Crown Castle
3530 Toringdon Way Suite 300
Charlotte NC 28277

Tel (704) 405-6600

April 16, 2015

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

RE: **T-Mobile-Exempt Modification - Crown Site BU: 823631**
T-Mobile Site ID: CT11092J
Located at: 36 Sugar Hollow Lake Road, Danbury, CT 06810

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 Mark D. Boughton, Mayor for the City of Danbury, and the Benevolent and Protective Order of Elks, Property Owner.

T-Mobile plans to modify the existing wireless communications facility owned by Crown Castle and located at **36 Sugar Hollow Lake Road, Danbury, CT 06810**. 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)

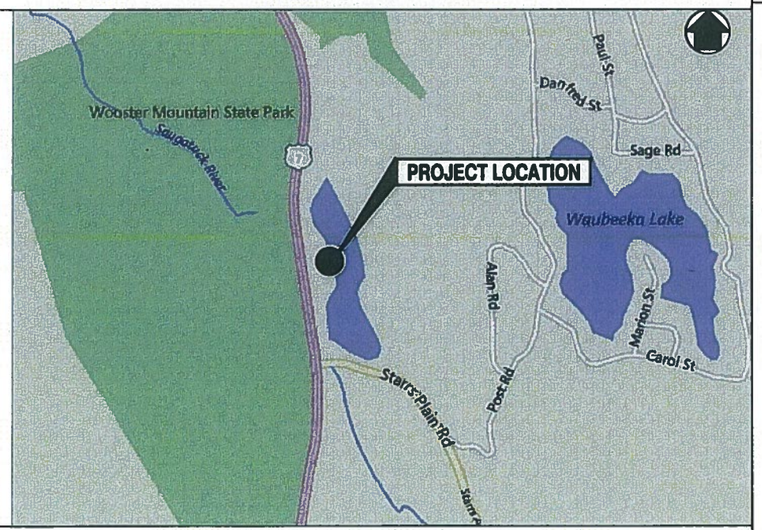
cc: The Honorable Mark D. Boughton, Mayor
155 Deer Hill Avenue
Danbury, CT 06810

Benevolent and Protective Order of Elks
60 Newtown Road TMB 71
DBA Danbury Lodge No. 120
Danbury, CT 06810

T-MOBILE NORTHEAST LLC

T-MOBILE SITE #: CT11092J
CROWN CASTLE BU #: 823631
SITE NAME: DANBURY/RT7
36 SUGAR HOLLOW LAKE ROAD
DANBURY , CT 06810
FAIRFIELD COUNTY

SITE INFORMATION



KEY MAP
N.T.S.

DIRECTIONS: (FROM PARSIPPANY):
START OUT GOING WEST ON SYLVAN WAY TOWARDS CENTURY DR. TURN RIGHT ONTO LITTETON RD/US202-N. KEEP LEFT AT THE FORK TO GO ON LITTELTON RD E. MERGE ONTO I-287 N. MERGE ONTO I87-S/I-287 E TOWARDS I-87 S NEW YORK CITY. TAKE THE I-87 S EXIT TOWARD SAW MILL PARKWAY S / NEW YORK CITY. TOWARD ELMSFORD. MERGE ONTO SAW MILL RIVER PKWAY N VIA THE RAMP ON THE LEFT TOWARD KATONAH. MERGE ONTO I-684 N VIA THE EXIT ON THE LEFT. MERGE ONTO I-84 VIA EXIT 9E TOWARD DANBURY. MERGE ONTO US-7 VIA EXIT 3 TOWARD NORWALK. SITE WILL BE ON THE LEFT.

PROJECT INFORMATION

T-MOBILE SITE #:	CT11092J
CROWN CASTLE BU #:	823631
SITE ADDRESS:	36 SUGAR HOLLOW LAKE ROAD DANBURY, CT 06810 FAIRFIELD COUNTY
LATITUDE:	41°-20'-59.0" N
LONGITUDE:	73°-28'-6.0" W
TOWER OWNER:	CROWN CASTLE 12 GILL STREET, SUITE 5800 WOBURN, MA 01801
CONTACT:	WARREN KELLEHER (781) 970-0055
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:	BRYAN HUFF (973) 576-0147
SCOPE OF WORK:	REMOVE AND REPLACE (2) EXISTING ANTENNAS WITH (6) NEW ANTENNAS, REMOVE AND REPLACE (4) EXISTING TMA'S WITH (2) NEW TMA'S, INSTALL (2) NEW RRU'S, INSTALL (4) NEW LINES OF COAX, INSTALL (1) NEW HYBRID LINE

CONFIGURATION
702Cu

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

DANBURY / RT7

CT11092J

36 SUGAR HOLLOW LAKE ROAD
DANBURY, CT 06810
FAIRFIELD COUNTY

SEAL

SCALE
AS SHOWN

REV.	DATE	BY	DESCRIPTION
0	04/15/15	BSH	ISSUED AS FINAL
A	04/09/15	HMP	ISSUED FOR REVIEW

REVISIONS

DRAWN BY HMP
CHECKED BY BSH
APPROVED BY GHN
DATE 04/10/15
TITLE

TITLE SHEET

PROJECT NO. 50066258/50066272

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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FAIRFIELD COUNTY

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SCALE

AS SHOWN

REV.	DATE	BY	DESCRIPTION
0	04/15/15	BSH	ISSUED AS FINAL
A	04/09/15	HMP	ISSUED FOR REVIEW

REVISIONS

DRAWN BY HMP
CHECKED BY BSH
APPROVED BY GHN
DATE 04/10/15

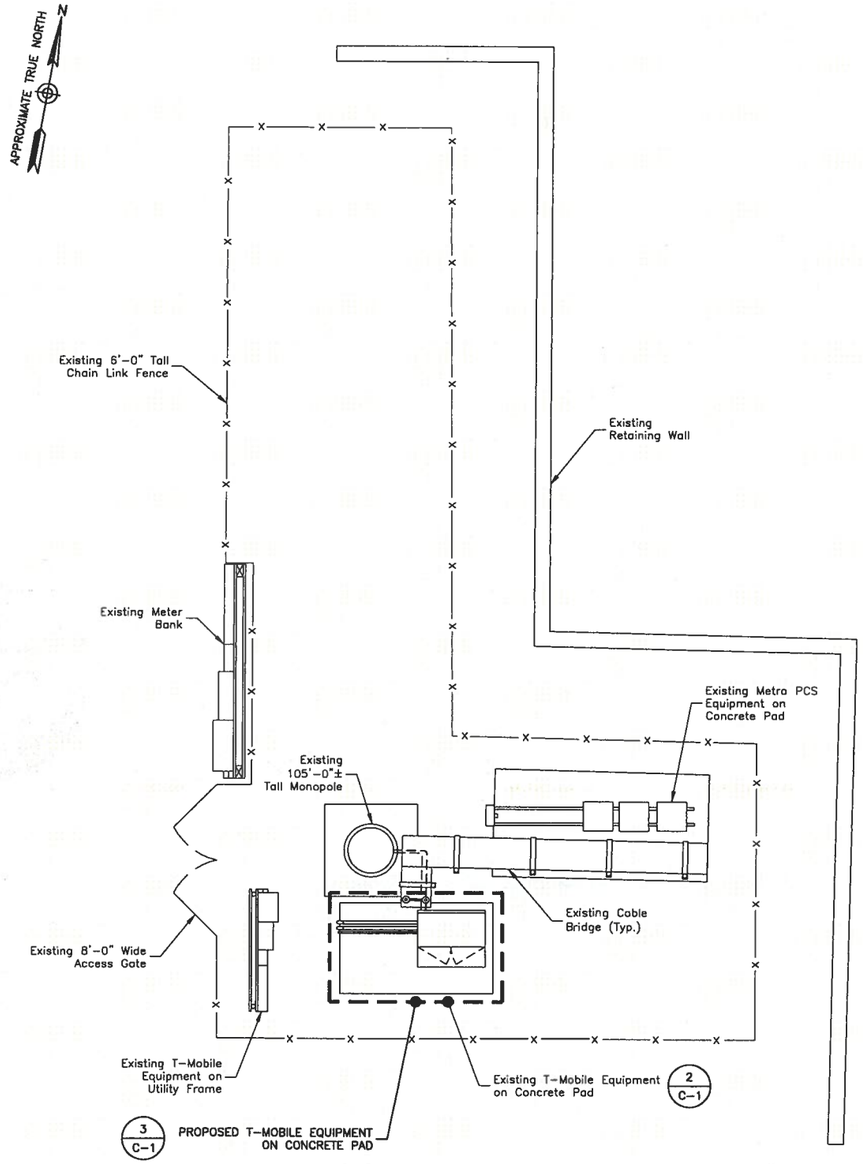
TITLE

GENERAL NOTES

PROJECT NO. 50066258/50066272

G - 1

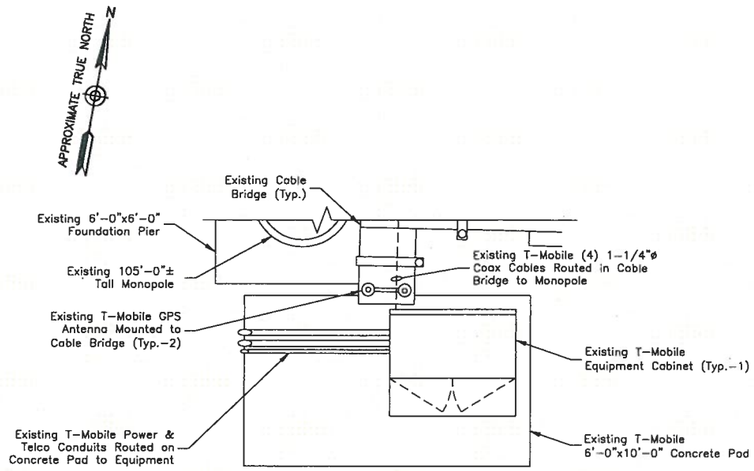
SHEET NO.



