: P/P

Reference #1: CT11396B

XOL 21.07.05 NV45 34.0A 08/2021*

ERIC BREUN
2016587728
10 INDUSTRIAL AVE
MAHWAH NJ 07430

1 LBS

1 OF 1

SHIP TO:
KILLINGLY TOWN HALL
MARY CALORIO
SECOND FLOOR
172 MAIN STREET
DANIELSON CT 06239

CT 063 0-01

UPS GROUND

TRACKING #: 1Z V25 742 03 9123 2081

BILLING: P/P

Reference #1: CT11396B

XOL 21.07.05 NV45 34.0A 08/2021*

Hello, your package has been delivered.

Delivery Date: Wednesday, 08/18/2021

Delivery Time: 10:57 AM

Left At: FRONT DESK

Signed by: JAN

TRANSCEND WIRELESS

Tracking Number:	1ZV257420394070090
Ship To:	ANN-MARIE AUBREY 172 MAIN STREET KILLINGLY, CT 06239 US
Number of Packages:	1
UPS Service:	UPS Ground
Package Weight:	1.0 LBS
Reference Number:	CT11396B

Hello, your package has been delivered.

Delivery Date: Wednesday, 08/18/2021

Delivery Time: 10:57 AM

Left At: FRONT DESK

Signed by: JAN

TRANSCEND WIRELESS

Tracking Number:	1ZV257420391232081
Ship To:	MARY CALORIO 172 MAIN STREET SECOND FLOOR DANIELSON, CT 06239 US
Number of Packages:	1
UPS Service:	UPS Ground
Package Weight:	1.0 LBS
Reference Number:	CT11396B

Parcel Information

Location:	79 PUTNAM PIKE	Property Use:	Public Use	Primary Use:	Town Hall
Unique ID:	6994	Map Block Lot:	106-42	Acres:	5.83
490 Acres:	0.00	Zone:	GC	Volume / Page:	1375/ 618
Developers Map / Lot:		Census:	9041-1032		
Location:	79 PUTNAM PIKE	Property Use:	Public Use	Primary Use:	Town Hall
Unique ID:	6994	Map Block Lot:	106-42	Acres:	5.83
490 Acres:	0.00	Zone:	GC	Volume / Page:	1375/ 618
Developers Map / Lot:		Census:	9041-1032		

Value Information

	Appraised Value	Assessed Value
Land	604,240	423,010
Buildings	553,600	387,520
Detached Outbuildings	0	0
Total	1,157,840	810,530

Owner's Information

Owner's Data
KILLINGY TOWN OF 172 MAIN ST KILLINGLY CT 06239

Building 1

Category:	Automotive	Use:	Auto Repair	GLA:	15,800
Stories:	2.00	Construction:	Steel	Year Built:	1960
Heating:	Hot Water	Fuel:		Cooling Percent:	0
Siding:	ENCLOSURE	Roof Material:		Beds/Units:	0

Special Features

Attached Components

Type:	Year Built:	Area:
Lump Sum	1960	1
Utility Storage	1960	160

Detached Outbuildings

Type:	Year Built:	Length:	Width:	Area:
Det Brick Stone Garage	1960	60.00	22.00	1,320
Paving	1960	0.00	0.00	20,000
Cblk/Fr Shed	2014	12.00	30.00	360

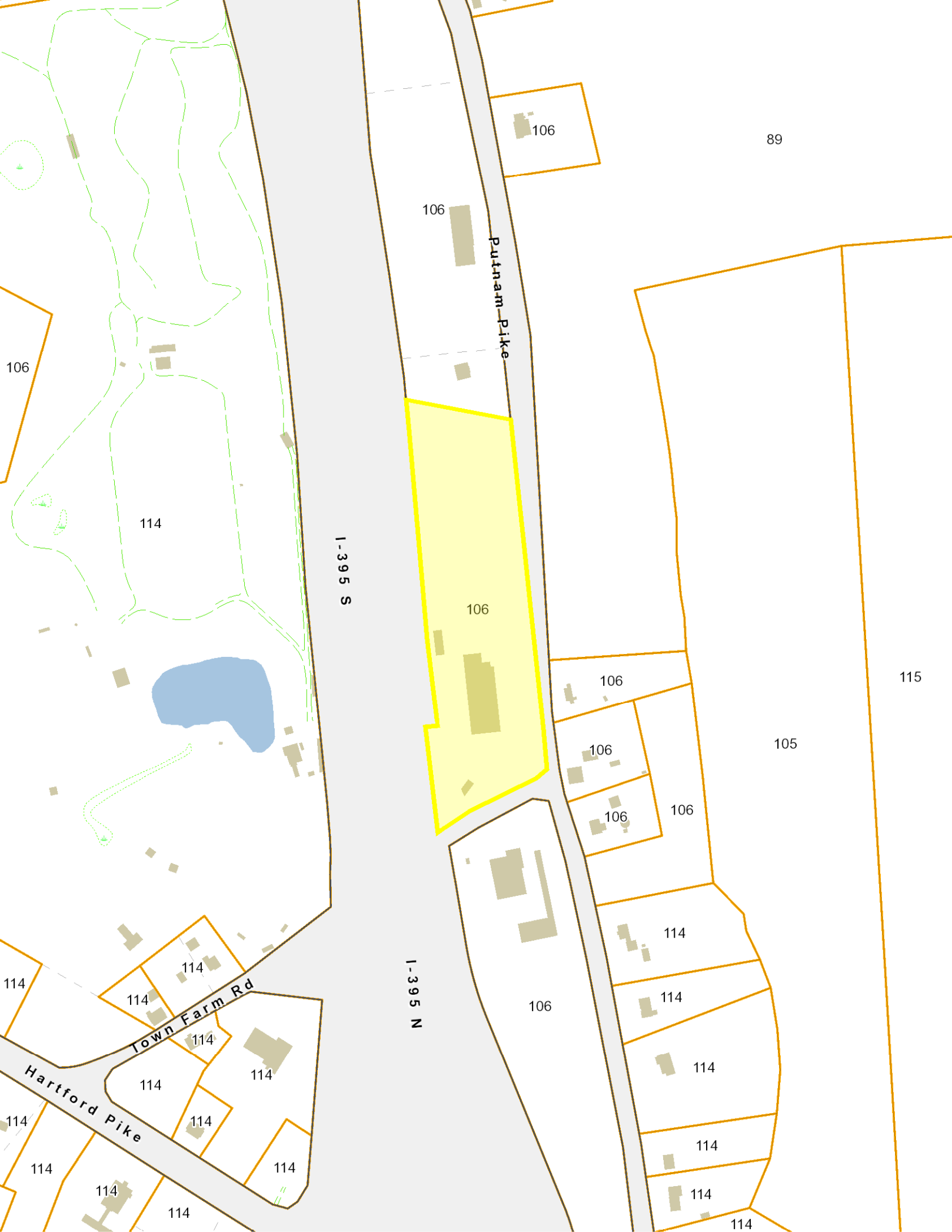
Owner History - Sales

Owner Name	Volume	Page	Sale Date	Deed Type	Sale Price
KILLINGY TOWN OF	1375	618	11/03/2020	Quit Claim	$0

Building Permits

Permit Number	Permit Type	Date Opened	Reason
21-000476	T:BUSINESS PERSONAL PROPERTY	04/26/2021	UPGRADE & REPL EQUIP AT EXISTING TELECOMM FACILITY
21-000547	Commercial	04/26/2021	INSTALL NEW CONCRETE PAD FOR NEW 25KW DIESEL GENERATOR & APPROP CONDUITS & ATS
27799	Solar	09/21/2020	INSTALL ROOF MOUNTED SOLAR PV SYSTEM - 168 MODULES-66,360 KW
26169	T:BUSINESS PERSONAL PROPERTY	07/12/2018	REPLACE 6 EXISTING ANTENNAS W/ 6 NEW ON EXISTING RAD HEIGHT ON EXISTING TELECOMMUNICATIONS TOWERS
25354	T:BUSINESS PERSONAL PROPERTY	06/15/2017	REMOVE & REPL 3 PANEL ANTENNAS, ADD 6 DIPLEXERS TO TOP & GROUND BASE & ADD 3 RR HEADS & 6 RET CABLE
23978	Boiler	10/20/2015	NVC REPL BOILER & BURNER
23714	T:BUSINESS PERSONAL PROPERTY	07/01/2015	REMOVE/REPL 6 ANTENNAES & ADD 9 RRU'S
23485	Comm Renovations	04/09/2015	MODIFICATION OF EXISTING TELECOM FACILITY PER PLANS
23332	Gas Line	12/02/2014	RUN UNDERGROUND GAS LINES FOR 1000 GAL AG PROPANE TANK FOR AT&T CELL TOWER
23297	Mechanical	11/13/2014	HOOK UP PREFAB COMMUNICATION SHELTER TO EXISTING UTILITIES
23235	Commercial New	10/10/2014	WIRELESS TELECOMM FACILITY - 12X30 EQUIP SHELTER, 12 ANTENNAS & ASSOC APPURTENANCES ON ANTENNA PLAT

23177	Fuel Tank	09/17/2014	INSTALL 2 AG 10000 GAL FUEL TANKS & REMV 2 UG FUEL TANKS PERSONAL PROPERTY
22544	Roof	08/29/2013	NVC ROOF REPL
22389	Roof	06/12/2013	NVC ROOF REPL
22121	T:BUSINESS PERSONAL PROPERTY	11/30/2012	ADD 12 NEW ANTENNAS (NEXLINK GLOBAL)
19971	Commercial New	05/06/2009	18X50 ANIMAL CONTROL KENNELS
19865	Commercial	01/29/2009	REPL WIRELESS COMM TOWER - EXISTING
19790	Generator	11/19/2008	NVC CELL PHONE TOWER GENERATOR
19723	Electrical	10/22/2008	ELEC FOR NEW EQUIP SHELTER
19649	T:BUSINESS PERSONAL PROPERTY	09/18/2008	ADD ANTENNAS TO EXISTING TELECOMM TOWER
19431	T:BUSINESS PERSONAL PROPERTY	06/12/2008	REPL EXISTING CINGULAR ANTENNAS W/NEW
17357	T:BUILDING	07/29/2005	MODIF TEL TOWER
16879	Electrical	11/10/2004	ELEC UPGRADE NVC
16011	T:BUSINESS PERSONAL PROPERTY	07/23/2003	ADD ANTENNAS NV
15235	Windows	05/03/2002	WINDOW REPLACE
13926	T:BUILDING	11/10/1999	INSTALL PROPANE
13763	T:BUILDING	07/30/1999	DOG PND TANK OU
13718	T:BUILDING	07/02/1999	DOG PND ENC WIN
13659	Electrical	06/07/1999	ELEC TO COMM TO
13580	Commercial	04/29/1999	SEE NOTES
12830	Addition	10/01/1997	ADDN 35X42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Putnam Pike
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Town Farm Rd
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Hartford Pike
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114

DATE: 6/18/98

TOWN OF KILLINGLY, CONNECTICUT
ZONING PERMIT

№ 006352

Complete Items #1-9 and the plot plan on the reverse side of the top sheet.

1. Location of Property 79 Putnam Pike
   House # & Street
   Tax Map Number 4683 Block 329 Lot 1 Zoning District LD Volume 34 Page 1 List 6991
2. Property Owner's Name Town of Killingly Phone
3. Property Owner's Address if different from property location 172 Main St.
4. Applicant's Name and Address if different from Property Owner's Name and Address ~~Robert~~ Omnipoint
   25 Van Zant St Norwalk CT Phone 203-855-5427

5. Lot Size 30,000 sq ft Lot Frontage 100'
6. This permit is applied for in accordance with the requirements of the Town of Killingly and/or Borough of Danielson Zoning Regulations for:
   - ☒ new construction
   - ☐ addition
   - ☐ accessory structure (sheds, satellite dishes, etc.)
   - ☐ swimming pool
   - ☐ excavating/filling/earth removal
   - ☐ sign
   - ☐ change of use
   - ☐ other
7. Proposed structure or project —
   Provide description and dimensions:
   Construction of a 150' monopole with related telecommunication facilities

8. Property Use:
   - ☐ single family residential
   - ☐ two-family residential
   - ☐ mobile home — residential
   - ☐ multi-family — residential
   - ☐ Industrial specify
   - ☒ Commercial specify telecommunication facility
   - ☐ Professional and Business specify

9. PERMIT VOID IF ...
work or activity is not commenced within one year from the date of issue and diligently prosecuted to completion.
This permit, if issued, is based upon the plot plan submitted. Falsification, by misrepresentation or omission, or failure to comply with the conditions of approval of this permit shall constitute a violation of the Town of Killingly and/or Borough of Danielson Zoning Regulations.
Agents of the Town of Killingly are authorized to enter upon the property for the purpose of inspection and verification of compliance with the terms of this permit.

(Signature of Owner or authorized agent)

203-855-5427
(Agent's phone #)

FOR OFFICE USE ONLY:

Inland Wetlands NA - no impact to wetlands 6-18-98
Historic District? Yes (No)
Slope greater than 15%? Yes (No)
Flood Hazard Zone? NO
Aquifer Protection Zone? (Yes) No
Public Sewer (On-Site Septic)
Site Plan Review Necessary? (Yes) No
Applicant's Name
Application No.
P&Z Commission Approval Date

Driveway Permit
Special Permit necessary? (Yes) No
Applicant's Name Omni Point
Application No. 98-706
P&Z Commission Approval Date 5-13-98
Subdivision necessary? Yes (No)
Applicant's Name
Application No.
P&Z Commission Approval Date
Variance Necessary? Yes (No)
Applicant's Name
Application No.
ZBA Approval Date

Approved ✓ Disapproved Date 6-18-98
Reason for Disapproval:
Comments: Able to condition approval of SP #98-706 Condition 1-5

George C Dion
Zoning Enforcement Officer

Orig./White: Z.E.O. / Blue: P &Z / Green: Bldg. Official / Yellow: Applicant

KILLINGLY/I-395/X93_1
SITE ID: CT11396B
79 PUTNAM PIKE
KILLINGLY, CT 06241

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

RAN TEMPLATE (PROVIDED BY RFDS)
67D5A998E ODE+6160

GENERAL NOTES

1. ALL WORK SHALL BE IN ACCORDANCE WITH THE 2015 INTERNATIONAL BUILDING CODE AS MODIFIED BY THE 2018 CONNECTICUT SUPPLEMENT, INCLUDING THE TIA/EIA-222 REVISION "G" "STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWERS AND SUPPORTING STRUCTURES." 2017 CONNECTICUT FIRE SAFETY CODE, NATIONAL ELECTRICAL CODE AND LOCAL CODES.
2. CONTRACTOR SHALL REVIEW ALL DRAWINGS AND SPECIFICATIONS IN THE CONTRACT DOCUMENT SET. CONTRACTOR SHALL COORDINATE ALL WORK SHOWN IN THE SET OF DRAWINGS. THE CONTRACTOR SHALL PROVIDE A COMPLETE SET OF DRAWINGS TO ALL SUBCONTRACTORS AND ALL RELATED PARTIES. THE SUBCONTRACTORS SHALL EXAMINE ALL THE DRAWINGS AND SPECIFICATIONS FOR THE INFORMATION THAT AFFECTS THEIR WORK.
3. CONTRACTOR SHALL PROVIDE A COMPLETE BUILD-OUT WITH ALL FINISHES, STRUCTURAL, MECHANICAL, AND ELECTRICAL COMPONENTS AND PROVIDE ALL ITEMS AS SHOWN OR INDICATED ON THE DRAWINGS OR IN THE WRITTEN SPECIFICATIONS.
4. CONTRACTOR SHALL FURNISH ALL MATERIAL, LABOR AND EQUIPMENT TO COMPLETE THE WORK AND FURNISH A COMPLETED JOB ALL IN ACCORDANCE WITH LOCAL AND STATE GOVERNING AUTHORITIES AND OTHER AUTHORITIES HAVING LAWFUL JURISDICTION OVER THE WORK.
5. CONTRACTOR SHALL SECURE AND PAY FOR ALL PERMITS AND ALL INSPECTIONS REQUIRED AND SHALL ALSO PAY FEES REQUIRED FOR THE GENERAL CONSTRUCTION, PLUMBING, ELECTRICAL, AND HVAC. PERMITS SHALL BE PAID FOR BY THE RESPECTIVE SUBCONTRACTORS.
6. CONTRACTOR SHALL MAINTAIN A CURRENT SET OF DRAWINGS AND SPECIFICATIONS ON SITE AT ALL TIMES AND INSURE DISTRIBUTION 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.

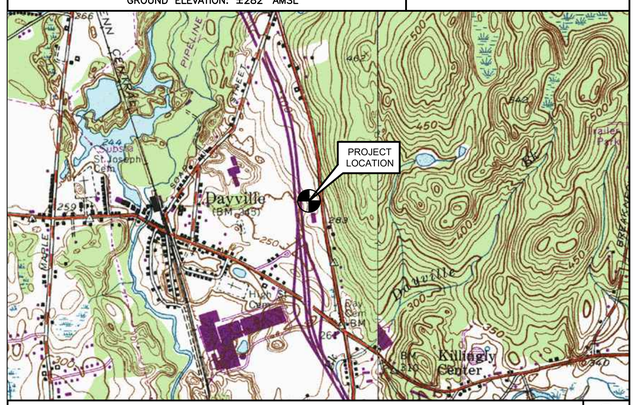
SITE DIRECTIONS

FROM: 35 GRIFFIN ROAD SOUTH, BLOOMFIELD, CT 06002 **TO:** 79 PUTNAM PIKE, KILLINGLY, CT 06241

1.	HEAD WEST ON GRIFFIN ROAD TOWARD TARIFFVILLE RD	0.18 MI.
2.	TURN RIGHT ONTO TARRIFVILLE RD.	0.29 MI.
3.	MERGE ONTO CT-187.	2.16 MI.
4.	STAY STRAIGHT TO GO ONTO BLUE HILLS AVE/CT-187.	4.03 MI.
5.	TURN LEFT ONTO COTTAGE GROVE RD/CT-218. CONTINUE TO FOLLOW CT-218.	1.03 MI.
6.	MERGE ONTO I-291 E TOWARD SOUTH WINDSOR.	6.15 MI.
7.	MERGE ONTO I-84 E VIA THE EXIT ON THE LEFT TOWARD BOSTON.	15.35 MI.
8.	TURN RIGHT ONTO TOLLAND STAGE RD/CT-74. CONTINUE TO FOLLOW CT-74.	7.54 MI.
9.	TURN LEFT ONTO POMPEY HOLLOW RD/US-44 E. CONTINUE TO FILLOW US-44 E.	11.89 MI.
10.	STAY STRAIGHT TO GO ONTO MASHAMOQUET RD/CT-101. CONTINUE TO FOLLOW CT-101..	5.03 MI.
11.	TURN SHARP LEFT INTO PUTNAM PIKE/CT-12.	0.45 MI.
12.	79 PUTNAM PIKE, KILLINGLT CT, CT 06241	

SITE COORDINATES: LATITUDE: 41° 50' 50.67" N
LONGITUDE: 71° 52' 44.24" W
GROUND ELEVATION: ±282' AMSL

COORDINATES AND GROUND ELEVATION ARE REFERENCED FROM GOOGLE EARTH



VICINITY MAP — NORTH

NOTE: PREVIOUS ANTENNA UPGRADE AND MOUNT MODIFICATIONS TO BE INSTALLED PRIOR TO THE PROPOSED ANCHOR INSTALLATION

PROJECT SUMMARY

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

1. INSTALL (1) ERICSSON AIR6449 B41 ANTENNA PER SECTOR. TOTAL (3)
2. INSTALL (1) RADIO 4460 B25+B66 PER SECTOR. TOTAL (3)
3. INSTALL (2) 6x24 HYBRID CABLES
4. REMOVE EXISTING COAX CABLES
5. INSTALL T-MOBILE POWER ENCLOSURE 6160
6. INSTALL T-MOBILE BATTERY CABINET B160
7. INSTALL (1) 6' VERTICAL PIPE MAST PER SECTOR FOR POS.3 ANTENNAS. TOTAL (3)
8. INSTALL 4'-0" x 6'-0" CONCRETE PAD
9. NEW 200AMP SERVICE UPGRADE TO BE INSTALLED

PROJECT INFORMATION

SITE NAME:	KILLINGLY/I-395/X93_1
SITE ID:	CT11396B
SITE ADDRESS:	79 PUTNAM PIKE KILLINGLY, CT 06241
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° 50' 50.67" N LONGITUDE: 71° 52' 44.24" W GROUND ELEVATION: ±282' AMSL SITE COORDINATES AND GROUND ELEVATION REFERENCED FROM GOOGLE EARTH.

SHEET INDEX

SHT. NO.	DESCRIPTION	REV.
T-1	TITLE SHEET	0
N-1	GENERAL NOTES AND SPECIFICATIONS	0
C-1	SITE LOCATION PLAN	0
C-2	COMPOUND PLAN, EQUIPMENT PLAN, AND ELEVATION	0
C-3	ANTENNA PLANS	0
C-4	TYPICAL EQUIPMENT DETAILS	0
C-5	TTYPICAL EQUIPMENT DETAILS	0
E-1	ELECTRICAL RISER DIAGRAM AND CONDUIT ROUTING	0
E-2	TYPICAL ELECTRICAL DETAILS	0
E-3	ELECTRICAL SPECIFICATIONS	0

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	08/03/21	RTS	TJR	CONSTRUCTION DRAWINGS - ISSUED FOR CONSTRUCTION

PROFESSIONAL ENGINEER SEAL

T-Mobile

Transcend Wireless

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

T-MOBILE NORTHEAST LLC

KILLINGLY/I-395/X93_1
SITE ID: CT11396B
79 PUTNAM PIKE
KILLINGLY, CT 06241

DATE: 06/24/21
SCALE: AS NOTED
JOB NO. 21022.21

TITLE SHEET

T-1

Sheet No. 1 of 10

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): 101 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

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2. CONTRACTOR SHALL REVIEW ALL DRAWINGS AND SPECIFICATIONS IN THE CONTRACT DOCUMENT SET. CONTRACTOR SHALL COORDINATE ALL WORK SHOWN IN THE SET OF DRAWINGS. THE CONTRACTOR SHALL PROVIDE A COMPLETE SET OF DRAWINGS TO ALL SUBCONTRACTORS AND ALL RELATED PARTIES. THE SUBCONTRACTORS SHALL EXAMINE ALL THE DRAWINGS AND SPECIFICATIONS FOR THE INFORMATION THAT AFFECTS THEIR WORK.
3. CONTRACTOR SHALL PROVIDE A COMPLETE BUILD-OUT WITH ALL FINISHES, STRUCTURAL, MECHANICAL, AND ELECTRICAL COMPONENTS AND PROVIDE ALL ITEMS AS SHOWN OR INDICATED ON THE DRAWINGS OR IN THE WRITTEN SPECIFICATIONS.
4. CONTRACTOR SHALL FURNISH ALL MATERIAL, LABOR AND EQUIPMENT TO COMPLETE THE WORK AND FURNISH A COMPLETED JOB ALL IN ACCORDANCE WITH LOCAL AND STATE GOVERNING AUTHORITIES AND OTHER AUTHORITIES HAVING LAWFUL JURISDICTION OVER THE WORK.
5. CONTRACTOR SHALL SECURE AND PAY FOR ALL PERMITS AND ALL INSPECTIONS REQUIRED AND SHALL ALSO PAY FEES REQUIRED FOR THE GENERAL CONSTRUCTION, PLUMBING, ELECTRICAL AND HVAC. PERMITS SHALL BE PAID FOR BY THE RESPECTIVE SUBCONTRACTORS.
6. CONTRACTOR SHALL MAINTAIN A CURRENT SET OF DRAWINGS AND SPECIFICATIONS ON SITE AT ALL TIMES AND INSURE DISTRIBUTION OF NEW DRAWINGS TO SUBCONTRACTORS AND OTHER RELEVANT PARTIES AS SOON AS THEY ARE MADE AVAILABLE. ALL OLD DRAWINGS SHALL BE MARKED VOID AND REMOVED FROM THE CONTRACT AREA. THE CONTRACTOR SHALL FURNISH AN 'AS-BUILT' SET OF DRAWINGS TO OWNER UPON COMPLETION OF PROJECT.
7. LOCATION OF EQUIPMENT AND WORK SUPPLIED BY OTHERS THAT IS DIAGRAMMATICALLY INDICATED ON THE DRAWINGS, SHALL BE DETERMINED BY THE CONTRACTOR. THE CONTRACTOR SHALL DETERMINE LOCATIONS AND DIMENSIONS SUBJECT TO STRUCTURAL CONDITIONS AND WORK OF THE SUBCONTRACTORS.
8. THE CONTRACTOR IS SOLELY RESPONSIBLE TO DETERMINE CONSTRUCTION PROCEDURE AND SEQUENCE, AND TO ENSURE THE SAFETY OF THE EXISTING STRUCTURES AND IT'S COMPONENT PARTS DURING CONSTRUCTION. THIS INCLUDES THE ADDITION OF WHATEVER SHORING, BRACING, UNDERPINNING, ETC. THAT MAY BE NECESSARY.
9. DRAWINGS INDICATE THE MINIMUM STANDARDS, BUT IF ANY WORK SHOULD BE INDICATED TO BE SUBSTANDARD TO ANY ORDINANCES, LAWS, CODES, RULES, OR REGULATIONS BEARING ON THE WORK, THE CONTRACTOR SHALL INCLUDE IN HIS WORK AND SHALL EXECUTE THE WORK CORRECTLY IN ACCORDANCE WITH SUCH ORDINANCES, LAWS, CODES, RULES OR REGULATIONS WITH NO INCREASE IN COSTS.
10. ALL UTILITY WORK SHALL BE IN ACCORDANCE WITH LOCAL UTILITY COMPANY REQUIREMENTS AND SPECIFICATIONS.
11. ALL EQUIPMENT AND PRODUCTS PURCHASED ARE TO BE REVIEWED BY CONTRACTOR AND ALL APPLICABLE SUBCONTRACTORS FOR ANY CONDITION PER MFR.'S RECOMMENDATIONS. CONTRACTOR TO SUPPLY THESE ITEMS AT NO COST TO OWNER OR CONSTRUCTION MANAGER.
12. ANY AND ALL ERRORS, DISCREPANCIES, AND "MISSED" ITEMS, ARE TO BE BROUGHT TO THE ATTENTION OF THE SITE OWNER'S CONSTRUCTION MANAGER DURING THE BIDDING PROCESS BY THE CONTRACTOR. ALL THESE ITEMS ARE TO BE INCLUDED IN THE BID. NO 'EXTRA' WILL BE ALLOWED FOR MISSED ITEMS.
13. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL ON-SITE SAFETY FROM THE TIME THE JOB IS AWARDED UNTIL ALL WORK IS COMPLETE AND ACCEPTED BY THE OWNER.
14. CONTRACTOR TO REVIEW ALL SHOP DRAWINGS AND SUBMIT COPY TO ENGINEER FOR APPROVAL. DRAWINGS MUST BEAR THE CHECKER'S INITIALS BEFORE SUBMITTING TO THE CONSTRUCTION MANAGER FOR REVIEW.
15. THE CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS, ELEVATIONS, ANGLES, AND EXISTING CONDITIONS AT THE SITE, PRIOR TO FABRICATION AND/OR INSTALLATION OF ANY WORK IN THE CONTRACT AREA.
16. COORDINATION, LAYOUT, FURNISHING AND INSTALLATION OF CONDUIT AND ALL APPURTENANCES REQUIRED FOR PROPER INSTALLATION OF ELECTRICAL AND TELECOMMUNICATION SERVICE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
17. ALL DAMAGE CAUSED TO ANY EXISTING STRUCTURE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR WILL BE HELD LIABLE FOR ALL REPAIRS REQUIRED FOR EXISTING STRUCTURES IF DAMAGED DURING CONSTRUCTION ACTIVITIES.
18. THE CONTRACTOR SHALL CONTACT 'CALL BEFORE YOU DIG' AT LEAST 48 HOURS PRIOR TO ANY EXCAVATIONS AT 1-800-922-4455. ALL UTILITIES SHALL BE IDENTIFIED AND CLEARLY MARKED. CONTRACTOR SHALL MAINTAIN AND PROTECT MARKED UTILITIES THROUGHOUT PROJECT COMPLETION.
18. CONTRACTOR SHALL COMPLY WITH OWNER'S ENVIRONMENTAL ENGINEER ON ALL METHODS AND PROVISIONS FOR ALL EXCAVATION ACTIVITIES INCLUDING SOIL DISPOSAL. ALL BACKFILL MATERIALS TO BE PROVIDED BY THE CONTRACTOR.
19. THE COUNTY/CITY/TOWN WILL MAKE PERIODIC FIELD OBSERVATION AND INSPECTIONS TO MONITOR THE INSTALLATION, MATERIALS, WORKMANSHIP AND EQUIPMENT INCORPORATED INTO THE PROJECT TO ENSURE COMPLIANCE WITH THE DESIGN PLANS, SPECIFICATIONS, CONTRACT DOCUMENTS AND APPROVED SHOP DRAWINGS.
20. THE COUNTY/CITY/TOWN MUST BE NOTIFIED (2) WORKING DAYS PRIOR TO CONCEALMENT/BURIAL OF ANY SYSTEM OR MATERIAL THAT WILL PREVENT THE DIRECT INSPECTION OF MATERIALS, METHODS OR WORKMANSHIP. EXAMPLES OF THESE PROCESSES ARE BACKFILLING A GROUND RING OR TOWER FOUNDATION, POURING TOWER FOUNDATIONS, BURYING GROUND RODS, PLATES OR GRIDS, ETC. THE CONTRACTOR MAY PROCEED WITH THE SCHEDULED PROCESS (2) WORKING DAYS AFTER PROVIDING NOTICE UNLESS NOTIFIED OTHERWISE BY THE COUNTY/CITY/TOWN.

STRUCTURAL STEEL

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

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

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

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SITE ID: CT11396B
79 PUTNAM PIKE
KILLINGLY, CT 06241

DATE: 06/24/21
SCALE: AS NOTED
JOB NO. 21022.21

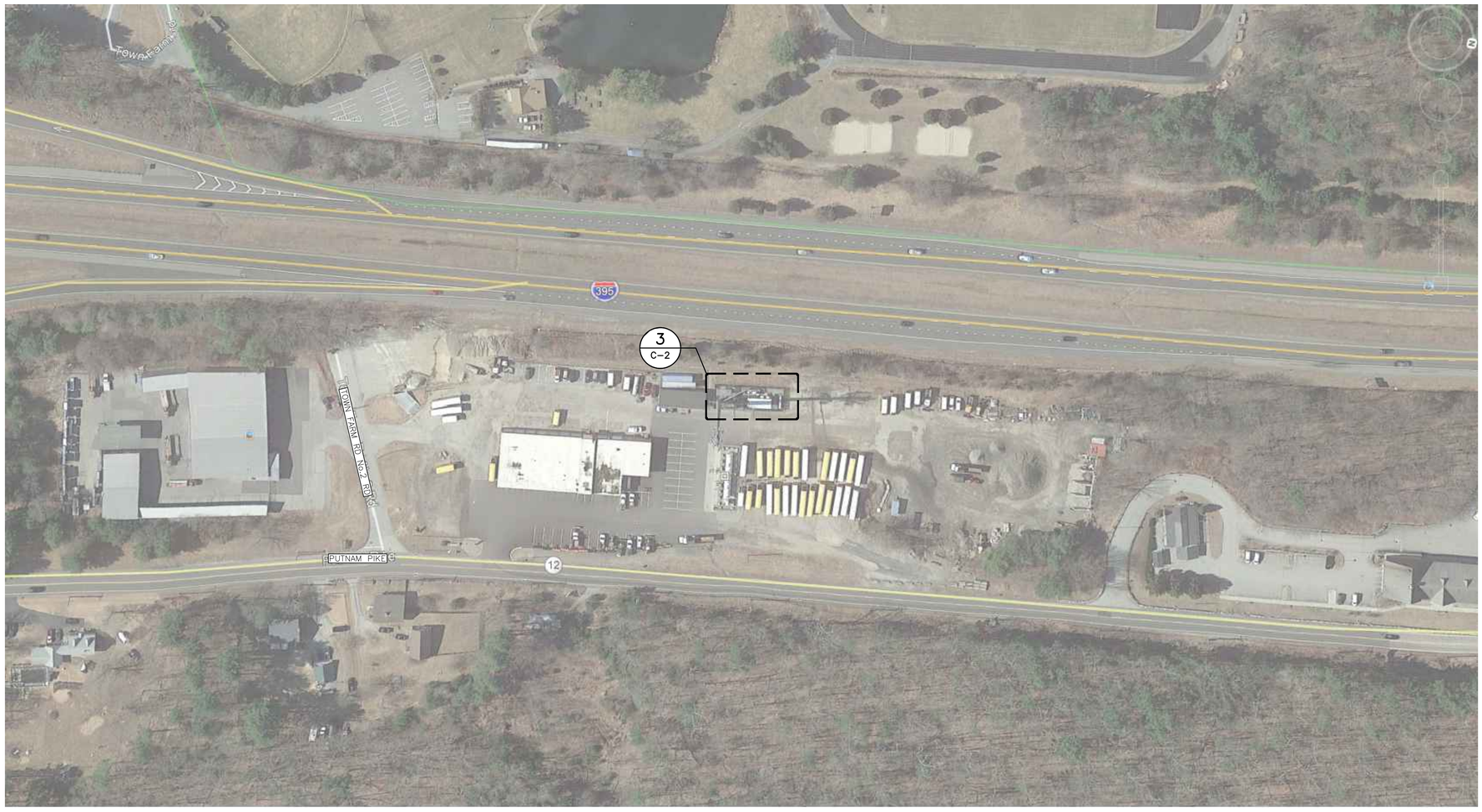
GENERAL NOTES AND SPECIFICATIONS

N-1

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

ANTENNA SCHEDULE

SECTOR	EXISTING/PROPOSED	ANTENNA	SIZE (INCHES) (L x W x D)	ANTENNA ℄ HEIGHT	AZIMUTH	(E/P) RRU (QTY)	(E/P) TMA (QTY)	(QTY) PROPOSED COAX (LENGTH)
A1	EXISTING	RFS–APX16DWV–16DWV–S–E–A20	55.9 x 13 x 3.15	150'	80°	(P) RADIO 4460 B25+B66 (1)		(1) 6x24 HYBRID CABLE (±220')
A2	EXISTING	RFS–APXVAALL24_43–U–NA20	95.9 x 24 x 8.5	148'	80°	(E) RADIO 4449 B71+B85 (1)		
A3	PROPOSED	ERICSSON (AIR6449 B41)	33.1 x 20.6 x 8.6	150'	80°			
B1	EXISTING	RFS–APX16DWV–16DWV–S–E–A20	55.9 x 13 x 3.15	150'	200°	(P) RADIO 4460 B25+B66 (1)		(1) 6x24 HYBRID CABLE (±220')
B2	EXISTING	RFS–APXVAALL24_43–U–NA20	95.9 x 24 x 8.5	148'	200°	(E) RADIO 4449 B71+B85 (1)		
B3	PROPOSED	ERICSSON (AIR6449 B41)	33.1 x 20.6 x 8.6	150'	200°			
C1	EXISTING	RFS–APX16DWV–16DWV–S–E–A20	55.9 x 13 x 3.15	150'	320°	(P) RADIO 4460 B25+B66 (1)		
C2	EXISTING	RFS–APXVAALL24_43–U–NA20	95.9 x 24 x 8.5	148'	320°	(E) RADIO 4449 B71+B85 (1)		
C3	PROPOSED	ERICSSON (AIR6449 B41)	33.1 x 20.6 x 8.6	150'	320°			



1 / C–1 SITE LOCATION PLAN
SCALE: NOT TO SCALE

TRUE NORTH

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SITE LOCATION PLAN

C-1

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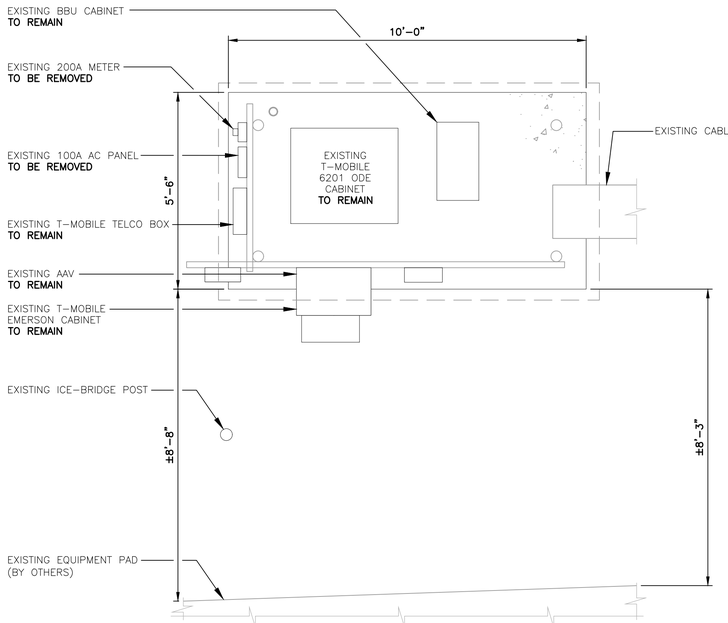
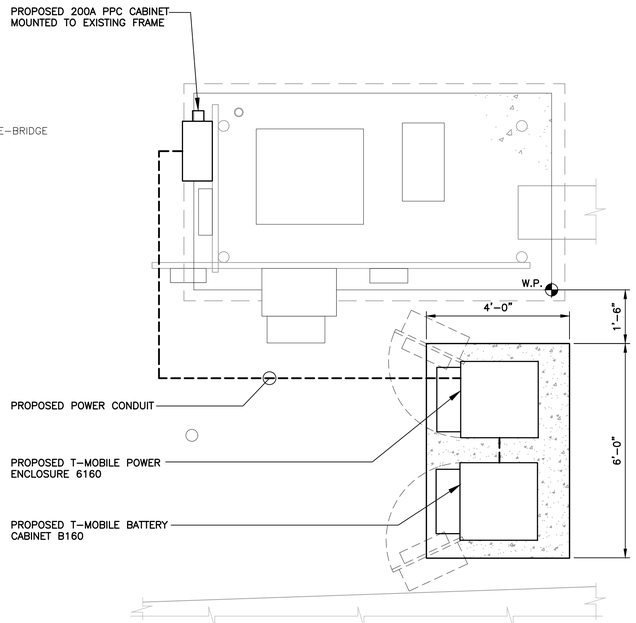
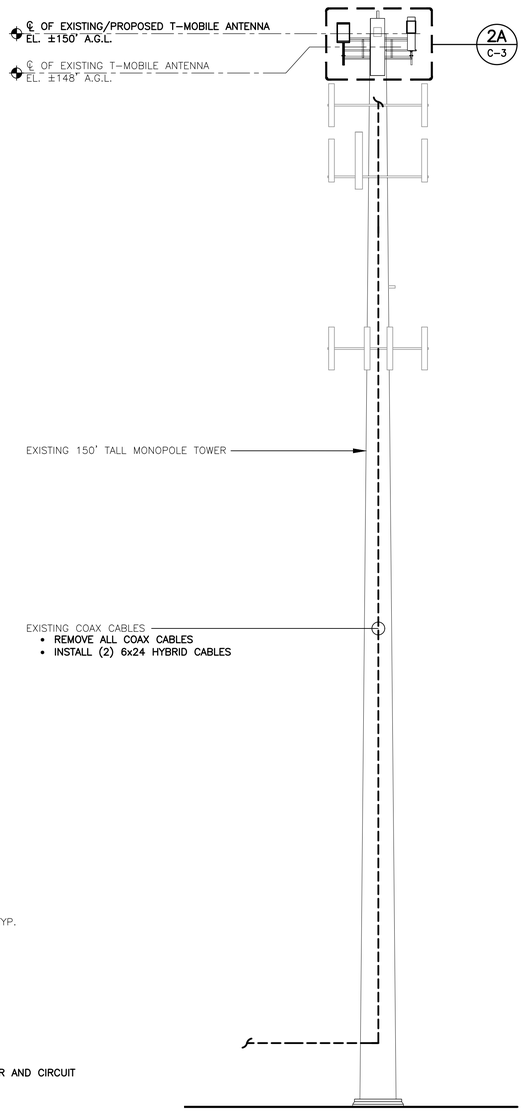
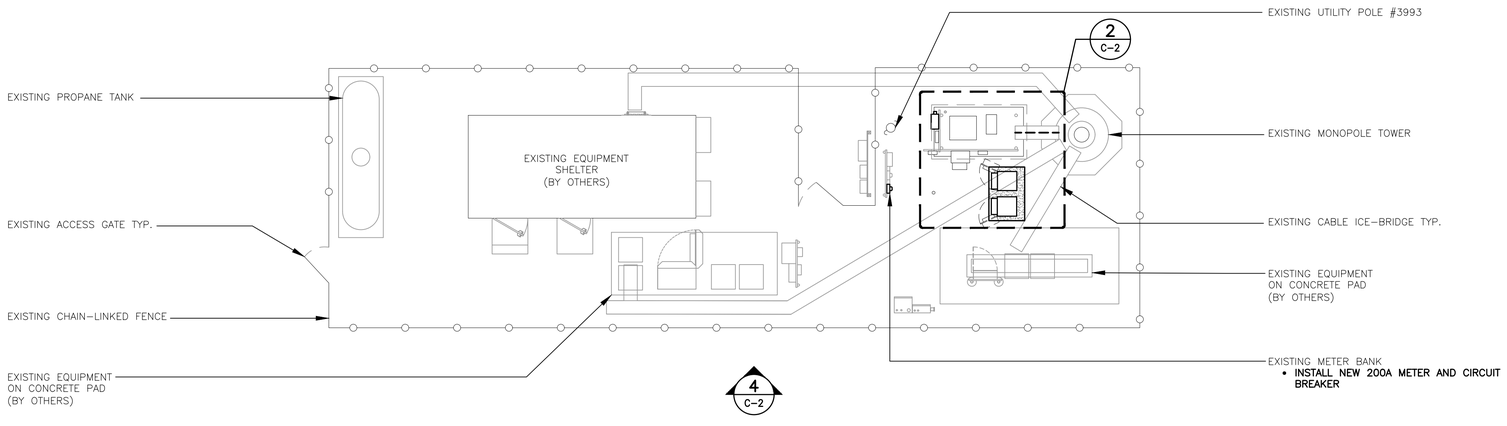


1 C-2 **EXISTING EQUIPMENT PLAN**
SCALE: 1/2" = 1'
TRUE NORTH



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





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

4 C-2 **WEST ELEVATION - PROPOSED**
SCALE: 1" = 5'

GRAPHIC SCALE
5 0 2.5 5 10 20
1" = 5'-0"

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 # 21022.21) 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 # 21022.21) DATED 07/06/21 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

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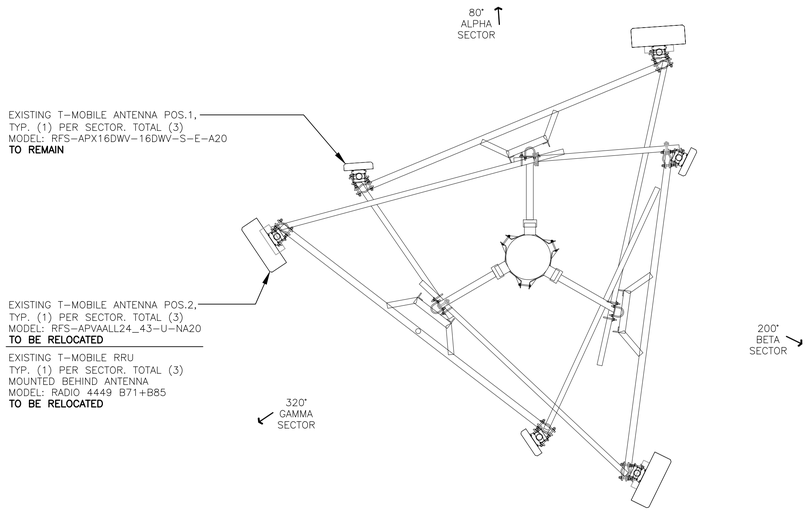
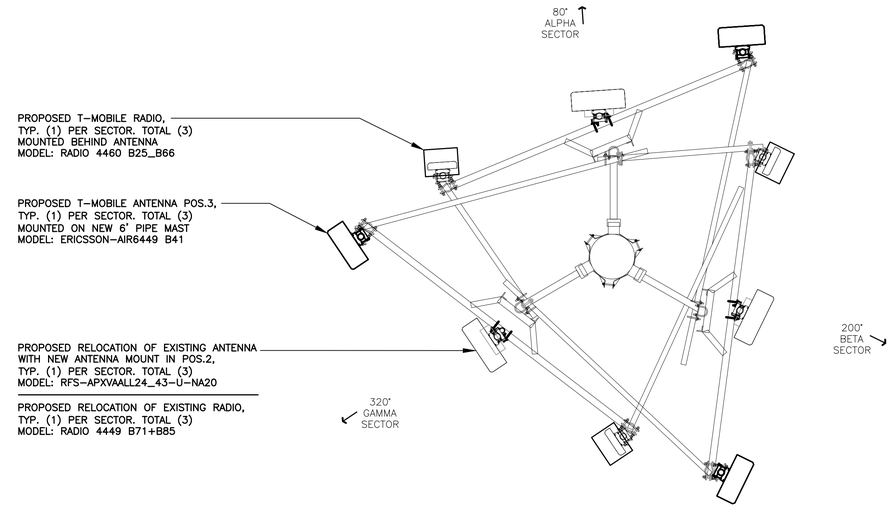
NOTE: PREVIOUS ANTENNA UPGRADE AND MOUNT MODIFICATIONS TO BE INSTALLED PRIOR TO THE PROPOSED ANCHOR INSTALLATION



1 C-3 ANTENNA PLAN - EXISTING

SCALE: 3/8" = 1'

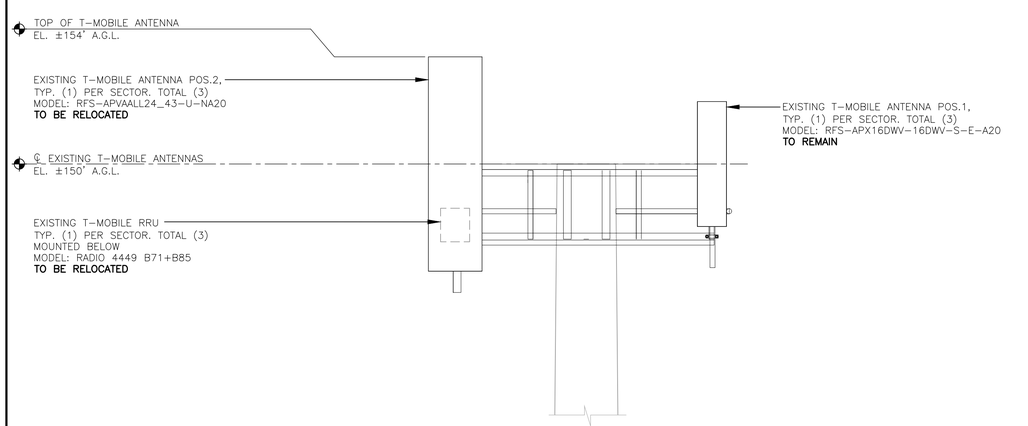
TRUE NORTH



1A C-3 ANTENNA PLAN - PROPOSED

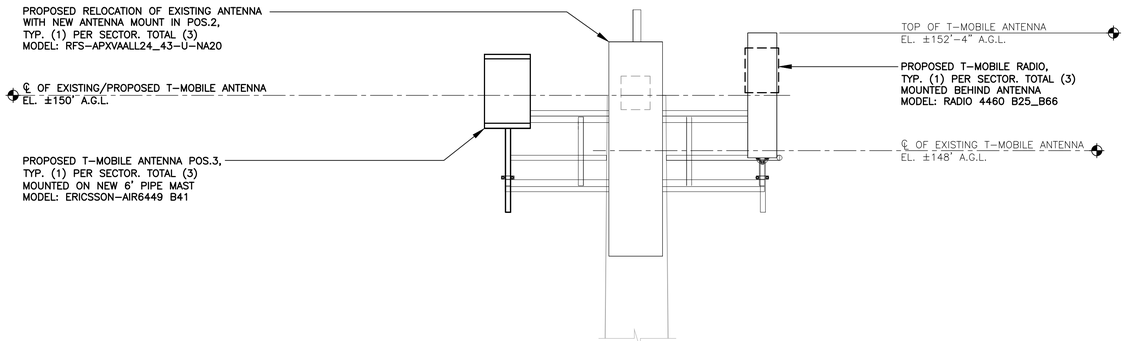
SCALE: 3/8" = 1'

TRUE NORTH



2 C-3 ANTENNA ELEVATION - EXISTING

SCALE: 1/2" = 1'



2A C-3 ANTENNA ELEVATION - PROPOSED

SCALE: 1/2" = 1'

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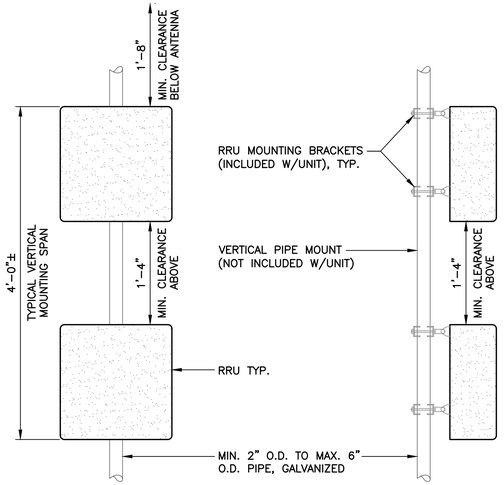
ANTENNA PLANS AND ELEVATIONS

C-3

Sheet No. 5 of 10



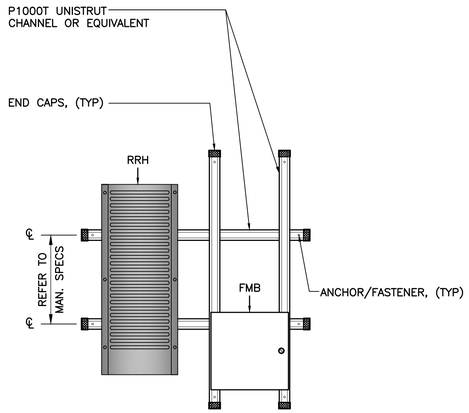
FRONT ELEVATION SIDE ELEVATION

NOTES: (PIPE MOUNTING)

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

1 C–4 TYPICAL RRU MOUNTING DETAIL

SCALE: NOT TO SCALE



FRONT ELEVATION

NOTES: (UNISTRUT MOUNTING)

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

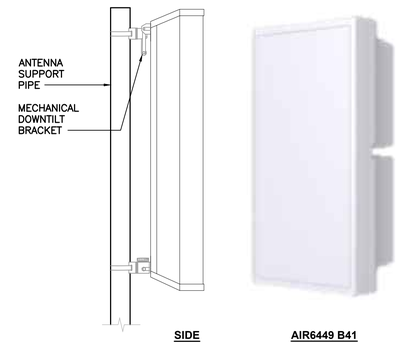
RADIO 4460 B25+B66

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

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

2 C–4 PROPOSED RRU DETAIL

SCALE: NOT TO SCALE



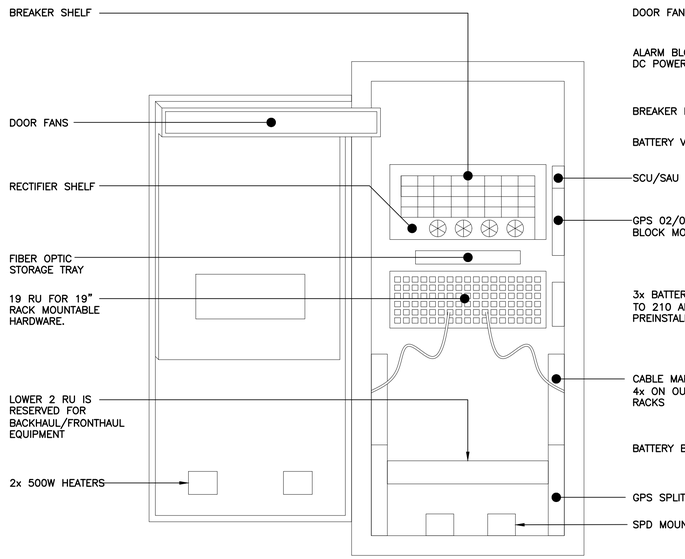
SIDE AIR6449 B41

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.

3 C–4 PROPOSED ANTENNA DETAIL

SCALE: NOT TO SCALE



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

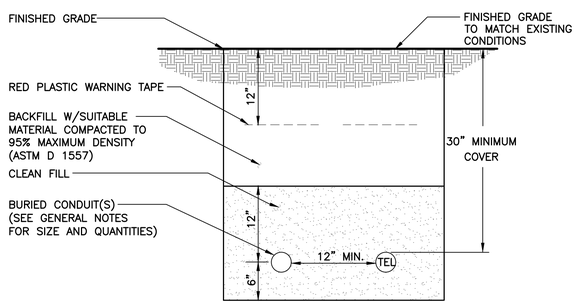
4 C–4 ENCLOSURE 6160 CABINET DETAIL

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



NOTES:
1. THE CLEAN FILL SHALL PASS THROUGH A 3/8" MESH SCREEN AND SHALL NOT CONTAIN SHARP STONES. OTHER BACKFILL SHALL NOT CONTAIN ASHES, CINDERS, SHELLS, FROZEN MATERIAL, LOOSE DEBRIS OR STONES LARGER THAN 2" IN MAXIMUM DIMENSION.
2. WHERE EXISTING UTILITIES ARE LIKELY TO BE ENCOUNTERED, CONTRACTOR SHALL HAND DIG AND PROTECT EXISTING UTILITIES.

6 C–4 TYPICAL ELECTRICAL/TEL TRENCH DETAIL

SCALE; NOT TO SCALE

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TYPICAL EQUIPMENT DETAILS

C-4

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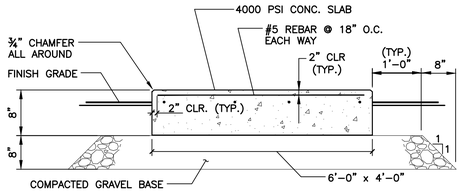
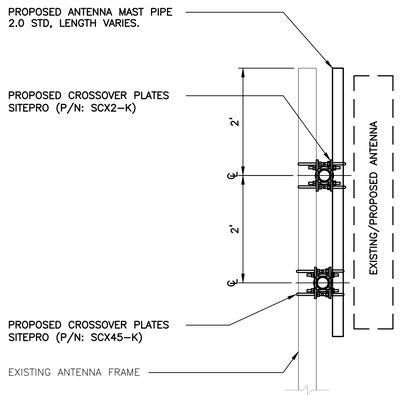
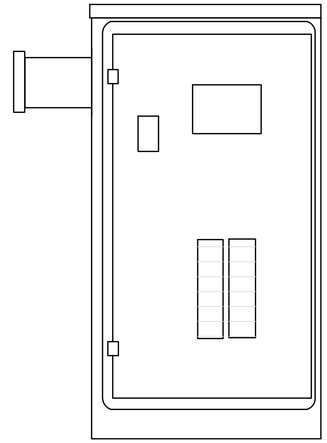


1 C-5 **TYPICAL CONCRETE PAD DETAIL**
SCALE: NOT TO SCALE



2 C-5 **TYPICAL ANTENNA MAST CONNECTION DETAIL**
SCALE: 3/4" = 1'-0"



PPC CABINET		
EQUIPMENT	DIMENSIONS	WEIGHT
MAKE: EMERSON MODEL: CAC-A75201090	40.0"H x 20.0"W x 10.0"D	±80 LBS

3 C-5 **PPC CABINET DETAIL**
SCALE: NOT TO SCALE

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TYPICAL EQUIPMENT DETAILS

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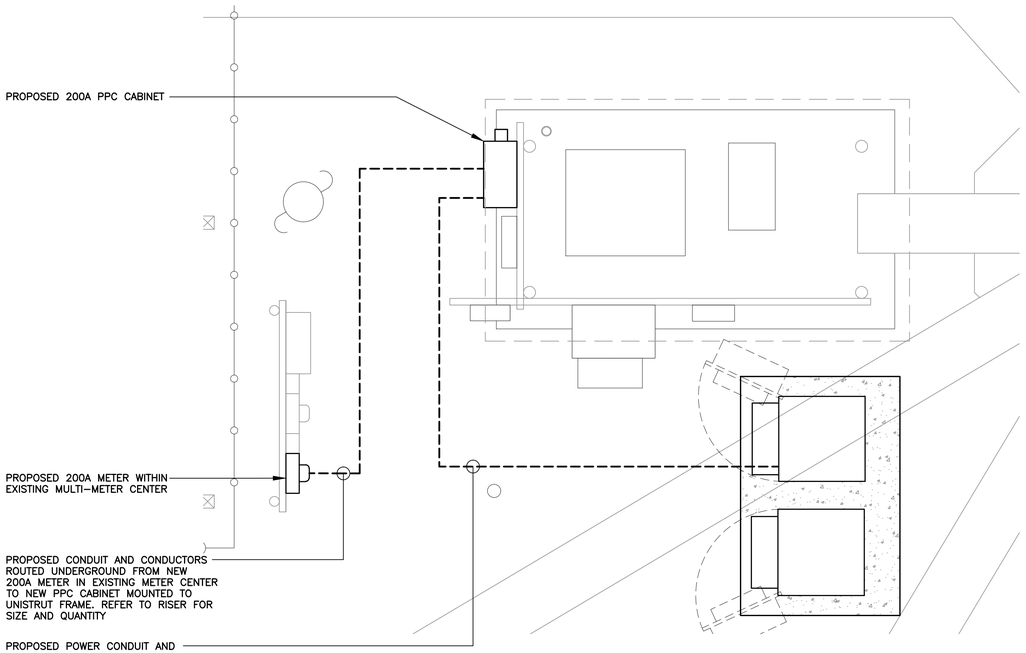
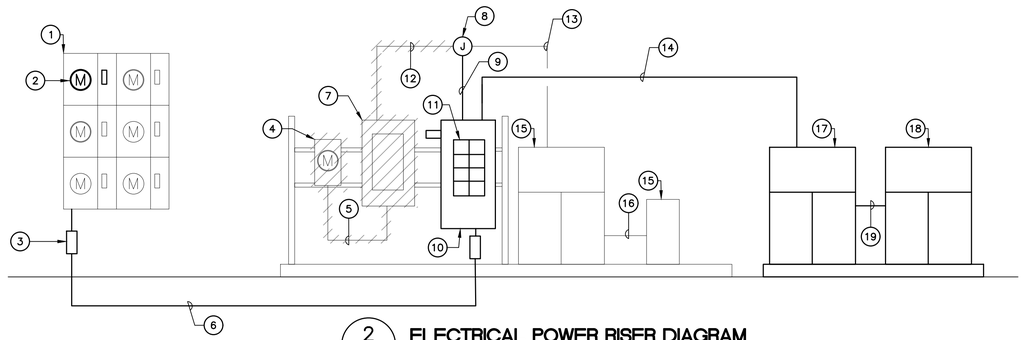


1 E-1 **ELECTRICAL CONDUIT ROUTING PLAN**
SCALE: NOT TO SCALE

RISER DIAGRAM NOTES

1. EXISTING MULTI METER CENTER TO REMAIN.
2. 200A METER AND CIRCUIT BREAKER.
3. EXPANSION COUPLING TYP.
4. EXISTING 200A METER TO BE REMOVED.
5. EXISTING CONDUITS AND CONDUCTORS TO BE REMOVED.
6. (3) 3/0 AWG, (1) #6 AWG GROUND, 2" CONDUIT.
7. EXISTING 100A AC PANEL TO BE REMOVED. ALL EXISTING TO REMAIN CIRCUITS AND ARE TO BE RELOCATED TO NEW PPC CABINET.
8. JUNCTION BOX SIZED PER N.E.C. AS REQUIRED.
9. EXTEND EXISTING CONDUITS AND CONDUCTORS TO NEW PPC CABINET.
10. NEW 200A PPC CABINET.
11. NEW 100A/2P CIRCUIT BREAKER TO SERVE NEW EQUIPMENT CABINET.
12. SECTION OF EXISTING CONDUITS AND CONDUCTORS TO BE REMOVED.
13. SECTION OF CONDUITS AND CONDUCTORS TO REMAIN.
14. (3) #1 AWG, (1) #8 AWG GROUND, 1-1/4" CONDUIT
15. EXISTING CABINET TO REMAIN.
16. EXISTING CONDUITS AND CONDUCTORS TO REMAIN
17. NEW T-MOBILE EQUIPMENT CABINET
18. NEW T-MOBILE BATTERY CABINET
19. 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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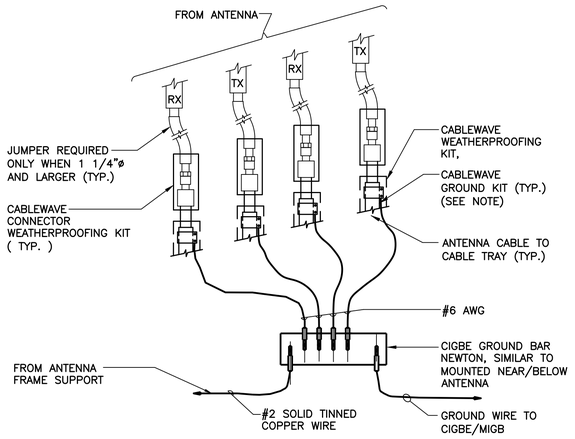
ELECTRICAL RISER DIAGRAM AND CONDUIT ROUTING

E-1

Sheet No. 8 of 10

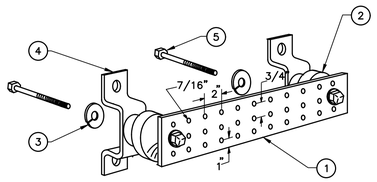


NOTES:

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

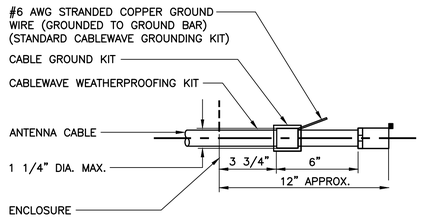


NOTES

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

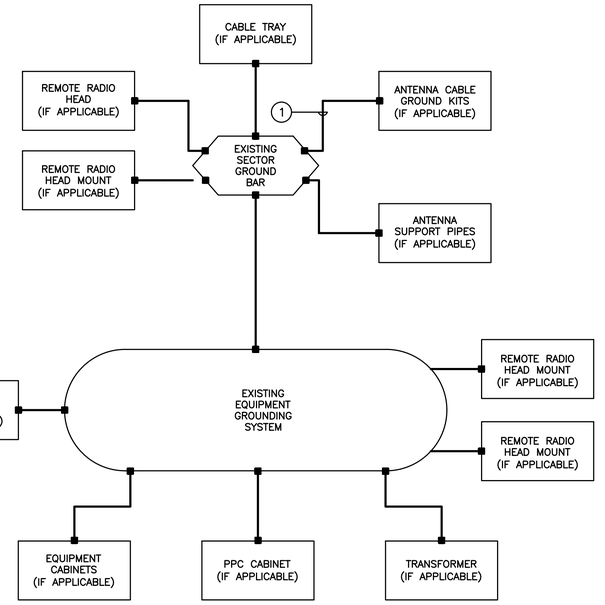


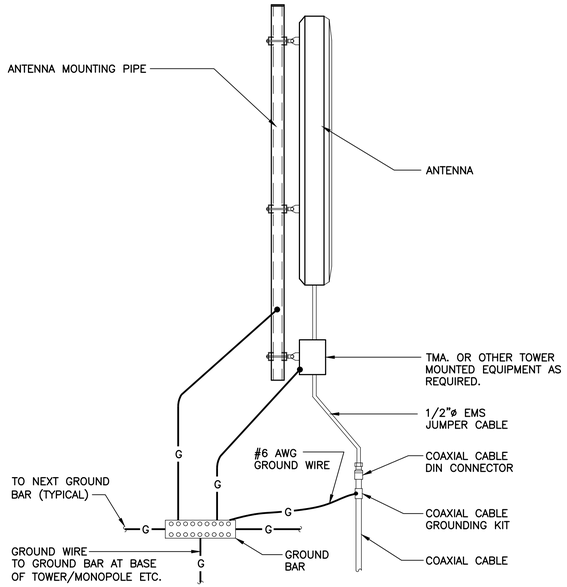
NOTES:

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



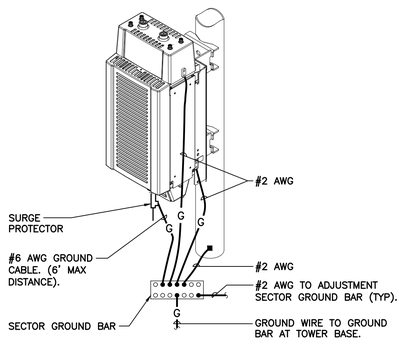


4 E-2 TYPICAL ANTENNA GROUNDING DETAIL

SCALE: NOT TO SCALE

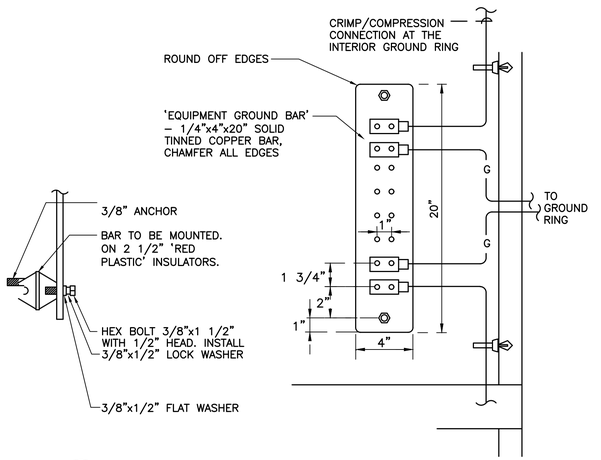
EACH RRH CABINET SHALL BE GROUNDED IN THE FOLLOWING MANNER:

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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TYPICAL ELECTRICAL DETAILS

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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
0	06/03/21	RTS	TJR	CONSTRUCTION DRAWINGS - ISSUED FOR CONSTRUCTION

PROFESSIONAL ENGINEER SEAL

T-Mobile

Transcend Wireless

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www.CentekEng.com

T-MOBILE NORTHEAST LLC

KILLINGLY/I-395/X93_1
SITE ID: CT11396B
79 PUTNAM PIKE
KILLINGLY, CT 06241

DATE: 06/24/21
SCALE: AS NOTED
JOB NO. 21022.21

ELECTRICAL SPECIFICATIONS

E-3

Sheet No. 10 of 10

CENTEK engineering
Centered on Solutions℠

Structural Analysis Report

Antenna Mount Analysis

Proposed T-Mobile
Upgrade

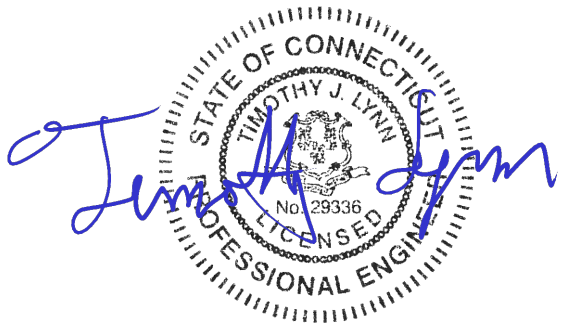
T-Mobile Site #: CT11396B

79 Putnam Pike
Killingly, CT

Centek Project No. 21022.21

Date: July 5, 2021

Max Stress Ratio = 83.3%



Prepared for:

T-Mobile USA
35 Griffin Road
Bloomfield, CT 06002

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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: CT11396B
79 Putnam Pike
Killingly, CT 06241

Centek Project No. 21022.21

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/modified mount, consisting of three (3) 12-ft sector frames to support the 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:
  Sector Frames: Three (3) RFS APXVAALL24_43-U-NA20 panel antennas, three (3) RFS APX16DWV-16DWV-S-E-A20 panel antennas, three (3) Ericsson AIR6449 B41panel antennas, three (3) Ericsson 4460 remote radio heads, three (3) Ericsson 4449 remote radio heads on the existing/modified mount with a RAD center elevation of 150-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 101 mph for Killingly 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 with the installation of all mount modifications per the mount analysis report prepared by Hudson Design Group dated May 30, 2019 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

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Subject: Loads on Equipment

Location: Killingly,CT

Rev. 0: 07/05/2021

Prepared by: F.J.P.. Checked by: T.J.L.
Job No. 21022.21

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

Wind Speeds

Basic Wind Speed	$V := 101$	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 =	$Exp := B$		(User Input)
Structure Height =	$h := 150$	ft	(User Input)
Height to Center of Antennas =	$z := 150$	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 =

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

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

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

$$K_{iz} := \left(\frac{z}{33}\right)^{0.1} = 1.163$$

Velocity Pressure Coefficient Antennas =

$$t_{iz} := 2.0 \cdot t_i \cdot I_{ice} \cdot K_{iz} \cdot K_{zt}^{0.35} = 2.327$$

$$Kz := 2.01 \cdot \left(\left(\frac{z}{zg}\right)\right)^{\overline{\alpha}} = 1.11$$

Velocity Pressure w/o Ice Antennas = $qz := 0.00256 \cdot K_d \cdot Kz \cdot V^2 \cdot I_{Wind} = 28$ psf

Velocity Pressure with Ice Antennas = $qz_{ice} := 0.00256 \cdot K_d \cdot Kz \cdot V_i^2 \cdot I_{Wind} = 7$ psf

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 =	$WT_{ant} := 150$	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 =	$F_{ant} := qz \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antF} = 613$	lbs
Surface Area for One Antenna =	$SA_{antS} := \frac{L_{ant} \cdot T_{ant}}{144} = 5.7$	sf
Total Antenna Wind Force Side =	$F_{ant} := qz \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antS} = 217$	lbs

Wind Load (with ice)

Surface Area for One Antenna w/ Ice =	$SA_{ICEantF} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (W_{ant} + 2 \cdot t_{iz})}{144} = 20$	sf
Total Antenna Wind Force w/ Ice Front =	$Fi_{ant} := qz_{ice} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantF} = 188$	lbs
Surface Area for One Antenna w/ Ice =	$SA_{ICEantS} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz})}{144} = 9.2$	sf
Total Antenna Wind Force w/ Ice Side =	$Fi_{ant} := qz_{ice} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantS} = 86$	lbs

Gravity Load (without ice)

Weight of All Antennas =	$WT_{ant} \cdot N_{ant} = 150$	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 =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 594$	lbs
Weight of Ice on All Antennas =	$W_{ICEant} \cdot N_{ant} = 594$	lbs

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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 =	$F_{ant} := qz \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antF} = 171$	lbs
Surface Area for One Antenna =	$SA_{antS} := \frac{L_{ant} \cdot T_{ant}}{144} = 1.9$	sf
Total Antenna Wind Force Side =	$F_{ant} := qz \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antS} = 69$	lbs

Wind Load (with ice)

Surface Area for One Antenna w/ Ice =	$SA_{ICEantF} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (W_{ant} + 2 \cdot t_{iz})}{144} = 6.6$	sf
Total Antenna Wind Force w/ Ice Front =	$Fi_{ant} := qz_{ice} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantF} = 59$	lbs
Surface Area for One Antenna w/ Ice =	$SA_{ICEantS} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz})}{144} = 3.4$	sf
Total Antenna Wind Force w/ Ice Side =	$Fi_{ant} := qz_{ice} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantS} = 30$	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 =	$V_{ice} := (L_{ant} + 2 \cdot t_{iz}) \cdot (W_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz}) - V_{ant} = 6670$	cu in
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 216$	lbs
Weight of Ice on All Antennas =	$W_{ICEant} \cdot N_{ant} = 216$	lbs

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	RFS - APX16DWV-16DWV-S-E-A20		
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 =	$T_{ant} := 3.15$	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 =	$F_{ant} := qz \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antF} = 196$	lbs
Surface Area for One Antenna =	$SA_{antS} := \frac{L_{ant} \cdot T_{ant}}{144} = 1.2$	sf
Total Antenna Wind Force Side =	$F_{ant} := qz \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antS} = 47$	lbs

Wind Load (with ice)

Surface Area for One Antenna w/ Ice =	$SA_{ICEantF} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (W_{ant} + 2 \cdot t_{iz})}{144} = 7.4$	sf
Total Antenna Wind Force w/ Ice Front =	$Fi_{ant} := qz_{ice} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantF} = 71$	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 =	$Fi_{ant} := qz_{ice} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantS} = 31$	lbs

Gravity Load (without ice)

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

Gravity Loads (ice only)

Volume of Each Antenna =	$V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 2289$	cu in
Volume of Ice on Each Antenna =	$V_{ice} := (L_{ant} + 2 \cdot t_{iz}) \cdot (W_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz}) - V_{ant} = 6053$	cu in
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 196$	lbs
Weight of Ice on All Antennas =	$W_{ICEant} \cdot N_{ant} = 196$	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 =	$F_{RRUS} := qz \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{RRUSF} = 50$	lbs
Surface Area for One RRUS =	$SA_{RRUSS} := \frac{L_{RRUS} \cdot T_{RRUS}}{144} = 0.6$	sf
Total RRUS Wind Force =	$F_{RRUS} := qz \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{RRUSS} = 20$	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 =	$Fi_{RRUS} := qz_{ice} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{ICERRUSF} = 22$	lbs
Surface Area for One RRUS w/ Ice =	$SA_{ICERRUSS} := \frac{(L_{RRUS} + 2 \cdot t_{iz}) \cdot (T_{RRUS} + 2 \cdot t_{iz})}{144} = 1.4$	sf
Total RRUS Wind Force w/ Ice =	$Fi_{RRUS} := qz_{ice} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{ICERRUSS} = 12$	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 =	$V_{ice} := (L_{RRUS} + 2 \cdot t_{iz}) \cdot (W_{RRUS} + 2 \cdot t_{iz}) \cdot (T_{RRUS} + 2 \cdot t_{iz}) - V_{RRUS} = 2448$	cu in
Weight of Ice on Each RRUS =	$W_{ICERRUS} := \frac{V_{ice}}{1728} \cdot Id = 79$	lbs
Weight of Ice on All RRUSs =	$W_{ICERRUS} \cdot N_{RRUS} = 79$	lbs

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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 =	$F_{RRUS} := qz \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{RRUSF} = 78$	lbs
Surface Area for One RRUS =	$SA_{RRUSS} := \frac{L_{RRUS} \cdot T_{RRUS}}{144} = 1.6$	sf
Total RRUS Wind Force =	$F_{RRUS} := qz \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{RRUSS} = 60$	lbs

Wind Load (with ice)

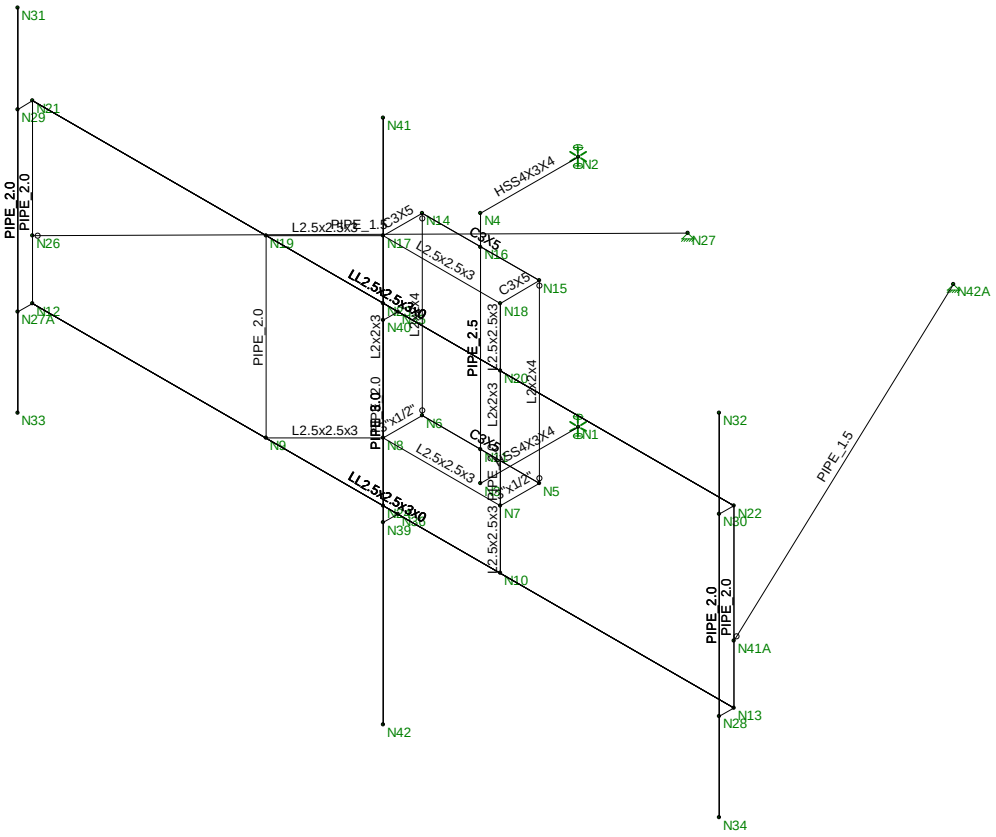
Surface Area for One RRUS w/ Ice =	$SA_{ICERRUSF} := \frac{(L_{RRUS} + 2 \cdot t_{iz}) \cdot (W_{RRUS} + 2 \cdot t_{iz})}{144} = 3.4$	sf
Total RRUS Wind Force w/ Ice =	$Fi_{RRUS} := qz_{ice} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{ICERRUSF} = 31$	lbs
Surface Area for One RRUS w/ Ice =	$SA_{ICERRUSS} := \frac{(L_{RRUS} + 2 \cdot t_{iz}) \cdot (T_{RRUS} + 2 \cdot t_{iz})}{144} = 2.8$	sf
Total RRUS Wind Force w/ Ice =	$Fi_{RRUS} := qz_{ice} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{ICERRUSS} = 25$	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 =	$V_{ice} := (L_{RRUS} + 2 \cdot t_{iz}) \cdot (W_{RRUS} + 2 \cdot t_{iz}) \cdot (T_{RRUS} + 2 \cdot t_{iz}) - V_{RRUS} = 4547$	cu in
Weight of Ice on Each RRUS =	$W_{ICERRUS} := \frac{V_{ice}}{1728} \cdot Id = 147$	lbs
Weight of Ice on All RRUSs =	$W_{ICERRUS} \cdot N_{RRUS} = 147$	lbs



Envelope Only Solution

Centek		
FJP	CT11396B - Mount	July 5, 2021 at 9:16 PM
21022.21	Member Framing	CT11396B_AMA.r3d

(Global) Model Settings

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

Hot Rolled Steel Code	AISC 14th(360-10): LRFD
Adjust Stiffness?	Yes(Iterative)
RISAConnection Code	AISC 14th(360-10): ASD
Cold Formed Steel Code	AISI S100-10: ASD
Wood Code	AWC NDS-12: ASD
Wood Temperature	< 100F
Concrete Code	ACI 318-11
Masonry Code	ACI 530-11: ASD
Aluminum Code	AA ADM1-10: ASD - Building
Stainless Steel Code	AISC 14th(360-10): ASD
Adjust Stiffness?	Yes(Iterative)

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

(Global) Model Settings, Continued

Seismic Code	ASCE 7-10
Seismic Base Elevation (ft)	Not Entered
Add Base Weight?	Yes
Ct X	.02
Ct Z	.02
T X (sec)	Not Entered
T Z (sec)	Not Entered
R X	3
R Z	3
Ct Exp. X	.75
Ct Exp. Z	.75
SD1	1
SDS	1
S1	1
TL (sec)	5
Risk Cat	I or II
Drift Cat	Other
Om Z	1
Om X	1
Cd Z	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)	150.001
Footing Concrete f'c (ksi)	4
Footing Concrete Ec (ksi)	3644
Lambda	1
Footing Steel fy (ksi)	60
Minimum Steel	0.0018
Maximum Steel	0.0075
Footing Top Bar	#3
Footing Top Bar Cover (in)	2
Footing Bottom Bar	#3
Footing Bottom Bar Cover (in)	3.5
Pedestal Bar	#3
Pedestal Bar Cover (in)	1.5
Pedestal Ties	#3

Hot Rolled Steel Properties

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

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design Ru...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	(E)Pipe Member	PIPE_2.0	Beam	Pipe	A53 Grade B	Typical	1.02	.627	.627	1.25
2	(E)HSS4x4x1/4	HSS4X3X4	Beam	Pipe	A500 Gr.46	Typical	2.91	3.91	6.15	7.96
3	(E)Plate	3"x1/2"	Beam	Pipe	A36 Gr.36	Typical	1.5	.031	1.125	.112
4	(E)C3	C3X5	Beam	Pipe	A36 Gr.36	Typical	1.47	.241	1.85	.043
5	(E)L2.5x2.5x3/16	L2.5x2.5x3	Beam	Pipe	A36 Gr.36	Typical	.901	.535	.535	.011
6	(E)Vert	PIPE_2.5	Beam	Pipe	A53 Grade B	Typical	1.61	1.45	1.45	2.89
7	(E)L2x2x3/16	L2x2x3	Beam	Pipe	A36 Gr.36	Typical	.722	.271	.271	.009
8	(E)Stablizer Arm	PIPE_1.5	Beam	Pipe	A53 Grade B	Typical	.749	.293	.293	.586

Hot Rolled Steel Section Sets (Continued)

	Label	Shape	Type	Design List	Material	Design Ru...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
9	(E)Antenna Mast_Pipe ...	PIPE_2.0	Beam	Pipe	A53 Grade B	Typical	1.02	.627	.627	1.25
10	(E)Antenna Mast_Pipe ...	PIPE_3.0	Beam	Pipe	A53 Grade B	Typical	2.07	2.85	2.85	5.69
11	(E)2L2.5x2.5x3/16	LL2.5x2.5x3x0	Beam	Pipe	A53 Grade B	Typical	1.8	1.91	1.07	.023
12	(E)L2x2x4	L2x2x4	Beam	Pipe	A53 Grade B	Typical	.944	.346	.346	.021

Hot Rolled Steel Design Parameters

	Label	Shape	Length[ft]	Lbyy[ft]	Lbzz[ft]	Lcomp top[ft]	Lcomp bot[ft]	L-torq...	Kyy	Kzz	Cb	Functi...
1	M1	(E)HSS4x4x1/4	1.67			Lbyy						Lateral
2	M2	(E)HSS4x4x1/4	1.67			Lbyy						Lateral
3	M3	(E)Vert	4			Lbyy						Lateral
4	M4	(E)C3	2			Lbyy						Lateral
5	M5	(E)Plate	.67			Lbyy						Lateral
6	M6	(E)Plate	.67			Lbyy						Lateral
7	M7	(E)L2.5x2.5x3/16	2			Lbyy						Lateral
8	M8	(E)L2.5x2.5x3/16	1.414			Lbyy						Lateral
9	M9	(E)L2.5x2.5x3/16	1.414			Lbyy						Lateral
10	M10	(E)2L2.5x2.5x3/16	12	4	4	4	4	4				Lateral
11	M11	(E)C3	2			Lbyy						Lateral
12	M12	(E)C3	.67			Lbyy						Lateral
13	M13	(E)C3	.67			Lbyy						Lateral
14	M14	(E)L2.5x2.5x3/16	2			Lbyy						Lateral
15	M15	(E)L2.5x2.5x3/16	1.414			Lbyy						Lateral
16	M16	(E)L2.5x2.5x3/16	1.414			Lbyy						Lateral
17	M17	(E)2L2.5x2.5x3/16	12	4	4	4	4	4				Lateral
18	M18	(E)L2x2x3/16	3			Lbyy						Lateral
19	M19	(E)L2x2x3/16	3			Lbyy						Lateral
20	M20	(E)Pipe Member	3			Lbyy						Lateral
21	M21	(E)Pipe Member	3			Lbyy						Lateral
22	M22	(E)Pipe Member	3			Lbyy						Lateral
23	M23	(E)Pipe Member	3			Lbyy						Lateral
24	M24	(E)Pipe Member	3			Lbyy						Lateral
25	M25	(E)Stablizer Arm	7.926			Lbyy						Lateral
26	PS.3	(E)Antenna Mast_P...	6			Lbyy						Lateral
27	PS.1	(E)Antenna Mast_P...	6			Lbyy						Lateral
28	PS.2	(E)Antenna Mast_P...	9			Lbyy						Lateral
29	M35	(E)Stablizer Arm	7.926			Lbyy						Lateral
30	M36	(E)L2x2x4	3			Lbyy						Lateral
31	M37	(E)L2x2x4	3			Lbyy						Lateral

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(...	Section/Shape	Type	Design List	Material	Design R...
1	M1	N2	N4			(E)HSS4x4x1/4	Beam	Pipe	A500 Gr.46	Typical
2	M2	N1	N3			(E)HSS4x4x1/4	Beam	Pipe	A500 Gr.46	Typical
3	M3	N3	N4			(E)Vert	Beam	Pipe	A53 Grade B	Typical
4	M4	N6	N5			(E)C3	Beam	Pipe	A36 Gr.36	Typical
5	M5	N6	N8			(E)Plate	Beam	Pipe	A36 Gr.36	Typical
6	M6	N5	N7			(E)Plate	Beam	Pipe	A36 Gr.36	Typical
7	M7	N8	N7			(E)L2.5x2.5x3/16	Beam	Pipe	A36 Gr.36	Typical
8	M8	N7	N10			(E)L2.5x2.5x3/16	Beam	Pipe	A36 Gr.36	Typical
9	M9	N8	N9		270	(E)L2.5x2.5x3/16	Beam	Pipe	A36 Gr.36	Typical
10	M10	N12	N13		90	(E)2L2.5x2.5x3/16	Beam	Pipe	A53 Grade B	Typical
11	M11	N14	N15			(E)C3	Beam	Pipe	A36 Gr.36	Typical
12	M12	N15	N18		180	(E)C3	Beam	Pipe	A36 Gr.36	Typical
13	M13	N14	N17			(E)C3	Beam	Pipe	A36 Gr.36	Typical
14	M14	N17	N18		90	(E)L2.5x2.5x3/16	Beam	Pipe	A36 Gr.36	Typical
15	M15	N18	N20		90	(E)L2.5x2.5x3/16	Beam	Pipe	A36 Gr.36	Typical
16	M16	N17	N19		180	(E)L2.5x2.5x3/16	Beam	Pipe	A36 Gr.36	Typical
17	M17	N21	N22		90	(E)2L2.5x2.5x3/16	Beam	Pipe	A53 Grade B	Typical
18	M18	N8	N17		90	(E)L2x2x3/16	Beam	Pipe	A36 Gr.36	Typical
19	M19	N18	N7		270	(E)L2x2x3/16	Beam	Pipe	A36 Gr.36	Typical

Member Primary Data (Continued)

	Label	I Joint	J Joint	K Joint	Rotate(...	Section/Shape	Type	Design List	Material	Design R...
20	M20	N21	N12			(E)Pipe Member	Beam	Pipe	A53 Grade B	Typical
21	M21	N19	N9			(E)Pipe Member	Beam	Pipe	A53 Grade B	Typical
22	M22	N20	N10			(E)Pipe Member	Beam	Pipe	A53 Grade B	Typical
23	M23	N22	N13			(E)Pipe Member	Beam	Pipe	A53 Grade B	Typical
24	M24	N23	N24			(E)Pipe Member	Beam	Pipe	A53 Grade B	Typical
25	M25	N26	N27			(E)Stablizer Arm	Beam	Pipe	A53 Grade B	Typical
26	PS.3	N31	N33			(E)Antenna Mast_Pipe 2.0...	Beam	Pipe	A53 Grade B	Typical
27	PS.1	N34	N32			(E)Antenna Mast_Pipe 2.0...	Beam	Pipe	A53 Grade B	Typical
28	M28	N29	N21			RIGID	None	None	RIGID	Typical
29	M29	N27A	N12			RIGID	None	None	RIGID	Typical
30	M30	N28	N13			RIGID	None	None	RIGID	Typical
31	M31	N30	N22			RIGID	None	None	RIGID	Typical
32	PS.2	N41	N42			(E)Antenna Mast_Pipe 3.0...	Beam	Pipe	A53 Grade B	Typical
33	M33	N40	N35			RIGID	None	None	RIGID	Typical
34	M34	N39	N36			RIGID	None	None	RIGID	Typical
35	M35	N41A	N42A			(E)Stablizer Arm	Beam	Pipe	A53 Grade B	Typical
36	M36	N14	N6		180	(E)L2x2x4	Beam	Pipe	A53 Grade B	Typical
37	M37	N15	N5		270	(E)L2x2x4	Beam	Pipe	A53 Grade B	Typical

Joint Coordinates and Temperatures

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Diap...
1	N1	0	0	0	0	
2	N2	0	4	0	0	
3	N3	0	0	1.67	0	
4	N4	0	4	1.67	0	
5	N5	1	.5	1.67	0	
6	N6	-1	.5	1.67	0	
7	N7	1	.5	2.34	0	
8	N8	-1	.5	2.34	0	
9	N9	-2	.5	3.34	0	
10	N10	2	.5	3.34	0	
11	N11	0	.5	1.67	0	
12	N12	-6	.5	3.34	0	
13	N13	6	.5	3.34	0	
14	N14	-1	3.5	1.67	0	
15	N15	1	3.5	1.67	0	
16	N16	0	3.5	1.67	0	
17	N17	-1	3.5	2.34	0	
18	N18	1	3.5	2.34	0	
19	N19	-2	3.5	3.34	0	
20	N20	2	3.5	3.34	0	
21	N21	-6	3.5	3.34	0	
22	N22	6	3.5	3.34	0	
23	N23	0	3.5	3.34	0	
24	N24	0	.5	3.34	0	
25	N26	-6	1.5	3.34	0	
26	N27	-0.432949	1.5	-2.302415	0	
27	N27A	-6	.5	3.59	0	
28	N28	6	.5	3.59	0	
29	N29	-6	3.5	3.59	0	
30	N30	6	3.5	3.59	0	
31	N31	-6	5	3.59	0	
32	N32	6	5	3.59	0	
33	N33	-6	-1	3.59	0	
34	N34	6	-1	3.59	0	
35	N35	.25	3.5	3.34	0	
36	N36	.25	.5	3.34	0	
37	N39	.25	.5	3.59	0	
38	N40	.25	3.5	3.59	0	
39	N41	.25	6.5	3.59	0	
40	N42	.25	-2.5	3.59	0	

Joint Coordinates and Temperatures (Continued)

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Diap...
41	N41A	6	1.5	3.34	0	
42	N42A	2.601908	1.5	-3.821136	0	

Joint Boundary Conditions

	Joint Label	X [k/in]	Y [k/in]	Z [k/in]	X Rot.[k-ft/rad]	Y Rot.[k-ft/rad]	Z Rot.[k-ft/rad]
1	N2	Reaction	Reaction	Reaction		Reaction	
2	N1	Reaction	Reaction	Reaction		Reaction	
3	N27	Reaction	Reaction	Reaction			
4	N42A	Reaction	Reaction	Reaction			

Member Point Loads (BLC 2 : Equipment Weight)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	PS.2	Y	-.075	1.083
2	PS.2	Y	-.075	5.917
3	PS.3	Y	-.052	1.667
4	PS.3	Y	-.052	4.417
5	PS.1	Y	-.021	3.417
6	PS.1	Y	-.021	5.333
7	PS.2	Y	-.074	1
8	PS.2	Y	-.109	7

Member Point Loads (BLC 3 : Ice Weight)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	PS.2	Y	-.297	1.083
2	PS.2	Y	-.297	5.917
3	PS.3	Y	-.108	1.667
4	PS.3	Y	-.108	4.417
5	PS.1	Y	-.098	3.417
6	PS.1	Y	-.098	5.333
7	PS.2	Y	-.079	1
8	PS.2	Y	-.147	7

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

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	PS.2	X	.043	1.083
2	PS.2	X	.043	5.917
3	PS.3	X	.015	1.667
4	PS.3	X	.015	4.417
5	PS.1	X	.016	3.417
6	PS.1	X	.016	5.333
7	PS.2	X	.012	1
8	PS.2	X	.028	7

Member Point Loads (BLC 5 : Wind X)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	PS.2	X	.109	1.083
2	PS.2	X	.109	5.917
3	PS.3	X	.035	1.667
4	PS.3	X	.035	4.417
5	PS.1	X	.024	3.417
6	PS.1	X	.024	5.333
7	PS.2	X	.02	1
8	PS.2	X	.06	7

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

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	PS.2	Z	.094	1.083
2	PS.2	Z	.094	5.917

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

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
3	PS.3	Z	.03	1.667
4	PS.3	Z	.03	4.417
5	PS.1	Z	.036	3.417
6	PS.1	Z	.036	5.333
7	PS.2	Z	.022	1
8	PS.2	Z	.034	7

Member Point Loads (BLC 7 : Wind Z)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	PS.2	Z	.307	1.083
2	PS.2	Z	.307	5.917
3	PS.3	Z	.086	1.667
4	PS.3	Z	.086	4.417
5	PS.1	Z	.098	3.417
6	PS.1	Z	.098	5.333
7	PS.2	Z	.05	1
8	PS.2	Z	.078	7

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

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/f...	Start Location[ft,%]	End Location[ft,%]
1	M8	X	.002	.002	0	0
2	M9	X	.002	.002	0	0
3	M15	X	.002	.002	0	0
4	M16	X	.002	.002	0	0
5	PS.3	X	.002	.002	0	0
6	PS.1	X	.002	.002	0	0
7	PS.2	X	.002	.002	0	0

Member Distributed Loads (BLC 5 : Wind X)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/f...	Start Location[ft,%]	End Location[ft,%]
1	M8	X	.006	.006	0	0
2	M9	X	.006	.006	0	0
3	M15	X	.006	.006	0	0
4	M16	X	.006	.006	0	0
5	PS.3	X	.006	.006	0	0
6	PS.1	X	.006	.006	0	0
7	PS.2	X	.008	.008	0	0

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

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/f...	Start Location[ft,%]	End Location[ft,%]
1	M17	Z	.002	.002	0	0
2	M10	Z	.002	.002	0	0
3	M24	Z	.002	.002	0	0
4	M16	Z	.002	.002	0	0
5	M9	Z	.002	.002	0	0
6	M15	Z	.002	.002	0	0
7	M8	Z	.002	.002	0	0
8	M4	Z	.002	.002	0	0
9	M11	Z	.002	.002	0	0
10	M18	Z	.002	.002	0	0
11	M19	Z	.002	.002	0	0
12	M3	Z	.002	.002	0	0

Member Distributed Loads (BLC 7 : Wind Z)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/f...	Start Location[ft,%]	End Location[ft,%]
1	M17	Z	.009	.009	0	0
2	M10	Z	.009	.009	0	0
3	M24	Z	.009	.009	0	0
4	M16	Z	.009	.009	0	0

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

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/f...	Start Location[ft,%]	End Location[ft,%]
5	M9	Z	.009	.009	0	0
6	M15	Z	.009	.009	0	0
7	M8	Z	.009	.009	0	0
8	M4	Z	.009	.009	0	0
9	M11	Z	.009	.009	0	0
10	M18	Z	.009	.009	0	0
11	M19	Z	.009	.009	0	0
12	M3	Z	.009	.009	0	0

Basic Load Cases

	BLC Description	Category	X Gra...	Y Gra...	Z Gra...	Joint	Point	Distrib...	Area(...	Surfa...
1	Self Weight	DL		-1						
2	Equipment Weight	DL					8			
3	Ice Weight	LL					8			
4	Wind w/ Ice X	WLX					8	7		
5	Wind X	WLX					8	7		
6	Wind w/ Ice Z	WLZ					8	12		
7	Wind Z	WLZ					8	12		

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-dire...	Yes	Y		1	1.2	2	1.2	5	1.6														
2	0.9D + 1.6W (X-dire...	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	N2	max	.055	6	1.248	6	-.716	2	0	6	.154	4	0	6
2		min	-.571	2	.438	2	-2.303	6	0	1	-1.123	2	0	1
3	N1	max	-.07	6	1.172	3	2.013	3	0	6	-.098	6	0	6
4		min	-.605	1	.193	5	.15	5	0	1	-1.142	1	0	1
5	N27	max	.252	5	.013	4	-.019	3	0	6	0	6	0	6
6		min	.019	3	.009	2	-.255	5	0	1	0	1	0	1
7	N42A	max	.085	1	.012	4	.179	1	0	6	0	6	0	6
8		min	-.136	5	.009	2	-.286	5	0	1	0	1	0	1
9	Totals:	max	0	4	2.403	3	0	1						
10		min	-.948	2	.878	5	-2.448	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	0	6	0	6	0	6	6.23e-03	3	0	6	2.417e-04	4
2		min	0	1	0	1	0	1	1.675e-03	5	0	1	-5.091e-04	2
3	N2	max	0	6	0	6	0	6	6.235e-03	3	0	6	4.685e-04	1
4		min	0	1	0	1	0	1	1.856e-03	5	0	1	1.045e-04	6
5	N3	max	.022	1	-.032	5	0	5	4.573e-03	3	1.685e-03	1	2.417e-04	4
6		min	.002	6	-.115	3	0	3	1.41e-03	5	1.045e-04	6	-5.091e-04	2
7	N4	max	.022	2	-.032	5	0	6	4.563e-03	3	1.714e-03	2	4.685e-04	1
8		min	-.004	4	-.115	3	0	2	9.308e-04	5	-3.232e-04	4	1.045e-04	6
9	N5	max	.025	1	-.03	5	.002	5	8.354e-03	3	6.098e-03	1	1.642e-04	5
10		min	.001	6	-.123	3	-.047	1	2.7e-03	2	5.717e-04	5	-7.841e-04	3
11	N6	max	.025	1	-.04	5	.026	2	8.821e-03	6	2.479e-03	2	1.042e-03	6
12		min	.001	6	-.124	3	-.03	6	2.932e-03	2	-4.597e-03	6	3.154e-04	2
13	N7	max	.074	1	-.052	5	.002	5	7.84e-03	6	3.302e-03	2	1.213e-03	6
14		min	.004	6	-.189	3	-.047	1	2.476e-03	2	-6.607e-04	6	1.318e-04	2

Envelope Joint Displacements (Continued)

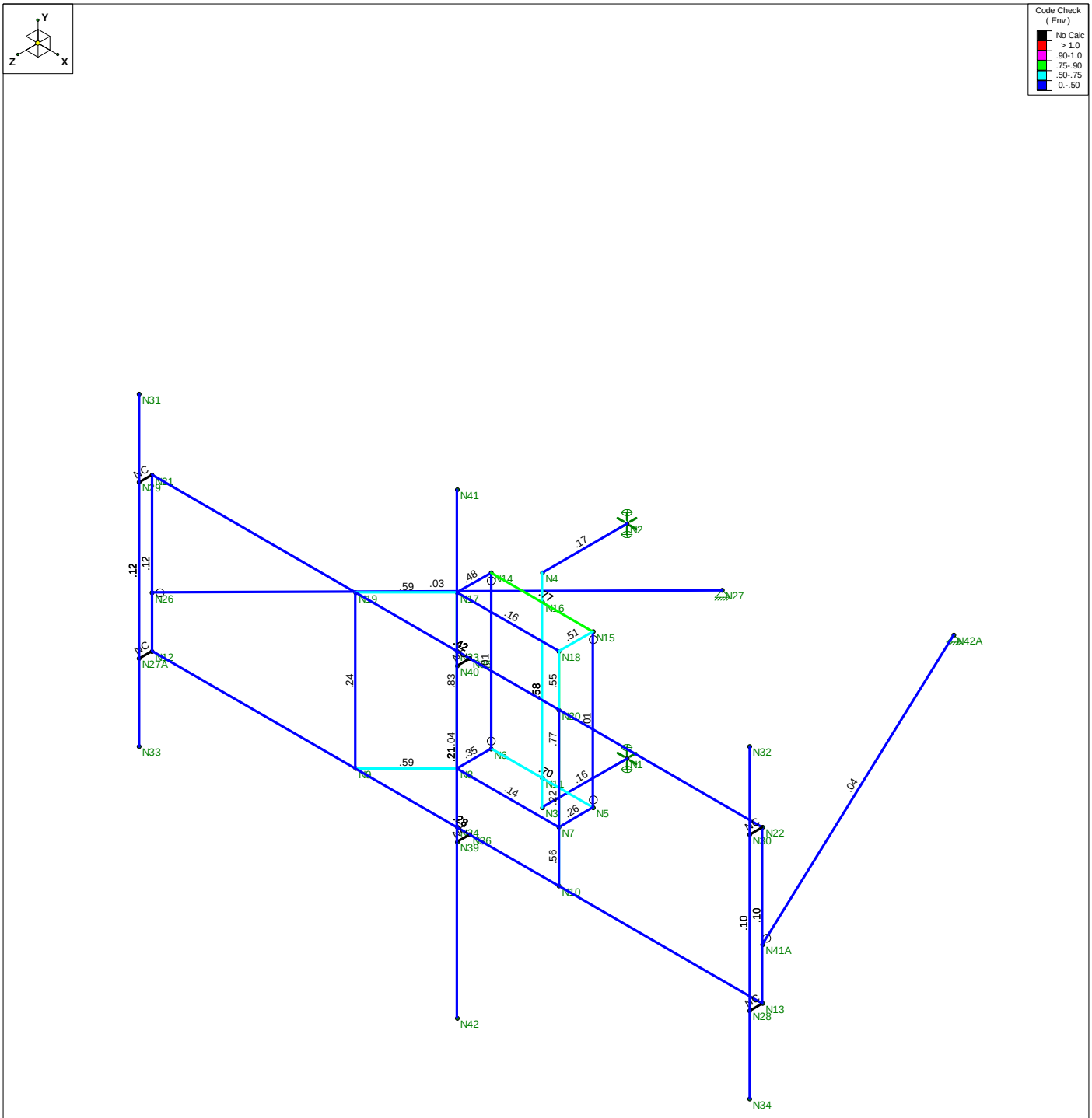
	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [rad]	LC	Y Rotatio...	LC	Z Rotation [rad]	LC
15	N8	max	.074	1	-.068	2	.026	2	8.252e-03	6	3.876e-03	1	1.726e-04	5
16		min	.004	6	-.193	6	-.03	6	2.778e-03	2	8.201e-04	5	-8.898e-04	3
17	N9	max	.112	1	-.103	2	.063	2	3.192e-03	3	2.737e-03	1	1.757e-03	4
18		min	.006	6	-.297	6	-.028	6	1.249e-03	5	-4.872e-05	5	6.599e-04	2
19	N10	max	.112	1	-.078	5	-.003	5	3.63e-03	6	1.698e-03	2	7.461e-04	5
20		min	.006	6	-.282	3	-.085	1	2.021e-04	2	-3.547e-04	6	-7.728e-04	3
21	N11	max	.025	1	-.032	5	.015	6	1.495e-03	6	1.974e-03	1	3.239e-04	4
22		min	.001	6	-.115	3	.006	2	5.523e-04	2	6.149e-05	6	-1.958e-04	2
23	N12	max	.113	1	-.147	2	.091	1	1.806e-03	2	4.388e-04	6	1.509e-03	6
24		min	.007	6	-.419	6	-.008	6	3.12e-05	5	-1.136e-05	2	3.966e-04	2
25	N13	max	.112	1	-.049	5	-.021	3	1.119e-02	4	1.179e-03	5	1.07e-03	4
26		min	.006	6	-.35	3	-.127	4	-1.839e-03	2	-1.961e-03	1	-6.427e-04	3
27	N14	max	.025	2	-.04	5	.043	1	8.711e-03	6	4.936e-03	1	1.022e-03	6
28		min	-.002	4	-.124	3	.016	6	2.855e-03	2	8.274e-04	5	2.373e-04	2
29	N15	max	.025	2	-.03	5	.054	4	8.264e-03	3	3.72e-03	2	1.435e-04	5
30		min	-.001	4	-.122	3	-.034	2	2.71e-03	2	-3.56e-03	4	-7.762e-04	3
31	N16	max	.025	2	-.032	5	.001	5	1.427e-03	3	2.094e-03	2	3.574e-04	4
32		min	-.002	4	-.115	3	-.015	3	-3.107e-04	5	-5.238e-04	4	8.944e-05	3
33	N17	max	.061	2	-.068	2	.044	1	8.345e-03	6	3.753e-03	2	1.728e-04	5
34		min	-.012	4	-.193	6	.016	6	2.728e-03	2	-1.805e-03	4	-5.906e-04	3
35	N18	max	.061	2	-.052	5	.054	4	7.925e-03	3	4.253e-03	1	1.096e-03	4
36		min	-.012	4	-.189	3	-.034	2	2.598e-03	2	-7.976e-04	5	7.151e-04	2
37	N19	max	.105	2	-.103	2	.088	1	3.062e-03	3	2.854e-03	2	1.674e-03	6
38		min	-.028	4	-.297	6	.012	6	7.765e-04	5	-2.036e-03	4	6.381e-04	2
39	N20	max	.105	2	-.078	5	.072	4	3.508e-03	6	3.041e-03	1	5.645e-04	5
40		min	-.028	4	-.282	3	-.078	2	1.26e-03	2	-1.103e-03	5	-7.694e-04	3
41	N21	max	.105	2	-.147	2	.158	2	1.935e-03	2	6.499e-04	4	1.771e-03	4
42		min	-.028	4	-.419	6	.014	5	2.425e-04	4	4.141e-04	3	6.054e-04	2
43	N22	max	.105	2	-.048	5	.279	4	1.152e-02	4	-4.671e-04	3	9.319e-04	4
44		min	-.028	4	-.35	3	-.105	2	-2.018e-03	2	-3.82e-03	4	-6.135e-04	3
45	N23	max	.105	2	-.096	2	.073	4	2.129e-03	6	3.712e-03	2	1.177e-03	4
46		min	-.028	4	-.283	3	.006	2	5.708e-04	2	-1.202e-03	4	-2.77e-05	2
47	N24	max	.112	1	-.096	2	.019	5	2.137e-03	6	3.543e-03	1	7.396e-04	4
48		min	.006	6	-.283	6	-.046	3	5.922e-04	2	-1.461e-04	5	1.2e-04	3
49	N26	max	.111	1	-.147	2	.111	1	1.758e-03	2	4.332e-04	6	7.528e-04	4
50		min	-.001	6	-.419	6	0	6	-3.777e-05	4	1.915e-04	2	-7.637e-05	3
51	N27	max	0	6	0	6	0	6	4.543e-03	3	1.65e-03	1	3.825e-03	6
52		min	0	1	0	1	0	1	1.874e-03	5	-1.492e-05	6	8.797e-04	2
53	N27A	max	.113	1	-.152	2	.091	1	1.806e-03	2	4.388e-04	6	1.509e-03	6
54		min	.008	6	-.421	6	-.008	6	3.12e-05	5	-1.136e-05	2	3.966e-04	2
55	N28	max	.106	1	-.082	5	-.021	3	1.119e-02	4	1.179e-03	5	1.07e-03	4
56		min	.006	6	-.351	3	-.127	4	-1.839e-03	2	-1.961e-03	1	-6.427e-04	3
57	N29	max	.107	2	-.153	2	.158	2	1.935e-03	2	6.499e-04	4	1.771e-03	4
58		min	-.026	4	-.421	6	.014	5	2.425e-04	4	4.141e-04	3	6.054e-04	2
59	N30	max	.103	2	-.082	5	.279	4	1.152e-02	4	-4.671e-04	3	9.319e-04	4
60		min	-.04	4	-.352	3	-.105	2	-2.018e-03	2	-3.82e-03	4	-6.135e-04	3
61	N31	max	.097	2	-.153	2	.192	2	1.935e-03	2	6.499e-04	4	1.771e-03	4
62		min	-.058	4	-.421	6	.019	5	2.425e-04	4	4.141e-04	3	5.537e-04	2
63	N32	max	.108	2	-.082	5	.495	4	1.206e-02	4	-4.671e-04	3	9.321e-04	4
64		min	-.057	4	-.352	3	-.141	2	-2.019e-03	2	-3.82e-03	4	-6.773e-04	3
65	N33	max	.125	1	-.152	2	.058	1	1.806e-03	2	4.388e-04	6	1.509e-03	6
66		min	.032	5	-.421	6	-.021	6	3.12e-05	5	-1.136e-05	2	4.483e-04	2
67	N34	max	.103	1	-.082	5	0	2	1.119e-02	4	1.179e-03	5	1.07e-03	4
68		min	0	6	-.351	3	-.329	4	-1.839e-03	2	-1.961e-03	1	-6.343e-04	3
69	N35	max	.105	2	-.093	5	.076	4	3.188e-03	4	3.76e-03	2	1.192e-03	4
70		min	-.028	4	-.283	3	-.005	2	5.392e-04	2	-4.705e-04	4	-1.295e-04	2
71	N36	max	.112	1	-.096	2	.019	5	2.268e-03	6	3.501e-03	1	8.598e-04	4
72		min	.006	6	-.282	3	-.049	3	6.805e-04	2	-3.728e-05	6	2.259e-04	2
73	N39	max	.123	1	-.098	2	.019	5	2.268e-03	6	3.501e-03	1	8.598e-04	4
74		min	.006	6	-.289	6	-.049	3	6.805e-04	2	-3.728e-05	6	2.259e-04	2
75	N40	max	.117	2	-.098	2	.076	4	3.188e-03	4	3.76e-03	2	1.192e-03	4
76		min	-.029	4	-.289	6	-.005	2	5.392e-04	2	-4.705e-04	4	-1.295e-04	2
77	N41	max	.149	2	-.098	2	.258	4	5.506e-03	4	3.76e-03	2	1.194e-03	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
78		min	-.072	4	-.29	6	.015	2	5.396e-04	2	-4.705e-04	4	-1.096e-03	2
79	N42	max	.141	1	-.098	2	-.024	5	2.228e-03	6	3.501e-03	1	8.591e-04	4
80		min	.02	6	-.289	6	-.127	3	6.801e-04	2	-3.728e-05	6	2.77e-04	3
81	N41A	max	.112	1	-.048	5	.004	5	1.101e-02	4	-4.791e-04	5	1.29e-03	4
82		min	-.004	5	-.35	3	-.054	1	-1.862e-03	2	-1.602e-03	1	1.697e-04	2
83	N42A	max	0	6	0	6	0	6	5.285e-03	6	1.31e-03	1	4.533e-03	5
84		min	0	1	0	1	0	1	1.73e-03	2	-5.74e-05	5	-1.697e-03	1

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

	Member	Shape	Code Check	Lo...	LC	She...	Lo...	Dir	...	phi*...	phi*...	phi*...	phi*...	Cb	Eqn
1	M18	L2x2x3	.833	3	6	.056	3	y	6	14.9...	23.3...	.558	1.239	2.2..	H2-1
2	M19	L2x2x3	.775	0	3	.051	0	y	3	14.9...	23.3...	.558	1.239	2.2..	H2-1
3	M11	C3X5	.766	1	4	.190	1	z	6	39.5...	47.6...	.981	4.104	1.4..	H1-...
4	M4	C3X5	.696	1	3	.178	1	z	6	39.5...	47.6...	.981	4.104	1.3..	H1-...
5	M16	L2.5x2.5x3	.587	1....	6	.092	0	y	6	26.9...	29.1...	.873	1.972	2.15	H2-1
6	M9	L2.5x2.5x3	.585	1....	6	.093	0	z	6	26.9...	29.1...	.873	1.972	2.15	H2-1
7	M3	PIPE_2.5	.581	4	6	.179	4		4	44.4...	50.7...	3.596	3.596	2.1..	H1-...
8	M8	L2.5x2.5x3	.558	1....	3	.084	0	y	3	26.9...	29.1...	.873	1.972	2.1..	H2-1
9	M15	L2.5x2.5x3	.548	1....	3	.085	0	z	3	26.9...	29.1...	.873	1.972	2.1..	H2-1
10	M12	C3X5	.513	0	4	.110	.335	z	3	46.5...	47.6...	.981	4.104	1.8..	H1-...
11	M13	C3X5	.481	0	4	.107	.335	z	6	46.5...	47.6...	.981	4.104	1.8..	H1-...
12	M17	LL2.5x2.5x3x0	.423	6.25	4	.107	6.25	z	5	45.4...	56.7	3.209	1.549	1	H1-...
13	M5	3"x1/2"	.349	0	3	.094	0	y	3	41.2...	48.6	.506	3.038	1.8..	H1-...
14	M10	LL2.5x2.5x3x0	.281	4	1	.086	6.25	z	4	45.4...	56.7	3.209	1.549	1	H1-...
15	M6	3"x1/2"	.259	0	6	.094	0	y	6	41.2...	48.6	.506	3.038	1.8..	H1-...
16	M21	PIPE_2.0	.244	3	6	.068	0		6	28.8...	32.13	1.872	1.872	2.2..	H1-...
17	M22	PIPE_2.0	.224	0	3	.059	0		4	28.8...	32.13	1.872	1.872	2.2..	H1-...
18	PS.2	PIPE_3.0	.208	3	4	.046	3		4	42.2...	65.2...	5.749	5.749	3.4..	H1-...
19	M1	HSS4X3X4	.167	1.67	6	.032	0	y	6	118....	120....	10.7...	13.1...	1.6..	H1-...
20	M14	L2.5x2.5x3	.163	2	2	.015	0	y	2	25.2...	29.1...	.873	1.972	2.2..	H2-1
21	M2	HSS4X3X4	.160	1.67	3	.031	0	y	3	118....	120....	10.7...	13.1...	1.6..	H1-...
22	M7	L2.5x2.5x3	.144	0	1	.015	0	z	1	25.2...	29.1...	.873	1.972	2.22	H2-1
23	M20	PIPE_2.0	.121	3	6	.041	2		4	28.8...	32.13	1.872	1.872	2.3..	H1-...
24	PS.3	PIPE_2.0	.119	4.5	3	.026	4....		5	20.8...	32.13	1.872	1.872	1.4..	H1-...
25	PS.1	PIPE_2.0	.100	4.5	4	.113	4.5		5	20.8...	32.13	1.872	1.872	1.4..	H1-...
26	M23	PIPE_2.0	.096	0	3	.122	2		4	28.8...	32.13	1.872	1.872	2.2..	H1-...
27	M24	PIPE_2.0	.045	3	4	.024	0		4	28.8...	32.13	1.872	1.872	2.1..	H1-...
28	M35	PIPE_1.5	.035	3....	1	.002	7....		6	7.316	23.5...	1.105	1.105	1.1..	H1-...
29	M25	PIPE_1.5	.029	3....	4	.002	0		6	7.316	23.5...	1.105	1.105	1.1..	H1-...
30	M36	L2x2x4	.009	3	1	.022	0	y	3	19.0...	29.7...	.672	1.504	1	H2-1
31	M37	L2x2x4	.006	0	1	.025	0	y	6	19.0...	29.7...	.672	1.504	1	H2-1



Member Code Checks Displayed (Enveloped)
Loads: BLC 8,
Envelope Only Solution

Centek		
FJP	CT11396B - Mount	July 6, 2021 at 8:44 AM
21022.21	Unity Check	CT11396B_AMA.r3d

CENTEK engineering

Centered on Solutions℠

Structural Analysis Report

150-ft Existing Nudd Monopole

Proposed T-Mobile
Antenna Upgrade

Site Ref: CT11396B

79 Putnam Pike
Dayville, CT

CENTEK Project No. 21022.21

Date: July 6, 2021

Max Stress Ratio = 93.3%

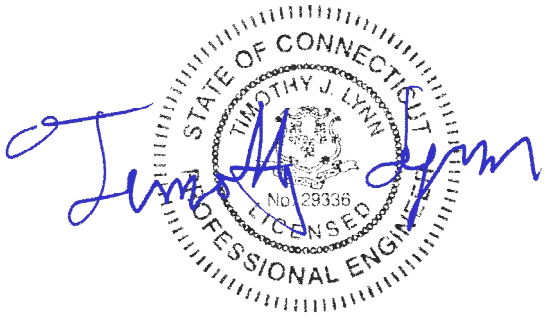


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Table of Contents

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 Dayville, Connecticut.

The host tower is a 150-ft tall, five-section, twelve sided, tapered monopole, originally designed and manufactured by Fred A. Nudd; dated July 24, 1998. The original manufacturers design documents were unavailable for use in this report. The tower geometry and structure member sizes were obtained from a previous structural report prepared by Centek job no. 20148.00 dated November 24, 2020.

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

The tower is made up of five (5) tapered vertical sections consisting of A36M-45 pole sections. The vertical tower sections are slip joint connected. The diameter of the pole (flat-flat) is 27.813-in at the top and 73.813-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: Two (2) 4-ft omni-directional antennas mounted on the existing T-Mobile mount with an elevation of 153-ft above grade.
  Coax Cables: Two (2) 7/8" ∅ coax cables running on the inside of the existing tower.
- SPRINT (EXISTING):
  Antennas: Three (3) Commscope NNVV-65B-R4 panel antennas, three (3) RFS APXVTM14 panel antennas, three (3) ALU 1900 MHz RRHs, six (6) ALU 800 MHz RRHs and three (3) ALU TD-RRH-8x20-25 RRHs mounted on three (3) 12-ft T-Frames with a RAD center elevation of 140-ft above grade.
  Coax Cables: Four (4) 1-5/8" ∅ Hybriflex cables running on the inside of the existing tower.
- AT&T (EXISTING):
  Antennas: Three (3) Powerwave 7770.00 panel antennas, six (6) CCI OPA-65R-LCUU-H8 panel antennas, six (6) LGP21401 TMAs, six (6) LGP21901 diplexers, three (3) Ericsson RRUS-11 remote radio heads, three (3) Ericsson RRUS-12 remote radio heads, six (6) Ericsson RRUS-32 remote radio heads, three (3) Ericsson A2 units and three (3) Raycap DC6-48-60-18-8F surge arrestors mounted on an existing low profile platform with a RAD center elevation of 130-ft above grade.
  Coax Cables: Twelve (12) 1-5/8" ∅ coax cables, one (1) fiber trunk and two (2) DC trunks running on the inside of the existing tower.
- TOWN (EXISTING):
  Antennas: Two (2) 4-ft omni-directional antennas mounted on the two (2) 6-ft side arms with an elevation of 124-ft above grade.
  Coax Cables: Two (2) 1/2" ∅ coax cables running on the inside of the existing tower.

- VERIZON (EXISTING):
  Antennas: Six (6) CSS X7C-FRO-660 panel antennas, six (6) Andrew HBXX-6517DS panel antennas, three (3) RRH2x40-AWS Remote Radio Heads, three (3) RRH2x40-07U Remote Radio Heads, three (3) RRH2x60-PCS Remote Radio Heads and two (2) RFS DB-T1-6Z-8AB-0Z main distribution boxes mounted on an existing low profile platform with a RAD center elevation of 108-ft above grade.
  Coax Cables: Two (2) 1-5/8" ∅ Hybriflex fiber line running on the interior of the monopole.
- T-MOBILE (EXISTING TO REMAIN):
  Antennas: Three (3) RFS APX16DWV-16DWVS panel antennas, three (3) RFS APXVAALL24_43 panel antennas and three (3) Ericsson 4449 remote radio heads mounted on three (3) 12-ft T-Frames (as modified by mount analysis prepared by Hudson Design Group dated May 30, 2019) with a RAD center elevation of 150-ft above grade.
  Coax Cables: One (1) 6x12 fiber cable running on the inside of the existing tower.
- T-MOBILE (EXISTING TO REMOVE):
  Antennas: Three (3) TMAs mounted on three (3) 12-ft T-Frames with a RAD center elevation of 150-ft above grade.
  Coax Cables: Six (6) 1-5/8" ∅ coax cables running on the inside of the existing tower.
- **T-MOBILE (PROPOSED):**
  Antennas: Three (3) Ericsson AIR6449 panel antennas and three (3) Ericsson 4460 remote radio heads mounted on three (3) 12-ft T-Frames (as modified by mount analysis prepared by Hudson Design Group dated May 30, 2019) with a RAD center elevation of 150-ft above grade.
  Coax Cables: Two (2) 6x24 fiber cables running on the inside of the existing tower.

Primary Assumptions Used in the Analysis

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

Analysis

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

The existing tower was analyzed for the controlling basic wind speed (3-second gust) with no ice and the applicable wind and ice combination to determine stresses in members as per guidelines of TIA-222-G-2005 entitled "Structural Standard for Antenna Support Structures and Antennas", the American Institute of Steel Construction (AISC) and the Manual of Steel Construction; Load and Resistance Factor Design (LRFD).

The controlling wind speed is determined by evaluating the local available wind speed data as provided in Appendix N of the CSBC[1] and the wind speed data available in the TIA-222-G-2005 Standard.

Tower Loading

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

Basic Wind Speed:	Dayville (Killingly); v = 101 mph	*[Appendix N of the 2018 CT Building Code]*
Load Cases:	Load Case 1; 101 mph wind speed w/ no ice plus gravity load – used in calculation of tower stresses and rotation.	*[Appendix N of the 2018 CT Building Code]*
	Load Case 2; 50 mph wind speed w/ 0.75" radial ice plus gravity load – used in calculation of tower stresses.	*[Annex B of TIA-222-G-2005]*

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

Tower Capacity

- Calculated stresses were found to be within allowable limits. This tower was found to be at **93.3%** of its total capacity.

Tower Section	Elevation	Stress Ratio (percentage of capacity)	Result
Pole Shaft (L6)	40.00'-51.00'	93.3%	**PASS**

Foundation and Anchors

The existing foundation consists of a 7.5-ft ∅ x 27.75-ft long reinforced concrete caisson. The sub-grade conditions used in the analysis of the existing foundation were obtained from a previous structural analysis report prepared by Malouf Engineering; project no: CT01125M-08V1, dated July 7, 2008. The base of the tower is connected to the foundation by means of (24) 2.00"∅, ASTM A687 anchor bolts embedded the concrete foundation structure.

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

Location	Vector	Proposed Reactions
Base	Shear	57 kips
	Compression	62 kips
	Moment	5681 kip-ft

- The foundation was found to be within allowable limits.

Foundation	Design Limit	Proposed Loading	Result
Reinforced Concrete Caisson	Moment Capacity	66.7%	**PASS**
	Lateral Deflection	0.38 in.(1)	**PASS**

(1) Lateral deflection limited to 0.75 in under service load combination per TIA-222-G section 9.5.

- 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	Tension	54.0%	**PASS**
Base Plate	Bending	80.8%	**PASS**

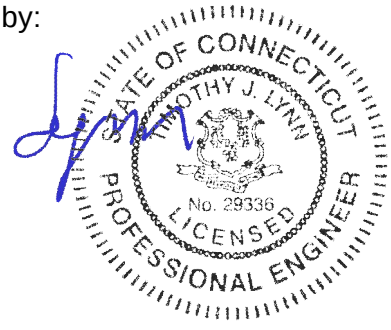
Conclusion

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.

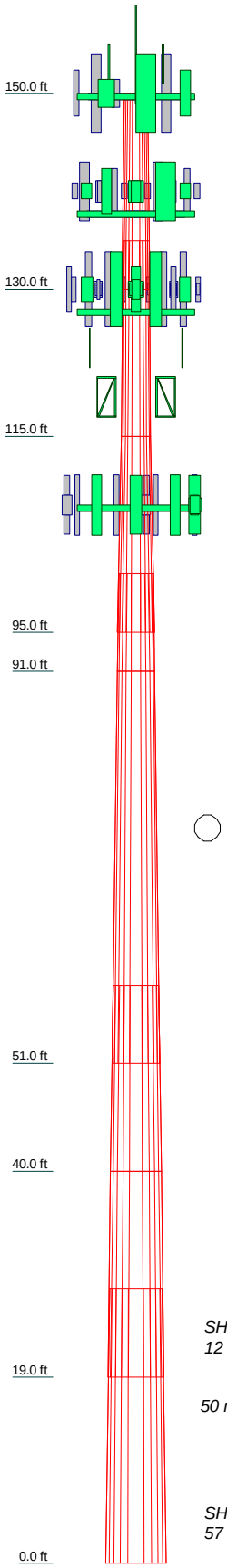
GENERAL DESCRIPTION OF STRUCTURAL ANALYSIS PROGRAM

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	20.000	12	0.250	5.000	27.813	34.313		1.7
2	20.000	12	0.250		32.188	36.688		1.9
3	20.000	12	0.313	6.000	36.688	45.188		2.8
4	10.000	12	0.313		42.013	45.813		1.5
5	40.000	12	0.375	8.000	45.813	58.875	A36M-45	8.5
6	19.000	12	0.375		55.513	61.688		4.5
7	21.000	12	0.438	9.000	61.688	68.500		6.5
8	28.000	12	0.438		64.705	73.813		9.2



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
4' x 3" DIA Omni	153	OPA-65R-LCUU-H8 (ATI)	130
4' x 3" DIA Omni	153	OPA-65R-LCUU-H8 (ATI)	130
Lightning Rod 3/4"x8'	150	(2) LPG21401 TMA (ATI)	130
APX16DWV-16DWVS-E-A20 (T-Mobile - Existing)	150	(2) LPG21401 TMA (ATI)	130
APXVAALL24-43 (T-Mobile - Existing)	150	(2) LPG21401 TMA (ATI)	130
AIR6449 (T-Mobile - Proposed)	150	(2) LGP21901 Diplexer (ATI)	130
APX16DWV-16DWVS-E-A20 (T-Mobile - Existing)	150	(2) LGP21901 Diplexer (ATI)	130
APXVAALL24-43 (T-Mobile - Existing)	150	(2) LGP21901 Diplexer (ATI)	130
AIR6449 (T-Mobile - Proposed)	150	RRUS-11 (ATI)	130
APX16DWV-16DWVS-E-A20 (T-Mobile - Existing)	150	RRUS-11 (ATI)	130
APXVAALL24-43 (T-Mobile - Existing)	150	RRUS-11 (ATI)	130
AIR6449 (T-Mobile - Proposed)	150	RRUS-12 (ATI)	130
4449 B5/B12 (T-Mobile - Existing)	150	RRUS-12 (ATI)	130
4449 B5/B12 (T-Mobile - Existing)	150	RRUS-12 (ATI)	130
4449 B5/B12 (T-Mobile - Existing)	150	(2) RRUS-32 (ATI)	130
4460 B25+B66 (T-Mobile - Proposed)	150	(2) RRUS-32 (ATI)	130
4460 B25+B66 (T-Mobile - Proposed)	150	(2) RRUS-32 (ATI)	130
4460 B25+B66 (T-Mobile - Proposed)	150	A2 (ATI)	130
Pirod 12' T-Frame Sector Mount (1) (T-Mobile - Existing)	150	A2 (ATI)	130
Pirod 12' T-Frame Sector Mount (1) (T-Mobile - Existing)	150	A2 (ATI)	130
Pirod 12' T-Frame Sector Mount (1) (T-Mobile - Existing)	150	DC6-48-60-18-8F Surge Arrestor (ATI)	130
NNVV-65B-R4 (Sprint)	140	DC6-48-60-18-8F Surge Arrestor (ATI)	130
APXVTM14 (Sprint)	140	DC6-48-60-18-8F Surge Arrestor (ATI)	130
NNVV-65B-R4 (Sprint)	140	Valmont 13' Low Profile Platform (ATI)	128
APXVTM14 (Sprint)	140	4' x 3" DIA Omni	124
NNVV-65B-R4 (Sprint)	140	4' x 3" DIA Omni	124
APXVTM14 (Sprint)	140	Pirod 6' Side Mount Standoff (1)	119
TD-RRH8x20-25 (Sprint)	140	Pirod 6' Side Mount Standoff (1)	119
TD-RRH8x20-25 (Sprint)	140	2-ft Stand Off	119
TD-RRH8x20-25 (Sprint)	140	X7C-FRO-660 (Verizon)	108
FD-RRH 4x45 1900 (Sprint)	140	HBXX-6517DS (Verizon)	108
FD-RRH 4x45 1900 (Sprint)	140	X7C-FRO-660 (Verizon)	108
FD-RRH 4x45 1900 (Sprint)	140	HBXX-6517DS (Verizon)	108
(2) FD-RRH 2x50 800 (Sprint)	140	X7C-FRO-660 (Verizon)	108
(2) FD-RRH 2x50 800 (Sprint)	140	HBXX-6517DS (Verizon)	108
(2) FD-RRH 2x50 800 (Sprint)	140	X7C-FRO-660 (Verizon)	108
Pirod 12' T-Frame Sector Mount (1) (Sprint)	138	HBXX-6517DS (Verizon)	108
Pirod 12' T-Frame Sector Mount (1) (Sprint)	138	X7C-FRO-660 (Verizon)	108
Pirod 12' T-Frame Sector Mount (1) (Sprint)	138	HBXX-6517DS (Verizon)	108
7770.00 (ATI)	130	RRH2x40-07-U (Verizon)	108
OPA-65R-LCUU-H8 (ATI)	130	RRH2x40-07-U (Verizon)	108
OPA-65R-LCUU-H8 (ATI)	130	RRH2x40-07-U (Verizon)	108
7770.00 (ATI)	130	RRH2x40-AWS (Verizon)	108
OPA-65R-LCUU-H8 (ATI)	130	RRH2x40-AWS (Verizon)	108
OPA-65R-LCUU-H8 (ATI)	130	RRH2x40-AWS (Verizon)	108
7770.00 (ATI)	130	RRH2x60-PCS (Verizon)	108
		RRH2x60-PCS (Verizon)	108
		RRH2x60-PCS (Verizon)	108
		DB-T1-6Z-8AB-0Z (Verizon)	108
		DB-T1-6Z-8AB-0Z (Verizon)	108
		Valmont 13' Low Profile Platform (Verizon)	108

ALL REACTIONS ARE FACTORED

AXIAL 100 K

SHEAR 12 K *MC 128*

TORQUE 2 kip-ft
50 mph WIND - 0.750 in IC

AXIAL 62 K

SHEAR 57 K *MC 5681 k*

TORQUE 8 kip-ft
REACTIONS - 101 mph WI

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A36M-45	45 ksi	60 ksi			

TOWER DESIGN NOTES

1. Tower designed for Exposure C to the TIA-222-G Standard.
2. Tower designed for a 101 mph basic wind in accordance with the TIA-222-G Standard.
3. Tower is also designed for a 50 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 60 mph wind.
5. Tower Structure Class II.
6. Topographic Category 1 with Crest Height of 0.000 ft
7. Weld together tower sections have flange connections.
8. Connections use galvanized A325 bolts, nuts and locking devices. Installation per TIA/EIA-222 and AISC Specifications.
9. Tower members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards.
10. Welds are fabricated with ER-70S-6 electrodes.
11. TOWER RATING: 93.3%

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

Job:	***21022.21 - CT11396B***		
Project:	***150ft Nudd Monopole - 79 Putnam Pike Dayville, CT***		
Client: T-Mobile	Drawn by: TJL		App'd:
Code: TIA-222-G	Date: 07/06/21		Scale: NTS
Path: J:\Jobs\21022\00.W\21_CT11396B05_Structural\Tower Analysis\Backup Documentation\ER Files\150' Nudd Monopole_ Dayville CT.eri			Dwg No. E-1

Tower Input Data

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

Basic wind speed of 101 mph.
Structure Class II.
Exposure Category C.
Topographic Category 1.
Crest Height 0.000 ft.
Nominal ice thickness of 0.750 in.
Ice thickness is considered to increase with height.
Ice density of 56 pcf.
A wind speed of 50 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 60 mph.
Weld together tower sections have flange connections..
Connections use galvanized A325 bolts, nuts and locking devices. Installation per TIA/EIA-222 and AISC Specifications..
Tower members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards..
Welds are fabricated with ER-70S-6 electrodes..
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	150.000-130.000	20.000	5.000	12	27.813	34.313	0.250	1.000	A36M-45 (45 ksi)
L2	130.000-115.000	20.000	0.000	12	32.188	36.688	0.250	1.000	A36M-45 (45 ksi)
L3	115.000-95.000	20.000	6.000	12	36.688	45.188	0.313	1.250	A36M-45 (45 ksi)
L4	95.000-91.000	10.000	0.000	12	42.013	45.813	0.313	1.250	A36M-45 (45 ksi)
L5	91.000-51.000	40.000	8.000	12	45.813	58.875	0.375	1.500	A36M-45 (45 ksi)
L6	51.000-40.000	19.000	0.000	12	55.513	61.688	0.375	1.500	A36M-45 (45 ksi)
L7	40.000-19.000	21.000	9.000	12	61.688	68.500	0.438	1.750	A36M-45 (45 ksi)
L8	19.000-0.000	28.000		12	64.705	73.813	0.438	1.750	A36M-45 (45 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	28.705	22.188	2151.482	9.867	14.407	149.337	4359.485	10.920	6.784	27.135
	35.435	27.420	4060.798	12.194	17.774	228.470	8228.278	13.495	8.526	34.103
L2	34.399	25.710	3347.223	11.434	16.673	200.756	6782.380	12.654	7.956	31.825
	37.894	29.332	4970.814	13.045	19.004	261.565	10072.218	14.436	9.162	36.649
L3	37.871	36.602	6181.599	13.022	19.004	325.277	12525.596	18.015	8.995	28.783
	46.671	45.155	11606.606	16.065	23.407	495.858	23518.130	22.224	11.273	36.073
L4	45.745	41.961	9313.223	14.929	21.762	427.949	18871.115	20.652	10.422	33.35
	47.318	45.784	12098.347	16.289	23.731	509.815	24514.531	22.534	11.440	36.609
L5	47.296	54.866	14458.271	16.267	23.731	609.260	29296.378	27.003	11.273	30.061
	60.820	70.639	30856.075	20.943	30.497	1011.766	62522.774	34.766	14.774	39.396
L6	60.030	66.579	25835.347	19.739	28.755	898.450	52349.418	32.768	13.872	36.993
	63.731	74.035	35523.861	21.950	31.954	1111.714	71980.974	36.438	15.527	41.406
L7	63.709	86.286	41317.892	21.927	31.954	1293.038	83721.251	42.467	15.360	35.108
	70.762	95.883	56694.845	24.366	35.483	1597.803	114879.126	47.191	17.186	39.281
L8	69.864	90.537	47731.088	23.008	33.517	1424.070	96716.125	44.560	16.169	36.957
	76.262	103.367	71033.665	26.268	38.235	1857.824	143933.463	50.874	18.609	42.535

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 150.000-130.000				1	1	1			
L2 130.000-115.000				1	1	1			
L3 115.000-95.000				1	1	1			
L4 95.000-91.000				1	1	1			

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
L5 91.000-51.000				1	1	1			
L6 51.000-40.000				1	1	1			
L7 40.000-19.000				1	1	1			
L8 19.000-0.000				1	1	1			

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight klf
7/8	C	No	Yes	Inside Pole	150.000 - 7.000	2	No Ice	0.000	0.001
							1/2" Ice	0.000	0.001
							1" Ice	0.000	0.001
HYBRIFLEX 1-1/4" (Sprint)	C	No	Yes	Inside Pole	138.000 - 7.000	4	No Ice	0.000	0.001
							1/2" Ice	0.000	0.001
							1" Ice	0.000	0.001
1 5/8 (AT&T)	C	No	Yes	Inside Pole	130.000 - 7.000	12	No Ice	0.000	0.001
							1/2" Ice	0.000	0.001
							1" Ice	0.000	0.001
Fiber Trunk (AT&T)	C	No	Yes	Inside Pole	130.000 - 7.000	1	No Ice	0.000	0.001
							1/2" Ice	0.000	0.001
							1" Ice	0.000	0.001
DC Trunk (AT&T)	C	No	Yes	Inside Pole	130.000 - 7.000	2	No Ice	0.000	0.000
							1/2" Ice	0.000	0.000
							1" Ice	0.000	0.000
1/2	C	No	Yes	Inside Pole	120.000 - 7.000	2	No Ice	0.000	0.000
							1/2" Ice	0.000	0.000
							1" Ice	0.000	0.000
HYBRIFLEX 1-5/8" (Verizon)	C	No	Yes	Inside Pole	108.000 - 7.000	2	No Ice	0.000	0.002
							1/2" Ice	0.000	0.002
							1" Ice	0.000	0.002
HYBRIFLEX 1-5/8" (T-Mobile - Existing)	C	No	Yes	Inside Pole	149.000 - 7.000	1	No Ice	0.000	0.002
							1/2" Ice	0.000	0.002
							1" Ice	0.000	0.002
HYBRIFLEX 1-5/8" (T-Mobile - Proposed)	C	No	Yes	Inside Pole	149.000 - 7.000	2	No Ice	0.000	0.002
							1/2" Ice	0.000	0.002
							1" Ice	0.000	0.002

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	150.000-130.000	A	0.000	0.000	0.000	0.000	0.000

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
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000	0.172
L2	130.000-115.000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000	0.388
L3	115.000-95.000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000	0.573
L4	95.000-91.000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000	0.120
L5	91.000-51.000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000	1.199
L6	51.000-40.000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000	0.330
L7	40.000-19.000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000	0.630
L8	19.000-0.000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000	0.360

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	150.000-130.000	A	1.733	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	0.000	0.172
L2	130.000-115.000	A	1.710	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	0.000	0.388
L3	115.000-95.000	A	1.684	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	0.000	0.573
L4	95.000-91.000	A	1.664	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	0.000	0.120
L5	91.000-51.000	A	1.618	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	0.000	1.199
L6	51.000-40.000	A	1.549	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	0.000	0.330
L7	40.000-19.000	A	1.482	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	0.000	0.630
L8	19.000-0.000	A	1.322	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	0.000	0.360

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Lightning Rod 3/4"x8'	C	From Face	3.500 0.000 4.000	0.000	150.000	No Ice 1/2" Ice 1" Ice	0.600 1.415 2.246	0.600 1.415 2.246	0.014 0.020 0.031
4' x 3" DIA Omni	C	From Leg	2.000 0.000 0.000	0.000	153.000	No Ice 1/2" Ice 1" Ice	1.000 1.248 1.505	1.000 1.248 1.505	0.015 0.024 0.036
4' x 3" DIA Omni	B	From Leg	2.000 0.000 0.000	0.000	153.000	No Ice 1/2" Ice 1" Ice	1.000 1.248 1.505	1.000 1.248 1.505	0.015 0.024 0.036
APX16DWV-16DWVS-E-A20 (T-Mobile - Existing)	A	From Face	3.000 -5.000 0.000	0.000	150.000	No Ice 1/2" Ice 1" Ice	6.460 6.833 7.214	2.150 2.490 2.837	0.041 0.074 0.112
APXVAALL24-43 (T-Mobile - Existing)	A	From Face	3.000 -1.000 0.000	0.000	150.000	No Ice 1/2" Ice 1" Ice	20.243 20.890 21.544	8.889 9.487 10.092	0.153 0.266 0.387
AIR6449 (T-Mobile - Proposed)	A	From Face	3.000 3.000 0.000	0.000	150.000	No Ice 1/2" Ice 1" Ice	5.655 5.956 6.265	2.416 2.641 2.874	0.103 0.141 0.184
APX16DWV-16DWVS-E-A20 (T-Mobile - Existing)	B	From Face	3.000 -5.000 0.000	0.000	150.000	No Ice 1/2" Ice 1" Ice	6.460 6.833 7.214	2.150 2.490 2.837	0.041 0.074 0.112
APXVAALL24-43 (T-Mobile - Existing)	B	From Face	3.000 -1.000 0.000	0.000	150.000	No Ice 1/2" Ice 1" Ice	20.243 20.890 21.544	8.889 9.487 10.092	0.153 0.266 0.387
AIR6449 (T-Mobile - Proposed)	B	From Face	3.000 3.000 0.000	0.000	150.000	No Ice 1/2" Ice 1" Ice	5.655 5.956 6.265	2.416 2.641 2.874	0.103 0.141 0.184
APX16DWV-16DWVS-E-A20 (T-Mobile - Existing)	C	From Face	3.000 -5.000 0.000	0.000	150.000	No Ice 1/2" Ice 1" Ice	6.460 6.833 7.214	2.150 2.490 2.837	0.041 0.074 0.112
APXVAALL24-43 (T-Mobile - Existing)	C	From Face	3.000 -1.000 0.000	0.000	150.000	No Ice 1/2" Ice 1" Ice	20.243 20.890 21.544	8.889 9.487 10.092	0.153 0.266 0.387
AIR6449 (T-Mobile - Proposed)	C	From Face	3.000 3.000 0.000	0.000	150.000	No Ice 1/2" Ice 1" Ice	5.655 5.956 6.265	2.416 2.641 2.874	0.103 0.141 0.184
4449 B5/B12 (T-Mobile - Existing)	A	From Face	3.000 -1.000 0.000	0.000	150.000	No Ice 1/2" Ice 1" Ice	1.968 2.144 2.328	1.408 1.564 1.727	0.071 0.090 0.111
4449 B5/B12 (T-Mobile - Existing)	B	From Face	3.000 -1.000 0.000	0.000	150.000	No Ice 1/2" Ice 1" Ice	1.968 2.144 2.328	1.408 1.564 1.727	0.071 0.090 0.111
4449 B5/B12 (T-Mobile - Existing)	C	From Face	3.000 -1.000 0.000	0.000	150.000	No Ice 1/2" Ice 1" Ice	1.968 2.144 2.328	1.408 1.564 1.727	0.071 0.090 0.111
4460 B25+B66 (T-Mobile - Proposed)	A	From Face	3.000 -1.000 0.000	0.000	150.000	No Ice 1/2" Ice 1" Ice	2.564 2.764 2.971	1.976 2.156 2.343	0.109 0.134 0.163
4460 B25+B66 (T-Mobile - Proposed)	B	From Face	3.000 -1.000 0.000	0.000	150.000	No Ice 1/2" Ice 1" Ice	2.564 2.764 2.971	1.976 2.156 2.343	0.109 0.134 0.163
4460 B25+B66 (T-Mobile - Proposed)	C	From Face	3.000 -1.000 0.000	0.000	150.000	No Ice 1/2" Ice 1" Ice	2.564 2.764 2.971	1.976 2.156 2.343	0.109 0.134 0.163

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Pirod 12' T-Frame Sector Mount (1) (T-Mobile - Existing)	A	From Face	1.000 0.000 0.000	0.000	150.000	No Ice 1/2" Ice 1" Ice	13.600 18.400 23.200	13.600 18.400 23.200	0.465 0.600 0.735
Pirod 12' T-Frame Sector Mount (1) (T-Mobile - Existing)	B	From Face	1.000 0.000 0.000	0.000	150.000	No Ice 1/2" Ice 1" Ice	13.600 18.400 23.200	13.600 18.400 23.200	0.465 0.600 0.735
Pirod 12' T-Frame Sector Mount (1) (T-Mobile - Existing)	C	From Face	1.000 0.000 0.000	0.000	150.000	No Ice 1/2" Ice 1" Ice	13.600 18.400 23.200	13.600 18.400 23.200	0.465 0.600 0.735
NNVV-65B-R4 (Sprint)	A	From Face	3.000 -3.000 0.000	0.000	140.000	No Ice 1/2" Ice 1" Ice	14.612 15.129 15.652	9.168 9.634 10.107	0.108 0.211 0.320
APXVTM14 (Sprint)	A	From Face	3.000 3.000 0.000	0.000	140.000	No Ice 1/2" Ice 1" Ice	6.342 6.716 7.097	3.607 3.967 4.333	0.056 0.096 0.140
NNVV-65B-R4 (Sprint)	B	From Face	3.000 -3.000 0.000	0.000	140.000	No Ice 1/2" Ice 1" Ice	14.612 15.129 15.652	9.168 9.634 10.107	0.108 0.211 0.320
APXVTM14 (Sprint)	B	From Face	3.000 3.000 0.000	0.000	140.000	No Ice 1/2" Ice 1" Ice	6.342 6.716 7.097	3.607 3.967 4.333	0.056 0.096 0.140
NNVV-65B-R4 (Sprint)	C	From Face	3.000 -3.000 0.000	0.000	140.000	No Ice 1/2" Ice 1" Ice	14.612 15.129 15.652	9.168 9.634 10.107	0.108 0.211 0.320
APXVTM14 (Sprint)	C	From Face	3.000 3.000 0.000	0.000	140.000	No Ice 1/2" Ice 1" Ice	6.342 6.716 7.097	3.607 3.967 4.333	0.056 0.096 0.140
TD-RRH8x20-25 (Sprint)	A	From Face	3.000 0.000 0.000	0.000	140.000	No Ice 1/2" Ice 1" Ice	4.045 4.298 4.557	1.533 1.712 1.899	0.070 0.097 0.128
TD-RRH8x20-25 (Sprint)	B	From Face	3.000 0.000 0.000	0.000	140.000	No Ice 1/2" Ice 1" Ice	4.045 4.298 4.557	1.533 1.712 1.899	0.070 0.097 0.128
TD-RRH8x20-25 (Sprint)	C	From Face	3.000 0.000 0.000	0.000	140.000	No Ice 1/2" Ice 1" Ice	4.045 4.298 4.557	1.533 1.712 1.899	0.070 0.097 0.128
FD-RRH 4x45 1900 (Sprint)	A	From Face	3.000 0.000 0.000	0.000	140.000	No Ice 1/2" Ice 1" Ice	2.319 2.524 2.736	2.384 2.590 2.804	0.060 0.084 0.111
FD-RRH 4x45 1900 (Sprint)	B	From Face	3.000 0.000 0.000	0.000	140.000	No Ice 1/2" Ice 1" Ice	2.319 2.524 2.736	2.384 2.590 2.804	0.060 0.084 0.111
FD-RRH 4x45 1900 (Sprint)	C	From Face	3.000 0.000 0.000	0.000	140.000	No Ice 1/2" Ice 1" Ice	2.319 2.524 2.736	2.384 2.590 2.804	0.060 0.084 0.111
(2) FD-RRH 2x50 800 (Sprint)	A	From Face	3.000 0.000 0.000	0.000	140.000	No Ice 1/2" Ice 1" Ice	2.058 2.240 2.429	1.932 2.109 2.293	0.064 0.086 0.111
(2) FD-RRH 2x50 800 (Sprint)	B	From Face	3.000 0.000 0.000	0.000	140.000	No Ice 1/2" Ice 1" Ice	2.058 2.240 2.429	1.932 2.109 2.293	0.064 0.086 0.111
(2) FD-RRH 2x50 800 (Sprint)	C	From Face	3.000 0.000 0.000	0.000	140.000	No Ice 1/2" Ice 1" Ice	2.058 2.240 2.429	1.932 2.109 2.293	0.064 0.086 0.111
Pirod 12' T-Frame Sector Mount (1) (Sprint)	A	From Face	1.000 0.000 0.000	0.000	138.000	No Ice 1/2" Ice 1" Ice	13.600 18.400 23.200	13.600 18.400 23.200	0.465 0.600 0.735

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Pirod 12' T-Frame Sector Mount (1) (Sprint)	B	From Face	1.000 0.000 0.000	0.000	138.000	No Ice 1/2" Ice 1" Ice	13.600 18.400 23.200	13.600 18.400 23.200	0.465 0.600 0.735
Pirod 12' T-Frame Sector Mount (1) (Sprint)	C	From Face	1.000 0.000 0.000	0.000	138.000	No Ice 1/2" Ice 1" Ice	13.600 18.400 23.200	13.600 18.400 23.200	0.465 0.600 0.735
7770.00 (AT&T)	A	From Face	3.000 -6.000 0.000	0.000	130.000	No Ice 1/2" Ice 1" Ice	5.508 5.867 6.233	2.928 3.273 3.625	0.035 0.068 0.105
OPA-65R-LCUU-H8 (AT&T)	A	From Face	3.000 -2.000 0.000	0.000	130.000	No Ice 1/2" Ice 1" Ice	12.976 13.558 14.147	7.516 8.087 8.666	0.088 0.162 0.243
OPA-65R-LCUU-H8 (AT&T)	A	From Face	3.000 2.000 0.000	0.000	130.000	No Ice 1/2" Ice 1" Ice	12.976 13.558 14.147	7.516 8.087 8.666	0.088 0.162 0.243
7770.00 (AT&T)	B	From Face	3.000 0.000 0.000	0.000	130.000	No Ice 1/2" Ice 1" Ice	5.508 5.867 6.233	2.928 3.273 3.625	0.035 0.068 0.105
OPA-65R-LCUU-H8 (AT&T)	B	From Face	3.000 -2.000 0.000	0.000	130.000	No Ice 1/2" Ice 1" Ice	12.976 13.558 14.147	7.516 8.087 8.666	0.088 0.162 0.243
OPA-65R-LCUU-H8 (AT&T)	B	From Face	3.000 2.000 0.000	0.000	130.000	No Ice 1/2" Ice 1" Ice	12.976 13.558 14.147	7.516 8.087 8.666	0.088 0.162 0.243
7770.00 (AT&T)	C	From Face	3.000 0.000 0.000	0.000	130.000	No Ice 1/2" Ice 1" Ice	5.508 5.867 6.233	2.928 3.273 3.625	0.035 0.068 0.105
OPA-65R-LCUU-H8 (AT&T)	C	From Face	3.000 -2.000 0.000	0.000	130.000	No Ice 1/2" Ice 1" Ice	12.976 13.558 14.147	7.516 8.087 8.666	0.088 0.162 0.243
OPA-65R-LCUU-H8 (AT&T)	C	From Face	3.000 2.000 0.000	0.000	130.000	No Ice 1/2" Ice 1" Ice	12.976 13.558 14.147	7.516 8.087 8.666	0.088 0.162 0.243
(2) LPG21401 TMA (AT&T)	A	From Face	3.000 0.000 0.000	0.000	130.000	No Ice 1/2" Ice 1" Ice	0.817 0.937 1.065	0.346 0.440 0.540	0.018 0.023 0.031
(2) LPG21401 TMA (AT&T)	B	From Face	3.000 0.000 0.000	0.000	130.000	No Ice 1/2" Ice 1" Ice	0.817 0.937 1.065	0.346 0.440 0.540	0.018 0.023 0.031
(2) LPG21401 TMA (AT&T)	C	From Face	3.000 0.000 0.000	0.000	130.000	No Ice 1/2" Ice 1" Ice	0.817 0.937 1.065	0.346 0.440 0.540	0.018 0.023 0.031
(2) LGP21901 Diplexer (AT&T)	A	From Face	3.000 0.000 0.000	0.000	130.000	No Ice 1/2" Ice 1" Ice	0.200 0.259 0.326	0.100 0.143 0.193	0.006 0.008 0.011
(2) LGP21901 Diplexer (AT&T)	B	From Face	3.000 0.000 0.000	0.000	130.000	No Ice 1/2" Ice 1" Ice	0.200 0.259 0.326	0.100 0.143 0.193	0.006 0.008 0.011
(2) LGP21901 Diplexer (AT&T)	C	From Face	3.000 0.000 0.000	0.000	130.000	No Ice 1/2" Ice 1" Ice	0.200 0.259 0.326	0.100 0.143 0.193	0.006 0.008 0.011
RRUS-11 (AT&T)	A	From Face	3.000 0.000 0.000	0.000	130.000	No Ice 1/2" Ice 1" Ice	2.566 2.765 2.971	1.068 1.211 1.361	0.050 0.070 0.092
RRUS-11 (AT&T)	B	From Face	3.000 0.000 0.000	0.000	130.000	No Ice 1/2" Ice 1" Ice	2.566 2.765 2.971	1.068 1.211 1.361	0.050 0.070 0.092

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
RRUS-11	C	From Face	3.000	0.000	130.000	No Ice	2.566	1.068	0.050
(AT&T)			0.000			1/2" Ice	2.765	1.211	0.070
			0.000			1" Ice	2.971	1.361	0.092
RRUS-12	A	From Face	3.000	0.000	130.000	No Ice	3.145	1.285	0.058
(AT&T)			0.000			1/2" Ice	3.365	1.438	0.081
			0.000			1" Ice	3.592	1.600	0.108
RRUS-12	B	From Face	3.000	0.000	130.000	No Ice	3.145	1.285	0.058
(AT&T)			0.000			1/2" Ice	3.365	1.438	0.081
			0.000			1" Ice	3.592	1.600	0.108
RRUS-12	C	From Face	3.000	0.000	130.000	No Ice	3.145	1.285	0.058
(AT&T)			0.000			1/2" Ice	3.365	1.438	0.081
			0.000			1" Ice	3.592	1.600	0.108
(2) RRUS-32	A	From Face	3.000	0.000	130.000	No Ice	3.314	2.424	0.077
(AT&T)			0.000			1/2" Ice	3.558	2.638	0.105
			0.000			1" Ice	3.809	2.860	0.136
(2) RRUS-32	B	From Face	3.000	0.000	130.000	No Ice	3.314	2.424	0.077
(AT&T)			0.000			1/2" Ice	3.558	2.638	0.105
			0.000			1" Ice	3.809	2.860	0.136
(2) RRUS-32	C	From Face	3.000	0.000	130.000	No Ice	3.314	2.424	0.077
(AT&T)			0.000			1/2" Ice	3.558	2.638	0.105
			0.000			1" Ice	3.809	2.860	0.136
A2	A	From Face	3.000	0.000	130.000	No Ice	2.077	0.505	0.022
(AT&T)			0.000			1/2" Ice	2.257	0.615	0.035
			0.000			1" Ice	2.443	0.732	0.050
A2	B	From Face	3.000	0.000	130.000	No Ice	2.077	0.505	0.022
(AT&T)			0.000			1/2" Ice	2.257	0.615	0.035
			0.000			1" Ice	2.443	0.732	0.050
A2	C	From Face	3.000	0.000	130.000	No Ice	2.077	0.505	0.022
(AT&T)			0.000			1/2" Ice	2.257	0.615	0.035
			0.000			1" Ice	2.443	0.732	0.050
DC6-48-60-18-8F Surge	A	From Face	3.000	0.000	130.000	No Ice	1.909	1.909	0.020
Arrestor			0.000			1/2" Ice	2.098	2.098	0.039
(AT&T)			0.000			1" Ice	2.294	2.294	0.062
DC6-48-60-18-8F Surge	B	From Face	3.000	0.000	130.000	No Ice	1.909	1.909	0.020
Arrestor			0.000			1/2" Ice	2.098	2.098	0.039
(AT&T)			0.000			1" Ice	2.294	2.294	0.062
DC6-48-60-18-8F Surge	C	From Face	3.000	0.000	130.000	No Ice	1.909	1.909	0.020
Arrestor			0.000			1/2" Ice	2.098	2.098	0.039
(AT&T)			0.000			1" Ice	2.294	2.294	0.062
Valmont 13' Low Profile	C	From Face	1.000	0.000	128.000	No Ice	15.700	15.700	1.300
Platform			0.000			1/2" Ice	20.100	20.100	1.765
(AT&T)			0.000			1" Ice	24.500	24.500	2.230
4' x 3" DIA Omni	C	From Leg	4.000	0.000	124.000	No Ice	1.000	1.000	0.015
			0.000			1/2" Ice	1.248	1.248	0.024
			0.000			1" Ice	1.505	1.505	0.036
4' x 3" DIA Omni	B	From Leg	4.000	0.000	124.000	No Ice	1.000	1.000	0.015
			0.000			1/2" Ice	1.248	1.248	0.024
			0.000			1" Ice	1.505	1.505	0.036
Pirod 6' Side Mount Standoff	C	From Leg	2.000	0.000	119.000	No Ice	4.970	4.970	0.070
(1)			0.000			1/2" Ice	6.120	6.120	0.130
			0.000			1" Ice	7.270	7.270	0.190
Pirod 6' Side Mount Standoff	B	From Leg	2.000	0.000	119.000	No Ice	4.970	4.970	0.070
(1)			0.000			1/2" Ice	6.120	6.120	0.130
			0.000			1" Ice	7.270	7.270	0.190
2-ft Stand Off	A	From Leg	2.000	0.000	119.000	No Ice	1.070	1.070	0.020
			0.000			1/2" Ice	1.620	1.620	0.028
			0.000			1" Ice	2.170	2.170	0.036

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
X7C-FRO-660	A	From Face	3.000	0.000	108.000	No Ice	9.549	5.867	0.040
(Verizon)			-6.000			1/2" Ice	10.019	6.325	0.100
			0.000			1" Ice	10.495	6.790	0.166
HBXX-6517DS	A	From Face	3.000	0.000	108.000	No Ice	8.528	5.243	0.050
(Verizon)			-4.000			1/2" Ice	9.000	5.709	0.100
			0.000			1" Ice	9.480	6.183	0.157
X7C-FRO-660	A	From Face	3.000	0.000	108.000	No Ice	9.549	5.867	0.040
(Verizon)			0.000			1/2" Ice	10.019	6.325	0.100
			0.000			1" Ice	10.495	6.790	0.166
HBXX-6517DS	A	From Face	3.000	0.000	108.000	No Ice	8.528	5.243	0.050
(Verizon)			4.000			1/2" Ice	9.000	5.709	0.100
			0.000			1" Ice	9.480	6.183	0.157
X7C-FRO-660	B	From Face	3.000	0.000	108.000	No Ice	9.549	5.867	0.040
(Verizon)			-6.000			1/2" Ice	10.019	6.325	0.100
			0.000			1" Ice	10.495	6.790	0.166
HBXX-6517DS	B	From Face	3.000	0.000	108.000	No Ice	8.528	5.243	0.050
(Verizon)			-4.000			1/2" Ice	9.000	5.709	0.100
			0.000			1" Ice	9.480	6.183	0.157
X7C-FRO-660	B	From Face	3.000	0.000	108.000	No Ice	9.549	5.867	0.040
(Verizon)			0.000			1/2" Ice	10.019	6.325	0.100
			0.000			1" Ice	10.495	6.790	0.166
HBXX-6517DS	B	From Face	3.000	0.000	108.000	No Ice	8.528	5.243	0.050
(Verizon)			4.000			1/2" Ice	9.000	5.709	0.100
			0.000			1" Ice	9.480	6.183	0.157
X7C-FRO-660	C	From Face	3.000	0.000	108.000	No Ice	9.549	5.867	0.040
(Verizon)			-6.000			1/2" Ice	10.019	6.325	0.100
			0.000			1" Ice	10.495	6.790	0.166
HBXX-6517DS	C	From Face	3.000	0.000	108.000	No Ice	8.528	5.243	0.050
(Verizon)			-4.000			1/2" Ice	9.000	5.709	0.100
			0.000			1" Ice	9.480	6.183	0.157
X7C-FRO-660	C	From Face	3.000	0.000	108.000	No Ice	9.549	5.867	0.040
(Verizon)			0.000			1/2" Ice	10.019	6.325	0.100
			0.000			1" Ice	10.495	6.790	0.166
HBXX-6517DS	C	From Face	3.000	0.000	108.000	No Ice	8.528	5.243	0.050
(Verizon)			4.000			1/2" Ice	9.000	5.709	0.100
			0.000			1" Ice	9.480	6.183	0.157
RRH2x40-07-U	A	From Face	3.000	0.000	108.000	No Ice	1.925	1.052	0.050
(Verizon)			-6.000			1/2" Ice	2.098	1.187	0.067
			0.000			1" Ice	2.278	1.329	0.086
RRH2x40-07-U	B	From Face	3.000	0.000	108.000	No Ice	1.925	1.052	0.050
(Verizon)			-6.000			1/2" Ice	2.098	1.187	0.067
			0.000			1" Ice	2.278	1.329	0.086
RRH2x40-07-U	C	From Face	3.000	0.000	108.000	No Ice	1.925	1.052	0.050
(Verizon)			-6.000			1/2" Ice	2.098	1.187	0.067
			0.000			1" Ice	2.278	1.329	0.086
RRH2x40-AWS	A	From Face	3.000	0.000	108.000	No Ice	2.161	1.420	0.044
(Verizon)			-6.000			1/2" Ice	2.360	1.590	0.061
			0.000			1" Ice	2.565	1.768	0.082
RRH2x40-AWS	B	From Face	3.000	0.000	108.000	No Ice	2.161	1.420	0.044
(Verizon)			-6.000			1/2" Ice	2.360	1.590	0.061
			0.000			1" Ice	2.565	1.768	0.082
RRH2x40-AWS	C	From Face	3.000	0.000	108.000	No Ice	2.161	1.420	0.044
(Verizon)			-6.000			1/2" Ice	2.360	1.590	0.061
			0.000			1" Ice	2.565	1.768	0.082
RRH2x60-PCS	A	From Face	3.000	0.000	108.000	No Ice	2.150	1.346	0.055
(Verizon)			-6.000			1/2" Ice	2.340	1.504	0.073
			0.000			1" Ice	2.537	1.669	0.093

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
RRH2x60-PCS	B	From Face	3.000	0.000	108.000	No Ice	2.150	1.346	0.055
(Verizon)			-6.000			1/2" Ice	2.340	1.504	0.073
			0.000			1" Ice	2.537	1.669	0.093
RRH2x60-PCS	C	From Face	3.000	0.000	108.000	No Ice	2.150	1.346	0.055
(Verizon)			-6.000			1/2" Ice	2.340	1.504	0.073
			0.000			1" Ice	2.537	1.669	0.093
DB-T1-6Z-8AB-0Z	A	From Face	3.000	0.000	108.000	No Ice	4.800	2.000	0.044
(Verizon)			-6.000			1/2" Ice	5.070	2.193	0.080
			0.000			1" Ice	5.348	2.393	0.120
DB-T1-6Z-8AB-0Z	B	From Face	3.000	0.000	108.000	No Ice	4.800	2.000	0.044
(Verizon)			-6.000			1/2" Ice	5.070	2.193	0.080
			0.000			1" Ice	5.348	2.393	0.120
Valmont 13' Low Profile	C	From Face	2.000	0.000	108.000	No Ice	15.700	15.700	1.300
Platform			0.000			1/2" Ice	20.100	20.100	1.765
(Verizon)			0.000			1" Ice	24.500	24.500	2.230

Tower Pressures - No Ice

G_H = 1.100

Section Elevation ft	z ft	K_Z	q_z ksf	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg % 	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
L1	139.651	1.358	0.034	53.450	A	0.000	53.450	53.450	100.00	0.000	0.000
150.000-130.0					B	0.000	53.450		100.00	0.000	0.000
00					C	0.000	53.450		100.00	0.000	0.000
L2	122.379	1.321	0.033	45.183	A	0.000	45.183	45.183	100.00	0.000	0.000
130.000-115.0					B	0.000	45.183		100.00	0.000	0.000
00					C	0.000	45.183		100.00	0.000	0.000
L3	104.654	1.278	0.032	70.452	A	0.000	70.452	70.452	100.00	0.000	0.000
115.000-95.00					B	0.000	70.452		100.00	0.000	0.000
0					C	0.000	70.452		100.00	0.000	0.000
L4	92.989	1.246	0.031	15.511	A	0.000	15.511	15.511	100.00	0.000	0.000
95.000-91.000					B	0.000	15.511		100.00	0.000	0.000
					C	0.000	15.511		100.00	0.000	0.000
L5	70.464	1.176	0.029	180.193	A	0.000	180.193	180.193	100.00	0.000	0.000
91.000-51.000					B	0.000	180.193		100.00	0.000	0.000
					C	0.000	180.193		100.00	0.000	0.000
L6	45.445	1.072	0.027	56.724	A	0.000	56.724	56.724	100.00	0.000	0.000
51.000-40.000					B	0.000	56.724		100.00	0.000	0.000
					C	0.000	56.724		100.00	0.000	0.000
L7	29.317	0.978	0.024	117.662	A	0.000	117.662	117.662	100.00	0.000	0.000
40.000-19.000					B	0.000	117.662		100.00	0.000	0.000
					C	0.000	117.662		100.00	0.000	0.000
L8	9.362	0.85	0.021	115.683	A	0.000	115.683	115.683	100.00	0.000	0.000
19.000-0.000					B	0.000	115.683		100.00	0.000	0.000
					C	0.000	115.683		100.00	0.000	0.000

Tower Pressure - With Ice

G_H = 1.100

Section Elevation ft	z ft	K_Z	q_z ksf	t_Z in	A_G 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	139.651	1.358	0.008	1.733	59.226	A	0.000	59.226	59.226	100.00	0.000	0.000
150.000-130.000						B	0.000	59.226		100.00	0.000	0.000
						C	0.000	59.226		100.00	0.000	0.000
L2	122.379	1.321	0.008	1.710	49.515	A	0.000	49.515	49.515	100.00	0.000	0.000
130.000-115.000						B	0.000	49.515		100.00	0.000	0.000
						C	0.000	49.515		100.00	0.000	0.000
L3	104.654	1.278	0.008	1.684	76.064	A	0.000	76.064	76.064	100.00	0.000	0.000
115.000-95.000						B	0.000	76.064		100.00	0.000	0.000
						C	0.000	76.064		100.00	0.000	0.000
L4	92.989	1.246	0.008	1.664	16.633	A	0.000	16.633	16.633	100.00	0.000	0.000
95.000-91.000						B	0.000	16.633		100.00	0.000	0.000
						C	0.000	16.633		100.00	0.000	0.000
L5	70.464	1.176	0.007	1.618	190.981	A	0.000	190.981	190.981	100.00	0.000	0.000
91.000-51.000						B	0.000	190.981		100.00	0.000	0.000
						C	0.000	190.981		100.00	0.000	0.000
L6	45.445	1.072	0.007	1.549	59.691	A	0.000	59.691	59.691	100.00	0.000	0.000
51.000-40.000						B	0.000	59.691		100.00	0.000	0.000
						C	0.000	59.691		100.00	0.000	0.000
L7	29.317	0.978	0.006	1.482	122.851	A	0.000	122.851	122.851	100.00	0.000	0.000
40.000-19.000						B	0.000	122.851		100.00	0.000	0.000
						C	0.000	122.851		100.00	0.000	0.000
L8 19.000-0.000	9.362	0.85	0.005	1.322	120.377	A	0.000	120.377	120.377	100.00	0.000	0.000
						B	0.000	120.377		100.00	0.000	0.000
						C	0.000	120.377		100.00	0.000	0.000

Tower Pressure - Service

G_H = 1.100

Section Elevation ft	z ft	K_Z	q_z ksf	A_G 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	139.651	1.358	0.011	53.450	A	0.000	53.450	53.450	100.00	0.000	0.000
150.000-130.0					B	0.000	53.450		100.00	0.000	0.000
00					C	0.000	53.450		100.00	0.000	0.000
L2	122.379	1.321	0.010	45.183	A	0.000	45.183	45.183	100.00	0.000	0.000
130.000-115.0					B	0.000	45.183		100.00	0.000	0.000
00					C	0.000	45.183		100.00	0.000	0.000
L3	104.654	1.278	0.010	70.452	A	0.000	70.452	70.452	100.00	0.000	0.000
115.000-95.00					B	0.000	70.452		100.00	0.000	0.000
0					C	0.000	70.452		100.00	0.000	0.000
L4	92.989	1.246	0.010	15.511	A	0.000	15.511	15.511	100.00	0.000	0.000
95.000-91.000					B	0.000	15.511		100.00	0.000	0.000
					C	0.000	15.511		100.00	0.000	0.000
L5	70.464	1.176	0.009	180.193	A	0.000	180.193	180.193	100.00	0.000	0.000
91.000-51.000					B	0.000	180.193		100.00	0.000	0.000
					C	0.000	180.193		100.00	0.000	0.000
L6	45.445	1.072	0.008	56.724	A	0.000	56.724	56.724	100.00	0.000	0.000
51.000-40.000					B	0.000	56.724		100.00	0.000	0.000

Section Elevation ft	z ft	K_Z	q_z ksf	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
					C	0.000	56.724		100.00	0.000	0.000
L7	29.317	0.978	0.008	117.662	A	0.000	117.662	117.662	100.00	0.000	0.000
40.000-19.000					B	0.000	117.662		100.00	0.000	0.000
					C	0.000	117.662		100.00	0.000	0.000
L8	9.362	0.85	0.007	115.683	A	0.000	115.683	115.683	100.00	0.000	0.000
19.000-0.000					B	0.000	115.683		100.00	0.000	0.000
					C	0.000	115.683		100.00	0.000	0.000

Tower Forces - No Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z ksf	D_F	D_R	A_E ft²	F K	w klf	Ctrl. Face
L1	0.172	1.688	A	1	1	0.034	1	1	53.450	1.981	0.099	C
150.000-130.0			B	1	1		1	1	53.450			
00			C	1	1		1	1	53.450			
L2	0.388	1.873	A	1	1	0.033	1	1	45.183	1.628	0.109	C
130.000-115.0			B	1	1		1	1	45.183			
00			C	1	1		1	1	45.183			
L3	0.573	2.782	A	1	1	0.032	1	1	70.452	2.457	0.123	C
115.000-95.00			B	1	1		1	1	70.452			
0			C	1	1		1	1	70.452			
L4	0.120	1.493	A	1	1	0.031	1	1	15.511	0.528	0.132	C
95.000-91.000			B	1	1		1	1	15.511			
			C	1	1		1	1	15.511			
L5	1.199	8.541	A	1	1	0.029	1	1	180.193	5.767	0.144	C
91.000-51.000			B	1	1		1	1	180.193			
			C	1	1		1	1	180.193			
L6	0.330	4.546	A	1	1	0.027	1	1	56.724	1.659	0.151	C
51.000-40.000			B	1	1		1	1	56.724			
			C	1	1		1	1	56.724			
L7	0.630	6.509	A	1	1	0.024	1	1	117.662	3.139	0.149	C
40.000-19.000			B	1	1		1	1	117.662			
			C	1	1		1	1	117.662			
L8	0.360	9.237	A	1	1	0.021	1	1	115.683	2.683	0.141	C
19.000-0.000			B	1	1		1	1	115.683			
			C	1	1		1	1	115.683			
Sum Weight:	3.770	36.669						OTM	1380.914 kip-ft	19.841		

Tower Forces - No Ice - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z ksf	D_F	D_R	A_E ft²	F K	w klf	Ctrl. Face
L1	0.172	1.688	A	1	1	0.034	1	1	53.450	1.981	0.099	C
150.000-130.0			B	1	1		1	1	53.450			
00			C	1	1		1	1	53.450			
L2	0.388	1.873	A	1	1	0.033	1	1	45.183	1.628	0.109	C

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z ksf	D_F	D_R	A_E ft^2	F K	w klf	Ctrl. Face
130.000-115.0			B	1	1		1	1	45.183			
00			C	1	1		1	1	45.183			
L3	0.573	2.782	A	1	1	0.032	1	1	70.452	2.457	0.123	C
115.000-95.00			B	1	1		1	1	70.452			
0			C	1	1		1	1	70.452			
L4	0.120	1.493	A	1	1	0.031	1	1	15.511	0.528	0.132	C
95.000-91.000			B	1	1		1	1	15.511			
			C	1	1		1	1	15.511			
L5	1.199	8.541	A	1	1	0.029	1	1	180.193	5.767	0.144	C
91.000-51.000			B	1	1		1	1	180.193			
			C	1	1		1	1	180.193			
L6	0.330	4.546	A	1	1	0.027	1	1	56.724	1.659	0.151	C
51.000-40.000			B	1	1		1	1	56.724			
			C	1	1		1	1	56.724			
L7	0.630	6.509	A	1	1	0.024	1	1	117.662	3.139	0.149	C
40.000-19.000			B	1	1		1	1	117.662			
			C	1	1		1	1	117.662			
L8	0.360	9.237	A	1	1	0.021	1	1	115.683	2.683	0.141	C
19.000-0.000			B	1	1		1	1	115.683			
			C	1	1		1	1	115.683			
Sum Weight:	3.770	36.669						OTM	1380.914 kip-ft	19.841		

Tower Forces - No Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z ksf	D_F	D_R	A_E ft^2	F K	w klf	Ctrl. Face
L1	0.172	1.688	A	1	1	0.034	1	1	53.450	1.981	0.099	C
150.000-130.0			B	1	1		1	1	53.450			
00			C	1	1		1	1	53.450			
L2	0.388	1.873	A	1	1	0.033	1	1	45.183	1.628	0.109	C
130.000-115.0			B	1	1		1	1	45.183			
00			C	1	1		1	1	45.183			
L3	0.573	2.782	A	1	1	0.032	1	1	70.452	2.457	0.123	C
115.000-95.00			B	1	1		1	1	70.452			
0			C	1	1		1	1	70.452			
L4	0.120	1.493	A	1	1	0.031	1	1	15.511	0.528	0.132	C
95.000-91.000			B	1	1		1	1	15.511			
			C	1	1		1	1	15.511			
L5	1.199	8.541	A	1	1	0.029	1	1	180.193	5.767	0.144	C
91.000-51.000			B	1	1		1	1	180.193			
			C	1	1		1	1	180.193			
L6	0.330	4.546	A	1	1	0.027	1	1	56.724	1.659	0.151	C
51.000-40.000			B	1	1		1	1	56.724			
			C	1	1		1	1	56.724			
L7	0.630	6.509	A	1	1	0.024	1	1	117.662	3.139	0.149	C
40.000-19.000			B	1	1		1	1	117.662			
			C	1	1		1	1	117.662			
L8	0.360	9.237	A	1	1	0.021	1	1	115.683	2.683	0.141	C
19.000-0.000			B	1	1		1	1	115.683			
			C	1	1		1	1	115.683			
Sum Weight:	3.770	36.669						OTM	1380.914	19.841		

Section Elevation ft	Add Weight K	Self Weight K	Face e	e	C_F	q_z ksf	D_F	D_R	A_E ft^2	F K	w klf	Ctrl. Face
									kip-ft			

Tower Forces - No Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face e	e	C_F	q_z ksf	D_F	D_R	A_E ft^2	F K	w klf	Ctrl. Face
L1	0.172	1.688	A	1	1	0.034	1	1	53.450	1.981	0.099	C
150.000-130.0			B	1	1		1	1	53.450			
00			C	1	1		1	1	53.450			
L2	0.388	1.873	A	1	1	0.033	1	1	45.183	1.628	0.109	C
130.000-115.0			B	1	1		1	1	45.183			
00			C	1	1		1	1	45.183			
L3	0.573	2.782	A	1	1	0.032	1	1	70.452	2.457	0.123	C
115.000-95.00			B	1	1		1	1	70.452			
0			C	1	1		1	1	70.452			
L4	0.120	1.493	A	1	1	0.031	1	1	15.511	0.528	0.132	C
95.000-91.000			B	1	1		1	1	15.511			
			C	1	1		1	1	15.511			
L5	1.199	8.541	A	1	1	0.029	1	1	180.193	5.767	0.144	C
91.000-51.000			B	1	1		1	1	180.193			
			C	1	1		1	1	180.193			
L6	0.330	4.546	A	1	1	0.027	1	1	56.724	1.659	0.151	C
51.000-40.000			B	1	1		1	1	56.724			
			C	1	1		1	1	56.724			
L7	0.630	6.509	A	1	1	0.024	1	1	117.662	3.139	0.149	C
40.000-19.000			B	1	1		1	1	117.662			
			C	1	1		1	1	117.662			
L8	0.360	9.237	A	1	1	0.021	1	1	115.683	2.683	0.141	C
19.000-0.000			B	1	1		1	1	115.683			
			C	1	1		1	1	115.683			
Sum Weight:	3.770	36.669						OTM	1380.914 kip-ft	19.841		

Tower Forces - With Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face e	e	C_F	q_z ksf	D_F	D_R	A_E ft^2	F K	w klf	Ctrl. Face
L1	0.172	3.111	A	1	1.2	0.008	1	1	59.226	0.645	0.032	C
150.000-130.0			B	1	1.2		1	1	59.226			
00			C	1	1.2		1	1	59.226			
L2	0.388	3.052	A	1	1.2	0.008	1	1	49.458	0.524	0.035	C
130.000-115.0			B	1	1.2		1	1	49.458			
00			C	1	1.2		1	1	49.458			
L3	0.573	4.579	A	1	1.2	0.008	1	1	76.064	0.780	0.039	C
115.000-95.00			B	1	1.2		1	1	76.064			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z ksf	D_F	D_R	A_E ft²	F K	w klf	Ctrl. Face
0			C	1	1.2		1	1	76.064			
L4	0.120	1.882	A	1	1.2	0.008	1	1	16.620	0.166	0.042	C
95.000-91.000			B	1	1.2		1	1	16.620			
			C	1	1.2		1	1	16.620			
L5	1.199	12.915	A	1	1.2	0.007	1	1	190.981	1.797	0.045	C
91.000-51.000			B	1	1.2		1	1	190.981			
			C	1	1.2		1	1	190.981			
L6	0.330	5.856	A	1	1.2	0.007	1	1	59.563	0.512	0.047	C
51.000-40.000			B	1	1.2		1	1	59.563			
			C	1	1.2		1	1	59.563			
L7	0.630	9.104	A	1	1.2	0.006	1	1	122.851	0.964	0.046	C
40.000-19.000			B	1	1.2		1	1	122.851			
			C	1	1.2		1	1	122.851			
L8	0.360	11.504	A	1	1.2	0.005	1	1	119.871	0.818	0.043	C
19.000-0.000			B	1	1.2		1	1	119.871			
			C	1	1.2		1	1	119.871			
Sum Weight:	3.770	52.004						OTM	437.226 kip-ft	6.207		

Tower Forces - With Ice - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z ksf	D_F	D_R	A_E ft²	F K	w klf	Ctrl. Face
L1	0.172	3.111	A	1	1.2	0.008	1	1	59.226	0.645	0.032	C
150.000-130.0			B	1	1.2		1	1	59.226			
00			C	1	1.2		1	1	59.226			
L2	0.388	3.052	A	1	1.2	0.008	1	1	49.458	0.524	0.035	C
130.000-115.0			B	1	1.2		1	1	49.458			
00			C	1	1.2		1	1	49.458			
L3	0.573	4.579	A	1	1.2	0.008	1	1	76.064	0.780	0.039	C
115.000-95.00			B	1	1.2		1	1	76.064			
0			C	1	1.2		1	1	76.064			
L4	0.120	1.882	A	1	1.2	0.008	1	1	16.620	0.166	0.042	C
95.000-91.000			B	1	1.2		1	1	16.620			
			C	1	1.2		1	1	16.620			
L5	1.199	12.915	A	1	1.2	0.007	1	1	190.981	1.797	0.045	C
91.000-51.000			B	1	1.2		1	1	190.981			
			C	1	1.2		1	1	190.981			
L6	0.330	5.856	A	1	1.2	0.007	1	1	59.563	0.512	0.047	C
51.000-40.000			B	1	1.2		1	1	59.563			
			C	1	1.2		1	1	59.563			
L7	0.630	9.104	A	1	1.2	0.006	1	1	122.851	0.964	0.046	C
40.000-19.000			B	1	1.2		1	1	122.851			
			C	1	1.2		1	1	122.851			
L8	0.360	11.504	A	1	1.2	0.005	1	1	119.871	0.818	0.043	C
19.000-0.000			B	1	1.2		1	1	119.871			
			C	1	1.2		1	1	119.871			
Sum Weight:	3.770	52.004						OTM	437.226 kip-ft	6.207		

Tower Forces - With Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z ksf	D_F	D_R	A_E ft^2	F K	w klf	Ctrl. Face
L1	0.172	3.111	A	1	1.2	0.008	1	1	59.226	0.645	0.032	C
150.000-130.0			B	1	1.2		1	1	59.226			
00			C	1	1.2		1	1	59.226			
L2	0.388	3.052	A	1	1.2	0.008	1	1	49.458	0.524	0.035	C
130.000-115.0			B	1	1.2		1	1	49.458			
00			C	1	1.2		1	1	49.458			
L3	0.573	4.579	A	1	1.2	0.008	1	1	76.064	0.780	0.039	C
115.000-95.00			B	1	1.2		1	1	76.064			
0			C	1	1.2		1	1	76.064			
L4	0.120	1.882	A	1	1.2	0.008	1	1	16.620	0.166	0.042	C
95.000-91.000			B	1	1.2		1	1	16.620			
			C	1	1.2		1	1	16.620			
L5	1.199	12.915	A	1	1.2	0.007	1	1	190.981	1.797	0.045	C
91.000-51.000			B	1	1.2		1	1	190.981			
			C	1	1.2		1	1	190.981			
L6	0.330	5.856	A	1	1.2	0.007	1	1	59.563	0.512	0.047	C
51.000-40.000			B	1	1.2		1	1	59.563			
			C	1	1.2		1	1	59.563			
L7	0.630	9.104	A	1	1.2	0.006	1	1	122.851	0.964	0.046	C
40.000-19.000			B	1	1.2		1	1	122.851			
			C	1	1.2		1	1	122.851			
L8	0.360	11.504	A	1	1.2	0.005	1	1	119.871	0.818	0.043	C
19.000-0.000			B	1	1.2		1	1	119.871			
			C	1	1.2		1	1	119.871			
Sum Weight:	3.770	52.004						OTM	437.226 kip-ft	6.207		

Tower Forces - With Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z ksf	D_F	D_R	A_E ft^2	F K	w klf	Ctrl. Face
L1	0.172	3.111	A	1	1.2	0.008	1	1	59.226	0.645	0.032	C
150.000-130.0			B	1	1.2		1	1	59.226			
00			C	1	1.2		1	1	59.226			
L2	0.388	3.052	A	1	1.2	0.008	1	1	49.458	0.524	0.035	C
130.000-115.0			B	1	1.2		1	1	49.458			
00			C	1	1.2		1	1	49.458			
L3	0.573	4.579	A	1	1.2	0.008	1	1	76.064	0.780	0.039	C
115.000-95.00			B	1	1.2		1	1	76.064			
0			C	1	1.2		1	1	76.064			
L4	0.120	1.882	A	1	1.2	0.008	1	1	16.620	0.166	0.042	C
95.000-91.000			B	1	1.2		1	1	16.620			
			C	1	1.2		1	1	16.620			
L5	1.199	12.915	A	1	1.2	0.007	1	1	190.981	1.797	0.045	C
91.000-51.000			B	1	1.2		1	1	190.981			
			C	1	1.2		1	1	190.981			
L6	0.330	5.856	A	1	1.2	0.007	1	1	59.563	0.512	0.047	C

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z ksf	D_F	D_R	A_E ft²	F K	w klf	Ctrl. Face
51.000-40.000			B	1	1.2		1	1	59.563			
			C	1	1.2		1	1	59.563			
L7	0.630	9.104	A	1	1.2	0.006	1	1	122.851	0.964	0.046	C
40.000-19.000			B	1	1.2		1	1	122.851			
			C	1	1.2		1	1	122.851			
L8	0.360	11.504	A	1	1.2	0.005	1	1	119.871	0.818	0.043	C
19.000-0.000			B	1	1.2		1	1	119.871			
			C	1	1.2		1	1	119.871			
Sum Weight:	3.770	52.004						OTM	437.226 kip-ft	6.207		

Tower Forces - Service - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z ksf	D_F	D_R	A_E ft²	F K	w klf	Ctrl. Face
L1	0.172	1.688	A	1	1	0.011	1	1	53.450	0.625	0.031	C
150.000-130.0			B	1	1		1	1	53.450			
00			C	1	1		1	1	53.450			
L2	0.388	1.873	A	1	1	0.010	1	1	45.183	0.514	0.034	C
130.000-115.0			B	1	1		1	1	45.183			
00			C	1	1		1	1	45.183			
L3	0.573	2.782	A	1	1	0.010	1	1	70.452	0.776	0.039	C
115.000-95.00			B	1	1		1	1	70.452			
0			C	1	1		1	1	70.452			
L4	0.120	1.493	A	1	1	0.010	1	1	15.511	0.167	0.042	C
95.000-91.000			B	1	1		1	1	15.511			
			C	1	1		1	1	15.511			
L5	1.199	8.541	A	1	1	0.009	1	1	180.193	1.821	0.046	C
91.000-51.000			B	1	1		1	1	180.193			
			C	1	1		1	1	180.193			
L6	0.330	4.546	A	1	1	0.008	1	1	56.724	0.524	0.048	C
51.000-40.000			B	1	1		1	1	56.724			
			C	1	1		1	1	56.724			
L7	0.630	6.509	A	1	1	0.008	1	1	117.662	0.991	0.047	C
40.000-19.000			B	1	1		1	1	117.662			
			C	1	1		1	1	117.662			
L8	0.360	9.237	A	1	1	0.007	1	1	115.683	0.847	0.045	C
19.000-0.000			B	1	1		1	1	115.683			
			C	1	1		1	1	115.683			
Sum Weight:	3.770	36.669						OTM	436.035 kip-ft	6.265		

Tower Forces - Service - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z ksf	D_F	D_R	A_E ft^2	F K	w klf	Ctrl. Face
L1	0.172	1.688	A	1	1	0.011	1	1	53.450	0.625	0.031	C
150.000-130.0			B	1	1		1	1	53.450			
00			C	1	1		1	1	53.450			
L2	0.388	1.873	A	1	1	0.010	1	1	45.183	0.514	0.034	C
130.000-115.0			B	1	1		1	1	45.183			
00			C	1	1		1	1	45.183			
L3	0.573	2.782	A	1	1	0.010	1	1	70.452	0.776	0.039	C
115.000-95.00			B	1	1		1	1	70.452			
0			C	1	1		1	1	70.452			
L4	0.120	1.493	A	1	1	0.010	1	1	15.511	0.167	0.042	C
95.000-91.000			B	1	1		1	1	15.511			
			C	1	1		1	1	15.511			
L5	1.199	8.541	A	1	1	0.009	1	1	180.193	1.821	0.046	C
91.000-51.000			B	1	1		1	1	180.193			
			C	1	1		1	1	180.193			
L6	0.330	4.546	A	1	1	0.008	1	1	56.724	0.524	0.048	C
51.000-40.000			B	1	1		1	1	56.724			
			C	1	1		1	1	56.724			
L7	0.630	6.509	A	1	1	0.008	1	1	117.662	0.991	0.047	C
40.000-19.000			B	1	1		1	1	117.662			
			C	1	1		1	1	117.662			
L8	0.360	9.237	A	1	1	0.007	1	1	115.683	0.847	0.045	C
19.000-0.000			B	1	1		1	1	115.683			
			C	1	1		1	1	115.683			
Sum Weight:	3.770	36.669						OTM	436.035 kip-ft	6.265		

Tower Forces - Service - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z ksf	D_F	D_R	A_E ft^2	F K	w klf	Ctrl. Face
L1	0.172	1.688	A	1	1	0.011	1	1	53.450	0.625	0.031	C
150.000-130.0			B	1	1		1	1	53.450			
00			C	1	1		1	1	53.450			
L2	0.388	1.873	A	1	1	0.010	1	1	45.183	0.514	0.034	C
130.000-115.0			B	1	1		1	1	45.183			
00			C	1	1		1	1	45.183			
L3	0.573	2.782	A	1	1	0.010	1	1	70.452	0.776	0.039	C
115.000-95.00			B	1	1		1	1	70.452			
0			C	1	1		1	1	70.452			
L4	0.120	1.493	A	1	1	0.010	1	1	15.511	0.167	0.042	C
95.000-91.000			B	1	1		1	1	15.511			
			C	1	1		1	1	15.511			
L5	1.199	8.541	A	1	1	0.009	1	1	180.193	1.821	0.046	C
91.000-51.000			B	1	1		1	1	180.193			
			C	1	1		1	1	180.193			
L6	0.330	4.546	A	1	1	0.008	1	1	56.724	0.524	0.048	C
51.000-40.000			B	1	1		1	1	56.724			
			C	1	1		1	1	56.724			
L7	0.630	6.509	A	1	1	0.008	1	1	117.662	0.991	0.047	C
40.000-19.000			B	1	1		1	1	117.662			
			C	1	1		1	1	117.662			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z ksf	D_F	D_R	A_E ft^2	F K	w klf	Ctrl. Face
L8	0.360	9.237	A	1	1	0.007	1	1	115.683	0.847	0.045	C
19.000-0.000			B	1	1		1	1	115.683			
			C	1	1		1	1	115.683			
Sum Weight:	3.770	36.669						OTM	436.035 kip-ft	6.265		

Tower Forces - Service - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z ksf	D_F	D_R	A_E ft^2	F K	w klf	Ctrl. Face
L1	0.172	1.688	A	1	1	0.011	1	1	53.450	0.625	0.031	C
150.000-130.0			B	1	1		1	1	53.450			
00			C	1	1		1	1	53.450			
L2	0.388	1.873	A	1	1	0.010	1	1	45.183	0.514	0.034	C
130.000-115.0			B	1	1		1	1	45.183			
00			C	1	1		1	1	45.183			
L3	0.573	2.782	A	1	1	0.010	1	1	70.452	0.776	0.039	C
115.000-95.00			B	1	1		1	1	70.452			
0			C	1	1		1	1	70.452			
L4	0.120	1.493	A	1	1	0.010	1	1	15.511	0.167	0.042	C
95.000-91.000			B	1	1		1	1	15.511			
			C	1	1		1	1	15.511			
L5	1.199	8.541	A	1	1	0.009	1	1	180.193	1.821	0.046	C
91.000-51.000			B	1	1		1	1	180.193			
			C	1	1		1	1	180.193			
L6	0.330	4.546	A	1	1	0.008	1	1	56.724	0.524	0.048	C
51.000-40.000			B	1	1		1	1	56.724			
			C	1	1		1	1	56.724			
L7	0.630	6.509	A	1	1	0.008	1	1	117.662	0.991	0.047	C
40.000-19.000			B	1	1		1	1	117.662			
			C	1	1		1	1	117.662			
L8	0.360	9.237	A	1	1	0.007	1	1	115.683	0.847	0.045	C
19.000-0.000			B	1	1		1	1	115.683			
			C	1	1		1	1	115.683			
Sum Weight:	3.770	36.669						OTM	436.035 kip-ft	6.265		

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	36.669					
Bracing Weight	0.000					
Total Member Self-Weight	36.669			8.223	0.369	
Total Weight	51.524			8.223	0.369	

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 0 deg - No Ice		0.000	-35.773	-3475.634	0.369	-1.291
Wind 30 deg - No Ice		17.926	-30.980	-3008.886	-1745.806	1.318
Wind 45 deg - No Ice		25.351	-25.295	-2455.236	-2469.095	2.532
Wind 60 deg - No Ice		31.048	-17.886	-1733.705	-3024.094	3.573
Wind 90 deg - No Ice		35.851	0.000	8.223	-3491.980	4.872
Wind 120 deg - No Ice		31.048	17.886	1750.152	-3024.094	4.865
Wind 135 deg - No Ice		25.351	25.295	2471.682	-2469.095	4.358
Wind 150 deg - No Ice		17.926	30.980	3025.332	-1745.806	3.554
Wind 180 deg - No Ice		0.000	35.773	3492.080	0.369	1.291
Wind 210 deg - No Ice		-17.926	30.980	3025.332	1746.544	-1.318
Wind 225 deg - No Ice		-25.351	25.295	2471.682	2469.833	-2.532
Wind 240 deg - No Ice		-31.048	17.886	1750.152	3024.832	-3.573
Wind 270 deg - No Ice		-35.851	0.000	8.223	3492.718	-4.872
Wind 300 deg - No Ice		-31.048	-17.886	-1733.705	3024.832	-4.865
Wind 315 deg - No Ice		-25.351	-25.295	-2455.236	2469.833	-4.358
Wind 330 deg - No Ice		-17.926	-30.980	-3008.886	1746.544	-3.554
Member Ice	15.335					
Total Weight Ice	86.574			19.073	1.615	
Wind 0 deg - Ice		0.000	-12.097	-1201.267	1.615	-0.383
Wind 30 deg - Ice		6.059	-10.477	-1037.773	-609.694	0.799
Wind 45 deg - Ice		8.569	-8.554	-843.838	-862.906	1.327
Wind 60 deg - Ice		10.495	-6.049	-591.097	-1057.202	1.766
Wind 90 deg - Ice		12.118	0.000	19.073	-1221.002	2.260
Wind 120 deg - Ice		10.495	6.049	629.243	-1057.202	2.149
Wind 135 deg - Ice		8.569	8.554	881.984	-862.906	1.869
Wind 150 deg - Ice		6.059	10.477	1075.919	-609.694	1.461
Wind 180 deg - Ice		0.000	12.097	1239.413	1.615	0.383
Wind 210 deg - Ice		-6.059	10.477	1075.919	612.923	-0.799
Wind 225 deg - Ice		-8.569	8.554	881.984	866.135	-1.327
Wind 240 deg - Ice		-10.495	6.049	629.243	1060.432	-1.766
Wind 270 deg - Ice		-12.118	0.000	19.073	1224.231	-2.260
Wind 300 deg - Ice		-10.495	-6.049	-591.097	1060.432	-2.149
Wind 315 deg - Ice		-8.569	-8.554	-843.838	866.135	-1.869
Wind 330 deg - Ice		-6.059	-10.477	-1037.773	612.923	-1.461
Total Weight	51.524			8.223	0.369	
Wind 0 deg - Service		0.000	-11.295	-1091.834	0.369	-0.408
Wind 30 deg - Service		5.660	-9.782	-944.455	-551.001	0.416
Wind 45 deg - Service		8.005	-7.987	-769.635	-779.385	0.799
Wind 60 deg - Service		9.804	-5.648	-541.806	-954.631	1.128
Wind 90 deg - Service		11.320	0.000	8.223	-1102.370	1.538
Wind 120 deg - Service		9.804	5.648	558.252	-954.631	1.536
Wind 135 deg - Service		8.005	7.987	786.081	-779.385	1.376
Wind 150 deg - Service		5.660	9.782	960.901	-551.001	1.122
Wind 180 deg - Service		0.000	11.295	1108.281	0.369	0.408
Wind 210 deg - Service		-5.660	9.782	960.901	551.739	-0.416
Wind 225 deg - Service		-8.005	7.987	786.081	780.123	-0.799
Wind 240 deg - Service		-9.804	5.648	558.252	955.369	-1.128
Wind 270 deg - Service		-11.320	0.000	8.223	1103.108	-1.538
Wind 300 deg - Service		-9.804	-5.648	-541.806	955.369	-1.536
Wind 315 deg - Service		-8.005	-7.987	-769.635	780.123	-1.376
Wind 330 deg - Service		-5.660	-9.782	-944.455	551.739	-1.122

Load Combinations

Comb. No.	Description

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

Comb. No.	Description
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	150 - 130	Pole	Max Tension	34	0.000	-0.000	0.000
			Max. Compression	34	-17.855	0.008	-0.605
			Max. Mx	26	-7.419	144.655	-0.184
			Max. My	18	-7.416	0.012	-144.803
			Max. Vy	26	-15.363	144.655	-0.184
			Max. Vx	18	15.364	0.012	-144.803
			Max. Torque	26			0.367
L2	130 - 115	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	34	-33.038	0.564	-10.620
			Max. Mx	26	-14.127	587.902	-4.395
			Max. My	18	-14.123	0.126	-592.243
			Max. Vy	26	-26.252	587.902	-4.395
			Max. Vx	18	26.254	0.126	-592.243
			Max. Torque	26			5.225
L3	115 - 95	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	34	-44.959	1.741	-21.397
			Max. Mx	26	-19.541	1015.879	-9.840
			Max. My	18	-19.543	0.406	-1024.499
			Max. Vy	26	-34.908	1015.879	-9.840
			Max. Vx	18	34.784	0.406	-1024.499
			Max. Torque	26			8.269
L4	95 - 91	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	34	-49.688	1.754	-21.558
			Max. Mx	26	-22.808	1375.812	-9.922
			Max. My	18	-22.811	0.419	-1383.188
			Max. Vy	26	-37.064	1375.812	-9.922
			Max. Vx	18	36.939	0.419	-1383.188
			Max. Torque	10			-8.267
L5	91 - 51	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	34	-62.332	1.783	-21.916
			Max. Mx	26	-32.360	2673.416	-10.091
			Max. My	18	-32.363	0.444	-2676.782
			Max. Vy	26	-44.172	2673.416	-10.091
			Max. Vx	18	44.046	0.444	-2676.782
			Max. Torque	10			-8.266
L6	51 - 40	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	34	-73.865	1.790	-21.998
			Max. Mx	26	-41.023	3555.980	-10.148
			Max. My	18	-41.025	0.452	-3556.954
			Max. Vy	26	-48.666	3555.980	-10.148
			Max. Vx	18	48.540	0.452	-3556.954
			Max. Torque	10			-8.258
L7	40 - 19	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	34	-80.142	1.790	-21.998
			Max. Mx	26	-46.037	4155.573	-10.167
			Max. My	18	-46.038	0.454	-4155.035
			Max. Vy	26	-51.308	4155.573	-10.167
			Max. Vx	18	51.182	0.454	-4155.035
			Max. Torque	10			-8.257

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L8	19 - 0	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	34	-99.883	1.790	-21.998
			Max. Mx	26	-61.818	5679.665	-10.177
			Max. My	18	-61.818	0.453	-5675.600
			Max. Vy	26	-57.374	5679.665	-10.177
			Max. Vx	18	57.248	0.453	-5675.600
			Max. Torque	10			-8.255

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	34	99.883	0.000	-0.000
	Max. H_x	27	46.372	57.362	-0.000
	Max. H_z	2	61.829	0.000	57.236
	Max. M_x	2	5655.250	0.000	57.236
	Max. M_z	10	5678.752	-57.362	0.000
	Max. Torsion	26	8.255	57.362	0.000
	Min. Vert	7	46.372	-40.561	40.472
	Min. H_x	11	46.372	-57.362	-0.000
	Min. H_z	18	61.829	0.000	-57.236
	Min. M_x	18	-5675.600	0.000	-57.236
	Min. M_z	26	-5679.665	57.362	0.000
	Min. Torsion	10	-8.255	-57.362	0.000

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	51.524	0.000	0.000	8.358	0.375	0.000
1.2 Dead+1.6 Wind 0 deg - No Ice	61.829	0.000	-57.236	-5655.250	0.453	-2.080
0.9 Dead+1.6 Wind 0 deg - No Ice	46.372	0.000	-57.236	-5634.092	0.337	-2.075
1.2 Dead+1.6 Wind 30 deg - No Ice	61.829	28.681	-49.568	-4896.224	-2839.155	2.326
0.9 Dead+1.6 Wind 30 deg - No Ice	46.372	28.681	-49.568	-4878.249	-2827.362	2.268
1.2 Dead+1.6 Wind 45 deg - No Ice	61.829	40.561	-40.472	-3995.880	-4015.357	4.366
0.9 Dead+1.6 Wind 45 deg - No Ice	46.372	40.561	-40.472	-3981.682	-3998.631	4.282
1.2 Dead+1.6 Wind 60 deg - No Ice	61.829	49.677	-28.618	-2822.532	-4917.886	6.109
0.9 Dead+1.6 Wind 60 deg - No Ice	46.372	49.677	-28.618	-2813.256	-4897.376	6.004
1.2 Dead+1.6 Wind 90 deg - No Ice	61.829	57.362	0.000	10.176	-5678.752	8.255
0.9 Dead+1.6 Wind 90 deg - No Ice	46.372	57.362	0.000	7.570	-5655.051	8.131
1.2 Dead+1.6 Wind 120 deg -	61.829	49.677	28.618	2842.883	-4917.885	8.189

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
No Ice						
0.9 Dead+1.6 Wind 120 deg - No Ice	46.372	49.677	28.618	2828.395	-4897.374	8.079
1.2 Dead+1.6 Wind 135 deg - No Ice	61.829	40.561	40.472	4016.231	-4015.355	7.308
0.9 Dead+1.6 Wind 135 deg - No Ice	46.372	40.561	40.472	3996.821	-3998.630	7.217
1.2 Dead+1.6 Wind 150 deg - No Ice	61.829	28.681	49.568	4916.574	-2839.154	5.929
0.9 Dead+1.6 Wind 150 deg - No Ice	46.372	28.681	49.568	4893.387	-2827.361	5.862
1.2 Dead+1.6 Wind 180 deg - No Ice	61.829	0.000	57.236	5675.600	0.453	2.080
0.9 Dead+1.6 Wind 180 deg - No Ice	46.372	0.000	57.236	5649.229	0.337	2.075
1.2 Dead+1.6 Wind 210 deg - No Ice	61.829	-28.681	49.568	4916.577	2840.061	-2.326
0.9 Dead+1.6 Wind 210 deg - No Ice	46.372	-28.681	49.568	4893.390	2828.036	-2.268
1.2 Dead+1.6 Wind 225 deg - No Ice	61.829	-40.561	40.472	4016.235	4016.264	-4.366
0.9 Dead+1.6 Wind 225 deg - No Ice	46.372	-40.561	40.472	3996.824	3999.306	-4.282
1.2 Dead+1.6 Wind 240 deg - No Ice	61.829	-49.677	28.618	2842.886	4918.795	-6.109
0.9 Dead+1.6 Wind 240 deg - No Ice	46.372	-49.677	28.618	2828.398	4898.052	-6.004
1.2 Dead+1.6 Wind 270 deg - No Ice	61.829	-57.362	0.000	10.176	5679.665	-8.255
0.9 Dead+1.6 Wind 270 deg - No Ice	46.372	-57.362	0.000	7.570	5655.729	-8.131
1.2 Dead+1.6 Wind 300 deg - No Ice	61.829	-49.677	-28.618	-2822.535	4918.797	-8.189
0.9 Dead+1.6 Wind 300 deg - No Ice	46.372	-49.677	-28.618	-2813.258	4898.053	-8.079
1.2 Dead+1.6 Wind 315 deg - No Ice	61.829	-40.561	-40.472	-3995.884	4016.266	-7.308
0.9 Dead+1.6 Wind 315 deg - No Ice	46.372	-40.561	-40.472	-3981.685	3999.307	-7.217
1.2 Dead+1.6 Wind 330 deg - No Ice	61.829	-28.681	-49.568	-4896.227	2840.062	-5.929
0.9 Dead+1.6 Wind 330 deg - No Ice	46.372	-28.681	-49.568	-4878.251	2828.037	-5.863
1.2 Dead+1.0 Ice+1.0 Temp	99.883	-0.000	0.000	21.998	1.790	0.000
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	99.883	-0.000	-12.097	-1240.473	1.802	-0.402
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	99.883	6.059	-10.477	-1071.312	-630.685	0.902
1.2 Dead+1.0 Wind 45 deg+1.0 Ice+1.0 Temp	99.883	8.569	-8.554	-870.657	-892.670	1.483
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	99.883	10.495	-6.049	-609.158	-1093.699	1.964
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	99.883	12.118	0.000	22.156	-1263.173	2.500
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	99.883	10.495	6.049	653.471	-1093.699	2.365
1.2 Dead+1.0 Wind 135 deg+1.0 Ice+1.0 Temp	99.883	8.569	8.554	914.970	-892.671	2.051
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	99.883	6.059	10.477	1115.625	-630.686	1.598
1.2 Dead+1.0 Wind 180	99.883	-0.000	12.097	1284.786	1.802	0.402

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
deg+1.0 Ice+1.0 Temp						
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	99.883	-6.059	10.477	1115.626	634.291	-0.902
1.2 Dead+1.0 Wind 225 deg+1.0 Ice+1.0 Temp	99.883	-8.569	8.554	914.970	896.276	-1.483
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	99.883	-10.495	6.049	653.471	1097.304	-1.964
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	99.883	-12.118	0.000	22.156	1266.779	-2.499
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	99.883	-10.495	-6.049	-609.158	1097.304	-2.365
1.2 Dead+1.0 Wind 315 deg+1.0 Ice+1.0 Temp	99.883	-8.569	-8.554	-870.657	896.276	-2.051
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	99.883	-6.059	-10.477	-1071.313	634.290	-1.598
Dead+Wind 0 deg - Service	51.524	0.000	-11.295	-1106.937	0.379	-0.411
Dead+Wind 30 deg - Service	51.524	5.660	-9.782	-957.504	-558.672	0.453
Dead+Wind 45 deg - Service	51.524	8.005	-7.987	-780.248	-790.238	0.854
Dead+Wind 60 deg - Service	51.524	9.804	-5.648	-549.244	-967.925	1.196
Dead+Wind 90 deg - Service	51.524	11.320	0.000	8.449	-1117.722	1.618
Dead+Wind 120 deg - Service	51.524	9.804	5.648	566.141	-967.925	1.607
Dead+Wind 135 deg - Service	51.524	8.005	7.987	797.145	-790.238	1.435
Dead+Wind 150 deg - Service	51.524	5.660	9.782	974.401	-558.672	1.165
Dead+Wind 180 deg - Service	51.524	0.000	11.295	1123.834	0.379	0.411
Dead+Wind 210 deg - Service	51.524	-5.660	9.782	974.401	559.429	-0.453
Dead+Wind 225 deg - Service	51.524	-8.005	7.987	797.145	790.996	-0.854
Dead+Wind 240 deg - Service	51.524	-9.804	5.648	566.142	968.683	-1.196
Dead+Wind 270 deg - Service	51.524	-11.320	0.000	8.449	1118.480	-1.618
Dead+Wind 300 deg - Service	51.524	-9.804	-5.648	-549.244	968.683	-1.607
Dead+Wind 315 deg - Service	51.524	-8.005	-7.987	-780.248	790.996	-1.435
Dead+Wind 330 deg - Service	51.524	-5.660	-9.782	-957.504	559.430	-1.165

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
1	0.000	-51.524	0.000	0.000	51.524	0.000	0.000%
2	0.000	-61.829	-57.236	0.000	61.829	57.236	0.000%
3	0.000	-46.372	-57.236	0.000	46.372	57.236	0.000%
4	28.681	-61.829	-49.568	-28.681	61.829	49.568	0.000%
5	28.681	-46.372	-49.568	-28.681	46.372	49.568	0.000%
6	40.561	-61.829	-40.472	-40.561	61.829	40.472	0.000%
7	40.561	-46.372	-40.472	-40.561	46.372	40.472	0.000%
8	49.677	-61.829	-28.618	-49.677	61.829	28.618	0.000%
9	49.677	-46.372	-28.618	-49.677	46.372	28.618	0.000%
10	57.362	-61.829	0.000	-57.362	61.829	0.000	0.000%
11	57.362	-46.372	0.000	-57.362	46.372	-0.000	0.000%
12	49.677	-61.829	28.618	-49.677	61.829	-28.618	0.000%
13	49.677	-46.372	28.618	-49.677	46.372	-28.618	0.000%
14	40.561	-61.829	40.472	-40.561	61.829	-40.472	0.000%
15	40.561	-46.372	40.472	-40.561	46.372	-40.472	0.000%
16	28.681	-61.829	49.568	-28.681	61.829	-49.568	0.000%
17	28.681	-46.372	49.568	-28.681	46.372	-49.568	0.000%
18	0.000	-61.829	57.236	0.000	61.829	-57.236	0.000%
19	0.000	-46.372	57.236	0.000	46.372	-57.236	0.000%
20	-28.681	-61.829	49.568	28.681	61.829	-49.568	0.000%
21	-28.681	-46.372	49.568	28.681	46.372	-49.568	0.000%

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
22	-40.561	-61.829	40.472	40.561	61.829	-40.472	0.000%
23	-40.561	-46.372	40.472	40.561	46.372	-40.472	0.000%
24	-49.677	-61.829	28.618	49.677	61.829	-28.618	0.000%
25	-49.677	-46.372	28.618	49.677	46.372	-28.618	0.000%
26	-57.362	-61.829	0.000	57.362	61.829	0.000	0.000%
27	-57.362	-46.372	0.000	57.362	46.372	-0.000	0.000%
28	-49.677	-61.829	-28.618	49.677	61.829	28.618	0.000%
29	-49.677	-46.372	-28.618	49.677	46.372	28.618	0.000%
30	-40.561	-61.829	-40.472	40.561	61.829	40.472	0.000%
31	-40.561	-46.372	-40.472	40.561	46.372	40.472	0.000%
32	-28.681	-61.829	-49.568	28.681	61.829	49.568	0.000%
33	-28.681	-46.372	-49.568	28.681	46.372	49.568	0.000%
34	0.000	-99.883	0.000	0.000	99.883	-0.000	0.000%
35	0.000	-99.883	-12.097	0.000	99.883	12.097	0.000%
36	6.059	-99.883	-10.477	-6.059	99.883	10.477	0.000%
37	8.569	-99.883	-8.554	-8.569	99.883	8.554	0.000%
38	10.495	-99.883	-6.049	-10.495	99.883	6.049	0.000%
39	12.118	-99.883	0.000	-12.118	99.883	-0.000	0.000%
40	10.495	-99.883	6.049	-10.495	99.883	-6.049	0.000%
41	8.569	-99.883	8.554	-8.569	99.883	-8.554	0.000%
42	6.059	-99.883	10.477	-6.059	99.883	-10.477	0.000%
43	0.000	-99.883	12.097	0.000	99.883	-12.097	0.000%
44	-6.059	-99.883	10.477	6.059	99.883	-10.477	0.000%
45	-8.569	-99.883	8.554	8.569	99.883	-8.554	0.000%
46	-10.495	-99.883	6.049	10.495	99.883	-6.049	0.000%
47	-12.118	-99.883	0.000	12.118	99.883	-0.000	0.000%
48	-10.495	-99.883	-6.049	10.495	99.883	6.049	0.000%
49	-8.569	-99.883	-8.554	8.569	99.883	8.554	0.000%
50	-6.059	-99.883	-10.477	6.059	99.883	10.477	0.000%
51	0.000	-51.524	-11.295	0.000	51.524	11.295	0.000%
52	5.660	-51.524	-9.782	-5.660	51.524	9.782	0.000%
53	8.005	-51.524	-7.987	-8.005	51.524	7.987	0.000%
54	9.804	-51.524	-5.648	-9.804	51.524	5.648	0.000%
55	11.320	-51.524	0.000	-11.320	51.524	0.000	0.000%
56	9.804	-51.524	5.648	-9.804	51.524	-5.648	0.000%
57	8.005	-51.524	7.987	-8.005	51.524	-7.987	0.000%
58	5.660	-51.524	9.782	-5.660	51.524	-9.782	0.000%
59	0.000	-51.524	11.295	0.000	51.524	-11.295	0.000%
60	-5.660	-51.524	9.782	5.660	51.524	-9.782	0.000%
61	-8.005	-51.524	7.987	8.005	51.524	-7.987	0.000%
62	-9.804	-51.524	5.648	9.804	51.524	-5.648	0.000%
63	-11.320	-51.524	0.000	11.320	51.524	0.000	0.000%
64	-9.804	-51.524	-5.648	9.804	51.524	5.648	0.000%
65	-8.005	-51.524	-7.987	8.005	51.524	7.987	0.000%
66	-5.660	-51.524	-9.782	5.660	51.524	9.782	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	0.00027556
3	Yes	4	0.00000001	0.00016252
4	Yes	5	0.00000001	0.00009038
5	Yes	5	0.00000001	0.00003893
6	Yes	5	0.00000001	0.00009791

7	Yes	5	0.00000001	0.00004161
8	Yes	5	0.00000001	0.00007877
9	Yes	5	0.00000001	0.00003366
10	Yes	5	0.00000001	0.00002415
11	Yes	4	0.00000001	0.00066428
12	Yes	5	0.00000001	0.00010254
13	Yes	5	0.00000001	0.00004431
14	Yes	5	0.00000001	0.00010111
15	Yes	5	0.00000001	0.00004288
16	Yes	5	0.00000001	0.00008068
17	Yes	5	0.00000001	0.00003430
18	Yes	4	0.00000001	0.00027770
19	Yes	4	0.00000001	0.00016344
20	Yes	5	0.00000001	0.00008465
21	Yes	5	0.00000001	0.00003610
22	Yes	5	0.00000001	0.00009963
23	Yes	5	0.00000001	0.00004213
24	Yes	5	0.00000001	0.00009875
25	Yes	5	0.00000001	0.00004253
26	Yes	5	0.00000001	0.00002415
27	Yes	4	0.00000001	0.00066445
28	Yes	5	0.00000001	0.00007718
29	Yes	5	0.00000001	0.00003295
30	Yes	5	0.00000001	0.00009950
31	Yes	5	0.00000001	0.00004238
32	Yes	5	0.00000001	0.00009650
33	Yes	5	0.00000001	0.00004177
34	Yes	4	0.00000001	0.00007031
35	Yes	5	0.00000001	0.00009130
36	Yes	5	0.00000001	0.00009773
37	Yes	5	0.00000001	0.00009994
38	Yes	5	0.00000001	0.00009842
39	Yes	5	0.00000001	0.00009605
40	Yes	5	0.00000001	0.00010519
41	Yes	5	0.00000001	0.00010693
42	Yes	5	0.00000001	0.00010461
43	Yes	5	0.00000001	0.00009878
44	Yes	5	0.00000001	0.00010499
45	Yes	5	0.00000001	0.00010722
46	Yes	5	0.00000001	0.00010545
47	Yes	5	0.00000001	0.00009664
48	Yes	5	0.00000001	0.00009912
49	Yes	5	0.00000001	0.00010070
50	Yes	5	0.00000001	0.00009852
51	Yes	4	0.00000001	0.00002677
52	Yes	4	0.00000001	0.00006501
53	Yes	4	0.00000001	0.00007094
54	Yes	4	0.00000001	0.00005640
55	Yes	4	0.00000001	0.00006114
56	Yes	4	0.00000001	0.00009532
57	Yes	4	0.00000001	0.00008405
58	Yes	4	0.00000001	0.00005912
59	Yes	4	0.00000001	0.00002770
60	Yes	4	0.00000001	0.00005752
61	Yes	4	0.00000001	0.00007542
62	Yes	4	0.00000001	0.00008548
63	Yes	4	0.00000001	0.00006123
64	Yes	4	0.00000001	0.00006196
65	Yes	4	0.00000001	0.00007996
66	Yes	4	0.00000001	0.00007958

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	150 - 130	10.989	59	0.663	0.004
L2	135 - 115	8.925	59	0.646	0.004
L3	115 - 95	6.357	59	0.559	0.003
L4	101 - 91	4.834	59	0.478	0.002
L5	91 - 51	3.871	59	0.433	0.002
L6	59 - 40	1.569	59	0.253	0.001
L7	40 - 19	0.708	59	0.167	0.000
L8	28 - 0	0.360	59	0.110	0.000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
153.000	4' x 3" DIA Omni	59	10.989	0.663	0.004	94982
150.000	Lightning Rod 3/4"x8'	59	10.989	0.663	0.004	94982
140.000	NNVV-65B-R4	59	9.608	0.655	0.004	47491
138.000	Pirod 12' T-Frame Sector Mount (1)	59	9.334	0.652	0.004	39384
130.000	7770.00	59	8.252	0.631	0.004	18635
128.000	Valmont 13' Low Profile Platform	59	7.988	0.624	0.004	16002
124.000	4' x 3" DIA Omni	59	7.467	0.607	0.003	12476
119.000	Pirod 6' Side Mount Standoff (1)	59	6.838	0.582	0.003	9787
108.000	X7C-FRO-660	59	5.567	0.517	0.002	10384

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	150 - 130	55.113	18	3.314	0.020
L2	135 - 115	44.797	18	3.229	0.020
L3	115 - 95	31.963	22	2.800	0.014
L4	101 - 91	24.339	24	2.399	0.010
L5	91 - 51	19.506	24	2.177	0.008
L6	59 - 40	7.923	24	1.275	0.003
L7	40 - 19	3.574	24	0.843	0.002
L8	28 - 0	1.821	24	0.553	0.001

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
153.000	4' x 3" DIA Omni	18	55.113	3.314	0.020	19018
150.000	Lightning Rod 3/4"x8'	18	55.113	3.314	0.020	19018
140.000	NNVV-65B-R4	18	48.209	3.274	0.020	9508

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
138.000	Pirod 12' T-Frame Sector Mount (1)	18	46.840	3.259	0.020	7886
130.000	7770.00	18	41.435	3.156	0.019	3763
128.000	Valmont 13' Low Profile Platform	18	40.111	3.119	0.018	3237
124.000	4' x 3" DIA Omni	18	37.510	3.035	0.017	2529
119.000	Pirod 6' Side Mount Standoff (1)	20	34.368	2.911	0.016	1987
108.000	X7C-FRO-660	22	28.012	2.592	0.012	2113

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	150 - 130 (1)	TP34.313x27.813x0.25	20.000	0.000	0.0	26.112	-7.416	1225.900	0.006
L2	130 - 115 (2)	TP36.688x32.188x0.25	20.000	0.000	0.0	29.332	-14.123	1305.960	0.011
L3	115 - 95 (3)	TP45.188x36.688x0.313	20.000	0.000	0.0	42.590	-19.543	1962.750	0.010
L4	95 - 91 (4)	TP45.813x42.013x0.313	10.000	0.000	0.0	45.784	-22.811	2039.500	0.011
L5	91 - 51 (5)	TP58.875x45.813x0.375	40.000	0.000	0.0	67.484	-32.361	2971.020	0.011
L6	51 - 40 (6)	TP61.688x55.513x0.375	19.000	0.000	0.0	74.035	-41.023	3097.120	0.013
L7	40 - 19 (7)	TP68.5x61.688x0.438	21.000	0.000	0.0	91.770	-46.037	4042.100	0.011
L8	19 - 0 (8)	TP73.813x64.705x0.438	28.000	0.000	0.0	103.367	-61.818	4258.160	0.015

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	150 - 130 (1)	TP34.313x27.813x0.25	144.803	810.297	0.179	0.000	810.297	0.000
L2	130 - 115 (2)	TP36.688x32.188x0.25	592.242	970.475	0.610	0.000	970.475	0.000
L3	115 - 95 (3)	TP45.188x36.688x0.313	1024.500	1693.333	0.605	0.000	1693.333	0.000
L4	95 - 91 (4)	TP45.813x42.013x0.313	1383.192	1892.508	0.731	0.000	1892.508	0.000
L5	91 - 51 (5)	TP58.875x45.813x0.375	2677.292	3386.808	0.791	0.000	3386.808	0.000
L6	51 - 40 (6)	TP61.688x55.513x0.375	3558.817	3875.550	0.918	0.000	3875.550	0.000
L7	40 - 19 (7)	TP68.5x61.688x0.438	4158.033	5370.833	0.774	0.000	5370.833	0.000
L8	19 - 0 (8)	TP73.813x64.705x0.438	5681.250	6377.691	0.891	0.000	6377.691	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	150 - 130 (1)	TP34.313x27.813x0.25	15.364	612.952	0.025	0.000	1647.325	0.000
L2	130 - 115 (2)	TP36.688x32.188x0.25	26.254	652.978	0.040	0.777	1972.392	0.000
L3	115 - 95 (3)	TP45.188x36.688x0.313	34.784	981.376	0.035	2.084	3442.150	0.001
L4	95 - 91 (4)	TP45.813x42.013x0.313	36.939	1019.750	0.036	2.083	3846.350	0.001

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 $\frac{T_u}{\phi T_n}$
L5	91 - 51 (5)	TP58.875x45.813x0.375	44.109	1485.510	0.030	4.368	6883.025	0.001
L6	51 - 40 (6)	TP61.688x55.513x0.375	48.634	1548.560	0.031	6.110	7874.717	0.001
L7	40 - 19 (7)	TP68.5x61.688x0.438	51.277	2021.050	0.025	6.109	10915.167	0.001
L8	19 - 0 (8)	TP73.813x64.705x0.438	57.343	2129.080	0.027	6.109	12958.167	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	150 - 130 (1)	0.006	0.179	0.000	0.025	0.000	0.185 ✔	1.000	4.8.2 ✔
L2	130 - 115 (2)	0.011	0.610	0.000	0.040	0.000	0.623 ✔	1.000	4.8.2 ✔
L3	115 - 95 (3)	0.010	0.605	0.000	0.035	0.001	0.616 ✔	1.000	4.8.2 ✔
L4	95 - 91 (4)	0.011	0.731	0.000	0.036	0.001	0.743 ✔	1.000	4.8.2 ✔
L5	91 - 51 (5)	0.011	0.791	0.000	0.030	0.001	0.802 ✔	1.000	4.8.2 ✔
L6	51 - 40 (6)	0.013	0.918	0.000	0.031	0.001	0.933 ✔	1.000	4.8.2 ✔
L7	40 - 19 (7)	0.011	0.774	0.000	0.025	0.001	0.786 ✔	1.000	4.8.2 ✔
L8	19 - 0 (8)	0.015	0.891	0.000	0.027	0.000	0.906 ✔	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	150 - 130	Pole	TP34.313x27.813x0.25	1	-7.416	1225.900	18.5	Pass
L2	130 - 115	Pole	TP36.688x32.188x0.25	2	-14.123	1305.960	62.3	Pass
L3	115 - 95	Pole	TP45.188x36.688x0.313	3	-19.543	1962.750	61.6	Pass
L4	95 - 91	Pole	TP45.813x42.013x0.313	4	-22.811	2039.500	74.3	Pass
L5	91 - 51	Pole	TP58.875x45.813x0.375	5	-32.361	2971.020	80.2	Pass
L6	51 - 40	Pole	TP61.688x55.513x0.375	6	-41.023	3097.120	93.3	Pass
L7	40 - 19	Pole	TP68.5x61.688x0.438	7	-46.037	4042.100	78.6	Pass
L8	19 - 0	Pole	TP73.813x64.705x0.438	8	-61.818	4258.160	90.6	Pass
							Summary	
						Pole (L6)	93.3	Pass
						RATING =	**93.3**	**Pass**

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Subject:	Anchor Bolt and Baseplate Analysis
Location:	150-FT Nudd Monopole Dayville, CT
Rev. 0: 7/6/21	Prepared by: T.J.L. Checked by: C.F.C. Job No. 21022.21

Anchor Bolt and Base Plate Analysis:

Input Data:

Tower Reactions:

Overturning Moment =	$M_u := 5681 \cdot ft \cdot kips$	(Input From tnxTower)
Shear Force =	$Shear := 57 \cdot kips$	(Input From tnxTower)
Axial Force =	$R_u := 62 \cdot kips$	(Input From tnxTower)

Anchor Bolt Data:

ASTMA687

Number of Anchor Bolts =	$N := 24$	(User Input)
Diameter of Bolt Circle =	$D_{BC} := 70.0 \cdot in$	(User Input)
Bolt "Column" Distance =	$l := 3.0 \cdot in$	(User Input)
Bolt Ultimate Strength =	$F_u := 125 \cdot ksi$	(User Input)
Bolt Yield Strength =	$F_y := 105 \cdot ksi$	(User Input)
Bolt Modulus =	$E := 29000 \cdot ksi$	(User Input)
Diameter of Anchor Bolts =	$D := 2.00 \cdot in$	(User Input)
Threads per Inch =	$n := 4.5$	(User Input)
Top of Concrete to Bot Leveling Nut =	$l_{ar} := 2 \cdot in$	(User Input)
Anchor Rod Force Correction Factor =	$n_c = 1$	Table 2-1 Addendum 3
	$\eta := 0.5$	For Ungrouted Base Plate per TIA-222-G Section 4.9.9
Nut Outside Diameter (Across Flats) =	$Nut_{OD} := 3.00in$	(User Input)

Stiffened Base Plate Data:

Use AST MA36 Mod 42

Plate Yield Strength =	$Fy_{bp} := 42 \cdot ksi$	(User Input)
Base Plate Thickness =	$t_{bp} := 2.00 \cdot in$	(User Input)
Base Plate Inside Diameter =	$D_{bpi} := 64.00 \cdot in$	(User Input)
Outer Pole Diameter =	$D_{pole} := 73.813 \cdot in$	(User Input)
Thickness of Monopole Shell at Base Plate =	$Wall_{thk} := 0.4375in$	(User Input)
Base Plate Outside Diameter =	$D_{bp} := D_{pole} - (Wall_{thk}) = 73.38 \cdot in$	(User Input)
Gussets Yield Strength =	$F_{yg} := 36ksi$	(User Input)
Gussets Per Bolt =	$n_g := 1$	(User Input)
Gusset Height =	$h_g := 20.0in$	(User Input)
Gusset Thickness =	$t_g := 0.75in$	(User Input)
Gusset Depth =	$t_{gl} := 3.5 \cdot in$	(User Input)

Anchor Bolt Analysis:

Gross Area of Bolt = $A_g := \frac{\pi}{4} \cdot D^2 = 3.142 \cdot in^2$

Net Area of Bolt = $A_n := \frac{\pi}{4} \cdot \left(D - \frac{0.9743 \cdot in}{n} \right)^2 = 2.498 \cdot in^2$

Tensile Root Diameter = $d_{rt} := D - \frac{0.9743 \cdot in}{n} = 1.783 \cdot in$

Plastic Section Modulus = $Z := \frac{d_{rt}^3}{6} = 0.945 \cdot in^3$

Maximum Anchor Rod Force = $P_u := \frac{n_c \cdot \pi \cdot M_u}{N \cdot D_{BC}} + \frac{R_u}{N} = 130.1 \cdot kips$

Maximum Shear Force = $V_u := \frac{Shear}{N} = 2.4 \cdot kips$

Design Tensile Strength = $\Phi R_{nt} := 0.8 \cdot F_u \cdot A_n = 249.822 \cdot k$

Bolt % of Capacity = $\frac{\left(P_u + \frac{V_u}{\eta} \right)}{\Phi R_{nt}} \cdot 100 = 54$

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

Internally Located NUDD Base Plate Assembly w/ Gussets
Analayis Based on Theory Developed For Monopole Compression Ring Plate
Required Thickness Calculations per Process Equipment Design by Brownell
And Young Chapter 10 ' Design of Vertical Vessels:

Anchor Bolt Forces = $C_i := \frac{M_u \cdot d_i}{I_p} + \frac{R_u}{N}$

$C_1 = 44.6 \cdot kips$ $C_7 = 159.4 \cdot kips$

$C_2 = 83.7 \cdot kips$ $C_8 = 143.2 \cdot kips$

$C_3 = 117.4 \cdot kips$ $C_9 = 117.4 \cdot kips$

$C_4 = 143.2 \cdot kips$ $C_{10} = 83.7 \cdot kips$

$C_5 = 159.4 \cdot kips$ $C_{11} = 44.6 \cdot kips$

$C_6 = 164.9 \cdot kips$ etc.

Outer Pole Radius = $R_{pole} := \frac{D_{pole}}{2} = 36.91 \cdot in$

Angle Between Bolts = $\alpha := \left(\frac{2 \cdot \pi}{N}\right) = 15 \cdot deg$

Input Data:

Maximum Bolt Force (P) = $P := (C_6) = 164.9 \cdot kips$ (User Input)

Poissons ratio (μ) = $\mu := 0.30$ (User Input)

Radial Distance From Face of Monopole Shell to Bolt Circle in inches (a) = $a := \frac{(|D_{BC} - D_{pole}| - Wall_{thk})}{2} = 1.688 \cdot in$

Radial Distance From Face of Monopole Shell to Edge of Base Plate in inches (l) = $l := \frac{(|D_{bpi} - D_{bp}|)}{2} = 4.69 \cdot in$

Gusset Spacing in inches (b) = $b := \alpha \cdot \left(\frac{D_{BC}}{2}\right) = 9.16 \cdot in$

$b := 5.715in$

Radius of Action of Concentrated Load, (One Half Distance Across Flats of Anchor Bolt Nut (e) = $e := (0.5 \cdot Nut_{OD}) = 1.5 \cdot in$

Design Bending Stress = $f_b := 0.9 \cdot Fy_{bp} = 37.8 \cdot ksi$

Plate Thickness Provided (t) = $t := t_{bp} = 2 \cdot in$

Gusset L/b Ratio per *Theory of Plates and Shells* byTimenshenko $\frac{b}{l} = 1.219$

If b/l ratio >1 then My controls, otherwise Mx and My are equal. Use My equation 10.38 for simplicity.

Note: If b/l if <1 invert b/l and flip axes 90 degrees

γ1,γ2 constants from Table 10.6

$\gamma 1 := 0.5113$ (User Input)

$\gamma 2 := 0.1290$ (User Input)

$$My := \left[\left(\frac{P}{4\cdot\pi}\right)\cdot\left[(1+\mu)\cdot\ln\left[\frac{\left(2\cdot l\cdot\sin\left(\pi\cdot\frac{a}{l}\right)\right)}{\pi\cdot e}\right]+1\right]-\left(\frac{\gamma 1\cdot P}{4\cdot\pi}\right)\right]\cdot in \qquad \text{Eq} - 10.38$$

$$Mx := \left[\left(\frac{P}{4\cdot\pi}\right)\cdot\left[(1+\mu)\cdot\ln\left[\frac{\left(2\cdot l\cdot\sin\left(\pi\cdot\frac{a}{l}\right)\right)}{\pi\cdot e}\right]+1\right]-(1-\mu-\gamma 2)\cdot\left(\frac{P}{4\cdot\pi}\right)\right]\cdot in \qquad \text{Eq} - 10.39$$

Maximum Moments in Plate =

$Mx = 15659\cdot in\cdot lb$

$My = 16442.39\cdot in\cdot lb$

Minimum Thicknesss Required (t) = $t_{reqd} := \left(\frac{6\cdot My}{f_b\cdot in}\right)^{0.5} = 1.616\cdot in$

Base Plate Ratio = $ThicknessRatio := \frac{t_{reqd}}{t} = 0.808$

Condition 3 = $Condition3 := if\left(\frac{t_{reqd}}{t} \le 1.0, "Okay", "No Good"\right)$

$Condition3 = "Okay"$

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Subject:	CAISSON FOUNDATION
Location:	150-ft Nudd Monopole Dayville (Killingly), CT
Rev. 0: 7/6/21	Prepared by: TJL Checked by: C.F.C. Job No. 21022.21

Caisson Foundation:

Input Data:

Shear Force =	$S := 57k$	*USER INPUT-FROM tnxTower*
Overturning Moment =	$M := 5681ft \cdot k$	*USER INPUT-FROM tnxTower*
Applied Axial Load =	$A1 := 62k$	*USER INPUT-FROM tnxTower*
Bending Moment =	$Mu := 5883ft \cdot k$	*USER INPUT--FROM LPILE*
Moment Capacity =	$Mn := 10122ft \cdot k$	*USER INPUT--FROM LPILE*
Foundation Diameter =	$d := 7.5ft$	*USER INPUT*
Overall Length of Caisson =	$L_c := 27.75ft$	*USER INPUT*
Depth From Top of Caisson to Grade =	$L_{pag} := 0.25ft$	*USER INPUT*
Number of Rebar =	$n := 66$	*USER INPUT*
Area of Rebar =	$Ar := 0.785in^2$	*USER INPUT*
Rebar Yield Strength =	$fy := 60ksi$	*USER INPUT*
Concrete Comp Strength =	$f'c := 4ksi$	*USER INPUT*

Check Moment Capacity:

Factor of Safety = $FS := \frac{0.9Mn}{Mu} = 1.5$

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

$FOSCheck := if(FS \geq FS_{reqd}, "OK", "NO GOOD")$

FOSCheck = "OK"

This program is licensed to:

TJL
Centek Engineering

Files Used for Analysis

Path to file locations: J:\Jobs\2102200.WI\21_CT11396B\05_Structural\Tower Analysis\Backup Documentation\LPile\
Name of input data file: Killingly Center Drilled Foundation.lpd
Name of output file: Killingly Center Drilled Foundation.lpo
Name of plot output file: Killingly Center Drilled Foundation.lpp
Name of runtime file: Killingly Center Drilled Foundation.lpr

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Time and Date of Analysis

Date: July 6, 2021 Time: 7:49:46

Problem Title

20148.00 - CT11396B

Program Options

Units Used in Computations - US Customary Units: Inches, Pounds

Basic Program Options:

Analysis Type 3:
- Computation of Nonlinear Bending Stiffness and Ultimate Bending Moment
  Capacity with Pile Response Computed Using Nonlinear EI

Computation Options:
- Only internally-generated p-y curves used in analysis
- Analysis does not use p-y multipliers (individual pile or shaft action only)
- Analysis assumes no shear resistance at pile tip
- Analysis for fixed-length pile or shaft only
- No computation of foundation stiffness matrix elements
- Output summary table of values for pile-head deflection, maximum
bending moment, and shear force only
- Analysis assumes no soil movements acting on pile
- No additional p-y curves to be computed at user-specified depths

Solution Control Parameters:
- Number of pile increments = 100
- Maximum number of iterations allowed = 100
- Deflection tolerance for convergence = 1.0000E-05 in
- Maximum allowable deflection = 1.0000E+02 in

Printing Options:
- Only summary tables of pile-head deflection, maximum bending moment,
  and maximum shear force are to be printed in output file.

Pile Structural Properties and Geometry

Pile Length = 333.00 in

Depth of ground surface below top of pile = 3.00 in

Slope angle of ground surface = 0.00 deg.

Structural properties of pile defined using 2 points

Point No.	Point Depth in	Pile Diameter in	Moment of Inertia in**4	Pile Area Sq.in	Modulus of Elasticity lbs/Sq.in
1	0.0000	90.00000000	3220623.	6361.7000	3604996.
2	333.0000	90.00000000	3220623.	6361.7000	3604996.

Please note that because this analysis makes computations of ultimate
moment capacity and pile response using nonlinear bending stiffness
that the above values of moment of inertia and modulus of are not used
for any computations other than total stress due to combined axial
loading and bending.

Soil and Rock Layering Information

The soil profile is modelled using 3 layers

Layer 1 is sand, p-y criteria by Reese et al., 1974
Distance from top of pile to top of layer   =   3.000 in
Distance from top of pile to bottom of layer =   90.000 in
p-y subgrade modulus k for top of soil layer =   25.000 lbs/in**3
p-y subgrade modulus k for bottom of layer   =   25.000 lbs/in**3

Layer 2 is sand, p-y criteria by Reese et al., 1974
Distance from top of pile to top of layer   =   90.000 in
Distance from top of pile to bottom of layer =   180.000 in
p-y subgrade modulus k for top of soil layer =   90.000 lbs/in**3
p-y subgrade modulus k for bottom of layer   =   90.000 lbs/in**3

Layer 3 is sand, p-y criteria by Reese et al., 1974
Distance from top of pile to top of layer   =   180.000 in
Distance from top of pile to bottom of layer =   333.000 in
p-y subgrade modulus k for top of soil layer =   60.000 lbs/in**3
p-y subgrade modulus k for bottom of layer   =   60.000 lbs/in**3

(Depth of lowest layer extends   0.00 in below pile tip)

Effective Unit Weight of Soil vs. Depth

Effective unit weight of soil with depth defined using 6 points

Point No.	Depth X in	Eff. Unit Weight lbs/in**3
1	3.00	0.05800
2	90.00	0.05800
3	90.00	0.06100
4	180.00	0.06100
5	180.00	0.02500
6	333.00	0.02500

Shear Strength of Soils

Shear strength parameters with depth defined using 6 points

Point No.	Depth X in	Cohesion c lbs/in**2	Angle of Friction Deg.	E50 or k_rm	RQD %
1	3.000	0.00000	30.00	------	------
2	90.000	0.00000	30.00	------	------
3	90.000	0.00000	30.00	------	------
4	180.000	0.00000	30.00	------	------
5	180.000	0.00000	33.00	------	------
6	333.000	0.00000	33.00	------	------

Notes:

(1) Cohesion = uniaxial compressive strength for rock materials.
(2) Values of E50 are reported for clay strata.
(3) Default values will be generated for E50 when input values are 0.
(4) RQD and k_rm are reported only for weak rock strata.

Loading Type

Static loading criteria was used for computation of p-y curves.

Pile-head Loading and Pile-head Fixity Conditions

Number of loads specified = 2

Load Case Number 1

Pile-head boundary conditions are Shear and Moment (BC Type 1)
Shear force at pile head = 57000.000 lbs
Bending moment at pile head = 68172000.000 in-lbs
Axial load at pile head = 62000.000 lbs

Non-zero moment at pile head for this load case indicates the pile-head may rotate under the applied pile-head loading, but is not a free-head (zero moment) condition.

Load Case Number 2

Pile-head boundary conditions are Shear and Moment (BC Type 1)
Shear force at pile head = 20000.000 lbs

Bending moment at pile head = 24120000.000 in-lbs
Axial load at pile head = 62000.000 lbs

Non-zero moment at pile head for this load case indicates the pile-head may rotate under the applied pile-head loading, but is not a free-head (zero moment) condition.

Computations of Nominal Moment Capacity and Nonlinear Bending Stiffness

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Number of sections = 1

Pile Section No. 1

The sectional shape is a circular drilled shaft (bored pile).

Outside Diameter = 90.0000 in

Material Properties:

Compressive Strength of Concrete	= 4.000	kip/in**2
Yield Stress of Reinforcement	= 60.	kip/in**2
Modulus of Elasticity of Reinforcement	= 29000.	kip/in**2
Number of Reinforcing Bars	= 66	
Area of Single Bar	= 0.79000	in**2
Number of Rows of Reinforcing Bars	= 33	
Area of Steel	= 52.140	in**2
Area of Shaft	= 6361.725	in**2
Percentage of Steel Reinforcement	= 0.820	percent
Cover Thickness (edge to bar center)	= 3.000	in

Unfactored Axial Squash Load Capacity = 24580.99 kip

Distribution and Area of Steel Reinforcement

Row Number	Area of Reinforcement in**2	Distance to Centroidal Axis in
1	1.580	41.952
2	1.580	41.573
3	1.580	40.816
4	1.580	39.690
5	1.580	38.205
6	1.580	36.373
7	1.580	34.212

8	1.580	31.741
9	1.580	28.983
10	1.580	25.963
11	1.580	22.707
12	1.580	19.246
13	1.580	15.610
14	1.580	11.833
15	1.580	7.949
16	1.580	3.992
17	1.580	0.000
18	1.580	-3.992
19	1.580	-7.949
20	1.580	-11.833
21	1.580	-15.610
22	1.580	-19.246
23	1.580	-22.707
24	1.580	-25.963
25	1.580	-28.983
26	1.580	-31.741
27	1.580	-34.212
28	1.580	-36.373
29	1.580	-38.205
30	1.580	-39.690
31	1.580	-40.816
32	1.580	-41.573
33	1.580	-41.952

Axial Thrust Force = 50000.00 lbs

Bending Moment in-lbs	Bending Stiffness lb-in2	Bending Curvature rad/in	Maximum Strain in/in	Neutral Axis Position inches	Max. Concrete Stress psi	Max. Steel Stress psi
8134337.	1.301494E+13	6.250000E-07	0.00003027	48.42922434	107.50597	822.54245
16194222.	1.295538E+13	0.00000125	0.00005850	46.79859951	206.10465	1585.97476
24180272.	1.289615E+13	0.00000188	0.00008677	46.27568677	303.33870	2350.52875
32090169.	1.283607E+13	0.00000250	0.00011500	45.99866554	398.93676	3113.95430
32090169.	1.026885E+13	0.00000313	0.00007565	24.20889035	261.37101	5686.13312
32090169.	8.557378E+12	0.00000375	0.00008941	23.84272859	307.63060	6863.17984
32090169.	7.334896E+12	0.00000438	0.00010296	23.53470907	352.84676	

```
 8046.12312
   32090169.  6.418034E+12    0.00000500    0.00011653   23.30686614     397.78411
 9228.60651
   32090169.  5.704919E+12    0.00000563    0.00013012   23.13249305     442.44179
10410.62693
   32090169.  5.134427E+12    0.00000625    0.00014372   22.99556360     486.81889
11592.18172
   32090169.  4.667661E+12    0.00000688    0.00015734   22.88588002     530.91449
12773.26805
   32090169.  4.278689E+12    0.00000750    0.00017097   22.79664829     574.72780
13953.88214
   32090169.  3.949559E+12    0.00000813    0.00018463   22.72315577     618.25775
15134.02233
   32090169.  3.667448E+12    0.00000875    0.00019829   22.66204700     661.50358
16313.68424
   32090169.  3.422951E+12    0.00000938    0.00021198   22.61085704     704.46438
17492.86467
   32090169.  3.209017E+12    0.00001000    0.00022568   22.56773248     747.13907
18671.56177
   32090169.  3.020251E+12    0.00001063    0.00023939   22.53126249     789.52678
19849.77170
   32090169.  2.852459E+12    0.00001125    0.00025313   22.50035003     831.62664
21027.49052
   32675293.  2.751604E+12    0.00001188    0.00026719   22.49999866     874.40074
22195.80544
   34351972.  2.748158E+12    0.00001250    0.00028125   22.49999866     916.82793
23364.00573
   36004208.  2.743178E+12    0.00001313    0.00029515   22.48759344     958.39400
24536.92775
   37642656.  2.737648E+12    0.00001375    0.00030897   22.47062579     999.37016
25712.11873
   39279364.  2.732477E+12    0.00001438    0.00032281   22.45645568    1040.05715
26886.75856
   40914316.  2.727621E+12    0.00001500    0.00033667   22.44473979    1080.45376
28060.84448
   42547510.  2.723041E+12    0.00001563    0.00035055   22.43519649    1120.55911
29234.37064
   44178925.  2.718703E+12    0.00001625    0.00036445   22.42757902    1160.37188
30407.33520
   45808553.  2.714581E+12    0.00001688    0.00037837   22.42168352    1199.89104
31579.73320
   47436388.  2.710651E+12    0.00001750    0.00039230   22.41733566    1239.11558
32751.55949
   49062410.  2.706892E+12    0.00001813    0.00040626   22.41437986    1278.04419
33922.81168
   50686620.  2.703286E+12    0.00001875    0.00042024   22.41269007    1316.67600
35093.48263
   52308998.  2.699819E+12    0.00001938    0.00043424   22.41214827    1355.00969
36263.56981
   53929536.  2.696477E+12    0.00002000    0.00044825   22.41265520    1393.04414
37433.06836
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   55548220.  2.693247E+12    0.00002063    0.00046229   22.41412237    1430.77812
38601.97420
   57165042.  2.690120E+12    0.00002125    0.00047635   22.41647467    1468.21059
39770.28139
   58779989.  2.687085E+12    0.00002188    0.00049043   22.41964236    1505.34027
40937.98605
   60393046.  2.684135E+12    0.00002250    0.00050453   22.42356375    1542.16588
42105.08408
   62004208.  2.681263E+12    0.00002313    0.00051865   22.42818788    1578.68640
43271.56870
   63613456.  2.678461E+12    0.00002375    0.00053279   22.43346378    1614.90041
44437.43677
   65220779.  2.675724E+12    0.00002438    0.00054696   22.43934855    1650.80668
45602.68321
   68429600.  2.670423E+12    0.00002563    0.00057535   22.45279446    1721.69098
47931.29036
   71630579.  2.665324E+12    0.00002688    0.00060383   22.46826276    1791.32922
50257.34647
   74823594.  2.660394E+12    0.00002813    0.00063241   22.48553082    1859.71049
52580.81321
   77994152.  2.655120E+12    0.00002938    0.00066094   22.49999866    1926.51307
54905.41345
   81101994.  2.648228E+12    0.00003063    0.00068906   22.49999866    1990.88227
57241.81403
   84192607.  2.641337E+12    0.00003188    0.00071719   22.49999866    2053.81391
59578.21460
   86984218.  2.625939E+12    0.00003313    0.00074531   22.49999866    2115.30800
60000.00000
   89269238.  2.596923E+12    0.00003438    0.00077206   22.46005252    2172.36574
60000.00000
   91149678.  2.558587E+12    0.00003563    0.00079694   22.37011805    2224.10874
60000.00000
   92815535.  2.517031E+12    0.00003688    0.00082111   22.26726338    2273.27007
60000.00000
   94323024.  2.474047E+12    0.00003813    0.00084475   22.15741619    2320.30866
60000.00000
   95664679.  2.429579E+12    0.00003938    0.00086782   22.03982010    2365.18156
60000.00000
   96884588.  2.384851E+12    0.00004063    0.00089045   21.91868886    2408.24277
60000.00000
   98040024.  2.341254E+12    0.00004188    0.00091287   21.79983750    2449.99034
60000.00000
   99053881.  2.296902E+12    0.00004313    0.00093473   21.67486534    2489.78479
60000.00000
1.000396E+08  2.254413E+12    0.00004438    0.00095652   21.55534878    2528.59837
60000.00000
1.009244E+08  2.212041E+12    0.00004563    0.00097789   21.43319830    2565.81175
60000.00000
1.017574E+08  2.170825E+12    0.00004688    0.00099907   21.31345376    2601.87378
60000.00000
1.025824E+08  2.131582E+12    0.00004813    0.00102026   21.20012239    2637.15498
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60000.00000
1.032801E+08 2.091749E+12 0.00004938 0.00104085 21.08046904 2670.63602
60000.00000
1.041700E+08 2.057678E+12 0.00005063 0.00106313 21.00000009 2706.13599
60000.00000
1.047281E+08 2.018855E+12 0.00005188 0.00108566 20.92836097 2741.16161
60000.00000
1.053164E+08 1.982426E+12 0.00005313 0.00110528 20.80536023 2770.73933
60000.00000
1.058810E+08 1.947236E+12 0.00005438 0.00112481 20.68616554 2799.48413
60000.00000
1.064438E+08 1.913597E+12 0.00005563 0.00114437 20.57291731 2827.60587
60000.00000
1.070048E+08 1.881404E+12 0.00005688 0.00116396 20.46522930 2855.10149
60000.00000
1.074660E+08 1.848877E+12 0.00005813 0.00118292 20.35135075 2881.02700
60000.00000
1.079244E+08 1.817674E+12 0.00005938 0.00120191 20.24265960 2906.35293
60000.00000
1.083812E+08 1.787731E+12 0.00006063 0.00122092 20.13895735 2931.08685
60000.00000
1.088364E+08 1.758972E+12 0.00006188 0.00123997 20.03994897 2955.22611
60000.00000
1.092646E+08 1.730924E+12 0.00006313 0.00125886 19.94232729 2978.52269
60000.00000
1.096334E+08 1.703043E+12 0.00006438 0.00127734 19.84218702 3000.68657
60000.00000
1.100008E+08 1.676202E+12 0.00006563 0.00129585 19.74630877 3022.28741
60000.00000
1.103666E+08 1.650342E+12 0.00006688 0.00131439 19.65445384 3043.32223
60000.00000
1.107311E+08 1.625410E+12 0.00006813 0.00133296 19.56640497 3063.78835
60000.00000
1.107311E+08 1.596123E+12 0.00006938 0.00135281 19.49999884 3085.06960
60000.00000
1.115165E+08 1.578994E+12 0.00007063 0.00137599 19.48309556 3109.20760
60000.00000
1.117969E+08 1.555436E+12 0.00007188 0.00139338 19.38608810 3126.43330
60000.00000
1.120762E+08 1.532666E+12 0.00007313 0.00141078 19.29276332 3143.15988
60000.00000
1.123543E+08 1.510646E+12 0.00007438 0.00142822 19.20293882 3159.38498
60000.00000
1.129069E+08 1.468707E+12 0.00007688 0.00146317 19.03311476 3190.32087
60000.00000
1.134478E+08 1.429264E+12 0.00007938 0.00149816 18.87443259 3219.15849
60000.00000
1.138784E+08 1.390881E+12 0.00008188 0.00153209 18.71251032 3245.04287
60000.00000
1.143047E+08 1.354722E+12 0.00008438 0.00156612 18.56141612 3269.00329
60000.00000

1.147265E+08 1.320593E+12 0.00008688 0.00160026 18.42022732 3291.02091
60000.00000
1.151439E+08 1.288323E+12 0.00008938 0.00163450 18.28812853 3311.07679
60000.00000
1.155188E+08 1.257347E+12 0.00009188 0.00166836 18.15900698 3328.89156
60000.00000
1.158404E+08 1.227448E+12 0.00009438 0.00170168 18.03105757 3344.46864
60000.00000
1.169061E+08 1.206773E+12 0.00009688 0.00174375 18.00000027 3361.57814
60000.00000
1.169061E+08 1.176414E+12 0.00009938 0.00177749 17.88671449 3372.91010
60000.00000
1.169061E+08 1.147545E+12 0.00010188 0.00180964 17.76332483 3381.84545
60000.00000
1.171459E+08 1.122356E+12 0.00010438 0.00184189 17.64681771 3389.01958
60000.00000
1.174114E+08 1.098587E+12 0.00010688 0.00187390 17.53355339 3394.36467
60000.00000
1.176243E+08 1.075422E+12 0.00010938 0.00190512 17.41827741 3397.87246
60000.00000
1.178338E+08 1.053263E+12 0.00011188 0.00193645 17.30901495 3399.70809
60000.00000
1.180367E+08 1.032015E+12 0.00011438 0.00196787 17.20538512 3396.77233
60000.00000
1.182326E+08 1.011616E+12 0.00011688 0.00199938 17.10703656 3388.93948
60000.00000
1.184270E+08 9.920584E+11 0.00011938 0.00203100 17.01364741 3388.77124
60000.00000
1.186197E+08 9.732896E+11 0.00012188 0.00206272 16.92492262 3393.56279
60000.00000
1.188107E+08 9.552621E+11 0.00012438 0.00209455 16.84059665 3397.04103
60000.00000
1.189881E+08 9.378372E+11 0.00012688 0.00212621 16.75827429 3399.17486
60000.00000
1.191276E+08 9.207933E+11 0.00012938 0.00215714 16.67355135 3399.98589
60000.00000
1.192634E+08 9.043672E+11 0.00013188 0.00218828 16.59359470 3394.26825
60000.00000
1.193978E+08 8.885419E+11 0.00013438 0.00221952 16.51733950 3387.50072
60000.00000
1.193978E+08 8.723128E+11 0.00013688 0.00225844 16.49999902 3384.87575
60000.00000
1.197216E+08 8.589889E+11 0.00013938 0.00229969 16.49999902 3391.61895
60000.00000
1.198997E+08 8.451078E+11 0.00014188 0.00233063 16.42735139 3395.06083
60000.00000
1.200191E+08 8.313011E+11 0.00014438 0.00236062 16.35059461 3397.50465
60000.00000
1.201377E+08 8.179591E+11 0.00014688 0.00239068 16.27697602 3399.12672
60000.00000
1.202555E+08 8.050580E+11 0.00014938 0.00242082 16.20634004 3399.91774

60000.00000
1.203712E+08 7.925673E+11 0.00015188 0.00245114 16.13918021 3396.89861
60000.00000
1.204851E+08 7.804706E+11 0.00015438 0.00248159 16.07507542 3391.32948
60000.00000
1.205750E+08 7.686056E+11 0.00015688 0.00251125 16.00796387 3385.96968
60000.00000
1.206537E+08 7.570429E+11 0.00015938 0.00254057 15.94085231 3380.69854
60000.00000
1.207289E+08 7.458154E+11 0.00016188 0.00257017 15.87752268 3378.25497
60000.00000
1.207977E+08 7.348908E+11 0.00016438 0.00260025 15.81899151 3382.90458
60000.00000
1.208660E+08 7.242909E+11 0.00016688 0.00263038 15.76254979 3387.00817
60000.00000
1.209294E+08 7.139740E+11 0.00016938 0.00266090 15.71012601 3390.62567
60000.00000
1.209877E+08 7.039287E+11 0.00017188 0.00269182 15.66149220 3393.71521
60000.00000
1.210456E+08 6.941683E+11 0.00017438 0.00272280 15.61462328 3396.19701
60000.00000
1.211597E+08 6.754546E+11 0.00017938 0.00278496 15.52590385 3399.31058
60000.00000
1.212675E+08 6.577220E+11 0.00018438 0.00284773 15.44532493 3397.38578
60000.00000
1.213561E+08 6.408245E+11 0.00018938 0.00291219 15.37789151 3387.29047
60000.00000
1.214434E+08 6.247892E+11 0.00019438 0.00297685 15.31496152 3377.14204
60000.00000
1.215149E+08 6.094791E+11 0.00019938 0.00304086 15.25196448 3370.29117
60000.00000
1.215615E+08 5.947963E+11 0.00020438 0.00310367 15.18615380 3379.34855
60000.00000
1.216070E+08 5.808096E+11 0.00020938 0.00316667 15.12438253 3386.80610
60000.00000
1.216432E+08 5.674320E+11 0.00021438 0.00323070 15.07030651 3392.77406
60000.00000
1.216730E+08 5.546348E+11 0.00021938 0.00329547 15.02209112 3397.03937
60000.00000
1.218982E+08 5.432790E+11 0.00022438 0.00336563 15.00000045 3399.65732
60000.00000
1.222746E+08 5.330773E+11 0.00022938 0.00344063 15.00000045 3394.06154
60000.00000
1.226234E+08 5.231930E+11 0.00023438 0.00351563 15.00000045 3383.16202
60000.00000
1.229589E+08 5.136665E+11 0.00023938 0.00359063 15.00000045 3372.26250
60000.00000
1.232813E+08 5.044758E+11 0.00024438 0.00366563 15.00000045 3361.36299
60000.00000
1.235904E+08 4.956008E+11 0.00024938 0.00374063 15.00000045 3366.14527
60000.00000

```
  1.238548E+08  4.868984E+11    0.00025438    0.00381563   15.00000045    3377.28498
  60000.00000

Unfactored (Nominal) Moment Capacity at Concrete Strain of 0.003 =  121469.26200
in-kip




------------------------------------------------------------------------------
             Computed Values of Load Distribution and Deflection
                 for Lateral Loading for Load Case Number  1
------------------------------------------------------------------------------

Pile-head boundary conditions are Shear and Moment (Pile-head Condition Type 1)
Specified shear force at pile head  =       57000.000 lbs
Specified moment at pile head       =    68172000.000 in-lbs
Specified axial load at pile head   =       62000.000 lbs


Output Verification:

Computed forces and moments are within specified convergence limits.



------------------------------------------------------------------------------
             Computed Values of Load Distribution and Deflection
                 for Lateral Loading for Load Case Number  2
------------------------------------------------------------------------------

Pile-head boundary conditions are Shear and Moment (Pile-head Condition Type 1)
Specified shear force at pile head  =       20000.000 lbs
Specified moment at pile head       =    24120000.000 in-lbs
Specified axial load at pile head   =       62000.000 lbs


Output Verification:

Computed forces and moments are within specified convergence limits.




------------------------------------------------------------------------------
                           Summary of Pile Response(s)
------------------------------------------------------------------------------

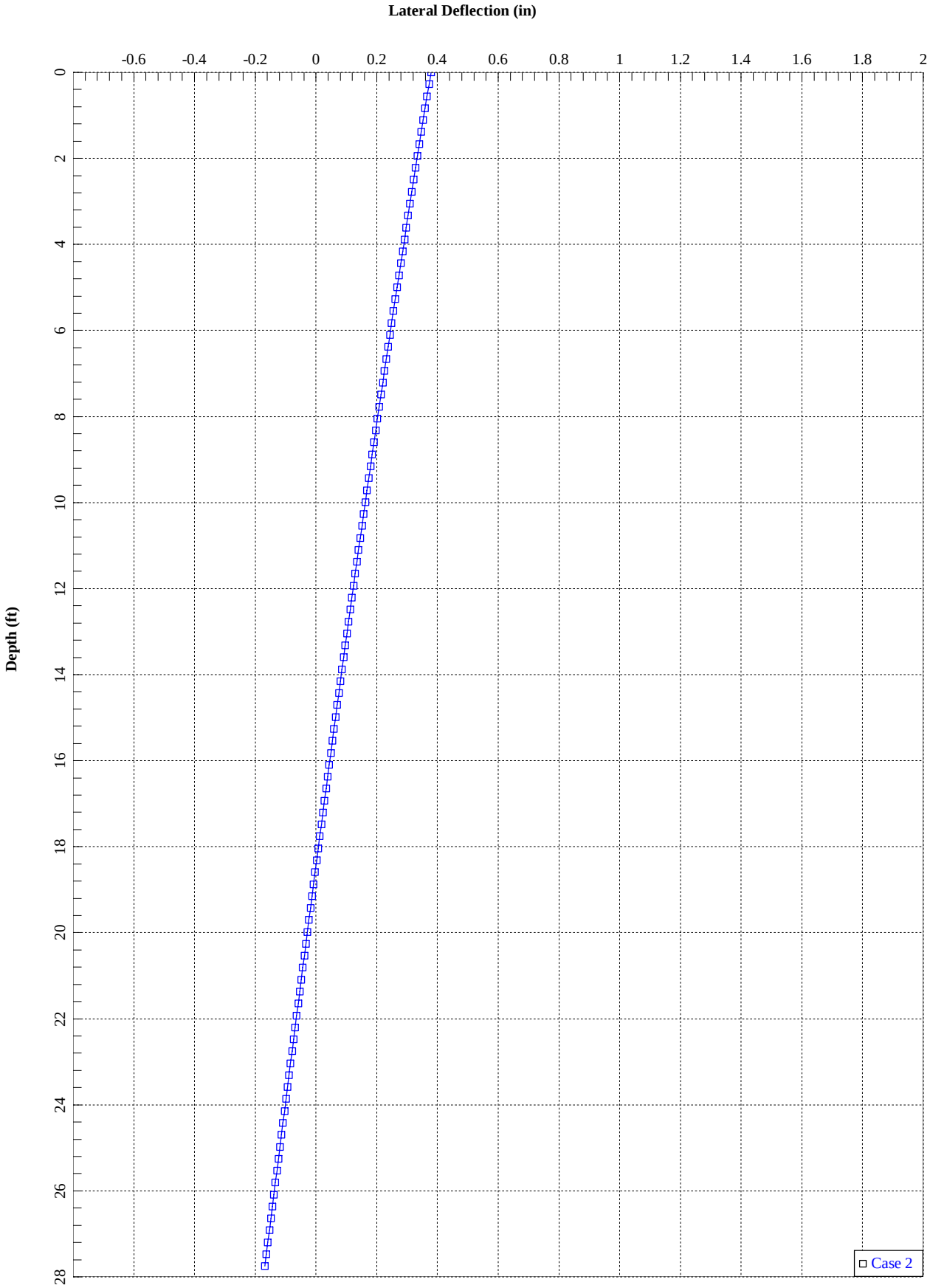
Definition of Symbols for Pile-Head Loading Conditions:

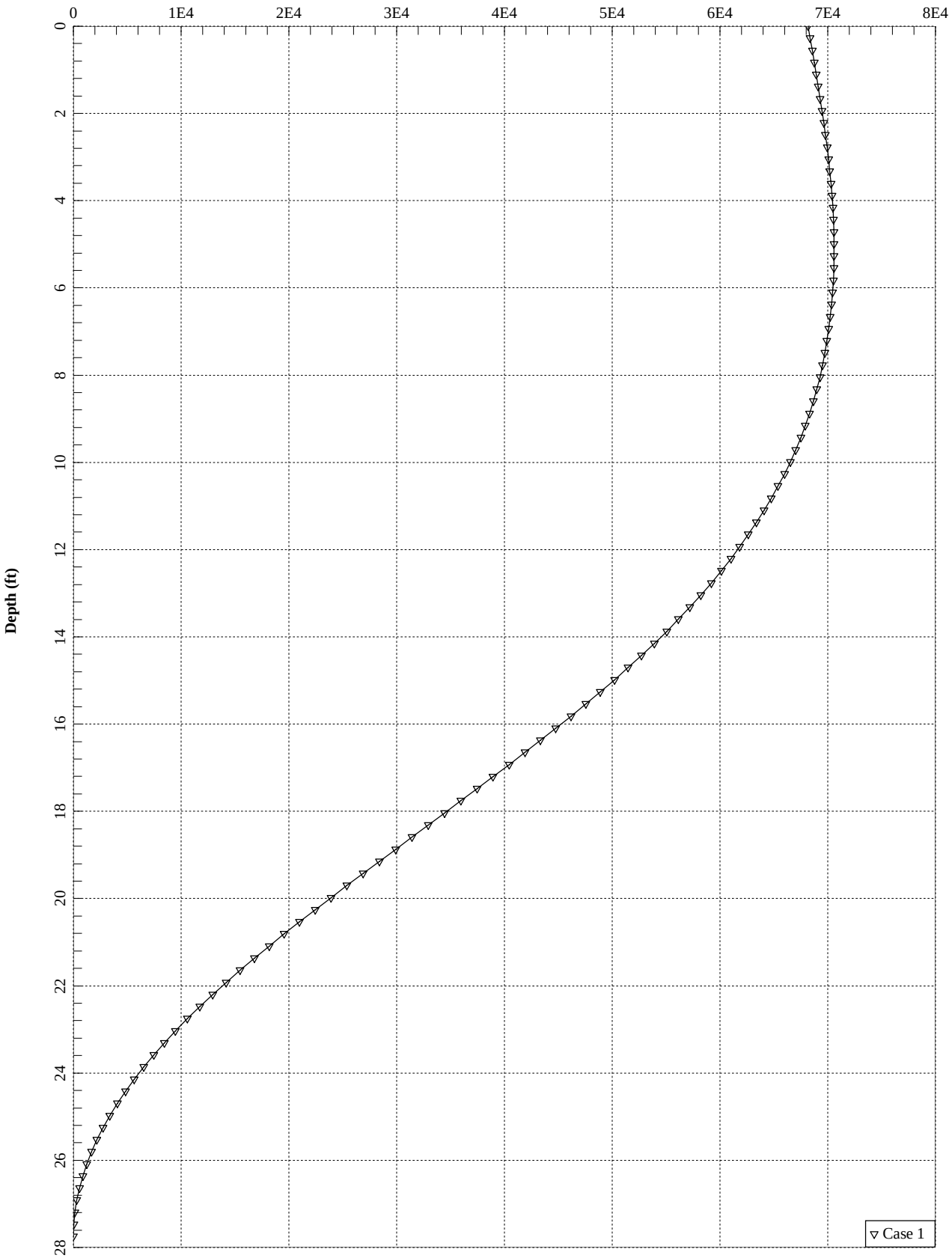
Type 1 = Shear and Moment,          y = pile-head displacment in
```

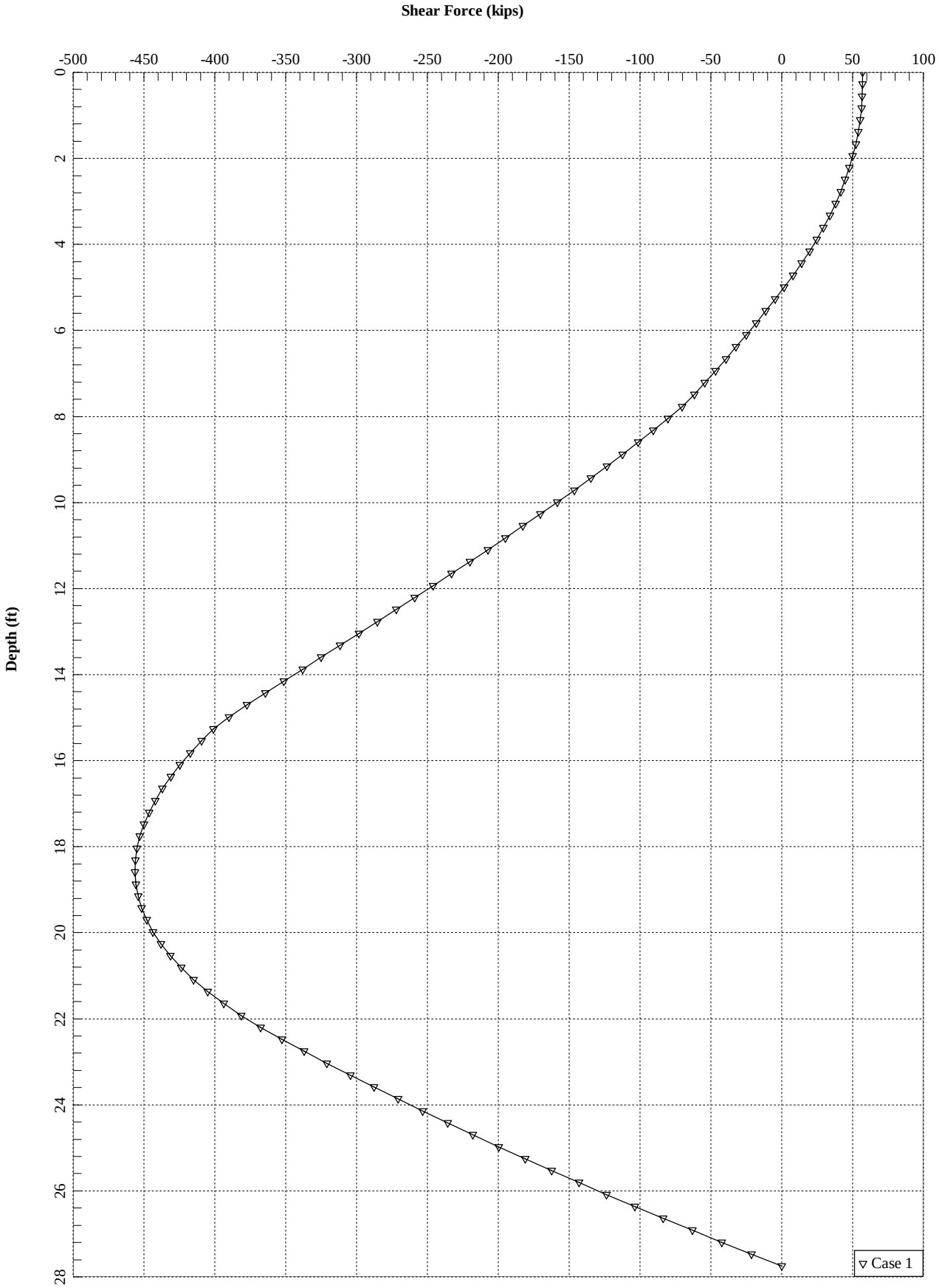
Type 2 = Shear and Slope, M = Pile-head Moment lbs-in
Type 3 = Shear and Rot. Stiffness, V = Pile-head Shear Force lbs
Type 4 = Deflection and Moment, S = Pile-head Slope, radians
Type 5 = Deflection and Slope, R = Rot. Stiffness of Pile-head in-lbs/rad

Load Type	Pile-Head Condition 1	Pile-Head Condition 2	Axial Load lbs	Pile-Head Deflection in	Maximum Moment in-lbs	Maximum Shear lbs
1	V= 57000.	M= 6.82E+07	62000.0000	1.9966	7.0590E+07	-456311.
1	V= 20000.	M= 2.41E+07	62000.0000	0.3785764	2.5157E+07	-155603.

The analysis ended normally.


Lateral Deflection (in)
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
1.2
1.4
1.6
1.8
2
Depth (ft)
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
Case 2


Bending Moment (in-kips)
0
1E4
2E4
3E4
4E4
5E4
6E4
7E4
8E4
Depth (ft)
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
Case 1


Shear Force (kips)
-500
-450
-400
-350
-300
-250
-200
-150
-100
-50
0
50
100
Depth (ft)
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
Case 1

RAN Template:	A&L Template:
67D5A998E ODE+6160	67D5998E_1xAIR+1OP+1QP

CT11396B_Anchor_4_draft

Print Name: Preliminary (RFDS_for_Scoping)

Section 1 - Site Information

Site ID: CT11396B
Status: Draft
Version: 4
Project Type: Anchor
Approved: Not Approved
Approved By: Not Approved
Last Modified: 6/15/2021 3:0:02 PM
Last Modified By: Dominic.Kallas2@T-Mobile.com

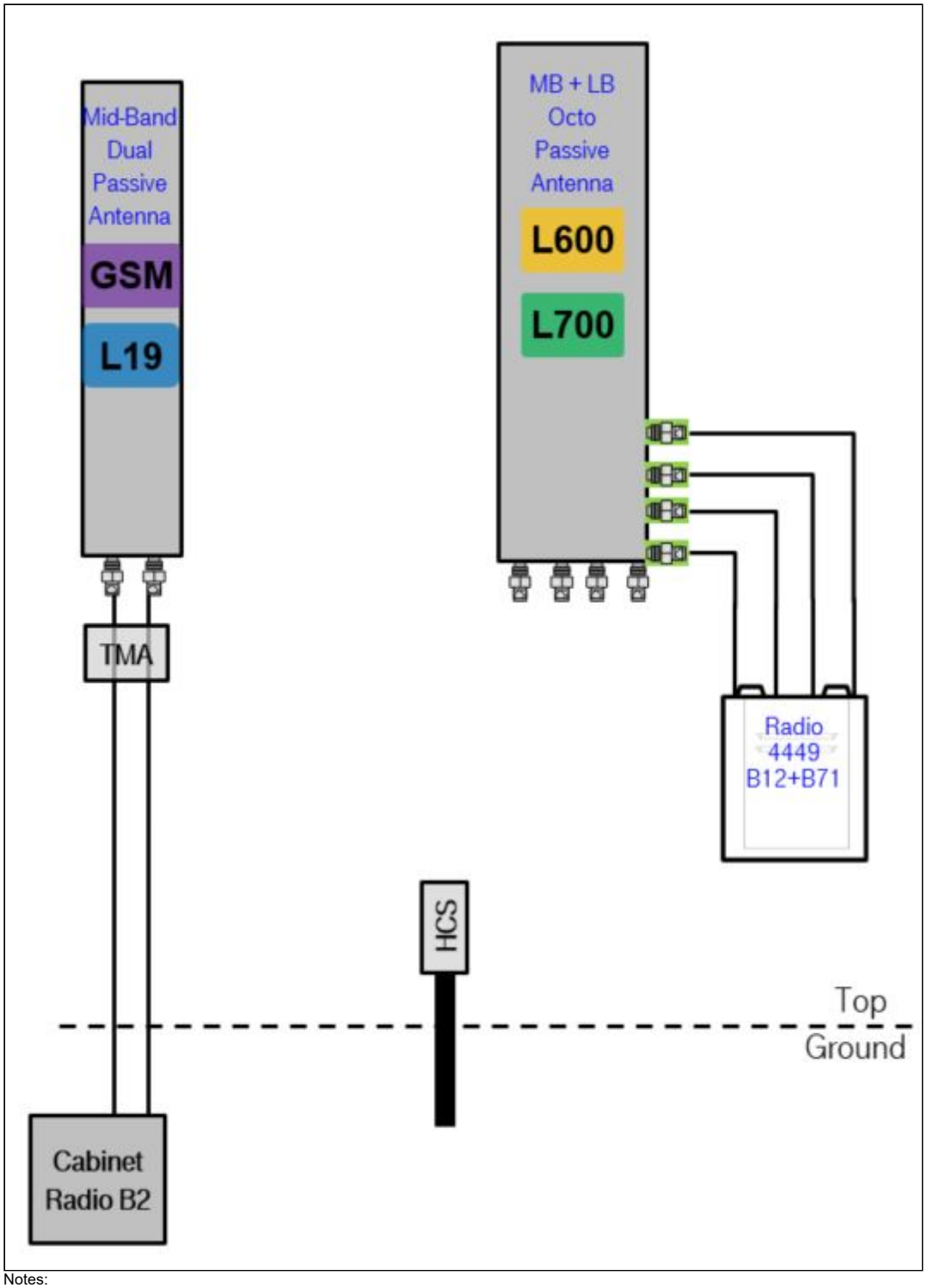
Site Name: Killingly/I-395/X93_1
Site Class: Monopole
Site Type: Structure Non Building
Plan Year: 2021
Market: CONNECTICUT CT
Vendor: Ericsson
Landlord: Town of Killingly

Latitude: 41.84743600
Longitude: -71.87888300
Address: 79 Putnam Pike
City, State: Killingly, CT
Region: NORTHEAST

RAN Template: 67D5A998E ODE+6160			**AL Template:** 67D5998E_1xAIR+1OP+1QP	
Sector Count: 3	**Antenna Count:** 9	**Coax Line Count:** 0	**TMA Count:** 0	**RRU Count:** 6

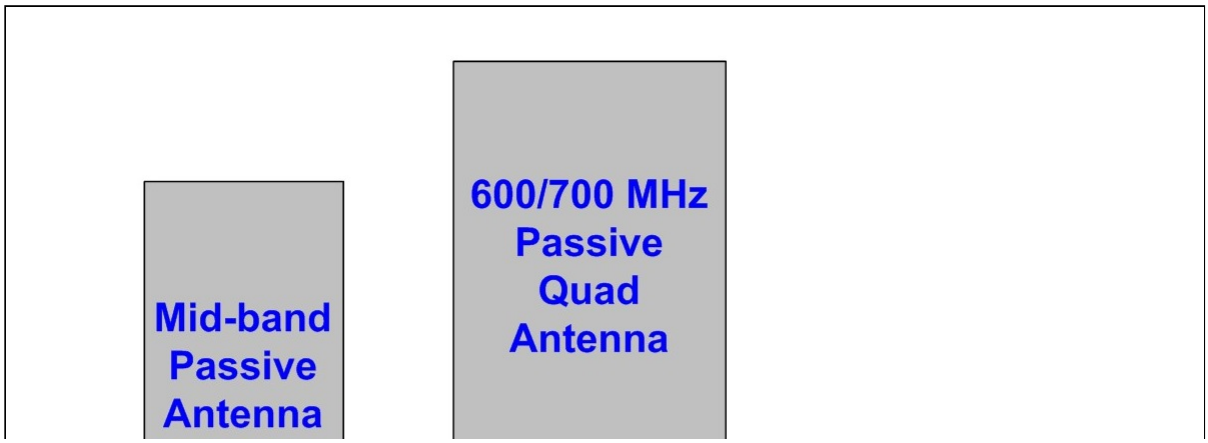
Section 2 - Existing Template Images

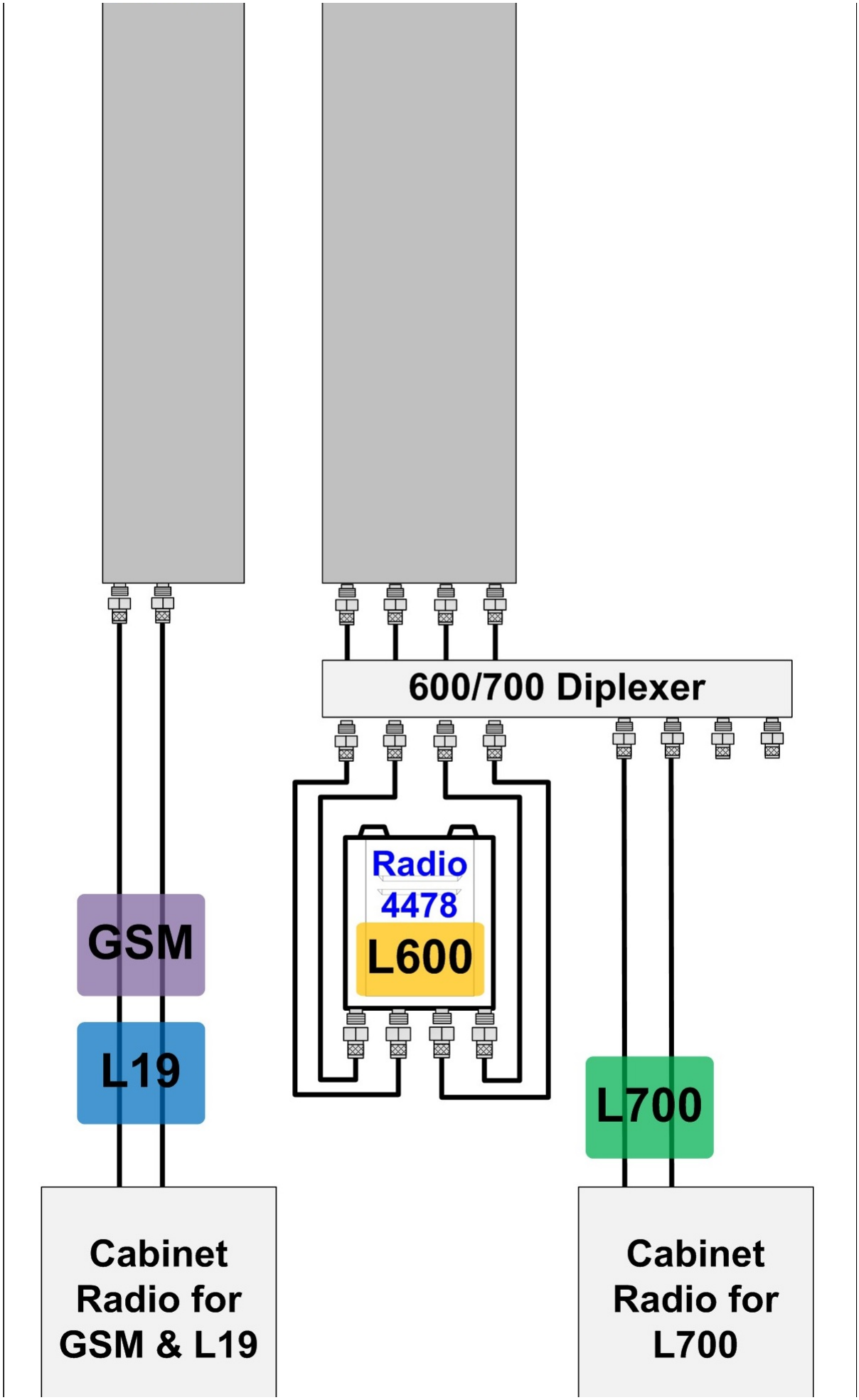
Capture.JPG



Notes:

6704G Antenna.jpg

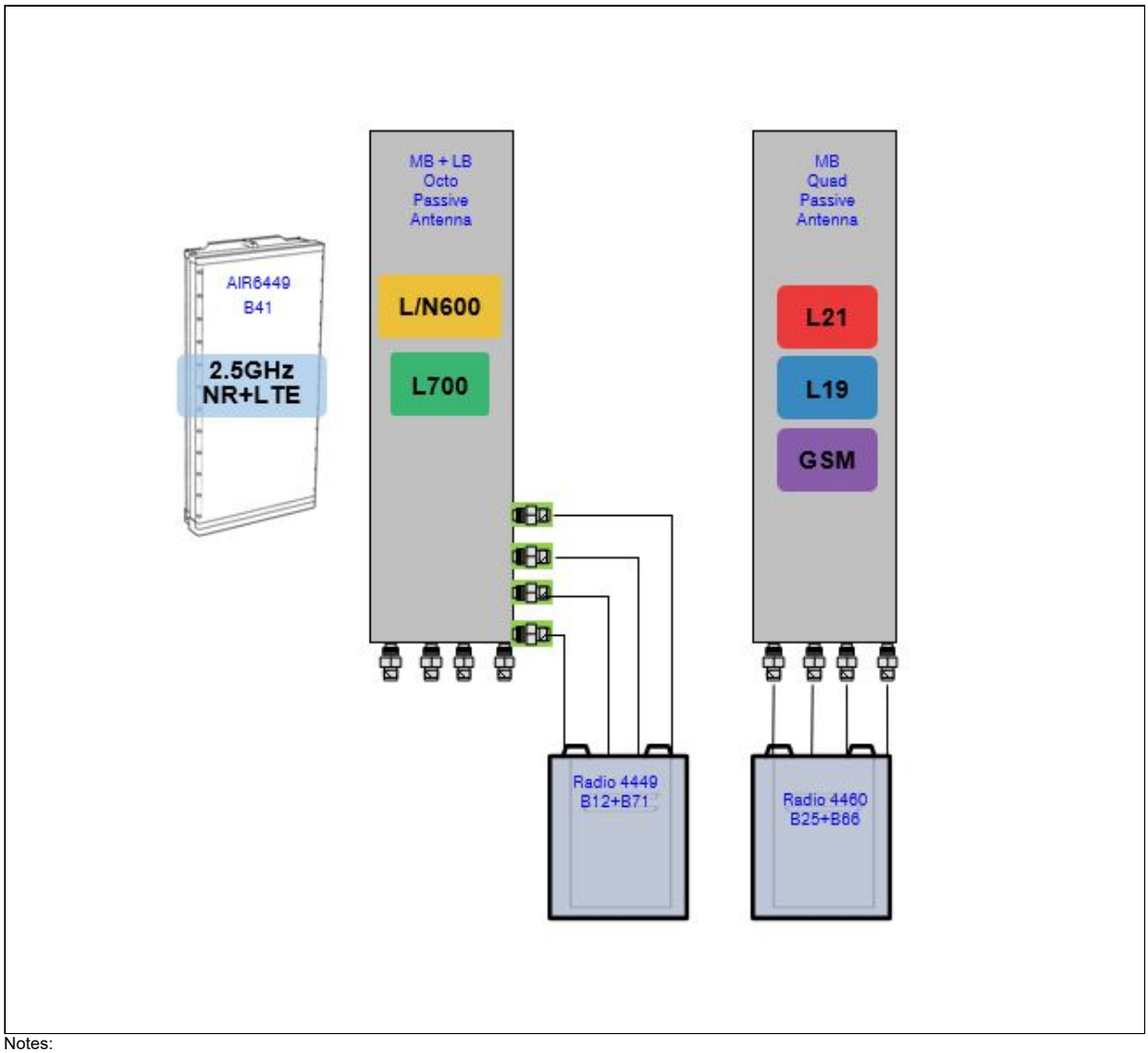



600/700 Diplexer
Radio
4478
L600
GSM
L19
L700
Cabinet
Radio for
GSM & L19
Cabinet
Radio for
L700

Notes:

Section 3 - Proposed Template Images

67D5998E_1xAIR+1OP+1QP.JPG



Notes:

Section 4 - Siteplan Images

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

RAN Template:	A&L Template:
67D5A998E ODE+6160	67D5998E_1xAIR+1OP+1QP

CT11396B_Anchor_4_draft

Print Name: Preliminary (RFDS_for_Scoping)

Section 5 - RAN Equipment

Existing RAN Equipment

Template: 67D04G

Enclosure	**1**
Enclosure Type	RBS 6201 ODE
Baseband	DUG20 (G1900); BB 6630 (L1900); BB 6648 (L700, L600, N600)
Hybrid Cable System	Ericsson 6x12 HCS *Select Length & AWG*
Radio	RUS01 B2 **(x 3)** (G1900); RUS01 B2 **(x 3)** (L1900)

Proposed RAN Equipment

Template: 67D5A998E ODE+6160

Enclosure	**1**	**2**	**3**
Enclosure Type	RBS 6201 ODE	Enclosure 6160	B160
Baseband	DUG20 (G1900); BB 6630 (L1900); BB 6648 (L700, L600, N600)	BB 6648 (L2500, N2500)	
Hybrid Cable System	Ericsson 6x12 HCS *Select Length & AWG* Ericsson Hybrid Trunk 6/24 4AWG 60m	Ericsson Hybrid Trunk 6/24 4AWG 60m PSU 4813	
Transport System		CSR IXRe V2 (Gen2)	

RAN Scope of Work:

Location of new cabinets to be determined.

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 (2) 6X24 HCS as follows:
* (1) 6X24 HCS terminating at the existing base station cabinet.
* (1) 6X24 HCS terminating at the new Enclosure 6160. Connect DC for the AIR6449 B41 to the PSU4813 Voltage Booster.

RAN Template:	A&L Template:
67D5A998E ODE+6160	67D5998E_1xAIR+1OP+1QP

CT11396B_Anchor_4_draft

Print Name: Preliminary (RFDS_for_Scoping)

Section 6 - A&L Equipment

Existing Template: 67D04G_1DP+1OP
Proposed Template: 67D5998E_1xAIR+1OP+1QP

Sector 1 (Existing) view from behind

Coverage Type	A - Outdoor Macro					
Antenna	1		2			
Antenna Model	RFS - APX16DWV-16DWV-S-E-A20 (Quad)		RFS - APXVAALL24_43-U-NA20 (Octo)			
Azimuth	80		80			
M. Tilt	0		0			
Height	150		148			
Ports	**P1**	**P2**	**P3**	**P4**	**P5**	**P6**
Active Tech.	L1900 G1900		L700 L600 N600	L700 L600 N600		
Dark Tech.						
Restricted Tech.						
Decomm. Tech.						
E. Tilt	2		2	2		
Cables	1-5/8" Coax - 170 ft. **(x2)**		Coax Jumper **(x2)**	Coax Jumper **(x2)**		
TMAs	Generic Twin Style 1A - PCS (AtAntenna)					
Diplexers / Combiners						
Radio			Radio 4449 B71+B85 (At Antenna)	SHARED Radio 4449 B71+B85 (At Antenna)		
Sector Equipment						

Unconnected Equipment:

Scope of Work:

*** Existing Two Mounts per Sector ***
Replace EMS antenna in Position 1 with RFS APX16 Quad.
Replace LB Dual in Position 2 with (1) LB/MB Octo.
Add (1) Radio 4449 B71+B12 for L600 and L700 to Postion 2 at antenna.

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

RAN Template:	A&L Template:
67D5A998E ODE+6160	67D5998E_1xAIR+1OP+1QP

CT11396B_Anchor_4_draft

Print Name: Preliminary (RFDS_for_Scoping)

Sector 1 (Proposed) view from behind

Coverage Type	A - Outdoor Macro							
Antenna	1		2				3	
Antenna Model	RFS - APX16DWV-16DWV-S-E-A20 (Quad)		RFS - APXVAALL24_43-U-NA20 (Octo)				Ericsson - AIR6449 B41 (Active Antenna - Massive MIMO)	
Azimuth	80		80				80	
M. Tilt	0		0				0	
Height	150		148				150	
Ports	P1	P2	P3	P4	P5	P6	P7	P8
Active Tech.	L2100 L1900 G1900	L2100 L1900 G1900	L700 L600 N600	L700 L600 N600			L2500 N2500	L2500 N2500
Dark Tech.								
Restricted Tech.								
Decomm. Tech.								
E. Tilt	2		2	2				
Cables	Coax Jumper **(x2)** Fiber Jumper **(x2)**	Coax Jumper **(x2)** Fiber Jumper **(x2)**	Coax Jumper **(x2)** Fiber Jumper	Coax Jumper **(x2)** Fiber Jumper			Fiber Jumper **(x2)**	Fiber Jumper **(x2)**
TMAs								
Diplexers / Combiners								
Radio	Radio 4460 B25+B66 (At Antenna)	SHARED Radio 4460 B25+B66 (At Antenna)	Radio 4449 B71+B85 (At Antenna)	SHARED Radio 4449 B71+B85 (At Antenna)				
Sector Equipment								

Unconnected Equipment:

Scope of Work:

Remove all TMAs.

Remove all Coaxial Lines.

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

Add new mount for new Position 3.

Install (1) AIR6449 B41 for L2500 and N2500 in Position 3.

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:
67D5A998E ODE+6160	67D5998E_1xAIR+1OP+1QP

CT11396B_Anchor_4_draft

Print Name: Preliminary (RFDS_for_Scoping)

Sector 2 (Existing) view from behind

Coverage Type	A - Outdoor Macro					
Antenna	1		2			
Antenna Model	RFS - APX16DWV-16DWV-S-E-A20 (Quad)		RFS - APXVAALL24_43-U-NA20 (Octo)			
Azimuth	200		200			
M. Tilt	0		0			
Height	150		148			
Ports	**P1**	**P2**	**P3**	**P4**	**P5**	**P6**
Active Tech.	L1900 G1900		L700 L600 N600	L700 L600 N600		
Dark Tech.						
Restricted Tech.						
Decomm. Tech.						
E. Tilt	2		2	2		
Cables	1-5/8" Coax - 170 ft. **(x2)**		Coax Jumper **(x2)**	Coax Jumper **(x2)**		
TMAs	Generic Twin Style 1A - PCS (AtAntenna)					
Diplexers / Combiners						
Radio			Radio 4449 B71+B85 (At Antenna)	SHARED Radio 4449 B71+B85 (At Antenna)		
Sector Equipment						

Unconnected Equipment:

Scope of Work:

*** Existing Two Mounts per Sector ***
Replace EMS antenna in Position 1 with RFS APX16 Quad.
Replace LB Dual in Position 2 with (1) LB/MB Octo.
Add (1) Radio 4449 B71+B12 for L600 and L700 to Postion 2 at antenna.

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

RAN Template:	A&L Template:
67D5A998E ODE+6160	67D5998E_1xAIR+1OP+1QP

CT11396B_Anchor_4_draft

Print Name: Preliminary (RFDS_for_Scoping)

Sector 2 (Proposed) view from behind

Coverage Type	A - Outdoor Macro							
Antenna	1		2				3	
Antenna Model	RFS - APX16DWV-16DWV-S-E-A20 (Quad)		RFS - APXVAALL24_43-U-NA20 (Octo)				Ericsson - AIR6449 B41 (Active Antenna - Massive MIMO)	
Azimuth	200		200				200	
M. Tilt	0		0				0	
Height	150		148				150	
Ports	P1	P2	P3	P4	P5	P6	P7	P8
Active Tech.	L2100 L1900 G1900	L2100 L1900 G1900	L700 L600 N600	L700 L600 N600			L2500 N2500	L2500 N2500
Dark Tech.								
Restricted Tech.								
Decomm. Tech.								
E. Tilt	2		2	2				
Cables	Coax Jumper **(x2)** Fiber Jumper **(x2)**	Coax Jumper **(x2)** Fiber Jumper **(x2)**	Coax Jumper **(x2)** Fiber Jumper	Coax Jumper **(x2)** Fiber Jumper			Fiber Jumper **(x2)**	Fiber Jumper **(x2)**
TMAs								
Diplexers / Combiners								
Radio	Radio 4460 B25+B66 (At Antenna)	SHARED Radio 4460 B25+B66 (At Antenna)	Radio 4449 B71+B85 (At Antenna)	SHARED Radio 4449 B71+B85 (At Antenna)				
Sector Equipment								

Unconnected Equipment:

Scope of Work:

Remove all TMAs.

Remove all Coaxial Lines.

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

Add new mount for new Position 3.

Install (1) AIR6449 B41 for L2500 and N2500 in Position 3.

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:
67D5A998E ODE+6160	67D5998E_1xAIR+1OP+1QP

CT11396B_Anchor_4_draft

Print Name: Preliminary (RFDS_for_Scoping)

Sector 3 (Existing) view from behind

Coverage Type	A - Outdoor Macro					
Antenna	1		2			
Antenna Model	RFS - APX16DWV-16DWV-S-E-A20 (Quad)		RFS - APXVAALL24_43-U-NA20 (Octo)			
Azimuth	320		320			
M. Tilt	0		0			
Height	150		148			
Ports	**P1**	**P2**	**P3**	**P4**	**P5**	**P6**
Active Tech.	L1900 G1900		L700 L600 N600	L700 L600 N600		
Dark Tech.						
Restricted Tech.						
Decomm. Tech.						
E. Tilt	2		2	2		
Cables	1-5/8" Coax - 170 ft. **(x2)**		Coax Jumper **(x2)**	Coax Jumper **(x2)**		
TMAs	Generic Twin Style 1A - PCS (AtAntenna)					
Diplexers / Combiners						
Radio			Radio 4449 B71+B85 (At Antenna)	SHARED Radio 4449 B71+B85 (At Antenna)		
Sector Equipment						

Unconnected Equipment:

Scope of Work:

*** Existing Two Mounts per Sector ***
Replace EMS antenna in Position 1 with RFS APX16 Quad.
Replace LB Dual in Position 2 with (1) LB/MB Octo.
Add (1) Radio 4449 B71+B12 for L600 and L700 to Postion 2 at antenna.

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

RAN Template:	A&L Template:
67D5A998E ODE+6160	67D5998E_1xAIR+1OP+1QP

CT11396B_Anchor_4_draft

Print Name: Preliminary (RFDS_for_Scoping)

Sector 3 (Proposed) view from behind

Coverage Type	A - Outdoor Macro							
Antenna	1		2				3	
Antenna Model	RFS - APX16DWV-16DWV-S-E-A20 (Quad)		RFS - APXVAALL24_43-U-NA20 (Octo)				Ericsson - AIR6449 B41 (Active Antenna - Massive MIMO)	
Azimuth	320		320				320	
M. Tilt	0		0				0	
Height	150		148				150	
Ports	P1	P2	P3	P4	P5	P6	P7	P8
Active Tech.	L2100 L1900 G1900	L2100 L1900 G1900	L700 L600 N600	L700 L600 N600			L2500 N2500	L2500 N2500
Dark Tech.								
Restricted Tech.								
Decomm. Tech.								
E. Tilt	2		2	2				
Cables	Coax Jumper **(x2)** Fiber Jumper **(x2)**	Coax Jumper **(x2)** Fiber Jumper **(x2)**	Coax Jumper **(x2)** Fiber Jumper	Coax Jumper **(x2)** Fiber Jumper			Fiber Jumper **(x2)**	Fiber Jumper **(x2)**
TMAs								
Diplexers / Combiners								
Radio	Radio 4460 B25+B66 (At Antenna)	SHARED Radio 4460 B25+B66 (At Antenna)	Radio 4449 B71+B85 (At Antenna)	SHARED Radio 4449 B71+B85 (At Antenna)				
Sector Equipment								

Unconnected Equipment:

Scope of Work:

Remove all TMAs.

Remove all Coaxial Lines.

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

Add new mount for new Position 3.

Install (1) AIR6449 B41 for L2500 and N2500 in Position 3.

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:
67D5A998E ODE+6160	67D5998E_1xAIR+1OP+1QP

CT11396B_Anchor_4_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

RAN Template:	A&L Template:
67D5A998E ODE+6160	67D5998E_1xAIR+1OP+1QP

CT11396B_Anchor_4_draft

Print Name: Preliminary (RFDS_for_Scoping)

Section 1 - Site Information

Site ID: CT11396B
Status: Draft
Version: 4
Project Type: Anchor
Approved: Not Approved
Approved By: Not Approved
Last Modified: 6/15/2021 3:0:02 PM
Last Modified By: Dominic.Kallas2@T-Mobile.com

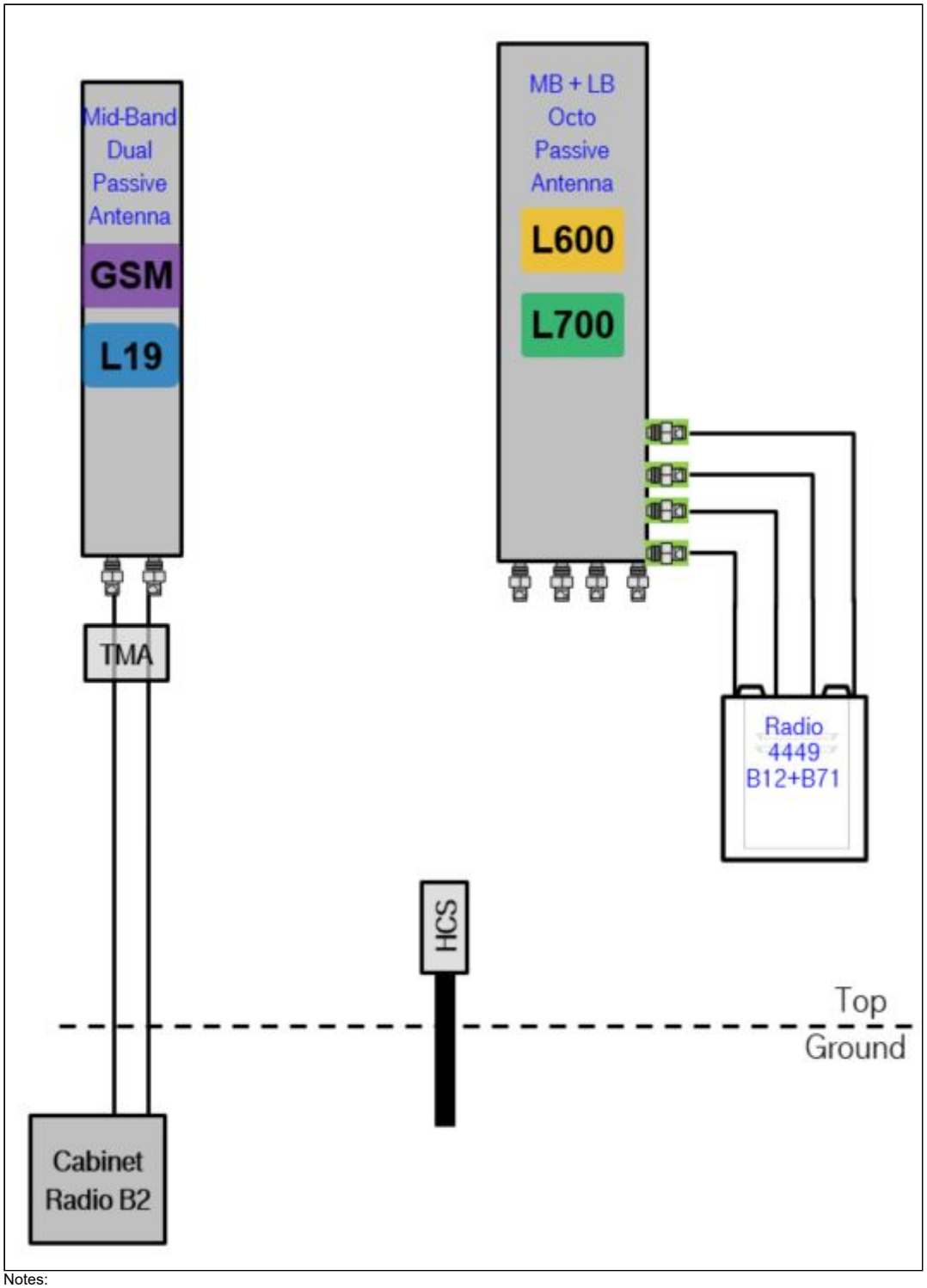
Site Name: Killingly/I-395/X93_1
Site Class: Monopole
Site Type: Structure Non Building
Plan Year: 2021
Market: CONNECTICUT CT
Vendor: Ericsson
Landlord: Town of Killingly

Latitude: 41.84743600
Longitude: -71.87888300
Address: 79 Putnam Pike
City, State: Killingly, CT
Region: NORTHEAST

RAN Template: 67D5A998E ODE+6160			**AL Template:** 67D5998E_1xAIR+1OP+1QP	
Sector Count: 3	**Antenna Count:** 9	**Coax Line Count:** 0	**TMA Count:** 0	**RRU Count:** 6

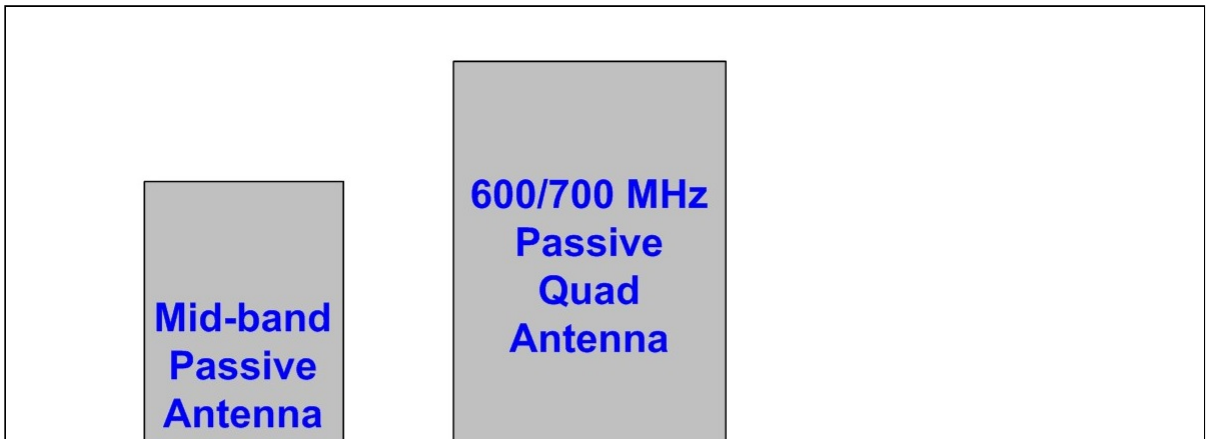
Section 2 - Existing Template Images

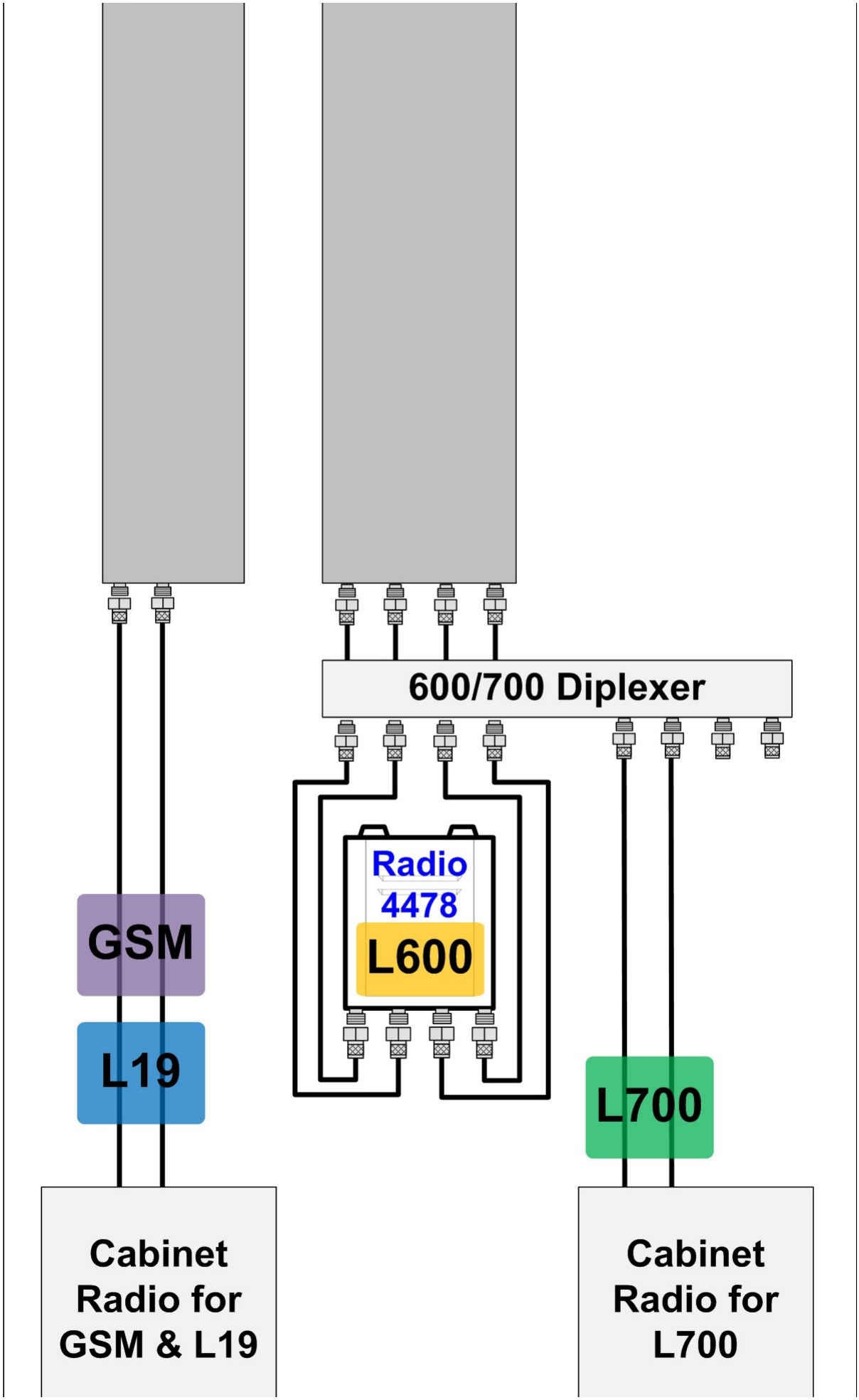
Capture.JPG



Notes:

6704G Antenna.jpg

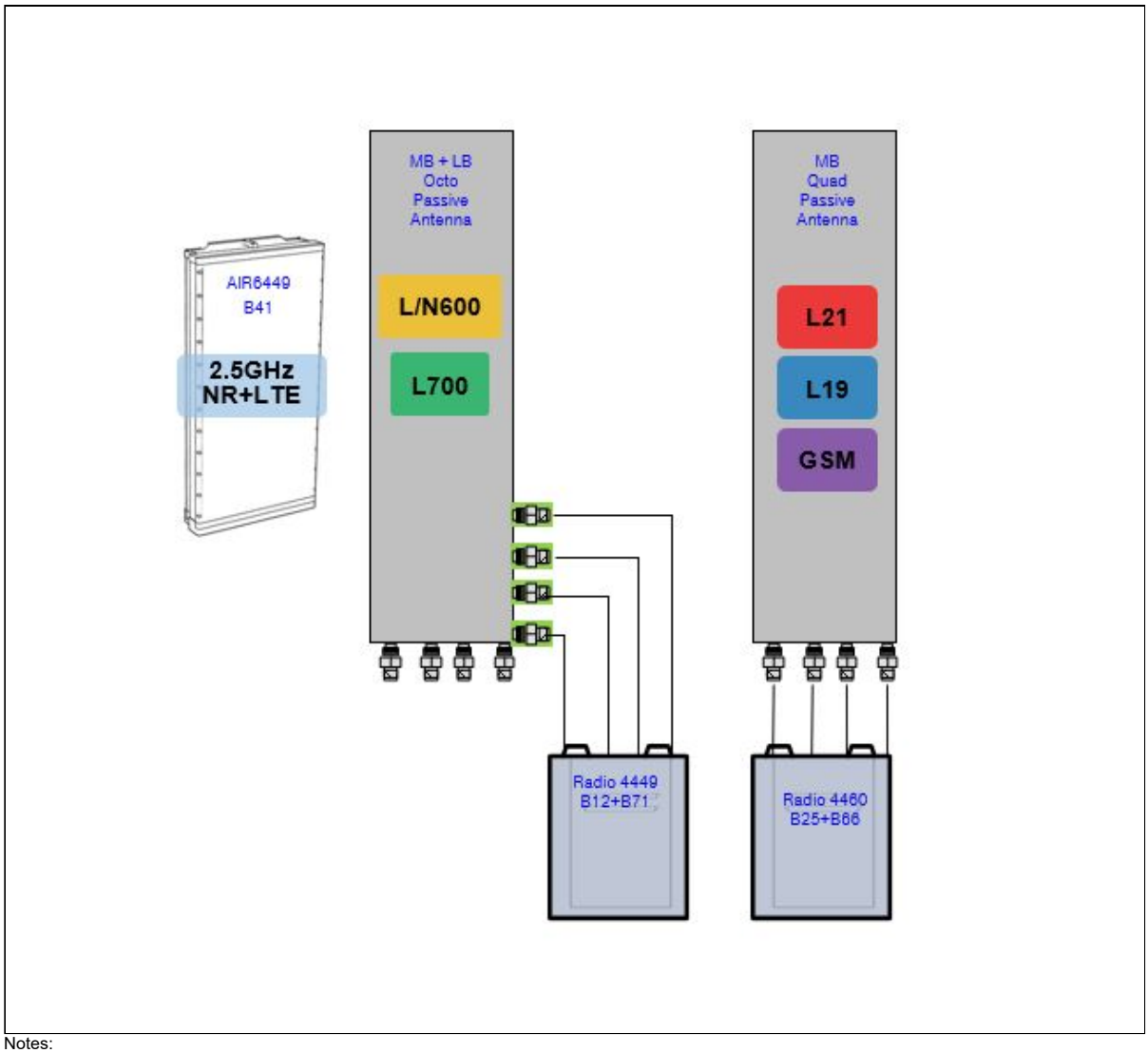



600/700 Diplexer
Radio
4478
L600
GSM
L19
L700
Cabinet
Radio for
GSM & L19
Cabinet
Radio for
L700

Notes:

Section 3 - Proposed Template Images

67D5998E_1xAIR+1OP+1QP.JPG



Notes:

Section 4 - Siteplan Images

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

RAN Template:	A&L Template:
67D5A998E ODE+6160	67D5998E_1xAIR+1OP+1QP

CT11396B_Anchor_4_draft

Print Name: Preliminary (RFDS_for_Scoping)

Section 5 - RAN Equipment

Existing RAN Equipment

Template: 67D04G

Enclosure	**1**
Enclosure Type	RBS 6201 ODE
Baseband	DUG20 (G1900); BB 6630 (L1900); BB 6648 (L700, L600, N600)
Hybrid Cable System	Ericsson 6x12 HCS *Select Length & AWG*
Radio	RUS01 B2 **(x 3)** (G1900); RUS01 B2 **(x 3)** (L1900)

Proposed RAN Equipment

Template: 67D5A998E ODE+6160

Enclosure	**1**	**2**	**3**
Enclosure Type	RBS 6201 ODE	Enclosure 6160	B160
Baseband	DUG20 (G1900); BB 6630 (L1900); BB 6648 (L700, L600, N600)	BB 6648 (L2500, N2500)	
Hybrid Cable System	Ericsson 6x12 HCS *Select Length & AWG* Ericsson Hybrid Trunk 6/24 4AWG 60m	Ericsson Hybrid Trunk 6/24 4AWG 60m PSU 4813	
Transport System		CSR IXRe V2 (Gen2)	

RAN Scope of Work:

Location of new cabinets to be determined.

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 (2) 6X24 HCS as follows:
* (1) 6X24 HCS terminating at the existing base station cabinet.
* (1) 6X24 HCS terminating at the new Enclosure 6160. Connect DC for the AIR6449 B41 to the PSU4813 Voltage Booster.

RAN Template:	A&L Template:
67D5A998E ODE+6160	67D5998E_1xAIR+1OP+1QP

CT11396B_Anchor_4_draft

Print Name: Preliminary (RFDS_for_Scoping)

Section 6 - A&L Equipment

Existing Template: 67D04G_1DP+1OP
Proposed Template: 67D5998E_1xAIR+1OP+1QP

Sector 1 (Existing) view from behind

Coverage Type	A - Outdoor Macro					
Antenna	1		2			
Antenna Model	RFS - APX16DWV-16DWV-S-E-A20 (Quad)		RFS - APXVAALL24_43-U-NA20 (Octo)			
Azimuth	80		80			
M. Tilt	0		0			
Height	150		148			
Ports	**P1**	**P2**	**P3**	**P4**	**P5**	**P6**
Active Tech.	L1900 G1900		L700 L600 N600	L700 L600 N600		
Dark Tech.						
Restricted Tech.						
Decomm. Tech.						
E. Tilt	2		2	2		
Cables	1-5/8" Coax - 170 ft. **(x2)**		Coax Jumper **(x2)**	Coax Jumper **(x2)**		
TMAs	Generic Twin Style 1A - PCS (AtAntenna)					
Diplexers / Combiners						
Radio			Radio 4449 B71+B85 (At Antenna)	SHARED Radio 4449 B71+B85 (At Antenna)		
Sector Equipment						

Unconnected Equipment:

Scope of Work:

*** Existing Two Mounts per Sector ***
Replace EMS antenna in Position 1 with RFS APX16 Quad.
Replace LB Dual in Position 2 with (1) LB/MB Octo.
Add (1) Radio 4449 B71+B12 for L600 and L700 to Postion 2 at antenna.

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

RAN Template:	A&L Template:
67D5A998E ODE+6160	67D5998E_1xAIR+1OP+1QP

CT11396B_Anchor_4_draft

Print Name: Preliminary (RFDS_for_Scoping)

Sector 1 (Proposed) view from behind

Coverage Type	A - Outdoor Macro							
Antenna	1		2				3	
Antenna Model	RFS - APX16DWV-16DWV-S-E-A20 (Quad)		RFS - APXVAALL24_43-U-NA20 (Octo)				Ericsson - AIR6449 B41 (Active Antenna - Massive MIMO)	
Azimuth	80		80				80	
M. Tilt	0		0				0	
Height	150		148				150	
Ports	P1	P2	P3	P4	P5	P6	P7	P8
Active Tech.	L2100 L1900 G1900	L2100 L1900 G1900	L700 L600 N600	L700 L600 N600			L2500 N2500	L2500 N2500
Dark Tech.								
Restricted Tech.								
Decomm. Tech.								
E. Tilt	2		2	2				
Cables	Coax Jumper **(x2)** Fiber Jumper **(x2)**	Coax Jumper **(x2)** Fiber Jumper **(x2)**	Coax Jumper **(x2)** Fiber Jumper	Coax Jumper **(x2)** Fiber Jumper			Fiber Jumper **(x2)**	Fiber Jumper **(x2)**
TMAs								
Diplexers / Combiners								
Radio	Radio 4460 B25+B66 (At Antenna)	SHARED Radio 4460 B25+B66 (At Antenna)	Radio 4449 B71+B85 (At Antenna)	SHARED Radio 4449 B71+B85 (At Antenna)				
Sector Equipment								

Unconnected Equipment:

Scope of Work:

Remove all TMAs.

Remove all Coaxial Lines.

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

Add new mount for new Position 3.

Install (1) AIR6449 B41 for L2500 and N2500 in Position 3.

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:
67D5A998E ODE+6160	67D5998E_1xAIR+1OP+1QP

CT11396B_Anchor_4_draft

Print Name: Preliminary (RFDS_for_Scoping)

Sector 2 (Existing) view from behind

Coverage Type	A - Outdoor Macro					
Antenna	1		2			
Antenna Model	RFS - APX16DWV-16DWV-S-E-A20 (Quad)		RFS - APXVAALL24_43-U-NA20 (Octo)			
Azimuth	200		200			
M. Tilt	0		0			
Height	150		148			
Ports	**P1**	**P2**	**P3**	**P4**	**P5**	**P6**
Active Tech.	L1900 G1900		L700 L600 N600	L700 L600 N600		
Dark Tech.						
Restricted Tech.						
Decomm. Tech.						
E. Tilt	2		2	2		
Cables	1-5/8" Coax - 170 ft. **(x2)**		Coax Jumper **(x2)**	Coax Jumper **(x2)**		
TMAs	Generic Twin Style 1A - PCS (AtAntenna)					
Diplexers / Combiners						
Radio			Radio 4449 B71+B85 (At Antenna)	SHARED Radio 4449 B71+B85 (At Antenna)		
Sector Equipment						

Unconnected Equipment:

Scope of Work:

*** Existing Two Mounts per Sector ***
Replace EMS antenna in Position 1 with RFS APX16 Quad.
Replace LB Dual in Position 2 with (1) LB/MB Octo.
Add (1) Radio 4449 B71+B12 for L600 and L700 to Postion 2 at antenna.

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

RAN Template:	A&L Template:
67D5A998E ODE+6160	67D5998E_1xAIR+1OP+1QP

CT11396B_Anchor_4_draft

Print Name: Preliminary (RFDS_for_Scoping)

Sector 2 (Proposed) view from behind

Coverage Type	A - Outdoor Macro							
Antenna	1		2				3	
Antenna Model	RFS - APX16DWV-16DWV-S-E-A20 (Quad)		RFS - APXVAALL24_43-U-NA20 (Octo)				Ericsson - AIR6449 B41 (Active Antenna - Massive MIMO)	
Azimuth	200		200				200	
M. Tilt	0		0				0	
Height	150		148				150	
Ports	P1	P2	P3	P4	P5	P6	P7	P8
Active Tech.	L2100 L1900 G1900	L2100 L1900 G1900	L700 L600 N600	L700 L600 N600			L2500 N2500	L2500 N2500
Dark Tech.								
Restricted Tech.								
Decomm. Tech.								
E. Tilt	2		2	2				
Cables	Coax Jumper **(x2)** Fiber Jumper **(x2)**	Coax Jumper **(x2)** Fiber Jumper **(x2)**	Coax Jumper **(x2)** Fiber Jumper	Coax Jumper **(x2)** Fiber Jumper			Fiber Jumper **(x2)**	Fiber Jumper **(x2)**
TMAs								
Diplexers / Combiners								
Radio	Radio 4460 B25+B66 (At Antenna)	SHARED Radio 4460 B25+B66 (At Antenna)	Radio 4449 B71+B85 (At Antenna)	SHARED Radio 4449 B71+B85 (At Antenna)				
Sector Equipment								

Unconnected Equipment:

Scope of Work:

Remove all TMAs.

Remove all Coaxial Lines.

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

Add new mount for new Position 3.

Install (1) AIR6449 B41 for L2500 and N2500 in Position 3.

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:
67D5A998E ODE+6160	67D5998E_1xAIR+1OP+1QP

CT11396B_Anchor_4_draft

Print Name: Preliminary (RFDS_for_Scoping)

Sector 3 (Existing) view from behind

Coverage Type	A - Outdoor Macro					
Antenna	1		2			
Antenna Model	RFS - APX16DWV-16DWV-S-E-A20 (Quad)		RFS - APXVAALL24_43-U-NA20 (Octo)			
Azimuth	320		320			
M. Tilt	0		0			
Height	150		148			
Ports	**P1**	**P2**	**P3**	**P4**	**P5**	**P6**
Active Tech.	L1900 G1900		L700 L600 N600	L700 L600 N600		
Dark Tech.						
Restricted Tech.						
Decomm. Tech.						
E. Tilt	2		2	2		
Cables	1-5/8" Coax - 170 ft. **(x2)**		Coax Jumper **(x2)**	Coax Jumper **(x2)**		
TMAs	Generic Twin Style 1A - PCS (AtAntenna)					
Diplexers / Combiners						
Radio			Radio 4449 B71+B85 (At Antenna)	SHARED Radio 4449 B71+B85 (At Antenna)		
Sector Equipment						

Unconnected Equipment:

Scope of Work:

*** Existing Two Mounts per Sector ***
Replace EMS antenna in Position 1 with RFS APX16 Quad.
Replace LB Dual in Position 2 with (1) LB/MB Octo.
Add (1) Radio 4449 B71+B12 for L600 and L700 to Postion 2 at antenna.

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

RAN Template:	A&L Template:
67D5A998E ODE+6160	67D5998E_1xAIR+1OP+1QP

CT11396B_Anchor_4_draft

Print Name: Preliminary (RFDS_for_Scoping)

Sector 3 (Proposed) view from behind

Coverage Type	A - Outdoor Macro							
Antenna	1		2				3	
Antenna Model	RFS - APX16DWV-16DWV-S-E-A20 (Quad)		RFS - APXVAALL24_43-U-NA20 (Octo)				Ericsson - AIR6449 B41 (Active Antenna - Massive MIMO)	
Azimuth	320		320				320	
M. Tilt	0		0				0	
Height	150		148				150	
Ports	P1	P2	P3	P4	P5	P6	P7	P8
Active Tech.	L2100 L1900 G1900	L2100 L1900 G1900	L700 L600 N600	L700 L600 N600			L2500 N2500	L2500 N2500
Dark Tech.								
Restricted Tech.								
Decomm. Tech.								
E. Tilt	2		2	2				
Cables	Coax Jumper **(x2)** Fiber Jumper **(x2)**	Coax Jumper **(x2)** Fiber Jumper **(x2)**	Coax Jumper **(x2)** Fiber Jumper	Coax Jumper **(x2)** Fiber Jumper			Fiber Jumper **(x2)**	Fiber Jumper **(x2)**
TMAs								
Diplexers / Combiners								
Radio	Radio 4460 B25+B66 (At Antenna)	SHARED Radio 4460 B25+B66 (At Antenna)	Radio 4449 B71+B85 (At Antenna)	SHARED Radio 4449 B71+B85 (At Antenna)				
Sector Equipment								

Unconnected Equipment:

Scope of Work:

Remove all TMAs.

Remove all Coaxial Lines.

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

Add new mount for new Position 3.

Install (1) AIR6449 B41 for L2500 and N2500 in Position 3.

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:
67D5A998E ODE+6160	67D5998E_1xAIR+1OP+1QP

CT11396B_Anchor_4_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: CT11396B

Killingly/I-395/X93_1
79 Putnam Pike
Killingly, Connecticut 06241

August 12, 2021

EBI Project Number: 6221004435

Site Compliance Summary	
Compliance Status:	**COMPLIANT**
Site total MPE% of FCC general population allowable limit:	**22.53%**

August 12, 2021

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

Emissions Analysis for Site: CT11396B - Killingly/I-395/X93_1

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **79 Putnam Pike** in **Killingly, 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 79 Putnam Pike in Killingly, Connecticut using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since T-Mobile is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufacturer's supplied specifications, minus 10 dB for directional panel antennas and 20 dB for highly focused parabolic microwave dishes, was focused at the base of the tower. For this report, the sample point is the top of a 6-foot person standing at the base of the tower. For power density calculations, the broadcast footprint of the AIR6449 antenna has been considered. Due to the beamforming nature of this antenna, the actual beam locations vary depending on demand and are narrow in nature. Using the broadcast footprint accounts for the potential location of beams at any given time.

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

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

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

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

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

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

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

7) 1 LTE Traffic channel (LTE 1C and 2C BRS Band - 2500 MHz) was considered for each sector of the proposed installation. This Channel has a transmit power of 60 Watts.

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

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

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

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

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

13) The antennas used in this modeling are the RFS APX16DWV-16DWV-S-E-A20 for the 1900 MHz / 1900 MHz / 2100 MHz channel(s), the RFS APXVAALL24_43-U-NA20 for the 600 MHz / 600 MHz / 700 MHz channel(s), the Ericsson AIR 6449 for the 2500 MHz / 2500 MHz / 2500 MHz / 2500 MHz channel(s) in Sector A, the RFS APX16DWV-16DWV-S-E-A20 for the 1900 MHz / 1900 MHz / 2100 MHz channel(s), the RFS APXVAALL24_43-U-NA20 for the 600 MHz / 600 MHz / 700 MHz channel(s), the Ericsson AIR 6449 for the 2500 MHz / 2500 MHz / 2500 MHz / 2500 MHz channel(s) in Sector B, the RFS APX16DWV-16DWV-S-E-A20 for the 1900 MHz / 1900 MHz / 2100 MHz channel(s), the RFS APXVAALL24_43-U-NA20 for the 600 MHz / 600 MHz / 700 MHz channel(s), the Ericsson AIR 6449 for the 2500 MHz / 2500 MHz / 2500 MHz / 2500 MHz channel(s) in Sector C. This is based on feedback from the carrier with regard to anticipated antenna selection. All Antenna gain values and

associated transmit power levels are shown in the Site Inventory and Power Data table below. The maximum gain of the antenna per the antenna manufacturer's supplied specifications, minus 10 dB for directional panel antennas and 20 dB for highly focused parabolic microwave dishes, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

14) The antenna mounting height centerline of the proposed antennas is 150 feet above ground level (AGL).

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

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

T-Mobile Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	1	Antenna #:	1	Antenna #:	1
Make / Model:	RFS APX16DWV-16DWV-S-E-A20	Make / Model:	RFS APX16DWV-16DWV-S-E-A20	Make / Model:	RFS APX16DWV-16DWV-S-E-A20
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:	15.9 dBd / 15.9 dBd / 15.9 dBd	Gain:	15.9 dBd / 15.9 dBd / 15.9 dBd	Gain:	15.9 dBd / 15.9 dBd / 15.9 dBd
Height (AGL):	150 feet	Height (AGL):	150 feet	Height (AGL):	150 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):	14,005.63	ERP (W):	14,005.63	ERP (W):	14,005.63
Antenna A1 MPE %:	**2.43%**	Antenna B1 MPE %:	**2.43%**	Antenna C1 MPE %:	**2.43%**
Antenna #:	**2**	Antenna #:	**2**	Antenna #:	**2**
Make / Model:	RFS APXVAALL24_43-U-NA20	Make / Model:	RFS APXVAALL24_43-U-NA20	Make / Model:	RFS APXVAALL24_43-U-NA20
Frequency Bands:	600 MHz / 600 MHz / 700 MHz	Frequency Bands:	600 MHz / 600 MHz / 700 MHz	Frequency Bands:	600 MHz / 600 MHz / 700 MHz
Gain:	12.95 dBd / 12.95 dBd / 13.65 dBd	Gain:	12.95 dBd / 12.95 dBd / 13.65 dBd	Gain:	12.95 dBd / 12.95 dBd / 13.65 dBd
Height (AGL):	150 feet	Height (AGL):	150 feet	Height (AGL):	150 feet
Channel Count:	5	Channel Count:	5	Channel Count:	5
Total TX Power (W):	200 Watts	Total TX Power (W):	200 Watts	Total TX Power (W):	200 Watts
ERP (W):	4,151.83	ERP (W):	4,151.83	ERP (W):	4,151.83
Antenna A2 MPE %:	**1.71%**	Antenna B2 MPE %:	**1.71%**	Antenna C2 MPE %:	**1.71%**
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):	150 feet	Height (AGL):	150 feet	Height (AGL):	150 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 %:	**6.30%**	Antenna B3 MPE %:	**6.30%**	Antenna C3 MPE %:	**6.30%**

Site Composite MPE %	
Carrier	MPE %
T-Mobile (Max at Sector A):	10.44%
AT&T	0.8%
Verizon	5.31%
Metro PCS	0.57%
Sprint	3.71%
Town	1.7%
Site Total MPE % :	22.53%

T-Mobile MPE % Per Sector	
T-Mobile Sector A Total:	10.44%
T-Mobile Sector B Total:	10.44%
T-Mobile Sector C Total:	10.44%
Site Total MPE % :	22.53%

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	1167.14	150.0	8.09	1900 MHz GSM	1000	0.81%
T-Mobile 1900 MHz LTE	2	2334.27	150.0	8.09	1900 MHz LTE	1000	0.81%
T-Mobile 2100 MHz LTE	2	2334.27	150.0	8.09	2100 MHz LTE	1000	0.81%
T-Mobile 600 MHz LTE	2	591.73	150.0	2.05	600 MHz LTE	400	0.51%
T-Mobile 600 MHz NR	1	1577.94	150.0	2.74	600 MHz NR	400	0.68%
T-Mobile 700 MHz LTE	2	695.22	150.0	2.41	700 MHz LTE	467	0.52%
T-Mobile 2500 MHz LTE 1C & 2C Traffic	1	11044.63	150.0	19.15	2500 MHz LTE 1C & 2C Traffic	1000	1.91%
T-Mobile 2500 MHz LTE 1C & 2C Broadcast	1	1074.06	150.0	1.86	2500 MHz LTE 1C & 2C Broadcast	1000	0.19%
T-Mobile 2500 MHz NR Traffic	1	22089.26	150.0	38.30	2500 MHz NR Traffic	1000	3.83%
T-Mobile 2500 MHz NR Broadcast	1	2148.13	150.0	3.72	2500 MHz NR Broadcast	1000	0.37%
						Total:	**10.44%**

• 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:	10.44%
Sector B:	10.44%
Sector C:	10.44%
T-Mobile Maximum MPE % (Sector A):	10.44%
Site Total:	22.53%
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **22.53%** 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.