Crown Castle
3530 Toringdon Way, Suite 300
Charlotte, NC 28277

August 27, 2015

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

RE: **T-Mobile - Exempt Modification - Crown Site BU: 807133**
T-Mobile Site ID: CT11114D
Located at: 50 Rockland Road, Norwalk, CT 06854

Dear Ms. Bachman:

This letter and exhibits are submitted on behalf of T-Mobile. T-Mobile is making modifications to certain existing sites in its Connecticut system in order to implement their 700MHz technology. Please accept this letter and exhibits as notification, pursuant to § 16-50j-73 of the Regulations of Connecticut State Agencies ("R.C.S.A."), of construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In compliance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to The Honorable Harry W. Rilling, Mayor for the City of Norwalk, and Connecticut Light and Power Company, Property Owner.

T-Mobile plans to modify the existing wireless communications facility owned by Crown Castle and located at **50 Rockland Road, Norwalk, CT**. Attached are a compound plan and elevation depicting the planned changes (Exhibit-1), and documentation of the structural sufficiency of the structure to accommodate the revised antenna configuration (Exhibit-2). Also included is a power density table report reflecting the modification to T-Mobile's operations at the site (Exhibit-3).

The changes to the facility do not constitute a modification as defined in Connecticut General Statutes ("C.G.S.") § 16-50i(d) because the general physical characteristics of the facility will not be significantly changed. Rather, the planned changes to the facility fall squarely within those activities explicitly provided for in the 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 tower. T-Mobile's additional antennas will be located at the same elevation on the existing tower.

2. There will be no proposed modifications to the ground and no extension of boundaries.

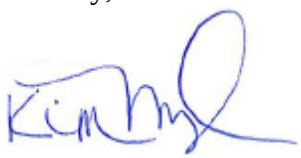
3. The proposed modifications will not increase noise levels at the facility by six decibels or more.

4. A Structural Modification Report confirming that the tower and foundation can support T-Mobile's proposed modifications is included as Exhibit-2.

5. The operation of the additional antennas will not increase radio frequency (RF) emissions at the facility to a level at or above the Federal Communications Commission (FCC) adopted safety standard. A cumulative General Power Density table report for T-Mobile's modified facility is included as Exhibit-3.

For the foregoing reasons, T-Mobile respectfully submits the proposed modifications to the above-reference telecommunications facility constitutes an exempt modification under R.C.S.A. § 16-50j-72(b)(2). Please send approval/rejection letter to Attn: Kimberly Myl.

Sincerely,



Kimberly Myl
Real Estate Specialist

Enclosures

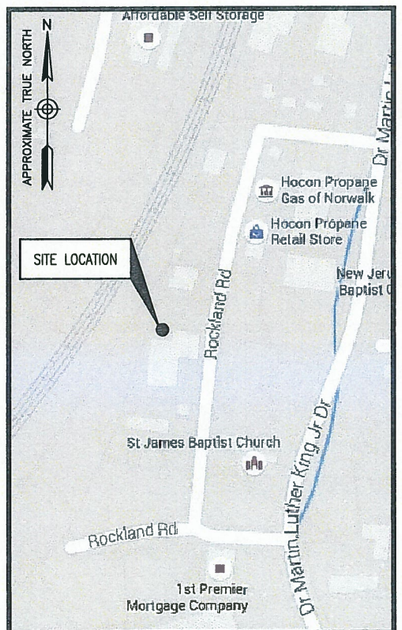
Tab 1: Exhibit-1: Compound plan and elevation depicting the planned changes
Tab 2: Exhibit-2: Structural Modification Report
Tab 3: Exhibit-3: General Power Density Table Report (RF Emissions Analysis Report)

cc: The Honorable Harry W. Rilling, Mayor
City of Norwalk
125 East Avenue
Norwalk, CT 06856

Connecticut Light & Power Company
Northeast Utilities
P.O. Box 2957
Hartford, CT 06141

T-MOBILE NORTHEAST LLC

T-MOBILE SITE #: CT11114D
CROWN CASTLE BU #: 807133
SITE NAME: BRG 134 943057
50 ROCKLAND ROAD OFC-MTSO
SO. NORWALK, CT 06854
FAIRFIELD COUNTY



VICINITY MAP

FROM PARSIPPANY, NJ:

HEAD NORTHWEST ON SYLVAN WAY. SLIGHT RIGHT ONTO US-202 N. USE THE RIGHT LANE TO TAKE THE RAMP ONTO I-80 E. TAKE EXIT 43 FOR I-287 TOWARD MORRISTOWN/MAHWAH. USE THE RIGHT 2 LANES TO MERGE ONTO I-287 E/I-87 S TOWARD TAPPAN ZEE BR/NEW YORK CITY. KEEP LEFT AT THE FORK TO CONTINUE ON I-287 E, FOLLOW SIGNS FOR WHITE PLAINS/RYE. KEEP LEFT TO STAY ON I-287 E. MERGE ONTO I-95 N. TAKE EXIT 12 FOR TOKENEKE RD TOWARD ROWAYTON. TURN RIGHT ON TOKENEKE RD. CONTINUE ONTO CUDLIPP ST. CONTINUE ONTO ROWAYTON AVE. TURN LEFT ONTO WITCH LN. TURN LEFT TO STAY ON WITCH LN. TURN RIGHT TO STAY ON WITCH LN. TURN LEFT ONTO OLD TROLLEY WAY. TURN LEFT ONTO DR MARTIN LUTHER KING JR DR. TURN LEFT ONTO ROCKLAND RD. TURN RIGHT TO STAY ON ROCKLAND RD. SITE WILL BE ON THE LEFT.

ENGINEER
DEWBERRY ENGINEERS INC.
600 PARSIPPANY ROAD
SUITE 301
PARSIPPANY, NJ 07054

CONTACT: BRYAN HUFF
PHONE #: (973) 576-0147

CONSTRUCTION
CROWN CASTLE
3 CORPORATE PARK DRIVE, SUITE 101
CLIFTON PARK, NY 12065

CONTACT: PATRICIA PELON
PHONE #: (518) 373-3507

CONSULTANT TEAM

SITE NAME:
BRG 134 943057

SITE NUMBER:
CT11114D

TOWER OWNER:
CROWN CASTLE
3 CORPORATE PARK DRIVE, SUITE 101
CLIFTON PARK, NY 12065

APPLICANT/DEVELOPER:
T-MOBILE NORTHEAST LLC
4 SYLVAN WAY
PARSIPPANY, NJ 07054

COORDINATES:
LATITUDE: 41°-4'-54.44" N (NAD83)
LONGITUDE: 73°-25'-49.52" W (NADB3)
(PER CROWN CASTLE)

CONFIGURATION
702Cu

PROJECT SUMMARY

SITE ADDRESS:
50 ROCKLAND ROAD NORWALK OFC-MTSO
SO. NORWALK, CT 06854
FAIRFIELD COUNTY

PROJECT DIRECTORY

- INSTALL (3) NEW ANTENNAS.
- INSTALL (3) NEW RRU'S.
- REMOVE EXISTING ANTENNAS & MOUNTS AT CENTERLINE ELEVATION OF 135'-0"± A.G.L.

SCOPE OF WORK

A.D.A. COMPLIANCE:
FACILITY IS UNMANNED AND NOT FOR HUMAN HABITATION.

SHT. NO.	DESCRIPTION
T-1	TITLE SHEET
G-1	GENERAL NOTES
C-1	COMPOUND PLAN & EQUIPMENT PLANS
C-2	ANTENNA LAYOUTS & ELEVATIONS
C-3	CONSTRUCTION DETAILS
E-1	GROUNDING NOTES & DETAILS

SHEET INDEX

T-MOBILE NORTHEAST LLC
4 SYLVAN WAY
PARSIPPANY, NJ 07054

CROWN CASTLE
3 CORPORATE PARK DRIVE, SUITE 101
CLIFTON PARK, NY 12065

CT11114D
BRG 134 943057

CONSTRUCTION DRAWINGS

0	08/20/15	ISSUED AS FINAL
A	08/11/15	ISSUED FOR REVIEW

Dewberry Engineers Inc.
600 PARSIPPANY ROAD
SUITE 301
PARSIPPANY, NJ 07054
PHONE: 973.739.9400
FAX: 973.739.9710

STATE OF CONNECTICUT
JIANG YU
No. 23222
REGISTERED PROFESSIONAL ENGINEER
CONNECTICUT LICENSE NO. 23222

DRAWN BY:	PS
REVIEWED BY:	BSH
CHECKED BY:	GHN
PROJECT NUMBER:	50066258
JOB NUMBER:	50074598
SITE ADDRESS:	

50 ROCKLAND ROAD
NORWALK OFC-MTSO
SO. NORWALK, CT 06854
FAIRFIELD COUNTY

SHEET TITLE

TITLE SHEET

SHEET NUMBER

T-1

GENERAL NOTES:

1. FOR THE PURPOSE OF CONSTRUCTION DRAWING, THE FOLLOWING DEFINITIONS SHALL APPLY:
   PROJECT MANAGEMENT – CROWN CASTLE
   CONTRACTOR – GENERAL CONTRACTOR (CONSTRUCTION)
   OWNER – T–MOBILE
   OEM – ORIGINAL EQUIPMENT MANUFACTURER
2. PRIOR TO THE SUBMISSION OF BIDS, THE BIDDING CONTRACTOR SHALL VISIT THE CELL SITE TO FAMILIARIZE WITH THE EXISTING CONDITIONS AND TO CONFIRM THAT THE WORK CAN BE ACCOMPLISHED AS SHOWN ON THE CONSTRUCTION DRAWINGS. ANY DISCREPANCY FOUND SHALL BE BROUGHT TO THE ATTENTION OF PROJECT MANAGEMENT.
3. ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS, AND ORDINANCES. CONTRACTOR SHALL ISSUE ALL APPROPRIATE NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS, AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY REGARDING THE PERFORMANCE OF THE WORK.
4. ALL WORK CARRIED OUT SHALL COMPLY WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS AND LOCAL JURISDICTIONAL CODES, ORDINANCES AND APPLICABLE REGULATIONS.
5. DRAWINGS PROVIDED HERE ARE NOT TO SCALE UNLESS OTHERWISE NOTED AND ARE INTENDED TO SHOW OUTLINE ONLY.
6. UNLESS NOTED OTHERWISE, THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT, APPURTENANCES, AND LABOR NECESSARY TO COMPLETE ALL INSTALLATIONS AS INDICATED ON THE DRAWINGS.
7. THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.
8. IF THE SPECIFIED EQUIPMENT CANNOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE CONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION FOR APPROVAL BY PROJECT MANAGEMENT.
9. CONTRACTOR SHALL DETERMINE ACTUAL ROUTING OF CONDUIT, POWER AND T1 CABLES, GROUNDING CABLES AS SHOWN ON THE POWER, GROUNDING AND TELCO PLAN DRAWING. CONTRACTOR SHALL UTILIZE EXISTING TRAYS AND/OR SHALL ADD NEW TRAYS AS NECESSARY. CONTRACTOR SHALL CONFIRM THE ACTUAL ROUTING WITH PROJECT MANAGEMENT.
10. THE CONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CURBS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT CONTRACTOR'S EXPENSE TO THE SATISFACTION OF THE OWNER.
11. CONTRACTOR SHALL LEGALLY AND PROPERLY DISPOSE OF ALL SCRAP MATERIALS SUCH AS COAXIAL CABLES AND OTHER ITEMS REMOVED FROM THE EXISTING FACILITY. ANTENNAS REMOVED SHALL BE RETURNED TO THE OWNER'S DESIGNATED LOCATION.
12. CONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION.
13. THE CONTRACTOR SHALL SUPERVISE AND DIRECT THE PROJECT DESCRIBED HEREIN. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR ALL CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES, AND PROCEDURES AND FOR COORDINATING ALL PORTIONS OF THE WORK UNDER THE CONTRACT.
14. CONTRACTOR SHALL NOTIFY DEWBERRY 48 HOURS IN ADVANCE OF POURING CONCRETE, OR BACKFILLING TRENCHES, SEALING ROOF AND WALL PENETRATIONS & POST DOWNS, FINISHING NEW WALLS OR FINAL ELECTRICAL CONNECTIONS FOR ENGINEER REVIEW.
15. CONTRACTOR SHALL VERIFY ALL EXISTING DIMENSIONS AND CONDITIONS PRIOR TO COMMENCING ANY WORK. ALL DIMENSIONS OF EXISTING CONSTRUCTION SHOWN ON THE DRAWINGS MUST BE VERIFIED. CONTRACTOR SHALL NOTIFY PROJECT MANAGEMENT OF ANY DISCREPANCIES PRIOR TO ORDERING MATERIAL OR PROCEEDING WITH CONSTRUCTION.
16. THE EXISTING CELL SITE IS IN FULL COMMERCIAL OPERATION. ANY CONSTRUCTION WORK BY CONTRACTOR SHALL NOT DISRUPT THE EXISTING NORMAL OPERATION. ANY WORK ON EXISTING EQUIPMENT MUST BE COORDINATED WITH CONTRACTOR. ALSO, WORK SHOULD BE SCHEDULED FOR AN APPROPRIATE MAINTENANCE WINDOW USUALLY IN LOW TRAFFIC PERIODS AFTER MIDNIGHT.
17. SINCE THE CELL SITE IS ACTIVE, ALL SAFETY PRECAUTIONS MUST BE TAKEN WHEN WORKING AROUND HIGH LEVELS OF ELECTROMAGNETIC RADIATION. EQUIPMENT SHOULD BE SHUTDOWN PRIOR TO PERFORMING ANY WORK THAT COULD EXPOSE THE WORKERS TO DANGER. PERSONAL RF EXPOSURE MONITORS ARE ADVISED TO BE WORN TO ALERT OF ANY DANGEROUS EXPOSURE LEVELS.

SITE WORK GENERAL NOTES:

1. THE CONTRACTOR SHALL CONTACT UTILITY LOCATING SERVICES PRIOR TO THE START OF CONSTRUCTION.
2. ALL EXISTING ACTIVE SEWER, WATER, GAS, ELECTRIC, AND OTHER UTILITIES WHERE ENCOUNTERED IN THE WORK, SHALL BE PROTECTED AT ALL TIMES, AND WHERE REQUIRED FOR THE PROPER EXECUTION OF THE WORK, SHALL BE RELOCATED AS DIRECTED BY CONTRACTOR. EXTREME CAUTION SHOULD BE USED BY THE CONTRACTOR WHEN EXCAVATING OR DRILLING PIERS AROUND OR NEAR UTILITIES. CONTRACTOR SHALL PROVIDE SAFETY TRAINING FOR THE WORKING CREW. THIS WILL INCLUDE BUT NOT BE LIMITED TO:
   A) FALL PROTECTION
   B) CONFINED SPACE
   C) ELECTRICAL SAFETY
   D) TRENCHING & EXCAVATION.
3. ALL SITE WORK SHALL BE AS INDICATED ON THE DRAWINGS AND PROJECT SPECIFICATIONS.
4. IF NECESSARY, RUBBISH, STUMPS, DEBRIS, STICKS, STONES, TOP SOIL AND OTHER REFUSE SHALL BE REMOVED FROM THE SITE AND DISPOSED OF LEGALLY.
5. ALL EXISTING INACTIVE SEWER, WATER, GAS, ELECTRIC AND OTHER UTILITIES, WHICH INTERFERE WITH THE EXECUTION OF THE WORK, SHALL BE REMOVED AND/OR CAPPED, PLUGGED OR OTHERWISE DISCONTINUED AT POINTS WHICH WILL NOT INTERFERE WITH THE EXECUTION OF THE WORK, SUBJECT TO THE APPROVAL OF CONTRACTOR, OWNER AND/OR LOCAL UTILITIES.
6. CONTRACTOR SHALL MINIMIZE DISTURBANCE TO EXISTING SITE DURING CONSTRUCTION.
7. THE CONTRACTOR SHALL PROVIDE SITE SIGNAGE IN ACCORDANCE WITH THE T–MOBILE SPECIFICATION FOR SITE SIGNAGE.
8. THE SITE SHALL BE GRADED TO CAUSE SURFACE WATER TO FLOW AWAY FROM THE TRANSMISSION EQUIPMENT AND TOWER AREAS.
9. NO FILL OR EMBANKMENT MATERIAL SHALL BE PLACED ON FROZEN GROUND. FROZEN MATERIALS, SNOW OR ICE SHALL NOT BE PLACED IN ANY FILL OR EMBANKMENT.
10. THE SUB GRADE SHALL BE COMPACTED AND BROUGHT TO A SMOOTH UNIFORM GRADE PRIOR TO FINISHED SURFACE APPLICATION, SEE SOIL COMPACTION NOTES.
11. THE AREAS OF THE OWNER'S PROPERTY DISTURBED BY THE WORK AND NOT COVERED BY THE TOWER, EQUIPMENT OR DRIVEWAY, SHALL BE GRADED TO A UNIFORM SLOPE, AND STABILIZED TO PREVENT EROSION.
12. EROSION CONTROL MEASURES, IF REQUIRED DURING CONSTRUCTION, SHALL BE IN CONFORMANCE WITH THE LOCAL JURISDICTION'S GUIDELINES FOR EROSION AND SEDIMENT CONTROL.

ELECTRICAL INSTALLATION NOTES:

1. ALL ELECTRICAL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS, NEC AND ALL APPLICABLE LOCAL CODES.
2. CONTRACTOR SHALL MODIFY EXISTING CABLE TRAY SYSTEM AS REQUIRED TO SUPPORT RF AND TRANSPORT CABLING TO THE NEW BTS EQUIPMENT. CONTRACTOR SHALL SUBMIT MODIFICATIONS TO PROJECT MANAGEMENT FOR APPROVAL.
3. CONDUIT ROUTINGS ARE SCHEMATIC. CONTRACTOR SHALL INSTALL CONDUITS SO THAT ACCESS TO EQUIPMENT IS NOT BLOCKED.
4. WIRING, RACEWAY AND SUPPORT METHODS AND MATERIALS SHALL COMPLY WITH THE REQUIREMENTS OF THE NEC AND TELCORDIA.
5. ALL CIRCUITS SHALL BE SEGREGATED AND MAINTAIN MINIMUM CABLE SEPARATION AS REQUIRED BY THE NEC AND TELCORDIA.
6. CABLES SHALL NOT BE ROUTED THROUGH LADDER–STYLE CABLE TRAY RUNGS.
7. EACH END OF EVERY POWER, POWER PHASE CONDUCTOR (I.E., HOTS), GROUNDING, AND T1 CONDUCTOR AND CABLE SHALL BE LABELED WITH COLOR–CODED INSULATION OR ELECTRICAL TAPE (3M BRAND, 1/2 INCH PLASTIC ELECTRICAL TAPE WITH UV PROTECTION, OR EQUAL). THE IDENTIFICATION METHOD SHALL CONFORM WITH NEC & OSHA, AND MATCH EXISTING INSTALLATION REQUIREMENTS.
8. ALL ELECTRICAL COMPONENTS SHALL BE CLEARLY LABELED WITH ENGRAVED LAMACOID PLASTIC LABELS. ALL EQUIPMENT SHALL BE LABELED WITH THEIR VOLTAGE RATING, PHASE CONFIGURATION, WIRE CONFIGURATION, POWER OR AMPACITY RATING, AND BRANCH CIRCUIT ID NUMBERS (I.E., PANELBOARD AND CIRCUIT ID'S).
9. PANELBOARDS (ID NUMBERS) AND INTERNAL CIRCUIT BREAKERS (CIRCUIT ID NUMBERS) SHALL BE CLEARLY LABELED WITH ENGRAVED LAMACOID PLASTIC LABELS.
10. ALL TIE WRAPS SHALL BE CUT FLUSH WITH APPROVED CUTTING TOOL TO REMOVE SHARP EDGES.
11. POWER, CONTROL, AND EQUIPMENT GROUND WIRING IN TUBING OR CONDUIT SHALL BE SINGLE CONDUCTOR (SIZE 14 AWG OR LARGER), 600V, OIL RESISTANT THHN OR THWN–2, CLASS B STRANDED COPPER CABLE RATED FOR 90 °C (WET AND DRY) OPERATION; LISTED OR LABELED FOR THE LOCATION AND RACEWAY SYSTEM USED, UNLESS OTHERWISE SPECIFIED.
12. POWER PHASE CONDUCTORS (I.E., HOTS) SHALL BE LABELED WITH COLOR–CODED INSULATION OR ELECTRICAL TAPE (3M BRAND, 1/2 INCH PLASTIC ELECTRICAL TAPE WITH UV PROTECTION, OR EQUAL.) PHASE CONDUCTOR COLOR CODES SHALL CONFORM WITH THE NEC & OSHA AND MATCH EXISTING INSTALLATION REQUIREMENTS.
13. SUPPLEMENTAL EQUIPMENT GROUND WIRING LOCATED INDOORS SHALL BE SINGLE CONDUCTOR (SIZE 6 AWG OR LARGER), 600V, OIL RESISTANT THHN OR THWN–2 GREEN INSULATION, CLASS B STRANDED COPPER CABLE RATED FOR 90°C (WET AND DRY) OPERATION; LISTED OR LABELED FOR THE LOCATION AND RACEWAY SYSTEM USED, UNLESS OTHERWISE SPECIFIED.
14. SUPPLEMENTAL EQUIPMENT GROUND WIRING LOCATED OUTDOORS, OR BELOW GRADE, SHALL BE SINGLE CONDUCTOR #2 AWG SOLID TINNED COPPER CABLE, UNLESS OTHERWISE SPECIFIED.
15. POWER AND CONTROL WIRING, NOT IN TUBING OR CONDUIT, SHALL BE MULTI–CONDUCTOR, TYPE TC CABLE (SIZE 14 AWG OR LARGER), 600V, OIL RESISTANT THHN OR THWN–2, CLASS B STRANDED COPPER CABLE RATED FOR 90°C (WET AND DRY) OPERATION; WITH OUTER JACKET; LISTED OR LABELED FOR THE LOCATION USED, UNLESS OTHERWISE SPECIFIED.
16. ALL POWER AND POWER GROUNDING CONNECTIONS SHALL BE CRIMP–STYLE, COMPRESSION WIRE LUGS AND WIRENUTS BY THOMAS AND BETTS (OR EQUAL). LUGS AND WIRENUTS SHALL BE RATED FOR OPERATION AT NO LESS THAN 75°C (90°C IF AVAILABLE).
17. RACEWAY AND CABLE TRAY SHALL BE LISTED OR LABELED FOR ELECTRICAL USE IN ACCORDANCE WITH NEMA, UL, ANSI/IEEE, AND NEC.
18. NEW RACEWAY OR CABLE TRAY WILL MATCH THE EXISTING INSTALLATION WHERE POSSIBLE.
19. ELECTRICAL METALLIC TUBING (EMT) OR RIGID NONMETALLIC CONDUIT (I.E., RIGID PVC SCHEDULE 40, OR RIGID PVC SCHEDULE 80 FOR LOCATIONS SUBJECT TO PHYSICAL DAMAGE) SHALL BE USED FOR EXPOSED INDOOR LOCATIONS.
20. ELECTRICAL METALLIC TUBING (EMT), ELECTRICAL NONMETALLIC TUBING (ENT), OR RIGID NONMETALLIC CONDUIT (RIGID PVC, SCHEDULE 40) SHALL BE USED FOR CONCEALED INDOOR LOCATIONS.
21. GALVANIZED STEEL INTERMEDIATE METALLIC CONDUIT (IMC) SHALL BE USED FOR OUTDOOR LOCATIONS ABOVE GRADE.
22. RIGID NONMETALLIC CONDUIT (I.E., RIGID PVC SCHEDULE 40 OR RIGID PVC SCHEDULE 80) SHALL BE USED UNDERGROUND; DIRECT BURIED, IN AREAS OF OCCASIONAL LIGHT VEHICLE TRAFFIC OR ENCASED IN REINFORCED CONCRETE IN AREAS OF HEAVY VEHICLE TRAFFIC.
23. LIQUID–TIGHT FLEXIBLE METALLIC CONDUIT (LIQUID–TITE FLEX) SHALL BE USED INDOORS AND OUTDOORS, WHERE VIBRATION OCCURS OR FLEXIBILITY IS NEEDED.
24. CONDUIT AND TUBING FITTINGS SHALL BE THREADED OR COMPRESSION–TYPE AND APPROVED FOR THE LOCATION USED. SETSCREW FITTINGS ARE NOT ACCEPTABLE.
25. CABINETS, BOXES, AND WIREWAYS SHALL BE LISTED OR LABELED FOR ELECTRICAL USE IN ACCORDANCE WITH NEMA, UL, ANSI/IEEE, AND NEC.
26. CABINETS, BOXES, AND WIREWAYS TO MATCH THE EXISTING INSTALLATION WHERE POSSIBLE.
27. WIREWAYS SHALL BE EPOXY–COATED (GRAY) AND INCLUDE A HINGED COVER, DESIGNED TO SWING OPEN DOWNWARD; SHALL BE PANDUIT TYPE E (OR EQUAL); AND RATED NEMA 1 (OR BETTER) INDOORS, OR NEMA 3R (OR BETTER) OUTDOORS.
28. EQUIPMENT CABINETS, TERMINAL BOXES, JUNCTION BOXES, AND PULL BOXES SHALL BE GALVANIZED OR EPOXY–COATED SHEET STEEL, SHALL MEET OR EXCEED UL 50, AND RATED NEMA 1 (OR BETTER) INDOORS, OR NEMA 3R (OR BETTER) OUTDOORS.
29. METAL RECEPTACLE, SWITCH, AND DEVICE BOXES SHALL BE GALVANIZED, EPOXY–COATED, OR NON–CORRODING; SHALL MEET OR EXCEED UL 514A AND NEMA OS 1; AND RATED NEMA 1 (OR BETTER) INDOORS, OR WEATHER PROTECTED (WP OR BETTER) OUTDOORS.
30. NONMETALLIC RECEPTACLE, SWITCH, AND DEVICE BOXES SHALL MEET OR EXCEED NEMA OS 2; AND RATED NEMA 1 (OR BETTER) INDOORS, OR WEATHER PROTECTED (WP OR BETTER) OUTDOORS.
31. THE CONTRACTOR SHALL NOTIFY AND OBTAIN NECESSARY AUTHORIZATION FROM PROJECT MANAGEMENT BEFORE COMMENCING WORK ON THE AC POWER DISTRIBUTION PANELS.
32. THE CONTRACTOR SHALL PROVIDE NECESSARY TAGGING ON THE BREAKERS, CABLES AND DISTRIBUTION PANELS IN ACCORDANCE WITH THE APPLICABLE CODES AND STANDARDS TO SAFEGUARD AGAINST LIFE AND PROPERTY.

CONCRETE AND REINFORCING STEEL NOTES:

1. ALL CONCRETE WORK SHALL BE IN ACCORDANCE WITH THE ACI 301, ACI 318, ACI 336, ASTM A184, ASTM A185 AND THE DESIGN AND CONSTRUCTION SPECIFICATION FOR CAST–IN–PLACE CONCRETE.
2. ALL CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 4000 PSI AT 28 DAYS, UNLESS NOTED OTHERWISE. A HIGHER STRENGTH (4000 PSI) MAY BE USED. ALL CONCRETING WORK SHALL BE DONE IN ACCORDANCE WITH ACI 318 CODE REQUIREMENTS.
3. REINFORCING STEEL SHALL CONFORM TO ASTM A 615, GRADE 60, DEFORMED UNLESS NOTED OTHERWISE. WELDED WIRE FABRIC SHALL CONFORM TO ASTM A 185 WELDED STEEL WIRE FABRIC UNLESS NOTED OTHERWISE (UNO). SPLICES SHALL BE CLASS "B" AND ALL HOOKS SHALL BE STANDARD, UNO.
4. THE FOLLOWING MINIMUM CONCRETE COVER SHALL BE PROVIDED FOR REINFORCING STEEL UNLESS SHOWN OTHERWISE ON DRAWINGS:

   CONCRETE CAST AGAINST EARTH.....3 IN.
   CONCRETE EXPOSED TO EARTH OR WEATHER:
   #6 AND LARGER .....2 IN.
   #5 AND SMALLER & WWF.....1 1/2 IN.
   CONCRETE NOT EXPOSED TO EARTH OR WEATHER OR NOT CAST AGAINST THE GROUND:
   SLAB AND WALL .....3/4 IN.
   BEAMS AND COLUMNS.....1 1/2 IN.

5. A CHAMFER 3/4" SHALL BE PROVIDED AT ALL EXPOSED EDGES OF CONCRETE, UNO, IN ACCORDANCE WITH ACI 301 SECTION 4.2.4.
6. INSTALLATION OF CONCRETE EXPANSION/WEDGE ANCHOR, SHALL BE PER MANUFACTURER'S WRITTEN RECOMMENDED PROCEDURE. THE ANCHOR BOLT, DOWEL OR ROD SHALL CONFORM TO MANUFACTURER'S RECOMMENDATION FOR EMBEDMENT DEPTH OR AS SHOWN ON THE DRAWINGS. NO REBAR SHALL BE CUT WITHOUT PRIOR CONTRACTOR APPROVAL WHEN DRILLING HOLES IN CONCRETE. SPECIAL INSPECTIONS, REQUIRED BY GOVERNING CODES, SHALL BE PERFORMED IN ORDER TO MAINTAIN MANUFACTURER'S MAXIMUM ALLOWABLE LOADS. ALL EXPANSION/WEDGE ANCHORS SHALL BE STAINLESS STEEL OR HOT DIPPED GALVANIZED. EXPANSION BOLTS SHALL BE PROVIDED BY RAMSET/REDHEAD OR APPROVED EQUAL.
7. CONCRETE CYLINDER TEST IS NOT REQUIRED FOR SLAB ON GRADE WHEN CONCRETE IS LESS THAN 50 CUBIC YARDS (IBC 1905.6.2.3) IN THAT EVENT THE FOLLOWING RECORDS SHALL BE PROVIDED BY THE CONCRETE SUPPLIER;
   (A) RESULTS OF CONCRETE CYLINDER TESTS PERFORMED AT THE SUPPLIER'S PLANT,
   (B) CERTIFICATION OF MINIMUM COMPRESSIVE STRENGTH FOR THE CONCRETE GRADE SUPPLIED.
   FOR GREATER THAN 50 CUBIC YARDS THE GC SHALL PERFORM THE CONCRETE CYLINDER TEST.
8. AS AN ALTERNATIVE TO ITEM 7, TEST CYLINDERS SHALL BE TAKEN INITIALLY AND THEREAFTER FOR EVERY 50 YARDS OF CONCRETE FROM EACH DIFFERENT BATCH PLANT.
9. EQUIPMENT SHALL NOT BE PLACED ON NEW PADS FOR SEVEN DAYS AFTER PAD IS POURED, UNLESS IT IS VERIFIED BY CYLINDER TESTS THAT COMPRESSIVE STRENGTH HAS BEEN ATTAINED.

STRUCTURAL STEEL NOTES:

1. ALL STEEL WORK SHALL BE PAINTED OR GALVANIZED IN ACCORDANCE WITH THE DRAWINGS UNLESS NOTED OTHERWISE. STRUCTURAL STEEL SHALL BE ASTM–A–36 UNLESS OTHERWISE NOTED ON THE SITE SPECIFIC DRAWINGS. STEEL DESIGN, INSTALLATION AND BOLTING SHALL BE PERFORMED IN ACCORDANCE WITH THE AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC) "MANUAL OF STEEL CONSTRUCTION".
2. ALL WELDING SHALL BE PERFORMED USING E70XX ELECTRODES AND WELDING SHALL CONFORM TO AISC. WHERE FILLET WELD SIZES ARE NOT SHOWN, PROVIDE THE MINIMUM SIZE PER TABLE J2.4 IN THE AISC "MANUAL OF STEEL CONSTRUCTION". PAINTED SURFACES SHALL BE TOUCHED UP.
3. BOLTED CONNECTIONS SHALL BE ASTM A325 BEARING TYPE (3/4"Ø) CONNECTIONS AND SHALL HAVE MINIMUM OF TWO BOLTS UNLESS NOTED OTHERWISE.
4. NON–STRUCTURAL CONNECTIONS FOR STEEL GRATING MAY USE 5/8" DIA. ASTM A 307 BOLTS UNLESS NOTED OTHERWISE.
5. INSTALLATION OF CONCRETE EXPANSION/WEDGE ANCHOR, SHALL BE PER MANUFACTURER'S WRITTEN RECOMMENDED PROCEDURE. THE ANCHOR BOLT, DOWEL OR ROD SHALL CONFORM TO MANUFACTURER'S RECOMMENDATION FOR EMBEDMENT DEPTH OR AS SHOWN ON THE DRAWINGS. NO REBAR SHALL BE CUT WITHOUT PRIOR CONTRACTOR APPROVAL WHEN DRILLING HOLES IN CONCRETE. SPECIAL INSPECTIONS, REQUIRED BY GOVERNING CODES, SHALL BE PERFORMED IN ORDER TO MAINTAIN MANUFACTURER'S MAXIMUM ALLOWABLE LOADS. ALL EXPANSION/WEDGE ANCHORS SHALL BE STAINLESS STEEL OR HOT DIPPED GALVANIZED. EXPANSION BOLTS SHALL BE PROVIDED BY RAMSET/REDHEAD OR APPROVED EQUAL.
6. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS FOR ENGINEER REVIEW & APPROVAL ON PROJECTS REQUIRING STRUCTURAL STEEL.
7. ALL STRUCTURAL STEEL WORK SHALL BE DONE IN ACCORDANCE WITH AISC SPECIFICATIONS.

CONSTRUCTION NOTES:

1. FIELD VERIFICATION:
   CONTRACTOR SHALL FIELD VERIFY SCOPE OF WORK, T–MOBILE ANTENNA PLATFORM LOCATION AND ANTENNAS TO BE REPLACED.
2. COORDINATION OF WORK:
   CONTRACTOR SHALL COORDINATE RF WORK AND PROCEDURES WITH PROJECT MANAGEMENT.
3. CABLE LADDER RACK:
   CONTRACTOR SHALL FURNISH AND INSTALL CABLE LADDER RACK, CABLE TRAY, AND CONDUIT AS REQUIRED TO SUPPORT CABLES TO THE NEW BTS LOCATION.
4. GROUNDING OF ALL EQUIPMENT AND ANTENNAS IS NOT CONSIDERED PART OF THE SCOPE OF THIS PROJECT AND IS THE RESPONSIBILITY OF THE OWNER AND CONTRACTOR AT THE TIME OF CONSTRUCTION. ALL EQUIPMENT AND ANTENNAS TO BE INSTALLED AND GROUNDED IN ACCORDANCE WITH GOVERNING BUILDING CODE, MANUFACTURER RECOMMENDATIONS AND OWNER SPECIFICATIONS.

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CROWN CASTLE

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CT11114D
BRG 134 943057

CONSTRUCTION DRAWINGS		
0	08/20/15	ISSUED AS FINAL
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DRAWN BY:	PS
REVIEWED BY:	BSH
CHECKED BY:	GHN
PROJECT NUMBER:	50066258
JOB NUMBER:	50074598

SITE ADDRESS:

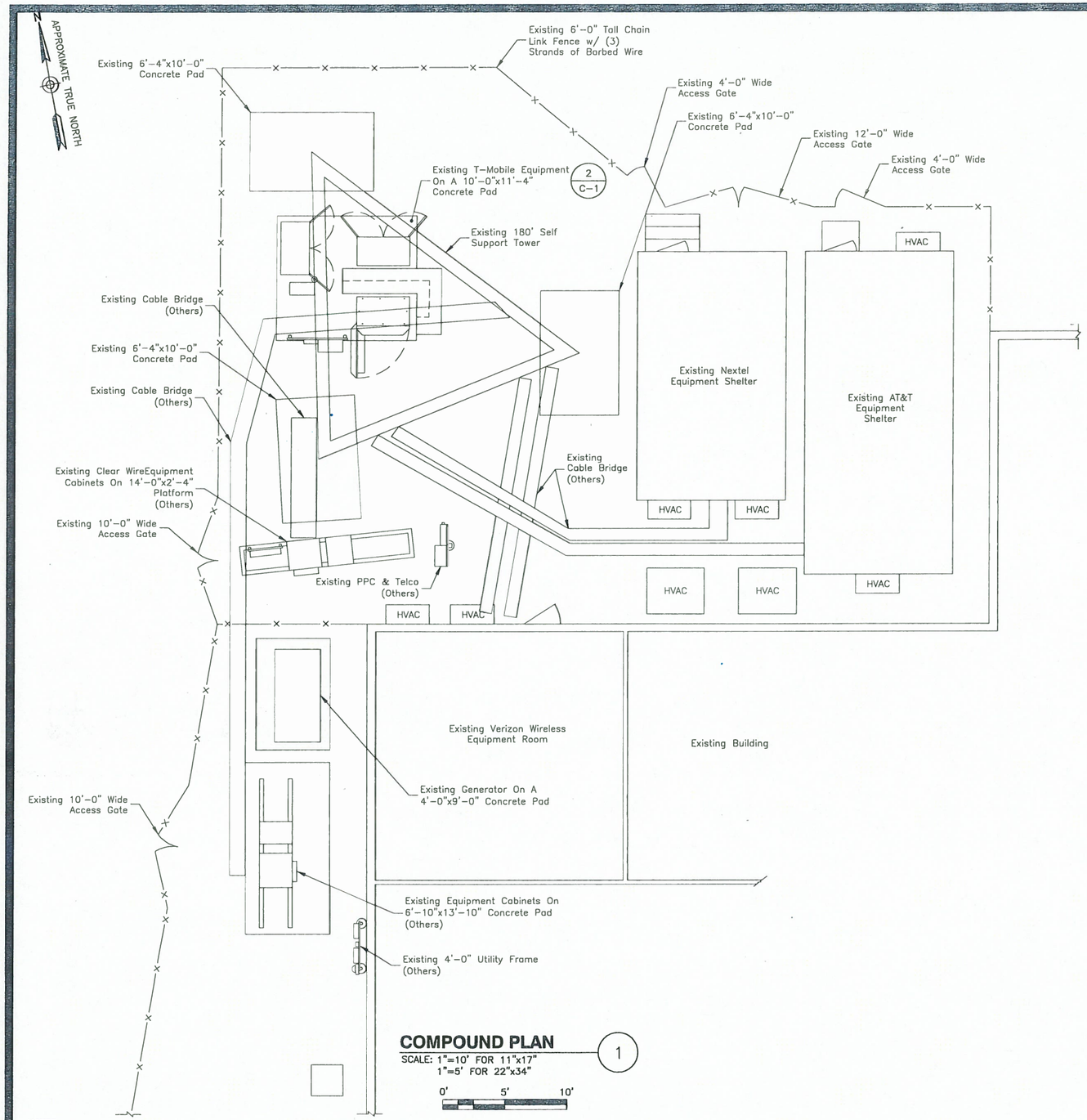
50 ROCKLAND ROAD
NORWALK OFC–MTSO
SO. NORWALK, CT 06854
FAIRFIELD COUNTY

SHEET TITLE

GENERAL NOTES

SHEET NUMBER

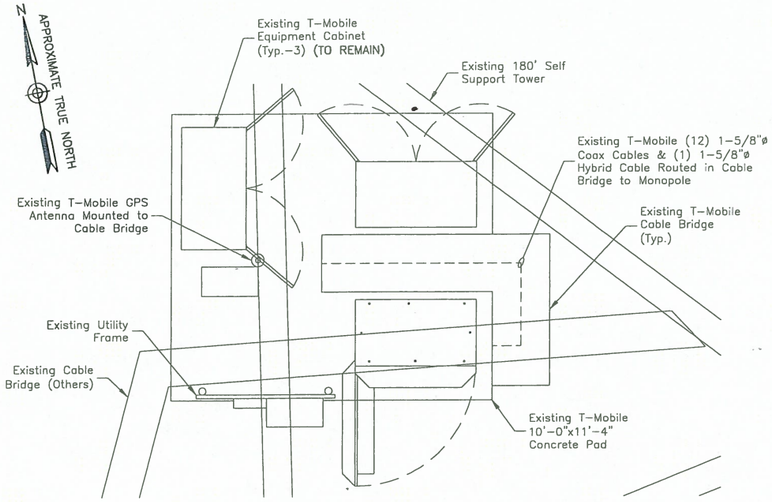
G–1



COMPOUND PLAN 1

SCALE: 1"=10' FOR 11"x17"
1"=5' FOR 22"x34"

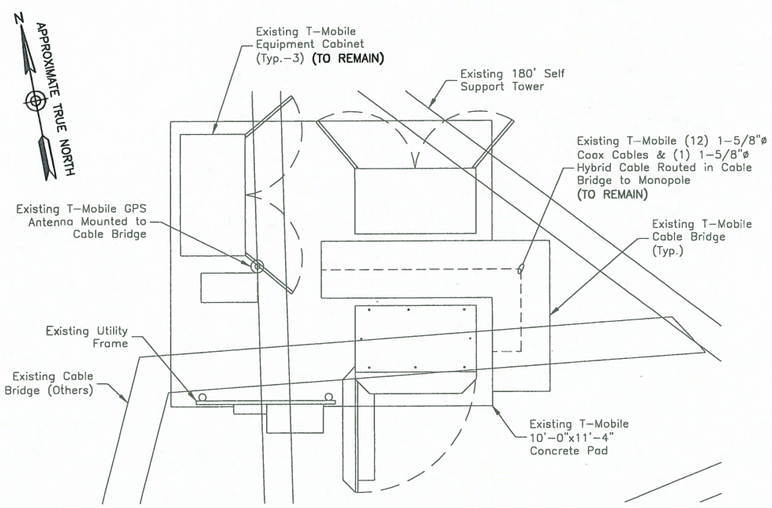
0' 5' 10'



EXISTING EQUIPMENT PLAN 2

SCALE: 3/16"=1' FOR 11"x17"
3/8"=1' FOR 22"x34"

0' 2' 4' 6'



NOTE:

1. NO EQUIPMENT IS PROPOSED AT GRADE.

PROPOSED EQUIPMENT PLAN 3

SCALE: 3/16"=1' FOR 11"x17"
3/8"=1' FOR 22"x34"

0' 2' 4' 6'

NOTES:

1. NORTH ARROW SHOWN AS APPROXIMATE.
2. NOT ALL INFORMATION IS SHOWN FOR CLARITY.
3. PLANS BASED ON DRAWINGS PROVIDED TO DEWBERRY ENGINEERS INC. BY CROWN CASTLE AND FIELD NOTES BY DEWBERRY ENGINEERS INC. ON 07-31-15.
4. ALL PROPOSED EQUIPMENT, INCLUDING ANTENNAS, RRU'S, COAX, ETC., SHALL BE MOUNTED IN ACCORDANCE WITH STRUCTURAL ANALYSIS TO BE COMPLETED BY OTHERS.

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STATE OF CONNECTICUT
JIANG YU
No. 23222
LICENSED PROFESSIONAL ENGINEER
JIANG YU, P.E.
CONNECTICUT LICENSE NO. 23222
IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER TO ALTER THIS DOCUMENT.

DRAWN BY:	PS
REVIEWED BY:	BSH
CHECKED BY:	GHN
PROJECT NUMBER:	50066258
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SITE ADDRESS:	

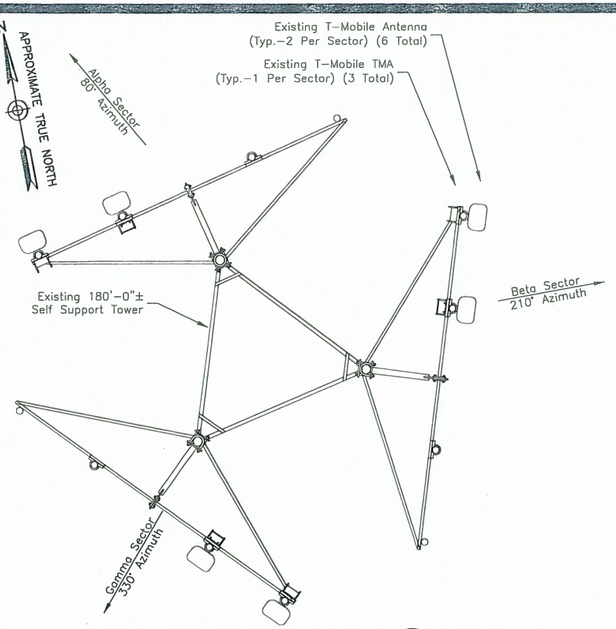
50 ROCKLAND ROAD
NORWALK OFC-MTSO
SO. NORWALK, CT 06854
FAIRFIELD COUNTY

SHEET TITLE

COMPOUND PLAN & EQUIPMENT PLANS

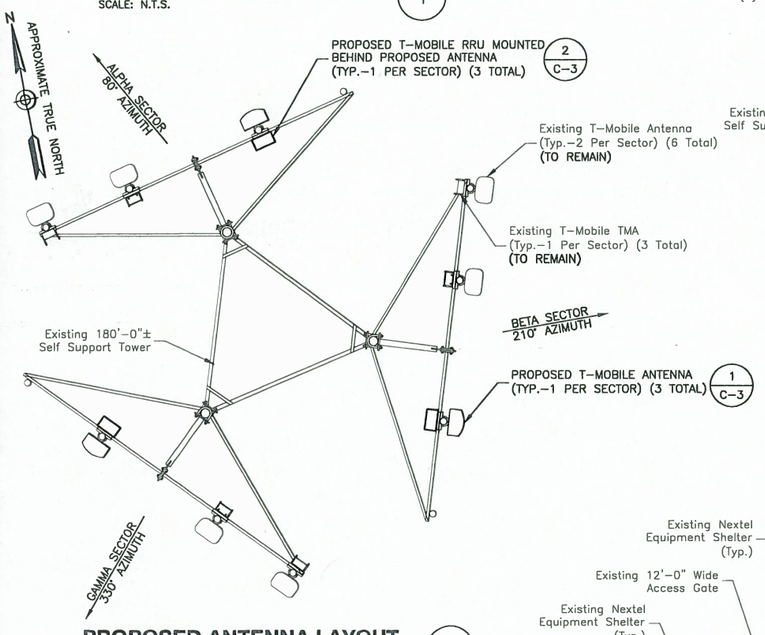
SHEET NUMBER

C-1



EXISTING ANTENNA LAYOUT 1

SCALE: N.T.S.

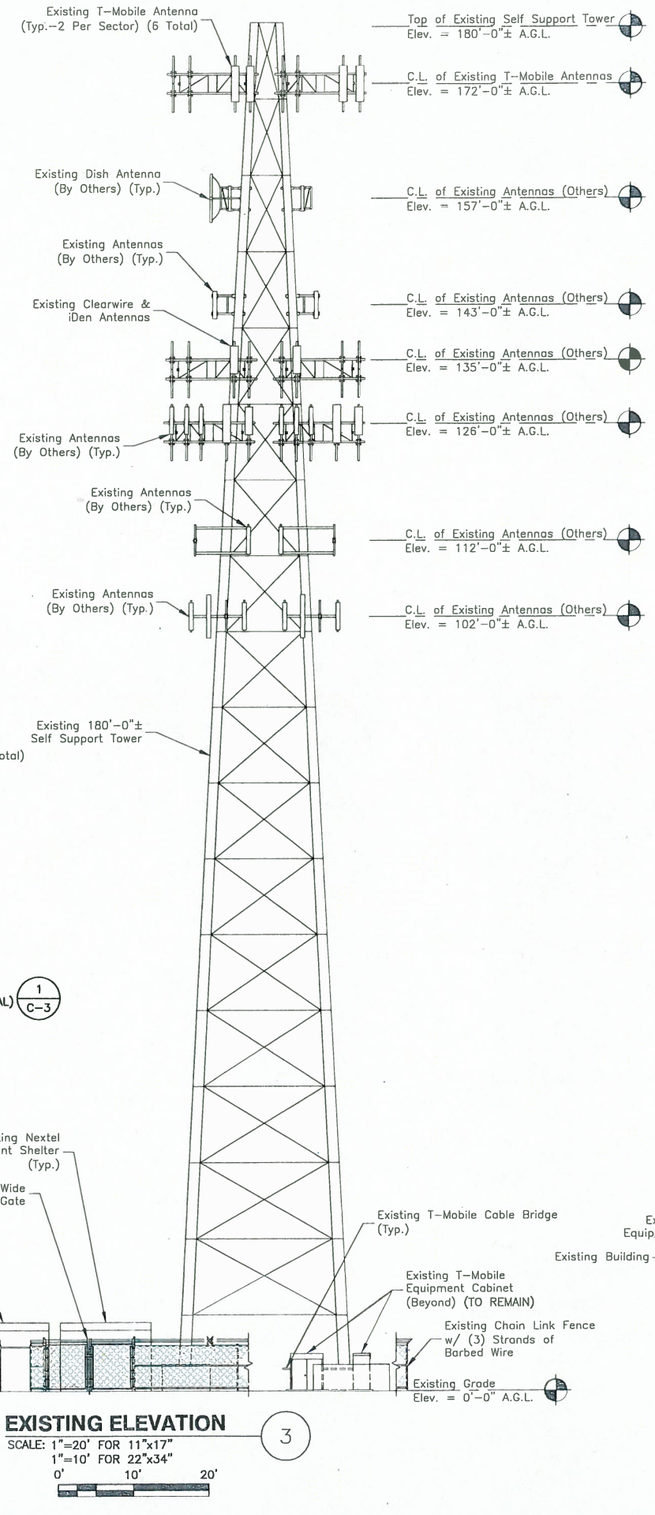


PROPOSED ANTENNA LAYOUT 2

SCALE: N.T.S.

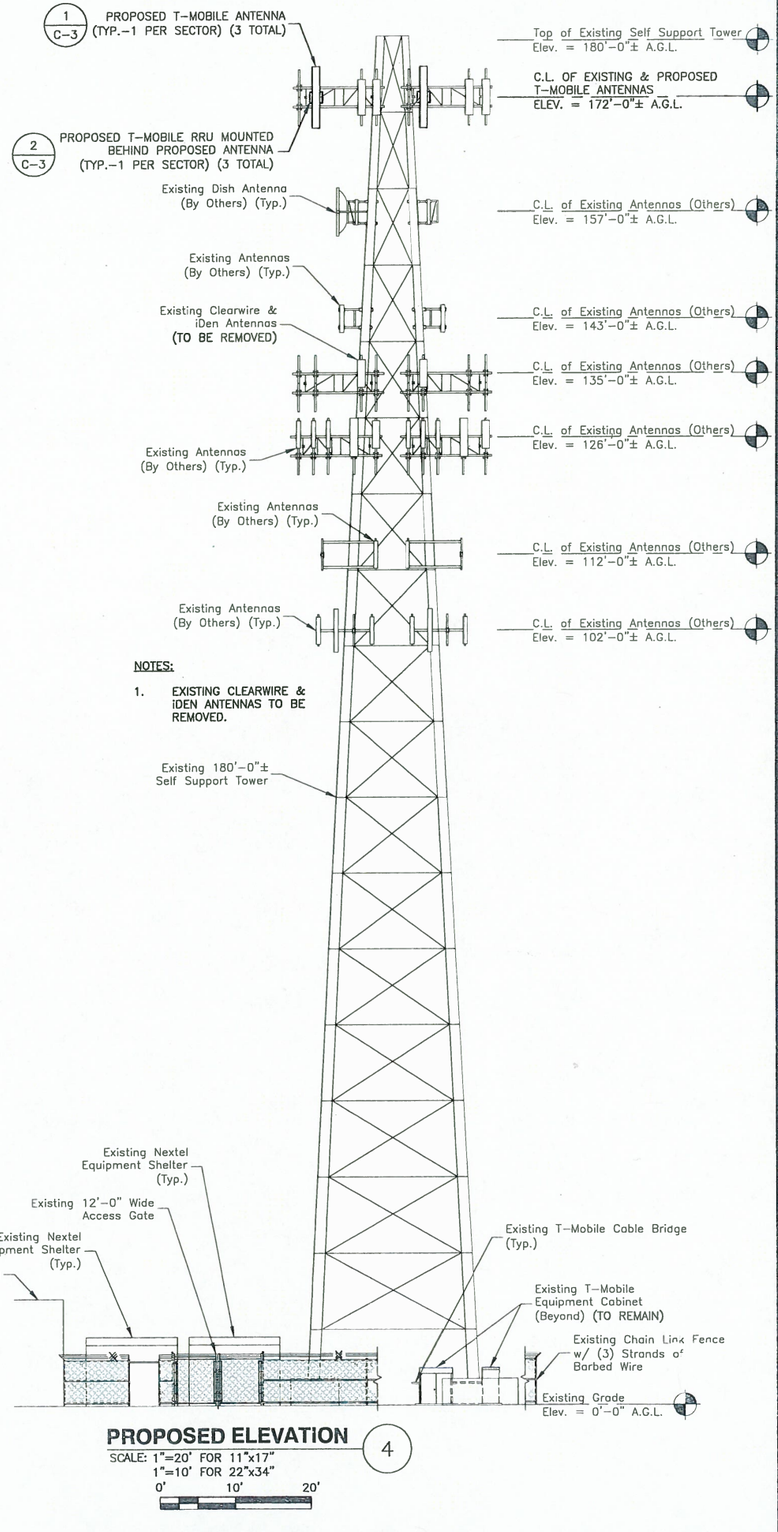
NOTES:

1. PRIOR TO START OF ANY WORK, A PASSING STRUCTURAL ANALYSIS SHALL BE PROVIDED BY A NEW YORK LICENSED P.E. CONTRACTOR TO OBTAIN A COPY BEFORE STARTING ANY WORK.
2. ALL PROPOSED EQUIPMENT, INCLUDING ANTENNAS, RRU'S, COAX, ETC., SHALL BE MOUNTED IN ACCORDANCE WITH STRUCTURAL ANALYSIS TO BE COMPLETED BY OTHERS.
3. DEWBERRY HAS NOT BEEN CONTRACTED TO PERFORM A STRUCTURAL ANALYSIS ON THE EXISTING ANTENNA MOUNT AND THEREFORE ASSUMES NO RESPONSIBILITY FOR THE STRUCTURAL CAPACITY.



EXISTING ELEVATION 3

SCALE: 1"=20' FOR 11"x17"
1"=10' FOR 22"x34"
0' 10' 20'



NOTES:

1. EXISTING CLEARWIRE & IDEN ANTENNAS TO BE REMOVED.

PROPOSED ELEVATION 4

SCALE: 1"=20' FOR 11"x17"
1"=10' FOR 22"x34"
0' 10' 20'

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PROFESSIONAL ENGINEER
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JOB NUMBER:	50074598

SITE ADDRESS:

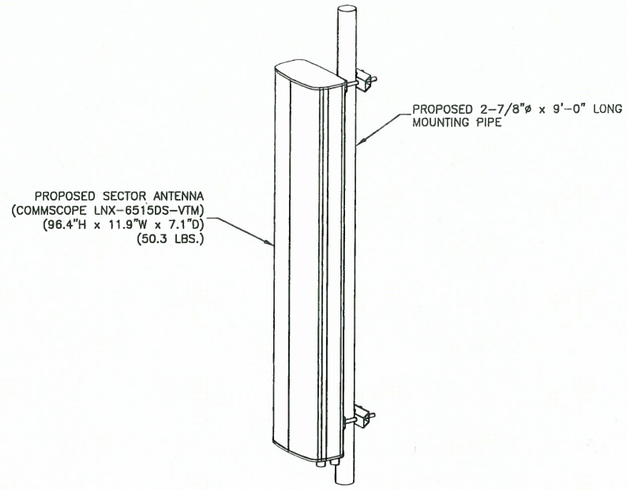
50 ROCKLAND ROAD
NORWALK OFC-MTSO
SO. NORWALK, CT 06854
FAIRFIELD COUNTY

SHEET TITLE

ANTENNA LAYOUTS & ELEVATIONS

SHEET NUMBER

C-2

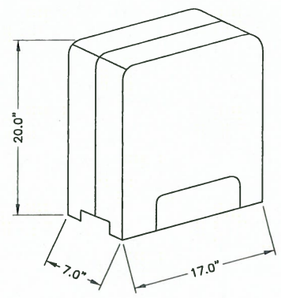


NOTES:

1. MOUNT ANTENNAS PER MANUFACTURER'S RECOMMENDATIONS.
2. GROUND ANTENNAS AND MOUNTS PER MANUFACTURER'S RECOMMENDATIONS AND T-MOBILE STANDARDS.
3. CONFIRM REQUIRED ANTENNAS WITH THE LATEST RFDS.

ISOMETRIC ANTENNA DETAIL 1

SCALE: N.T.S.



SPECIFICATIONS:

HEIGHT:	20.0"
WIDTH:	17.0"
DEPTH:	7.0"
WEIGHT:	50.7 LBS

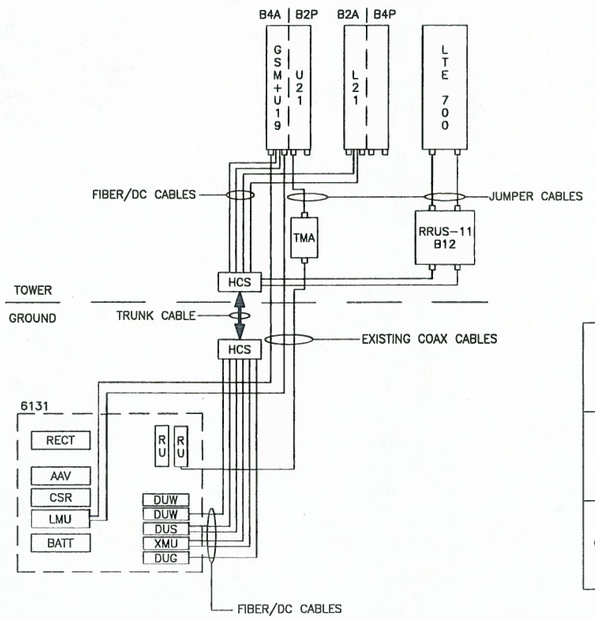
ERICSSON RRUS-11 B12

RRU NOTES:

1. MOUNT EQUIPMENT PER MANUFACTURER'S RECOMMENDATIONS.
2. GROUND EQUIPMENT AND MOUNTS PER MANUFACTURER'S RECOMMENDATIONS AND T-MOBILE STANDARDS.
3. CONFIRM REQUIRED EQUIPMENT WITH THE LATEST RFDS.

RRUS-11 - REMOTE RADIO UNIT 2

SCALE: N.T.S.



SITE CONFIGURATION 702Cu 1

SCALE: N.T.S.

DESIGN CONFIGURATION

	ANTENNAS		COAX		COAX LENGTH	RRH	
	EXISTING	PROPOSED	EXISTING	PROPOSED		EXISTING	PROPOSED
ALPHA	ERICSSON AIR21 B4A B2P	EXISTING TO REMAIN	(4) 1-5/8"ø & MLE HYBRID 9POWER/18FIBER RL 2	–	223'-0"	–	–
	ERICSSON AIR21 B2A B4P	EXISTING TO REMAIN				–	–
	–	COMMSCOPE LNX-6515DS-VTM				–	RRUS 11 B12
BETA	ERICSSON AIR21 B4A B2P	EXISTING TO REMAIN	(4) 1-5/8"ø & MLE HYBRID 9POWER/18FIBER RL 2	–	223'-0"	–	–
	ERICSSON AIR21 B2A B4P	EXISTING TO REMAIN				–	–
	–	COMMSCOPE LNX-6515DS-VTM				–	RRUS 11 B12
GAMMA	ERICSSON AIR21 B4A B2P	EXISTING TO REMAIN	(4) 1-5/8"ø & MLE HYBRID 9POWER/18FIBER RL 2	–	223'-0"	–	–
	ERICSSON AIR21 B2A B4P	EXISTING TO REMAIN				–	–
	–	COMMSCOPE LNX-6515DS-VTM				–	RRUS 11 B12

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NORWALK OFC-MTSO
SO. NORWALK, CT 06854
FAIRFIELD COUNTY

SHEET TITLE

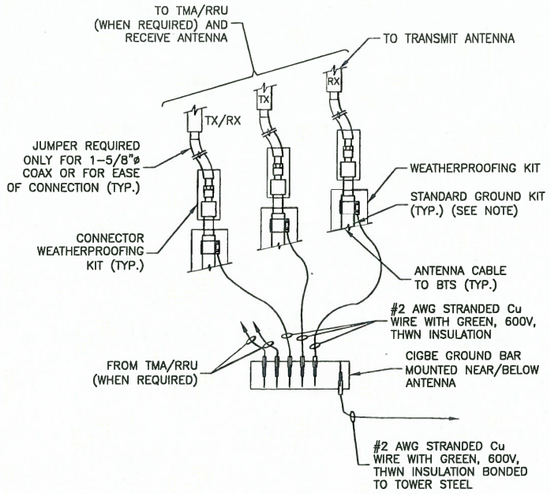
CONSTRUCTION DETAILS

SHEET NUMBER

C-3

GROUNDING NOTES:

1. THE CONTRACTOR SHALL REVIEW AND INSPECT THE EXISTING FACILITY GROUNDING SYSTEM AND LIGHTNING PROTECTION SYSTEM (AS DESIGNED AND INSTALLED) FOR STRICT COMPLIANCE WITH THE NEC (AS ADOPTED BY THE AHJ). THE SITE-SPECIFIC (UL, LPI, OR NFPA) LIGHTING PROTECTION CODE, AND GENERAL COMPLIANCE WITH TELCORDIA AND TIA GROUNDING STANDARDS. THE CONTRACTOR SHALL REPORT ANY VIOLATIONS OR ADVERSE FINDINGS TO THE ENGINEER FOR RESOLUTION.
2. ALL GROUND ELECTRODE SYSTEMS (INCLUDING TELECOMMUNICATION, RADIO, LIGHTNING PROTECTION, AND AC POWER GES'S) SHALL BE BONDED TOGETHER, AT OR BELOW GRADE, BY TWO OR MORE COPPER BONDING CONDUCTORS. ALL AVAILABLE GROUNDING ELECTRODES SHALL BE CONNECTED TOGETHER IN ACCORDANCE WITH THE NEC.
3. THE CONTRACTOR SHALL PERFORM IEEE FALL-OF-POTENTIAL RESISTANCE TO EARTH TESTING (PER IEEE 1100 AND 81) FOR GROUND ELECTRODE SYSTEMS. USE OF OTHER METHODS MUST BE PRE-APPROVED BY THE ENGINEER IN WRITING.
4. THE CONTRACTOR SHALL FURNISH AND INSTALL SUPPLEMENTAL GROUND ELECTRODES AS NEEDED TO ACHIEVE A TEST RESULT OF 5 OHMS OR LESS ON TOWER SITES AND 10 OHMS OR LESS ON ROOFTOP SITES. WHEN ADDING ELECTRODES, CONTRACTOR SHALL MAINTAIN A MINIMUM DISTANCE BETWEEN THE ADDED ELECTRODE AND ANY OTHER EXISTING ELECTRODE EQUAL TO THE BURIED LENGTH OF THE ROD. IDEALLY, CONTRACTOR SHALL STRIVE TO KEEP THE SEPARATION DISTANCE EQUAL TO TWICE THE BURIED LENGTH OF THE RODS.
5. THE CONTRACTOR IS RESPONSIBLE FOR PROPERLY SEQUENCING GROUNDING AND UNDERGROUND CONDUIT INSTALLATION AS TO PREVENT ANY LOSS OF CONTINUITY IN THE GROUNDING SYSTEM OR DAMAGE TO THE CONDUIT.
6. METAL CONDUIT AND TRAY SHALL BE GROUNDED AND MADE ELECTRICALLY CONTINUOUS WITH LISTED BONDING FITTINGS OR BY BONDING ACROSS THE DISCONTINUITY WITH 6 AWG COPPER WIRE AND UL APPROVED GROUNDING TYPE CONDUIT CLAMPS.
7. METAL RACEWAY SHALL NOT BE USED AS THE NEC REQUIRED EQUIPMENT GROUND CONDUCTOR. STRANDED COPPER CONDUCTORS WITH GREEN INSULATION, SIZED IN ACCORDANCE WITH THE NEC, SHALL BE FURNISHED AND INSTALLED WITH THE POWER CIRCUITS TO TRANSMISSION EQUIPMENT.
8. CONNECTIONS TO THE GROUND BUS SHALL NOT BE DOUBLED UP OR STACKED. BACK-TO-BACK CONNECTIONS ON OPPOSITE SIDES OF THE GROUND BUS ARE PERMITTED.
9. ALUMINUM CONDUCTOR OR COPPER CLAD STEEL CONDUCTOR SHALL NOT BE USED FOR GROUNDING CONNECTIONS.
10. USE OF 90° BENDS IN THE PROTECTION GROUNDING CONDUCTORS SHALL BE AVOIDED WHEN 45° BENDS CAN BE ADEQUATELY SUPPORTED. IN ALL CASES, BENDS SHALL BE MADE WITH A MINIMUM BEND RADIUS OF 8 INCHES.
11. EACH INTERIOR TRANSMISSION CABINET FRAME/PLINTH SHALL BE DIRECTLY CONNECTED TO THE MASTER GROUND BAR WITH 6 AWG STRANDED, GREEN INSULATED SUPPLEMENTAL EQUIPMENT GROUND WIRE UNLESS NOTED OTHERWISE IN THE DETAILS. EACH OUTDOOR CABINET FRAME/PLINTH SHALL BE DIRECTLY CONNECTED TO THE BURIED GROUND RING WITH 2 AWG SOLID TIN-PLATED COPPER WIRE UNLESS NOTED OTHERWISE IN THE DETAILS.
12. ALL EXTERIOR GROUND CONDUCTORS BETWEEN EQUIPMENT/GROUND BARS AND THE GROUND RING, SHALL BE 2 AWG SOLID TIN-PLATED COPPER UNLESS OTHERWISE INDICATED.
13. EXOTHERMIC WELDS SHALL BE USED FOR ALL GROUNDING CONNECTIONS BELOW GRADE. CONNECTIONS TO ABOVE GRADE UNITS SHALL BE MADE WITH EXOTHERMIC WELDS WHERE PRACTICAL OR WITH 2 HOLE MECHANICAL TYPE BRASS CONNECTORS WITH STAINLESS STEEL HARDWARE, INCLUDING SET SCREWS. HIGH PRESSURE CRIMP CONNECTORS MAY ONLY BE USED WITH WRITTEN PERMISSION FROM T-MOBILE MARKET REPRESENTATIVE.
14. EXOTHERMIC WELDS SHALL BE PERMITTED ON TOWERS ONLY WITH THE EXPRESS APPROVAL OF THE TOWER MANUFACTURER OR THE CONTRACTORS STRUCTURAL ENGINEER.
15. ALL WIRE TO WIRE GROUND CONNECTIONS TO THE INTERIOR GROUND RING SHALL BE FORMED USING HIGH PRESS CRIMPS OR SPLIT BOLT CONNECTORS WHERE INDICATED IN THE DETAILS.
16. ON ROOFTOP SITES WHERE EXOTHERMIC WELDS ARE A FIRE HAZARD COPPER COMPRESSION CAP CONNECTORS MAY BE USED FOR WIRE TO WIRE CONNECTORS. 2 HOLE MECHANICAL TYPE BRASS CONNECTORS WITH STAINLESS STEEL HARDWARE, INCLUDING SET SCREWS SHALL BE USED FOR CONNECTION TO ALL ROOFTOP TRANSMISSION EQUIPMENT AND STRUCTURAL STEEL.
17. COAX BRIDGE BONDING CONDUCTORS SHALL BE EXOTHERMICALLY BONDED OR BOLTED TO THE BRIDGE AND THE TOWER GROUND BAR USING TWO-HOLE MECHANICAL TYPE BRASS CONNECTORS AND STAINLESS STEEL HARDWARE.
18. APPROVED ANTIOXIDANT COATINGS (I.E., CONDUCTIVE GEL OR PASTE) SHALL BE USED ON ALL COMPRESSION AND BOLTED GROUND CONNECTIONS.
19. ALL EXTERIOR GROUND CONNECTIONS SHALL BE COATED WITH A CORROSION RESISTANT MATERIAL.
20. MISCELLANEOUS ELECTRICAL AND NON-ELECTRICAL METAL BOXES, FRAMES AND SUPPORTS SHALL BE BONDED TO THE GROUND RING, IN ACCORDANCE WITH THE NEC.
21. BOND ALL METALLIC OBJECTS WITHIN 6 FT OF THE BURIED GROUND RING WITH 2 AWG SOLID TIN-PLATED COPPER GROUND CONDUCTOR. DURING EXCAVATION FOR NEW GROUND CONDUCTORS, IF EXISTING GROUND CONDUCTORS ARE ENCOUNTERED, BOND EXISTING GROUND CONDUCTORS TO NEW CONDUCTORS.
22. GROUND CONDUCTORS USED IN THE FACILITY GROUND AND LIGHTNING PROTECTION SYSTEMS SHALL NOT BE ROUTED THROUGH METALLIC OBJECTS THAT FORM A RING AROUND THE CONDUCTOR, SUCH AS METALLIC CONDUITS, METAL SUPPORT CLIPS OR SLEEVES THROUGH WALLS OR FLOORS. WHEN IT IS REQUIRED TO BE HOUSED IN CONDUIT TO MEET CODE REQUIREMENTS OR LOCAL CONDITIONS, NON-METALLIC MATERIAL SUCH AS PVC PLASTIC CONDUIT SHALL BE USED. WHERE USE OF METAL CONDUIT IS UNAVOIDABLE (E.G., NON-METALLIC CONDUIT PROHIBITED BY LOCAL CODE) THE GROUND CONDUCTOR SHALL BE BONDED TO EACH END OF THE METAL CONDUIT WITH LISTED BONDING FITTINGS.

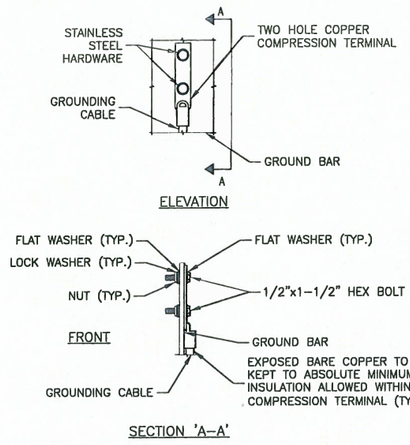


NOTE:

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

CONNECTION OF GROUND WIRES TO GROUNDING BAR (CIGBE) — 1

SCALE: N.T.S.

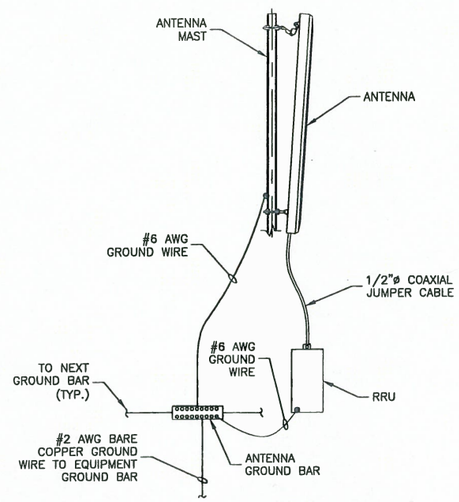


NOTES:

1. DOUBLING UP OR STACKING OF CONNECTIONS IS NOT PERMITTED.
2. OXIDE INHIBITING COMPOUND TO BE USED AT ALL LOCATIONS.

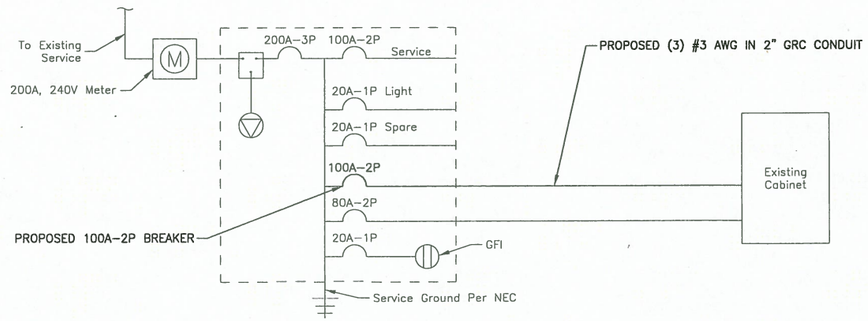
TYPICAL GROUND BAR MECHANICAL CONNECTION DETAIL — 2

SCALE: N.T.S.



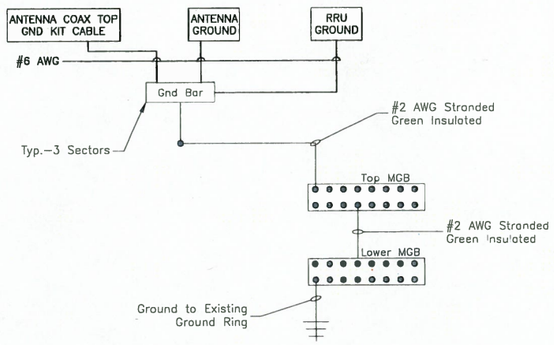
TYPICAL ANTENNA GROUNDING DETAIL — 3

SCALE: N.T.S



ONE LINE POWER DIAGRAM — 4

SCALE: N.T.S.



NOTES:

1. BOND ANTENNA GROUNDING KIT CABLE TO TOP CIGBE
2. BOND ANTENNA GROUNDING KIT CABLE TO BOTTOM CIGBE.
3. SCHEMATIC GROUNDING DIAGRAM IS TYPICAL FOR EACH SECTOR.
4. VERIFY EXISTING GROUND SYSTEM IS INSTALLED PER T-MOBILE STANDARDS.

SCHEMATIC GROUNDING DIAGRAM — 5

SCALE: N.T.S.

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STATE OF CONNECTICUT — JIANG — No. 25222 — PROFESSIONAL ENGINEER
CONNECTICUT LICENSE NO. 0023222

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FAIRFIELD COUNTY

SHEET TITLE

GROUNDING NOTES & DETAILS

SHEET NUMBER

E-1

Date: **July 22, 2015**

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(949) 809-4999

Subject: **Structural Analysis Report**

Carrier Designation:	***T-Mobile* Co-Locate**	
	Carrier Site Number:	CT11114D
	Carrier Site Name:	Norwalk/ South Norwalk
Crown Castle Designation:	**Crown Castle BU Number:**	807133
	Crown Castle Site Name:	BRG 134 943057
	Crown Castle JDE Job Number:	340883
	Crown Castle Work Order Number:	1092768
	Crown Castle Application Number:	303556 Rev. 0
Engineering Firm Designation:	**FDH Velocitel Project Number:**	15BWJD1400

Site Data: **50 ROCKLAND ROADNORWALK OFC - MTSO, SO NORWALK, Fairfield County, CT**
Latitude *41° 4' 54.44"*, Longitude *-73° 25' 49.52"*
180 Foot - Self Support Tower

Dear Sean Dempsey,

FDH Velocitel is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above mentioned tower. This analysis has been performed in accordance with the Crown Castle Structural 'Statement of Work' and the terms of Crown Castle Purchase Order Number 808503, in accordance with application 303556, revision 0.

The purpose of the analysis is to determine acceptability of the tower stress level. Based on our analysis we have determined the tower stress level for the structure and foundation, under the following load case, to be:

LC7: Existing + Reserved + Proposed Equipment **Sufficient Capacity**
Note: See Table I and Table II for the proposed and existing/reserved loading, respectively.

The analysis has been performed in accordance with the TIA/EIA-222-F standard and local code requirements based upon a wind speed of 85 mph fastest mile.

All modifications and equipment proposed in this report shall be installed in accordance with the attached drawings for the determined available structural capacity to be effective.

We at *FDH Velocitel* appreciate the opportunity of providing our continuing professional services to you and Crown Castle. If you have any questions or need further assistance on this or any other projects please give us a call.

Respectfully submitted by:

Kevin C. Diaz, EIT
Project Engineer

Reviewed by:

Dennis D. Abel, PE
Director – Structural Engineering
CT PE License No. 23247

07-22-2015

STATE OF CONNECTICUT
No. 23247
LICENSED PROFESSIONAL ENGINEER

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 180 ft Self Support tower designed by ROHN in July of 1987. The tower was originally designed for E.I.A. Zone A. This tower has been modified per reinforcement drawings prepared by Vertical Solutions in November of 2004. Modifications include installation of diagonal reinforcement. These modifications were considered in this analysis.

2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 85 mph with no ice, 37.6 mph with 0.75 inch ice thickness and 50 mph under service loads.

Table 1 - Proposed Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
172.0	173.0	3	commscope	LNX-6515DS-VTM w/ Mount Pipe	-	-	-
		3	ericsson	RRUS 11 B12			

Table 2 - Existing and Reserved Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
178.0	178.0	2	crown mounts	Side Arm Mount [SO 306-1]	-	-	1
172.0	173.0	3	ericsson	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	13	1-5/8	1
		3	ericsson	ERICSSON AIR 21 B4A B2P w/ Mount Pipe			
		3	ericsson	KRY 112 144/1			
	172.0	1	crown mounts	Sector Mount [SM 602-3]			
157.0	157.0	2	andrew	VHLP2-18	2	1/2	1
		2	crown mounts	Side Arm Mount [SO 202-1]			
148.0	148.0	3	alcatel lucent	TD-RRH8x20-25	1	1-1/4	2
		3	rfs celwave	APXVTM14-C-120 w/ Mount Pipe			
		9	rfs celwave	ACU-A20-N	3	1-1/4	1
		3	rfs celwave	APXVSPP18-C-A20 w/ Mount Pipe			
		1	site pro	Site Pro VFA12-U w/ 12' Stiff Arm			
143.0	145.0	3	alcatel lucent	800 EXTERNAL NOTCH FILTER	-	-	1
		3	alcatel lucent	PCS 1900MHz 4x45W-65MHz			
		3	alcatel lucent	TME-800MHZ 2X50W RRH			
	143.0	1	crown mounts	Side Arm Mount [SO 312-3]			
	142.0	3	alcatel lucent	PCS 1900MHz 4x45W-65MHz			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
134.0	135.0	1	andrew	VHLP2-23	9 6 1	1-1/4 5/16 1/2	3
		3	argus tech	LLPX310R w/ Mount Pipe			
		9	decibel	DB844H90-XY w/ Mount Pipe			
		3	samsung telecommunication	FDD_R6_RRH			
	134.0	1	crown mounts	Pipe Mount [PM 601-1]			
		1	crown mounts	Sector Mount [SM 502-3]			
126.0	130.0	1	gps	GPS_A	19 1	1-5/8 1/2	1
	128.0	3	alcatel lucent	RRH2X40-AWS			
		2	andrew	LNX-6514DS-T4M w/ Mount Pipe			
		4	decibel	DB844G65ZAXY w/ Mount Pipe			
		2	decibel	DB844H80-XY w/ Mount Pipe			
		1	powerwave technologies	P65.16.XL.2 w/ Mount Pipe			
		1	rfs celwave	DB-T1-6Z-8AB-0Z			
		3	rymsa wireless	MG D3-800TV w/ Mount Pipe			
		3	rymsa wireless	MG D3-800Tx w/ Mount Pipe			
	126.0	1	crown mounts	Sector Mount [SM 410-3]			
112.0	112.0	1	crown mounts	Sector Mount [SM 104-3]	6	1-5/8	1
		3	kathrein	800 10504 w/ Mount Pipe			
102.0	102.0	6	ericsson	RRUS 11 B2	-	-	2
		6	powerwave technologies	LGP2140X			
		6	powerwave technologies	7770.00 w/ Mount Pipe	12 2 1	1-5/8 5/8 3/8	1
		6	powerwave technologies	LGP2140X			
		3	powerwave technologies	P65-16-XLH-RR w/ Mount Pipe			
		1	raycap	DC6-48-60-18-8F			
		1	crown mounts	Sector Mount [SM 301-3]			
30.0	30.0	2	crown mounts	Side Arm Mount [SO 701-1]	2	1/2	1
		2	gps	GPS_A			
12.0	12.0	1	astron wireless	VG-1060	2	1/4	1
		1	crown mounts	Pipe Mount [PM 601-1]			
		1	gps	GPS_A			

Notes:
1) Existing Equipment
2) Reserved Equipment; Considered in Analysis
3) Equipment to be Removed; Not Considered in Analysis

Table 3 - Design Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
217	217	4	celwave	PD10017	-	-
207	207	6	celwave	PD1132		
180	180	3	generic	8' Dish		
170	170	1	generic	8' Dish		
156	156	1	generic	8' Dish		
150	150	1	generic	8' Dish		
130	130	1	celwave	PD1109		

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	FDH Engineering, Inc.	2311843	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	Arcnet/ Paul J. Ford	821566	CCISITES
4-TOWER MANUFACTURER DRAWINGS	Rohn	392878	CCISITES
4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	Vertical Structures, Inc.	1257479	CCISITES
4-POST-MODIFICATION INSPECTION	Vertical Structures, Inc.	4065020	CCISITES

3.1) Analysis Method

tnxTower (version 6.1.4.1), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A.

3.2) Assumptions

1) Tower and structures were built in accordance with the manufacturer's specifications.
2) The tower and structures have been maintained in accordance with the manufacturer's specification.
3) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
4) When applicable, transmission cables are considered as structural components for calculating wind loads as allowed by TIA/EIA-222-F.

This analysis may be affected if any assumptions are not valid or have been made in error. FDH Velocitel should be notified to determine the effect on the structural integrity of the tower.

4) ANALYSIS RESULTS

Table 5 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
T1	180 - 160	Leg	ROHN 3 EH	1	-9.86	96.06	10.3	Pass
T2	160 - 153.333	Leg	ROHN 4 EH	36	-14.39	139.07	10.3	Pass
T3	153.333 - 146.667	Leg	ROHN 4 EH	43	-20.98	139.07	15.1	Pass
T4	146.667 - 140	Leg	ROHN 4 EH	55	-28.80	139.07	20.7	Pass
T5	140 - 120	Leg	ROHN 5 EH	67	-57.26	206.29	27.8	Pass
T6	120 - 100	Leg	ROHN 6 EHS	88	-91.83	236.06	38.9	Pass
T7	100 - 80	Leg	ROHN 6 EH	109	-125.66	264.29	47.5	Pass
T8	80 - 70	Leg	ROHN 8 EHS	124	-143.17	332.54	43.1	Pass
T9	70 - 60	Leg	ROHN 8 EHS	133	-160.94	332.54	48.4	Pass
T10	60 - 40	Leg	ROHN 8 EHS	142	-195.45	332.54	58.8	Pass
T11	40 - 20	Leg	ROHN 8 EH	157	-229.17	435.22	52.7	Pass
T12	20 - 0	Leg	ROHN 8 EH	172	-262.49	435.22	60.3	Pass
T1	180 - 160	Diagonal	L2x2x3/16	15	-2.11	6.68	31.5 36.3 (b)	Pass
T2	160 - 153.333	Diagonal	L2 1/2x2 1/2x1/4	41	-2.62	13.09	20.1 28.2 (b)	Pass
T3	153.333 - 146.667	Diagonal	L2 1/2x2 1/2x1/4	53	-3.16	11.83	26.7 33.4 (b)	Pass
T4	146.667 - 140	Diagonal	L2 1/2x2 1/2x1/4	65	-4.57	10.74	42.6 49.4 (b)	Pass
T5	140 - 120	Diagonal	L2 1/2x2 1/2x1/4	74	-6.32	8.26	76.5	Pass
T6	120 - 100	Diagonal	L3x3x1/4	95	-7.86	11.62	67.6 77.1 (b)	Pass
T7	100 - 80	Diagonal	L3 1/2x3 1/2x1/4	112	-9.44	12.51	75.5 77.6 (b)	Pass
T8	80 - 70	Diagonal	L3 1/2x3 1/2x1/4	127	-9.87	11.68	84.5	Pass
T9	70 - 60	Diagonal	2L3 1/2x3 1/2x1/4x3/8	136	-10.53	17.97	58.6 59.9 (b)	Pass
T10	60 - 40	Diagonal	L4x4x1/4	145	-10.88	13.64	79.8 86.6 (b)	Pass
T11	40 - 20	Diagonal	L4x4x5/16	160	-11.38	14.28	79.7	Pass
T12	20 - 0	Diagonal	2L4x4x5/16x3/8	175	-12.32	20.68	59.6 70.3 (b)	Pass
T1	180 - 160	Top Girt	L2x2x1/8	4	-0.11	2.79	4.0	Pass
T3	153.333 - 146.667	Top Girt	L2x2x1/8	46	-0.21	1.36	15.5	Pass
T4	146.667 - 140	Top Girt	L2x2x1/8	60	0.13	8.50	1.5 3.1 (b)	Pass
T1	180 - 160	Mid Girt	L2x2x1/8	7	-0.25	2.05	12.3	Pass
							Summary	
						Leg (T12)	60.3	Pass
						Diagonal (T10)	86.6	Pass
						Top Girt (T3)	15.5	Pass
						Mid Girt (T1)	12.3	Pass

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
						Bolt Checks	86.6	Pass
						Rating =	**86.6**	Pass

Table 6 - Tower Component Stresses vs. Capacity – LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Base Foundation	0	98.9	Pass

Structure Rating (max from all components) =	**98.9%**

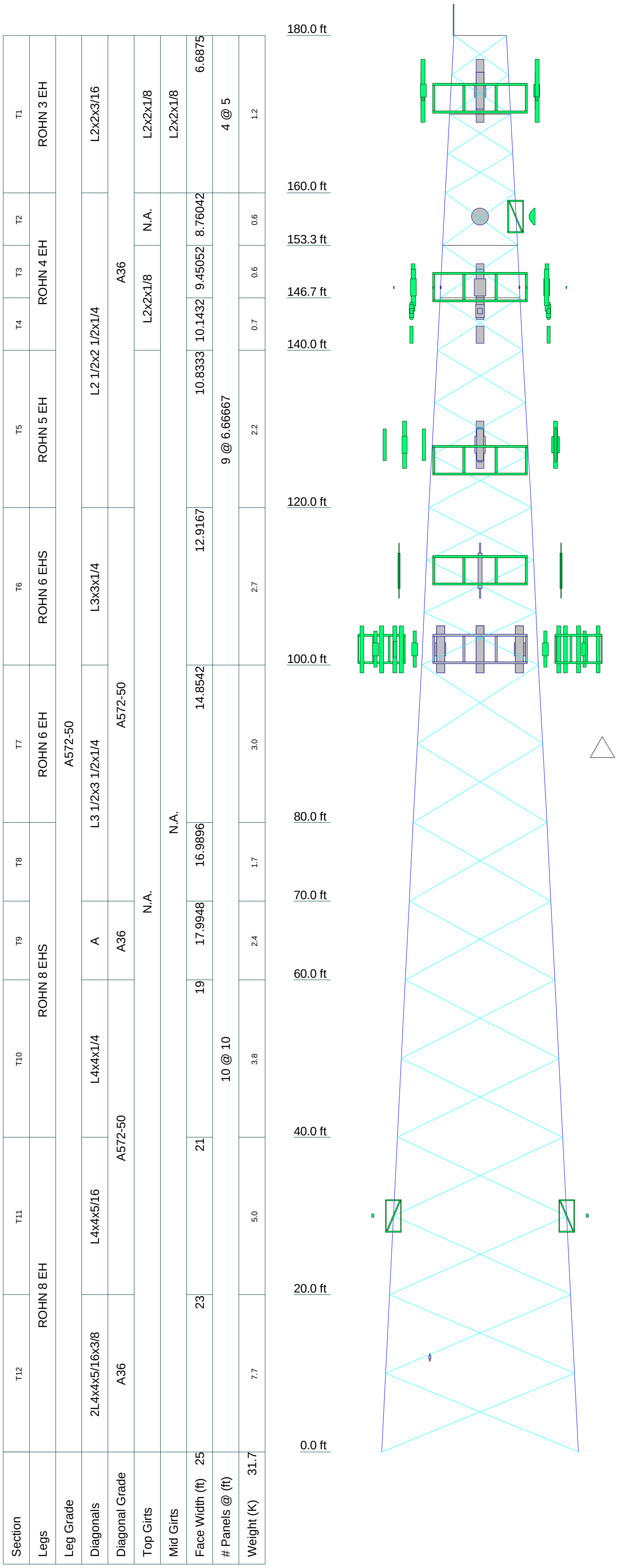
Notes:
1) See additional documentation in “Appendix C – Additional Calculations” for calculations supporting the % capacity consumed.

4.1) Recommendations

The tower and its foundations have sufficient capacity to carry the existing, reserved, and proposed loads. No modifications are required at this time.

APPENDIX A

TNXTOWER OUTPUT



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Lightning Rod	180	Side Arm Mount [SO 312-3]	143
Empty Pipe Mount	178	PCS 1900MHz 4x45W-65MHz	143
Empty Pipe Mount	178	PCS 1900MHz 4x45W-65MHz	143
Side Arm Mount [SO 306-1]	178	(2) DB844G65ZAXY w/ Mount Pipe	126
Side Arm Mount [SO 306-1]	178	LNX-6514DS-T4M w/ Mount Pipe	126
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	172	LNX-6514DS-T4M w/ Mount Pipe	126
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	172	MG D3-800TV w/ Mount Pipe	126
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	172	MG D3-800TV w/ Mount Pipe	126
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	172	MG D3-800TV w/ Mount Pipe	126
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	172	MG D3-800Tx w/ Mount Pipe	126
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	172	MG D3-800Tx w/ Mount Pipe	126
LNX-6515DS-VTM w/ Mount Pipe	172	MG D3-800Tx w/ Mount Pipe	126
LNX-6515DS-VTM w/ Mount Pipe	172	DB844H80-XY w/ Mount Pipe	126
LNX-6515DS-VTM w/ Mount Pipe	172	DB844H80-XY w/ Mount Pipe	126
KRY 112 144/1	172	GPS_A	126
KRY 112 144/1	172	P65.16.XL.2 w/ Mount Pipe	126
KRY 112 144/1	172	RRH2X40-AWS	126
RRUS 11 B12	172	RRH2X40-AWS	126
RRUS 11 B12	172	RRH2X40-AWS	126
RRUS 11 B12	172	DB-T1-6Z-8AB-0Z	126
Sector Mount [SM 602-3]	172	Sector Mount [SM 410-3]	126
Empty Pipe Mount	172	DB844G65ZAXY w/ Mount Pipe	126
Empty Pipe Mount	172	DB844G65ZAXY w/ Mount Pipe	126
Empty Pipe Mount	172	800 10504 w/ Mount Pipe	112
Side Arm Mount [SO 202-1]	157	Sector Mount [SM 104-3]	112
Side Arm Mount [SO 202-1]	157	Empty Mount Pipe	112
VHLP2-18	157	Empty Mount Pipe	112
VHLP2-18	157	Empty Mount Pipe	112
APXVSPP18-C-A20 w/ Mount Pipe	148	800 10504 w/ Mount Pipe	112
APXVTM14-C-120 w/ Mount Pipe	148	800 10504 w/ Mount Pipe	112
APXVTM14-C-120 w/ Mount Pipe	148	(2) 7770.00 w/ Mount Pipe	102
APXVTM14-C-120 w/ Mount Pipe	148	P65-16-XLH-RR w/ Mount Pipe	102
(3) ACU-A20-N	148	P65-16-XLH-RR w/ Mount Pipe	102
(3) ACU-A20-N	148	P65-16-XLH-RR w/ Mount Pipe	102
(3) ACU-A20-N	148	(2) LGP2140X	102
TD-RRH8x20-25	148	(2) LGP2140X	102
TD-RRH8x20-25	148	(2) LGP2140X	102
TD-RRH8x20-25	148	(2) LGP2140X	102
Site Pro VFA12-U w/ 12' Stiff Arm	148	(2) LGP2140X	102
APXVSPP18-C-A20 w/ Mount Pipe	148	(2) LGP2140X	102
APXVSPP18-C-A20 w/ Mount Pipe	148	(2) RRUS 11 B2	102
PCS 1900MHz 4x45W-65MHz	143	(2) RRUS 11 B2	102
PCS 1900MHz 4x45W-65MHz	143	(2) RRUS 11 B2	102
PCS 1900MHz 4x45W-65MHz	143	DC6-48-60-18-8F	102
PCS 1900MHz 4x45W-65MHz	143	Sector Mount [SM 301-3]	102
TME-800MHZ 2X50W RRH	143	Empty Mount Pipe	102
TME-800MHZ 2X50W RRH	143	Empty Mount Pipe	102
TME-800MHZ 2X50W RRH	143	Empty Mount Pipe	102
800 EXTERNAL NOTCH FILTER	143	(2) 7770.00 w/ Mount Pipe	102
800 EXTERNAL NOTCH FILTER	143	(2) 7770.00 w/ Mount Pipe	102
800 EXTERNAL NOTCH FILTER	143	Side Arm Mount [SO 701-1]	30
		Side Arm Mount [SO 701-1]	30
		GPS_A	30
		GPS_A	30
		Pipe Mount [PM 601-1]	12
		VG-1060	12
		GPS_A	12

SYMBOL LIST

MARK	SIZE	MARK	SIZE
A	2L3 1/2x3 1/2x1/4x3/8		

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower is located in Fairfield County, Connecticut.
2. Tower designed for a 85 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 38 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.

FDH VELOCITEL
ENGINEERING INNOVATION
Tower Analysis

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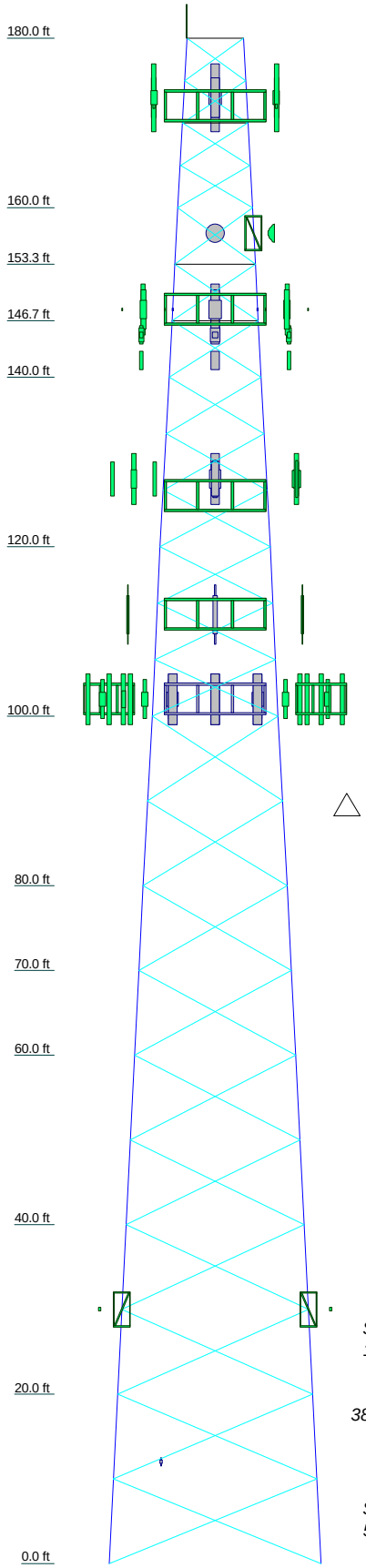
Irvine, California 92612
Phone: (949)809-4999
FAX: (949)553-3919

Job: ***BRG 134 943057 - BU# 807133***		
Project: ***15BWJD1400***		
Client: Crown Castle	Drawn by: KDiaz	App'd:
Code: TIA/EIA-222-F	Date: 07/22/15	Scale: NTS
Path:		Dwg No. E-1

Section	T12	T11	T10	T9	T8	T7	T6	T5	T4	T3	T2	T1
Legs	ROHN 8 EH			ROHN 8 EHS		ROHN 6 EH	ROHN 6 EHS	ROHN 5 EH		ROHN 4 EH		ROHN 3 EH
Leg Grade	A572-50											
Diagonals	2L4x4x5/16x3/8	L4x4x5/16	L4x4x1/4	A		L3 1/2x3 1/2x1/4	L3x3x1/4	L2 1/2x2 1/2x1/4				L2x2x3/16
Diagonal Grade	A36	A572-50		A36		A572-50				A36		
Top Girts				N.A.					L2x2x1/8		N.A.	L2x2x1/8
Mid Girts				N.A.								L2x2x1/8
Face Width (ft)	25	23	21	19	16.9896	14.8542	12.9167	10.8333	10.1432	9.45052	8.76042	6.6875
# Panels @ (ft)	7.7	5.0	3.8	2.4	1.7	3.0	2.7	2.2	0.7	0.6	0.6	1.2
Weight (K)	31.7											



SYMBOL LIST

MARK	SIZE	MARK	SIZE
A	2L3 1/2x3 1/2x1/4x3/8		

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower is located in Fairfield County, Connecticut.
2. Tower designed for a 85 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 38 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 86.6%

MAX. CORNER REACTIONS AT BASE:
DOWN: 271 K
SHEAR: 33 K

UPLIFT: -222 K
SHEAR: 28 K

AXIAL
111 K
SHEAR 16 K
MOMENT 1661 kip-ft
TORQUE 11 kip-ft
38 mph WIND - 0.7500 in ICE

AXIAL
57 K
SHEAR 54 K
MOMENT 5449 kip-ft
TORQUE 38 kip-ft
REACTIONS - 85 mph WIND

FDH VELOCITEL ENGINEERING INNOVATION
Tower Analysis

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Job: ***BRG 134 943057 - BU# 807133***			
Project: ***15BWJD1400***			
Client: Crown Castle	Drawn by: KDiaz	App'd:	
Code: TIA/EIA-222-F	Date: 07/22/15	Scale: NTS	
Path:		Dwg No. E-1	

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Tower Input Data

The main tower is a 3x free standing tower with an overall height of 180.00 ft above the ground line.
The base of the tower is set at an elevation of 0.00 ft above the ground line.
The face width of the tower is 6.69 ft at the top and 25.00 ft at the base.
This tower is designed using the TIA/EIA-222-F standard.
The following design criteria apply:

Tower is located in Fairfield County, Connecticut.
Basic wind speed of 85 mph.
Nominal ice thickness of 0.7500 in.
Ice thickness is considered to increase with height.
Ice density of 56 pcf.
A wind speed of 38 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 50 mph.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in tower member design is 1.333.
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		Treat Feedline Bundles As Cylinder
	Consider Moments - Horizontals		Assume Legs Pinned		Use ASCE 10 X-Brace Ly Rules
	Consider Moments - Diagonals	√	Assume Rigid Index Plate	√	Calculate Redundant Bracing Forces
	Use Moment Magnification	√	Use Clear Spans For Wind Area		Ignore Redundant Members in FEA
√	Use Code Stress Ratios	√	Use Clear Spans For KL/r	√	SR Leg Bolts Resist Compression
√	Use Code Safety Factors - Guys		Retension Guys To Initial Tension	√	All Leg Panels Have Same Allowable
√	Escalate Ice	√	Bypass Mast Stability Checks		Offset Girt At Foundation
	Always Use Max Kz	√	Use Azimuth Dish Coefficients	√	Consider Feedline Torque
	Use Special Wind Profile	√	Project Wind Area of Appurt.	√	Include Angle Block Shear Check
√	Include Bolts In Member Capacity		Autocalc Torque Arm Areas		Poles
	Leg Bolts Are At Top Of Section		SR Members Have Cut Ends		Include Shear-Torsion Interaction
√	Secondary Horizontal Braces Leg	√	Sort Capacity Reports By Component		Always Use Sub-Critical Flow
	Use Diamond Inner Bracing (4 Sided)		Triangulate Diamond Inner Bracing		Use Top Mounted Sockets
	Add IBC .6D+W Combination		Use TIA-222-G Tension Splice Capacity Exemption		

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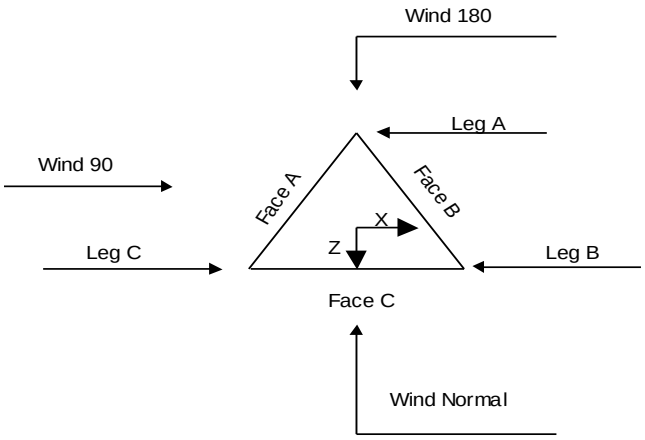


Triangular Tower

Tower Section Geometry

Tower Section	*Tower Elevation*	*Assembly Database*	*Description*	*Section Width*	*Number of Sections*	*Section Length*
	ft			*ft*		*ft*
T1	180.00-160.00			6.69	1	20.00
T2	160.00-153.33			8.76	1	6.67
T3	153.33-146.67			9.45	1	6.67
T4	146.67-140.00			10.14	1	6.67
T5	140.00-120.00			10.83	1	20.00
T6	120.00-100.00			12.92	1	20.00
T7	100.00-80.00			14.85	1	20.00
T8	80.00-70.00			16.99	1	10.00
T9	70.00-60.00			17.99	1	10.00
T10	60.00-40.00			19.00	1	20.00
T11	40.00-20.00			21.00	1	20.00
T12	20.00-0.00			23.00	1	20.00

Tower Section Geometry *(cont'd)*

Tower Section	*Tower Elevation*	*Diagonal Spacing*	*Bracing Type*	*Has K Brace End Panels*	*Has Horizontals*	*Top Girt Offset*	*Bottom Girt Offset*
	ft	*ft*				*in*	*in*
T1	180.00-160.00	5.00	X Brace	No	No	0.0000	0.0000
T2	160.00-153.33	6.67	X Brace	No	No	0.0000	0.0000
T3	153.33-146.67	6.67	X Brace	No	No	0.0000	0.0000

Tower Section	Tower Elevation ft	Diagonal Spacing ft	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset in	Bottom Girt Offset in
T4	146.67-140.00	6.67	X Brace	No	No	0.0000	0.0000
T5	140.00-120.00	6.67	X Brace	No	No	0.0000	0.0000
T6	120.00-100.00	6.67	X Brace	No	No	0.0000	0.0000
T7	100.00-80.00	10.00	X Brace	No	No	0.0000	0.0000
T8	80.00-70.00	10.00	X Brace	No	No	0.0000	0.0000
T9	70.00-60.00	10.00	X Brace	No	No	0.0000	0.0000
T10	60.00-40.00	10.00	X Brace	No	No	0.0000	0.0000
T11	40.00-20.00	10.00	X Brace	No	No	0.0000	0.0000
T12	20.00-0.00	10.00	X Brace	No	No	0.0000	0.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 180.00-160.00	Pipe	ROHN 3 EH	A572-50 (50 ksi)	Single Angle	L2x2x3/16	A36 (36 ksi)
T2 160.00-153.33	Pipe	ROHN 4 EH	A572-50 (50 ksi)	Single Angle	L2 1/2x2 1/2x1/4	A36 (36 ksi)
T3 153.33-146.67	Pipe	ROHN 4 EH	A572-50 (50 ksi)	Single Angle	L2 1/2x2 1/2x1/4	A36 (36 ksi)
T4 146.67-140.00	Pipe	ROHN 4 EH	A572-50 (50 ksi)	Single Angle	L2 1/2x2 1/2x1/4	A36 (36 ksi)
T5 140.00-120.00	Pipe	ROHN 5 EH	A572-50 (50 ksi)	Single Angle	L2 1/2x2 1/2x1/4	A36 (36 ksi)
T6 120.00-100.00	Pipe	ROHN 6 EHS	A572-50 (50 ksi)	Single Angle	L3x3x1/4	A572-50 (50 ksi)
T7 100.00-80.00	Pipe	ROHN 6 EH	A572-50 (50 ksi)	Single Angle	L3 1/2x3 1/2x1/4	A572-50 (50 ksi)
T8 80.00-70.00	Pipe	ROHN 8 EHS	A572-50 (50 ksi)	Single Angle	L3 1/2x3 1/2x1/4	A572-50 (50 ksi)
T9 70.00-60.00	Pipe	ROHN 8 EHS	A572-50 (50 ksi)	Double Equal Angle	2L3 1/2x3 1/2x1/4x3/8	A36 (36 ksi)
T10 60.00-40.00	Pipe	ROHN 8 EHS	A572-50 (50 ksi)	Single Angle	L4x4x1/4	A572-50 (50 ksi)
T11 40.00-20.00	Pipe	ROHN 8 EH	A572-50 (50 ksi)	Single Angle	L4x4x5/16	A572-50 (50 ksi)
T12 20.00-0.00	Pipe	ROHN 8 EH	A572-50 (50 ksi)	Double Equal Angle	2L4x4x5/16x3/8	A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Top Girt Type	Top Girt Size	Top Girt Grade	Bottom Girt Type	Bottom Girt Size	Bottom Girt Grade
T1 180.00-160.00	Equal Angle	L2x2x1/8	A36 (36 ksi)	Single Angle		A36 (36 ksi)
T3 153.33-146.67	Equal Angle	L2x2x1/8	A36 (36 ksi)	Single Angle		A36 (36 ksi)
T4 146.67-140.00	Single Angle	L2x2x1/8	A36 (36 ksi)	Single Angle		A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	No. of Mid Girts	Mid Girt Type	Mid Girt Size	Mid Girt Grade	Horizontal Type	Horizontal Size	Horizontal Grade
T1 180.00-160.00	1	Equal Angle	L2x2x1/8	A36 (36 ksi)	Single Angle		A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
T1 180.00-160.00	0.00	0.2500	A36 (36 ksi)	1	1	1	30.0000	30.0000
T2 160.00-153.33	0.00	0.2500	A36 (36 ksi)	1	1	1	30.0000	30.0000
T3 153.33-146.67	0.00	0.2500	A36 (36 ksi)	1	1	1	30.0000	30.0000
T4 146.67-140.00	0.00	0.2500	A36 (36 ksi)	1	1	1	30.0000	30.0000
T5 140.00-120.00	0.00	0.2500	A36 (36 ksi)	1	1	1	30.0000	30.0000
T6 120.00-100.00	0.00	0.2500	A36 (36 ksi)	1	1	1	30.0000	30.0000
T7 100.00-80.00	0.00	0.3750	A36 (36 ksi)	1	1	1	30.0000	30.0000
T8 80.00-70.00	0.00	0.3750	A36 (36 ksi)	1	1	1	30.0000	30.0000
T9 70.00-60.00	0.00	0.3750	A36 (36 ksi)	1	1	1	123.1250	30.0000
T10 60.00-40.00	0.00	0.3750	A36 (36 ksi)	1	1	1	30.0000	30.0000
T11 40.00-20.00	0.00	0.3750	A36 (36 ksi)	1	1	1	30.0000	30.0000
T12 20.00-0.00	0.00	0.3750	A36 (36 ksi)	1	1	1	155.6250	30.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	K Factors[1] Legs	X Brace Diags X Y	K Brace Diags X Y	Single Diags X Y	Girts X Y	Horiz. X Y	Sec. Horiz. X Y	Inner Brace X Y
T1	Yes	No	1	1	1	1	1	1	1	1

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	Legs	K Factors[1] X Brace Diags X Y	K Brace Diags X Y	Single Diags X Y	Girts X Y	Horiz. X Y	Sec. Horiz. X Y	Inner Brace X Y
180.00-160.00				1	1	1	1	1	1	1
T2	Yes	No	1	1	1	1	1	1	1	1
160.00-153.33				1	1	1	1	1	1	1
T3	Yes	No	1	1	1	1	1	1	1	1
153.33-146.67				1	1	1	1	1	1	1
T4	Yes	No	1	1	1	1	1	1	1	1
146.67-140.00				1	1	1	1	1	1	1
T5	Yes	No	1	1	1	1	1	1	1	1
140.00-120.00				1	1	1	1	1	1	1
T6	Yes	No	1	1	1	1	1	1	1	1
120.00-100.00				1	1	1	1	1	1	1
T7	Yes	No	1	1	1	1	1	1	1	1
100.00-80.00				1	1	1	1	1	1	1
T8	Yes	No	1	1	1	1	1	1	1	1
80.00-70.00				1	1	1	1	1	1	1
T9	Yes	No	1	1	1	1	1	1	1	1
70.00-60.00				1	1	1	1	1	1	1
T10	Yes	No	1	1	1	1	1	1	1	1
60.00-40.00				1	1	1	1	1	1	1
T11	Yes	No	1	1	1	1	1	1	1	1
40.00-20.00				1	1	1	1	1	1	1
T12	Yes	No	1	1	1	1	1	1	1	1
20.00-0.00				1	1	1	1	1	1	1

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

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Net Width Deduct in	Leg U	Diagonal Net Width Deduct in	Diagonal U	Top Girt Net Width Deduct in	Top Girt U	Bottom Girt Net Width Deduct in	Bottom Girt U	Mid Girt Net Width Deduct in	Mid Girt U	Long Horizontal Net Width Deduct in	Long Horizontal U	Short Horizontal Net Width Deduct in	Short Horizontal U
T1 180.00-160.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T2 160.00-153.33	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T3 153.33-146.67	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T4 146.67-140.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T5 140.00-120.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T6 120.00-100.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T7 100.00-80.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T8 80.00-70.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T9 70.00-60.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T10 60.00-40.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75

Tower Elevation ft	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U
T11 40.00-20.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T12 20.00-0.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Connection Type	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
		Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.
T1 180.00-160.00	Flange	0.8750 A325X	4	0.6250 A325X	1	0.6250 A325X	1	0.0000 A325X	0	0.6250 A325X	1	0.6250 A325X	0	0.6250 A325N	0
T2 160.00-153.33	Flange	0.0000 A325X	0	0.6250 A325X	1	0.0000 A325X	0	0.0000 A325X	0	0.6250 A325X	0	0.6250 A325X	0	0.6250 A325N	0
T3 153.33-146.67	Flange	0.0000 A325X	0	0.6250 A325X	1	0.6250 A325X	1	0.0000 A325X	0	0.6250 A325X	0	0.6250 A325X	0	0.6250 A325N	0
T4 146.67-140.00	Flange	1.0000 A325X	4	0.6250 A325X	1	0.6250 A325X	1	0.0000 A325X	0	0.6250 A325X	0	0.6250 A325X	0	0.6250 A325N	0
T5 140.00-120.00	Flange	1.0000 A325X	6	0.6250 A325X	1	0.0000 A325X	0	0.0000 A325X	0	0.6250 A325X	0	0.6250 A325X	0	0.6250 A325N	0
T6 120.00-100.00	Flange	1.0000 A325X	6	0.6250 A325X	1	0.0000 A325X	0	0.0000 A325X	0	0.6250 A325X	0	0.6250 A325X	0	0.6250 A325N	0
T7 100.00-80.00	Flange	1.0000 A325X	8	0.7500 A325X	1	0.0000 A325X	0	0.0000 A325X	0	0.6250 A325X	0	0.6250 A325X	0	0.6250 A325N	0
T8 80.00-70.00	Flange	0.0000 A325X	0	0.7500 A325X	1	0.0000 A325X	0	0.0000 A325X	0	0.6250 A325X	0	0.6250 A325X	0	0.6250 A325N	0
T9 70.00-60.00	Flange	1.0000 A325X	8	0.7500 A325X	1	0.0000 A325X	0	0.0000 A325X	0	0.6250 A325X	0	0.6250 A325X	0	0.6250 A325N	0
T10 60.00-40.00	Flange	1.0000 A325X	8	0.7500 A325X	1	0.0000 A325X	0	0.0000 A325X	0	0.6250 A325X	0	0.6250 A325X	0	0.6250 A325N	0
T11 40.00-20.00	Flange	1.0000 A325X	8	0.7500 A325X	1	0.0000 A325X	0	0.0000 A325X	0	0.6250 A325X	0	0.6250 A325X	0	0.6250 A325N	0
T12 20.00-0.00	Flange	1.0000 A449	10	0.7500 A325X	1	0.0000 A325X	0	0.0000 A325X	0	0.6250 A325X	0	0.6250 A325X	0	0.6250 A325N	0

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight klf
Safety Line 3/8	B	No	Ar (Leg)	180.00 - 0.00	0.0000	0	1	1	0.3750	0.3750		0.00
Feedline Ladder (Af) 1.5"	A	Yes	Af (CfAe)	157.00 - 0.00	0.0000	-0.4	2	2	24.0000 1.5000	1.5000	6.0000	0.00
Feedline Ladder (Af)	A	Yes	Af (CfAe)	172.00 - 0.00	0.0000	0	2	2	24.0000 1.5000	1.5000	6.0000	0.00

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight klf
1.5" Feedline Ladder (Af)	B	Yes	Af (CfAe)	112.00 - 0.00	0.0000	0.35	2	2	24.0000 1.5000	1.5000	6.0000	0.00
1.5" Feedline Ladder (Af)	C	Yes	Af (CfAe)	126.00 - 0.00	-1.0000	-0.3	4	2	24.0000 1.5000	1.5000	6.0000	0.00
1.5" 2" Rigid Conduit	A	Yes	Ar (CfAe)	134.00 - 0.00	0.0000	-0.4	1	1	2.0000	2.0000		0.00
********** ********** ********												
MLE Hybrid 9Power/18Fiber RL 2(1 5/8)	A	Yes	Ar (CfAe)	172.00 - 0.00	5.5000	-0.05	1	1	1.0000	1.6250		0.00
LCF158-50JA-A0(1 5/8")	A	Yes	Ar (CfAe)	172.00 - 0.00	0.0000	0	12	9	1.9800 1.0000	1.9800		0.00
*** 7983A(1/2")	A	Yes	Ar (CfAe)	157.00 - 0.00	0.0000	-0.425	2	2	1.0000	0.5800		0.00
*** HB114-21U3M12-XXXF(1-1/4")	A	Yes	Ar (CfAe)	148.00 - 0.00	0.0000	-0.375	4	4	1.0000	1.5400		0.00
*** 561(1-5/8")	C	Yes	Ar (CfAe)	126.00 - 0.00	-5.0000	-0.3	18	9	1.0000	1.6250		0.00
LDF4-50A(1/2")	C	Yes	Ar (CfAe)	126.00 - 0.00	-3.0000	-0.345	1	1	1.0000	0.6300		0.00
HB158-1-08U8-S8J18(1-5/8")	C	Yes	Ar (CfAe)	126.00 - 0.00	-4.7500	-0.345	1	1	1.0000	1.9800		0.00
*** LDF7-50A(1-5/8")	B	Yes	Ar (CfAe)	112.00 - 0.00	0.0000	0.35	6	6	1.0000	1.9800		0.00
*** CR 50 1873(1-5/8")	C	Yes	Ar (CfAe)	102.00 - 0.00	0.0000	0.425	12	8	1.0000	1.9800		0.00
2" Rigid Conduit	C	Yes	Ar (CfAe)	102.00 - 0.00	4.0000	0.435	1	1	2.0000	2.0000		0.00
FB-L98-002-XXX(3/8)	C	Yes	Ar (CfAe)	102.00 - 0.00	0.0000	0.425	1	1	1.0000	0.0000		0.00
WR-VG82ST-BRDA(5/8")	C	Yes	Ar (CfAe)	102.00 - 0.00	0.0000	0.425	2	2	1.0000	0.0000		0.00
*** LDF4-50A(1/2")	C	Yes	Ar (CfAe)	30.00 - 0.00	0.0000	0.35	2	2	1.0000	0.6300		0.00
*** LDF1-50A(1/4")	A	Yes	Ar (CfAe)	12.00 - 0.00	0.0000	0.4	2	2	1.0000	0.3450		0.00

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
T1	180.00-160.00	A	19.445	3.000	0.000	0.000	0.22
		B	0.625	0.000	0.000	0.000	0.00

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
		C	0.625	0.000	0.000	0.000	0.00
T2	160.00-153.33	A	11.157	2.583	0.000	0.000	0.15
		B	0.208	0.000	0.000	0.000	0.00
		C	0.208	0.000	0.000	0.000	0.00
T3	153.33-146.67	A	12.132	3.333	0.000	0.000	0.18
		B	0.208	0.000	0.000	0.000	0.00
		C	0.208	0.000	0.000	0.000	0.00
T4	146.67-140.00	A	14.869	3.333	0.000	0.000	0.21
		B	0.208	0.000	0.000	0.000	0.00
		C	0.208	0.000	0.000	0.000	0.00
T5	140.00-120.00	A	46.942	10.000	0.000	0.000	0.67
		B	0.625	0.000	0.000	0.000	0.00
		C	9.243	1.500	0.000	0.000	0.26
T6	120.00-100.00	A	47.942	10.000	0.000	0.000	0.69
		B	12.505	3.000	0.000	0.000	0.16
		C	32.323	5.000	0.000	0.000	0.88
T7	100.00-80.00	A	47.942	10.000	0.000	0.000	0.69
		B	20.425	5.000	0.000	0.000	0.27
		C	59.083	5.000	0.000	0.000	1.12
T8	80.00-70.00	A	23.971	5.000	0.000	0.000	0.34
		B	10.213	2.500	0.000	0.000	0.14
		C	29.542	2.500	0.000	0.000	0.56
T9	70.00-60.00	A	23.971	5.000	0.000	0.000	0.34
		B	10.213	2.500	0.000	0.000	0.14
		C	29.542	2.500	0.000	0.000	0.56
T10	60.00-40.00	A	47.942	10.000	0.000	0.000	0.69
		B	20.425	5.000	0.000	0.000	0.27
		C	59.083	5.000	0.000	0.000	1.12
T11	40.00-20.00	A	47.942	10.000	0.000	0.000	0.69
		B	20.425	5.000	0.000	0.000	0.27
		C	60.133	5.000	0.000	0.000	1.12
T12	20.00-0.00	A	48.632	10.000	0.000	0.000	0.69
		B	20.425	5.000	0.000	0.000	0.27
		C	61.183	5.000	0.000	0.000	1.13

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
T1	180.00-160.00	A	0.913	37.706	5.435	0.000	0.000	0.80
		B		3.668	0.000	0.000	0.000	0.03
		C		3.668	0.000	0.000	0.000	0.00
T2	160.00-153.33	A	0.904	21.579	5.142	0.000	0.000	0.51
		B		1.213	0.000	0.000	0.000	0.01
		C		1.213	0.000	0.000	0.000	0.00
T3	153.33-146.67	A	0.899	22.489	7.723	0.000	0.000	0.58
		B		1.208	0.000	0.000	0.000	0.01
		C		1.208	0.000	0.000	0.000	0.00
T4	146.67-140.00	A	0.895	23.908	11.095	0.000	0.000	0.66
		B		1.202	0.000	0.000	0.000	0.01
		C		1.202	0.000	0.000	0.000	0.00
T5	140.00-120.00	A	0.884	75.703	33.192	0.000	0.000	2.03
		B		3.572	0.000	0.000	0.000	0.03
		C		8.342	13.179	0.000	0.000	0.61
T6	120.00-100.00	A	0.867	76.827	33.036	0.000	0.000	2.03
		B		7.227	20.211	0.000	0.000	0.49
		C		21.056	47.495	0.000	0.000	2.12

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
T7	100.00-80.00	A	0.846	75.933	32.853	0.000	0.000	1.99
		B		9.565	33.593	0.000	0.000	0.78
		C		36.876	80.193	0.000	0.000	3.05
T8	80.00-70.00	A	0.828	37.570	16.345	0.000	0.000	0.98
		B		4.721	16.756	0.000	0.000	0.39
		C		18.194	40.056	0.000	0.000	1.51
T9	70.00-60.00	A	0.814	37.265	16.282	0.000	0.000	0.97
		B		4.674	16.725	0.000	0.000	0.38
		C		18.006	40.025	0.000	0.000	1.50
T10	60.00-40.00	A	0.788	73.437	32.341	0.000	0.000	1.88
		B		9.181	33.337	0.000	0.000	0.75
		C		35.339	79.937	0.000	0.000	2.96
T11	40.00-20.00	A	0.750	71.775	32.000	0.000	0.000	1.81
		B		8.925	33.167	0.000	0.000	0.73
		C		36.092	81.125	0.000	0.000	2.93
T12	20.00-0.00	A	0.750	73.620	33.345	0.000	0.000	1.84
		B		8.925	33.167	0.000	0.000	0.73
		C		37.867	82.483	0.000	0.000	2.95

Feed Line Shielding

Section	Elevation ft	Face	A_R ft^2	A_R Ice ft^2	A_F ft^2	A_F Ice ft^2
T1	180.00-160.00	A	0.000	3.899	2.161	4.270
		B	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000
T2	160.00-153.33	A	0.000	1.555	1.064	2.150
		B	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000
T3	153.33-146.67	A	0.000	2.425	1.556	3.173
		B	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000
T4	146.67-140.00	A	0.000	2.738	1.803	3.598
		B	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000
T5	140.00-120.00	A	0.000	5.724	4.084	8.093
		B	0.000	0.000	0.000	0.000
		C	0.000	0.940	0.726	1.330
T6	120.00-100.00	A	0.000	5.468	4.822	9.464
		B	0.000	1.206	1.238	2.087
		C	0.000	3.220	3.054	5.573
T7	100.00-80.00	A	0.000	3.749	3.993	7.756
		B	0.000	1.386	1.709	2.866
		C	0.000	3.848	4.373	7.959
T8	80.00-70.00	A	0.000	1.772	1.947	3.746
		B	0.000	0.658	0.833	1.391
		C	0.000	1.826	2.132	3.862
T9	70.00-60.00	A	0.000	1.706	1.921	3.671
		B	0.000	0.636	0.822	1.368
		C	0.000	1.765	2.104	3.797
T10	60.00-40.00	A	0.000	3.211	4.319	8.147
		B	0.000	1.205	1.849	3.058
		C	0.000	3.343	4.731	8.482
T11	40.00-20.00	A	0.000	2.942	4.244	7.844
		B	0.000	1.116	1.816	2.976
		C	0.000	3.179	4.725	8.478

Section	Elevation	Face	A_R	A_R Ice	A_F	A_F Ice
	ft		ft^2	ft^2	ft^2	ft^2
T12	20.00-0.00	A	0.000	2.987	4.235	7.967
		B	0.000	1.101	1.791	2.935
		C	0.000	3.220	4.735	8.587

Feed Line Center of Pressure

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
T1	180.00-160.00	-5.1972	-2.9169	-4.3517	-2.4226
T2	160.00-153.33	-9.3505	-3.8044	-9.0524	-3.8116
T3	153.33-146.67	-10.1624	-2.6978	-9.0539	-2.7725
T4	146.67-140.00	-12.7504	-1.6159	-10.6438	-2.1037
T5	140.00-120.00	-11.9215	0.8861	-10.8388	0.1179
T6	120.00-100.00	-2.1136	7.0544	-2.5668	5.8595
T7	100.00-80.00	-6.9415	13.6569	-7.3336	11.9583
T8	80.00-70.00	-6.9708	13.7970	-7.5465	12.4833
T9	70.00-60.00	-7.2922	14.4811	-7.8853	13.1689
T10	60.00-40.00	-7.4334	14.8319	-8.0937	13.7366
T11	40.00-20.00	-8.2386	16.1779	-8.8105	15.0875
T12	20.00-0.00	-9.0493	17.1653	-9.5298	15.8418

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
**********									
**********									
Lightning Rod	C	From Leg	0.00 0.00 2.00	0.0000	180.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.25 0.66 0.97 1.49 2.68	0.25 0.66 0.97 1.49 2.68	0.03 0.03 0.04 0.06 0.14
***									
Empty Pipe Mount	A	From Leg	4.00 0.00 0.00	0.0000	178.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.00 1.39 1.70 2.35 3.78	1.00 1.39 1.70 2.35 3.78	0.01 0.02 0.03 0.06 0.18
Empty Pipe Mount	B	From Leg	4.00 0.00 0.00	0.0000	178.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.00 1.39 1.70 2.35 3.78	1.00 1.39 1.70 2.35 3.78	0.01 0.02 0.03 0.06 0.18
Side Arm Mount [SO 306-1]	A	From Leg	0.00 0.00 0.00	0.0000	178.00	No Ice 1/2" Ice 1" Ice	0.98 1.70 2.42	2.18 3.80 5.42	0.04 0.06 0.08

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						2" Ice	3.86	8.66	0.12
						4" Ice	6.74	15.14	0.20
Side Arm Mount [SO 306-1]	B	From Leg	0.00	0.0000	178.00	No Ice	0.98	2.18	0.04
			0.00			1/2" Ice	1.70	3.80	0.06
			0.00			1" Ice	2.42	5.42	0.08
						2" Ice	3.86	8.66	0.12
						4" Ice	6.74	15.14	0.20
***									
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	A	From Leg	4.00	0.0000	172.00	No Ice	6.83	5.64	0.11
			0.00			1/2" Ice	7.35	6.48	0.17
			1.00			1" Ice	7.86	7.26	0.23
						2" Ice	8.93	8.86	0.38
						4" Ice	11.18	12.29	0.81
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	B	From Leg	4.00	0.0000	172.00	No Ice	6.83	5.64	0.11
			0.00			1/2" Ice	7.35	6.48	0.17
			1.00			1" Ice	7.86	7.26	0.23
						2" Ice	8.93	8.86	0.38
						4" Ice	11.18	12.29	0.81
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	C	From Leg	4.00	0.0000	172.00	No Ice	6.83	5.64	0.11
			0.00			1/2" Ice	7.35	6.48	0.17
			1.00			1" Ice	7.86	7.26	0.23
						2" Ice	8.93	8.86	0.38
						4" Ice	11.18	12.29	0.81
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	A	From Leg	4.00	0.0000	172.00	No Ice	6.83	5.64	0.11
			0.00			1/2" Ice	7.35	6.48	0.17
			1.00			1" Ice	7.86	7.26	0.23
						2" Ice	8.93	8.86	0.38
						4" Ice	11.18	12.29	0.81
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	B	From Leg	4.00	0.0000	172.00	No Ice	6.83	5.64	0.11
			0.00			1/2" Ice	7.35	6.48	0.17
			1.00			1" Ice	7.86	7.26	0.23
						2" Ice	8.93	8.86	0.38
						4" Ice	11.18	12.29	0.81
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	C	From Leg	4.00	0.0000	172.00	No Ice	6.83	5.64	0.11
			0.00			1/2" Ice	7.35	6.48	0.17
			1.00			1" Ice	7.86	7.26	0.23
						2" Ice	8.93	8.86	0.38
						4" Ice	11.18	12.29	0.81
LNX-6515DS-VTM w/ Mount Pipe	A	From Leg	4.00	0.0000	172.00	No Ice	11.68	9.84	0.08
			0.00			1/2" Ice	12.40	11.37	0.17
			1.00			1" Ice	13.14	12.91	0.27
						2" Ice	14.60	15.27	0.51
						4" Ice	17.87	20.14	1.15
LNX-6515DS-VTM w/ Mount Pipe	B	From Leg	4.00	0.0000	172.00	No Ice	11.68	9.84	0.08
			0.00			1/2" Ice	12.40	11.37	0.17
			1.00			1" Ice	13.14	12.91	0.27
						2" Ice	14.60	15.27	0.51
						4" Ice	17.87	20.14	1.15
LNX-6515DS-VTM w/ Mount Pipe	C	From Leg	4.00	0.0000	172.00	No Ice	11.68	9.84	0.08
			0.00			1/2" Ice	12.40	11.37	0.17
			1.00			1" Ice	13.14	12.91	0.27
						2" Ice	14.60	15.27	0.51
						4" Ice	17.87	20.14	1.15
KRY 112 144/1	A	From Leg	4.00	0.0000	172.00	No Ice	0.41	0.19	0.01
			0.00			1/2" Ice	0.50	0.26	0.01
			1.00			1" Ice	0.60	0.33	0.02
						2" Ice	0.82	0.51	0.03

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						4" Ice	1.36	0.97	0.08
KRY 112 144/1	B	From Leg	4.00 0.00 0.00	0.0000	172.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.41 0.50 0.60 0.82 1.36	0.19 0.26 0.33 0.51 0.97	0.01 0.01 0.02 0.03 0.08
KRY 112 144/1	C	From Leg	4.00 0.00 0.00	0.0000	172.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.41 0.50 0.60 0.82 1.36	0.19 0.26 0.33 0.51 0.97	0.01 0.01 0.02 0.03 0.08
RRUS 11 B12	A	From Leg	4.00 0.00 1.00	0.0000	172.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.31 3.55 3.80 4.33 5.50	1.36 1.54 1.73 2.13 3.04	0.05 0.07 0.10 0.15 0.31
RRUS 11 B12	B	From Leg	4.00 0.00 1.00	0.0000	172.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.31 3.55 3.80 4.33 5.50	1.36 1.54 1.73 2.13 3.04	0.05 0.07 0.10 0.15 0.31
RRUS 11 B12	C	From Leg	4.00 0.00 1.00	0.0000	172.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.31 3.55 3.80 4.33 5.50	1.36 1.54 1.73 2.13 3.04	0.05 0.07 0.10 0.15 0.31
Sector Mount [SM 602-3]	C	None		0.0000	172.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	33.11 44.90 56.69 80.27 127.43	33.11 44.90 56.69 80.27 127.43	1.54 2.16 2.78 4.01 6.49
Empty Pipe Mount	A	From Leg	4.00 0.00 0.00	0.0000	172.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.05 1.67 2.09 2.85 4.48	1.05 1.67 2.09 2.85 4.48	0.02 0.03 0.04 0.08 0.21
Empty Pipe Mount	B	From Leg	4.00 0.00 0.00	0.0000	172.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.05 1.67 2.09 2.85 4.48	1.05 1.67 2.09 2.85 4.48	0.02 0.03 0.04 0.08 0.21
Empty Pipe Mount	C	From Leg	4.00 0.00 0.00	0.0000	172.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.05 1.67 2.09 2.85 4.48	1.05 1.67 2.09 2.85 4.48	0.02 0.03 0.04 0.08 0.21
***									
Side Arm Mount [SO 202-1]	A	From Leg	0.00 0.00 0.00	0.0000	157.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.96 4.10 5.24 7.52 12.08	2.53 3.51 4.49 6.45 10.37	0.11 0.13 0.16 0.20 0.30
Side Arm Mount [SO 202-1]	B	From Leg	0.00 0.00 0.00	0.0000	157.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.96 4.10 5.24 7.52 12.08	2.53 3.51 4.49 6.45 10.37	0.11 0.13 0.16 0.20 0.30

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
***									
APXVSPP18-C-A20 w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	148.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.50 9.15 9.77 11.03 13.68	6.95 8.13 9.02 10.84 14.85	0.08 0.15 0.23 0.41 0.91
APXVSPP18-C-A20 w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	148.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.50 9.15 9.77 11.03 13.68	6.95 8.13 9.02 10.84 14.85	0.08 0.15 0.23 0.41 0.91
APXVSPP18-C-A20 w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	148.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.50 9.15 9.77 11.03 13.68	6.95 8.13 9.02 10.84 14.85	0.08 0.15 0.23 0.41 0.91
APXVTM14-C-120 w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	148.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.13 7.66 8.18 9.26 11.53	4.96 5.75 6.47 8.01 11.41	0.08 0.13 0.19 0.34 0.75
APXVTM14-C-120 w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	148.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.13 7.66 8.18 9.26 11.53	4.96 5.75 6.47 8.01 11.41	0.08 0.13 0.19 0.34 0.75
APXVTM14-C-120 w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	148.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.13 7.66 8.18 9.26 11.53	4.96 5.75 6.47 8.01 11.41	0.08 0.13 0.19 0.34 0.75
(3) ACU-A20-N	A	From Leg	4.00 0.00 0.00	0.0000	148.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.08 0.12 0.17 0.30 0.67	0.14 0.19 0.25 0.40 0.80	0.00 0.00 0.00 0.01 0.04
(3) ACU-A20-N	B	From Leg	4.00 0.00 0.00	0.0000	148.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.08 0.12 0.17 0.30 0.67	0.14 0.19 0.25 0.40 0.80	0.00 0.00 0.00 0.01 0.04
(3) ACU-A20-N	C	From Leg	4.00 0.00 0.00	0.0000	148.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.08 0.12 0.17 0.30 0.67	0.14 0.19 0.25 0.40 0.80	0.00 0.00 0.00 0.01 0.04
TD-RRH8x20-25	A	From Leg	4.00 0.00 0.00	0.0000	148.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.72 5.01 5.32 5.95 7.31	1.70 1.92 2.14 2.62 3.68	0.07 0.10 0.13 0.20 0.40
TD-RRH8x20-25	B	From Leg	4.00 0.00 0.00	0.0000	148.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.72 5.01 5.32 5.95 7.31	1.70 1.92 2.14 2.62 3.68	0.07 0.10 0.13 0.20 0.40
TD-RRH8x20-25	C	From Leg	4.00	0.0000	148.00	No Ice	4.72	1.70	0.07

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00			1/2" Ice	5.01	1.92	0.10
			0.00			1" Ice	5.32	2.14	0.13
						2" Ice	5.95	2.62	0.20
						4" Ice	7.31	3.68	0.40
Site Pro VFA12-U w/ 12' Stiff Arm	C	None		0.0000	148.00	No Ice	33.02	33.02	1.67
						1/2" Ice	47.36	47.36	2.22
						1" Ice	61.70	61.70	2.77
						2" Ice	90.38	90.38	3.88
						4" Ice	147.74	147.74	6.08
***									
PCS 1900MHz 4x45W-65MHz	A	From Leg	4.00 0.00 2.00	0.0000	143.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.71 2.95 3.20 3.72 4.86	2.61 2.85 3.09 3.61 4.74	0.06 0.08 0.11 0.17 0.35
PCS 1900MHz 4x45W-65MHz	A	From Leg	4.00 0.00 -1.00	0.0000	143.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.71 2.95 3.20 3.72 4.86	2.61 2.85 3.09 3.61 4.74	0.06 0.08 0.11 0.17 0.35
PCS 1900MHz 4x45W-65MHz	B	From Leg	4.00 0.00 2.00	0.0000	143.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.71 2.95 3.20 3.72 4.86	2.61 2.85 3.09 3.61 4.74	0.06 0.08 0.11 0.17 0.35
PCS 1900MHz 4x45W-65MHz	B	From Leg	4.00 0.00 -1.00	0.0000	143.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.71 2.95 3.20 3.72 4.86	2.61 2.85 3.09 3.61 4.74	0.06 0.08 0.11 0.17 0.35
PCS 1900MHz 4x45W-65MHz	C	From Leg	4.00 0.00 2.00	0.0000	143.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.71 2.95 3.20 3.72 4.86	2.61 2.85 3.09 3.61 4.74	0.06 0.08 0.11 0.17 0.35
PCS 1900MHz 4x45W-65MHz	C	From Leg	4.00 0.00 -1.00	0.0000	143.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.71 2.95 3.20 3.72 4.86	2.61 2.85 3.09 3.61 4.74	0.06 0.08 0.11 0.17 0.35
TME-800MHZ 2X50W RRH	A	From Leg	4.00 0.00 2.00	0.0000	143.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.49 2.71 2.93 3.41 4.46	2.07 2.27 2.48 2.93 3.93	0.05 0.07 0.10 0.16 0.32
TME-800MHZ 2X50W RRH	B	From Leg	4.00 0.00 2.00	0.0000	143.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.49 2.71 2.93 3.41 4.46	2.07 2.27 2.48 2.93 3.93	0.05 0.07 0.10 0.16 0.32
TME-800MHZ 2X50W RRH	C	From Leg	4.00 0.00 2.00	0.0000	143.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.49 2.71 2.93 3.41 4.46	2.07 2.27 2.48 2.93 3.93	0.05 0.07 0.10 0.16 0.32
800 EXTERNAL NOTCH FILTER	A	From Leg	4.00 0.00	0.0000	143.00	No Ice 1/2" Ice	0.77 0.89	0.37 0.46	0.01 0.02

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			2.00			1" Ice	1.02	0.56	0.02
						2" Ice	1.30	0.79	0.04
						4" Ice	1.97	1.34	0.11
800 EXTERNAL NOTCH FILTER	B	From Leg	4.00 0.00 2.00	0.0000	143.00	No Ice 1/2" Ice 1" Ice	0.77 0.89 1.02	0.37 0.46 0.56	0.01 0.02 0.02
						2" Ice	1.30	0.79	0.04
						4" Ice	1.97	1.34	0.11
800 EXTERNAL NOTCH FILTER	C	From Leg	4.00 0.00 2.00	0.0000	143.00	No Ice 1/2" Ice 1" Ice	0.77 0.89 1.02	0.37 0.46 0.56	0.01 0.02 0.02
						2" Ice	1.30	0.79	0.04
						4" Ice	1.97	1.34	0.11
Side Arm Mount [SO 312-3]	C	None		0.0000	143.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.87 11.82 15.77 23.67 39.47	7.87 11.82 15.77 23.67 39.47	0.21 0.32 0.43 0.65 1.08
***									
***									
DB844G65ZAXY w/ Mount Pipe	A	From Leg	4.00 0.00 2.00	0.0000	126.00	No Ice 1/2" Ice 1" Ice	4.90 5.35 5.80	4.92 5.60 6.28	0.03 0.08 0.13
						2" Ice	6.73	7.71	0.26
						4" Ice	8.73	10.83	0.62
DB844G65ZAXY w/ Mount Pipe	B	From Leg	4.00 0.00 2.00	0.0000	126.00	No Ice 1/2" Ice 1" Ice	4.90 5.35 5.80	4.92 5.60 6.28	0.03 0.08 0.13
						2" Ice	6.73	7.71	0.26
						4" Ice	8.73	10.83	0.62
(2) DB844G65ZAXY w/ Mount Pipe	C	From Leg	4.00 0.00 2.00	0.0000	126.00	No Ice 1/2" Ice 1" Ice	4.90 5.35 5.80	4.92 5.60 6.28	0.03 0.08 0.13
						2" Ice	6.73	7.71	0.26
						4" Ice	8.73	10.83	0.62
LNX-6514DS-T4M w/ Mount Pipe	A	From Leg	4.00 0.00 2.00	0.0000	126.00	No Ice 1/2" Ice 1" Ice	8.57 9.22 9.84	7.00 8.19 9.08	0.06 0.13 0.20
						2" Ice	11.10	10.90	0.38
						4" Ice	13.75	14.93	0.89
LNX-6514DS-T4M w/ Mount Pipe	B	From Leg	4.00 0.00 2.00	0.0000	126.00	No Ice 1/2" Ice 1" Ice	8.57 9.22 9.84	7.00 8.19 9.08	0.06 0.13 0.20
						2" Ice	11.10	10.90	0.38
						4" Ice	13.75	14.93	0.89
MG D3-800TV w/ Mount Pipe	A	From Leg	4.00 0.00 2.00	0.0000	126.00	No Ice 1/2" Ice 1" Ice	3.57 3.98 4.39	3.42 4.12 4.78	0.04 0.07 0.11
						2" Ice	5.33	6.16	0.21
						4" Ice	7.34	9.18	0.52
MG D3-800TV w/ Mount Pipe	B	From Leg	4.00 0.00 2.00	0.0000	126.00	No Ice 1/2" Ice 1" Ice	3.57 3.98 4.39	3.42 4.12 4.78	0.04 0.07 0.11
						2" Ice	5.33	6.16	0.21
						4" Ice	7.34	9.18	0.52
MG D3-800TV w/ Mount Pipe	C	From Leg	4.00 0.00	0.0000	126.00	No Ice 1/2" Ice	3.57 3.98	3.42 4.12	0.04 0.07

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			2.00			1" Ice	4.39	4.78	0.11
						2" Ice	5.33	6.16	0.21
						4" Ice	7.34	9.18	0.52
MG D3-800Tx w/ Mount Pipe	A	From Leg	4.00	0.0000	126.00	No Ice	3.57	3.42	0.03
			0.00			1/2" Ice	3.98	4.12	0.07
			2.00			1" Ice	4.39	4.78	0.11
						2" Ice	5.33	6.16	0.21
						4" Ice	7.34	9.18	0.52
MG D3-800Tx w/ Mount Pipe	B	From Leg	4.00	0.0000	126.00	No Ice	3.57	3.42	0.03
			0.00			1/2" Ice	3.98	4.12	0.07
			2.00			1" Ice	4.39	4.78	0.11
						2" Ice	5.33	6.16	0.21
						4" Ice	7.34	9.18	0.52
MG D3-800Tx w/ Mount Pipe	C	From Leg	4.00	0.0000	126.00	No Ice	3.57	3.42	0.03
			0.00			1/2" Ice	3.98	4.12	0.07
			2.00			1" Ice	4.39	4.78	0.11
						2" Ice	5.33	6.16	0.21
						4" Ice	7.34	9.18	0.52
DB844H80-XY w/ Mount Pipe	A	From Leg	4.00	0.0000	126.00	No Ice	3.10	5.15	0.03
			0.00			1/2" Ice	3.48	5.83	0.07
			2.00			1" Ice	3.88	6.52	0.11
						2" Ice	4.76	7.96	0.22
						4" Ice	6.66	11.09	0.55
DB844H80-XY w/ Mount Pipe	B	From Leg	4.00	0.0000	126.00	No Ice	3.10	5.15	0.03
			0.00			1/2" Ice	3.48	5.83	0.07
			2.00			1" Ice	3.88	6.52	0.11
						2" Ice	4.76	7.96	0.22
						4" Ice	6.66	11.09	0.55
GPS_A	B	From Leg	4.00	0.0000	126.00	No Ice	0.30	0.30	0.00
			0.00			1/2" Ice	0.37	0.37	0.00
			4.00			1" Ice	0.46	0.46	0.01
						2" Ice	0.65	0.65	0.02
						4" Ice	1.15	1.15	0.08
P65.16.XL.2 w/ Mount Pipe	C	From Leg	4.00	0.0000	126.00	No Ice	8.64	5.78	0.06
			0.00			1/2" Ice	9.29	6.95	0.12
			2.00			1" Ice	9.91	7.83	0.19
						2" Ice	11.18	9.63	0.36
						4" Ice	13.83	13.44	0.84
RRH2X40-AWS	A	From Leg	4.00	0.0000	126.00	No Ice	3.77	2.23	0.05
			0.00			1/2" Ice	4.04	2.46	0.07
			2.00			1" Ice	4.32	2.69	0.10
						2" Ice	4.89	3.19	0.17
						4" Ice	6.15	4.28	0.36
RRH2X40-AWS	B	From Leg	4.00	0.0000	126.00	No Ice	3.77	2.23	0.05
			0.00			1/2" Ice	4.04	2.46	0.07
			2.00			1" Ice	4.32	2.69	0.10
						2" Ice	4.89	3.19	0.17
						4" Ice	6.15	4.28	0.36
RRH2X40-AWS	C	From Leg	4.00	0.0000	126.00	No Ice	3.77	2.23	0.05
			0.00			1/2" Ice	4.04	2.46	0.07
			2.00			1" Ice	4.32	2.69	0.10
						2" Ice	4.89	3.19	0.17
						4" Ice	6.15	4.28	0.36
DB-T1-6Z-8AB-0Z	B	From Leg	4.00	0.0000	126.00	No Ice	5.60	2.33	0.04
			0.00			1/2" Ice	5.92	2.56	0.08
			2.00			1" Ice	6.24	2.79	0.12
						2" Ice	6.91	3.28	0.21

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						4" Ice	8.37	4.37	0.45
Sector Mount [SM 410-3]	C	None		0.0000	126.00	No Ice	23.96	23.96	1.10
						1/2" Ice	34.06	34.06	1.60
						1" Ice	44.16	44.16	2.10
						2" Ice	64.36	64.36	3.10
						4" Ice	104.76	104.76	5.09
***									
800 10504 w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	112.00	No Ice	3.59	3.18	0.04
						1/2" Ice	4.01	3.91	0.07
						1" Ice	4.42	4.58	0.11
						2" Ice	5.34	5.98	0.21
						4" Ice	7.38	8.98	0.51
800 10504 w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	112.00	No Ice	3.59	3.18	0.04
						1/2" Ice	4.01	3.91	0.07
						1" Ice	4.42	4.58	0.11
						2" Ice	5.34	5.98	0.21
						4" Ice	7.38	8.98	0.51
800 10504 w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	112.00	No Ice	3.59	3.18	0.04
						1/2" Ice	4.01	3.91	0.07
						1" Ice	4.42	4.58	0.11
						2" Ice	5.34	5.98	0.21
						4" Ice	7.38	8.98	0.51
Sector Mount [SM 104-3]	C	None		0.0000	112.00	No Ice	30.02	30.02	0.95
						1/2" Ice	40.48	40.48	1.40
						1" Ice	50.94	50.94	1.86
						2" Ice	71.86	71.86	2.76
						4" Ice	113.70	113.70	4.57
Empty Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	112.00	No Ice	1.40	1.40	0.03
						1/2" Ice	2.13	2.13	0.04
						1" Ice	2.68	2.68	0.06
						2" Ice	3.56	3.56	0.10
						4" Ice	5.42	5.42	0.26
Empty Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	112.00	No Ice	1.40	1.40	0.03
						1/2" Ice	2.13	2.13	0.04
						1" Ice	2.68	2.68	0.06
						2" Ice	3.56	3.56	0.10
						4" Ice	5.42	5.42	0.26
Empty Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	112.00	No Ice	1.40	1.40	0.03
						1/2" Ice	2.13	2.13	0.04
						1" Ice	2.68	2.68	0.06
						2" Ice	3.56	3.56	0.10
						4" Ice	5.42	5.42	0.26
***									
(2) 7770.00 w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	102.00	No Ice	6.12	4.25	0.06
						1/2" Ice	6.63	5.01	0.10
						1" Ice	7.13	5.71	0.16
						2" Ice	8.16	7.16	0.29
						4" Ice	10.36	10.41	0.66
(2) 7770.00 w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	102.00	No Ice	6.12	4.25	0.06
						1/2" Ice	6.63	5.01	0.10
						1" Ice	7.13	5.71	0.16
						2" Ice	8.16	7.16	0.29
						4" Ice	10.36	10.41	0.66
(2) 7770.00 w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	102.00	No Ice	6.12	4.25	0.06
						1/2" Ice	6.63	5.01	0.10
						1" Ice	7.13	5.71	0.16
						2" Ice	8.16	7.16	0.29

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						4" Ice	10.36	10.41	0.66
P65-16-XLH-RR w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	102.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.64 9.29 9.91 11.18 13.83	6.36 7.54 8.43 10.24 14.10	0.08 0.14 0.22 0.39 0.89
P65-16-XLH-RR w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	102.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.64 9.29 9.91 11.18 13.83	6.36 7.54 8.43 10.24 14.10	0.08 0.14 0.22 0.39 0.89
P65-16-XLH-RR w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	102.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.64 9.29 9.91 11.18 13.83	6.36 7.54 8.43 10.24 14.10	0.08 0.14 0.22 0.39 0.89
(2) LGP2140X	A	From Leg	4.00 0.00 0.00	0.0000	102.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.26 1.42 1.58 1.94 2.75	0.38 0.49 0.62 0.89 1.54	0.01 0.02 0.03 0.05 0.13
(2) LGP2140X	B	From Leg	4.00 0.00 0.00	0.0000	102.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.26 1.42 1.58 1.94 2.75	0.38 0.49 0.62 0.89 1.54	0.01 0.02 0.03 0.05 0.13
(2) LGP2140X	C	From Leg	4.00 0.00 0.00	0.0000	102.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.26 1.42 1.58 1.94 2.75	0.38 0.49 0.62 0.89 1.54	0.01 0.02 0.03 0.05 0.13
(2) LGP2140X	A	From Leg	4.00 0.00 0.00	0.0000	102.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.26 1.42 1.58 1.94 2.75	0.38 0.49 0.62 0.89 1.54	0.01 0.02 0.03 0.05 0.13
(2) LGP2140X	B	From Leg	4.00 0.00 0.00	0.0000	102.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.26 1.42 1.58 1.94 2.75	0.38 0.49 0.62 0.89 1.54	0.01 0.02 0.03 0.05 0.13
(2) LGP2140X	C	From Leg	4.00 0.00 0.00	0.0000	102.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.26 1.42 1.58 1.94 2.75	0.38 0.49 0.62 0.89 1.54	0.01 0.02 0.03 0.05 0.13
(2) RRUS 11 B2	A	From Leg	4.00 0.00 0.00	0.0000	102.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.31 3.55 3.80 4.33 5.50	1.36 1.54 1.73 2.13 3.04	0.05 0.07 0.10 0.15 0.31
(2) RRUS 11 B2	B	From Leg	4.00 0.00 0.00	0.0000	102.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.31 3.55 3.80 4.33 5.50	1.36 1.54 1.73 2.13 3.04	0.05 0.07 0.10 0.15 0.31
(2) RRUS 11 B2	C	From Leg	4.00	0.0000	102.00	No Ice	3.31	1.36	0.05

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00			1/2" Ice	3.55	1.54	0.07
			0.00			1" Ice	3.80	1.73	0.10
						2" Ice	4.33	2.13	0.15
						4" Ice	5.50	3.04	0.31
DC6-48-60-18-8F	C	From Leg	4.00	0.0000	102.00	No Ice	2.57	4.32	0.03
			0.00			1/2" Ice	2.80	4.60	0.06
			0.00			1" Ice	3.04	4.88	0.10
						2" Ice	3.54	5.49	0.18
						4" Ice	4.66	6.80	0.40
Sector Mount [SM 301-3]	C	None		0.0000	102.00	No Ice	29.61	1.00	1.30
						1/2" Ice	39.80	1.20	1.84
						1" Ice	49.99	1.40	2.38
						2" Ice	70.37	1.80	3.46
						4" Ice	111.13	2.60	5.63
Empty Mount Pipe	A	From Leg	4.00	0.0000	102.00	No Ice	1.40	1.40	0.03
			0.00			1/2" Ice	2.13	2.13	0.04
			0.00			1" Ice	2.68	2.68	0.06
						2" Ice	3.56	3.56	0.10
						4" Ice	5.42	5.42	0.26
Empty Mount Pipe	B	From Leg	4.00	0.0000	102.00	No Ice	1.40	1.40	0.03
			0.00			1/2" Ice	2.13	2.13	0.04
			0.00			1" Ice	2.68	2.68	0.06
						2" Ice	3.56	3.56	0.10
						4" Ice	5.42	5.42	0.26
Empty Mount Pipe	C	From Leg	4.00	0.0000	102.00	No Ice	1.40	1.40	0.03
			0.00			1/2" Ice	2.13	2.13	0.04
			0.00			1" Ice	2.68	2.68	0.06
						2" Ice	3.56	3.56	0.10
						4" Ice	5.42	5.42	0.26
***									
GPS_A	B	From Leg	3.00	0.0000	30.00	No Ice	0.30	0.30	0.00
			0.00			1/2" Ice	0.37	0.37	0.00
			0.00			1" Ice	0.46	0.46	0.01
						2" Ice	0.65	0.65	0.02
						4" Ice	1.15	1.15	0.08
GPS_A	C	From Leg	3.00	0.0000	30.00	No Ice	0.30	0.30	0.00
			0.00			1/2" Ice	0.37	0.37	0.00
			0.00			1" Ice	0.46	0.46	0.01
						2" Ice	0.65	0.65	0.02
						4" Ice	1.15	1.15	0.08
Side Arm Mount [SO 701-1]	B	From Leg	0.00	0.0000	30.00	No Ice	0.85	1.67	0.07
			0.00			1/2" Ice	1.14	2.34	0.08
			0.00			1" Ice	1.43	3.01	0.09
						2" Ice	2.01	4.35	0.12
						4" Ice	3.17	7.03	0.18
Side Arm Mount [SO 701-1]	C	From Leg	0.00	0.0000	30.00	No Ice	0.85	1.67	0.07
			0.00			1/2" Ice	1.14	2.34	0.08
			0.00			1" Ice	1.43	3.01	0.09
						2" Ice	2.01	4.35	0.12
						4" Ice	3.17	7.03	0.18
***									
VG-1060	A	From Face	0.50	0.0000	12.00	No Ice	0.13	0.13	0.00
			0.00			1/2" Ice	0.22	0.22	0.00
			0.00			1" Ice	0.31	0.31	0.01
						2" Ice	0.53	0.53	0.01
						4" Ice	1.11	1.11	0.05
GPS_A	A	From Face	0.50	0.0000	12.00	No Ice	0.30	0.30	0.00

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00			1/2" Ice	0.37	0.37	0.00
			0.00			1" Ice	0.46	0.46	0.01
						2" Ice	0.65	0.65	0.02
						4" Ice	1.15	1.15	0.08
Pipe Mount [PM 601-1]	A	From Face	0.00	0.0000	12.00	No Ice	3.00	0.90	0.07
			0.00			1/2" Ice	3.74	1.12	0.08
			0.00			1" Ice	4.48	1.34	0.09
						2" Ice	5.96	1.78	0.12
						4" Ice	8.92	2.66	0.18

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
**********											
**********											
*											
VHLP2-18	A	Paraboloid w/o Radome	From Leg	2.00	-10.0000		157.00	2.17	No Ice	3.72	0.03
				0.00					1/2" Ice	4.01	0.05
				0.00					1" Ice	4.30	0.07
									2" Ice	4.88	0.11
									4" Ice	6.04	0.20
VHLP2-18	B	Paraboloid w/o Radome	From Leg	2.00	-40.0000		157.00	2.17	No Ice	3.72	0.03
				0.00					1/2" Ice	4.01	0.05
				0.00					1" Ice	4.30	0.07
									2" Ice	4.88	0.11
									4" Ice	6.04	0.20
***											

Tower Pressures - No Ice

$G_H = 1.121$

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
T1	170.00	1.597	0	160.320	A	14.957	31.133	11.688	25.36	0.000	0.000
180.00-160.00					B	14.117	12.313		44.22	0.000	0.000
					C	14.117	12.313		44.22	0.000	0.000
T2	156.67	1.561	0	63.206	A	6.050	16.166	5.009	22.55	0.000	0.000
160.00-153.33					B	4.531	5.217		51.38	0.000	0.000
					C	4.531	5.217		51.38	0.000	0.000
T3	150.00	1.541	0	67.816	A	8.039	17.141	5.009	19.89	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
153.33-146.67					B	6.262	5.217		43.64	0.000	0.000
					C	6.262	5.217		43.64	0.000	0.000
T4	143.33	1.521	0	72.425	A	8.152	19.878	5.009	17.87	0.000	0.000
146.67-140.00					B	6.622	5.217		42.31	0.000	0.000
					C	6.622	5.217		42.31	0.000	0.000
T5	130.00	1.48	0	246.784	A	22.301	65.519	18.577	21.15	0.000	0.000
140.00-120.00					B	16.385	19.202		52.20	0.000	0.000
					C	17.159	27.819		41.30	0.000	0.000
T6	110.00	1.411	0	288.763	A	27.392	70.060	22.118	22.70	0.000	0.000
120.00-100.00					B	23.976	34.623		37.74	0.000	0.000
					C	24.160	54.441		28.14	0.000	0.000
T7	90.00	1.332	0	329.495	A	27.187	70.067	22.125	22.75	0.000	0.000
100.00-80.00					B	24.471	42.550		33.01	0.000	0.000
					C	21.807	81.209		21.48	0.000	0.000
T8 80.00-70.00	75.00	1.264	0	182.118	A	14.381	38.370	14.399	27.30	0.000	0.000
					B	12.995	24.612		38.29	0.000	0.000
					C	11.696	43.941		25.88	0.000	0.000
T9 70.00-60.00	65.00	1.214	0	192.171	A	14.870	38.370	14.399	27.05	0.000	0.000
					B	13.468	24.612		37.81	0.000	0.000
					C	12.187	43.941		25.65	0.000	0.000
T10	50.00	1.126	0	414.393	A	34.427	76.740	28.798	25.91	0.000	0.000
60.00-40.00					B	31.898	49.223		35.50	0.000	0.000
					C	29.016	87.881		24.64	0.000	0.000
T11	30.00	1	0	454.393	A	36.929	76.740	28.798	25.34	0.000	0.000
40.00-20.00					B	34.356	49.223		34.46	0.000	0.000
					C	31.448	88.931		23.92	0.000	0.000
T12 20.00-0.00	10.00	1	0	494.393	A	39.397	77.430	28.798	24.65	0.000	0.000
					B	36.840	49.223		33.46	0.000	0.000
					C	33.896	89.981		23.25	0.000	0.000

Tower Pressure - With Ice

G_H = 1.121

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
T1	170.00	1.597	0	0.9130	163.368	A	15.282	64.483	17.785	22.30	0.000	0.000
180.00-160.00						B	14.117	34.344		36.70	0.000	0.000
						C	14.117	34.344		36.70	0.000	0.000
T2	156.67	1.561	0	0.9041	64.212	A	7.523	30.322	7.022	18.55	0.000	0.000
160.00-153.33						B	4.531	11.512		43.77	0.000	0.000
						C	4.531	11.512		43.77	0.000	0.000
T3	150.00	1.541	0	0.8994	68.817	A	10.811	31.853	7.011	16.43	0.000	0.000
153.33-146.67						B	6.262	12.997		36.41	0.000	0.000
						C	6.262	12.997		36.41	0.000	0.000
T4	143.33	1.521	0	0.8945	73.420	A	14.118	33.201	7.000	14.79	0.000	0.000
146.67-140.00						B	6.622	13.233		35.26	0.000	0.000
						C	6.622	13.233		35.26	0.000	0.000
T5	130.00	1.48	0	0.8841	249.735	A	41.484	106.050	24.482	16.59	0.000	0.000
140.00-120.00						B	16.385	39.643		43.70	0.000	0.000
						C	28.234	43.472		34.14	0.000	0.000
T6	110.00	1.411	0	0.8666	291.655	A	45.787	112.097	27.904	17.67	0.000	0.000
120.00-100.00						B	40.338	46.759		32.04	0.000	0.000
						C	64.136	58.574		22.74	0.000	0.000

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
T7 100.00-80.00	90.00	1.332	0	0.8460	332.319	A	46.277	110.198	27.776	17.75	0.000	0.000
						B	51.907	46.193		28.31	0.000	0.000
						C	93.414	71.042		16.89	0.000	0.000
T8 80.00-70.00	75.00	1.264	0	0.8277	183.500	A	23.927	58.318	17.163	20.87	0.000	0.000
						B	26.692	26.583		32.21	0.000	0.000
						C	47.522	38.887		19.86	0.000	0.000
T9 70.00-60.00	65.00	1.214	0	0.8136	193.528	A	24.402	58.155	17.116	20.73	0.000	0.000
						B	27.147	26.635		31.82	0.000	0.000
						C	48.018	38.837		19.71	0.000	0.000
T10 60.00-40.00	50.00	1.126	0	0.7883	417.024	A	52.941	115.619	34.062	20.21	0.000	0.000
						B	59.026	53.369		30.31	0.000	0.000
						C	100.202	77.389		19.18	0.000	0.000
T11 40.00-20.00	30.00	1	0	0.7500	456.896	A	55.328	114.329	33.806	19.93	0.000	0.000
						B	61.363	53.305		29.48	0.000	0.000
						C	103.819	78.408		18.55	0.000	0.000
T12 20.00-0.00	10.00	1	0	0.7500	496.896	A	59.010	117.051	33.806	19.20	0.000	0.000
						B	63.863	54.242		28.62	0.000	0.000
						C	107.527	81.064		17.93	0.000	0.000

Tower Pressure - Service

G_H = 1.121

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
T1	170.00	1.597	0	160.320	A	14.957	31.133	11.688	25.36	0.000	0.000
180.00-160.00					B	14.117	12.313		44.22	0.000	0.000
					C	14.117	12.313		44.22	0.000	0.000
T2	156.67	1.561	0	63.206	A	6.050	16.166	5.009	22.55	0.000	0.000
160.00-153.33					B	4.531	5.217		51.38	0.000	0.000
					C	4.531	5.217		51.38	0.000	0.000
T3	150.00	1.541	0	67.816	A	8.039	17.141	5.009	19.89	0.000	0.000
153.33-146.67					B	6.262	5.217		43.64	0.000	0.000
					C	6.262	5.217		43.64	0.000	0.000
T4	143.33	1.521	0	72.425	A	8.152	19.878	5.009	17.87	0.000	0.000
146.67-140.00					B	6.622	5.217		42.31	0.000	0.000
					C	6.622	5.217		42.31	0.000	0.000
T5	130.00	1.48	0	246.784	A	22.301	65.519	18.577	21.15	0.000	0.000
140.00-120.00					B	16.385	19.202		52.20	0.000	0.000
					C	17.159	27.819		41.30	0.000	0.000
T6	110.00	1.411	0	288.763	A	27.392	70.060	22.118	22.70	0.000	0.000
120.00-100.00					B	23.976	34.623		37.74	0.000	0.000
					C	24.160	54.441		28.14	0.000	0.000
T7	90.00	1.332	0	329.495	A	27.187	70.067	22.125	22.75	0.000	0.000
100.00-80.00					B	24.471	42.550		33.01	0.000	0.000
					C	21.807	81.209		21.48	0.000	0.000
T8 80.00-70.00	75.00	1.264	0	182.118	A	14.381	38.370	14.399	27.30	0.000	0.000
					B	12.995	24.612		38.29	0.000	0.000
					C	11.696	43.941		25.88	0.000	0.000
T9 70.00-60.00	65.00	1.214	0	192.171	A	14.870	38.370	14.399	27.05	0.000	0.000
					B	13.468	24.612		37.81	0.000	0.000
					C	12.187	43.941		25.65	0.000	0.000
T10	50.00	1.126	0	414.393	A	34.427	76.740	28.798	25.91	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
60.00-40.00					B	31.898	49.223		35.50	0.000	0.000
					C	29.016	87.881		24.64	0.000	0.000
T11	30.00	1	0	454.393	A	36.929	76.740	28.798	25.34	0.000	0.000
40.00-20.00					B	34.356	49.223		34.46	0.000	0.000
					C	31.448	88.931		23.92	0.000	0.000
T12 20.00-0.00	10.00	1	0	494.393	A	39.397	77.430	28.798	24.65	0.000	0.000
					B	36.840	49.223		33.46	0.000	0.000
					C	33.896	89.981		23.25	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	R_R	D_F	D_R	A_E ft²	F K	w klf	Ctrl. Face
T1	0.22	1.23	A	0.287	2.33	0.612	1	1	34.015	2.62	0.13	A
180.00-160.00			B	0.165	2.718	0.584	1	1	21.306			
			C	0.165	2.718	0.584	1	1	21.306			
T2	0.15	0.57	A	0.351	2.168	0.633	1	1	16.283	1.14	0.17	A
160.00-153.33			B	0.154	2.756	0.582	1	1	7.568			
			C	0.154	2.756	0.582	1	1	7.568			
T3	0.19	0.64	A	0.371	2.124	0.64	1	1	19.015	1.29	0.19	A
153.33-146.67			B	0.169	2.702	0.585	1	1	9.312			
			C	0.169	2.702	0.585	1	1	9.312			
T4	0.21	0.65	A	0.387	2.09	0.646	1	1	21.001	1.38	0.21	A
146.67-140.00			B	0.163	2.723	0.584	1	1	9.667			
			C	0.163	2.723	0.584	1	1	9.667			
T5	0.93	2.24	A	0.356	2.158	0.635	1	1	63.877	4.23	0.21	A
140.00-120.00			B	0.144	2.793	0.581	1	1	27.533			
			C	0.182	2.656	0.587	1	1	33.487			
T6	1.73	2.73	A	0.337	2.201	0.628	1	1	71.395	4.60	0.23	A
120.00-100.00			B	0.203	2.586	0.591	1	1	44.438			
			C	0.272	2.373	0.608	1	1	57.249			
T7	2.08	3.02	A	0.295	2.309	0.614	1	1	70.238	4.51	0.23	C
100.00-80.00			B	0.203	2.585	0.591	1	1	49.622			
			C	0.313	2.263	0.62	1	1	72.144			
T8	1.04	1.69	A	0.29	2.324	0.613	1	1	37.894	2.32	0.23	C
80.00-70.00			B	0.206	2.574	0.592	1	1	27.558			
			C	0.305	2.281	0.618	1	1	38.834			
T9	1.04	2.45	A	0.277	2.359	0.609	1	1	38.242	2.28	0.23	C
70.00-60.00			B	0.198	2.602	0.59	1	1	27.990			
			C	0.292	2.317	0.614	1	1	39.145			
T10	2.08	3.76	A	0.268	2.384	0.607	1	1	80.985	4.53	0.23	C
60.00-40.00			B	0.196	2.61	0.59	1	1	60.917			
			C	0.282	2.345	0.611	1	1	82.675			
T11	2.08	4.98	A	0.25	2.437	0.602	1	1	83.119	4.23	0.21	C
40.00-20.00			B	0.184	2.651	0.587	1	1	63.262			
			C	0.265	2.393	0.606	1	1	85.322			
T12	2.09	7.71	A	0.236	2.479	0.598	1	1	85.736	4.45	0.22	C
20.00-0.00			B	0.174	2.685	0.585	1	1	65.658			
			C	0.251	2.436	0.602	1	1	88.067			
Sum Weight:	13.83	31.66						OTM	3198.28 kip-ft	37.58		

Tower Forces - No Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w klf	Ctrl. Face
T1	0.22	1.23	A	0.287	2.33	0.612	0.8	1	31.023	2.39	0.12	A
180.00-160.00			B	0.165	2.718	0.584	0.8	1	18.483			
			C	0.165	2.718	0.584	0.8	1	18.483			
T2	0.15	0.57	A	0.351	2.168	0.633	0.8	1	15.073	1.06	0.16	A
160.00-153.33			B	0.154	2.756	0.582	0.8	1	6.662			
			C	0.154	2.756	0.582	0.8	1	6.662			
T3	0.19	0.64	A	0.371	2.124	0.64	0.8	1	17.407	1.18	0.18	A
153.33-146.67			B	0.169	2.702	0.585	0.8	1	8.060			
			C	0.169	2.702	0.585	0.8	1	8.060			
T4	0.21	0.65	A	0.387	2.09	0.646	0.8	1	19.371	1.28	0.19	A
146.67-140.00			B	0.163	2.723	0.584	0.8	1	8.342			
			C	0.163	2.723	0.584	0.8	1	8.342			
T5	0.93	2.24	A	0.356	2.158	0.635	0.8	1	59.417	3.93	0.20	A
140.00-120.00			B	0.144	2.793	0.581	0.8	1	24.257			
			C	0.182	2.656	0.587	0.8	1	30.056			
T6	1.73	2.73	A	0.337	2.201	0.628	0.8	1	65.917	4.24	0.21	A
120.00-100.00			B	0.203	2.586	0.591	0.8	1	39.643			
			C	0.272	2.373	0.608	0.8	1	52.417			
T7	2.08	3.02	A	0.295	2.309	0.614	0.8	1	64.801	4.24	0.21	C
100.00-80.00			B	0.203	2.585	0.591	0.8	1	44.728			
			C	0.313	2.263	0.62	0.8	1	67.783			
T8	1.04	1.69	A	0.29	2.324	0.613	0.8	1	35.018	2.18	0.22	C
80.00-70.00			B	0.206	2.574	0.592	0.8	1	24.960			
			C	0.305	2.281	0.618	0.8	1	36.494			
T9	1.04	2.45	A	0.277	2.359	0.609	0.8	1	35.268	2.14	0.21	C
70.00-60.00			B	0.198	2.602	0.59	0.8	1	25.296			
			C	0.292	2.317	0.614	0.8	1	36.707			
T10	2.08	3.76	A	0.268	2.384	0.607	0.8	1	74.100	4.21	0.21	C
60.00-40.00			B	0.196	2.61	0.59	0.8	1	54.537			
			C	0.282	2.345	0.611	0.8	1	76.872			
T11	2.08	4.98	A	0.25	2.437	0.602	0.8	1	75.733	3.92	0.20	C
40.00-20.00			B	0.184	2.651	0.587	0.8	1	56.391			
			C	0.265	2.393	0.606	0.8	1	79.032			
T12	2.09	7.71	A	0.236	2.479	0.598	0.8	1	77.857	4.10	0.21	C
20.00-0.00			B	0.174	2.685	0.585	0.8	1	58.290			
			C	0.251	2.436	0.602	0.8	1	81.287			
Sum Weight:	13.83	31.66						OTM	2963.88 kip-ft	34.88		

Tower Forces - No Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w klf	Ctrl. Face
T1	0.22	1.23	A	0.287	2.33	0.612	0.85	1	31.771	2.45	0.12	A
180.00-160.00			B	0.165	2.718	0.584	0.85	1	19.189			
			C	0.165	2.718	0.584	0.85	1	19.189			
T2	0.15	0.57	A	0.351	2.168	0.633	0.85	1	15.376	1.08	0.16	A
160.00-153.33			B	0.154	2.756	0.582	0.85	1	6.888			
			C	0.154	2.756	0.582	0.85	1	6.888			
T3	0.19	0.64	A	0.371	2.124	0.64	0.85	1	17.809	1.21	0.18	A
153.33-146.67			B	0.169	2.702	0.585	0.85	1	8.373			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w klf	Ctrl. Face
			C	0.169	2.702	0.585	0.85	1	8.373			
T4	0.21	0.65	A	0.387	2.09	0.646	0.85	1	19.778	1.30	0.20	A
146.67-140.00			B	0.163	2.723	0.584	0.85	1	8.673			
			C	0.163	2.723	0.584	0.85	1	8.673			
T5	0.93	2.24	A	0.356	2.158	0.635	0.85	1	60.532	4.01	0.20	A
140.00-120.00			B	0.144	2.793	0.581	0.85	1	25.076			
			C	0.182	2.656	0.587	0.85	1	30.914			
T6	1.73	2.73	A	0.337	2.201	0.628	0.85	1	67.287	4.33	0.22	A
120.00-100.00			B	0.203	2.586	0.591	0.85	1	40.842			
			C	0.272	2.373	0.608	0.85	1	53.625			
T7	2.08	3.02	A	0.295	2.309	0.614	0.85	1	66.160	4.30	0.22	C
100.00-80.00			B	0.203	2.585	0.591	0.85	1	45.952			
			C	0.313	2.263	0.62	0.85	1	68.873			
T8	1.04	1.69	A	0.29	2.324	0.613	0.85	1	35.737	2.22	0.22	C
80.00-70.00			B	0.206	2.574	0.592	0.85	1	25.609			
			C	0.305	2.281	0.618	0.85	1	37.079			
T9	1.04	2.45	A	0.277	2.359	0.609	0.85	1	36.012	2.18	0.22	C
70.00-60.00			B	0.198	2.602	0.59	0.85	1	25.970			
			C	0.292	2.317	0.614	0.85	1	37.317			
T10	2.08	3.76	A	0.268	2.384	0.607	0.85	1	75.821	4.29	0.21	C
60.00-40.00			B	0.196	2.61	0.59	0.85	1	56.132			
			C	0.282	2.345	0.611	0.85	1	78.322			
T11	2.08	4.98	A	0.25	2.437	0.602	0.85	1	77.580	4.00	0.20	C
40.00-20.00			B	0.184	2.651	0.587	0.85	1	58.109			
			C	0.265	2.393	0.606	0.85	1	80.604			
T12	2.09	7.71	A	0.236	2.479	0.598	0.85	1	79.827	4.19	0.21	C
20.00-0.00			B	0.174	2.685	0.585	0.85	1	60.132			
			C	0.251	2.436	0.602	0.85	1	82.982			
Sum Weight:	13.83	31.66						OTM	3022.48 kip-ft	35.55		

Tower Forces - With Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w klf	Ctrl. Face
T1	0.83	2.61	A	0.488	1.916	0.692	1	1	59.877	0.74	0.04	A
180.00-160.00			B	0.297	2.305	0.615	1	1	35.234			
			C	0.297	2.305	0.615	1	1	35.234			
T2	0.52	1.02	A	0.589	1.811	0.747	1	1	30.178	0.35	0.05	A
160.00-153.33			B	0.25	2.438	0.602	1	1	11.459			
			C	0.25	2.438	0.602	1	1	11.459			
T3	0.59	1.20	A	0.62	1.793	0.766	1	1	35.212	0.40	0.06	A
153.33-146.67			B	0.28	2.351	0.61	1	1	14.189			
			C	0.28	2.351	0.61	1	1	14.189			
T4	0.67	1.24	A	0.644	1.783	0.782	1	1	40.076	0.44	0.07	A
146.67-140.00			B	0.27	2.378	0.607	1	1	14.658			
			C	0.27	2.378	0.607	1	1	14.658			
T5	2.67	3.80	A	0.591	1.81	0.748	1	1	120.808	1.31	0.07	A
140.00-120.00			B	0.224	2.517	0.596	1	1	39.999			
			C	0.287	2.331	0.612	1	1	54.841			
T6	4.64	4.65	A	0.541	1.852	0.719	1	1	126.435	1.34	0.07	A
120.00-100.00			B	0.299	2.3	0.615	1	1	69.117			
			C	0.421	2.024	0.66	1	1	102.812			
T7	5.82	4.77	A	0.471	1.941	0.683	1	1	121.551	1.47	0.07	C

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w klf	Ctrl. Face
100.00-80.00			B	0.295	2.309	0.614	1	1	80.290			
			C	0.495	1.907	0.695	1	1	142.781			
T8	2.87	2.65	A	0.448	1.976	0.672	1	1	63.143	0.74	0.07	C
80.00-70.00			B	0.29	2.322	0.613	1	1	42.988			
			C	0.471	1.941	0.683	1	1	74.085			
T9	2.85	3.78	A	0.427	2.014	0.663	1	1	62.948	0.72	0.07	C
70.00-60.00			B	0.278	2.356	0.609	1	1	43.378			
			C	0.449	1.975	0.673	1	1	74.145			
T10	5.59	5.88	A	0.404	2.056	0.653	1	1	128.477	1.40	0.07	C
60.00-40.00			B	0.27	2.38	0.607	1	1	91.423			
			C	0.426	2.015	0.662	1	1	151.472			
T11	5.47	7.10	A	0.371	2.124	0.64	1	1	128.535	1.30	0.06	C
40.00-20.00			B	0.251	2.435	0.602	1	1	93.459			
			C	0.399	2.066	0.651	1	1	154.873			
T12	5.52	10.91	A	0.354	2.162	0.634	1	1	133.223	1.37	0.07	C
20.00-0.00			B	0.238	2.475	0.599	1	1	96.344			
			C	0.38	2.106	0.643	1	1	159.690			
Sum Weight:	38.04	49.60						OTM	978.93 kip-ft	11.58		

Tower Forces - With Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w klf	Ctrl. Face
T1	0.83	2.61	A	0.488	1.916	0.692	0.8	1	56.821	0.71	0.04	A
180.00-160.00			B	0.297	2.305	0.615	0.8	1	32.411			
			C	0.297	2.305	0.615	0.8	1	32.411			
T2	0.52	1.02	A	0.589	1.811	0.747	0.8	1	28.674	0.33	0.05	A
160.00-153.33			B	0.25	2.438	0.602	0.8	1	10.553			
			C	0.25	2.438	0.602	0.8	1	10.553			
T3	0.59	1.20	A	0.62	1.793	0.766	0.8	1	33.050	0.37	0.06	A
153.33-146.67			B	0.28	2.351	0.61	0.8	1	12.937			
			C	0.28	2.351	0.61	0.8	1	12.937			
T4	0.67	1.24	A	0.644	1.783	0.782	0.8	1	37.252	0.41	0.06	A
146.67-140.00			B	0.27	2.378	0.607	0.8	1	13.334			
			C	0.27	2.378	0.607	0.8	1	13.334			
T5	2.67	3.80	A	0.591	1.81	0.748	0.8	1	112.511	1.22	0.06	A
140.00-120.00			B	0.224	2.517	0.596	0.8	1	36.722			
			C	0.287	2.331	0.612	0.8	1	49.194			
T6	4.64	4.65	A	0.541	1.852	0.719	0.8	1	117.278	1.24	0.06	A
120.00-100.00			B	0.299	2.3	0.615	0.8	1	61.049			
			C	0.421	2.024	0.66	0.8	1	89.984			
T7	5.82	4.77	A	0.471	1.941	0.683	0.8	1	112.295	1.28	0.06	C
100.00-80.00			B	0.295	2.309	0.614	0.8	1	69.909			
			C	0.495	1.907	0.695	0.8	1	124.098			
T8	2.87	2.65	A	0.448	1.976	0.672	0.8	1	58.358	0.64	0.06	C
80.00-70.00			B	0.29	2.322	0.613	0.8	1	37.649			
			C	0.471	1.941	0.683	0.8	1	64.581			
T9	2.85	3.78	A	0.427	2.014	0.663	0.8	1	58.068	0.63	0.06	C
70.00-60.00			B	0.278	2.356	0.609	0.8	1	37.949			
			C	0.449	1.975	0.673	0.8	1	64.541			
T10	5.59	5.88	A	0.404	2.056	0.653	0.8	1	117.889	1.21	0.06	C
60.00-40.00			B	0.27	2.38	0.607	0.8	1	79.618			
			C	0.426	2.015	0.662	0.8	1	131.431			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w klf	Ctrl. Face
T11	5.47	7.10	A	0.371	2.124	0.64	0.8	1	117.469	1.13	0.06	C
40.00-20.00			B	0.251	2.435	0.602	0.8	1	81.186			
			C	0.399	2.066	0.651	0.8	1	134.109			
T12	5.52	10.91	A	0.354	2.162	0.634	0.8	1	121.421	1.18	0.06	C
20.00-0.00			B	0.238	2.475	0.599	0.8	1	83.572			
			C	0.38	2.106	0.643	0.8	1	138.184			
Sum Weight:	38.04	49.60						OTM	892.43 kip-ft	10.35		

Tower Forces - With Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w klf	Ctrl. Face
T1	0.83	2.61	A	0.488	1.916	0.692	0.85	1	57.585	0.72	0.04	A
180.00-160.00			B	0.297	2.305	0.615	0.85	1	33.117			
			C	0.297	2.305	0.615	0.85	1	33.117			
T2	0.52	1.02	A	0.589	1.811	0.747	0.85	1	29.050	0.33	0.05	A
160.00-153.33			B	0.25	2.438	0.602	0.85	1	10.779			
			C	0.25	2.438	0.602	0.85	1	10.779			
T3	0.59	1.20	A	0.62	1.793	0.766	0.85	1	33.590	0.38	0.06	A
153.33-146.67			B	0.28	2.351	0.61	0.85	1	13.250			
			C	0.28	2.351	0.61	0.85	1	13.250			
T4	0.67	1.24	A	0.644	1.783	0.782	0.85	1	37.958	0.42	0.06	A
146.67-140.00			B	0.27	2.378	0.607	0.85	1	13.665			
			C	0.27	2.378	0.607	0.85	1	13.665			
T5	2.67	3.80	A	0.591	1.81	0.748	0.85	1	114.586	1.25	0.06	A
140.00-120.00			B	0.224	2.517	0.596	0.85	1	37.541			
			C	0.287	2.331	0.612	0.85	1	50.606			
T6	4.64	4.65	A	0.541	1.852	0.719	0.85	1	119.567	1.27	0.06	A
120.00-100.00			B	0.299	2.3	0.615	0.85	1	63.066			
			C	0.421	2.024	0.66	0.85	1	93.191			
T7	5.82	4.77	A	0.471	1.941	0.683	0.85	1	114.609	1.33	0.07	C
100.00-80.00			B	0.295	2.309	0.614	0.85	1	72.504			
			C	0.495	1.907	0.695	0.85	1	128.769			
T8	2.87	2.65	A	0.448	1.976	0.672	0.85	1	59.554	0.67	0.07	C
80.00-70.00			B	0.29	2.322	0.613	0.85	1	38.984			
			C	0.471	1.941	0.683	0.85	1	66.957			
T9	2.85	3.78	A	0.427	2.014	0.663	0.85	1	59.288	0.65	0.07	C
70.00-60.00			B	0.278	2.356	0.609	0.85	1	39.306			
			C	0.449	1.975	0.673	0.85	1	66.942			
T10	5.59	5.88	A	0.404	2.056	0.653	0.85	1	120.536	1.26	0.06	C
60.00-40.00			B	0.27	2.38	0.607	0.85	1	82.569			
			C	0.426	2.015	0.662	0.85	1	136.441			
T11	5.47	7.10	A	0.371	2.124	0.64	0.85	1	120.236	1.17	0.06	C
40.00-20.00			B	0.251	2.435	0.602	0.85	1	84.254			
			C	0.399	2.066	0.651	0.85	1	139.300			
T12	5.52	10.91	A	0.354	2.162	0.634	0.85	1	124.372	1.23	0.06	C
20.00-0.00			B	0.238	2.475	0.599	0.85	1	86.765			
			C	0.38	2.106	0.643	0.85	1	143.561			
Sum Weight:	38.04	49.60						OTM	914.05 kip-ft	10.66		

Tower Forces - Service - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w klf	Ctrl. Face
T1	0.22	1.23	A	0.287	2.33	0.612	1	1	34.015	0.91	0.05	A
180.00-160.00			B	0.165	2.718	0.584	1	1	21.306			
			C	0.165	2.718	0.584	1	1	21.306			
T2	0.15	0.57	A	0.351	2.168	0.633	1	1	16.283	0.40	0.06	A
160.00-153.33			B	0.154	2.756	0.582	1	1	7.568			
			C	0.154	2.756	0.582	1	1	7.568			
T3	0.19	0.64	A	0.371	2.124	0.64	1	1	19.015	0.45	0.07	A
153.33-146.67			B	0.169	2.702	0.585	1	1	9.312			
			C	0.169	2.702	0.585	1	1	9.312			
T4	0.21	0.65	A	0.387	2.09	0.646	1	1	21.001	0.48	0.07	A
146.67-140.00			B	0.163	2.723	0.584	1	1	9.667			
			C	0.163	2.723	0.584	1	1	9.667			
T5	0.93	2.24	A	0.356	2.158	0.635	1	1	63.877	1.46	0.07	A
140.00-120.00			B	0.144	2.793	0.581	1	1	27.533			
			C	0.182	2.656	0.587	1	1	33.487			
T6	1.73	2.73	A	0.337	2.201	0.628	1	1	71.395	1.59	0.08	A
120.00-100.00			B	0.203	2.586	0.591	1	1	44.438			
			C	0.272	2.373	0.608	1	1	57.249			
T7	2.08	3.02	A	0.295	2.309	0.614	1	1	70.238	1.56	0.08	C
100.00-80.00			B	0.203	2.585	0.591	1	1	49.622			
			C	0.313	2.263	0.62	1	1	72.144			
T8	1.04	1.69	A	0.29	2.324	0.613	1	1	37.894	0.80	0.08	C
80.00-70.00			B	0.206	2.574	0.592	1	1	27.558			
			C	0.305	2.281	0.618	1	1	38.834			
T9	1.04	2.45	A	0.277	2.359	0.609	1	1	38.242	0.79	0.08	C
70.00-60.00			B	0.198	2.602	0.59	1	1	27.990			
			C	0.292	2.317	0.614	1	1	39.145			
T10	2.08	3.76	A	0.268	2.384	0.607	1	1	80.985	1.57	0.08	C
60.00-40.00			B	0.196	2.61	0.59	1	1	60.917			
			C	0.282	2.345	0.611	1	1	82.675			
T11	2.08	4.98	A	0.25	2.437	0.602	1	1	83.119	1.46	0.07	C
40.00-20.00			B	0.184	2.651	0.587	1	1	63.262			
			C	0.265	2.393	0.606	1	1	85.322			
T12	2.09	7.71	A	0.236	2.479	0.598	1	1	85.736	1.54	0.08	C
20.00-0.00			B	0.174	2.685	0.585	1	1	65.658			
			C	0.251	2.436	0.602	1	1	88.067			
Sum Weight:	13.83	31.66						OTM	1106.67 kip-ft	13.00		

Tower Forces - Service - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w klf	Ctrl. Face
T1	0.22	1.23	A	0.287	2.33	0.612	0.8	1	31.023	0.83	0.04	A
180.00-160.00			B	0.165	2.718	0.584	0.8	1	18.483			
			C	0.165	2.718	0.584	0.8	1	18.483			
T2	0.15	0.57	A	0.351	2.168	0.633	0.8	1	15.073	0.37	0.05	A
160.00-153.33			B	0.154	2.756	0.582	0.8	1	6.662			
			C	0.154	2.756	0.582	0.8	1	6.662			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w klf	Ctrl. Face
T3	0.19	0.64	A	0.371	2.124	0.64	0.8	1	17.407	0.41	0.06	A
153.33-146.67			B	0.169	2.702	0.585	0.8	1	8.060			
			C	0.169	2.702	0.585	0.8	1	8.060			
T4	0.21	0.65	A	0.387	2.09	0.646	0.8	1	19.371	0.44	0.07	A
146.67-140.00			B	0.163	2.723	0.584	0.8	1	8.342			
			C	0.163	2.723	0.584	0.8	1	8.342			
T5	0.93	2.24	A	0.356	2.158	0.635	0.8	1	59.417	1.36	0.07	A
140.00-120.00			B	0.144	2.793	0.581	0.8	1	24.257			
			C	0.182	2.656	0.587	0.8	1	30.056			
T6	1.73	2.73	A	0.337	2.201	0.628	0.8	1	65.917	1.47	0.07	A
120.00-100.00			B	0.203	2.586	0.591	0.8	1	39.643			
			C	0.272	2.373	0.608	0.8	1	52.417			
T7	2.08	3.02	A	0.295	2.309	0.614	0.8	1	64.801	1.47	0.07	C
100.00-80.00			B	0.203	2.585	0.591	0.8	1	44.728			
			C	0.313	2.263	0.62	0.8	1	67.783			
T8	1.04	1.69	A	0.29	2.324	0.613	0.8	1	35.018	0.76	0.08	C
80.00-70.00			B	0.206	2.574	0.592	0.8	1	24.960			
			C	0.305	2.281	0.618	0.8	1	36.494			
T9	1.04	2.45	A	0.277	2.359	0.609	0.8	1	35.268	0.74	0.07	C
70.00-60.00			B	0.198	2.602	0.59	0.8	1	25.296			
			C	0.292	2.317	0.614	0.8	1	36.707			
T10	2.08	3.76	A	0.268	2.384	0.607	0.8	1	74.100	1.46	0.07	C
60.00-40.00			B	0.196	2.61	0.59	0.8	1	54.537			
			C	0.282	2.345	0.611	0.8	1	76.872			
T11	2.08	4.98	A	0.25	2.437	0.602	0.8	1	75.733	1.36	0.07	C
40.00-20.00			B	0.184	2.651	0.587	0.8	1	56.391			
			C	0.265	2.393	0.606	0.8	1	79.032			
T12	2.09	7.71	A	0.236	2.479	0.598	0.8	1	77.857	1.42	0.07	C
20.00-0.00			B	0.174	2.685	0.585	0.8	1	58.290			
			C	0.251	2.436	0.602	0.8	1	81.287			
Sum Weight:	13.83	31.66						OTM	1025.56 kip-ft	12.07		

Tower Forces - Service - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w klf	Ctrl. Face
T1	0.22	1.23	A	0.287	2.33	0.612	0.85	1	31.771	0.85	0.04	A
180.00-160.00			B	0.165	2.718	0.584	0.85	1	19.189			
			C	0.165	2.718	0.584	0.85	1	19.189			
T2	0.15	0.57	A	0.351	2.168	0.633	0.85	1	15.376	0.37	0.06	A
160.00-153.33			B	0.154	2.756	0.582	0.85	1	6.888			
			C	0.154	2.756	0.582	0.85	1	6.888			
T3	0.19	0.64	A	0.371	2.124	0.64	0.85	1	17.809	0.42	0.06	A
153.33-146.67			B	0.169	2.702	0.585	0.85	1	8.373			
			C	0.169	2.702	0.585	0.85	1	8.373			
T4	0.21	0.65	A	0.387	2.09	0.646	0.85	1	19.778	0.45	0.07	A
146.67-140.00			B	0.163	2.723	0.584	0.85	1	8.673			
			C	0.163	2.723	0.584	0.85	1	8.673			
T5	0.93	2.24	A	0.356	2.158	0.635	0.85	1	60.532	1.39	0.07	A
140.00-120.00			B	0.144	2.793	0.581	0.85	1	25.076			
			C	0.182	2.656	0.587	0.85	1	30.914			
T6	1.73	2.73	A	0.337	2.201	0.628	0.85	1	67.287	1.50	0.07	A
120.00-100.00			B	0.203	2.586	0.591	0.85	1	40.842			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w klf	Ctrl. Face
			C	0.272	2.373	0.608	0.85	1	53.625			
T7	2.08	3.02	A	0.295	2.309	0.614	0.85	1	66.160	1.49	0.07	C
100.00-80.00			B	0.203	2.585	0.591	0.85	1	45.952			
			C	0.313	2.263	0.62	0.85	1	68.873			
T8	1.04	1.69	A	0.29	2.324	0.613	0.85	1	35.737	0.77	0.08	C
80.00-70.00			B	0.206	2.574	0.592	0.85	1	25.609			
			C	0.305	2.281	0.618	0.85	1	37.079			
T9	1.04	2.45	A	0.277	2.359	0.609	0.85	1	36.012	0.75	0.08	C
70.00-60.00			B	0.198	2.602	0.59	0.85	1	25.970			
			C	0.292	2.317	0.614	0.85	1	37.317			
T10	2.08	3.76	A	0.268	2.384	0.607	0.85	1	75.821	1.48	0.07	C
60.00-40.00			B	0.196	2.61	0.59	0.85	1	56.132			
			C	0.282	2.345	0.611	0.85	1	78.322			
T11	2.08	4.98	A	0.25	2.437	0.602	0.85	1	77.580	1.38	0.07	C
40.00-20.00			B	0.184	2.651	0.587	0.85	1	58.109			
			C	0.265	2.393	0.606	0.85	1	80.604			
T12	2.09	7.71	A	0.236	2.479	0.598	0.85	1	79.827	1.45	0.07	C
20.00-0.00			B	0.174	2.685	0.585	0.85	1	60.132			
			C	0.251	2.436	0.602	0.85	1	82.982			
Sum Weight:	13.83	31.66						OTM	1045.84 kip-ft	12.30		

Discrete Appurtenance Pressures - No Ice $G_H = 1.121$

Description	Aiming Azimuth °	Weight K	$Offset_x$ ft	$Offset_z$ ft	z ft	K_z	q_z ksf	C_AA_C Front ft²	C_AA_C Side ft²
Lightning Rod	240.0000	0.03	-3.34	1.93	182.00	1.629	0	0.25	0.25
Empty Pipe Mount	0.0000	0.01	0.00	-7.98	178.00	1.619	0	1.00	1.00
Empty Pipe Mount	120.0000	0.01	6.91	3.99	178.00	1.619	0	1.00	1.00
Side Arm Mount [SO 306-1]	0.0000	0.04	0.00	-3.98	178.00	1.619	0	0.98	2.18
Side Arm Mount [SO 306-1]	120.0000	0.04	3.45	1.99	178.00	1.619	0	0.98	2.18
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	0.0000	0.11	0.00	-8.34	173.00	1.605	0	6.83	5.64
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	120.0000	0.11	7.22	4.17	173.00	1.605	0	6.83	5.64
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	240.0000	0.11	-7.22	4.17	173.00	1.605	0	6.83	5.64
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	0.0000	0.11	0.00	-8.34	173.00	1.605	0	6.83	5.64
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	120.0000	0.11	7.22	4.17	173.00	1.605	0	6.83	5.64
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	240.0000	0.11	-7.22	4.17	173.00	1.605	0	6.83	5.64
LNX-6515DS-VTM w/ Mount Pipe	0.0000	0.08	0.00	-8.34	173.00	1.605	0	11.68	9.84
LNX-6515DS-VTM w/ Mount Pipe	120.0000	0.08	7.22	4.17	173.00	1.605	0	11.68	9.84
LNX-6515DS-VTM w/ Mount Pipe	240.0000	0.08	-7.22	4.17	173.00	1.605	0	11.68	9.84
KRY 112 144/1	0.0000	0.01	0.00	-8.34	173.00	1.605	0	0.41	0.19
KRY 112 144/1	120.0000	0.01	7.22	4.17	172.00	1.603	0	0.41	0.19
KRY 112 144/1	240.0000	0.01	-7.22	4.17	172.00	1.603	0	0.41	0.19
RRUS 11 B12	0.0000	0.05	0.00	-8.34	173.00	1.605	0	3.31	1.36

Description	Aiming Azimuth °	Weight K	$Offset_x$ ft	$Offset_z$ ft	z ft	K_z	q_z ksf	C_AA_C Front ft^2	C_AA_C Side ft^2
RRUS 11 B12	120.0000	0.05	7.22	4.17	173.00	1.605	0	3.31	1.36
RRUS 11 B12	240.0000	0.05	-7.22	4.17	173.00	1.605	0	3.31	1.36
Sector Mount [SM 602-3]	0.0000	1.54	0.00	0.00	172.00	1.603	0	33.11	33.11
Empty Pipe Mount	0.0000	0.02	0.00	-8.34	172.00	1.603	0	1.05	1.05
Empty Pipe Mount	120.0000	0.02	7.22	4.17	172.00	1.603	0	1.05	1.05
Empty Pipe Mount	240.0000	0.02	-7.22	4.17	172.00	1.603	0	1.05	1.05
Side Arm Mount [SO 202-1]	0.0000	0.11	0.00	-5.24	157.00	1.561	0	2.96	2.53
Side Arm Mount [SO 202-1]	120.0000	0.11	4.54	2.62	157.00	1.561	0	2.96	2.53
APXVSPP18-C-A20 w/ Mount Pipe	0.0000	0.08	0.00	-9.78	148.00	1.535	0	8.50	6.95
APXVSPP18-C-A20 w/ Mount Pipe	120.0000	0.08	8.47	4.89	148.00	1.535	0	8.50	6.95
APXVSPP18-C-A20 w/ Mount Pipe	240.0000	0.08	-8.47	4.89	148.00	1.535	0	8.50	6.95
APXVTM14-C-120 w/ Mount Pipe	0.0000	0.08	0.00	-9.78	148.00	1.535	0	7.13	4.96
APXVTM14-C-120 w/ Mount Pipe	120.0000	0.08	8.47	4.89	148.00	1.535	0	7.13	4.96
APXVTM14-C-120 w/ Mount Pipe	240.0000	0.08	-8.47	4.89	148.00	1.535	0	7.13	4.96
ACU-A20-N	0.0000	0.00	0.00	-9.78	148.00	1.535	0	0.23	0.41
ACU-A20-N	120.0000	0.00	8.47	4.89	148.00	1.535	0	0.23	0.41
ACU-A20-N	240.0000	0.00	-8.47	4.89	148.00	1.535	0	0.23	0.41
TD-RRH8x20-25	0.0000	0.07	0.00	-9.78	148.00	1.535	0	4.72	1.70
TD-RRH8x20-25	120.0000	0.07	8.47	4.89	148.00	1.535	0	4.72	1.70
TD-RRH8x20-25	240.0000	0.07	-8.47	4.89	148.00	1.535	0	4.72	1.70
Site Pro VFA12-U w/ 12' Stiff Arm	0.0000	1.67	0.00	0.00	148.00	1.535	0	33.02	33.02
PCS 1900MHz 4x45W-65MHz	0.0000	0.06	0.00	-10.08	145.00	1.526	0	2.71	2.61
PCS 1900MHz 4x45W-65MHz	0.0000	0.06	0.00	-10.08	142.00	1.517	0	2.71	2.61
PCS 1900MHz 4x45W-65MHz	120.0000	0.06	8.73	5.04	145.00	1.526	0	2.71	2.61
PCS 1900MHz 4x45W-65MHz	120.0000	0.06	8.73	5.04	142.00	1.517	0	2.71	2.61
PCS 1900MHz 4x45W-65MHz	240.0000	0.06	-8.73	5.04	145.00	1.526	0	2.71	2.61
PCS 1900MHz 4x45W-65MHz	240.0000	0.06	-8.73	5.04	142.00	1.517	0	2.71	2.61
TME-800MHZ 2X50W RRH	0.0000	0.05	0.00	-10.08	145.00	1.526	0	2.49	2.07
TME-800MHZ 2X50W RRH	120.0000	0.05	8.73	5.04	145.00	1.526	0	2.49	2.07
TME-800MHZ 2X50W RRH	240.0000	0.05	-8.73	5.04	145.00	1.526	0	2.49	2.07
800 EXTERNAL NOTCH FILTER	0.0000	0.01	0.00	-10.08	145.00	1.526	0	0.77	0.37
800 EXTERNAL NOTCH FILTER	120.0000	0.01	8.73	5.04	145.00	1.526	0	0.77	0.37
800 EXTERNAL NOTCH FILTER	240.0000	0.01	-8.73	5.04	145.00	1.526	0	0.77	0.37
Side Arm Mount [SO 312-3]	0.0000	0.21	0.00	0.00	143.00	1.520	0	7.87	7.87
DB844G65ZAXY w/ Mount Pipe	0.0000	0.03	0.00	-11.10	128.00	1.473	0	4.90	4.92
DB844G65ZAXY w/ Mount Pipe	120.0000	0.03	9.61	5.55	128.00	1.473	0	4.90	4.92

Description	Aiming Azimuth °	Weight K	$Offset_x$ ft	$Offset_z$ ft	z ft	K_z	q_z ksf	C_AA_C Front ft^2	C_AA_C Side ft^2
DB844G65ZAXY w/ Mount Pipe	240.0000	0.06	-9.61	5.55	128.00	1.473	0	9.81	9.84
LNX-6514DS-T4M w/ Mount Pipe	0.0000	0.06	0.00	-11.10	128.00	1.473	0	8.57	7.00
LNX-6514DS-T4M w/ Mount Pipe	120.0000	0.06	9.61	5.55	128.00	1.473	0	8.57	7.00
MG D3-800TV w/ Mount Pipe	0.0000	0.04	0.00	-11.10	128.00	1.473	0	3.57	3.42
MG D3-800TV w/ Mount Pipe	120.0000	0.04	9.61	5.55	128.00	1.473	0	3.57	3.42
MG D3-800TV w/ Mount Pipe	240.0000	0.04	-9.61	5.55	128.00	1.473	0	3.57	3.42
MG D3-800Tx w/ Mount Pipe	0.0000	0.03	0.00	-11.10	128.00	1.473	0	3.57	3.42
MG D3-800Tx w/ Mount Pipe	120.0000	0.03	9.61	5.55	128.00	1.473	0	3.57	3.42
MG D3-800Tx w/ Mount Pipe	240.0000	0.03	-9.61	5.55	128.00	1.473	0	3.57	3.42
DB844H80-XY w/ Mount Pipe	0.0000	0.03	0.00	-11.10	128.00	1.473	0	3.10	5.15
DB844H80-XY w/ Mount Pipe	120.0000	0.03	9.61	5.55	128.00	1.473	0	3.10	5.15
GPS_A	120.0000	0.00	9.61	5.55	130.00	1.480	0	0.30	0.30
P65.16.XL.2 w/ Mount Pipe	240.0000	0.06	-9.61	5.55	128.00	1.473	0	8.64	5.78
RRH2X40-AWS	0.0000	0.05	0.00	-11.10	128.00	1.473	0	3.77	2.23
RRH2X40-AWS	120.0000	0.05	9.61	5.55	128.00	1.473	0	3.77	2.23
RRH2X40-AWS	240.0000	0.05	-9.61	5.55	128.00	1.473	0	3.77	2.23
DB-T1-6Z-8AB-0Z	120.0000	0.04	9.61	5.55	128.00	1.473	0	5.60	2.33
Sector Mount [SM 410-3]	0.0000	1.10	0.00	0.00	126.00	1.466	0	23.96	23.96
800 10504 w/ Mount Pipe	0.0000	0.04	0.00	-11.90	112.00	1.418	0	3.59	3.18
800 10504 w/ Mount Pipe	120.0000	0.04	10.31	5.95	112.00	1.418	0	3.59	3.18
800 10504 w/ Mount Pipe	240.0000	0.04	-10.31	5.95	112.00	1.418	0	3.59	3.18
Sector Mount [SM 104-3]	0.0000	0.95	0.00	0.00	112.00	1.418	0	30.02	30.02
Empty Mount Pipe	0.0000	0.03	0.00	-11.90	112.00	1.418	0	1.40	1.40
Empty Mount Pipe	120.0000	0.03	10.31	5.95	112.00	1.418	0	1.40	1.40
Empty Mount Pipe	240.0000	0.03	-10.31	5.95	112.00	1.418	0	1.40	1.40
7770.00 w/ Mount Pipe	0.0000	0.12	0.00	-12.46	102.00	1.380	0	12.24	8.51
7770.00 w/ Mount Pipe	120.0000	0.12	10.79	6.23	102.00	1.380	0	12.24	8.51
7770.00 w/ Mount Pipe	240.0000	0.12	-10.79	6.23	102.00	1.380	0	12.24	8.51
P65-16-XLH-RR w/ Mount Pipe	0.0000	0.08	0.00	-12.46	102.00	1.380	0	8.64	6.36
P65-16-XLH-RR w/ Mount Pipe	120.0000	0.08	10.79	6.23	102.00	1.380	0	8.64	6.36
P65-16-XLH-RR w/ Mount Pipe	240.0000	0.08	-10.79	6.23	102.00	1.380	0	8.64	6.36
LGP2140X	0.0000	0.02	0.00	-12.46	102.00	1.380	0	2.52	0.76
LGP2140X	120.0000	0.02	10.79	6.23	102.00	1.380	0	2.52	0.76
LGP2140X	240.0000	0.02	-10.79	6.23	102.00	1.380	0	2.52	0.76
LGP2140X	0.0000	0.02	0.00	-12.46	102.00	1.380	0	2.52	0.76
LGP2140X	120.0000	0.02	10.79	6.23	102.00	1.380	0	2.52	0.76
LGP2140X	240.0000	0.02	-10.79	6.23	102.00	1.380	0	2.52	0.76
RRUS 11 B2	0.0000	0.10	0.00	-12.46	102.00	1.380	0	6.61	2.72
RRUS 11 B2	120.0000	0.10	10.79	6.23	102.00	1.380	0	6.61	2.72
RRUS 11 B2	240.0000	0.10	-10.79	6.23	102.00	1.380	0	6.61	2.72
DC6-48-60-18-8F	240.0000	0.03	-10.79	6.23	102.00	1.380	0	2.57	4.32

Description	Aiming Azimuth °	Weight K	$Offset_x$ ft	$Offset_z$ ft	z ft	K_z	q_z ksf	C_AA_C Front ft^2	C_AA_C Side ft^2
Sector Mount [SM 301-3]	0.0000	1.30	0.00	0.00	102.00	1.380	0	29.61	1.00
Empty Mount Pipe	0.0000	0.03	0.00	-12.46	102.00	1.380	0	1.40	1.40
Empty Mount Pipe	120.0000	0.03	10.79	6.23	102.00	1.380	0	1.40	1.40
Empty Mount Pipe	240.0000	0.03	-10.79	6.23	102.00	1.380	0	1.40	1.40
GPS_A	120.0000	0.00	13.60	7.85	30.00	1.000	0	0.30	0.30
GPS_A	240.0000	0.00	-13.60	7.85	30.00	1.000	0	0.30	0.30
Side Arm Mount [SO 701-1]	120.0000	0.07	11.00	6.35	30.00	1.000	0	0.85	1.67
Side Arm Mount [SO 701-1]	240.0000	0.07	-11.00	6.35	30.00	1.000	0	0.85	1.67
VG-1060	300.0000	0.00	-6.38	-3.69	12.00	1.000	0	0.13	0.13
GPS_A	300.0000	0.00	-6.38	-3.69	12.00	1.000	0	0.30	0.30
Pipe Mount [PM 601-1]	300.0000	0.07	-5.95	-3.44	12.00	1.000	0	3.00	0.90
	Sum Weight:	11.82							

Discrete Appurtenance Pressures - With Ice $G_H = 1.121$

Description	Aiming Azimuth °	Weight K	$Offset_x$ ft	$Offset_z$ ft	z ft	K_z	q_z ksf	C_AA_C Front ft^2	C_AA_C Side ft^2	t_z in
Lightning Rod	240.0000	0.04	-3.34	1.93	182.00	1.629	0	0.92	0.92	0.9193
Empty Pipe Mount	0.0000	0.03	0.00	-7.98	178.00	1.619	0	1.65	1.65	0.9181
Empty Pipe Mount	120.0000	0.03	6.91	3.99	178.00	1.619	0	1.65	1.65	0.9181
Side Arm Mount [SO 306-1]	0.0000	0.08	0.00	-3.98	178.00	1.619	0	2.30	5.15	0.9181
Side Arm Mount [SO 306-1]	120.0000	0.08	3.45	1.99	178.00	1.619	0	2.30	5.15	0.9181
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	0.0000	0.22	0.00	-8.34	173.00	1.605	0	7.77	7.12	0.9143
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	120.0000	0.22	7.22	4.17	173.00	1.605	0	7.77	7.12	0.9143
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	240.0000	0.22	-7.22	4.17	173.00	1.605	0	7.77	7.12	0.9143
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	0.0000	0.22	0.00	-8.34	173.00	1.605	0	7.77	7.12	0.9143
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	120.0000	0.22	7.22	4.17	173.00	1.605	0	7.77	7.12	0.9143
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	240.0000	0.22	-7.22	4.17	173.00	1.605	0	7.77	7.12	0.9143
LNX-6515DS-VTM w/ Mount Pipe	0.0000	0.26	0.00	-8.34	173.00	1.605	0	13.01	12.65	0.9143
LNX-6515DS-VTM w/ Mount Pipe	120.0000	0.26	7.22	4.17	173.00	1.605	0	13.01	12.65	0.9143
LNX-6515DS-VTM w/ Mount Pipe	240.0000	0.26	-7.22	4.17	173.00	1.605	0	13.01	12.65	0.9143
KRY 112 144/1	0.0000	0.02	0.00	-8.34	173.00	1.605	0	0.58	0.32	0.9143
KRY 112 144/1	120.0000	0.02	7.22	4.17	172.00	1.603	0	0.58	0.32	0.9143
KRY 112 144/1	240.0000	0.02	-7.22	4.17	172.00	1.603	0	0.58	0.32	0.9143
RRUS 11 B12	0.0000	0.09	0.00	-8.34	173.00	1.605	0	3.76	1.70	0.9143
RRUS 11 B12	120.0000	0.09	7.22	4.17	173.00	1.605	0	3.76	1.70	0.9143
RRUS 11 B12	240.0000	0.09	-7.22	4.17	173.00	1.605	0	3.76	1.70	0.9143
Sector Mount [SM 602-3]	0.0000	2.67	0.00	0.00	172.00	1.603	0	54.67	54.67	0.9143
Empty Pipe Mount	0.0000	0.04	0.00	-8.34	172.00	1.603	0	2.02	2.02	0.9143
Empty Pipe Mount	120.0000	0.04	7.22	4.17	172.00	1.603	0	2.02	2.02	0.9143
Empty Pipe Mount	240.0000	0.04	-7.22	4.17	172.00	1.603	0	2.02	2.02	0.9143

Description	Aiming Azimuth °	Weight K	$Offset_x$ ft	$Offset_z$ ft	z ft	K_z	q_z ksf	C_AA_C Front ft^2	C_AA_C Side ft^2	t_z in
Side Arm Mount [SO 202-1]	0.0000	0.15	0.00	-5.24	157.00	1.561	0	5.02	4.30	0.9044
Side Arm Mount [SO 202-1]	120.0000	0.15	4.54	2.62	157.00	1.561	0	5.02	4.30	0.9044
APXVSPP18-C-A20 w/ Mount Pipe	0.0000	0.21	0.00	-9.78	148.00	1.535	0	9.64	8.84	0.8980
APXVSPP18-C-A20 w/ Mount Pipe	120.0000	0.21	8.47	4.89	148.00	1.535	0	9.64	8.84	0.8980
APXVSPP18-C-A20 w/ Mount Pipe	240.0000	0.21	-8.47	4.89	148.00	1.535	0	9.64	8.84	0.8980
APXVTM14-C-120 w/ Mount Pipe	0.0000	0.18	0.00	-9.78	148.00	1.535	0	8.08	6.33	0.8980
APXVTM14-C-120 w/ Mount Pipe	120.0000	0.18	8.47	4.89	148.00	1.535	0	8.08	6.33	0.8980
APXVTM14-C-120 w/ Mount Pipe	240.0000	0.18	-8.47	4.89	148.00	1.535	0	8.08	6.33	0.8980
ACU-A20-N	0.0000	0.01	0.00	-9.78	148.00	1.535	0	0.49	0.71	0.8980
ACU-A20-N	120.0000	0.01	8.47	4.89	148.00	1.535	0	0.49	0.71	0.8980
ACU-A20-N	240.0000	0.01	-8.47	4.89	148.00	1.535	0	0.49	0.71	0.8980
TD-RRH8x20-25	0.0000	0.12	0.00	-9.78	148.00	1.535	0	5.25	2.10	0.8980
TD-RRH8x20-25	120.0000	0.12	8.47	4.89	148.00	1.535	0	5.25	2.10	0.8980
TD-RRH8x20-25	240.0000	0.12	-8.47	4.89	148.00	1.535	0	5.25	2.10	0.8980
Site Pro VFA12-U w/ 12' Stiff Arm	0.0000	2.66	0.00	0.00	148.00	1.535	0	58.77	58.77	0.8980
PCS 1900MHz 4x45W-65MHz	0.0000	0.10	0.00	-10.08	145.00	1.526	0	3.14	3.04	0.8943
PCS 1900MHz 4x45W-65MHz	0.0000	0.10	0.00	-10.08	142.00	1.517	0	3.14	3.04	0.8943
PCS 1900MHz 4x45W-65MHz	120.0000	0.10	8.73	5.04	145.00	1.526	0	3.14	3.04	0.8943
PCS 1900MHz 4x45W-65MHz	120.0000	0.10	8.73	5.04	142.00	1.517	0	3.14	3.04	0.8943
PCS 1900MHz 4x45W-65MHz	240.0000	0.10	-8.73	5.04	145.00	1.526	0	3.14	3.04	0.8943
PCS 1900MHz 4x45W-65MHz	240.0000	0.10	-8.73	5.04	142.00	1.517	0	3.14	3.04	0.8943
TME-800MHZ 2X50W RRH	0.0000	0.09	0.00	-10.08	145.00	1.526	0	2.88	2.44	0.8943
TME-800MHZ 2X50W RRH	120.0000	0.09	8.73	5.04	145.00	1.526	0	2.88	2.44	0.8943
TME-800MHZ 2X50W RRH	240.0000	0.09	-8.73	5.04	145.00	1.526	0	2.88	2.44	0.8943
800 EXTERNAL NOTCH FILTER	0.0000	0.02	0.00	-10.08	145.00	1.526	0	0.99	0.54	0.8943
800 EXTERNAL NOTCH FILTER	120.0000	0.02	8.73	5.04	145.00	1.526	0	0.99	0.54	0.8943
800 EXTERNAL NOTCH FILTER	240.0000	0.02	-8.73	5.04	145.00	1.526	0	0.99	0.54	0.8943
Side Arm Mount [SO 312-3]	0.0000	0.41	0.00	0.00	143.00	1.520	0	14.93	14.93	0.8943
DB844G65ZAXY w/ Mount Pipe	0.0000	0.12	0.00	-11.10	128.00	1.473	0	5.69	6.12	0.8808
DB844G65ZAXY w/ Mount Pipe	120.0000	0.12	9.61	5.55	128.00	1.473	0	5.69	6.12	0.8808
DB844G65ZAXY w/ Mount Pipe	240.0000	0.24	-9.61	5.55	128.00	1.473	0	11.38	12.24	0.8808
LNX-6514DS-T4M w/ Mount Pipe	0.0000	0.18	0.00	-11.10	128.00	1.473	0	9.69	8.87	0.8808
LNX-6514DS-T4M w/ Mount Pipe	120.0000	0.18	9.61	5.55	128.00	1.473	0	9.69	8.87	0.8808
MG D3-800TV w/	0.0000	0.10	0.00	-11.10	128.00	1.473	0	4.29	4.63	0.8808

Description	Aiming Azimuth °	Weight K	$Offset_x$ ft	$Offset_z$ ft	z ft	K_z	q_z ksf	C_AA_C Front ft^2	C_AA_C Side ft^2	t_z in
Mount Pipe										
MG D3-800TV w/ Mount Pipe	120.0000	0.10	9.61	5.55	128.00	1.473	0	4.29	4.63	0.8808
MG D3-800TV w/ Mount Pipe	240.0000	0.10	-9.61	5.55	128.00	1.473	0	4.29	4.63	0.8808
MG D3-800Tx w/ Mount Pipe	0.0000	0.10	0.00	-11.10	128.00	1.473	0	4.29	4.63	0.8808
MG D3-800Tx w/ Mount Pipe	120.0000	0.10	9.61	5.55	128.00	1.473	0	4.29	4.63	0.8808
MG D3-800Tx w/ Mount Pipe	240.0000	0.10	-9.61	5.55	128.00	1.473	0	4.29	4.63	0.8808
DB844H80-XY w/ Mount Pipe	0.0000	0.10	0.00	-11.10	128.00	1.473	0	3.78	6.36	0.8808
DB844H80-XY w/ Mount Pipe	120.0000	0.10	9.61	5.55	128.00	1.473	0	3.78	6.36	0.8808
GPS_A	120.0000	0.01	9.61	5.55	130.00	1.480	0	0.44	0.44	0.8808
P65.16.XL.2 w/ Mount Pipe	240.0000	0.18	-9.61	5.55	128.00	1.473	0	9.76	7.62	0.8808
RRH2X40-AWS	0.0000	0.10	0.00	-11.10	128.00	1.473	0	4.25	2.64	0.8808
RRH2X40-AWS	120.0000	0.10	9.61	5.55	128.00	1.473	0	4.25	2.64	0.8808
RRH2X40-AWS	240.0000	0.10	-9.61	5.55	128.00	1.473	0	4.25	2.64	0.8808
DB-T1-6Z-8AB-0Z	120.0000	0.11	9.61	5.55	128.00	1.473	0	6.16	2.74	0.8808
Sector Mount [SM 410-3]	0.0000	1.98	0.00	0.00	126.00	1.466	0	41.75	41.75	0.8808
800 10504 w/ Mount Pipe	0.0000	0.10	0.00	-11.90	112.00	1.418	0	4.31	4.40	0.8685
800 10504 w/ Mount Pipe	120.0000	0.10	10.31	5.95	112.00	1.418	0	4.31	4.40	0.8685
800 10504 w/ Mount Pipe	240.0000	0.10	-10.31	5.95	112.00	1.418	0	4.31	4.40	0.8685
Sector Mount [SM 104-3]	0.0000	1.74	0.00	0.00	112.00	1.418	0	48.19	48.19	0.8685
Empty Mount Pipe	0.0000	0.05	0.00	-11.90	112.00	1.418	0	2.53	2.53	0.8685
Empty Mount Pipe	120.0000	0.05	10.31	5.95	112.00	1.418	0	2.53	2.53	0.8685
Empty Mount Pipe	240.0000	0.05	-10.31	5.95	112.00	1.418	0	2.53	2.53	0.8685
7770.00 w/ Mount Pipe	0.0000	0.28	0.00	-12.46	102.00	1.380	0	13.97	11.03	0.8588
7770.00 w/ Mount Pipe	120.0000	0.28	10.79	6.23	102.00	1.380	0	13.97	11.03	0.8588
7770.00 w/ Mount Pipe	240.0000	0.28	-10.79	6.23	102.00	1.380	0	13.97	11.03	0.8588
P65-16-XLH-RR w/ Mount Pipe	0.0000	0.20	0.00	-12.46	102.00	1.380	0	9.73	8.18	0.8588
P65-16-XLH-RR w/ Mount Pipe	120.0000	0.20	10.79	6.23	102.00	1.380	0	9.73	8.18	0.8588
P65-16-XLH-RR w/ Mount Pipe	240.0000	0.20	-10.79	6.23	102.00	1.380	0	9.73	8.18	0.8588
LGP2140X	0.0000	0.06	0.00	-12.46	102.00	1.380	0	3.07	1.16	0.8588
LGP2140X	120.0000	0.06	10.79	6.23	102.00	1.380	0	3.07	1.16	0.8588
LGP2140X	240.0000	0.06	-10.79	6.23	102.00	1.380	0	3.07	1.16	0.8588
LGP2140X	0.0000	0.06	0.00	-12.46	102.00	1.380	0	3.07	1.16	0.8588
LGP2140X	120.0000	0.06	10.79	6.23	102.00	1.380	0	3.07	1.16	0.8588
LGP2140X	240.0000	0.06	-10.79	6.23	102.00	1.380	0	3.07	1.16	0.8588
RRUS 11 B2	0.0000	0.18	0.00	-12.46	102.00	1.380	0	7.46	3.35	0.8588
RRUS 11 B2	120.0000	0.18	10.79	6.23	102.00	1.380	0	7.46	3.35	0.8588
RRUS 11 B2	240.0000	0.18	-10.79	6.23	102.00	1.380	0	7.46	3.35	0.8588
DC6-48-60-18-8F	240.0000	0.09	-10.79	6.23	102.00	1.380	0	2.97	4.80	0.8588
Sector Mount [SM 301-3]	0.0000	2.23	0.00	0.00	102.00	1.380	0	47.11	1.34	0.8588
Empty Mount Pipe	0.0000	0.05	0.00	-12.46	102.00	1.380	0	2.52	2.52	0.8588
Empty Mount Pipe	120.0000	0.05	10.79	6.23	102.00	1.380	0	2.52	2.52	0.8588
Empty Mount Pipe	240.0000	0.05	-10.79	6.23	102.00	1.380	0	2.52	2.52	0.8588
GPS_A	120.0000	0.01	13.60	7.85	30.00	1.000	0	0.42	0.42	0.7500
GPS_A	240.0000	0.01	-13.60	7.85	30.00	1.000	0	0.42	0.42	0.7500

Description	Aiming Azimuth °	Weight K	$Offset_x$ ft	$Offset_z$ ft	z ft	K_z	q_z ksf	C_AA_C Front ft^2	C_AA_C Side ft^2	t_z in
Side Arm Mount [SO 701-1]	120.0000	0.09	11.00	6.35	30.00	1.000	0	1.28	2.67	0.7500
Side Arm Mount [SO 701-1]	240.0000	0.09	-11.00	6.35	30.00	1.000	0	1.28	2.67	0.7500
VG-1060	300.0000	0.00	-6.38	-3.69	12.00	1.000	0	0.26	0.26	0.7500
GPS_A	300.0000	0.01	-6.38	-3.69	12.00	1.000	0	0.42	0.42	0.7500
Pipe Mount [PM 601-1]	300.0000	0.09	-5.95	-3.44	12.00	1.000	0	4.11	1.23	0.7500
	Sum Weight:	22.86								

Discrete Appurtenance Pressures - Service $G_H = 1.121$

Description	Aiming Azimuth °	Weight K	$Offset_x$ ft	$Offset_z$ ft	z ft	K_z	q_z ksf	C_AA_C Front ft^2	C_AA_C Side ft^2
Lightning Rod	240.0000	0.03	-3.34	1.93	182.00	1.629	0	0.25	0.25
Empty Pipe Mount	0.0000	0.01	0.00	-7.98	178.00	1.619	0	1.00	1.00
Empty Pipe Mount	120.0000	0.01	6.91	3.99	178.00	1.619	0	1.00	1.00
Side Arm Mount [SO 306-1]	0.0000	0.04	0.00	-3.98	178.00	1.619	0	0.98	2.18
Side Arm Mount [SO 306-1]	120.0000	0.04	3.45	1.99	178.00	1.619	0	0.98	2.18
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	0.0000	0.11	0.00	-8.34	173.00	1.605	0	6.83	5.64
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	120.0000	0.11	7.22	4.17	173.00	1.605	0	6.83	5.64
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	240.0000	0.11	-7.22	4.17	173.00	1.605	0	6.83	5.64
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	0.0000	0.11	0.00	-8.34	173.00	1.605	0	6.83	5.64
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	120.0000	0.11	7.22	4.17	173.00	1.605	0	6.83	5.64
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	240.0000	0.11	-7.22	4.17	173.00	1.605	0	6.83	5.64
LNX-6515DS-VTM w/ Mount Pipe	0.0000	0.08	0.00	-8.34	173.00	1.605	0	11.68	9.84
LNX-6515DS-VTM w/ Mount Pipe	120.0000	0.08	7.22	4.17	173.00	1.605	0	11.68	9.84
LNX-6515DS-VTM w/ Mount Pipe	240.0000	0.08	-7.22	4.17	173.00	1.605	0	11.68	9.84
KRY 112 144/1	0.0000	0.01	0.00	-8.34	173.00	1.605	0	0.41	0.19
KRY 112 144/1	120.0000	0.01	7.22	4.17	172.00	1.603	0	0.41	0.19
KRY 112 144/1	240.0000	0.01	-7.22	4.17	172.00	1.603	0	0.41	0.19
RRUS 11 B12	0.0000	0.05	0.00	-8.34	173.00	1.605	0	3.31	1.36
RRUS 11 B12	120.0000	0.05	7.22	4.17	173.00	1.605	0	3.31	1.36
RRUS 11 B12	240.0000	0.05	-7.22	4.17	173.00	1.605	0	3.31	1.36
Sector Mount [SM 602-3]	0.0000	1.54	0.00	0.00	172.00	1.603	0	33.11	33.11
Empty Pipe Mount	0.0000	0.02	0.00	-8.34	172.00	1.603	0	1.05	1.05
Empty Pipe Mount	120.0000	0.02	7.22	4.17	172.00	1.603	0	1.05	1.05
Empty Pipe Mount	240.0000	0.02	-7.22	4.17	172.00	1.603	0	1.05	1.05
Side Arm Mount [SO 202-1]	0.0000	0.11	0.00	-5.24	157.00	1.561	0	2.96	2.53
Side Arm Mount [SO 202-1]	120.0000	0.11	4.54	2.62	157.00	1.561	0	2.96	2.53
APXVSPP18-C-A20 w/ Mount Pipe	0.0000	0.08	0.00	-9.78	148.00	1.535	0	8.50	6.95
APXVSPP18-C-A20 w/	120.0000	0.08	8.47	4.89	148.00	1.535	0	8.50	6.95

Description	Aiming Azimuth °	Weight K	$Offset_x$ ft	$Offset_z$ ft	z ft	K_z	q_z ksf	C_AA_C Front ft^2	C_AA_C Side ft^2
Mount Pipe									
APXVSPP18-C-A20 w/ Mount Pipe	240.0000	0.08	-8.47	4.89	148.00	1.535	0	8.50	6.95
APXVTM14-C-120 w/ Mount Pipe	0.0000	0.08	0.00	-9.78	148.00	1.535	0	7.13	4.96
APXVTM14-C-120 w/ Mount Pipe	120.0000	0.08	8.47	4.89	148.00	1.535	0	7.13	4.96
APXVTM14-C-120 w/ Mount Pipe	240.0000	0.08	-8.47	4.89	148.00	1.535	0	7.13	4.96
ACU-A20-N	0.0000	0.00	0.00	-9.78	148.00	1.535	0	0.23	0.41
ACU-A20-N	120.0000	0.00	8.47	4.89	148.00	1.535	0	0.23	0.41
ACU-A20-N	240.0000	0.00	-8.47	4.89	148.00	1.535	0	0.23	0.41
TD-RRH8x20-25	0.0000	0.07	0.00	-9.78	148.00	1.535	0	4.72	1.70
TD-RRH8x20-25	120.0000	0.07	8.47	4.89	148.00	1.535	0	4.72	1.70
TD-RRH8x20-25	240.0000	0.07	-8.47	4.89	148.00	1.535	0	4.72	1.70
Site Pro VFA12-U w/ 12' Stiff Arm	0.0000	1.67	0.00	0.00	148.00	1.535	0	33.02	33.02
PCS 1900MHz 4x45W-65MHz	0.0000	0.06	0.00	-10.08	145.00	1.526	0	2.71	2.61
PCS 1900MHz 4x45W-65MHz	0.0000	0.06	0.00	-10.08	142.00	1.517	0	2.71	2.61
PCS 1900MHz 4x45W-65MHz	120.0000	0.06	8.73	5.04	145.00	1.526	0	2.71	2.61
PCS 1900MHz 4x45W-65MHz	120.0000	0.06	8.73	5.04	142.00	1.517	0	2.71	2.61
PCS 1900MHz 4x45W-65MHz	240.0000	0.06	-8.73	5.04	145.00	1.526	0	2.71	2.61
PCS 1900MHz 4x45W-65MHz	240.0000	0.06	-8.73	5.04	142.00	1.517	0	2.71	2.61
TME-800MHZ 2X50W RRH	0.0000	0.05	0.00	-10.08	145.00	1.526	0	2.49	2.07
TME-800MHZ 2X50W RRH	120.0000	0.05	8.73	5.04	145.00	1.526	0	2.49	2.07
TME-800MHZ 2X50W RRH	240.0000	0.05	-8.73	5.04	145.00	1.526	0	2.49	2.07
800 EXTERNAL NOTCH FILTER	0.0000	0.01	0.00	-10.08	145.00	1.526	0	0.77	0.37
800 EXTERNAL NOTCH FILTER	120.0000	0.01	8.73	5.04	145.00	1.526	0	0.77	0.37
800 EXTERNAL NOTCH FILTER	240.0000	0.01	-8.73	5.04	145.00	1.526	0	0.77	0.37
Side Arm Mount [SO 312-3]	0.0000	0.21	0.00	0.00	143.00	1.520	0	7.87	7.87
DB844G65ZAXY w/ Mount Pipe	0.0000	0.03	0.00	-11.10	128.00	1.473	0	4.90	4.92
DB844G65ZAXY w/ Mount Pipe	120.0000	0.03	9.61	5.55	128.00	1.473	0	4.90	4.92
DB844G65ZAXY w/ Mount Pipe	240.0000	0.06	-9.61	5.55	128.00	1.473	0	9.81	9.84
LNX-6514DS-T4M w/ Mount Pipe	0.0000	0.06	0.00	-11.10	128.00	1.473	0	8.57	7.00
LNX-6514DS-T4M w/ Mount Pipe	120.0000	0.06	9.61	5.55	128.00	1.473	0	8.57	7.00
MG D3-800TV w/ Mount Pipe	0.0000	0.04	0.00	-11.10	128.00	1.473	0	3.57	3.42
MG D3-800TV w/ Mount Pipe	120.0000	0.04	9.61	5.55	128.00	1.473	0	3.57	3.42
MG D3-800TV w/ Mount Pipe	240.0000	0.04	-9.61	5.55	128.00	1.473	0	3.57	3.42
MG D3-800Tx w/ Mount Pipe	0.0000	0.03	0.00	-11.10	128.00	1.473	0	3.57	3.42

Description	Aiming Azimuth °	Weight K	$Offset_x$ ft	$Offset_z$ ft	z ft	K_z	q_z ksf	C_AA_C Front ft^2	C_AA_C Side ft^2
MG D3-800Tx w/ Mount Pipe	120.0000	0.03	9.61	5.55	128.00	1.473	0	3.57	3.42
MG D3-800Tx w/ Mount Pipe	240.0000	0.03	-9.61	5.55	128.00	1.473	0	3.57	3.42
DB844H80-XY w/ Mount Pipe	0.0000	0.03	0.00	-11.10	128.00	1.473	0	3.10	5.15
DB844H80-XY w/ Mount Pipe	120.0000	0.03	9.61	5.55	128.00	1.473	0	3.10	5.15
GPS_A	120.0000	0.00	9.61	5.55	130.00	1.480	0	0.30	0.30
P65.16.XL.2 w/ Mount Pipe	240.0000	0.06	-9.61	5.55	128.00	1.473	0	8.64	5.78
RRH2X40-AWS	0.0000	0.05	0.00	-11.10	128.00	1.473	0	3.77	2.23
RRH2X40-AWS	120.0000	0.05	9.61	5.55	128.00	1.473	0	3.77	2.23
RRH2X40-AWS	240.0000	0.05	-9.61	5.55	128.00	1.473	0	3.77	2.23
DB-T1-6Z-8AB-0Z	120.0000	0.04	9.61	5.55	128.00	1.473	0	5.60	2.33
Sector Mount [SM 410-3]	0.0000	1.10	0.00	0.00	126.00	1.466	0	23.96	23.96
800 10504 w/ Mount Pipe	0.0000	0.04	0.00	-11.90	112.00	1.418	0	3.59	3.18
800 10504 w/ Mount Pipe	120.0000	0.04	10.31	5.95	112.00	1.418	0	3.59	3.18
800 10504 w/ Mount Pipe	240.0000	0.04	-10.31	5.95	112.00	1.418	0	3.59	3.18
Sector Mount [SM 104-3]	0.0000	0.95	0.00	0.00	112.00	1.418	0	30.02	30.02
Empty Mount Pipe	0.0000	0.03	0.00	-11.90	112.00	1.418	0	1.40	1.40
Empty Mount Pipe	120.0000	0.03	10.31	5.95	112.00	1.418	0	1.40	1.40
Empty Mount Pipe	240.0000	0.03	-10.31	5.95	112.00	1.418	0	1.40	1.40
7770.00 w/ Mount Pipe	0.0000	0.12	0.00	-12.46	102.00	1.380	0	12.24	8.51
7770.00 w/ Mount Pipe	120.0000	0.12	10.79	6.23	102.00	1.380	0	12.24	8.51
7770.00 w/ Mount Pipe	240.0000	0.12	-10.79	6.23	102.00	1.380	0	12.24	8.51
P65-16-XLH-RR w/ Mount Pipe	0.0000	0.08	0.00	-12.46	102.00	1.380	0	8.64	6.36
P65-16-XLH-RR w/ Mount Pipe	120.0000	0.08	10.79	6.23	102.00	1.380	0	8.64	6.36
P65-16-XLH-RR w/ Mount Pipe	240.0000	0.08	-10.79	6.23	102.00	1.380	0	8.64	6.36
LGP2140X	0.0000	0.02	0.00	-12.46	102.00	1.380	0	2.52	0.76
LGP2140X	120.0000	0.02	10.79	6.23	102.00	1.380	0	2.52	0.76
LGP2140X	240.0000	0.02	-10.79	6.23	102.00	1.380	0	2.52	0.76
LGP2140X	0.0000	0.02	0.00	-12.46	102.00	1.380	0	2.52	0.76
LGP2140X	120.0000	0.02	10.79	6.23	102.00	1.380	0	2.52	0.76
LGP2140X	240.0000	0.02	-10.79	6.23	102.00	1.380	0	2.52	0.76
RRUS 11 B2	0.0000	0.10	0.00	-12.46	102.00	1.380	0	6.61	2.72
RRUS 11 B2	120.0000	0.10	10.79	6.23	102.00	1.380	0	6.61	2.72
RRUS 11 B2	240.0000	0.10	-10.79	6.23	102.00	1.380	0	6.61	2.72
DC6-48-60-18-8F	240.0000	0.03	-10.79	6.23	102.00	1.380	0	2.57	4.32
Sector Mount [SM 301-3]	0.0000	1.30	0.00	0.00	102.00	1.380	0	29.61	1.00
Empty Mount Pipe	0.0000	0.03	0.00	-12.46	102.00	1.380	0	1.40	1.40
Empty Mount Pipe	120.0000	0.03	10.79	6.23	102.00	1.380	0	1.40	1.40
Empty Mount Pipe	240.0000	0.03	-10.79	6.23	102.00	1.380	0	1.40	1.40
GPS_A	120.0000	0.00	13.60	7.85	30.00	1.000	0	0.30	0.30
GPS_A	240.0000	0.00	-13.60	7.85	30.00	1.000	0	0.30	0.30
Side Arm Mount [SO 701-1]	120.0000	0.07	11.00	6.35	30.00	1.000	0	0.85	1.67
Side Arm Mount [SO 701-1]	240.0000	0.07	-11.00	6.35	30.00	1.000	0	0.85	1.67
VG-1060	300.0000	0.00	-6.38	-3.69	12.00	1.000	0	0.13	0.13
GPS_A	300.0000	0.00	-6.38	-3.69	12.00	1.000	0	0.30	0.30
Pipe Mount [PM 601-1]	300.0000	0.07	-5.95	-3.44	12.00	1.000	0	3.00	0.90

Description	Aiming Azimuth °	Weight K	$Offset_x$ ft	$Offset_z$ ft	z ft	K_z	q_z ksf	C_AA_C Front ft^2	C_AA_C Side ft^2
	Sum Weight:	11.82							

Dish Pressures - No Ice

Elevation ft	Dish Description	Aiming Azimuth °	Weight K	$Offset_x$ ft	$Offset_z$ ft	K_z	A_A ft^2	q_z ksf
157.00	VHLP2-18	-10.0000	0.03	0.00	-7.24	1.561	3.72	0
157.00	VHLP2-18	80.0000	0.03	6.27	3.62	1.561	3.72	0
		Sum Weight:	0.06					

Dish Pressures - With Ice

Elevation ft	Dish Description	Aiming Azimuth °	Weight K	$Offset_x$ ft	$Offset_z$ ft	K_z	A_A ft^2	q_z ksf	t_z in
157.00	VHLP2-18	-10.0000	0.07	0.00	-7.24	1.561	4.24	0	0.9044
157.00	VHLP2-18	80.0000	0.07	6.27	3.62	1.561	4.24	0	0.9044
		Sum Weight:	0.13						

Dish Pressures - Service

Elevation ft	Dish Description	Aiming Azimuth °	Weight K	$Offset_x$ ft	$Offset_z$ ft	K_z	A_A ft^2	q_z ksf
157.00	VHLP2-18	-10.0000	0.03	0.00	-7.24	1.561	3.72	0
157.00	VHLP2-18	80.0000	0.03	6.27	3.62	1.561	3.72	0
		Sum Weight:	0.06					

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	15.06					
Bracing Weight	16.60					
Total Member Self-Weight	31.66			41.92	0.72	
Total Weight	57.37			41.92	0.72	
Wind 0 deg - No Ice		0.01	-53.60	-5345.01	-4.93	-22.96
Wind 30 deg - No Ice		25.81	-44.64	-4470.41	-2611.31	-4.36
Wind 60 deg - No Ice		44.13	-25.45	-2539.17	-4470.71	14.30
Wind 90 deg - No Ice		51.67	0.11	54.62	-5224.08	29.10
Wind 120 deg - No Ice		46.49	26.98	2759.36	-4671.79	37.99
Wind 150 deg - No Ice		25.86	44.75	4567.16	-2612.10	33.56
Wind 180 deg - No Ice		-0.02	50.97	5205.97	7.55	20.77

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 210 deg - No Ice		-25.89	44.74	4568.66	2624.75	3.42
Wind 240 deg - No Ice		-46.55	26.89	2753.05	4686.74	-15.47
Wind 270 deg - No Ice		-51.73	-0.03	41.43	5234.83	-29.62
Wind 300 deg - No Ice		-44.28	-25.40	-2523.34	4490.90	-36.07
Wind 330 deg - No Ice		-26.00	-44.65	-4467.37	2634.71	-33.85
Member Ice	17.94					
Total Weight Ice	110.63			102.61	25.67	
Wind 0 deg - Ice		0.01	-15.91	-1468.74	23.74	-7.17
Wind 30 deg - Ice		7.50	-12.98	-1202.23	-729.85	-1.88
Wind 60 deg - Ice		12.73	-7.35	-641.47	-1263.09	3.26
Wind 90 deg - Ice		15.02	0.02	104.78	-1484.38	7.66
Wind 120 deg - Ice		13.79	7.99	893.07	-1336.90	10.93
Wind 150 deg - Ice		7.51	13.00	1409.67	-728.87	9.57
Wind 180 deg - Ice		-0.01	14.70	1590.04	27.87	6.26
Wind 210 deg - Ice		-7.52	13.00	1410.68	783.87	1.67
Wind 240 deg - Ice		-13.81	7.98	892.82	1391.93	-3.85
Wind 270 deg - Ice		-15.03	-0.00	103.18	1537.80	-7.78
Wind 300 deg - Ice		-12.76	-7.33	-636.77	1317.95	-9.74
Wind 330 deg - Ice		-7.54	-12.98	-1200.88	784.94	-9.63
Total Weight	57.37			41.92	0.72	
Wind 0 deg - Service		0.00	-18.55	-1863.43	-2.42	-7.94
Wind 30 deg - Service		8.93	-15.45	-1560.80	-904.28	-1.51
Wind 60 deg - Service		15.27	-8.81	-892.55	-1547.67	4.95
Wind 90 deg - Service		17.88	0.04	4.95	-1808.36	10.07
Wind 120 deg - Service		16.09	9.33	940.85	-1617.25	13.15
Wind 150 deg - Service		8.95	15.49	1566.39	-904.55	11.61
Wind 180 deg - Service		-0.01	17.64	1787.43	1.90	7.19
Wind 210 deg - Service		-8.96	15.48	1566.91	907.50	1.18
Wind 240 deg - Service		-16.11	9.30	938.67	1620.99	-5.35
Wind 270 deg - Service		-17.90	-0.01	0.39	1810.65	-10.25
Wind 300 deg - Service		-15.32	-8.79	-887.07	1553.23	-12.48
Wind 330 deg - Service		-9.00	-15.45	-1559.75	910.95	-11.71

Load Combinations

Comb. No.	Description
1	Dead Only
2	Dead+Wind 0 deg - No Ice
3	Dead+Wind 30 deg - No Ice
4	Dead+Wind 60 deg - No Ice
5	Dead+Wind 90 deg - No Ice
6	Dead+Wind 120 deg - No Ice
7	Dead+Wind 150 deg - No Ice
8	Dead+Wind 180 deg - No Ice
9	Dead+Wind 210 deg - No Ice
10	Dead+Wind 240 deg - No Ice
11	Dead+Wind 270 deg - No Ice
12	Dead+Wind 300 deg - No Ice
13	Dead+Wind 330 deg - No Ice
14	Dead+Ice+Temp
15	Dead+Wind 0 deg+Ice+Temp
16	Dead+Wind 30 deg+Ice+Temp
17	Dead+Wind 60 deg+Ice+Temp
18	Dead+Wind 90 deg+Ice+Temp
19	Dead+Wind 120 deg+Ice+Temp

Comb. No.	Description
20	Dead+Wind 150 deg+Ice+Temp
21	Dead+Wind 180 deg+Ice+Temp
22	Dead+Wind 210 deg+Ice+Temp
23	Dead+Wind 240 deg+Ice+Temp
24	Dead+Wind 270 deg+Ice+Temp
25	Dead+Wind 300 deg+Ice+Temp
26	Dead+Wind 330 deg+Ice+Temp
27	Dead+Wind 0 deg - Service
28	Dead+Wind 30 deg - Service
29	Dead+Wind 60 deg - Service
30	Dead+Wind 90 deg - Service
31	Dead+Wind 120 deg - Service
32	Dead+Wind 150 deg - Service
33	Dead+Wind 180 deg - Service
34	Dead+Wind 210 deg - Service
35	Dead+Wind 240 deg - Service
36	Dead+Wind 270 deg - Service
37	Dead+Wind 300 deg - Service
38	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T1	180 - 160	Leg	Max Tension	4	6.86	0.13	0.01
			Max. Compression	10	-9.86	0.16	-0.01
			Max. Mx	8	0.15	1.08	-0.01
			Max. My	7	-1.11	-0.02	1.08
			Max. Vy	8	0.82	-0.55	-0.01
			Max. Vx	13	-0.82	-0.02	0.53
		Diagonal	Max Tension	9	2.21	0.00	0.00
			Max. Compression	9	-2.25	0.00	0.00
			Max. Mx	25	0.47	0.02	-0.00
			Max. My	23	0.05	0.02	-0.00
			Max. Vy	25	0.02	0.02	-0.00
			Max. Vx	23	0.00	0.00	0.00
		Top Girt	Max Tension	8	0.09	0.00	0.00
			Max. Compression	2	-0.11	0.00	0.00
			Max. Mx	14	-0.02	-0.03	0.00
			Max. My	15	-0.01	0.00	0.00
			Max. Vy	14	0.02	0.00	0.00
			Max. Vx	15	-0.00	0.00	0.00
		Mid Girt	Max Tension	6	0.27	0.00	0.00
			Max. Compression	8	-0.25	0.00	0.00
			Max. Mx	14	0.02	-0.04	0.00
			Max. My	15	-0.01	0.00	0.00
			Max. Vy	14	-0.02	0.00	0.00
			Max. Vx	15	-0.00	0.00	0.00
T2	160 - 153.333	Leg	Max Tension	12	10.87	-0.16	0.01
			Max. Compression	2	-14.39	0.26	0.01
			Max. Mx	8	10.53	-0.30	0.01
			Max. My	9	-1.52	-0.02	0.35
			Max. Vy	8	0.13	-0.30	0.01
			Max. Vx	9	-0.15	-0.02	0.35
		Diagonal	Max Tension	3	2.55	0.00	0.00
			Max. Compression	3	-2.62	0.00	0.00
			Max. Mx	25	0.55	0.03	0.00
			Max. My	18	-0.33	0.03	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vy	25	0.03	0.03	0.00
			Max. Vx	24	0.00	0.00	0.00
T3	153.333 - 146.667	Leg	Max Tension	4	15.84	-0.29	0.02
			Max. Compression	10	-20.98	0.59	-0.03
			Max. Mx	4	14.96	-0.64	0.02
			Max. My	7	-2.70	-0.03	-0.60
			Max. Vy	4	0.86	-0.64	0.02
			Max. Vx	7	0.83	-0.03	-0.60
		Diagonal	Max Tension	3	3.02	0.00	0.00
			Max. Compression	3	-3.16	0.00	0.00
			Max. Mx	25	0.62	0.03	0.00
			Max. My	23	0.04	0.03	-0.01
			Max. Vy	25	0.03	0.03	0.00
			Max. Vx	23	0.00	0.00	0.00
		Top Girt	Max Tension	4	0.33	0.00	0.00
			Max. Compression	2	-0.21	0.00	0.00
			Max. Mx	14	0.13	-0.06	0.00
			Max. My	26	0.13	0.00	0.00
			Max. Vy	14	0.03	0.00	0.00
			Max. Vx	26	-0.00	0.00	0.00
T4	146.667 - 140	Leg	Max Tension	12	21.59	-0.64	0.01
			Max. Compression	10	-28.80	0.21	-0.02
			Max. Mx	4	21.49	-0.64	0.02
			Max. My	7	-2.93	-0.03	-0.60
			Max. Vy	4	-0.26	-0.64	0.02
			Max. Vx	7	-0.27	-0.03	-0.60
		Diagonal	Max Tension	3	4.48	0.00	0.00
			Max. Compression	3	-4.57	0.00	0.00
			Max. Mx	25	0.99	0.04	0.01
			Max. My	17	-1.10	0.03	0.01
			Max. Vy	25	0.03	0.04	0.01
			Max. Vx	17	-0.00	0.00	0.00
		Top Girt	Max Tension	25	0.14	0.00	0.00
			Max. Compression	10	-0.00	0.00	0.00
			Max. Mx	14	0.12	-0.07	0.00
			Max. My	26	0.12	0.00	0.00
			Max. Vy	14	0.03	0.00	0.00
			Max. Vx	26	0.00	0.00	0.00
T5	140 - 120	Leg	Max Tension	12	45.47	-0.47	0.01
			Max. Compression	10	-57.26	0.37	-0.00
			Max. Mx	4	45.02	-0.47	0.01
			Max. My	7	-5.24	-0.01	-0.70
			Max. Vy	4	-1.08	-0.47	0.01
			Max. Vx	3	-0.98	-0.01	-0.13
		Diagonal	Max Tension	3	6.29	0.00	0.00
			Max. Compression	3	-6.32	0.00	0.00
			Max. Mx	25	1.40	0.05	0.01
			Max. My	21	-1.46	0.05	-0.01
			Max. Vy	25	0.04	0.05	0.01
			Max. Vx	21	0.00	0.00	0.00
T6	120 - 100	Leg	Max Tension	8	74.02	-0.70	-0.01
			Max. Compression	10	-91.83	1.14	0.02
			Max. Mx	12	72.96	-1.18	0.08
			Max. My	7	-6.91	-0.02	-0.94
			Max. Vy	12	0.93	-1.18	0.08
			Max. Vx	13	-0.88	-0.03	0.87
		Diagonal	Max Tension	3	7.83	0.00	0.00
			Max. Compression	3	-7.86	0.00	0.00
			Max. Mx	23	2.03	0.08	0.01
			Max. My	15	0.16	0.07	0.01

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vy	21	0.05	0.08	-0.01
			Max. Vx	15	-0.00	0.00	0.00
T7	100 - 80	Leg	Max Tension	8	102.80	-0.23	-0.03
			Max. Compression	10	-125.66	0.51	0.03
			Max. Mx	12	86.34	-1.18	0.08
			Max. My	7	-8.28	-0.03	-0.87
			Max. Vy	12	-0.18	-1.18	0.08
			Max. Vx	13	0.14	-0.03	0.87
		Diagonal	Max Tension	11	9.45	0.00	0.00
			Max. Compression	3	-9.55	0.00	0.00
			Max. Mx	21	2.31	0.12	0.02
			Max. My	3	-9.52	0.02	0.02
			Max. Vy	21	0.06	0.12	0.02
			Max. Vx	15	0.00	0.00	0.00
T8	80 - 70	Leg	Max Tension	8	118.10	-0.58	-0.02
			Max. Compression	10	-143.17	1.84	0.05
			Max. Mx	2	-140.79	1.84	0.10
			Max. My	7	-10.58	0.05	-1.71
			Max. Vy	2	-0.23	1.84	0.10
			Max. Vx	13	-0.26	0.06	1.70
		Diagonal	Max Tension	11	9.69	0.00	0.00
			Max. Compression	11	-9.87	0.00	0.00
			Max. Mx	21	1.91	0.14	-0.02
			Max. My	20	-1.45	0.12	-0.02
			Max. Vy	21	0.06	0.14	-0.02
			Max. Vx	20	-0.00	0.00	0.00
T9	70 - 60	Leg	Max Tension	8	133.16	-1.63	-0.09
			Max. Compression	10	-160.94	0.16	0.01
			Max. Mx	2	-158.15	1.84	0.10
			Max. My	7	-11.25	0.05	-1.71
			Max. Vy	2	0.26	1.84	0.10
			Max. Vx	13	0.27	0.06	1.70
		Diagonal	Max Tension	11	10.32	0.00	0.00
			Max. Compression	11	-10.53	0.00	0.00
			Max. Mx	21	2.19	-0.25	0.03
			Max. My	25	-2.22	-0.21	-0.04
			Max. Vy	21	-0.12	-0.25	0.03
			Max. Vx	25	0.01	0.00	0.00
T10	60 - 40	Leg	Max Tension	8	162.31	-1.01	-0.03
			Max. Compression	10	-195.45	1.35	0.04
			Max. Mx	25	22.62	-2.47	0.04
			Max. My	7	-12.93	-0.02	-1.13
			Max. Vy	17	0.38	-2.47	-0.02
			Max. Vx	13	-0.20	-0.01	1.12
		Diagonal	Max Tension	11	10.55	0.00	0.00
			Max. Compression	11	-10.88	0.00	0.00
			Max. Mx	21	1.83	0.19	-0.02
			Max. My	20	-1.09	0.16	-0.02
			Max. Vy	21	0.08	0.18	0.02
			Max. Vx	20	-0.00	0.00	0.00
T11	40 - 20	Leg	Max Tension	8	190.02	-0.72	-0.01
			Max. Compression	10	-229.17	2.27	0.08
			Max. Mx	17	23.62	-5.89	-0.01
			Max. My	9	-14.61	-0.17	1.20
			Max. Vy	17	0.98	-5.89	-0.01
			Max. Vx	7	-0.17	-0.16	-1.20
		Diagonal	Max Tension	11	11.05	0.00	0.00
			Max. Compression	11	-11.38	0.00	0.00
			Max. Mx	21	0.96	0.27	-0.03
			Max. My	20	-2.97	0.26	-0.03
			Max. Vy	21	0.10	0.27	-0.03

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T12	20 - 0	Leg	Max. Vx	20	0.01	0.00	0.00
			Max Tension	8	215.59	-0.94	-0.02
			Max. Compression	10	-262.49	0.00	-0.00
			Max. Mx	17	30.24	-5.89	-0.01
			Max. My	7	-17.83	-0.22	-2.36
			Max. Vy	17	-1.16	-5.89	-0.01
			Max. Vx	7	-0.35	-0.22	-2.36
		Diagonal	Max Tension	11	12.10	0.00	0.00
			Max. Compression	11	-12.32	0.00	0.00
			Max. Mx	21	-1.55	-0.67	0.06
			Max. My	11	-11.76	-0.23	-0.07
			Max. Vy	21	-0.20	-0.67	0.06
			Max. Vx	24	0.01	0.00	0.00

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Leg C	Max. Vert	10	270.79	28.94	-16.26
	Max. H_x	10	270.79	28.94	-16.26
	Max. H_z	3	-189.08	-20.07	14.15
	Min. Vert	4	-218.93	-24.53	13.81
	Min. H_x	4	-218.93	-24.53	13.81
	Min. H_z	10	270.79	28.94	-16.26
Leg B	Max. Vert	6	270.33	-29.19	-15.81
	Max. H_x	12	-219.37	24.83	13.40
	Max. H_z	13	-189.95	20.60	13.43
	Min. Vert	12	-219.37	24.83	13.40
	Min. H_x	6	270.33	-29.19	-15.81
	Min. H_z	6	270.33	-29.19	-15.81
Leg A	Max. Vert	2	266.61	-0.52	33.04
	Max. H_x	11	17.21	3.48	1.70
	Max. H_z	2	266.61	-0.52	33.04
	Min. Vert	8	-221.92	0.48	-28.21
	Min. H_x	5	16.59	-3.49	1.61
	Min. H_z	8	-221.92	0.48	-28.21

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	57.37	0.00	0.00	41.92	0.72	-0.00
Dead+Wind 0 deg - No Ice	57.37	0.01	-53.60	-5358.14	-4.90	-22.97
Dead+Wind 30 deg - No Ice	57.37	25.81	-44.64	-4481.42	-2617.72	-4.34
Dead+Wind 60 deg - No Ice	57.37	44.13	-25.45	-2545.44	-4481.70	14.38
Dead+Wind 90 deg - No Ice	57.37	51.67	0.11	54.76	-5236.93	29.22
Dead+Wind 120 deg - No Ice	57.37	46.49	26.98	2766.15	-4683.23	38.09
Dead+Wind 150 deg - No Ice	57.37	25.86	44.75	4578.39	-2618.48	33.60
Dead+Wind 180 deg - No Ice	57.37	-0.02	50.97	5218.75	7.61	20.78
Dead+Wind 210 deg - No Ice	57.37	-25.89	44.74	4579.86	2631.22	3.40
Dead+Wind 240 deg - No Ice	57.37	-46.55	26.89	2759.80	4698.25	-15.55

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
Dead+Wind 270 deg - No Ice	57.37	-51.73	-0.03	41.54	5247.72	-29.74
Dead+Wind 300 deg - No Ice	57.37	-44.28	-25.40	-2529.52	4501.98	-36.15
Dead+Wind 330 deg - No Ice	57.37	-26.00	-44.65	-4478.35	2641.25	-33.89
Dead+Ice+Temp	110.63	0.00	-0.00	102.71	25.71	-0.00
Dead+Wind 0 deg+Ice+Temp	110.63	0.01	-15.91	-1475.62	23.87	-7.20
Dead+Wind 30 deg+Ice+Temp	110.63	7.50	-12.98	-1207.97	-733.24	-1.87
Dead+Wind 60 deg+Ice+Temp	110.63	12.73	-7.35	-644.61	-1268.99	3.30
Dead+Wind 90 deg+Ice+Temp	110.63	15.02	0.02	105.14	-1491.29	7.73
Dead+Wind 120 deg+Ice+Temp	110.63	13.79	7.99	897.05	-1343.02	11.00
Dead+Wind 150 deg+Ice+Temp	110.63	7.51	13.00	1416.12	-732.25	9.62
Dead+Wind 180 deg+Ice+Temp	110.63	-0.01	14.70	1597.35	28.01	6.28
Dead+Wind 210 deg+Ice+Temp	110.63	-7.52	13.00	1417.13	787.55	1.66
Dead+Wind 240 deg+Ice+Temp	110.63	-13.81	7.98	896.79	1398.33	-3.90
Dead+Wind 270 deg+Ice+Temp	110.63	-15.03	-0.00	103.53	1544.99	-7.85
Dead+Wind 300 deg+Ice+Temp	110.63	-12.76	-7.33	-639.88	1324.14	-9.80
Dead+Wind 330 deg+Ice+Temp	110.63	-7.54	-12.98	-1206.60	788.62	-9.69
Dead+Wind 0 deg - Service	57.37	0.00	-18.55	-1826.59	-1.23	-7.95
Dead+Wind 30 deg - Service	57.37	8.93	-15.45	-1523.20	-905.31	-1.50
Dead+Wind 60 deg - Service	57.37	15.27	-8.81	-853.32	-1550.30	4.97
Dead+Wind 90 deg - Service	57.37	17.88	0.04	46.41	-1811.61	10.11
Dead+Wind 120 deg - Service	57.37	16.09	9.33	984.62	-1620.05	13.18
Dead+Wind 150 deg - Service	57.37	8.95	15.49	1611.68	-905.59	11.62
Dead+Wind 180 deg - Service	57.37	-0.01	17.64	1833.27	3.10	7.19
Dead+Wind 210 deg - Service	57.37	-8.96	15.48	1612.18	910.93	1.18
Dead+Wind 240 deg - Service	57.37	-16.11	9.30	982.41	1626.17	-5.38
Dead+Wind 270 deg - Service	57.37	-17.90	-0.01	41.83	1816.29	-10.29
Dead+Wind 300 deg - Service	57.37	-15.32	-8.79	-847.82	1558.26	-12.51
Dead+Wind 330 deg - Service	57.37	-9.00	-15.45	-1522.15	914.40	-11.73

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX	PY	PZ	PX	PY	PZ	% Error
	K	K	K	K	K	K	
1	0.00	-57.37	0.00	0.00	57.37	0.00	0.000%
2	0.01	-57.37	-53.60	-0.01	57.37	53.60	0.000%
3	25.81	-57.37	-44.64	-25.81	57.37	44.64	0.000%
4	44.13	-57.37	-25.45	-44.13	57.37	25.45	0.000%
5	51.67	-57.37	0.11	-51.67	57.37	-0.11	0.000%
6	46.49	-57.37	26.98	-46.49	57.37	-26.98	0.000%
7	25.86	-57.37	44.75	-25.86	57.37	-44.75	0.000%
8	-0.02	-57.37	50.97	0.02	57.37	-50.97	0.000%
9	-25.89	-57.37	44.74	25.89	57.37	-44.74	0.000%
10	-46.55	-57.37	26.89	46.55	57.37	-26.89	0.000%
11	-51.73	-57.37	-0.03	51.73	57.37	0.03	0.000%
12	-44.28	-57.37	-25.40	44.28	57.37	25.40	0.000%
13	-26.00	-57.37	-44.65	26.00	57.37	44.65	0.000%
14	0.00	-110.63	0.00	0.00	110.63	0.00	0.000%
15	0.01	-110.63	-15.91	-0.01	110.63	15.91	0.000%
16	7.50	-110.63	-12.98	-7.50	110.63	12.98	0.000%
17	12.73	-110.63	-7.35	-12.73	110.63	7.35	0.000%
18	15.02	-110.63	0.02	-15.02	110.63	-0.02	0.000%
19	13.79	-110.63	7.99	-13.79	110.63	-7.99	0.000%
20	7.51	-110.63	13.00	-7.51	110.63	-13.00	0.000%
21	-0.01	-110.63	14.70	0.01	110.63	-14.70	0.000%
22	-7.52	-110.63	13.00	7.52	110.63	-13.00	0.000%
23	-13.81	-110.63	7.98	13.81	110.63	-7.98	0.000%
24	-15.03	-110.63	-0.00	15.03	110.63	0.00	0.000%

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
25	-12.76	-110.63	-7.33	12.76	110.63	7.33	0.000%
26	-7.54	-110.63	-12.98	7.54	110.63	12.98	0.000%
27	0.00	-57.37	-18.55	-0.00	57.37	18.55	0.000%
28	8.93	-57.37	-15.45	-8.93	57.37	15.45	0.000%
29	15.27	-57.37	-8.81	-15.27	57.37	8.81	0.000%
30	17.88	-57.37	0.04	-17.88	57.37	-0.04	0.000%
31	16.09	-57.37	9.33	-16.09	57.37	-9.33	0.000%
32	8.95	-57.37	15.49	-8.95	57.37	-15.49	0.000%
33	-0.01	-57.37	17.64	0.01	57.37	-17.64	0.000%
34	-8.96	-57.37	15.48	8.96	57.37	-15.48	0.000%
35	-16.11	-57.37	9.30	16.11	57.37	-9.30	0.000%
36	-17.90	-57.37	-0.01	17.90	57.37	0.01	0.000%
37	-15.32	-57.37	-8.79	15.32	57.37	8.79	0.000%
38	-9.00	-57.37	-15.45	9.00	57.37	15.45	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	0.00000001
3	Yes	4	0.00000001	0.00000001
4	Yes	4	0.00000001	0.00000001
5	Yes	4	0.00000001	0.00000001
6	Yes	4	0.00000001	0.00000001
7	Yes	4	0.00000001	0.00000001
8	Yes	4	0.00000001	0.00000001
9	Yes	4	0.00000001	0.00000001
10	Yes	4	0.00000001	0.00000001
11	Yes	4	0.00000001	0.00000001
12	Yes	4	0.00000001	0.00000001
13	Yes	4	0.00000001	0.00000001
14	Yes	4	0.00000001	0.00000001
15	Yes	4	0.00000001	0.00000001
16	Yes	4	0.00000001	0.00000001
17	Yes	4	0.00000001	0.00000001
18	Yes	4	0.00000001	0.00000001
19	Yes	4	0.00000001	0.00000001
20	Yes	4	0.00000001	0.00000001
21	Yes	4	0.00000001	0.00000001
22	Yes	4	0.00000001	0.00000001
23	Yes	4	0.00000001	0.00000001
24	Yes	4	0.00000001	0.00000001
25	Yes	4	0.00000001	0.00000001
26	Yes	4	0.00000001	0.00000001
27	Yes	4	0.00000001	0.00000001
28	Yes	4	0.00000001	0.00000001
29	Yes	4	0.00000001	0.00000001
30	Yes	4	0.00000001	0.00000001
31	Yes	4	0.00000001	0.00000001
32	Yes	4	0.00000001	0.00000001
33	Yes	4	0.00000001	0.00000001
34	Yes	4	0.00000001	0.00000001
35	Yes	4	0.00000001	0.00000001
36	Yes	4	0.00000001	0.00000001
37	Yes	4	0.00000001	0.00000001

38	Yes	4	0.00000001	0.00000001

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	180 - 160	3.221	35	0.1347	0.0113
T2	160 - 153.333	2.647	35	0.1321	0.0116
T3	153.333 - 146.667	2.460	35	0.1298	0.0116
T4	146.667 - 140	2.276	35	0.1267	0.0114
T5	140 - 120	2.093	35	0.1227	0.0112
T6	120 - 100	1.575	35	0.1098	0.0096
T7	100 - 80	1.114	35	0.0922	0.0079
T8	80 - 70	0.729	35	0.0741	0.0064
T9	70 - 60	0.564	35	0.0652	0.0055
T10	60 - 40	0.427	35	0.0555	0.0050
T11	40 - 20	0.200	35	0.0349	0.0029
T12	20 - 0	0.056	35	0.0181	0.0010

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
180.00	Lightning Rod	35	3.221	0.1347	0.0113	815286
178.00	Empty Pipe Mount	35	3.163	0.1346	0.0113	815286
172.00	ERICSSON AIR 21 B4A B2P w/ Mount Pipe	35	2.990	0.1341	0.0115	509557
157.00	VHLP2-18	35	2.562	0.1311	0.0116	166649
148.00	APXVSPP18-C-A20 w/ Mount Pipe	35	2.312	0.1274	0.0115	322172
143.00	PCS 1900MHz 4x45W-65MHz	35	2.175	0.1246	0.0113	187401
126.00	DB844G65ZAXY w/ Mount Pipe	35	1.725	0.1140	0.0101	93923
112.00	800 10504 w/ Mount Pipe	35	1.382	0.1032	0.0089	71586
102.00	(2) 7770.00 w/ Mount Pipe	35	1.156	0.0941	0.0081	58931
30.00	GPS_A	35	0.116	0.0263	0.0019	48752
12.00	VG-1060	35	0.026	0.0111	0.0006	71759

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	180 - 160	9.245	10	0.3865	0.0326
T2	160 - 153.333	7.598	10	0.3789	0.0335
T3	153.333 - 146.667	7.061	10	0.3723	0.0334
T4	146.667 - 140	6.533	10	0.3634	0.0331
T5	140 - 120	6.010	10	0.3518	0.0323
T6	120 - 100	4.521	10	0.3148	0.0277
T7	100 - 80	3.198	10	0.2644	0.0230
T8	80 - 70	2.093	10	0.2125	0.0185

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T9	70 - 60	1.621	10	0.1871	0.0159
T10	60 - 40	1.228	10	0.1592	0.0143
T11	40 - 20	0.576	10	0.1002	0.0085
T12	20 - 0	0.161	10	0.0519	0.0030

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
180.00	Lightning Rod	10	9.245	0.3865	0.0326	286918
178.00	Empty Pipe Mount	10	9.079	0.3861	0.0328	286918
172.00	ERICSSON AIR 21 B4A B2P w/ Mount Pipe	10	8.583	0.3849	0.0331	179324
157.00	VHLP2-18	10	7.355	0.3762	0.0335	58510
148.00	APXVSPP18-C-A20 w/ Mount Pipe	10	6.638	0.3654	0.0332	112016
143.00	PCS 1900MHz 4x45W-65MHz	10	6.244	0.3572	0.0327	65536
126.00	DB844G65ZAXY w/ Mount Pipe	10	4.953	0.3269	0.0292	32826
112.00	800 10504 w/ Mount Pipe	10	3.968	0.2960	0.0258	24981
102.00	(2) 7770.00 w/ Mount Pipe	10	3.321	0.2698	0.0234	20534
30.00	GPS_A	10	0.333	0.0754	0.0054	16979
12.00	VG-1060	10	0.076	0.0319	0.0016	24974

Bolt Design Data

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt K	Allowable Load K	Ratio Load / Allowable	Allowable Ratio	Criteria
T1	180	Leg	A325X	0.8750	4	1.72	26.46	0.065	1.333	Bolt Tension
		Diagonal	A325X	0.6250	1	2.21	4.55	0.484	1.333	Member Block Shear
		Top Girt	A325X	0.6250	1	0.09	3.04	0.031	1.333	Member Block Shear
		Mid Girt	A325X	0.6250	1	0.27	3.04	0.089	1.333	Member Block Shear
T2	160	Diagonal	A325X	0.6250	1	2.55	6.80	0.376	1.333	Member Bearing
T3	153.333	Diagonal	A325X	0.6250	1	3.02	6.80	0.445	1.333	Member Bearing
		Top Girt	A325X	0.6250	1	0.33	3.04	0.110	1.333	Member Block Shear
T4	146.667	Leg	A325X	1.0000	4	5.40	34.56	0.156	1.333	Bolt Tension
		Diagonal	A325X	0.6250	1	4.48	6.80	0.659	1.333	Member Bearing
		Top Girt	A325X	0.6250	1	0.13	3.04	0.041	1	Member Block Shear
T5	140	Leg	A325X	1.0000	6	7.58	34.56	0.219	1.333	Bolt Tension
		Diagonal	A325X	0.6250	1	6.29	6.80	0.926	1.333	Member Bearing
T6	120	Leg	A325X	1.0000	6	12.34	34.56	0.357	1.333	Bolt Tension
		Diagonal	A325X	0.6250	1	7.83	7.62	1.027	1.333	Member Bearing
T7	100	Leg	A325X	1.0000	8	12.85	34.56	0.372	1.333	Bolt Tension
		Diagonal	A325X	0.7500	1	9.45	9.14	1.034	1.333	Member Bearing
T8	80	Diagonal	A325X	0.7500	1	9.69	9.14	1.060	1.333	Member Bearing
T9	70	Leg	A325X	1.0000	8	16.65	34.56	0.482	1.333	Bolt Tension

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt K	Allowable Load K	Ratio Load / Allowable	Allowable Ratio	Criteria
		Diagonal	A325X	0.7500	1	10.32	12.91	0.799	1.333	Gusset Bearing
T10	60	Leg	A325X	1.0000	8	20.29	34.56	0.587	1.333	Bolt Tension
		Diagonal	A325X	0.7500	1	10.55	9.14	1.154	1.333	Member Bearing
T11	40	Leg	A325X	1.0000	8	23.75	34.56	0.687	1.333	Bolt Tension
		Diagonal	A325X	0.7500	1	11.05	11.43	0.967	1.333	Member Bearing
T12	20	Leg	A449	1.0000	10	21.56	31.10	0.693	1.333	Bolt Tension
		Diagonal	A325X	0.7500	1	12.10	12.91	0.937	1.333	Gusset Bearing

Compression Checks

Leg Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio P / P_a
T1	180 - 160	ROHN 3 EH	20.04	5.01	52.9 K=1.00	23.893	3.0159	-9.86	72.06	0.137
T2	160 - 153.333	ROHN 4 EH	6.68	6.68	54.3 K=1.00	23.671	4.4074	-14.39	104.33	0.138
T3	153.333 - 146.667	ROHN 4 EH	6.68	6.68	54.3 K=1.00	23.671	4.4074	-20.98	104.33	0.201
T4	146.667 - 140	ROHN 4 EH	6.68	6.68	54.3 K=1.00	23.671	4.4074	-28.80	104.33	0.276
T5	140 - 120	ROHN 5 EH	20.04	6.68	43.6 K=1.00	25.320	6.1120	-57.26	154.75	0.370
T6	120 - 100	ROHN 6 EHS	20.03	6.68	36.0 K=1.00	26.380	6.7133	-91.83	177.09	0.519
T7	100 - 80	ROHN 6 EH	20.04	10.02	54.8 K=1.00	23.589	8.4049	-125.66	198.26	0.634
T8	80 - 70	ROHN 8 EHS	10.02	10.02	41.2 K=1.00	25.667	9.7193	-143.17	249.47	0.574
T9	70 - 60	ROHN 8 EHS	10.02	10.02	41.2 K=1.00	25.667	9.7193	-160.94	249.47	0.645
T10	60 - 40	ROHN 8 EHS	20.03	10.02	41.2 K=1.00	25.667	9.7193	-195.45	249.47	0.783
T11	40 - 20	ROHN 8 EH	20.03	10.02	41.8 K=1.00	25.582	12.7627	-229.17	326.50	0.702
T12	20 - 0	ROHN 8 EH	20.03	10.02	41.8 K=1.00	25.582	12.7627	-262.49	326.50	0.804

Diagonal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio P / P_a
T1	180 - 160	L2x2x3/16	9.86	4.79	146.0 K=1.00	7.007	0.7150	-2.11	5.01	0.420
T2	160 - 153.333	L2 1/2x2 1/2x1/4	11.29	5.51	134.5	8.249	1.1900	-2.62	9.82	0.267

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T3	153.333 - 146.667	L2 1/2x2 1/2x1/4	11.85	5.79	141.5 K=1.00	7.461	1.1900	-3.16	8.88	0.356
T4	146.667 - 140	L2 1/2x2 1/2x1/4	12.43	6.08	148.5 K=1.00	6.769	1.1900	-4.57	8.06	0.568
T5	140 - 120	L2 1/2x2 1/2x1/4	14.23	6.93	169.3 K=1.00	5.207	1.1900	-6.32	6.20	1.020
T6	120 - 100	L3x3x1/4	15.99	7.75	157.1 K=1.00	6.053	1.4400	-7.86	8.72	0.901
T7	100 - 80	L3 1/2x3 1/2x1/4	19.26	9.48	164.0 K=1.00	5.554	1.6900	-9.44	9.39	1.006
T8	80 - 70	L3 1/2x3 1/2x1/4	20.15	9.82	169.7 K=1.00	5.184	1.6900	-9.87	8.76	1.127
T9	70 - 60	2L3 1/2x3 1/2x1/4x3/8 2L 'a' > 59.6944 in - 136	21.03	10.26	193.5 K=1.00	3.988	3.3800	-10.53	13.48	0.781
T10	60 - 40	L4x4x1/4	22.81	11.15	168.3 K=1.00	5.274	1.9400	-10.88	10.23	1.064
T11	40 - 20	L4x4x5/16	24.62	12.06	182.9 K=1.00	4.463	2.4000	-11.38	10.71	1.063
T12	20 - 0	2L4x4x5/16x3/8 2L 'a' > 74.5105 in - 175	26.46	12.98	214.9 K=1.00	3.233	4.8000	-12.32	15.52	0.794

Top Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	180 - 160	L2x2x1/8	6.69	6.16	185.8 K=1.00	4.324	0.4844	-0.11	2.09	0.054
T3	153.333 - 146.667	L2x2x1/8 KL/R > 200 (C) - 46	9.45	8.84	266.7 K=1.00	2.099	0.4844	-0.21	1.02	0.206
T4	146.667 - 140	L2x2x1/8 KL/R > 200 (C) - 59	10.14	9.53	287.6 K=1.00	1.805	0.4844	-0.00	0.87	0.003

Mid Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	180 - 160	L2x2x1/8 KL/R > 200 (C) - 7	7.72	7.19	217.1 K=1.00	3.168	0.4844	-0.25	1.53	0.164

Tension Checks

Leg Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	180 - 160	ROHN 3 EH	20.04	5.01	52.9	30.000	3.0159	6.86	90.48	0.076
T2	160 - 153.333	ROHN 4 EH	6.68	6.68	54.3	30.000	4.4074	10.87	132.22	0.082
T3	153.333 - 146.667	ROHN 4 EH	6.68	6.68	54.3	30.000	4.4074	15.84	132.22	0.120
T4	146.667 - 140	ROHN 4 EH	6.68	6.68	54.3	30.000	4.4074	21.59	132.22	0.163
T5	140 - 120	ROHN 5 EH	20.04	6.68	43.6	30.000	6.1120	45.47	183.36	0.248
T6	120 - 100	ROHN 6 EHS	20.03	6.68	36.0	30.000	6.7133	74.02	201.40	0.368
T7	100 - 80	ROHN 6 EH	20.04	10.02	54.8	30.000	8.4049	102.80	252.15	0.408
T8	80 - 70	ROHN 8 EHS	10.02	10.02	41.2	30.000	9.7193	118.10	291.58	0.405
T9	70 - 60	ROHN 8 EHS	10.02	10.02	41.2	30.000	9.7193	133.16	291.58	0.457
T10	60 - 40	ROHN 8 EHS	20.03	10.02	41.2	30.000	9.7193	162.31	291.58	0.557
T11	40 - 20	ROHN 8 EH	20.03	10.02	41.8	30.000	12.7627	190.02	382.88	0.496
T12	20 - 0	ROHN 8 EH	20.03	10.02	41.8	30.000	12.7627	215.59	382.88	0.563

Diagonal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	180 - 160	L2x2x3/16	9.42	4.57	91.3	29.000	0.4308	2.21	12.49	0.177
T2	160 - 153.333	L2 1/2x2 1/2x1/4	11.29	5.51	87.8	29.000	0.7519	2.55	21.80	0.117
T3	153.333 - 146.667	L2 1/2x2 1/2x1/4	11.85	5.79	92.2	29.000	0.7519	3.02	21.80	0.139
T4	146.667 - 140	L2 1/2x2 1/2x1/4	12.43	6.08	96.7	29.000	0.7519	4.48	21.80	0.205
T5	140 - 120	L2 1/2x2 1/2x1/4	14.23	6.93	110.0	29.000	0.7519	6.29	21.80	0.288
T6	120 - 100	L3x3x1/4	15.99	7.75	101.5	32.500	0.9394	7.83	30.53	0.256
T7	100 - 80	L3 1/2x3 1/2x1/4	19.26	9.48	105.9	32.500	1.1034	9.45	35.86	0.264
T8	80 - 70	L3 1/2x3 1/2x1/4	20.15	9.82	109.6	32.500	1.1034	9.69	35.86	0.270
T9	70 - 60	2L3 1/2x3 1/2x1/4x3/8 2L 'a' > 59.6944 in - 137	21.03	10.26	114.4	29.000	2.2069	10.32	64.00	0.161
T10	60 - 40	L4x4x1/4	22.81	11.15	108.3	32.500	1.2909	10.55	41.96	0.251
T11	40 - 20	L4x4x5/16	23.71	11.60	113.6	32.500	1.5949	11.05	51.84	0.213
T12	20 - 0	2L4x4x5/16x3/8 2L 'a' > 74.5105 in - 176	26.46	12.98	126.9	29.000	3.1898	12.10	92.51	0.131

Top Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	180 - 160	L2x2x1/8	6.69	6.16	122.6	29.000	0.2930	0.09	8.50	0.011
T3	153.333 - 146.667	L2x2x1/8	9.45	8.84	173.9	29.000	0.2930	0.33	8.50	0.039
T4	146.667 - 140	L2x2x1/8	10.14	9.53	187.2	29.000	0.2930	0.13	8.50	0.015*

* DL controls

Mid Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	180 - 160	L2x2x1/8	7.72	7.19	142.4	29.000	0.2930	0.27	8.50	0.032

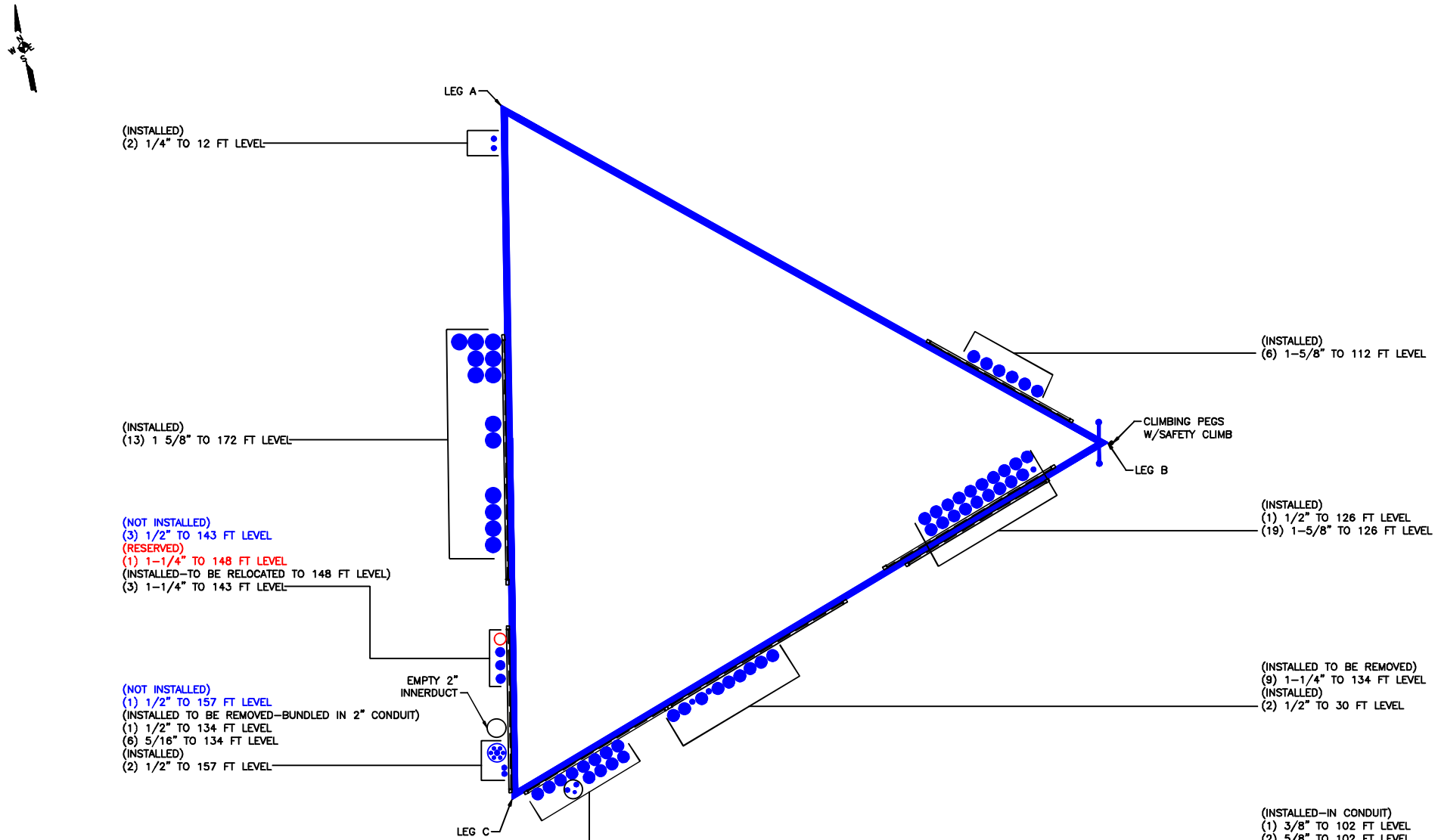
Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
T1	180 - 160	Leg	ROHN 3 EH	1	-9.86	96.06	10.3	Pass
T2	160 - 153.333	Leg	ROHN 4 EH	36	-14.39	139.07	10.3	Pass
T3	153.333 - 146.667	Leg	ROHN 4 EH	43	-20.98	139.07	15.1	Pass
T4	146.667 - 140	Leg	ROHN 4 EH	55	-28.80	139.07	20.7	Pass
T5	140 - 120	Leg	ROHN 5 EH	67	-57.26	206.29	27.8	Pass
T6	120 - 100	Leg	ROHN 6 EHS	88	-91.83	236.06	38.9	Pass
T7	100 - 80	Leg	ROHN 6 EH	109	-125.66	264.29	47.5	Pass
T8	80 - 70	Leg	ROHN 8 EHS	124	-143.17	332.54	43.1	Pass
T9	70 - 60	Leg	ROHN 8 EHS	133	-160.94	332.54	48.4	Pass
T10	60 - 40	Leg	ROHN 8 EHS	142	-195.45	332.54	58.8	Pass
T11	40 - 20	Leg	ROHN 8 EH	157	-229.17	435.22	52.7	Pass
T12	20 - 0	Leg	ROHN 8 EH	172	-262.49	435.22	60.3	Pass
T1	180 - 160	Diagonal	L2x2x3/16	15	-2.11	6.68	31.5 36.3 (b)	Pass
T2	160 - 153.333	Diagonal	L2 1/2x2 1/2x1/4	41	-2.62	13.09	20.1 28.2 (b)	Pass
T3	153.333 - 146.667	Diagonal	L2 1/2x2 1/2x1/4	53	-3.16	11.83	26.7 33.4 (b)	Pass
T4	146.667 - 140	Diagonal	L2 1/2x2 1/2x1/4	65	-4.57	10.74	42.6 49.4 (b)	Pass
T5	140 - 120	Diagonal	L2 1/2x2 1/2x1/4	74	-6.32	8.26	76.5	Pass
T6	120 - 100	Diagonal	L3x3x1/4	95	-7.86	11.62	67.6 77.1 (b)	Pass
T7	100 - 80	Diagonal	L3 1/2x3 1/2x1/4	112	-9.44	12.51	75.5 77.6 (b)	Pass
T8	80 - 70	Diagonal	L3 1/2x3 1/2x1/4	127	-9.87	11.68	84.5	Pass
T9	70 - 60	Diagonal	2L3 1/2x3 1/2x1/4x3/8	136	-10.53	17.97	58.6 59.9 (b)	Pass
T10	60 - 40	Diagonal	L4x4x1/4	145	-10.88	13.64	79.8 86.6 (b)	Pass
T11	40 - 20	Diagonal	L4x4x5/16	160	-11.38	14.28	79.7	Pass
T12	20 - 0	Diagonal	2L4x4x5/16x3/8	175	-12.32	20.68	59.6 70.3 (b)	Pass
T1	180 - 160	Top Girt	L2x2x1/8	4	-0.11	2.79	4.0	Pass
T3	153.333 - 146.667	Top Girt	L2x2x1/8	46	-0.21	1.36	15.5	Pass
T4	146.667 - 140	Top Girt	L2x2x1/8	60	0.13	8.50	1.5 3.1 (b)	Pass
T1	180 - 160	Mid Girt	L2x2x1/8	7	-0.25	2.05	12.3	Pass
							Summary	
						Leg (T12)	60.3	Pass
						Diagonal (T10)	86.6	Pass
						Top Girt	15.5	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
						(T3) Mid Girt	12.3	Pass
						(T1) Bolt Checks	86.6	Pass
						RATING =	**86.6**	**Pass**

APPENDIX B

BASE LEVEL DRAWING



BUSINESS UNIT: 807133 TOWER ID: C_BASELEVEL

APPENDIX C

ADDITIONAL CALCULATIONS

FDH Velocitel Project No. 15BWJD1400
Site ID: BU# 807133
Site Name: BRG 134 943057
Date:
By: Kevin C. Diaz, EIT

Foundation Calculations

TNX Reactions:

$P_{uplift} := 222\ kip$ $w_c := (6.25\ ft \cdot 9.75\ ft \cdot 9\ ft) \cdot 150\ pcf = 82.266\ kip$

$P_{comp} := 271\ kip$

Compression Check: $q_{ult} := 30\ ksf$ Per Geo

$A_{bearing} := 6.25\ ft \cdot 9.75\ ft = 60.938\ ft^2$

$P_{total} := P_{comp} + w_c = 353.266\ kip$

$q_n := \frac{P_{total}}{A_{bearing}} = 40.258\ psi$

$Capacity := \frac{q_n}{0.5 \cdot q_{ult}} \cdot 100 = 38.648$ % Passing

Tensile Anchor Bar Check: (4) #11 A615 Gr. 60 Anchor Bars

$\Omega := 1.67$ $N := 4$ $d := 1.410\ in$ $F_y := 60\ ksi$ $A_g := \left(\frac{\pi}{4}\right) \cdot d^2 = 1.561\ in^2$

$P_n := \frac{F_y \cdot A_g}{\Omega} = 56.1\ kip$ $P_u := \frac{P_{uplift}}{N} = 55.5\ kip$

$Capacity := \frac{P_u}{P_n} \cdot 100 = 98.93$ % Passing

Uplift Check / Soil-Grout Interaction:

$\Omega := 2.0$ $Q_{ult} := 16.0\ ksf$ [Ultimate Skin Friction]

$P_n := \frac{\pi \cdot (2.25\ in) \cdot 15.5\ ft \cdot Q_{ult}}{\Omega} = 73.042\ kip$

$P_u := \frac{P_{uplift}}{N} = 55.5\ kip$

$Capacity := \frac{P_u}{P_n} \cdot 100 = 75.984$ % Passing

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

T-Mobile Existing Facility

Site ID: CT11114D

Norwalk/ South Norwalk
50 Rockland Road
Norwalk, CT 06854

August 27, 2015

EBI Project Number: 6215004522

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general public allowable limit:	71.95 %

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

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August 27, 2015

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

Emissions Analysis for Site: **CT11114D – Norwalk/ South Norwalk**

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **50 Rockland Road, Norwalk, CT**, 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 (μW/cm2). 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 public 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 public 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 limit for the 700 MHz Band is approximately 467 $\mu W/cm^2$, and the general population exposure limit for the PCS and AWS 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 **50 Rockland Road, Norwalk, CT**, 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 manufactures supplied specifications, minus 10 dB, was focused at the base of the tower. For this report the sample point is the top of a 6 foot person standing at the base of the tower.

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

1) 2 LTE channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel

2) 2 UMTS channels (AWS Band – 2100 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

3) 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.

4) 1 LTE channel (700 MHz Band) was considered for each sector of the proposed installation. This channel has a transmit power of 30 Watts.

5) 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.

6) For the following calculations the sample point was the top of a six foot person standing at the base of the tower. The maximum gain of the antenna per the antenna manufactures supplied specifications minus 10 dB 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.

7) The antennas used in this modeling are the **Ericsson AIR21 B4A/B2P** & **B2A/B4P)** for 1900 MHz (PCS) and 2100 MHz (AWS) channels and the **Commscope LNX-6515DS-VTM** for 700 MHz channels. This is based on feedback from the carrier with regards to anticipated antenna selection. The **Ericsson AIR21 B4A/B2P** & **B2A/B4P)** have a maximum gain of **15.9 dBd** at their main lobe. The **Commscope LNX-6515DS-VTM** has a maximum gain of **14.6 dBd** at its main lobe. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, 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.

8) The antenna mounting height centerline of the proposed antennas is **173 feet** above ground level (AGL).

9) 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.

All calculations were done with respect to uncontrolled / general public threshold limits.

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T-Mobile Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	**1**	Antenna #:	**1**	Antenna #:	**1**
Make / Model:	Ericsson AIR21 B4A/B2P	Make / Model:	Ericsson AIR21 B4A/B2P	Make / Model:	Ericsson AIR21 B4A/B2P
Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	173	Height (AGL):	173	Height (AGL):	173
Frequency Bands	2100 MHz (AWS)	Frequency Bands	2100 MHz (AWS)	Frequency Bands	2100 MHz (AWS)
Channel Count	2	Channel Count	2	# PCS Channels:	2
Total TX Power:	120	Total TX Power:	120	# AWS Channels:	120
ERP (W):	4,668.54	ERP (W):	4,668.54	ERP (W):	4,668.54
Antenna A1 MPE%	0.60	Antenna B1 MPE%	0.60	Antenna C1 MPE%	0.60
Antenna #:	**2**	Antenna #:	**2**	Antenna #:	**2**
Make / Model:	Ericsson AIR21 B4A/B2P	Make / Model:	Ericsson AIR21 B4A/B2P	Make / Model:	Ericsson AIR21 B4A/B2P
Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	173	Height (AGL):	173	Height (AGL):	173
Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)
Channel Count	4	Channel Count	4	Channel Count	4
Total TX Power:	120	Total TX Power:	120	Total TX Power:	120
ERP (W):	4,668.54	ERP (W):	4,668.54	ERP (W):	4,668.54
Antenna A2 MPE%	0.60	Antenna B2 MPE%	0.60	Antenna C2 MPE%	0.60
Antenna #:	**3**	Antenna #:	**3**	Antenna #:	**3**
Make / Model:	Commscope LNX-6515DS-VTM	Make / Model:	Commscope LNX-6515DS-VTM	Make / Model:	Commscope LNX-6515DS-VTM
Gain:	14.6 dBd	Gain:	14.6 dBd	Gain:	14.6 dBd
Height (AGL):	173	Height (AGL):	173	Height (AGL):	173
Frequency Bands	700 MHz	Frequency Bands	700 MHz	Frequency Bands	700 MHz
Channel Count	1	Channel Count	1	Channel Count	1
Total TX Power:	30	Total TX Power:	30	Total TX Power:	30
ERP (W):	865.21	ERP (W):	865.21	ERP (W):	865.21
Antenna A3 MPE%	0.24	Antenna B3 MPE%	0.24	Antenna C3 MPE%	0.24

Site Composite MPE%	
Carrier	**MPE%**
T-Mobile (Per Sector Max)	**1.44 %**
AT&T	16.44 %
MetroPCS	13.98 %
Clearwire	1.02 %
Verizon Wireless	31.97 %
Sprint	7.10 %
Site Total MPE %:	**71.95 %**

T-Mobile Sector 1 Total:	1.44 %
T-Mobile Sector 2 Total:	1.44 %
T-Mobile Sector 3 Total:	1.44 %
Site Total:	71.95 %

T-Mobile _per sector	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ($\mu W/cm^2$)	Frequency (MHz)	Allowable MPE ($\mu W/cm^2$)	Calculated % MPE
T-Mobile 2100 MHz (AWS) LTE	**2**	**2334.27**	**173**	**6.02**	**2100**	**1000**	**0.60 %**
T-Mobile 700 MHz LTE	**1**	**865.21**	**173**	**1.12**	**700**	**467**	**0.24 %**
T-Mobile 1900 MHz (PCS) LTE	**2**	**1167.14**	**173**	**3.01**	**1900**	**1000**	**0.30 %**
T-Mobile 2100 MHz (AWS) UMTS	**2**	**1167.14**	**173**	**3.01**	**2100**	**1000**	**0.30 %**
						Total:	**1.44%**

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Summary

All calculations performed for this analysis yielded results that were **within** the allowable limits for general public 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 public exposure to RF Emissions are shown here:

T-Mobile Sector	Power Density Value (%)
Sector 1:	1.44 %
Sector 2:	1.44 %
Sector 3 :	1.44 %
T-Mobile Per Sector Maximum:	1.44 %
Site Total:	71.95 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **71.95%** of the allowable FCC established general public 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.

Scott Heffernan
RF Engineering Director

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