COMPOUND PLAN 1

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

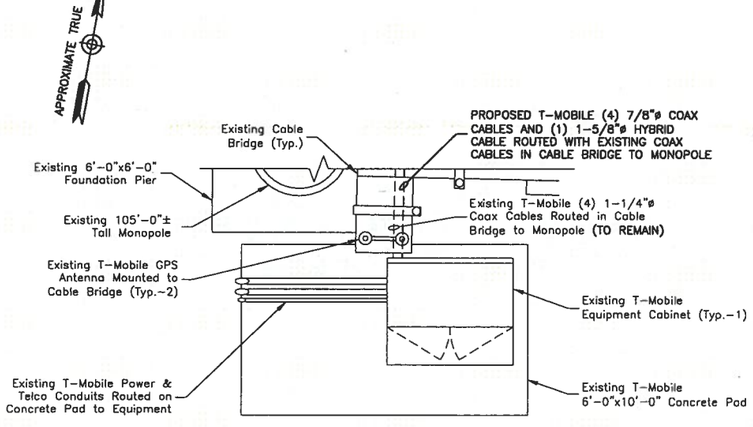
0' 5' 10'



EXISTING EQUIPMENT PLAN 2

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

0' 2' 4' 6'



PROPOSED EQUIPMENT PLAN 3

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

0' 2' 4' 6'

NOTES:

1. NORTH SHOWN AS APPROXIMATE.
2. NOT ALL INFORMATION IS SHOWN FOR CLARITY.
3. ALL PROPOSED EQUIPMENT, INCLUDING ANTENNAS, RRU'S, COAX, ETC., SHALL BE MOUNTED IN ACCORDANCE WITH THE TOWER STRUCTURAL ANALYSIS BY PAUL J FORD AND COMPANY DATED MARCH 18, 2015.

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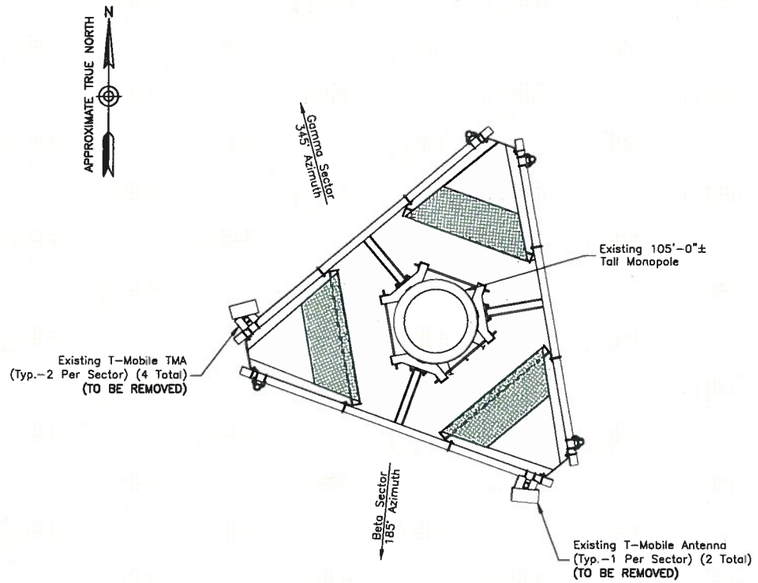
TITLE

COMPOUND PLAN & EQUIPMENT PLANS

PROJECT NO. 50066258/50066272

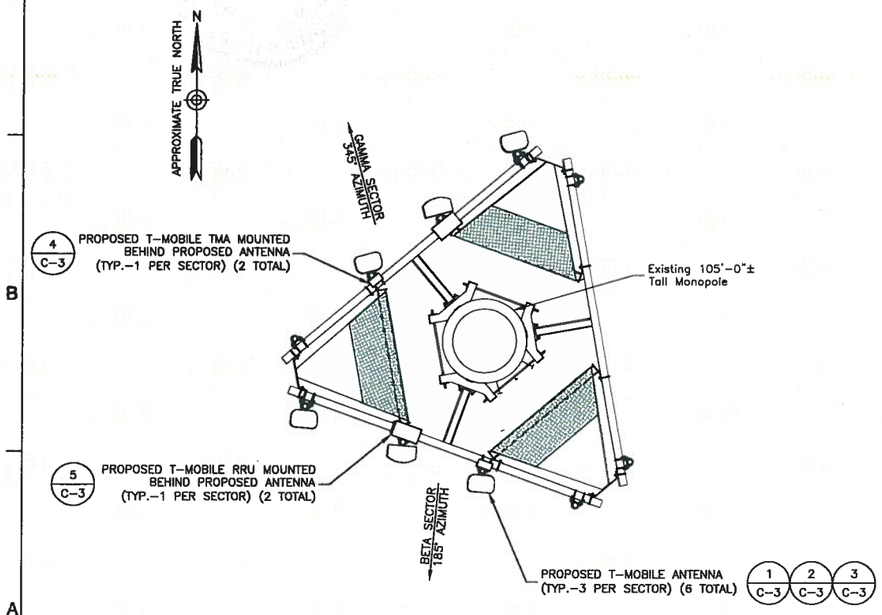
C - 1

SHEET NO.



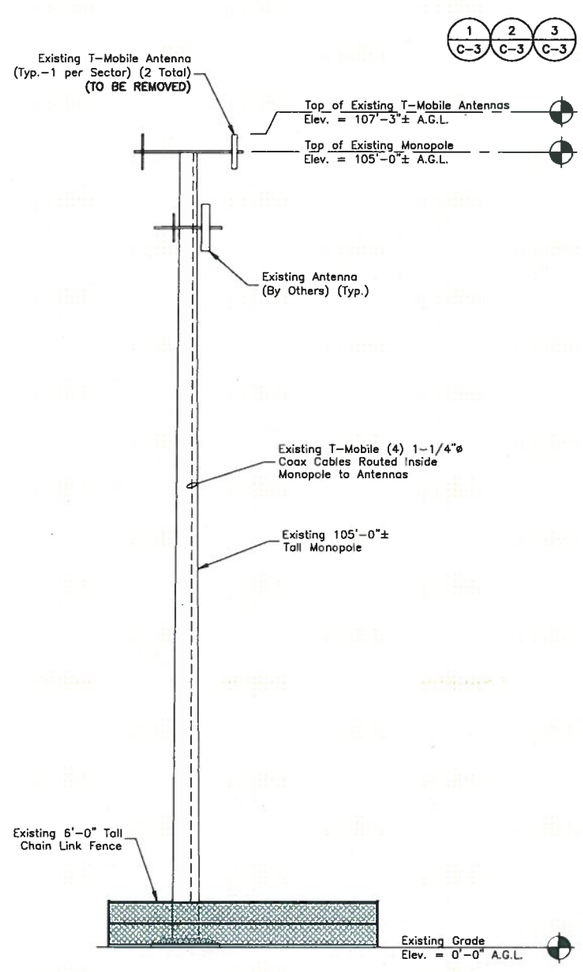
EXISTING ANTENNA LAYOUT 1

SCALE: N.T.S.



PROPOSED ANTENNA LAYOUT 2

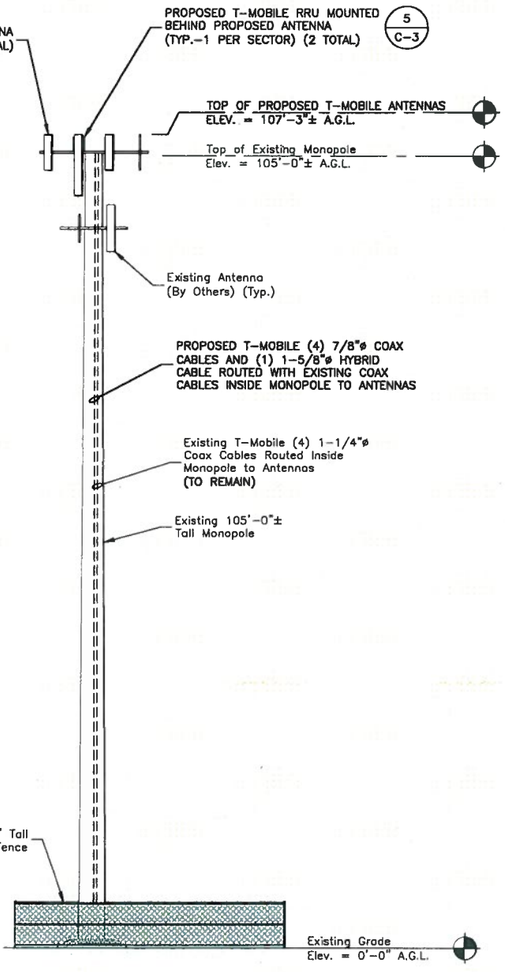
SCALE: N.T.S.



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'

NOTES:

1. ALL PROPOSED EQUIPMENT, INCLUDING ANTENNAS, RRU'S, COAX, ETC., SHALL BE MOUNTED IN ACCORDANCE WITH THE TOWER STRUCTURAL ANALYSIS BY PAUL J FORD AND COMPANY DATED MARCH 18, 2015.
2. DEWBERRY HAS NOT BEEN CONTRACTED TO PERFORM A STRUCTURAL ANALYSIS ON THE EXISTING ANTENNA MOUNT AND THEREFORE ASSUMES NO RESPONSIBILITY FOR THE STRUCTURAL CAPACITY.
3. TOP OF PROPOSED ANTENNAS ARE NOT TO EXCEED TOP OF EXISTING ANTENNAS.

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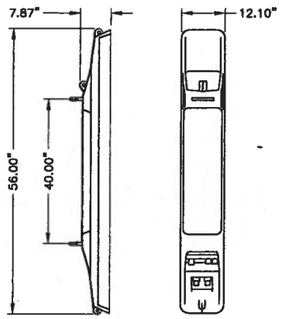
TITLE

ANTENNA LAYOUTS & ELEVATIONS

PROJECT NO. 50066258/50066272

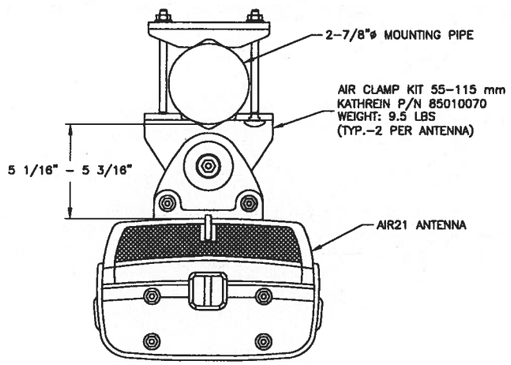
C - 2

SHEET NO.

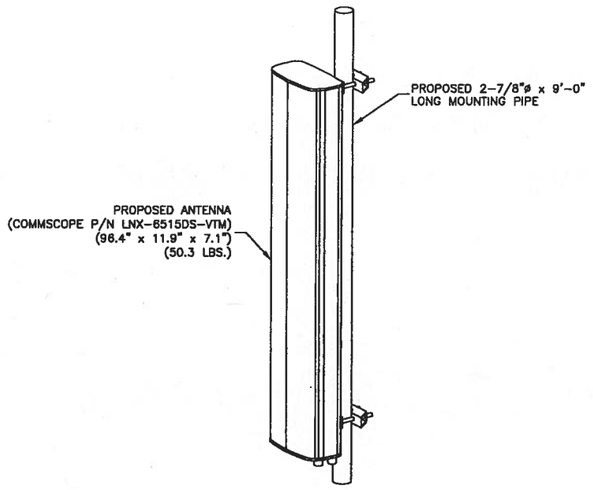


WEIGHT: 91.5 LBS.

AIR21 ANTENNA DETAIL (1)
SCALE: N.T.S.

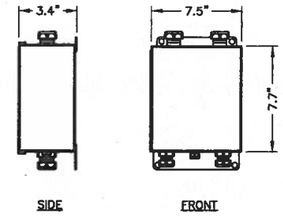


AIR21 MOUNT/CLAMP (2)
SCALE: N.T.S.



NOTE:
1. PLEASE SEE RFDS FOR SPECIFIC ANTENNA MODEL.

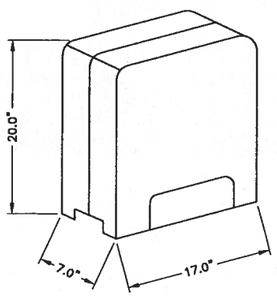
ISOMETRIC ANTENNA DETAIL (3)
SCALE: N.T.S.



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 EQUIPMENT WITH THE LATEST RFDS.

DUAL-PORT TMA DETAIL (4)
SCALE: N.T.S.

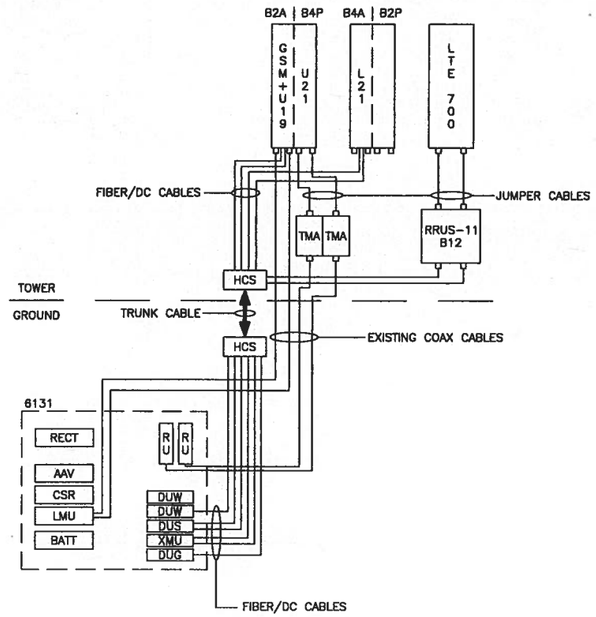


SPECIFICATIONS:
HEIGHT: 20.0"
WIDTH: 17.0"
DEPTH: 7.0"
WEIGHT: 50.7 LBS

ERICSSON RRUS-11 B12

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

RRUS-11 - REMOTE RADIO UNIT (5)
SCALE: N.T.S.



SITE CONFIGURATION 702Cu (6)
SCALE: N.T.S.

DESIGN CONFIGURATION

	ANTENNAS		COAX		COAX LENGTH	PROPOSED HCS
	EXISTING	PROPOSED	EXISTING	PROPOSED		
BETA	DAPA 48212S	ERICSSON AIR21 B2A B4P	(2) 1-1/4"ø	(2) 7/8"ø	155'-0"	(1) 1-5/8"ø @ 155'-0"
	–	COMMSCOPE LNX-6515DS-VTM				
	–	ERICSSON AIR21 B4A B2P				
GAMMA	DAPA 48212S	ERICSSON AIR21 B2A B4P	(2) 1-1/4"ø	(2) 7/8"ø	155'-0"	
	–	COMMSCOPE LNX-6515DS-VTM				
	–	ERICSSON AIR21 B4A B2P				

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REVISIONS

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CHECKED BY BSH
APPROVED BY GHN
DATE 04/10/15

TITLE

CONSTRUCTION DETAILS

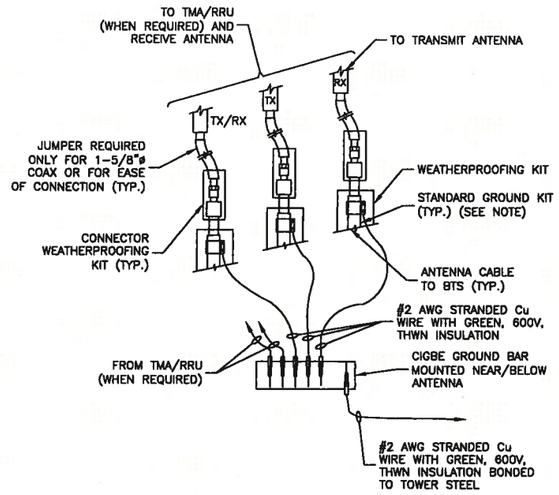
PROJECT NO. 50066258/50066272

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. MISCELLANEOUS ELECTRICAL AND NON-ELECTRICAL METAL BOXES, FRAMES AND SUPPORTS SHALL BE BONDED TO THE GROUND RING, IN ACCORDANCE WITH THE NEC.
21. BOND ALL METALLIC OBJECTS WITHIN 6 FT OF THE BURIED GROUND RING WITH 2 AWG SOLID TIN-PLATED COPPER GROUND CONDUCTOR. DURING EXCAVATION FOR NEW GROUND CONDUCTORS, IF EXISTING GROUND CONDUCTORS ARE ENCOUNTERED, BOND EXISTING GROUND CONDUCTORS TO NEW CONDUCTORS.
22. GROUND CONDUCTORS USED IN THE FACILITY GROUND AND LIGHTNING PROTECTION SYSTEMS SHALL NOT BE ROUTED THROUGH METALLIC OBJECTS THAT FORM A RING AROUND THE CONDUCTOR, SUCH AS METALLIC CONDUITS, METAL SUPPORT CLIPS OR SLEEVES THROUGH WALLS OR FLOORS. WHEN IT IS REQUIRED TO BE HOUSED IN CONDUIT TO MEET CODE REQUIREMENTS OR LOCAL CONDITIONS, NON-METALLIC MATERIAL SUCH AS PVC PLASTIC CONDUIT SHALL BE USED. WHERE USE OF METAL CONDUIT IS UNAVOIDABLE (E.G., NON-METALLIC CONDUIT PROHIBITED BY LOCAL CODE) THE GROUND CONDUCTOR SHALL BE BONDED TO EACH END OF THE METAL CONDUIT WITH LISTED BONDING FITTINGS.

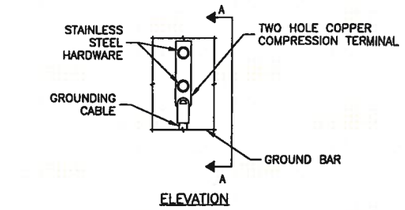


NOTE:

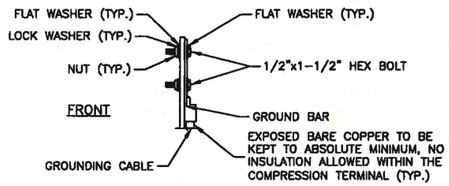
1. DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO CIGBE.

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

SCALE: N.T.S.



ELEVATION



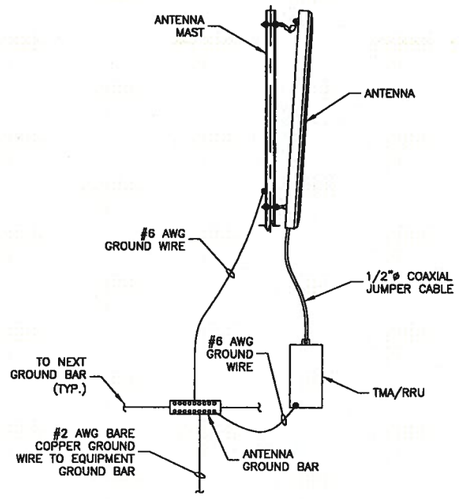
SECTION 'A-A'

NOTES:

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

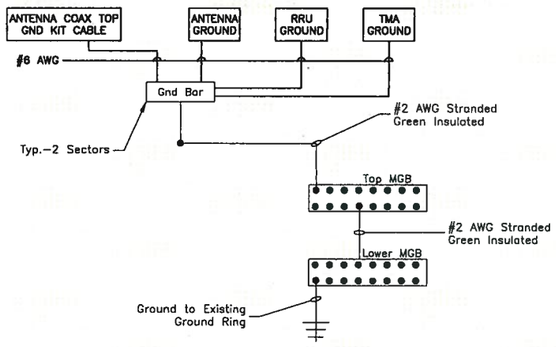
TYPICAL GROUND BAR MECHANICAL CONNECTION DETAIL — 2

SCALE: N.T.S.



TYPICAL ANTENNA GROUNDING DETAIL — 3

SCALE: N.T.S



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 — 4

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TITLE

GROUNDING NOTES & DETAILS

PROJECT NO. 50066258/50066272

E - 1

SHEET NO.

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

Date: **March 18, 2015**

Veronica Harris
Crown Castle
1200 McArthur Blvd
Mahwah, NJ 07430
201.236.9094

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:	CT11092J
	Carrier Site Name:	Danbury/Rt 7
Crown Castle Designation:	**Crown Castle BU Number:**	823631
	Crown Castle Site Name:	Danbury/Rt 7
	Crown Castle JDE Job Number:	325625
	Crown Castle Work Order Number:	1020864
	Crown Castle Application Number:	282651 Rev. 1
Engineering Firm Designation:	**Paul J. Ford and Company Project Number:**	37515-1122.001.7805
Site Data:	**36 Sugar Hollow Lake Road, Danbury, Fairfield County, CT** **Latitude *41° 20' 59"*, Longitude *-73° 28' 6"*** **105 Foot - Monopole Tower**	

Dear Veronica Harris,

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 766718, in accordance with application 282651, revision 1.

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:

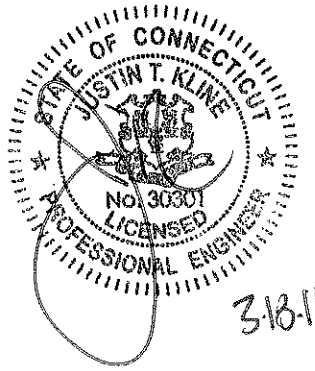
LC5: Existing + Proposed Equipment **Sufficient Capacity**
Note: See Table I and Table II for the proposed and existing loading, respectively.

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.

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: **March 18, 2015**

Veronica Harris
Crown Castle
1200 McArthur Blvd
Mahwah, NJ 07430
201.236.9094

Paul J. Ford and Company
250 E. Broad Street, Suite 600
Columbus, OH 43215
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Subject: Structural Analysis Report

Carrier Designation:	***T-Mobile* Co-Locate**	
	Carrier Site Number:	CT11092J
	Carrier Site Name:	Danbury/Rt 7
Crown Castle Designation:	**Crown Castle BU Number:**	823631
	Crown Castle Site Name:	Danbury/Rt 7
	Crown Castle JDE Job Number:	325625
	Crown Castle Work Order Number:	1020864
	Crown Castle Application Number:	282651 Rev. 1
Engineering Firm Designation:	**Paul J. Ford and Company Project Number:**	37515-1122.001.7805
Site Data:	**36 Sugar Hollow Lake Road, Danbury, Fairfield County, CT**	
	Latitude *41° 20' 59"*, Longitude *-73° 28' 6"*	
	105 Foot - Monopole Tower	

Dear Veronica Harris,

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 766718, in accordance with application 282651, revision 1.

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:

LC5: Existing + Proposed Equipment **Sufficient Capacity**
Note: See Table I and Table II for the proposed and existing 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.

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

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 105 ft. monopole tower designed by PIROD MANUFACTURES INC. in June 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
105.0	105.0	2	commscope	LNX-6515DS-VTM w/ Mount Pipe	1	1-5/8	--
		2	ericsson	ERICSSON AIR 21 B2A B4P w/ Mount Pipe			
		2	ericsson	ERICSSON AIR 21 B4A B2P w/ Mount Pipe			
		2	ericsson	KRY 112 144/1			
		2	ericsson	RRUS 11 B12			

Table 2 - Existing 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
105.0	105.0	2	dapa	48212S w/ Mount Pipe	--	--	2
		2	remec	G20045A1			
		1	tower mounts	Platform Mount [LP 405-1]	4 4	7/8 1-1/4	1
95.0	95.0	3	kathrein	800 10504 w/ Mount Pipe	6	1-5/8	1
		1	maxrad	GPS-TMG-26NMS			
		1	tower mounts	Platform Mount [LP 304-1]			

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

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	FPA, 99A075AR1, 10/20/1999	3528937	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	PiRod, A-116418, 06/07/2000	3845210	CCISITES
4-TOWER MANUFACTURER DRAWINGS	PiRod, A-116418, 06/07/2000	3528938	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) In accordance with discussions with CCI Corporate Engineering: Based on the assumption that the monopole manufacturer (ROHN/PiRod) has designed the flange plates at splices to adequately develop the full capacity of the unreinforced shaft section using unpublished and/or proprietary methodologies, we are assuming that if our analysis shows that both the existing shaft and the existing flange bolts are at a usage capacity of 100% or less, then the existing flange plates are at a usage capacity of 100% or less and no additional analysis of the flange plate is required.

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	105 - 80	Pole	P18x3/8	1	-5.88	697.49	44.6	Pass
L2	80 - 60	Pole	P24x3/8	2	-8.00	934.94	50.4	Pass
L3	60 - 40	Pole	P30x3/8	3	-10.62	1166.57	56.0	Pass
L4	40 - 20	Pole	P36x3/8	4	-13.72	1325.68	58.3	Pass
L5	20 - 0	Pole	P42x3/8	5	-17.31	1484.55	59.6	Pass
							Summary	
						Pole (L5)	59.6	Pass
						Rating =	59.6	Pass

Table 5 - Tower Component Stresses vs. Capacity

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	46.9	Pass
1,2	Base Plate	0	59.6	Pass
1	Base Foundation Structural Steel	0	59.0	Pass
1	Base Foundation Soil Interaction	0	71.7	Pass
1,2	Flange Connection	20	58.3	Pass
1,2	Flange Connection	40	56.0	Pass
1,2	Flange Connection	60	50.4	Pass
1,2	Flange Connection	80	44.6	Pass

Structure Rating (max from all components) =	**71.7%**

Notes:
1) See additional documentation in “Appendix C – Additional Calculations” for calculations supporting the % capacity consumed.
2) See assumption #4.

4.1) Recommendations

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

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 85.00 mph.
3) Nominal ice thickness of 0.7500 in.
4) Ice density of 56.00 pcf.
5) A wind speed of 36.10 mph is used in combination with ice.
6) Temperature drop of 50.00 °F.
7) Deflections calculated using a wind speed of 50.00 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		

Pole Section Geometry

Section	*Elevation* *ft*	*Section Length* *ft*	*Pole Size*	*Pole Grade*	*Socket Length* *ft*
L1	105.0000-80.0000	25.0000	P18x3/8	A53-B-42 (42 ksi)	
L2	80.0000-60.0000	20.0000	P24x3/8	A53-B-42 (42 ksi)	
L3	60.0000-40.0000	20.0000	P30x3/8	A53-B-42 (42 ksi)	
L4	40.0000-20.0000	20.0000	P36x3/8	A53-B-42 (42 ksi)	
L5	20.0000-0.0000	20.0000	P42x3/8	A53-B-42 (42 ksi)	

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 105.0000-80.0000				1	1	1		

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
L2 80.0000-60.0000				1	1	1		
L3 60.0000-40.0000				1	1	1		
L4 40.0000-20.0000				1	1	1		
L5 20.0000-0.0000				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 plf
LDF5-50A(7/8")	C	No	Inside Pole	105.0000 - 0.0000	4	No Ice	0.0000	0.33
						1/2" Ice	0.0000	0.33
						1" Ice	0.0000	0.33
LDF6-50A(1-1/4")	C	No	Inside Pole	105.0000 - 0.0000	4	No Ice	0.0000	0.66
						1/2" Ice	0.0000	0.66
						1" Ice	0.0000	0.66
MLE Hybrid 9Power/18Fiber RL 2(1 5/8) ***	C	No	Inside Pole	105.0000 - 0.0000	1	No Ice	0.0000	1.07
						1/2" Ice	0.0000	1.07
						1" Ice	0.0000	1.07
LDF7-50A(1-5/8")	C	No	Inside Pole	95.0000 - 0.0000	6	No Ice	0.0000	0.82
						1/2" Ice	0.0000	0.82
						1" Ice	0.0000	0.82

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	105.0000-80.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.20
L2	80.0000-60.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.20
L3	60.0000-40.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.20
L4	40.0000-20.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.20
L5	20.0000-0.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.20

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	105.0000-80.0000	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	0.000	0.20
L2	80.0000-60.0000	A	0.750	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 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
		C		0.000	0.000	0.000	0.000	0.20
L3	60.0000-40.0000	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	0.000	0.20
L4	40.0000-20.0000	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	0.000	0.20
L5	20.0000-0.0000	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	0.000	0.20

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	105.0000-80.0000	0.0000	0.0000	0.0000	0.0000
L2	80.0000-60.0000	0.0000	0.0000	0.0000	0.0000
L3	60.0000-40.0000	0.0000	0.0000	0.0000	0.0000
L4	40.0000-20.0000	0.0000	0.0000	0.0000	0.0000
L5	20.0000-0.0000	0.0000	0.0000	0.0000	0.0000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	A	From Leg	4.0000 0.00 0.00	0.0000	105.0000	No Ice 1/2" Ice 1" Ice	6.8155 7.3373 7.8532	5.6334 6.4717 7.2478	0.11 0.17 0.23
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	C	From Leg	4.0000 0.00 0.00	0.0000	105.0000	No Ice 1/2" Ice 1" Ice	6.8155 7.3373 7.8532	5.6334 6.4717 7.2478	0.11 0.17 0.23
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	A	From Leg	4.0000 0.00 0.00	0.0000	105.0000	No Ice 1/2" Ice 1" Ice	6.8253 7.3471 7.8632	5.6424 6.4800 7.2567	0.11 0.17 0.23
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	C	From Leg	4.0000 0.00 0.00	0.0000	105.0000	No Ice 1/2" Ice 1" Ice	6.8253 7.3471 7.8632	5.6424 6.4800 7.2567	0.11 0.17 0.23
LNX-6515DS-VTM w/ Mount Pipe	A	From Leg	4.0000 0.00 0.00	0.0000	105.0000	No Ice 1/2" Ice 1" Ice	11.6828 12.4043 13.1351	9.8418 11.3657 12.9138	0.08 0.17 0.27
LNX-6515DS-VTM w/ Mount Pipe	C	From Leg	4.0000 0.00 0.00	0.0000	105.0000	No Ice 1/2" Ice 1" Ice	11.6828 12.4043 13.1351	9.8418 11.3657 12.9138	0.08 0.17 0.27
KRY 112 144/1	A	From Leg	4.0000 0.00 0.00	0.0000	105.0000	No Ice 1/2" Ice 1" Ice	0.4083 0.4969 0.5941	0.2042 0.2733 0.3511	0.01 0.01 0.02
KRY 112 144/1	C	From Leg	4.0000 0.00 0.00	0.0000	105.0000	No Ice 1/2" Ice 1" Ice	0.4083 0.4969 0.5941	0.2042 0.2733 0.3511	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
RRUS 11 B12	A	From Leg	4.0000 0.00 0.00	0.0000	105.0000	No Ice 1/2" Ice 1" Ice	3.3056 3.5497 3.8025	1.3611 1.5404 1.7284	0.05 0.07 0.10
RRUS 11 B12	C	From Leg	4.0000 0.00 0.00	0.0000	105.0000	No Ice 1/2" Ice 1" Ice	3.3056 3.5497 3.8025	1.3611 1.5404 1.7284	0.05 0.07 0.10
(2) 2.375" OD x 5' Mount Pipe	B	From Leg	4.0000 0.00 0.00	0.0000	105.0000	No Ice 1/2" Ice 1" Ice	1.1875 1.4956 1.8071	1.1875 1.4956 1.8071	0.02 0.03 0.04
Platform Mount [LP 405-1]	C	None		0.0000	105.0000	No Ice 1/2" Ice 1" Ice	20.8000 28.1000 35.4000	20.8000 28.1000 35.4000	1.80 2.07 2.33
***									
800 10504 w/ Mount Pipe	A	From Leg	4.0000 0.00 0.00	0.0000	95.0000	No Ice 1/2" Ice 1" Ice	3.5887 4.0069 4.4217	3.1779 3.9053 4.5808	0.04 0.07 0.11
800 10504 w/ Mount Pipe	B	From Leg	4.0000 0.00 0.00	0.0000	95.0000	No Ice 1/2" Ice 1" Ice	3.5887 4.0069 4.4217	3.1779 3.9053 4.5808	0.04 0.07 0.11
800 10504 w/ Mount Pipe	C	From Leg	4.0000 0.00 0.00	0.0000	95.0000	No Ice 1/2" Ice 1" Ice	3.5887 4.0069 4.4217	3.1779 3.9053 4.5808	0.04 0.07 0.11
GPS-TMG-26NMS	A	From Leg	4.0000 0.00 0.00	0.0000	95.0000	No Ice 1/2" Ice 1" Ice	0.1556 0.2130 0.2791	0.1556 0.2130 0.2791	0.00 0.00 0.01
2.375" OD x 5' Mount Pipe	A	From Leg	4.0000 0.00 0.00	0.0000	95.0000	No Ice 1/2" Ice 1" Ice	1.1875 1.4956 1.8071	1.1875 1.4956 1.8071	0.02 0.03 0.04
2.375" OD x 5' Mount Pipe	B	From Leg	4.0000 0.00 0.00	0.0000	95.0000	No Ice 1/2" Ice 1" Ice	1.1875 1.4956 1.8071	1.1875 1.4956 1.8071	0.02 0.03 0.04
2.375" OD x 5' Mount Pipe	C	From Leg	4.0000 0.00 0.00	0.0000	95.0000	No Ice 1/2" Ice 1" Ice	1.1875 1.4956 1.8071	1.1875 1.4956 1.8071	0.02 0.03 0.04
Platform Mount [LP 304-1]	C	None		0.0000	95.0000	No Ice 1/2" Ice 1" Ice	17.4600 22.4400 27.4200	17.4600 22.4400 27.4200	1.35 1.62 1.90

Tower Pressures - No Ice

G_H = 1.690

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg % 	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
L1 105.0000-80.0000	92.5000	1.342	25	37.500	A B C	0.000 0.000 0.000	37.500 37.500 37.500	37.500	100.00 100.00 100.00	0.000 0.000 0.000	0.000 0.000 0.000

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg %	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
L2 80.0000-60.0000	70.0000	1.24	23	40.000	A	0.000	40.000	40.000	100.00	0.000	0.000
					B	0.000	40.000		100.00	0.000	0.000
					C	0.000	40.000		100.00	0.000	0.000
L3 60.0000-40.0000	50.0000	1.126	21	50.000	A	0.000	50.000	50.000	100.00	0.000	0.000
					B	0.000	50.000		100.00	0.000	0.000
					C	0.000	50.000		100.00	0.000	0.000
L4 40.0000-20.0000	30.0000	1	18	60.000	A	0.000	60.000	60.000	100.00	0.000	0.000
					B	0.000	60.000		100.00	0.000	0.000
					C	0.000	60.000		100.00	0.000	0.000
L5 20.0000-0.0000	10.0000	1	18	70.000	A	0.000	70.000	70.000	100.00	0.000	0.000
					B	0.000	70.000		100.00	0.000	0.000
					C	0.000	70.000		100.00	0.000	0.000

Tower Pressure - With Ice

G_H = 1.690

Section Elevation ft	z ft	K_Z	q_z psf	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 105.0000-80.0000	92.5000	1.342	4	0.7500	40.625	A	0.000	40.625	40.625	100.00	0.000	0.000
						B	0.000	40.625		100.00	0.000	0.000
						C	0.000	40.625		100.00	0.000	0.000
L2 80.0000-60.0000	70.0000	1.24	4	0.7500	42.500	A	0.000	42.500	42.500	100.00	0.000	0.000
						B	0.000	42.500		100.00	0.000	0.000
						C	0.000	42.500		100.00	0.000	0.000
L3 60.0000-40.0000	50.0000	1.126	4	0.7500	52.500	A	0.000	52.500	52.500	100.00	0.000	0.000
						B	0.000	52.500		100.00	0.000	0.000
						C	0.000	52.500		100.00	0.000	0.000
L4 40.0000-20.0000	30.0000	1	3	0.7500	62.500	A	0.000	62.500	62.500	100.00	0.000	0.000
						B	0.000	62.500		100.00	0.000	0.000
						C	0.000	62.500		100.00	0.000	0.000
L5 20.0000-0.0000	10.0000	1	3	0.7500	72.500	A	0.000	72.500	72.500	100.00	0.000	0.000
						B	0.000	72.500		100.00	0.000	0.000
						C	0.000	72.500		100.00	0.000	0.000

Tower Pressure - Service

G_H = 1.690

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg %	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
L1 105.0000-80.0000	92.5000	1.342	9	37.500	A	0.000	37.500	37.500	100.00	0.000	0.000
					B	0.000	37.500		100.00	0.000	0.000
					C	0.000	37.500		100.00	0.000	0.000
L2 80.0000-60.0000	70.0000	1.24	8	40.000	A	0.000	40.000	40.000	100.00	0.000	0.000
					B	0.000	40.000		100.00	0.000	0.000
					C	0.000	40.000		100.00	0.000	0.000
L3 60.0000-40.0000	50.0000	1.126	7	50.000	A	0.000	50.000	50.000	100.00	0.000	0.000
					B	0.000	50.000		100.00	0.000	0.000
					C	0.000	50.000		100.00	0.000	0.000
L4 40.0000-20.0000	30.0000	1	6	60.000	A	0.000	60.000	60.000	100.00	0.000	0.000
					B	0.000	60.000		100.00	0.000	0.000
					C	0.000	60.000		100.00	0.000	0.000
L5 20.0000-0.0000	10.0000	1	6	70.000	A	0.000	70.000	70.000	100.00	0.000	0.000
					B	0.000	70.000		100.00	0.000	0.000
					C	0.000	70.000		100.00	0.000	0.000

Load Combinations

Comb. No.	Description
1	Dead Only
2	Dead+Wind 0 deg - No Ice
3	Dead+Wind 30 deg - No Ice
4	Dead+Wind 60 deg - No Ice
5	Dead+Wind 90 deg - No Ice
6	Dead+Wind 120 deg - No Ice
7	Dead+Wind 150 deg - No Ice
8	Dead+Wind 180 deg - No Ice
9	Dead+Wind 210 deg - No Ice
10	Dead+Wind 240 deg - No Ice
11	Dead+Wind 270 deg - No Ice
12	Dead+Wind 300 deg - No Ice
13	Dead+Wind 330 deg - No Ice
14	Dead+Ice+Temp
15	Dead+Wind 0 deg+Ice+Temp
16	Dead+Wind 30 deg+Ice+Temp
17	Dead+Wind 60 deg+Ice+Temp
18	Dead+Wind 90 deg+Ice+Temp
19	Dead+Wind 120 deg+Ice+Temp
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	105 - 80	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-8.24	2.77	1.61
			Max. Mx	11	-5.89	116.32	-2.33
			Max. My	2	-5.88	-1.79	119.31
			Max. Vy	11	-5.62	116.32	-2.33
			Max. Vx	2	-5.76	-1.79	119.31
			Max. Torque	9			-4.27
L2	80 - 60	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-10.79	2.79	1.63
			Max. Mx	11	-8.01	237.89	-4.78
			Max. My	2	-8.01	-4.22	243.72
			Max. Vy	11	-6.53	237.89	-4.78
			Max. Vx	2	-6.67	-4.22	243.72
			Max. Torque	9			-4.27
L3	60 - 40	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-13.93	2.78	1.62
			Max. Mx	11	-10.63	378.56	-7.22
			Max. My	2	-10.62	-6.65	387.23
			Max. Vy	11	-7.53	378.56	-7.22

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vx	2	-7.67	-6.65	387.23
			Max. Torque	3			4.27
L4	40 - 20	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-17.66	2.75	1.61
			Max. Mx	11	-13.73	539.81	-9.65
			Max. My	2	-13.72	-9.08	551.30
			Max. Vy	11	-8.59	539.81	-9.65
			Max. Vx	2	-8.73	-9.08	551.30
			Max. Torque	3			4.26
L5	20 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-21.98	2.72	1.59
			Max. Mx	11	-17.31	723.68	-12.06
			Max. My	2	-17.31	-11.49	737.96
			Max. Vy	5	9.80	-720.96	13.65
			Max. Vx	2	-9.93	-11.49	737.96
			Max. Torque	3			4.26

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	14	21.98	-0.00	-0.00
	Max. H_x	11	17.31	9.79	-0.12
	Max. H_z	2	17.31	-0.12	9.93
	Max. M_x	2	737.96	-0.12	9.93
	Max. M_z	5	720.96	-9.79	0.12
	Max. Torsion	3	4.26	-5.00	8.66
	Min. Vert	36	17.31	3.39	-0.04
	Min. H_x	5	17.31	-9.79	0.12
	Min. H_z	8	17.31	0.12	-9.93
	Min. M_x	8	-736.37	0.12	-9.93
	Min. M_z	11	-723.68	9.79	-0.12
	Min. Torsion	9	-4.26	5.00	-8.66

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	17.31	0.00	0.00	-0.76	1.32	0.00
Dead+Wind 0 deg - No Ice	17.31	0.12	-9.93	-737.96	-11.49	-3.68
Dead+Wind 30 deg - No Ice	17.31	5.00	-8.66	-645.62	-370.93	-4.26
Dead+Wind 60 deg - No Ice	17.31	8.54	-5.07	-380.50	-630.61	-3.71
Dead+Wind 90 deg - No Ice	17.31	9.79	-0.12	-13.65	-720.96	-2.16
Dead+Wind 120 deg - No Ice	17.31	8.42	4.86	356.66	-617.76	-0.03
Dead+Wind 150 deg - No Ice	17.31	4.79	8.54	631.17	-348.65	2.11
Dead+Wind 180 deg - No Ice	17.31	-0.12	9.93	736.37	14.22	3.68
Dead+Wind 210 deg - No Ice	17.31	-5.00	8.66	644.04	373.66	4.26
Dead+Wind 240 deg - No Ice	17.31	-8.54	5.07	378.92	633.34	3.71
Dead+Wind 270 deg - No Ice	17.31	-9.79	0.12	12.06	723.68	2.16
Dead+Wind 300 deg - No Ice	17.31	-8.42	-4.86	-358.25	620.50	0.03
Dead+Wind 330 deg - No Ice	17.31	-4.79	-8.54	-632.78	351.40	-2.11
Dead+Ice+Temp	21.98	0.00	0.00	-1.59	2.72	0.00
Dead+Wind 0 deg+Ice+Temp	21.98	0.01	-2.09	-163.93	1.25	-0.81
Dead+Wind 30 deg+Ice+Temp	21.98	1.05	-1.81	-143.00	-78.73	-0.95
Dead+Wind 60 deg+Ice+Temp	21.98	1.80	-1.06	-84.20	-136.86	-0.82
Dead+Wind 90	21.98	2.07	-0.01	-3.28	-157.54	-0.48

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
deg+Ice+Temp						
Dead+Wind 120 deg+Ice+Temp	21.98	1.78	1.03	78.06	-135.24	-0.01
Dead+Wind 150 deg+Ice+Temp	21.98	1.02	1.80	138.05	-75.94	0.47
Dead+Wind 180 deg+Ice+Temp	21.98	-0.01	2.09	160.59	4.47	0.81
Dead+Wind 210 deg+Ice+Temp	21.98	-1.05	1.81	139.66	84.46	0.95
Dead+Wind 240 deg+Ice+Temp	21.98	-1.80	1.06	80.85	142.58	0.82
Dead+Wind 270 deg+Ice+Temp	21.98	-2.07	0.01	-0.06	163.26	0.48
Dead+Wind 300 deg+Ice+Temp	21.98	-1.78	-1.03	-81.41	140.97	0.01
Dead+Wind 330 deg+Ice+Temp	21.98	-1.02	-1.80	-141.39	81.67	-0.47
Dead+Wind 0 deg - Service	17.31	0.04	-3.44	-255.89	-3.08	-1.28
Dead+Wind 30 deg - Service	17.31	1.73	-3.00	-223.94	-127.46	-1.48
Dead+Wind 60 deg - Service	17.31	2.96	-1.75	-132.20	-217.32	-1.28
Dead+Wind 90 deg - Service	17.31	3.39	-0.04	-5.24	-248.54	-0.75
Dead+Wind 120 deg - Service	17.31	2.91	1.68	122.88	-212.84	-0.01
Dead+Wind 150 deg - Service	17.31	1.66	2.95	217.86	-119.73	0.73
Dead+Wind 180 deg - Service	17.31	-0.04	3.44	254.30	5.82	1.28
Dead+Wind 210 deg - Service	17.31	-1.73	3.00	222.35	130.20	1.48
Dead+Wind 240 deg - Service	17.31	-2.96	1.75	130.61	220.07	1.28
Dead+Wind 270 deg - Service	17.31	-3.39	0.04	3.65	251.29	0.75
Dead+Wind 300 deg - Service	17.31	-2.91	-1.68	-124.47	215.58	0.01
Dead+Wind 330 deg - Service	17.31	-1.66	-2.95	-219.45	122.48	-0.73

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX	PY	PZ	PX	PY	PZ	% Error
	K	K	K	K	K	K	
1	0.00	-17.31	0.00	-0.00	17.31	-0.00	0.003%
2	0.12	-17.31	-9.93	-0.12	17.31	9.93	0.001%
3	5.00	-17.31	-8.66	-5.00	17.31	8.66	0.001%
4	8.54	-17.31	-5.07	-8.54	17.31	5.07	0.000%
5	9.79	-17.31	-0.12	-9.79	17.31	0.12	0.000%
6	8.42	-17.31	4.86	-8.42	17.31	-4.86	0.000%
7	4.79	-17.31	8.54	-4.79	17.31	-8.54	0.001%
8	-0.12	-17.31	9.93	0.12	17.31	-9.93	0.000%
9	-5.00	-17.31	8.66	5.00	17.31	-8.66	0.000%
10	-8.54	-17.31	5.07	8.54	17.31	-5.07	0.000%
11	-9.79	-17.31	0.12	9.79	17.31	-0.12	0.001%
12	-8.42	-17.31	-4.86	8.42	17.31	4.86	0.000%
13	-4.79	-17.31	-8.54	4.79	17.31	8.54	0.000%
14	0.00	-21.98	0.00	-0.00	21.98	-0.00	0.007%
15	0.01	-21.98	-2.09	-0.01	21.98	2.09	0.000%
16	1.05	-21.98	-1.81	-1.05	21.98	1.81	0.000%
17	1.80	-21.98	-1.06	-1.80	21.98	1.06	0.000%
18	2.07	-21.98	-0.01	-2.07	21.98	0.01	0.000%
19	1.78	-21.98	1.03	-1.78	21.98	-1.03	0.000%
20	1.02	-21.98	1.80	-1.02	21.98	-1.80	0.000%
21	-0.01	-21.98	2.09	0.01	21.98	-2.09	0.000%
22	-1.05	-21.98	1.81	1.05	21.98	-1.81	0.000%
23	-1.80	-21.98	1.06	1.80	21.98	-1.06	0.000%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
24	-2.07	-21.98	0.01	2.07	21.98	-0.01	0.000%
25	-1.78	-21.98	-1.03	1.78	21.98	1.03	0.000%
26	-1.02	-21.98	-1.80	1.02	21.98	1.80	0.000%
27	0.04	-17.31	-3.44	-0.04	17.31	3.44	0.002%
28	1.73	-17.31	-3.00	-1.73	17.31	3.00	0.002%
29	2.96	-17.31	-1.75	-2.96	17.31	1.75	0.002%
30	3.39	-17.31	-0.04	-3.39	17.31	0.04	0.005%
31	2.91	-17.31	1.68	-2.91	17.31	-1.68	0.005%
32	1.66	-17.31	2.96	-1.66	17.31	-2.95	0.005%
33	-0.04	-17.31	3.44	0.04	17.31	-3.44	0.002%
34	-1.73	-17.31	3.00	1.73	17.31	-3.00	0.002%
35	-2.96	-17.31	1.75	2.96	17.31	-1.75	0.002%
36	-3.39	-17.31	0.04	3.39	17.31	-0.04	0.005%
37	-2.91	-17.31	-1.68	2.91	17.31	1.68	0.005%
38	-1.66	-17.31	-2.96	1.66	17.31	2.95	0.005%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	6	0.00000001	0.00001647
2	Yes	14	0.00000001	0.00009256
3	Yes	14	0.00000001	0.00009494
4	Yes	14	0.00000001	0.00014156
5	Yes	14	0.00000001	0.00005827
6	Yes	14	0.00000001	0.00005853
7	Yes	13	0.00000001	0.00013679
8	Yes	14	0.00000001	0.00009848
9	Yes	15	0.00000001	0.00005692
10	Yes	14	0.00000001	0.00008653
11	Yes	13	0.00000001	0.00013925
12	Yes	14	0.00000001	0.00006123
13	Yes	14	0.00000001	0.00010239
14	Yes	6	0.00000001	0.00011314
15	Yes	13	0.00000001	0.00009756
16	Yes	13	0.00000001	0.00009768
17	Yes	13	0.00000001	0.00009498
18	Yes	13	0.00000001	0.00008900
19	Yes	13	0.00000001	0.00008868
20	Yes	13	0.00000001	0.00009022
21	Yes	13	0.00000001	0.00009294
22	Yes	13	0.00000001	0.00009853
23	Yes	13	0.00000001	0.00009903
24	Yes	13	0.00000001	0.00009698
25	Yes	13	0.00000001	0.00009842
26	Yes	13	0.00000001	0.00009909
27	Yes	12	0.00000001	0.00009252
28	Yes	12	0.00000001	0.00009279
29	Yes	12	0.00000001	0.00009935
30	Yes	11	0.00000001	0.00013759
31	Yes	11	0.00000001	0.00007142
32	Yes	11	0.00000001	0.00010612
33	Yes	12	0.00000001	0.00009300
34	Yes	12	0.00000001	0.00011499
35	Yes	12	0.00000001	0.00008069
36	Yes	11	0.00000001	0.00013813
37	Yes	11	0.00000001	0.00007467
38	Yes	11	0.00000001	0.00014790

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	105 - 80	8.509	28	0.7733	0.0278
L2	80 - 60	4.735	28	0.6072	0.0111
L3	60 - 40	2.533	28	0.4229	0.0055
L4	40 - 20	1.077	28	0.2599	0.0027
L5	20 - 0	0.264	28	0.1202	0.0010

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
105.0000	ERICSSON AIR 21 B4A B2P w/ Mount Pipe	28	8.509	0.7733	0.0278	25653
95.0000	800 10504 w/ Mount Pipe	28	6.918	0.7133	0.0202	12826

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	105 - 80	24.575	3	2.2304	0.0802
L2	80 - 60	13.678	3	1.7541	0.0320
L3	60 - 40	7.318	3	1.2217	0.0159
L4	40 - 20	3.112	3	0.7508	0.0077
L5	20 - 0	0.763	3	0.3474	0.0030

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
105.0000	ERICSSON AIR 21 B4A B2P w/ Mount Pipe	3	24.575	2.2304	0.0802	9002
95.0000	800 10504 w/ Mount Pipe	3	19.982	2.0602	0.0584	4500

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	105 - 80 (1)	P18x3/8	25.0000	0.0000	0.0	25.200	20.7640	-5.88	523.25	0.011
L2	80 - 60 (2)	P24x3/8	20.0000	0.0000	0.0	25.200	27.8325	-8.00	701.38	0.011
L3	60 - 40 (3)	P30x3/8	20.0000	0.0000	0.0	25.075	34.9011	-10.62	875.15	0.012
L4	40 - 20 (4)	P36x3/8	20.0000	0.0000	0.0	23.696	41.9697	-13.72	994.51	0.014
L5	20 - 0 (5)	P42x3/8	20.0000	0.0000	0.0	22.711	49.0383	-17.31	1113.69	0.016

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	105 - 80 (1)	P18x3/8	120.32	16.109	27.720	0.581	0.00	0.000	27.720	0.000
L2	80 - 60 (2)	P24x3/8	246.15	18.249	27.720	0.658	0.00	0.000	27.720	0.000
L3	60 - 40 (3)	P30x3/8	391.07	18.382	25.075	0.733	0.00	0.000	25.075	0.000
L4	40 - 20 (4)	P36x3/8	556.54	18.053	23.696	0.762	0.00	0.000	23.696	0.000
L5	20 - 0 (5)	P42x3/8	744.59	17.666	22.711	0.778	0.00	0.000	22.711	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	105 - 80 (1)	P18x3/8	5.84	0.562	16.800	0.033	4.27	0.286	16.800	0.017
L2	80 - 60 (2)	P24x3/8	6.74	0.484	16.800	0.029	4.27	0.158	16.800	0.009
L3	60 - 40 (3)	P30x3/8	7.75	0.444	16.800	0.026	4.26	0.100	15.644	0.006
L4	40 - 20 (4)	P36x3/8	8.80	0.419	16.800	0.025	4.26	0.069	13.388	0.005
L5	20 - 0 (5)	P42x3/8	10.00	0.408	16.800	0.024	4.26	0.051	11.926	0.004

Pole Interaction Design Data

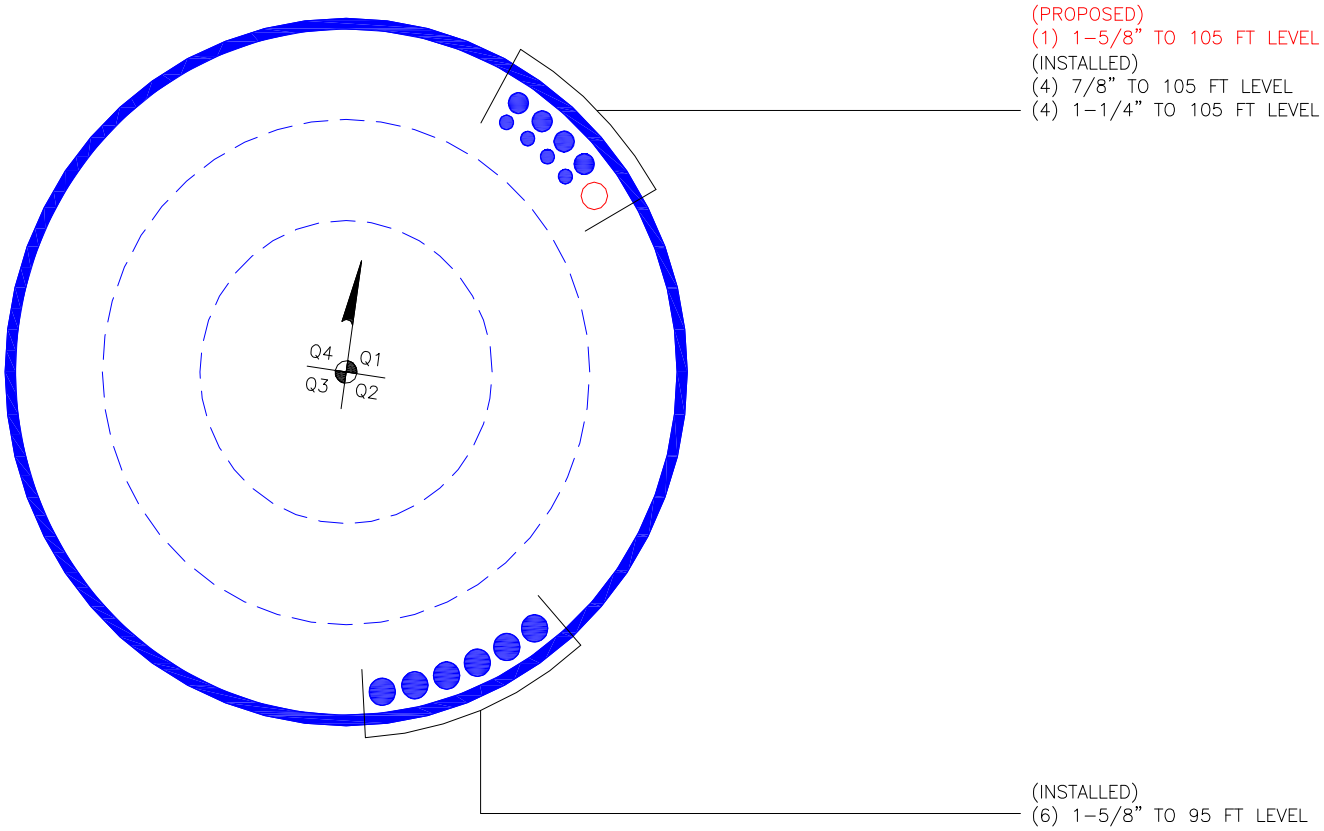
Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	105 - 80 (1)	0.011	0.581	0.000	0.033	0.017	0.595 ✔	1.333	H1-3+VT ✔
L2	80 - 60 (2)	0.011	0.658	0.000	0.029	0.009	0.671 ✔	1.333	H1-3+VT ✔
L3	60 - 40 (3)	0.012	0.733	0.000	0.026	0.006	0.746 ✔	1.333	H1-3+VT ✔
L4	40 - 20 (4)	0.014	0.762	0.000	0.025	0.005	0.777 ✔	1.333	H1-3+VT ✔
L5	20 - 0 (5)	0.016	0.778	0.000	0.024	0.004	0.794 ✔	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	105 - 80	Pole	P18x3/8	1	-5.88	697.49	44.6	Pass
L2	80 - 60	Pole	P24x3/8	2	-8.00	934.94	50.4	Pass
L3	60 - 40	Pole	P30x3/8	3	-10.62	1166.57	56.0	Pass
L4	40 - 20	Pole	P36x3/8	4	-13.72	1325.68	58.3	Pass
L5	20 - 0	Pole	P42x3/8	5	-17.31	1484.55	59.6	Pass
							Summary	
						Pole (L5)	59.6	Pass
						RATING =	**59.6**	**Pass**

APPENDIX B

BASE LEVEL DRAWING


(PROPOSED)
(1) 1-5/8" TO 105 FT LEVEL
(INSTALLED)
(4) 7/8" TO 105 FT LEVEL
(4) 1-1/4" TO 105 FT LEVEL
Q4
Q1
Q3
Q2
(INSTALLED)
(6) 1-5/8" TO 95 FT LEVEL

APPENDIX C

ADDITIONAL CALCULATIONS

Stiffened or Unstiffened, Exterior Flange Plate - Any Bolt Material TIA Rev F

Site Data

BU#: *823631*
Site Name: *Danubury/Rt 7*
App #:

Pole Manufacturer:	Pirod

Reactions		
Moment:	120.32	ft-kips
Axial:	5.88	kips
Shear:	5.84	kips
Elevation:	80	feet

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

Bolt Data			
Qty:	16		
Diameter (in.):	1	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:	0	<-- Disregard	Bolt Fty:
N/A:	0	<-- Disregard	44.00
Circle (in.):	21		

Plate Data		
Diam:	24	in
Thick, t:	1.25	in
Grade (Fy):	36	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	3.53	in

Stiffener Data (Welding at Both Sides)		
Config:	2	*
Weld Type:	Fillet	
Groove Depth:	0	<-- Disregard
Groove Angle:	0	<-- Disregard
Fillet H. Weld:	0.375	in
Fillet V. Weld:	0.3125	in
Width:	5	in
Height:	3	in
Thick:	0.375	in
Notch:	0.5	in
Grade:	36	ksi
Weld str.:	70	ksi

Pole Data		
Diam:	18	in
Thick:	0.375	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	63	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor		
ASIF:	1.3333333	

Flange Bolt Results — Rigid (Service, ASD; Fty*ASIF)

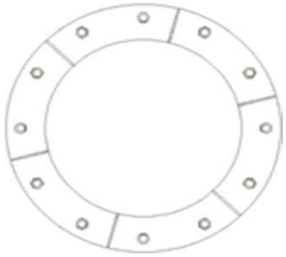
Bolt Tension Capacity, **B**:	46.08	kips	
Max Bolt directly applied T:	16.82	Kips	
Min. PL "tc" for **B** cap. **w/o** Pry:	1.474	in	
Min PL "treq" for actual **T w/ Pry**:	0.683	in	
Min PL "t1" for actual **T w/o Pry**:	0.891	in	
T allowable with Prying:	41.76	kips	0≤α'≤1 case
Prying Force, Q:	0.00	kips	
Total Bolt Tension=T+Q:	16.82	kips	
Prying Bolt Stress Ratio=(T+Q)/(B):	36.5%	**Pass**	

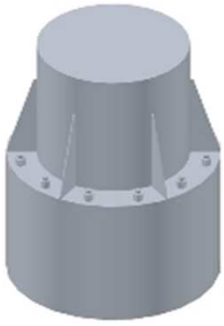
Exterior Flange Plate Results — Flexural Check — Rigid (Service ASD; 0.75*Fy*ASIF; Comp. Y.L. Length: 10.82)

Compression Side Plate Stress:	Rohn/Pirod,	OK
Allowable Plate Stress:	36.0	ksi
Compression Plate Stress Ratio:	Rohn/Pirod,	OK
No Prying		
Tension Side Stress Ratio, (treq/t)^2:	29.9%	**Pass**

b/Le>2, Stiffeners are not fully effective

Stiffener Results	N/A for Rohn / Pirod
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

Stiffened or Unstiffened, Interior Flange Plate - Any Bolt Material TIA Rev F

Site Data

BU#: *823631*
Site Name: *Danubury/Rt 7*
App #:

Manufacturer:	Pirod

Reactions

Moment:	120.32	ft-kips
Axial:	5.88	kips
Shear:	5.84	kips
Exterior Flange Run, T+Q:	16.82	kips

Elevation: 80 feet

Bolt Data

Qty:	16		
Diam:	1	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:	0	<-- Disregard	Bolt Fty:
N/A:	0	<-- Disregard	44.00
Circle:	21	in	

Interior Flange Bolt Results

Maximum Bolt Tension:	16.8	Kips, Ext. T=Interior T
Allowable Tension:	46.1	Kips
Bolt Stress Ratio:	36.5%	**Pass**

Plate Data

Plate Outer Diam:	23.25	in
Plate Inner Diam:	Butt	in (Hole @ Ctr)
Thick:	1.25	in
Grade:	36	ksi
Effective Width:	4.57	in

Interior Flange Plate Results Flexural Check

Controlling Bolt Axial Force:	17.6	Kips, Ext. C= Interior C
Plate Stress:	Rohn/Pirod	OK
Allowable Plate Stress:	36.0	ksi
Plate Stress Ratio:	Rohn/Pirod	OK

Stiffener Data (Welding at Both Sides)

Config:	2	*
Weld Type:	Fillet	
Groove Depth:	0	<-- Disregard
Groove Angle:	0	<-- Disregard
Fillet H. Weld:	0.375	in
Fillet V. Weld:	0.3125	in
Width:	5	in
Height:	3	in
Thick:	0.375	in
Notch:	0.5	in
Grade:	36	ksi
Weld str.:	70	ksi

#VALUE!

Stiffener Results N/A for Rohn / Pirod

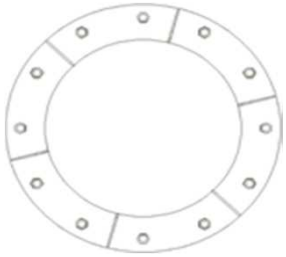
Horizontal Weld :	N/A
Vertical Weld:	N/A
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	N/A
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	N/A
Plate Comp. (AISC Bracket):	N/A

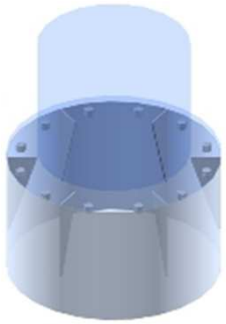
Pole Results

Pole Punching Shear Check: N/A

Pole Data

Pole OuterDiam:	24	in
Thick:	0.375	in
Pole Inner Diam:	23.25	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	63	ksi





Stress Increase Factor

ASIF:	1.3333333	

* 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

Stiffened or Unstiffened, Exterior Flange Plate - Any Bolt Material TIA Rev F

Site Data

BU#: *823631*
Site Name: *Danubury/Rt 7*
App #:

Pole Manufacturer:	Pirod

Reactions		
Moment:	246.15	ft-kips
Axial:	8	kips
Shear:	6.74	kips
Elevation:	60	feet

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

Bolt Data			
Qty:	20		
Diameter (in.):	1	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:	0	<-- Disregard	Bolt Fty:
N/A:	0	<-- Disregard	44.00
Circle (in.):	27		

Plate Data		
Diam:	30	in
Thick, t:	1.25	in
Grade (Fy):	36	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	3.77	in

Stiffener Data (Welding at Both Sides)		
Config:	2	*
Weld Type:	Fillet	
Groove Depth:	0	<-- Disregard
Groove Angle:	0	<-- Disregard
Fillet H. Weld:	0.375	in
Fillet V. Weld:	0.3125	in
Width:	5	in
Height:	3	in
Thick:	0.375	in
Notch:	0.5	in
Grade:	36	ksi
Weld str.:	70	ksi

Pole Data		
Diam:	24	in
Thick:	0.375	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	63	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor		
ASIF:	1.3333333	

Flange Bolt Results — Rigid: Service, ASD; Fty*ASIF

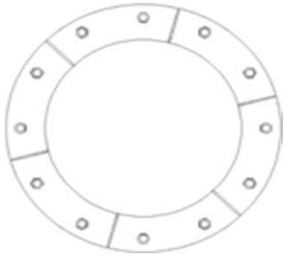
Bolt Tension Capacity, **B**:	46.08	kips	
Max Bolt directly applied T:	21.48	Kips	
Min. PL "tc" for **B** cap. **w/o** Pry:	1.427	in	
Min PL "treq" for actual **T w/ Pry**:	0.743	in	
Min PL "t1" for actual **T w/o Pry**:	0.974	in	
T allowable with Prying:	42.50	kips	0≤α'≤1 case
Prying Force, