Crown Castle
3530 Toringdon Way Suite 300
Charlotte NC 28277

Tel (704) 405-6600

October 17, 2014

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

RE: **T-Mobile-Exempt Modification - Crown Site BU: 807132**
T-Mobile Site ID: CT11091A
Located at: 1081 North Street, Greenwich CT 06831

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 Peter Tesei, First Selectman for the Town of Greenwich and Crown Atlantic Company, L.L.C., Property Owner.

T-Mobile plans to modify the existing wireless communications facility owned by Crown Castle and located at **1081 North Street, Greenwich CT 06831**. 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 replacement 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. The operation of the replacement 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.

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

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).

Sincerely,

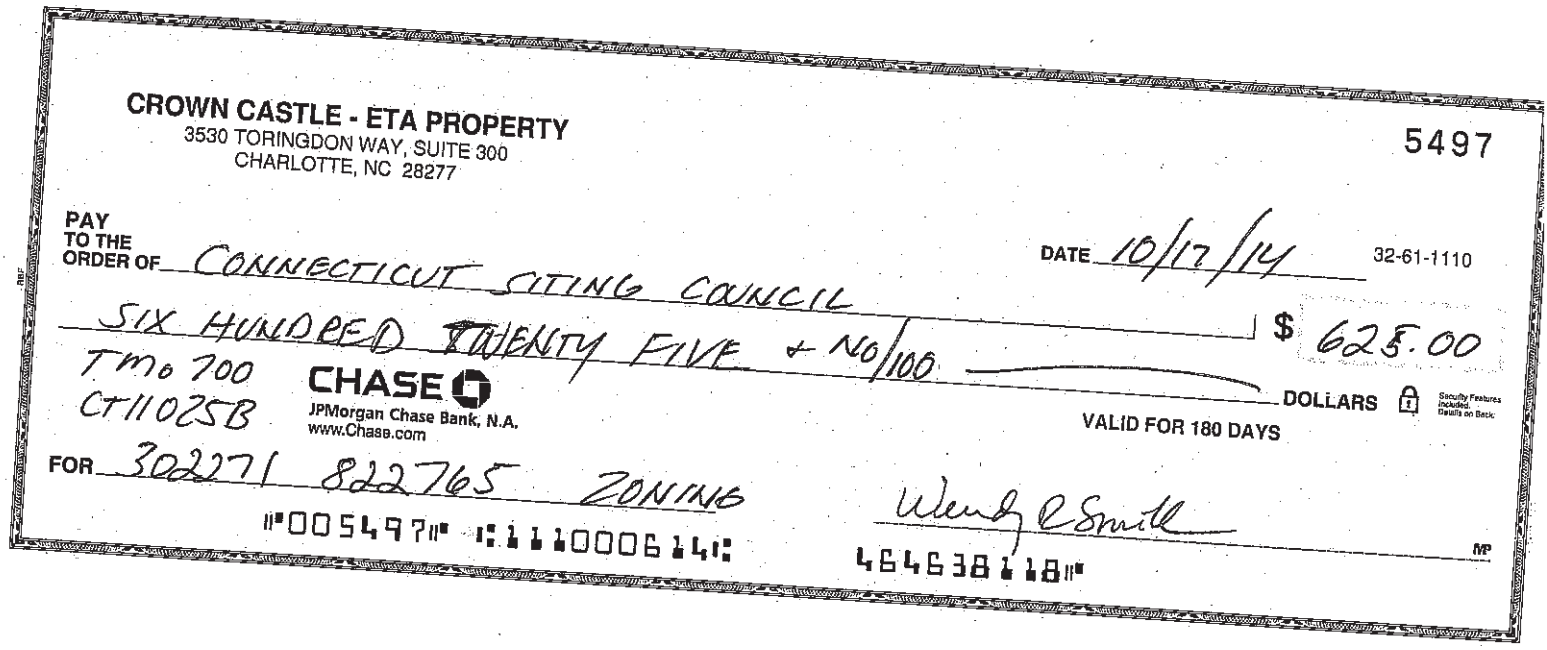
Jerry Feathers
Real Estate Specialist

Enclosure

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 Peter Tesei, First Selectman
Town Hall
101 Field Point Road
Greenwich, CT 06830

cc: Crown Atlantic Company, L.L.C.
Post Office Box 203127
Houston, TX 77216-3127



CROWN CASTLE - ETA PROPERTY
3530 TORINGDON WAY, SUITE 300
CHARLOTTE, NC 28277

5497

PAY TO THE ORDER OF CONNECTICUT SITING COUNCIL

DATE 10/17/14

32-61-1110

SIX HUNDRED TWENTY FIVE + NO/100 $ 625.00

DOLLARS

Security Features Included. Details on Back.

TM0 700
CT11025B

CHASE
JPMorgan Chase Bank, N.A.
www.Chase.com

VALID FOR 180 DAYS

FOR 302271 822765 ZONING

Wendy R Smith

MP

⑈005497⑈ ⑆111000614⑆ 464638118⑈

5500

CROWN CASTLE - ETA PROPERTY
3530 TORINGDON WAY, SUITE 300
CHARLOTTE, NC 28277

32-61-1110

DATE 10/17/14

PAY TO THE ORDER OF CITY OF TORRINGTON $ 75.00

SEVENTY FIVE & NO/100 DOLLARS

Security Features Included. Details on Back.

VALID FOR 180 DAYS

TM0700
CT11369A

CHASE
JPMorgan Chase Bank, N.A.
www.Chase.com

FOR 302374 828540 ZONING

Wendy R Smith

MP

⑈005500⑈ ⑆111000614⑆ 464638118⑈

5499

CROWN CASTLE - ETA PROPERTY
3530 TORINGDON WAY, SUITE 300
CHARLOTTE, NC 28277

32-61-1110

DATE 10/17/14

PAY TO THE ORDER OF GLOUCESTER TOWNSHIP $ 25-00

TWENTY FIVE + NO/100 DOLLARS

Security Features Included. Details on Back.

TM0700
ICA6429B

CHASE
JPMorgan Chase Bank, N.A.
www.Chase.com

VALID FOR 180 DAYS

FOR 301730 823509 20116

Wendy R Smith

MP

⑈005499⑈ ⑆111000614⑆ 464638118⑈

5501

CROWN CASTLE - ETA PROPERTY
3530 TORINGDON WAY, SUITE 300
CHARLOTTE, NC 28277

32-61-1110

DATE 10/17/14

PAY TO THE ORDER OF TOWN OF FRANKLIN $ 150.00

ONE HUNDRED FIFTY + 00/100 DOLLARS

Security Features Included. Details on Back.

VALID FOR 180 DAYS

T-Mobile
4BN042513

CHASE
JPMorgan Chase Bank, N.A.
www.Chase.com

FOR 285436 806638 BP

Wendy K Smith

⑈005501⑈ ⑆111000614⑆ 464638118⑈

5495

CROWN CASTLE - ETA PROPERTY
3530 TORINGDON WAY, SUITE 300
CHARLOTTE, NC 28277

32-61-1110

DATE 10/17/14

PAY TO THE ORDER OF CONNECTICUT SITING COUNCIL $ 625.00

SIX HUNDRED TWENTY FIVE + 00/100 DOLLARS

Security Features Included. Details on Back.

VALID FOR 180 DAYS

T-Mobile
CT11091A

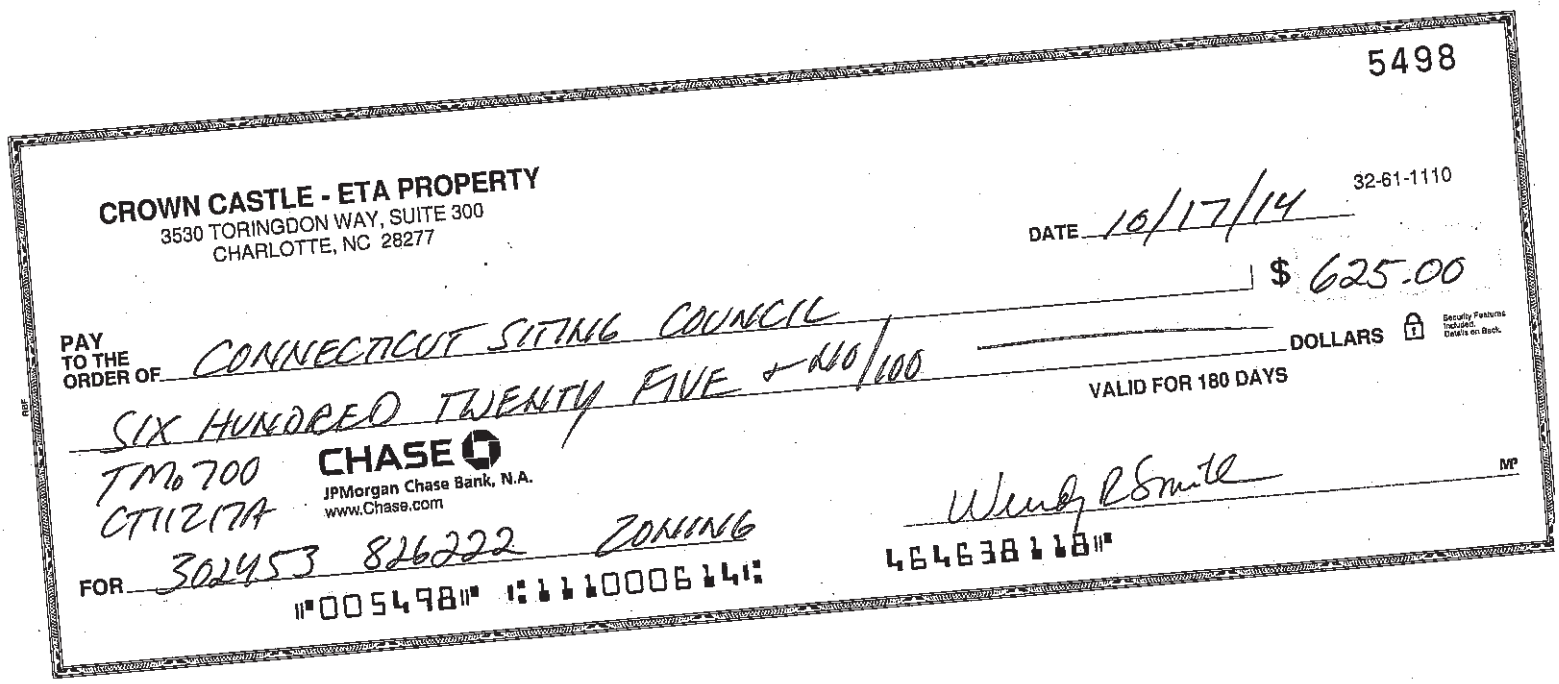
CHASE
JPMorgan Chase Bank, N.A.
www.Chase.com

FOR 301597 807132 ZONING

Wendy R Smith

MP

⑈005495⑈ ⑆111000614⑆ 464638118⑈



5498

CROWN CASTLE - ETA PROPERTY
3530 TORINGDON WAY, SUITE 300
CHARLOTTE, NC 28277

32-61-1110

DATE 10/17/14

$ 625.00

PAY TO THE ORDER OF CONNECTICUT SITING COUNCIL

SIX HUNDRED TWENTY FIVE & 00/100 DOLLARS

Security Features Included. Details on Back.

VALID FOR 180 DAYS

CHASE
JPMorgan Chase Bank, N.A.
www.Chase.com

TM0700
CT11217A

FOR 302453 826222 ZONING

Wendy R Smith

MP

⑈005498⑈ ⑆111000614⑆ 464638118⑈

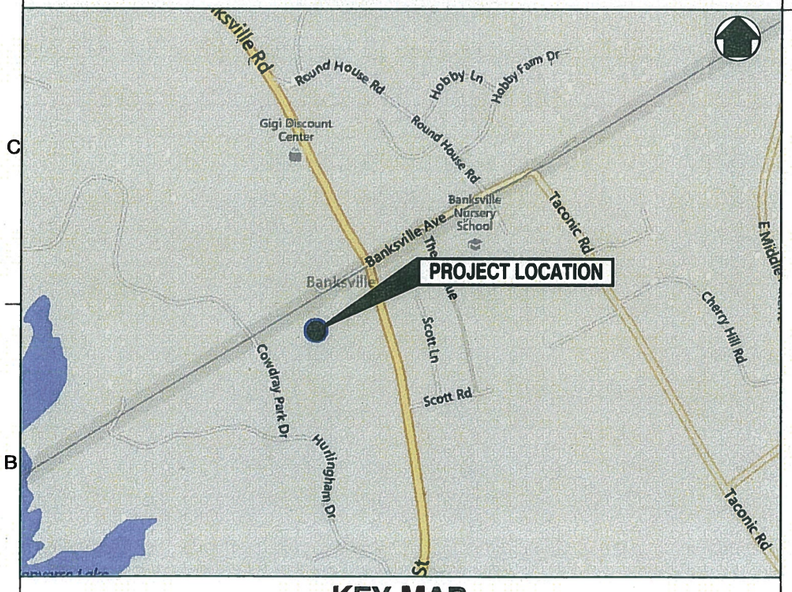
T-Mobile®

T-MOBILE NORTHEAST LLC

T-MOBILE SITE #: CT11091A
CROWN CASTLE BU #:807132
SITE NAME: BRG 133 943050
1081 NORTH STREET
GREENWICH, CT 06831
FAIRFIELD COUNTY

SITE CONFIGURATION: 702C

SITE INFORMATION



KEY MAP
N.T.S.

DIRECTIONS: (FROM PARSIPPANY):

START OUT GOING WEST ON SYLVAN WAY TOWARD CENTURY DR. TURN RIGHT ONTO LITTLETON RD / US-202 N. KEEP LEFT AT THE FORK TO GO ON LITTLETON RD E. MERGE ONTO I-287 N. MERGE ONTO I-87 S / I-287 E / NEW YORK TRWY S TOWARD I-87 S / TAPPAN ZEE BRG /NEW YORK CITY. KEEP LEFT TO TAKE I-287 E / CROSS WESTCHESTER EXPY E VIA EXIT 8 TOWARD WHITE PLAINS / RYE. MERGE ONTO I-684 N VIA EXIT 9A TOWARD BREWSTER. TAKE THE NY-22 N EXIT, EXIT 3N, TOWARD BEDFORD. TURN RIGHT ONTO BEDFORD RD / NY-22.URN RIGHT ONTO BANKSVILLE RD. TURN RIGHT TO STAY ON BANKSVILLE RD. TURN LEFT ONTO ROUND HILL RD. TURN RIGHT ONTO COUNTY HWY-56A / BEDFORD BANKSVILLE RD. COUNTY HWY-56A / BEDFORD BANKSVILLE RD BECOMES NORTH ST. 1081 NORTH ST WILL BE ON THE LEFT.

PROJECT INFORMATION

T-MOBILE SITE #:	CT11091A
CROWN CASTLE BU #:	807132
SITE ADDRESS:	1081 NORTH STREET GREENWICH, CT 06831 FAIRFIELD COUNTY
LATITUDE:	N 41° 8' 22.91"
LONGITUDE:	W 73° 38' 29.58"
TOWER OWNER:	CROWN CASTLE 1200 MACARTHUR BLVD., SUITE 200 MAHWAH, NJ 07430
CONTACT:	PETER TISI (201) 236-9224
APPLICANT:	T-MOBILE NORTHEAST, LLC 4 SYLVAN WAY PARSIPPANY, NJ 07054
CONTACT:	PHONE #: (973) 397-4800 FAX #: (973) 292-8893
ENGINEER:	DEWBERRY ENGINEERS INC. 600 PARSIPPANY ROAD, SUITE 301 PARSIPPANY, NJ 07054
CONTACT:	GREG NAWROTZKI (973) 576-9653
SCOPE OF WORK:	REMOVE AND REPLACE EXISTING ANTENNAS AND MOUNT WITH (6) NEW ANTENNAS AND MOUNT, REMOVE AND REPLACE EXISTING TMA'S WITH (3) NEW TMA'S, REMOVE AND REPLACE EXISTING EQUIPMENT CABINET WITH (1) NEW EQUIPMENT CABINET AT GRADE, ADD (6) NEW LINES OF COAX & (1) NEW HYBRID CABLE.

SHEET INDEX

SHEET NO.	SHEET 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

APPROVALS

T-MOBILE — DATE

OWNER/ LANDLORD — DATE

RF ENGINEER — DATE

ZONING — DATE

CONSTRUCTION — DATE

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

T-Mobile
T-MOBILE NORTHEAST LLC
4 SYLVAN WAY
PARSIPPANY, NJ 07054
PHONE: (973) 397-4800
FAX: (973) 292-8893

BRG 133 943050

CT11091A

1081 NORTH STREET
GREENWICH, CT 06831
FAIRFIELD COUNTY

SEAL

SCALE
AS SHOWN

REV.	DATE	BY	DESCRIPTION
0	10/16/14	ALH	ISSUED AS FINAL
A	10/15/14	ALH	ISSUED FOR REVIEW

REVISIONS

DRAWN BY ALH
CHECKED BY BSH
APPROVED BY GHN
DATE 10/14/14

TITLE

TITLE SHEET

PROJECT NO. 50066258/50066274

T - 1

SHEET NO.

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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CT11091A

1081 NORTH STREET
GREENWICH, CT 06831
FAIRFIELD COUNTY

SEAL

SCALE

AS SHOWN

REV.	DATE	BY	DESCRIPTION
0	10/16/14	ALH	ISSUED AS FINAL
A	10/15/14	ALH	ISSUED FOR REVIEW

REVISIONS

DRAWN BY ALH
CHECKED BY BSH
APPROVED BY GHN
DATE 10/14/14

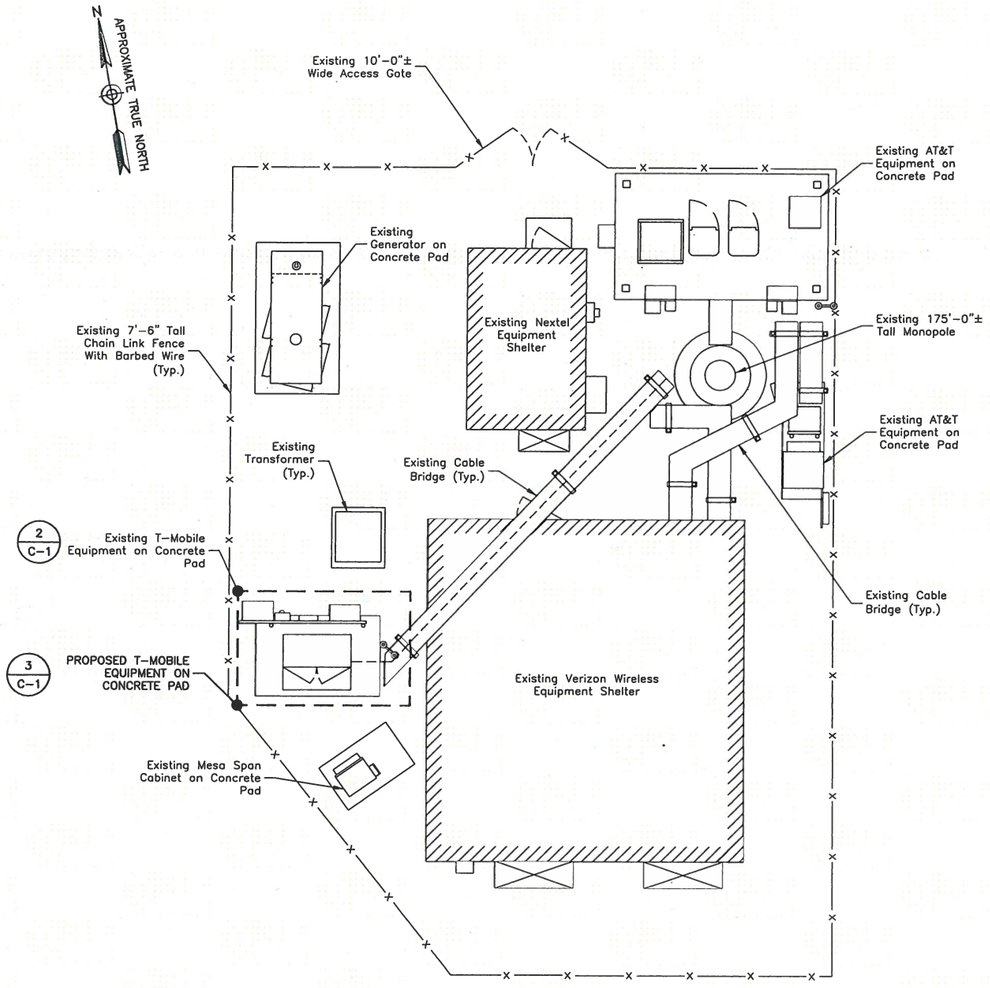
TITLE

GENERAL NOTES

PROJECT NO. 50066258/50066274

G - 1

SHEET NO.

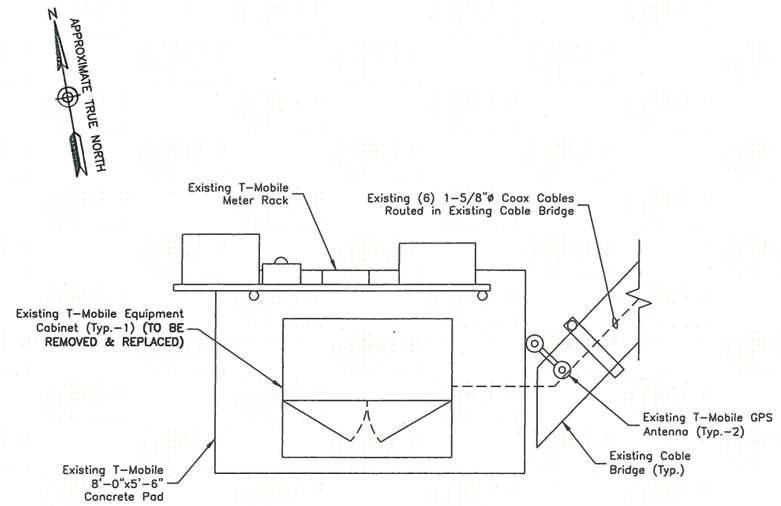


COMPOUND PLAN

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

1

0' 5' 10'

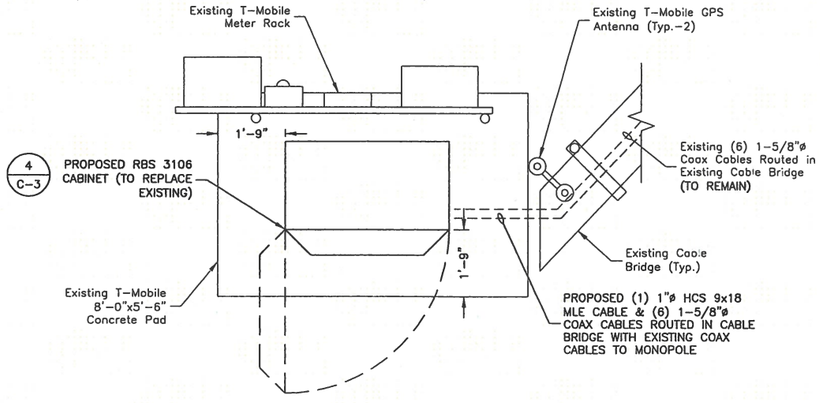


EXISTING EQUIPMENT PLAN

SCALE: 1/4"=1' FOR 11"x17"
1/2"=1' FOR 22"x34"

2

0' 1' 2' 4'



PROPOSED EQUIPMENT PLAN

SCALE: 1/4"=1' FOR 11"x17"
1/2"=1' FOR 22"x34"

3

0' 1' 2' 4'

NOTES:

1. NORTH SHOWN AS APPROXIMATE.
2. NOT ALL INFORMATION IS SHOWN FOR CLARITY.
3. MOUNT ALL ANTENNAS, TMAS, COAX, ETC. IN ACCORDANCE WITH STRUCTURAL ANALYSIS BY PAUL J. FORD AND COMPANY DATED AUGUST 29, 2014.

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FAIRFIELD COUNTY

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STATE OF CONNECTICUT
JIANG YU
No. 23222
REGISTERED PROFESSIONAL ENGINEER

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0	10/16/14	ALH	ISSUED AS FINAL
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CHECKED BY BSH
APPROVED BY GHN
DATE 10/14/14

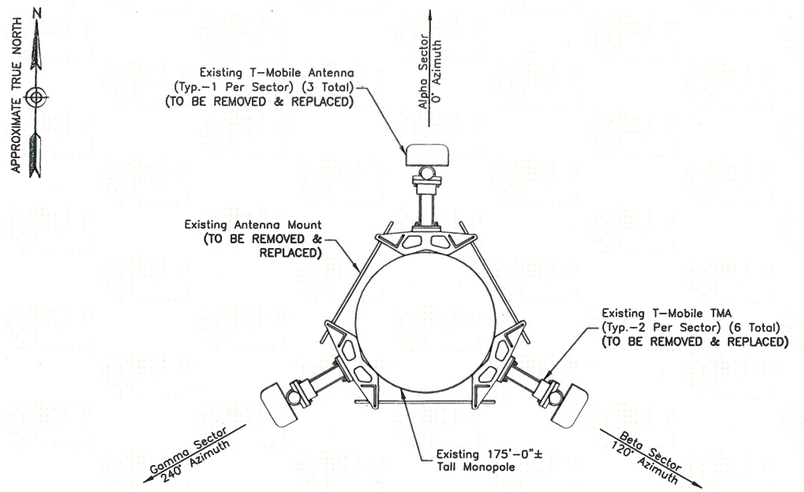
TITLE

COMPOUND PLAN & EQUIPMENT PLANS

PROJECT NO. 50066258/50066274

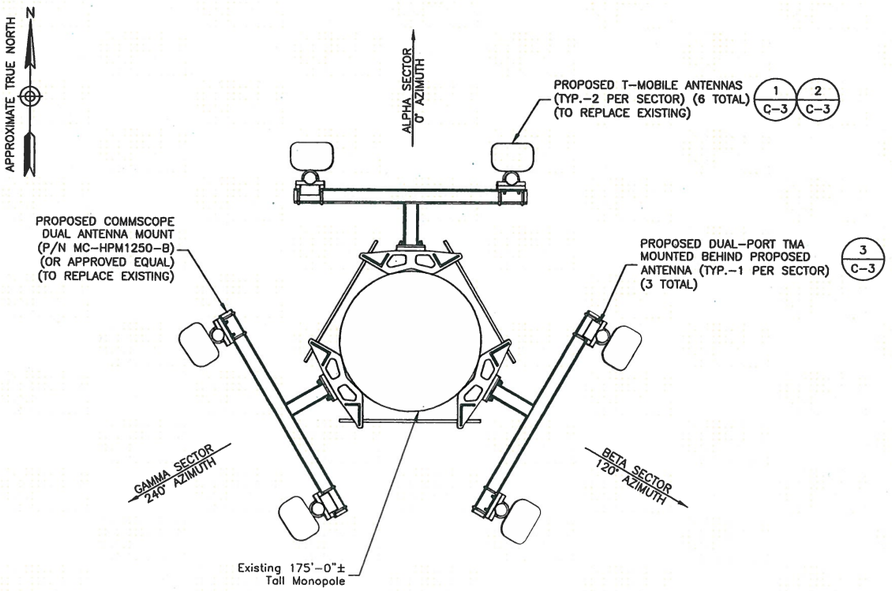
C - 1

SHEET NO.



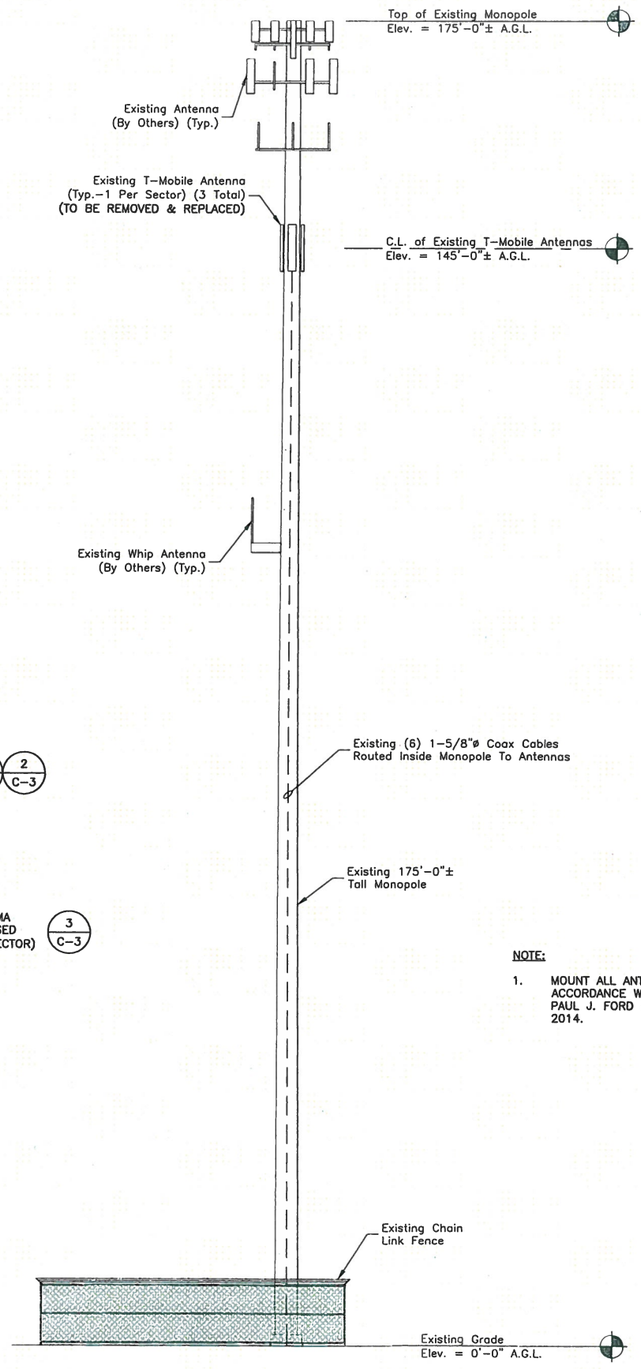
EXISTING ANTENNA LAYOUT (1)

SCALE: N.T.S.



PROPOSED ANTENNA LAYOUT (2)

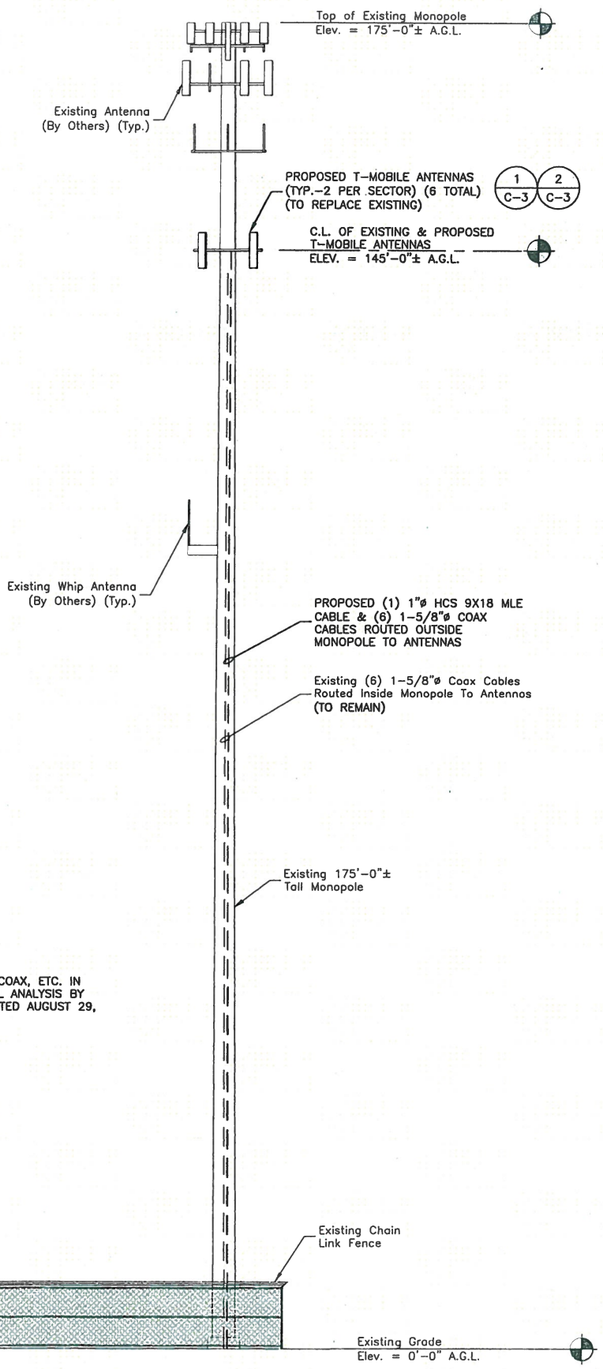
SCALE: N.T.S.



EXISTING ELEVATION (3)

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

0' 10' 20'



PROPOSED ELEVATION (4)

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

0' 10' 20'

NOTE:

1. MOUNT ALL ANTENNAS, TMAS, COAX, ETC. IN ACCORDANCE WITH STRUCTURAL ANALYSIS BY PAUL J. FORD & COMPANY DATED AUGUST 29, 2014.

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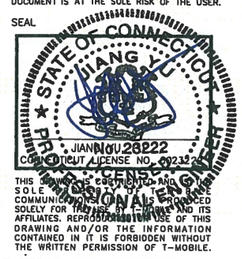

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APPROVED BY GHN
DATE 10/14/14

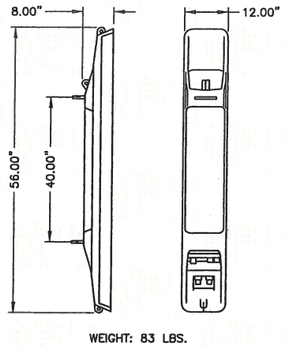
TITLE

ANTENNA LAYOUTS & ELEVATIONS

PROJECT NO. 50066258/50066274

C - 2

SHEET NO.



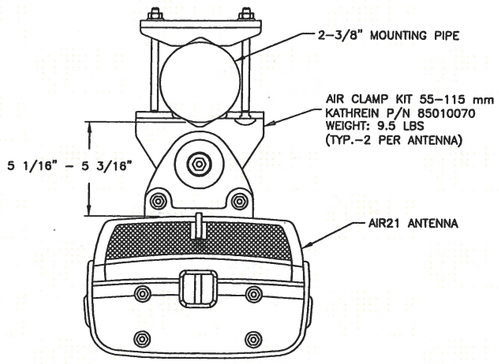
WEIGHT: 83 LBS.

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.

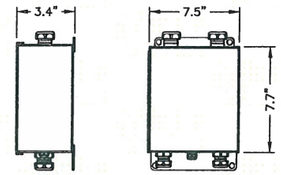
AIR21 ANTENNA DETAIL 1

SCALE: N.T.S.



AIR21 MOUNT/CLAMP 2

SCALE: N.T.S.



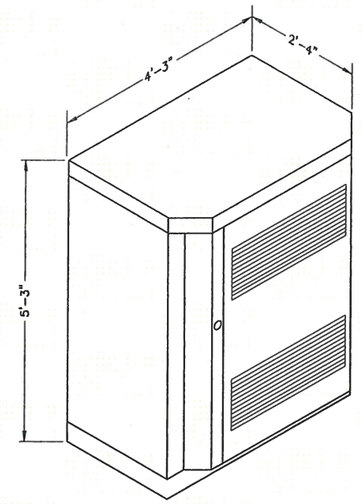
ERICSSON KRY 112 144/1

NOTES:

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

DUAL-PORT TMA DETAIL 3

SCALE: N.T.S.



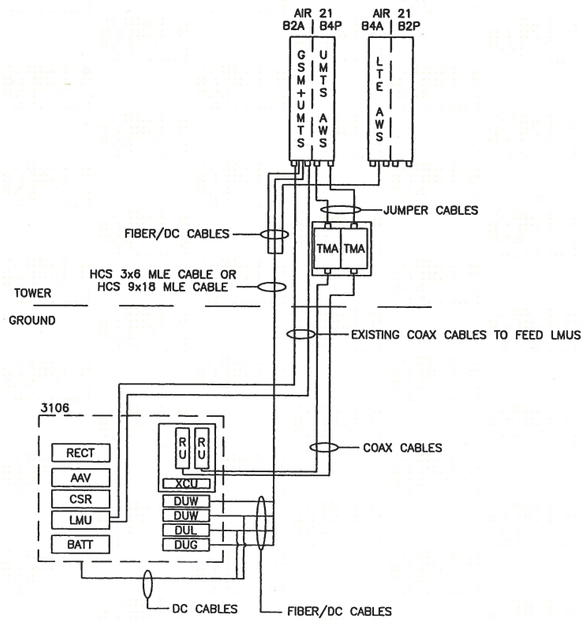
ISOMETRIC

NOTE:

1. CONTRACTOR SHALL SECURE CABINET AS PER MANUFACTURER RECOMENDATIONS.

ERICSSON RBS 3106 CABINET 4

SCALE: N.T.S.



SITE CONFIGURATION 5

SCALE: N.T.S.

DESIGN CONFIGURATION

	ANTENNAS		COAX		COAX LENGTH	HCS LENGTH
	EXISTING	PROPOSED	EXISTING	PROPOSED		
ALPHA	EXISTING RFS ANTENNA	ERICSSON AIR21 ANTENNA	(2) 1–5/8"	(2) 1–5/8"	195'	(1) 1" @ 195' (ROUND UP TO NEXT AVAILABLE CABLE LENGTH)
	–	ERICSSON AIR21 ANTENNA				
BETA	EXISTING RFS ANTENNA	ERICSSON AIR21 ANTENNA	(2) 1–5/8"	(2) 1–5/8"	195'	
	–	ERICSSON AIR21 ANTENNA				
GAMMA	EXISTING RFS ANTENNA	ERICSSON AIR21 ANTENNA	(2) 1–5/8"	(2) 1–5/8"	195'	
	–	ERICSSON AIR21 ANTENNA				

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DATE 10/14/14

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CONSTRUCTION DETAILS

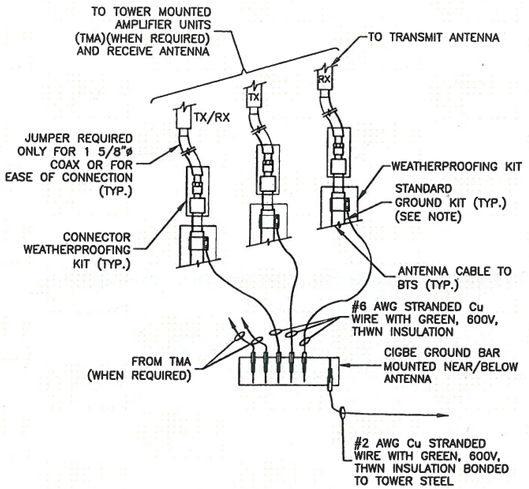
PROJECT NO. 50066258/50066274

C - 3

SHEET NO.

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. MISCELLANEQUS 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.

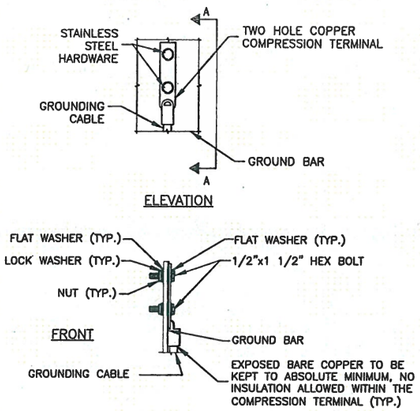


NOTE:

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.

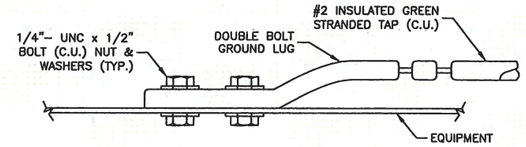


NOTES:

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

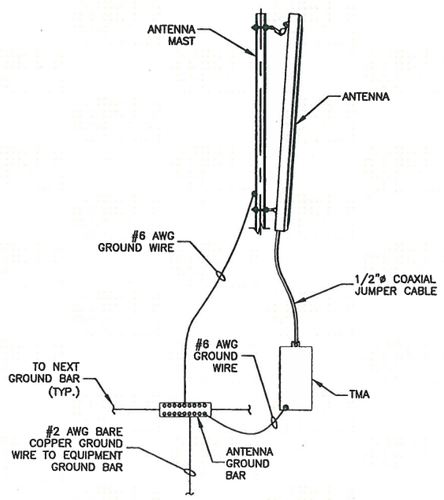
TYPICAL GROUND BAR MECHANICAL CONNECTION DETAIL 2

SCALE: N.T.S.



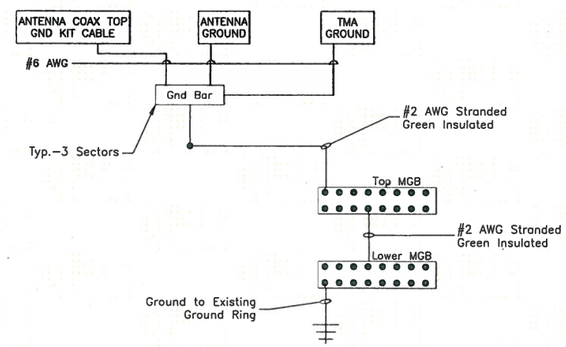
CONNECTION TO EQUIPMENT DETAIL 3

SCALE: N.T.S.



TYPICAL ANTENNA GROUNDING DETAIL 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.

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

T-Mobile
T-MOBILE NORTHEAST LLC
4 SYLVAN WAY
PARSIPPANY, NJ 07054
PHONE: (973) 397-4000
FAX: (973) 292-8893

BRG 133 943050

CT11091A

1081 NORTH STREET
GREENWICH, CT 06831
FAIRFIELD COUNTY

SEAL

SCALE

AS SHOWN

REV.	DATE	BY	DESCRIPTION
0	10/16/14	ALH	ISSUED AS FINAL
A	10/15/14	ALH	ISSUED FOR REVIEW

REVISIONS

DRAWN BY ALH

CHECKED BY BSH

APPROVED BY GHN

DATE 10/14/14

TITLE

GROUNDING NOTES & DETAILS

PROJECT NO. 50066258/50066274

E - 1

SHEET NO.

PAUL J. FORD AND COMPANY
STRUCTURAL ENGINEERS
250 East Broad Street • Suite 600 • Columbus, Ohio 43215-3708

Date: **August 29, 2014**

Sean Dempsey
Crown Castle
3530 Toringdon Way, Suite 300
Charlotte, NC 28277
704.405.6565

Paul J. Ford and Company
250 E. Broad Street, Suite 600
Columbus, OH 43215
614.221.6679
jmeinerding@pjfweb.com

Subject: **Structural Analysis Report**

Carrier Designation:	***T-Mobile* Co-Locate**	
	Carrier Site Number:	CT11091A
	Carrier Site Name:	Banksville (Greenwich), CT
Crown Castle Designation:	**Crown Castle BU Number:**	807132
	Crown Castle Site Name:	BRG 133 943050
	Crown Castle JDE Job Number:	301597
	Crown Castle Work Order Number:	916508
	Crown Castle Application Number:	260885 Rev. 2
Engineering Firm Designation:	**Paul J. Ford and Company Project Number:**	37513-2761.002.7805
Site Data:	**1081 North Street, Greenwich, Fairfield County, CT** **Latitude *41° 8' 22.91"*, Longitude *-73° 38' 29.58"*** **175 Foot - Monopole Tower**	

Dear Sean Dempsey,

Paul J. Ford and Company 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 686169, in accordance with application 260885, revision 2.

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:

LC4.7: Modified Structure w/ Existing + Reserved + Proposed Equipment **Sufficient Capacity**
Note: See Table I and Table II for the proposed and existing/reserved loading, respectively.

The structural analysis was performed for this tower in accordance with the requirements of the 2005 Connecticut Building Code and the 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.

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

We at *Paul J. Ford and Company* 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:

Joey Meinerding, E.I
Structural Designer

tnxTower Report - version 6.1.4.1

PAUL J. FORD AND COMPANY
STRUCTURAL ENGINEERS
250 East Broad Street • Suite 600 • Columbus, Ohio 43215-3708

Date: **August 29, 2014**

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	Carrier Site Name:	Banksville (Greenwich), CT
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Respectfully submitted by:

Joey Meinerding, E.I.
Structural Designer

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 175 ft. monopole tower designed by SSI Services in October of 2000. The tower was originally designed for a wind speed of 85 mph per TIA/EIA-222-F.

2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of the 2005 Connecticut Building Code and the 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
144.0	145.0	3	ericsson	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	7	1-5/8	--
		3	ericsson	ERICSSON AIR 21 B4A B2P w/ Mount Pipe			
		3	ericsson	KRY 112 144/1			
	144.0	1	tower mounts	RMV12-3xx Mount			

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
174.0	176.0	3	alcatel lucent	RRH2X40-AWS	1	1-5/8	2
	175.0	3	antel	BXA-171063-12BF-EDIN-X w/ Mount Pipe			
		1	rfs celwave	DB-T1-6Z-8AB-0Z			
		2	antel	ADA-85408580CF w/ Mount Pipe	11 2	1-1/4 1-5/8	1
		2	antel	BXA-80080/4CF w/ Mount Pipe			
		2	decibel	932DG90T2E-M w/ Mount Pipe			
		3	powerwave technologies	P65.16.XL.2 w/ Mount Pipe			
		6	rfs celwave	FD9R6004/2C-3L			
	174.0	1	tower mounts	Platform Mount [LP 602-1]			
162.0	162.0	6	ericsson	RRUS-11	1 2 4	3/8 3/4 1-1/4	1
		2	kathrein	800 10121 w/ Mount Pipe			
		2	powerwave technologies	7770.00 w/ Mount Pipe			
		8	powerwave technologies	LGP2140X			
		3	powerwave technologies	P65-16-XLH-RR w/ Mount Pipe			
		1	raycap	DC6-48-60-18-8F			
		1	tower mounts	Platform Mount [LP 303-1]			
156.0	156.0	1	tower mounts	Platform Mount [LP 602-1]	--	--	3
144.0	144.0	3	ems wireless	RR90-17-02DP w/ Mount Pipe	--	--	3
		6	ericsson	KRY 112 71			
		1	tower mounts	Pipe Mount [PM 601-3]			
		--	--	--	6	1-5/8	1
129.0	134.5	1	antel	BCR-87010:90	1	1-1/4	1
	129.0	1	tower mounts	Side Arm Mount [SO 701-1]			

Notes:
1) Existing Equipment
2) Reserved Equipment
3) Equipment To Be Removed

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	FDH, 14215O1600, 04/09/2014	4837566	CCISITES
4-POST-MODIFICATION INSPECTION	B&T, 83626.003, 07/26/2012	3279736	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	SSI/PJF, 37600-0057, 10/26/2000	1057735	CCISITES
4-TOWER MANUFACTURER DRAWINGS	SSI/PJF, 37600-0057, 10/26/2000	1057736	CCISITES
4-TOWER PROPOSED REINFORCEMENT DESIGN/DRAWINGS/DATA	PJF, 37513-2761 BP, 04/16/2014	4856181	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) Monopole was reinforced in conformance with the referenced modification drawings.
5) Monopole will be reinforced in conformance with the referenced proposed modification drawings.

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

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	175 - 145.5	Pole	TP27.435x22.125x0.2188	1	-4.66	965.83	45.0	Pass
L2	145.5 - 95.5	Pole	TP35.997x26.1874x0.3125	2	-12.85	1814.93	93.0	Pass
L3	95.5 - 83.25	Pole	TP37.5769x34.382x0.375	3	-16.87	2335.32	92.7	Pass
L4	83.25 - 65.5	Pole	TP40.7716x37.5769x0.5255	4	-21.60	2885.66	90.7	Pass
L5	65.5 - 64	Pole	TP41.0416x40.7716x0.5244	5	-22.01	2897.82	91.5	Pass
L6	64 - 46.58	Pole	TP44.177x41.0416x0.616	6	-25.58	3568.83	82.1	Pass
L7	46.58 - 43.25	Pole	TP44.0268x41.7895x0.6421	7	-30.73	3806.59	84.7	Pass
L8	43.25 - 42.58	Pole	TP44.1474x44.0268x0.6815	8	-30.98	3959.48	82.0	Pass
L9	42.58 - 42	Pole	TP44.2518x44.1474x0.7773	9	-31.22	4615.69	71.0	Pass
L10	42 - 35.5	Pole	TP45.422x44.2518x0.6708	10	-33.63	4105.15	83.2	Pass
L11	35.5 - 18	Pole	TP48.5724x45.422x0.6982	11	-40.68	4638.43	82.7	Pass
L12	18 - 17	Pole	TP48.7524x48.5724x0.697	12	-41.10	4651.17	82.9	Pass
L13	17 - 2.75	Pole	TP50.505x48.7524x0.6609	13	-46.90	4902.19	86.7	Pass
L14	2.75 - 0	Pole	TP51x50.505x0.6644	14	-48.05	5130.24	84.1	Pass
							Summary	
						Pole (L2)	93.0	Pass
						Rating =	93.0	Pass

Table 5 - Tower Component Stresses vs. Capacity

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	95.3	Pass
1	Base Plate	0	63.8	Pass
1	Base Foundation	0	89.6	Pass

Structure Rating (max from all components) =	95.3%

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

4.1) Recommendations

Remove the mount at the 156 ft. level.
Install the proposed modifications per the referenced drawings.

APPENDIX A

TNXTOWER OUTPUT

Tower Input Data

There is a pole section.
This tower is designed using the TIA/EIA-222-F standard.
The following design criteria apply:

1) Tower is located in Fairfield County, Connecticut.
2) Basic wind speed of 85 mph.
3) Nominal ice thickness of 0.7500 in.
4) Ice density of 56.00 pcf.
5) A wind speed of 38 mph is used in combination with ice.
6) Temperature drop of 50 °F.
7) Deflections calculated using a wind speed of 50 mph.
8) A non-linear (P-delta) analysis was used.
9) Pressures are calculated at each section.
10) Stress ratio used in pole design is 1.333.
11) 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		

Tapered Pole Section Geometry

Section	*Elevation*	*Section Length*	*Splice Length*	*Number of Sides*	*Top Diameter*	*Bottom Diameter*	*Wall Thickness*	*Bend Radius*	*Pole Grade*
	ft	*ft*	*ft*		*in*	*in*	*in*	*in*	
L1	175.00-145.50	29.50	4.50	12	22.1250	27.4350	0.2188	0.8752	A572-65 (65 ksi)
L2	145.50-95.50	54.50	5.50	12	26.1874	35.9970	0.3125	1.2500	A572-65 (65 ksi)
L3	95.50-83.25	17.75	0.00	12	34.3820	37.5769	0.3750	1.5000	A572-65 (65 ksi)
L4	83.25-65.50	17.75	0.00	12	37.5769	40.7716	0.5255	2.1020	Reinf 52.98 ksi (53 ksi)
L5	65.50-64.00	1.50	0.00	12	40.7716	41.0416	0.5244	2.0975	Reinf 52.96 ksi (53 ksi)
L6	64.00-46.58	17.42	6.42	12	41.0416	44.1770	0.6160	2.4640	Reinf 53.05 ksi (53 ksi)
L7	46.58-43.25	9.75	0.00	12	41.7895	44.0268	0.6421	2.5684	Reinf 53.06 ksi (53 ksi)
L8	43.25-42.58	0.67	0.00	12	44.0268	44.1474	0.6815	2.7261	Reinf 51.90 ksi (52 ksi)
L9	42.58-42.00	0.58	0.00	12	44.1474	44.2518	0.7773	3.1090	Reinf 53.04 ksi (53 ksi)
L10	42.00-35.50	6.50	0.00	12	44.2518	45.4220	0.6708	2.6832	Reinf 53.10 ksi

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L11	35.50-18.00	17.50	0.00	12	45.4220	48.5724	0.6982	2.7930	(53 ksi) Reinf 53.88 ksi (54 ksi)
L12	18.00-17.00	1.00	0.00	12	48.5724	48.7524	0.6970	2.7880	Reinf 53.92 ksi (54 ksi)
L13	17.00-2.75	14.25	0.00	12	48.7524	50.5050	0.6609	2.6438	Reinf 57.78 ksi (58 ksi)
L14	2.75-0.00	2.75		12	50.5050	51.0000	0.6644	2.6574	Reinf 59.57 ksi (60 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	22.9055	15.4337	945.3449	7.8424	11.4608	82.4854	1915.5251	7.5960	5.3431	24.42
	28.4028	19.1748	1812.8906	9.7434	14.2113	127.5666	3673.4079	9.4372	6.7662	30.924
L2	27.9497	26.0366	2224.9891	9.2632	13.5651	164.0234	4508.4311	12.8144	6.1807	19.778
	37.2668	35.9075	5836.2071	12.7751	18.6464	312.9930	11825.7378	17.6726	8.8097	28.191
L3	36.6198	41.0635	6061.4927	12.1745	17.8099	340.3441	12282.2276	20.2102	8.2094	21.892
	38.9024	44.9213	7935.3740	13.3183	19.4648	407.6778	16079.2192	22.1089	9.0656	24.175
L4	38.9024	62.6950	10985.6904	13.2644	19.4648	564.3870	22259.9871	30.8566	8.6623	16.484
	42.2099	68.1009	14079.5004	14.4081	21.1197	666.6522	28528.8849	33.5172	9.5185	18.113
L5	42.2099	67.9576	14050.6656	14.4085	21.1197	665.2869	28470.4579	33.4467	9.5215	18.158
	42.4894	68.4135	14335.3237	14.5052	21.2596	674.3001	29047.2522	33.6710	9.5938	18.296
L6	42.4894	80.1850	16726.0196	14.4724	21.2596	786.7529	33891.4504	39.4646	9.3483	15.176
	45.7354	86.4041	20927.4377	15.5948	22.8837	914.5134	42404.6624	42.5255	10.1886	16.54
L7	44.7888	85.0735	18385.0425	14.7308	21.6470	849.3133	37253.0806	41.8706	9.4788	14.762
	45.5798	89.6991	21549.9528	15.5317	22.8059	944.9306	43666.0468	44.1472	10.0784	15.696
L8	45.5798	95.1222	22811.3209	15.5176	22.8059	1000.2396	46221.9206	46.8163	9.9727	14.633
	45.7047	95.3869	23002.2877	15.5608	22.8683	1005.8574	46608.8711	46.9466	10.0050	14.68
L9	45.7047	108.5444	26060.0008	15.5265	22.8683	1139.5669	52804.6267	53.4222	9.7485	12.542
	45.8128	108.8057	26248.6662	15.5639	22.9224	1145.1088	53186.9140	53.5508	9.7764	12.578
L10	45.8128	94.1339	22820.5366	15.6020	22.9224	995.5552	46240.5941	46.3298	10.0617	15
	47.0243	96.6614	24708.5623	16.0209	23.5286	1050.1515	50066.2461	47.5738	10.3753	15.467
L11	47.0243	100.5538	25672.0184	16.0111	23.5286	1091.0998	52018.4692	49.4895	10.3018	14.754
	50.2858	107.6370	31488.3406	17.1389	25.1605	1251.4991	63803.9151	52.9757	11.1461	15.963
L12	50.2858	107.4487	31434.8632	17.1394	25.1605	1249.3736	63695.5552	52.8830	11.1494	15.996
	50.4722	107.8527	31790.8201	17.2038	25.2538	1258.8552	64416.8205	53.0818	11.1977	16.066
L13	50.4722	102.3496	30214.0042	17.2167	25.2538	1196.4164	61221.7640	50.3733	11.2943	17.088
	52.2866	106.0794	33639.0379	17.8442	26.1616	1285.8183	68161.8107	52.2091	11.7640	17.799
L14	52.2866	106.6194	33805.6531	17.8429	26.1616	1292.1870	68499.4184	52.4748	11.7549	17.694

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
	52.7991	107.6784	34822.9697	18.0202	26.4180	1318.1531	70560.7775	52.9960	11.8875	17.893

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
L1 175.00-145.50				1	1	1		
L2 145.50-95.50				1	1	1		
L3 95.50-83.25				1	1	1		
L4 83.25-65.50				1	1	1		
L5 65.50-64.00				1	1	1		
L6 64.00-46.58				1	1	1		
L7 46.58-43.25				1	1	1		
L8 43.25-42.58				1	1	1		
L9 42.58-42.00				1	1	1		
L10 42.00-35.50				1	1	1		
L11 35.50-18.00				1	1	1		
L12 18.00-17.00				1	1	1		
L13 17.00-2.75				1	1	1		
L14 2.75-0.00				1	1	1		

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight klf
LDF6-50A(1-1/4")	C	No	Inside Pole	174.00 - 0.00	11	No Ice	0.00	0.00
						1/2" Ice	0.00	0.00
						1" Ice	0.00	0.00
LDF7-50A(1-5/8")	C	No	Inside Pole	174.00 - 0.00	2	No Ice	0.00	0.00
						1/2" Ice	0.00	0.00
						1" Ice	0.00	0.00
HB158-1-08U8-S8J18(1-5/8)	C	No	CaAa (Out Of Face)	174.00 - 0.00	1	No Ice	0.20	0.00
						1/2" Ice	0.30	0.00
						1" Ice	0.40	0.00
***								
LDF6-50A(1-1/4")	C	No	Inside Pole	162.00 - 0.00	4	No Ice	0.00	0.00
						1/2" Ice	0.00	0.00
						1" Ice	0.00	0.00
2" Conduit	C	No	Inside Pole	162.00 - 0.00	1	No Ice	0.00	0.00
						1/2" Ice	0.00	0.00
						1" Ice	0.00	0.00
FB-L98B-002-75000(3/8")	C	No	Inside Pole	162.00 - 0.00	1	No Ice	0.00	0.00
						1/2" Ice	0.00	0.00
						1" Ice	0.00	0.00
WR-VG86ST-BRD(3/4")	C	No	Inside Pole	162.00 - 0.00	2	No Ice	0.00	0.00
						1/2" Ice	0.00	0.00
						1" Ice	0.00	0.00
LDF7-50A(1-5/8")	C	No	CaAa (Out Of Face)	162.00 - 0.00	2	No Ice	0.00	0.00
						1/2" Ice	0.00	0.00
						1" Ice	0.00	0.00

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight klf
LDF7-50A(1-5/8")	C	No	CaAa (Out Of Face)	162.00 - 0.00	2	No Ice	0.20	0.00
						1/2" Ice	0.30	0.00
						1" Ice	0.40	0.00
***								
LDF7-50A(1-5/8")	C	No	Inside Pole	144.00 - 0.00	6	No Ice	0.00	0.00
						1/2" Ice	0.00	0.00
						1" Ice	0.00	0.00
LDF7-50A(1-5/8")	C	No	CaAa (Out Of Face)	144.00 - 0.00	6	No Ice	0.00	0.00
						1/2" Ice	0.00	0.00
						1" Ice	0.00	0.00
MLE Hybrid 9Power/18Fiber RL 2(1 5/8)	C	No	CaAa (Out Of Face)	144.00 - 0.00	1	No Ice	0.00	0.00
						1/2" Ice	0.00	0.00
						1" Ice	0.00	0.00
***								
LDF6-50A(1-1/4")	C	No	CaAa (Out Of Face)	129.00 - 0.00	1	No Ice	0.00	0.00
						1/2" Ice	0.00	0.00
						1" Ice	0.00	0.00
***								
Aero MP3-05	C	No	CaAa (Out Of Face)	45.50 - 0.00	1	No Ice	0.35	0.00
						1/2" Ice	0.40	0.00
						1" Ice	0.66	0.00
Aero MP3-04	C	No	CaAa (Out Of Face)	65.50 - 45.50	1	No Ice	0.27	0.00
						1/2" Ice	0.38	0.00
						1" Ice	0.49	0.00
***								
1" Flat Reinforcement	C	No	CaAa (Out Of Face)	85.50 - 65.50	1	No Ice	0.17	0.00
						1/2" Ice	0.28	0.00
						1" Ice	0.39	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
L1	175.00-145.50	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	12.177	0.44
L2	145.50-95.50	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	29.700	1.51
L3	95.50-83.25	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	7.652	0.38
L4	83.25-65.50	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	13.502	0.54
L5	65.50-64.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	1.295	0.05
L6	64.00-46.58	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	15.034	0.53
L7	46.58-43.25	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	3.051	0.10
L8	43.25-42.58	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.631	0.02
L9	42.58-42.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.546	0.02
L10	42.00-35.50	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	6.122	0.20
L11	35.50-18.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	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	0.000	0.000	0.000	16.481	0.54
L12	18.00-17.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.942	0.03
L13	17.00-2.75	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	13.421	0.44
L14	2.75-0.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	2.590	0.08

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	175.00-145.50	A	0.750	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	21.402	0.68
L2	145.50-95.50	A	0.750	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	52.200	3.08
L3	95.50-83.25	A	0.750	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	13.539	0.78
L4	83.25-65.50	A	0.750	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	24.448	1.13
L5	65.50-64.00	A	0.750	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	2.220	0.10
L6	64.00-46.58	A	0.750	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	25.776	1.11
L7	46.58-43.25	A	0.750	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	5.136	0.21
L8	43.25-42.58	A	0.750	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	1.053	0.04
L9	42.58-42.00	A	0.750	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.912	0.04
L10	42.00-35.50	A	0.750	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	10.220	0.41
L11	35.50-18.00	A	0.750	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	27.516	1.11
L12	18.00-17.00	A	0.750	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	1.572	0.06
L13	17.00-2.75	A	0.750	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	22.406	0.90
L14	2.75-0.00	A	0.750	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	4.324	0.17

Feed Line Center of Pressure

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
L1	175.00-145.50	-0.4590	0.2650	-0.6856	0.3958
L2	145.50-95.50	-0.6292	0.3633	-0.9383	0.5417
L3	95.50-83.25	-0.6739	0.3891	-1.0235	0.5909
L4	83.25-65.50	-0.8014	0.4627	-1.2253	0.7074
L5	65.50-64.00	-0.8946	0.5165	-1.3070	0.7546
L6	64.00-46.58	-0.9019	0.5207	-1.3239	0.7643
L7	46.58-43.25	-0.9509	0.5490	-1.3739	0.7932
L8	43.25-42.58	-0.9738	0.5622	-1.3971	0.8066
L9	42.58-42.00	-0.9743	0.5625	-1.3982	0.8072
L10	42.00-35.50	-0.9771	0.5641	-1.4045	0.8109
L11	35.50-18.00	-0.9863	0.5694	-1.4250	0.8227
L12	18.00-17.00	-0.9928	0.5732	-1.4398	0.8313
L13	17.00-2.75	-0.9965	0.5753	-1.4482	0.8361
L14	2.75-0.00	-1.0006	0.5777	-1.4576	0.8415

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert	Azimuth Adjustment	Placement		C_AA_A Front	C_AA_A Side	Weight
			ft ft ft	°	ft		ft^2	ft^2	K
(2) ADA-85408580CF w/ Mount Pipe	A	From Leg	4.00 0.00 1.00	0.000	174.00	No Ice 1/2" Ice 1" Ice	5.40 5.84 6.30	3.42 4.02 4.64	0.03 0.07 0.12
BXA-80080/4CF w/ Mount Pipe	B	From Leg	4.00 0.00 1.00	0.000	174.00	No Ice 1/2" Ice 1" Ice	5.49 5.94 6.40	4.03 4.65 5.30	0.03 0.08 0.13
BXA-80080/4CF w/ Mount Pipe	C	From Leg	4.00 0.00 1.00	0.000	174.00	No Ice 1/2" Ice 1" Ice	5.49 5.94 6.40	4.03 4.65 5.30	0.03 0.08 0.13
932DG90T2E-M w/ Mount Pipe	B	From Leg	4.00 0.00 1.00	0.000	174.00	No Ice 1/2" Ice 1" Ice	3.77 4.19 4.65	3.33 4.01 4.66	0.03 0.06 0.10
932DG90T2E-M w/ Mount Pipe	C	From Leg	4.00 0.00 1.00	0.000	174.00	No Ice 1/2" Ice 1" Ice	3.77 4.19 4.65	3.33 4.01 4.66	0.03 0.06 0.10
P65.16.XL.2 w/ Mount Pipe	A	From Leg	4.00 0.00 1.00	0.000	174.00	No Ice 1/2" Ice 1" Ice	8.64 9.29 9.91	5.78 6.95 7.83	0.06 0.12 0.19
P65.16.XL.2 w/ Mount Pipe	B	From Leg	4.00 0.00 1.00	0.000	174.00	No Ice 1/2" Ice 1" Ice	8.64 9.29 9.91	5.78 6.95 7.83	0.06 0.12 0.19
P65.16.XL.2 w/ Mount Pipe	C	From Leg	4.00 0.00 1.00	0.000	174.00	No Ice 1/2" Ice 1" Ice	8.64 9.29 9.91	5.78 6.95 7.83	0.06 0.12 0.19
(2) FD9R6004/2C-3L	A	From Leg	4.00 0.00 1.00	0.000	174.00	No Ice 1/2" Ice 1" Ice	0.37 0.45 0.54	0.08 0.14 0.20	0.00 0.01 0.01
(2) FD9R6004/2C-3L	B	From Leg	4.00 0.00 1.00	0.000	174.00	No Ice 1/2" Ice 1" Ice	0.37 0.45 0.54	0.08 0.14 0.20	0.00 0.01 0.01
(2) FD9R6004/2C-3L	C	From Leg	4.00	0.000	174.00	No Ice	0.37	0.08	0.00

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00			1/2"	0.45	0.14	0.01
			1.00			Ice	0.54	0.20	0.01
						1" Ice			
BXA-171063-12BF-EDIN-X w/ Mount Pipe	A	From Leg	4.00	0.000	174.00	No Ice	5.04	5.30	0.04
			0.00			1/2"	5.59	6.47	0.08
			1.00			Ice	6.11	7.36	0.14
						1" Ice			
BXA-171063-12BF-EDIN-X w/ Mount Pipe	B	From Leg	4.00	0.000	174.00	No Ice	5.04	5.30	0.04
			0.00			1/2"	5.59	6.47	0.08
			1.00			Ice	6.11	7.36	0.14
						1" Ice			
BXA-171063-12BF-EDIN-X w/ Mount Pipe	C	From Leg	4.00	0.000	174.00	No Ice	5.04	5.30	0.04
			0.00			1/2"	5.59	6.47	0.08
			1.00			Ice	6.11	7.36	0.14
						1" Ice			
RRH2X40-AWS	A	From Leg	4.00	0.000	174.00	No Ice	2.52	1.59	0.04
			0.00			1/2"	2.75	1.80	0.06
			2.00			Ice	2.99	2.01	0.08
						1" Ice			
RRH2X40-AWS	B	From Leg	4.00	0.000	174.00	No Ice	2.52	1.59	0.04
			0.00			1/2"	2.75	1.80	0.06
			2.00			Ice	2.99	2.01	0.08
						1" Ice			
RRH2X40-AWS	C	From Leg	4.00	0.000	174.00	No Ice	2.52	1.59	0.04
			0.00			1/2"	2.75	1.80	0.06
			2.00			Ice	2.99	2.01	0.08
						1" Ice			
DB-T1-6Z-8AB-0Z	C	From Leg	4.00	0.000	174.00	No Ice	5.60	2.33	0.04
			0.00			1/2"	5.92	2.56	0.08
			1.00			Ice	6.24	2.79	0.12
						1" Ice			
Platform Mount [LP 602-1]	C	None		0.000	174.00	No Ice	32.03	32.03	1.34
						1/2"	38.71	38.71	1.80
						Ice	45.39	45.39	2.26
						1" Ice			
***									
P65-16-XLH-RR w/ Mount Pipe	A	From Leg	4.00	0.000	162.00	No Ice	8.64	6.36	0.08
			0.00			1/2"	9.29	7.54	0.14
			0.00			Ice	9.91	8.43	0.22
						1" Ice			
P65-16-XLH-RR w/ Mount Pipe	B	From Leg	4.00	0.000	162.00	No Ice	8.64	6.36	0.08
			0.00			1/2"	9.29	7.54	0.14
			0.00			Ice	9.91	8.43	0.22
						1" Ice			
P65-16-XLH-RR w/ Mount Pipe	C	From Leg	4.00	0.000	162.00	No Ice	8.64	6.36	0.08
			0.00			1/2"	9.29	7.54	0.14
			0.00			Ice	9.91	8.43	0.22
						1" Ice			
(2) 800 10121 w/ Mount Pipe	A	From Leg	4.00	0.000	162.00	No Ice	6.03	4.95	0.07
			0.00			1/2"	6.71	6.02	0.12
			0.00			Ice	7.30	6.81	0.18
						1" Ice			
(2) 7770.00 w/ Mount Pipe	B	From Leg	4.00	0.000	162.00	No Ice	6.12	4.25	0.06
			0.00			1/2"	6.63	5.01	0.10
			0.00			Ice	7.13	5.71	0.16
						1" Ice			
(2) RRUS-11	A	From Leg	4.00	0.000	162.00	No Ice	3.25	1.37	0.05
			0.00			1/2"	3.49	1.55	0.07
			0.00			Ice	3.74	1.74	0.09
						1" Ice			
(2) RRUS-11	B	From Leg	4.00	0.000	162.00	No Ice	3.25	1.37	0.05
			0.00			1/2"	3.49	1.55	0.07
			0.00			Ice	3.74	1.74	0.09
						1" Ice			
(2) RRUS-11	C	From Leg	4.00	0.000	162.00	No Ice	3.25	1.37	0.05

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00 0.00			1/2" Ice 1" Ice	3.49 3.74	1.55 1.74	0.07 0.09
(4) LGP2140X	A	From Leg	4.00 0.00 0.00	0.000	162.00	No Ice 1/2" Ice 1" Ice	1.26 1.42 1.58	0.38 0.49 0.62	0.01 0.02 0.03
(4) LGP2140X	B	From Leg	4.00 0.00 0.00	0.000	162.00	No Ice 1/2" Ice 1" Ice	1.26 1.42 1.58	0.38 0.49 0.62	0.01 0.02 0.03
DC6-48-60-18-8F	C	From Leg	4.00 0.00 0.00	0.000	162.00	No Ice 1/2" Ice 1" Ice	1.27 1.46 1.66	1.27 1.46 1.66	0.02 0.03 0.05
2.375" OD x 5' Mount Pipe	A	From Leg	4.00 0.00 0.00	0.000	162.00	No Ice 1/2" Ice 1" Ice	1.19 1.50 1.81	1.19 1.50 1.81	0.02 0.03 0.04
2.375" OD x 5' Mount Pipe	B	From Leg	4.00 0.00 0.00	0.000	162.00	No Ice 1/2" Ice 1" Ice	1.19 1.50 1.81	1.19 1.50 1.81	0.02 0.03 0.04
(3) 2.375" OD x 5' Mount Pipe	C	From Leg	4.00 0.00 0.00	0.000	162.00	No Ice 1/2" Ice 1" Ice	1.19 1.50 1.81	1.19 1.50 1.81	0.02 0.03 0.04
Platform Mount [LP 303-1]	C	None		0.000	162.00	No Ice 1/2" Ice 1" Ice	14.66 18.87 23.08	14.66 18.87 23.08	1.25 1.48 1.71
***									
***									
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	A	From Leg	4.00 0.00 1.00	0.000	144.00	No Ice 1/2" Ice 1" Ice	6.83 7.35 7.86	5.64 6.48 7.26	0.11 0.17 0.23
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	B	From Leg	4.00 0.00 1.00	0.000	144.00	No Ice 1/2" Ice 1" Ice	6.83 7.35 7.86	5.64 6.48 7.26	0.11 0.17 0.23
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	C	From Leg	4.00 0.00 1.00	0.000	144.00	No Ice 1/2" Ice 1" Ice	6.83 7.35 7.86	5.64 6.48 7.26	0.11 0.17 0.23
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	A	From Leg	4.00 0.00 1.00	0.000	144.00	No Ice 1/2" Ice 1" Ice	6.82 7.34 7.85	5.63 6.47 7.25	0.11 0.17 0.23
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	B	From Leg	4.00 0.00 1.00	0.000	144.00	No Ice 1/2" Ice 1" Ice	6.82 7.34 7.85	5.63 6.47 7.25	0.11 0.17 0.23
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	C	From Leg	4.00 0.00 1.00	0.000	144.00	No Ice 1/2" Ice 1" Ice	6.82 7.34 7.85	5.63 6.47 7.25	0.11 0.17 0.23
KRY 112 144/1	A	From Leg	4.00 0.00 1.00	0.000	144.00	No Ice 1/2" Ice 1" Ice	0.41 0.50 0.59	0.20 0.27 0.35	0.01 0.01 0.02
KRY 112 144/1	B	From Leg	4.00 0.00 1.00	0.000	144.00	No Ice 1/2" Ice 1" Ice	0.41 0.50 0.59	0.20 0.27 0.35	0.01 0.01 0.02

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
KRY 112 144/1	C	From Leg	4.00 0.00 1.00	0.000	144.00	No Ice 1/2" Ice 1" Ice	0.41 0.50 0.59	0.20 0.27 0.35	0.01 0.01 0.02
RMV12-3xx Mount	C	None		0.000	144.00	No Ice 1/2" Ice 1" Ice	11.59 15.44 19.29	11.59 15.44 19.29	0.77 0.99 1.21
***									
BCR-87010:90	A	From Leg	3.00 0.00 5.50	0.000	129.00	No Ice 1/2" Ice 1" Ice	4.79 5.95 6.67	4.79 5.95 6.67	0.04 0.07 0.11
Side Arm Mount [SO 701-1]	A	None		0.000	129.00	No Ice 1/2" Ice 1" Ice	0.85 1.14 1.43	1.67 2.34 3.01	0.07 0.08 0.09

Tower Pressures - No Ice

G_H = 1.690

Section Elevation ft	z ft	K_Z	q_z ksf	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg % 	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
L1 175.00-145.50	159.72	1.569	0.03	60.917	A	0.000	60.917	60.917	100.00	0.000	0.000
					B	0.000	60.917		100.00	0.000	0.000
					C	0.000	60.917		100.00	0.000	12.177
L2 145.50-95.50	119.68	1.445	0.03	131.238	A	0.000	131.238	131.238	100.00	0.000	0.000
					B	0.000	131.238		100.00	0.000	0.000
					C	0.000	131.238		100.00	0.000	29.700
L3 95.50-83.25	89.31	1.329	0.02	37.234	A	0.000	37.234	37.234	100.00	0.000	0.000
					B	0.000	37.234		100.00	0.000	0.000
					C	0.000	37.234		100.00	0.000	7.652
L4 83.25-65.50	74.25	1.261	0.02	57.945	A	0.000	57.945	57.945	100.00	0.000	0.000
					B	0.000	57.945		100.00	0.000	0.000
					C	0.000	57.945		100.00	0.000	13.502
L5 65.50-64.00	64.75	1.212	0.02	5.113	A	0.000	5.113	5.113	100.00	0.000	0.000
					B	0.000	5.113		100.00	0.000	0.000
					C	0.000	5.113		100.00	0.000	1.295
L6 64.00-46.58	55.18	1.158	0.02	61.855	A	0.000	61.855	61.855	100.00	0.000	0.000
					B	0.000	61.855		100.00	0.000	0.000
					C	0.000	61.855		100.00	0.000	15.034
L7 46.58-43.25	44.91	1.092	0.02	12.111	A	0.000	12.111	12.111	100.00	0.000	0.000
					B	0.000	12.111		100.00	0.000	0.000
					C	0.000	12.111		100.00	0.000	3.051
L8 43.25-42.58	42.91	1.078	0.02	2.462	A	0.000	2.462	2.462	100.00	0.000	0.000
					B	0.000	2.462		100.00	0.000	0.000
					C	0.000	2.462		100.00	0.000	0.631
L9 42.58-42.00	42.29	1.073	0.02	2.136	A	0.000	2.136	2.136	100.00	0.000	0.000
					B	0.000	2.136		100.00	0.000	0.000
					C	0.000	2.136		100.00	0.000	0.546
L10 42.00-35.50	38.74	1.047	0.02	24.287	A	0.000	24.287	24.287	100.00	0.000	0.000
					B	0.000	24.287		100.00	0.000	0.000
					C	0.000	24.287		100.00	0.000	6.122
L11 35.50-18.00	26.65	1	0.02	68.538	A	0.000	68.538	68.538	100.00	0.000	0.000
					B	0.000	68.538		100.00	0.000	0.000
					C	0.000	68.538		100.00	0.000	16.481

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
L12 18.00-17.00	17.50	1	0.02	4.055	A	0.000	4.055	4.055	100.00	0.000	0.000
					B	0.000	4.055		100.00	0.000	0.000
					C	0.000	4.055		100.00	0.000	0.942
L13 17.00-2.75	9.83	1	0.02	58.934	A	0.000	58.934	58.934	100.00	0.000	0.000
					B	0.000	58.934		100.00	0.000	0.000
					C	0.000	58.934		100.00	0.000	13.421
L14 2.75-0.00	1.37	1	0.02	11.631	A	0.000	11.631	11.631	100.00	0.000	0.000
					B	0.000	11.631		100.00	0.000	0.000
					C	0.000	11.631		100.00	0.000	2.590

Tower Pressure - With Ice

G_H = 1.690

Section Elevation ft	z ft	K_Z	q_z ksf	t_Z in	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg %	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
L1 175.00-145.50	159.72	1.569	0.01	0.7500	64.605	A	0.000	64.605	64.605	100.00	0.000	0.000
						B	0.000	64.605		100.00	0.000	0.000
						C	0.000	64.605		100.00	0.000	21.402
L2 145.50-95.50	119.68	1.445	0.01	0.7500	137.488	A	0.000	137.488	137.488	100.00	0.000	0.000
						B	0.000	137.488		100.00	0.000	0.000
						C	0.000	137.488		100.00	0.000	52.200
L3 95.50-83.25	89.31	1.329	0.00	0.7500	38.766	A	0.000	38.766	38.766	100.00	0.000	0.000
						B	0.000	38.766		100.00	0.000	0.000
						C	0.000	38.766		100.00	0.000	13.539
L4 83.25-65.50	74.25	1.261	0.00	0.7500	60.164	A	0.000	60.164	60.164	100.00	0.000	0.000
						B	0.000	60.164		100.00	0.000	0.000
						C	0.000	60.164		100.00	0.000	24.448
L5 65.50-64.00	64.75	1.212	0.00	0.7500	5.301	A	0.000	5.301	5.301	100.00	0.000	0.000
						B	0.000	5.301		100.00	0.000	0.000
						C	0.000	5.301		100.00	0.000	2.220
L6 64.00-46.58	55.18	1.158	0.00	0.7500	64.032	A	0.000	64.032	64.032	100.00	0.000	0.000
						B	0.000	64.032		100.00	0.000	0.000
						C	0.000	64.032		100.00	0.000	25.776
L7 46.58-43.25	44.91	1.092	0.00	0.7500	12.528	A	0.000	12.528	12.528	100.00	0.000	0.000
						B	0.000	12.528		100.00	0.000	0.000
						C	0.000	12.528		100.00	0.000	5.136
L8 43.25-42.58	42.91	1.078	0.00	0.7500	2.545	A	0.000	2.545	2.545	100.00	0.000	0.000
						B	0.000	2.545		100.00	0.000	0.000
						C	0.000	2.545		100.00	0.000	1.053
L9 42.58-42.00	42.29	1.073	0.00	0.7500	2.209	A	0.000	2.209	2.209	100.00	0.000	0.000
						B	0.000	2.209		100.00	0.000	0.000
						C	0.000	2.209		100.00	0.000	0.912
L10 42.00-35.50	38.74	1.047	0.00	0.7500	25.099	A	0.000	25.099	25.099	100.00	0.000	0.000
						B	0.000	25.099		100.00	0.000	0.000
						C	0.000	25.099		100.00	0.000	10.220
L11 35.50-18.00	26.65	1	0.00	0.7500	70.725	A	0.000	70.725	70.725	100.00	0.000	0.000
						B	0.000	70.725		100.00	0.000	0.000
						C	0.000	70.725		100.00	0.000	27.516
L12 18.00-17.00	17.50	1	0.00	0.7500	4.180	A	0.000	4.180	4.180	100.00	0.000	0.000
						B	0.000	4.180		100.00	0.000	0.000
						C	0.000	4.180		100.00	0.000	1.572
L13 17.00-2.75	9.83	1	0.00	0.7500	60.715	A	0.000	60.715	60.715	100.00	0.000	0.000
						B	0.000	60.715		100.00	0.000	0.000
						C	0.000	60.715		100.00	0.000	22.406
L14 2.75-0.00	1.37	1	0.00	0.7500	11.975	A	0.000	11.975	11.975	100.00	0.000	0.000
						B	0.000	11.975		100.00	0.000	0.000
						C	0.000	11.975		100.00	0.000	4.324

Tower Pressure - Service

G_H = 1.690

Section Elevation ft	z ft	K_Z	q_z ksf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1 175.00-145.50	159.72	1.569	0.01	60.917	A	0.000	60.917	60.917	100.00	0.000	0.000
					B	0.000	60.917		100.00	0.000	0.000
					C	0.000	60.917		100.00	0.000	12.177
L2 145.50-95.50	119.68	1.445	0.01	131.238	A	0.000	131.238	131.238	100.00	0.000	0.000
					B	0.000	131.238		100.00	0.000	0.000
					C	0.000	131.238		100.00	0.000	29.700
L3 95.50-83.25	89.31	1.329	0.01	37.234	A	0.000	37.234	37.234	100.00	0.000	0.000
					B	0.000	37.234		100.00	0.000	0.000
					C	0.000	37.234		100.00	0.000	7.652
L4 83.25-65.50	74.25	1.261	0.01	57.945	A	0.000	57.945	57.945	100.00	0.000	0.000
					B	0.000	57.945		100.00	0.000	0.000
					C	0.000	57.945		100.00	0.000	13.502
L5 65.50-64.00	64.75	1.212	0.01	5.113	A	0.000	5.113	5.113	100.00	0.000	0.000
					B	0.000	5.113		100.00	0.000	0.000
					C	0.000	5.113		100.00	0.000	1.295
L6 64.00-46.58	55.18	1.158	0.01	61.855	A	0.000	61.855	61.855	100.00	0.000	0.000
					B	0.000	61.855		100.00	0.000	0.000
					C	0.000	61.855		100.00	0.000	15.034
L7 46.58-43.25	44.91	1.092	0.01	12.111	A	0.000	12.111	12.111	100.00	0.000	0.000
					B	0.000	12.111		100.00	0.000	0.000
					C	0.000	12.111		100.00	0.000	3.051
L8 43.25-42.58	42.91	1.078	0.01	2.462	A	0.000	2.462	2.462	100.00	0.000	0.000
					B	0.000	2.462		100.00	0.000	0.000
					C	0.000	2.462		100.00	0.000	0.631
L9 42.58-42.00	42.29	1.073	0.01	2.136	A	0.000	2.136	2.136	100.00	0.000	0.000
					B	0.000	2.136		100.00	0.000	0.000
					C	0.000	2.136		100.00	0.000	0.546
L10 42.00-35.50	38.74	1.047	0.01	24.287	A	0.000	24.287	24.287	100.00	0.000	0.000
					B	0.000	24.287		100.00	0.000	0.000
					C	0.000	24.287		100.00	0.000	6.122
L11 35.50-18.00	26.65	1	0.01	68.538	A	0.000	68.538	68.538	100.00	0.000	0.000
					B	0.000	68.538		100.00	0.000	0.000
					C	0.000	68.538		100.00	0.000	16.481
L12 18.00-17.00	17.50	1	0.01	4.055	A	0.000	4.055	4.055	100.00	0.000	0.000
					B	0.000	4.055		100.00	0.000	0.000
					C	0.000	4.055		100.00	0.000	0.942
L13 17.00-2.75	9.83	1	0.01	58.934	A	0.000	58.934	58.934	100.00	0.000	0.000
					B	0.000	58.934		100.00	0.000	0.000
					C	0.000	58.934		100.00	0.000	13.421
L14 2.75-0.00	1.37	1	0.01	11.631	A	0.000	11.631	11.631	100.00	0.000	0.000
					B	0.000	11.631		100.00	0.000	0.000
					C	0.000	11.631		100.00	0.000	2.590

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

Comb. No.	Description
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
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
L1	175 - 145.5	Pole	Max Tension	30	0.00	0.00	-0.00
			Max. Compression	14	-9.97	-0.40	0.48
			Max. Mx	5	-4.68	-228.98	0.07
			Max. My	2	-4.66	-0.01	230.80
			Max. Vy	11	-13.16	228.60	0.28
			Max. Vx	2	-13.29	-0.01	230.80
			Max. Torque	7			1.06
L2	145.5 - 95.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-22.16	1.87	-0.43
			Max. Mx	11	-12.87	1171.71	4.36
			Max. My	2	-12.85	4.76	1179.43
			Max. Vy	11	-23.34	1171.71	4.36
			Max. Vx	8	23.47	-3.93	-1179.32
			Max. Torque	12			-1.62
L3	95.5 - 83.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-27.15	2.87	-1.01
			Max. Mx	11	-16.89	1611.41	5.77
			Max. My	8	-16.87	-5.22	-1621.18
			Max. Vy	11	-26.13	1611.41	5.77
			Max. Vx	8	26.25	-5.22	-1621.18
			Max. Torque	11			-1.36
L4	83.25 - 65.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-32.89	3.97	-1.65
			Max. Mx	11	-21.61	2100.18	7.15
			Max. My	8	-21.60	-6.47	-2112.09
			Max. Vy	11	-28.96	2100.18	7.15
			Max. Vx	8	29.08	-6.47	-2112.09
			Max. Torque	11			-1.29
L5	65.5 - 64	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-33.39	4.06	-1.70
			Max. Mx	11	-22.02	2143.80	7.26
			Max. My	8	-22.01	-6.58	-2155.90
			Max. Vy	11	-29.20	2143.80	7.26
			Max. Vx	8	29.33	-6.58	-2155.90
			Max. Torque	11			-1.18
L6	64 - 46.58	Pole	Max Tension	1	0.00	0.00	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. Compression	14	-37.61	4.79	-2.13
			Max. Mx	11	-25.59	2474.47	8.10
			Max. My	8	-25.58	-7.33	-2487.88
			Max. Vy	11	-30.92	2474.47	8.10
			Max. Vx	8	31.05	-7.33	-2487.88
			Max. Torque	11			-1.17
L7	46.58 - 43.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-43.40	5.44	-2.50
			Max. Mx	11	-30.74	2784.22	8.85
			Max. My	8	-30.73	-8.00	-2798.80
			Max. Vy	11	-32.55	2784.22	8.85
			Max. Vx	8	32.68	-8.00	-2798.80
			Max. Torque	11			-1.05
L8	43.25 - 42.58	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-43.68	5.48	-2.53
			Max. Mx	11	-30.99	2806.06	8.90
			Max. My	8	-30.98	-8.05	-2820.72
			Max. Vy	11	-32.65	2806.06	8.90
			Max. Vx	8	32.77	-8.05	-2820.72
			Max. Torque	11			-1.02
L9	42.58 - 42	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-43.96	5.52	-2.56
			Max. Mx	11	-31.23	2825.03	8.94
			Max. My	8	-31.22	-8.09	-2839.76
			Max. Vy	11	-32.74	2825.03	8.94
			Max. Vx	8	32.86	-8.09	-2839.76
			Max. Torque	11			-1.02
L10	42 - 35.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-46.76	5.97	-2.82
			Max. Mx	11	-33.64	3040.91	9.43
			Max. My	8	-33.64	-8.53	-3056.41
			Max. Vy	11	-33.68	3040.91	9.43
			Max. Vx	8	33.81	-8.53	-3056.41
			Max. Torque	11			-1.01
L11	35.5 - 18	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-54.85	7.25	-3.56
			Max. Mx	11	-40.69	3651.77	10.73
			Max. My	8	-40.68	-9.69	-3669.34
			Max. Vy	11	-36.13	3651.77	10.73
			Max. Vx	8	36.26	-9.69	-3669.34
			Max. Torque	4			1.00
L12	18 - 17	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-55.33	7.32	-3.61
			Max. Mx	11	-41.10	3687.98	10.81
			Max. My	8	-41.10	-9.75	-3705.67
			Max. Vy	11	-36.27	3687.98	10.81
			Max. Vx	8	36.40	-9.75	-3705.67
			Max. Torque	4			0.99
L13	17 - 2.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-61.96	8.42	-4.24
			Max. Mx	11	-46.91	4218.99	11.84
			Max. My	8	-46.90	-10.67	-4238.33
			Max. Vy	11	-38.24	4218.99	11.84
			Max. Vx	8	38.36	-10.67	-4238.33
			Max. Torque	3			1.01
L14	2.75 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-63.27	8.64	-4.37
			Max. Mx	11	-48.05	4324.68	12.04
			Max. My	8	-48.05	-10.84	-4344.33
			Max. Vy	11	-38.62	4324.68	12.04
			Max. Vx	8	38.74	-10.84	-4344.33
			Max. Torque	3			1.03

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	14	63.27	-0.00	0.00
	Max. H_x	11	48.07	38.60	0.08
	Max. H_z	2	48.07	0.08	38.72
	Max. M_x	2	4342.39	0.08	38.72
	Max. M_z	5	4320.34	-38.60	-0.08
	Max. Torsion	3	1.03	-19.23	33.50
	Min. Vert	8	48.07	-0.08	-38.72
	Min. H_x	5	48.07	-38.60	-0.08
	Min. H_z	8	48.07	-0.08	-38.72
	Min. M_x	8	-4344.33	-0.08	-38.72
	Min. M_z	11	-4324.68	38.60	0.08
	Min. Torsion	9	-1.03	19.23	-33.50

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	48.07	-0.00	0.00	0.95	2.12	0.00
Dead+Wind 0 deg - No Ice	48.07	-0.08	-38.72	-4342.39	15.20	-0.79
Dead+Wind 30 deg - No Ice	48.07	19.23	-33.50	-3754.50	-2148.06	-1.03
Dead+Wind 60 deg - No Ice	48.07	33.39	-19.29	-2159.75	-3735.20	-0.99
Dead+Wind 90 deg - No Ice	48.07	38.60	0.08	14.00	-4320.34	-0.69
Dead+Wind 120 deg - No Ice	48.07	33.47	19.44	2184.22	-3748.14	-0.20
Dead+Wind 150 deg - No Ice	48.07	19.37	33.58	3769.39	-2170.56	0.34
Dead+Wind 180 deg - No Ice	48.07	0.08	38.72	4344.33	-10.84	0.79
Dead+Wind 210 deg - No Ice	48.07	-19.23	33.50	3756.44	2152.40	1.03
Dead+Wind 240 deg - No Ice	48.07	-33.39	19.29	2161.70	3739.53	0.99
Dead+Wind 270 deg - No Ice	48.07	-38.60	-0.08	-12.04	4324.68	0.69
Dead+Wind 300 deg - No Ice	48.07	-33.47	-19.44	-2182.26	3752.49	0.20
Dead+Wind 330 deg - No Ice	48.07	-19.37	-33.58	-3767.44	2174.92	-0.34
Dead+Ice+Temp	63.27	0.00	-0.00	4.37	8.64	-0.00
Dead+Wind 0 deg+Ice+Temp	63.27	-0.01	-9.01	-1036.40	11.19	-0.32
Dead+Wind 30 deg+Ice+Temp	63.27	4.49	-7.80	-895.89	-507.84	-0.34
Dead+Wind 60 deg+Ice+Temp	63.27	7.78	-4.50	-514.08	-888.37	-0.27
Dead+Wind 90 deg+Ice+Temp	63.27	8.99	0.01	6.69	-1028.42	-0.13
Dead+Wind 120 deg+Ice+Temp	63.27	7.80	4.52	526.88	-890.53	0.05
Dead+Wind 150 deg+Ice+Temp	63.27	4.51	7.81	907.10	-511.58	0.22
Dead+Wind 180 deg+Ice+Temp	63.27	0.01	9.01	1045.44	6.86	0.32
Dead+Wind 210 deg+Ice+Temp	63.27	-4.49	7.80	904.93	525.89	0.34
Dead+Wind 240 deg+Ice+Temp	63.27	-7.78	4.50	523.13	906.42	0.27
Dead+Wind 270 deg+Ice+Temp	63.27	-8.99	-0.01	2.36	1046.47	0.13
Dead+Wind 300 deg+Ice+Temp	63.27	-7.80	-4.52	-517.83	908.59	-0.05
Dead+Wind 330 deg+Ice+Temp	63.27	-4.51	-7.81	-898.05	529.64	-0.22
Dead+Wind 0 deg - Service	48.07	-0.03	-13.40	-1504.12	6.69	-0.27
Dead+Wind 30 deg - Service	48.07	6.65	-11.59	-1300.32	-742.89	-0.36
Dead+Wind 60 deg - Service	48.07	11.55	-6.67	-747.72	-1292.82	-0.35
Dead+Wind 90 deg - Service	48.07	13.36	0.03	5.48	-1495.66	-0.24
Dead+Wind 120 deg - Service	48.07	11.58	6.72	757.48	-1297.33	-0.08

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 150 deg - Service	48.07	6.70	11.62	1306.77	-750.70	0.11
Dead+Wind 180 deg - Service	48.07	0.03	13.40	1506.06	-2.33	0.27
Dead+Wind 210 deg - Service	48.07	-6.65	11.59	1302.26	747.24	0.36
Dead+Wind 240 deg - Service	48.07	-11.55	6.67	749.67	1297.18	0.35
Dead+Wind 270 deg - Service	48.07	-13.36	-0.03	-3.54	1500.01	0.25
Dead+Wind 300 deg - Service	48.07	-11.58	-6.72	-755.54	1301.69	0.08
Dead+Wind 330 deg - Service	48.07	-6.70	-11.62	-1304.83	755.06	-0.11

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	-48.07	0.00	0.00	48.07	-0.00	0.000%
2	-0.08	-48.07	-38.73	0.08	48.07	38.72	0.006%
3	19.23	-48.07	-33.50	-19.23	48.07	33.50	0.000%
4	33.39	-48.07	-19.29	-33.39	48.07	19.29	0.000%
5	38.60	-48.07	0.08	-38.60	48.07	-0.08	0.006%
6	33.47	-48.07	19.44	-33.47	48.07	-19.44	0.000%
7	19.37	-48.07	33.58	-19.37	48.07	-33.58	0.000%
8	0.08	-48.07	38.73	-0.08	48.07	-38.72	0.006%
9	-19.23	-48.07	33.50	19.23	48.07	-33.50	0.000%
10	-33.39	-48.07	19.29	33.39	48.07	-19.29	0.000%
11	-38.60	-48.07	-0.08	38.60	48.07	0.08	0.006%
12	-33.47	-48.07	-19.44	33.47	48.07	19.44	0.000%
13	-19.37	-48.07	-33.58	19.37	48.07	33.58	0.000%
14	0.00	-63.27	0.00	-0.00	63.27	0.00	0.003%
15	-0.01	-63.27	-9.01	0.01	63.27	9.01	0.000%
16	4.49	-63.27	-7.80	-4.49	63.27	7.80	0.000%
17	7.78	-63.27	-4.50	-7.78	63.27	4.50	0.000%
18	8.99	-63.27	0.01	-8.99	63.27	-0.01	0.000%
19	7.80	-63.27	4.52	-7.80	63.27	-4.52	0.000%
20	4.51	-63.27	7.81	-4.51	63.27	-7.81	0.000%
21	0.01	-63.27	9.01	-0.01	63.27	-9.01	0.000%
22	-4.49	-63.27	7.80	4.49	63.27	-7.80	0.000%
23	-7.78	-63.27	4.50	7.78	63.27	-4.50	0.000%
24	-8.99	-63.27	-0.01	8.99	63.27	0.01	0.000%
25	-7.80	-63.27	-4.52	7.80	63.27	4.52	0.000%
26	-4.51	-63.27	-7.81	4.51	63.27	7.81	0.000%
27	-0.03	-48.07	-13.40	0.03	48.07	13.40	0.003%
28	6.65	-48.07	-11.59	-6.65	48.07	11.59	0.001%
29	11.55	-48.07	-6.68	-11.55	48.07	6.67	0.001%
30	13.36	-48.07	0.03	-13.36	48.07	-0.03	0.003%
31	11.58	-48.07	6.73	-11.58	48.07	-6.72	0.001%
32	6.70	-48.07	11.62	-6.70	48.07	-11.62	0.001%
33	0.03	-48.07	13.40	-0.03	48.07	-13.40	0.003%
34	-6.65	-48.07	11.59	6.65	48.07	-11.59	0.001%
35	-11.55	-48.07	6.68	11.55	48.07	-6.67	0.001%
36	-13.36	-48.07	-0.03	13.36	48.07	0.03	0.003%
37	-11.58	-48.07	-6.73	11.58	48.07	6.72	0.001%
38	-6.70	-48.07	-11.62	6.70	48.07	11.62	0.001%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	6	0.00000001	0.00000001
2	Yes	15	0.00007131	0.00007569
3	Yes	20	0.00000001	0.00007635
4	Yes	20	0.00000001	0.00007763
5	Yes	15	0.00007139	0.00008581
6	Yes	20	0.00000001	0.00007712
7	Yes	20	0.00000001	0.00007874
8	Yes	15	0.00007131	0.00007610
9	Yes	20	0.00000001	0.00007753
10	Yes	20	0.00000001	0.00007598
11	Yes	15	0.00007138	0.00012344
12	Yes	20	0.00000001	0.00007906
13	Yes	20	0.00000001	0.00007771
14	Yes	6	0.00000001	0.00008252
15	Yes	17	0.00000001	0.00014774
16	Yes	18	0.00000001	0.00007878
17	Yes	18	0.00000001	0.00007869
18	Yes	17	0.00000001	0.00014645
19	Yes	18	0.00000001	0.00007930
20	Yes	18	0.00000001	0.00007965
21	Yes	17	0.00000001	0.00014853
22	Yes	18	0.00000001	0.00008019
23	Yes	18	0.00000001	0.00008000
24	Yes	17	0.00000001	0.00014862
25	Yes	18	0.00000001	0.00008016
26	Yes	18	0.00000001	0.00008009
27	Yes	15	0.00007664	0.00003225
28	Yes	16	0.00000001	0.00008807
29	Yes	16	0.00000001	0.00009283
30	Yes	15	0.00007664	0.00003397
31	Yes	16	0.00000001	0.00008835
32	Yes	16	0.00000001	0.00009391
33	Yes	15	0.00007663	0.00003228
34	Yes	16	0.00000001	0.00009226
35	Yes	16	0.00000001	0.00008701
36	Yes	15	0.00007663	0.00003521
37	Yes	16	0.00000001	0.00009532
38	Yes	16	0.00000001	0.00009025

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	175 - 145.5	43.419	38	2.321	0.003
L2	150 - 95.5	31.547	38	2.157	0.003
L3	101 - 83.25	13.089	38	1.328	0.001
L4	83.25 - 65.5	8.642	38	1.027	0.001
L5	65.5 - 64	5.310	38	0.765	0.000
L6	64 - 46.58	5.073	38	0.743	0.000
L7	53 - 43.25	3.523	38	0.603	0.000
L8	43.25 - 42.58	2.364	38	0.518	0.000
L9	42.58 - 42	2.292	38	0.510	0.000
L10	42 - 35.5	2.230	38	0.504	0.000
L11	35.5 - 18	1.598	38	0.424	0.000
L12	18 - 17	0.418	38	0.220	0.000
L13	17 - 2.75	0.373	38	0.209	0.000
L14	2.75 - 0	0.010	38	0.034	0.000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
174.00	(2) ADA-85408580CF w/ Mount Pipe	38	42.933	2.317	0.003	23327
162.00	P65-16-XLH-RR w/ Mount Pipe	38	37.144	2.254	0.003	8971
144.00	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	38	28.874	2.086	0.003	4320
129.00	BCR-87010:90	38	22.645	1.853	0.002	3648

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	175 - 145.5	124.833	13	6.682	0.009
L2	150 - 95.5	90.770	13	6.210	0.008
L3	101 - 83.25	37.722	13	3.828	0.003
L4	83.25 - 65.5	24.916	13	2.960	0.002
L5	65.5 - 64	15.314	13	2.206	0.001
L6	64 - 46.58	14.631	13	2.143	0.001
L7	53 - 43.25	10.162	13	1.739	0.001
L8	43.25 - 42.58	6.819	13	1.495	0.001
L9	42.58 - 42	6.611	13	1.471	0.001
L10	42 - 35.5	6.433	13	1.453	0.001
L11	35.5 - 18	4.611	13	1.224	0.000
L12	18 - 17	1.207	13	0.636	0.000
L13	17 - 2.75	1.078	13	0.603	0.000
L14	2.75 - 0	0.028	13	0.098	0.000

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
174.00	(2) ADA-85408580CF w/ Mount Pipe	13	123.440	6.669	0.008	8319
162.00	P65-16-XLH-RR w/ Mount Pipe	13	106.832	6.490	0.008	3198
144.00	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	13	83.096	6.007	0.008	1534
129.00	BCR-87010:90	13	65.201	5.338	0.006	1289

Compression Checks

Pole Design Data

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 $\frac{P}{P_a}$
L1	175 - 145.5 (1)	TP27.435x22.125x0.2188	29.50	0.00	0.0	38.95	18.6041	-4.66	724.55	0.006
L2	145.5 - 95.5 (2)	TP35.997x26.1874x0.3125	54.50	0.00	0.0	39.00	34.9114	-12.85	1361.54	0.009
L3	95.5 - 83.25 (3)	TP37.5769x34.382x0.375	17.75	0.00	0.0	39.00	44.9213	-16.87	1751.93	0.010
L4	83.25 - 65.5 (4)	TP40.7716x37.5769x0.5255	17.75	0.00	0.0	31.79	68.1009	-21.60	2164.79	0.010
L5	65.5 - 64 (5)	TP41.0416x40.7716x0.524	1.50	0.00	0.0	31.78	68.4135	-22.01	2173.91	0.010

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 $\frac{P}{P_a}$
		4								
L6	64 - 46.58 (6)	TP44.177x41.0416x0.616	17.42	0.00	0.0	31.83	84.1121	-25.58	2677.29	0.010
L7	46.58 - 43.25 (7)	TP44.0268x41.7895x0.6421	9.75	0.00	0.0	31.84	89.6991	-30.73	2855.66	0.011
L8	43.25 - 42.58 (8)	TP44.1474x44.0268x0.6815	0.67	0.00	0.0	31.14	95.3869	-30.98	2970.35	0.010
L9	42.58 - 42 (9)	TP44.2518x44.1474x0.7773	0.58	0.00	0.0	31.82	108.8060	-31.22	3462.63	0.009
L10	42 - 35.5 (10)	TP45.422x44.2518x0.6708	6.50	0.00	0.0	31.86	96.6614	-33.63	3079.63	0.011
L11	35.5 - 18 (11)	TP48.5724x45.422x0.6982	17.50	0.00	0.0	32.33	107.6370	-40.68	3479.69	0.012
L12	18 - 17 (12)	TP48.7524x48.5724x0.697	1.00	0.00	0.0	32.35	107.8530	-41.10	3489.25	0.012
L13	17 - 2.75 (13)	TP50.505x48.7524x0.6609	14.25	0.00	0.0	34.67	106.0790	-46.90	3677.56	0.013
L14	2.75 - 0 (14)	TP51x50.505x0.6644	2.75	0.00	0.0	35.74	107.6780	-48.05	3848.64	0.012

Pole Bending Design Data

Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
L1	175 - 145.5 (1)	TP27.435x22.125x0.2188	230.80	23.07	38.95	0.592	0.00	0.00	38.95	0.000
L2	145.5 - 95.5 (2)	TP35.997x26.1874x0.3125	1181.50	47.93	39.00	1.229	0.00	0.00	39.00	0.000
L3	95.5 - 83.25 (3)	TP37.5769x34.382x0.375	1624.03	47.80	39.00	1.226	0.00	0.00	39.00	0.000
L4	83.25 - 65.5 (4)	TP40.7716x37.5769x0.5255	2115.60	38.08	31.79	1.198	0.00	0.00	31.79	0.000
L5	65.5 - 64 (5)	TP41.0416x40.7716x0.5244	2159.47	38.43	31.78	1.209	0.00	0.00	31.78	0.000
L6	64 - 46.58 (6)	TP44.177x41.0416x0.616	2491.85	34.52	31.83	1.084	0.00	0.00	31.83	0.000
L7	46.58 - 43.25 (7)	TP44.0268x41.7895x0.6421	2803.12	35.60	31.84	1.118	0.00	0.00	31.84	0.000
L8	43.25 - 42.58 (8)	TP44.1474x44.0268x0.6815	2825.07	33.70	31.14	1.082	0.00	0.00	31.14	0.000
L9	42.58 - 42 (9)	TP44.2518x44.1474x0.7773	2844.13	29.80	31.82	0.937	0.00	0.00	31.82	0.000
L10	42 - 35.5 (10)	TP45.422x44.2518x0.6708	3061.02	34.98	31.86	1.098	0.00	0.00	31.86	0.000
L11	35.5 - 18 (11)	TP48.5724x45.422x0.6982	3674.57	35.23	32.33	1.090	0.00	0.00	32.33	0.000
L12	18 - 17 (12)	TP48.7524x48.5724x0.697	3710.93	35.37	32.35	1.093	0.00	0.00	32.35	0.000
L13	17 - 2.75 (13)	TP50.505x48.7524x0.6609	4244.07	39.61	34.67	1.143	0.00	0.00	34.67	0.000
L14	2.75 - 0 (14)	TP51x50.505x0.6644	4350.17	39.60	35.74	1.108	0.00	0.00	35.74	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V K	Actual f_v ksi	Allow. F_v ksi	Ratio $\frac{f_v}{F_v}$	Actual T kip-ft	Actual f_{vt} ksi	Allow. F_{vt} ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
L1	175 - 145.5 (1)	TP27.435x22.125x0.2188	13.29	0.71	26.00	0.056	0.77	0.04	26.00	0.001
L2	145.5 - 95.5 (2)	TP35.997x26.1874x0.3125	23.51	0.67	26.00	0.053	1.06	0.02	26.00	0.001

Section No.	Elevation ft	Size	Actual V K	Actual f_v ksi	Allow. F_v ksi	Ratio $\frac{f_v}{F_v}$	Actual T kip-ft	Actual f_{vt} ksi	Allow. F_{vt} ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
L3	95.5 - 83.25 (3)	TP37.5769x34.382x0.375	26.30	0.59	26.00	0.046	0.86	0.01	26.00	0.000
L4	83.25 - 65.5 (4)	TP40.7716x37.5769x0.5255	29.13	0.43	21.19	0.041	0.65	0.01	21.19	0.000
L5	65.5 - 64 (5)	TP41.0416x40.7716x0.5244	29.37	0.43	21.18	0.041	0.63	0.01	21.18	0.000
L6	64 - 46.58 (6)	TP44.177x41.0416x0.616	31.09	0.37	21.22	0.035	0.47	0.00	21.22	0.000
L7	46.58 - 43.25 (7)	TP44.0268x41.7895x0.6421	32.72	0.36	21.22	0.035	0.33	0.00	21.22	0.000
L8	43.25 - 42.58 (8)	TP44.1474x44.0268x0.6815	32.82	0.34	20.76	0.034	0.31	0.00	20.76	0.000
L9	42.58 - 42 (9)	TP44.2518x44.1474x0.7773	32.91	0.30	21.22	0.029	0.30	0.00	21.22	0.000
L10	42 - 35.5 (10)	TP45.422x44.2518x0.6708	33.85	0.35	21.24	0.034	0.22	0.00	21.24	0.000
L11	35.5 - 18 (11)	TP48.5724x45.422x0.6982	36.30	0.34	21.55	0.032	0.06	0.00	21.55	0.000
L12	18 - 17 (12)	TP48.7524x48.5724x0.697	36.44	0.34	21.57	0.032	0.07	0.00	21.57	0.000
L13	17 - 2.75 (13)	TP50.505x48.7524x0.6609	38.41	0.36	23.11	0.032	0.30	0.00	23.11	0.000
L14	2.75 - 0 (14)	TP51x50.505x0.6644	38.79	0.36	23.83	0.031	0.34	0.00	23.83	0.000

Pole Interaction Design Data

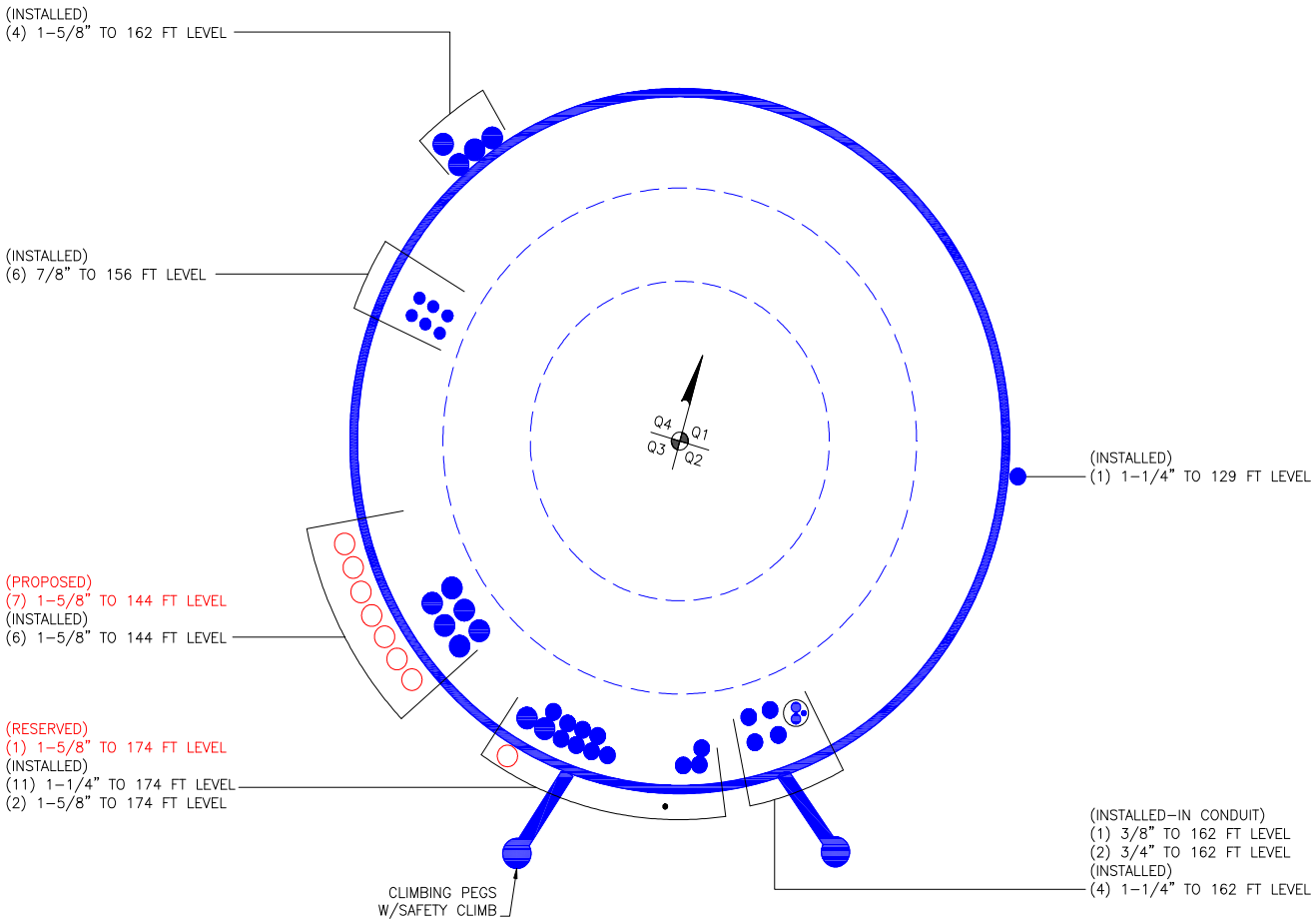
Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	175 - 145.5 (1)	0.006	0.592	0.000	0.056	0.001	0.600 ✔	1.333	H1-3+VT ✔
L2	145.5 - 95.5 (2)	0.009	1.229	0.000	0.053	0.001	1.239 ✔	1.333	H1-3+VT ✔
L3	95.5 - 83.25 (3)	0.010	1.226	0.000	0.046	0.000	1.236 ✔	1.333	H1-3+VT ✔
L4	83.25 - 65.5 (4)	0.010	1.198	0.000	0.041	0.000	1.208 ✔	1.333	H1-3+VT ✔
L5	65.5 - 64 (5)	0.010	1.209	0.000	0.041	0.000	1.220 ✔	1.333	H1-3+VT ✔
L6	64 - 46.58 (6)	0.010	1.084	0.000	0.035	0.000	1.094 ✔	1.333	H1-3+VT ✔
L7	46.58 - 43.25 (7)	0.011	1.118	0.000	0.035	0.000	1.129 ✔	1.333	H1-3+VT ✔
L8	43.25 - 42.58 (8)	0.010	1.082	0.000	0.034	0.000	1.093 ✔	1.333	H1-3+VT ✔
L9	42.58 - 42 (9)	0.009	0.937	0.000	0.029	0.000	0.946 ✔	1.333	H1-3+VT ✔
L10	42 - 35.5 (10)	0.011	1.098	0.000	0.034	0.000	1.109 ✔	1.333	H1-3+VT ✔
L11	35.5 - 18 (11)	0.012	1.090	0.000	0.032	0.000	1.102 ✔	1.333	H1-3+VT ✔
L12	18 - 17 (12)	0.012	1.093	0.000	0.032	0.000	1.105 ✔	1.333	H1-3+VT ✔
L13	17 - 2.75 (13)	0.013	1.143	0.000	0.032	0.000	1.156 ✔	1.333	H1-3+VT ✔
L14	2.75 - 0 (14)	0.012	1.108	0.000	0.031	0.000	1.121 ✔	1.333	H1-3+VT ✔

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
L1	175 - 145.5	Pole	TP27.435x22.125x0.2188	1	-4.66	965.83	45.0	Pass
L2	145.5 - 95.5	Pole	TP35.997x26.1874x0.3125	2	-12.85	1814.93	93.0	Pass
L3	95.5 - 83.25	Pole	TP37.5769x34.382x0.375	3	-16.87	2335.32	92.7	Pass
L4	83.25 - 65.5	Pole	TP40.7716x37.5769x0.5255	4	-21.60	2885.66	90.7	Pass
L5	65.5 - 64	Pole	TP41.0416x40.7716x0.5244	5	-22.01	2897.82	91.5	Pass
L6	64 - 46.58	Pole	TP44.177x41.0416x0.616	6	-25.58	3568.83	82.1	Pass
L7	46.58 - 43.25	Pole	TP44.0268x41.7895x0.6421	7	-30.73	3806.59	84.7	Pass
L8	43.25 - 42.58	Pole	TP44.1474x44.0268x0.6815	8	-30.98	3959.48	82.0	Pass
L9	42.58 - 42	Pole	TP44.2518x44.1474x0.7773	9	-31.22	4615.69	71.0	Pass
L10	42 - 35.5	Pole	TP45.422x44.2518x0.6708	10	-33.63	4105.15	83.2	Pass
L11	35.5 - 18	Pole	TP48.5724x45.422x0.6982	11	-40.68	4638.43	82.7	Pass
L12	18 - 17	Pole	TP48.7524x48.5724x0.697	12	-41.10	4651.17	82.9	Pass
L13	17 - 2.75	Pole	TP50.505x48.7524x0.6609	13	-46.90	4902.19	86.7	Pass
L14	2.75 - 0	Pole	TP51x50.505x0.6644	14	-48.05	5130.24	84.1	Pass
							Summary	
						Pole (L2)	93.0	Pass
						RATING =	**93.0**	**Pass**

APPENDIX B

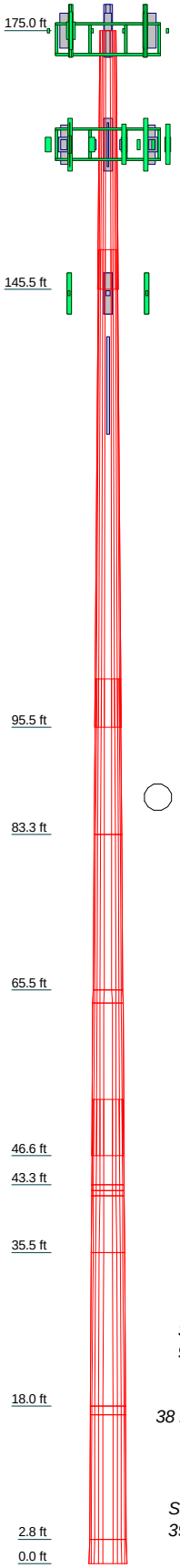
BASE LEVEL DRAWING

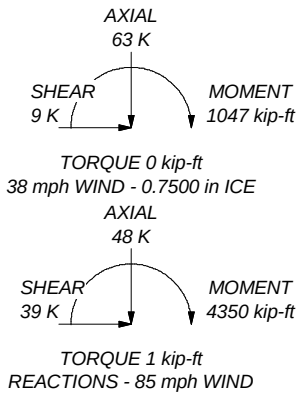

(INSTALLED)
(4) 1-5/8" TO 162 FT LEVEL
(INSTALLED)
(6) 7/8" TO 156 FT LEVEL
(PROPOSED)
(7) 1-5/8" TO 144 FT LEVEL
(INSTALLED)
(6) 1-5/8" TO 144 FT LEVEL
(RESERVED)
(1) 1-5/8" TO 174 FT LEVEL
(INSTALLED)
(11) 1-1/4" TO 174 FT LEVEL
(2) 1-5/8" TO 174 FT LEVEL
CLIMBING PEGS
W/SAFETY CLIMB
Q4
Q1
Q3
Q2
(INSTALLED)
(1) 1-1/4" TO 129 FT LEVEL
(INSTALLED-IN CONDUIT)
(1) 3/8" TO 162 FT LEVEL
(2) 3/4" TO 162 FT LEVEL
(INSTALLED)
(4) 1-1/4" TO 162 FT LEVEL

APPENDIX C

ADDITIONAL CALCULATIONS

Section	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Length (ft)	29.50	54.50	17.75	17.75	1.50	17.42	9.75	12	12	6.50	17.50	1.00	14.25	2.75
Number of Sides	12	12	12	12	12	12	12	12	12	12	12	12	12	12
Thickness (in)	0.2188	0.3125	0.3750	0.5255	0.5244	0.6160	0.6721	0.6768	0.6768	0.6708	0.6982	0.6970	0.6609	0.6644
Socket Length (ft)	4.50	5.50				6.42								
Top Dia (in)	22.1250	26.1874	34.3820	37.5769	40.7716	41.0416	44.1770	44.2540	44.2540	45.4220	45.4220	48.5724	48.7524	50.5050
Bot Dia (in)	27.4350	35.9970	37.5769	40.7716	41.0416	44.1770	44.2540	45.4220	45.4220	48.5724	48.5724	48.7524	50.5050	51.0000
Grade	A572-65			Reinf 52.98 ksi	Reinf 52.96 ksi	Reinf 53.05 ksi	Reinf 53.10 ksi	Reinf 53.10 ksi	Reinf 53.10 ksi	Reinf 53.10 ksi	Reinf 53.88 ksi	Reinf 53.92 ksi	Reinf 57.78 ksi	Reinf 59.57 ksi
Weight (K)	1.7	5.7	2.6	4.0	0.3	4.9	2.2	2.2	2.2	2.1	6.2	0.4	5.1	1.0





DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
(2) ADA-85408580CF w/ Mount Pipe	174	(2) RRUS-11	162
BXA-80080/4CF w/ Mount Pipe	174	(2) RRUS-11	162
BXA-80080/4CF w/ Mount Pipe	174	(4) LGP2140X	162
932DG90T2E-M w/ Mount Pipe	174	(4) LGP2140X	162
932DG90T2E-M w/ Mount Pipe	174	DC6-48-60-18-8F	162
P65.16.XL.2 w/ Mount Pipe	174	2.375" OD x 5' Mount Pipe	162
P65.16.XL.2 w/ Mount Pipe	174	2.375" OD x 5' Mount Pipe	162
P65.16.XL.2 w/ Mount Pipe	174	(3) 2.375" OD x 5' Mount Pipe	162
(2) FD9R6004/2C-3L	174	Platform Mount [LP 303-1]	162
(2) FD9R6004/2C-3L	174	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	144
(2) FD9R6004/2C-3L	174	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	144
BXA-171063-12BF-EDIN-X w/ Mount Pipe	174	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	144
BXA-171063-12BF-EDIN-X w/ Mount Pipe	174	ERICSSON AIR 21 B4A B2P w/ Mount Pipe	144
BXA-171063-12BF-EDIN-X w/ Mount Pipe	174	ERICSSON AIR 21 B4A B2P w/ Mount Pipe	144
RRH2X40-AWS	174	ERICSSON AIR 21 B4A B2P w/ Mount Pipe	144
RRH2X40-AWS	174	KRY 112 144/1	144
RRH2X40-AWS	174	KRY 112 144/1	144
DB-T1-6Z-8AB-0Z	174	KRY 112 144/1	144
Platform Mount [LP 602-1]	174	RMV12-3xx Mount	144
P65-16-XLH-RR w/ Mount Pipe	162	BCR-87010:90	129
P65-16-XLH-RR w/ Mount Pipe	162	Side Arm Mount [SO 701-1]	129
P65-16-XLH-RR w/ Mount Pipe	162		
(2) 800 10121 w/ Mount Pipe	162		
(2) 7770.00 w/ Mount Pipe	162		
(2) RRUS-11	162		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-65	65 ksi	80 ksi	Reinf 53.04 ksi	53 ksi	67 ksi
Reinf 52.98 ksi	53 ksi	67 ksi	Reinf 53.10 ksi	53 ksi	67 ksi
Reinf 52.96 ksi	53 ksi	67 ksi	Reinf 53.88 ksi	54 ksi	68 ksi
Reinf 53.05 ksi	53 ksi	67 ksi	Reinf 53.92 ksi	54 ksi	68 ksi
Reinf 53.06 ksi	53 ksi	67 ksi	Reinf 57.78 ksi	58 ksi	73 ksi
Reinf 51.90 ksi	52 ksi	65 ksi	Reinf 59.57 ksi	60 ksi	75 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.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 93%

Paul J. Ford and Company
250 E. Broad Street, Suite 600
Columbus, OH 43215
Phone: 614.221.6679
FAX: 614.448.4105

Job:	***176 ft Monopole / BRG 133 943050***		
Project:	***PJF 37513-2761 / BU 807132***		
Client: CCI	Drawn by: Joey Meinerding	App'd:	
Code: TIA/EIA-222-F	Date: 08/29/14	Scale: NTS	
Path: T:\375_Crown_Castle\2013\37513-2761.BU 807132\WO 916508.BU 807132 - SA 002\37513-2761.002.7805.eri		Dwg No. E-1	

PAUL J. FORD AND COMPANY
STRUCTURAL ENGINEERS
250 East Broad Street • Suite 600 • Columbus, Ohio 43215-3708

v4.4 - Effective 7-12-13

Date: 8/29/2014
PJF Project: 37513-2761.002.7805
Client Ref. # 807132
Site Name: BRG 133 943050
Description: 176' Pole
Owner: CCI
Engineer: JWM

Asymmetric Anchor Rod Analysis

Moment =	4350	k-ft	TIA Ref.	F	Location =	Base Plate		
Axial =	48.0	kips	ASIF =	1.3333	η =	N/A	for BP, Rev. G Sect. 4.9.9	
Shear =	39.0	kips	Max Ratio =	100.0%	Threads =	N/A	for FP, Rev. G	
Anchor Qty =	20							

**** For Post Installed Anchors: Check anchors for embedment, epoxy/grout bond, and capacity based on proof load. ****

Item	Nominal Anchor Dia, in	Spec	Fy, ksi	Fu, ksi	Location, degrees	Anchor Circle, in	Area Override, in^2	Area, in^2	Max Net Compression, kips	Max Net Tension, kips	Load for Capacity Calc, kips	Capacity Override, kips	Capacity, kips	Capacity Ratio
1	2.250	#18J A615 Gr 75	75	100	0.0	59.30	0.00	3.98	180.62	175.60	175.60	0.00	195.00	90.1%
2	2.250	#18J A615 Gr 75	75	100	22.5	59.30	0.00	3.98	176.85	171.84	171.84	0.00	195.00	88.1%
3	2.250	#18J A615 Gr 75	75	100	45.0	59.30	0.00	3.98	175.80	170.79	170.79	0.00	195.00	87.6%
4	2.250	#18J A615 Gr 75	75	100	67.5	59.30	0.00	3.98	178.41	173.40	173.40	0.00	195.00	88.9%
5	2.250	#18J A615 Gr 75	75	100	90.0	59.30	0.00	3.98	183.45	178.44	178.44	0.00	195.00	91.5%
6	2.250	#18J A615 Gr 75	75	100	112.5	59.30	0.00	3.98	188.35	183.34	183.34	0.00	195.00	94.0%
7	2.250	#18J A615 Gr 75	75	100	135.0	59.30	0.00	3.98	190.77	185.76	185.76	0.00	195.00	95.3%
8	2.250	#18J A615 Gr 75	75	100	157.5	59.30	0.00	3.98	189.75	184.74	184.74	0.00	195.00	94.7%
9	2.250	#18J A615 Gr 75	75	100	180.0	59.30	0.00	3.98	186.07	181.06	181.06	0.00	195.00	92.9%
10	2.250	#18J A615 Gr 75	75	100	202.5	59.30	0.00	3.98	181.87	176.86	176.86	0.00	195.00	90.7%
11	2.250	#18J A615 Gr 75	75	100	225.0	59.30	0.00	3.98	179.54	174.53	174.53	0.00	195.00	89.5%
12	2.250	#18J A615 Gr 75	75	100	247.5	59.30	0.00	3.98	180.23	175.22	175.22	0.00	195.00	89.9%
13	2.250	#18J A615 Gr 75	75	100	270.0	59.30	0.00	3.98	183.12	178.10	178.10	0.00	195.00	91.3%
14	2.250	#18J A615 Gr 75	75	100	292.5	59.30	0.00	3.98	186.00	180.99	180.99	0.00	195.00	92.8%
15	2.250	#18J A615 Gr 75	75	100	315.0	59.30	0.00	3.98	186.80	181.79	181.79	0.00	195.00	93.2%
16	2.250	#18J A615 Gr 75	75	100	337.5	59.30	0.00	3.98	184.69	179.68	179.68	0.00	195.00	92.1%
17	2.000	A193 Gr B7	105	125	10.0	62.50	0.00	3.14	148.71	144.76	144.76	0.00	172.79	83.8%
18	2.000	A193 Gr B7	105	125	80.0	62.50	0.00	3.14	150.54	146.58	146.58	0.00	172.79	84.8%
19	2.000	A193 Gr B7	105	125	190.0	62.50	0.00	3.14	152.95	149.00	149.00	0.00	172.79	86.2%
20	2.000	A193 Gr B7	105	125	280.0	62.50	0.00	3.14	153.45	149.49	149.49	0.00	172.79	86.5%
									76.25					

Stiffened or Unstiffened, Ungrouted, Circular Base Plate - Any Rod Material

TIA Rev F

Site Data

BU#:	*807132*
Site Name:	*BRG 133 943050*
App #:	
Pole Manufacturer:	*Other*

Reactions		
Moment:	3721.4	ft-kips
Axial:	40.1	kips
Shear:	32.6	kips

Reactions adjusted to account for additional anchor rods.

Anchor Rod Data		
Qty:	16	
Diam:	2.25	in
Rod Material:	A615-J	
Strength (Fu):	100	ksi
Yield (Fy):	75	ksi
Bolt Circle:	59.3	in

Plate Data		
Diam:	63.5	in
Thick:	2.75	in
Grade:	60	ksi
Single-Rod B-eff:	10.25	in

Stiffener Data (Welding at both sides)		
Config:	0	*
Weld Type:		
Groove Depth:		in **
Groove Angle:		degrees
Fillet H. Weld:		<-- Disregard
Fillet V. Weld:		in
Width:		in
Height:		in
Thick:		in
Notch:		in
Grade:		ksi
Weld str.:		ksi

Pole Data		
Diam:	51	in
Thick:	0.4375	in
Grade:	65	ksi
# of Sides:	12	"0" IF Round
Fu	80	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor		
ASIF:	1.333	

If No stiffeners, Criteria:	AISC ASD	<-Only Applcable to Unstiffened Cases

Anchor Rod Results

Maximum Rod Tension:	185.8	Kips	Rigid
Allowable Tension:	195.0	Kips	Service, ASD
Anchor Rod Stress Ratio:	95.3%	**Pass**	Fty*ASIF

Base Plate Results Flexural Check

Base Plate Stress:	38.3	ksi	Rigid
Allowable Plate Stress:	60.0	ksi	Service ASD
Base Plate Stress Ratio:	63.8%	**Pass**	0.75*Fy*ASIF
			Y.L. Length: 30.26

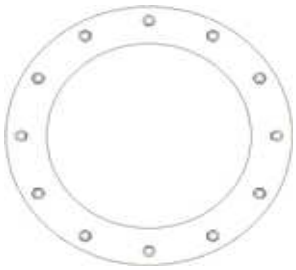
n/a

Stiffener Results

Horizontal Weld :	n/a
Vertical Weld:	n/a
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	n/a
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	n/a
Plate Comp. (AISC Bracket):	n/a

Pole Results

Pole Punching Shear Check: n/a



* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt

** Note: for complete joint penetration groove welds the groove depth must be exactly 1/2 the stiffener thickness for calculation purposes

Check Foundation Capacity

PJF job no: 37513-2761.002
Site: 807132, BRG 133 943050
Location: Greenwich, CT

Assumptions:

1) Foundation attempts to rotate about point at intersection of centerline of foundation and rock surface
2) There is sufficient caisson rotation so that both soil & existing rock anchors develop full resistance to caisson overturning

Pole Base Moment	**4350**	ft-k	
Pole Base Shear	**39**	kips	
Depth to Rock Surface	**10**	ft	
Moment at Rock Surface	**4740**	ft-k	
Allowable lateral soil moment capacity	**1289.5**	ft-k	(SF = 2.0)
Remaining moment carried by rock anchors	**3450.5**	ft-k	
Total OTM Supported by Combined Action	**4740.0**	ft-k	
Allow. OTM for Combined Action	**5142.6**	ft-k	(SF = 2.0)
Actual S.F. against overturning	**2.23**		
% Capacity	**89.6%**	**OK**	

EBI Consulting
environmental | engineering | due diligence

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

T-Mobile Existing Facility

Site ID: CT11091A

Greenwich North 2
1081 North Street
Greenwich, CT 06831

October 14, 2014

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general public allowable limit:	37.74 %

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

EBI Consulting
environmental | engineering | due diligence

October 14, 2014

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

Emissions Analysis for Site: **CT11091A – Greenwich North 2**

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **1081 North Street, Greenwich, 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 both 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 **1081 North Street, Greenwich, 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 GSM channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel

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) 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.

5) 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.

6) The antennas used in this modeling are the **Ericsson AIR21 B4A/B2P** for 1900 MHz (PCS) and 2100 MHz (AWS) channels. This is based on feedback from the carrier with regards to anticipated antenna selection. The **Ericsson AIR21 B4A/B2P** has a maximum gain of **15.9 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.

7) The antenna mounting height centerline of the proposed antennas is **145 feet** above ground level (AGL).

8) 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.

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):	145	Height (AGL):	145	Height (AGL):	145
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	2	Channel Count	2	# PCS Channels:	2
Total TX Power:	120	Total TX Power:	120	# AWS Channels:	120
ERP (W):	1,906.06	ERP (W):	1,906.06	ERP (W):	1,906.06
Antenna A1 MPE%	0.87	Antenna B1 MPE%	0.87	Antenna C1 MPE%	0.87
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):	145	Height (AGL):	145	Height (AGL):	145
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):	1,906.06	ERP (W):	1,906.06	ERP (W):	1,906.06
Antenna A2 MPE%	0.87	Antenna B2 MPE%	0.87	Antenna C2 MPE%	0.87

Site Composite MPE%	
Carrier	**MPE%**
T-Mobile	**5.21**
RAM Mobile	2.73 %
Verizon Wireless	14.58 %
Sprint	10.33 %
AT&T	4.89 %
Site Total MPE %:	**37.74 %**

T-Mobile Sector 1 Total:	1.74 %
T-Mobile Sector 2 Total:	1.74 %
T-Mobile Sector 3 Total:	1.74 %
Site Total:	37.74 %

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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:	1.74 %
Sector 2:	1.74 %
Sector 3 :	1.74 %
T-Mobile Total:	5.21 %
Site Total:	37.74 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **37.74%** 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.

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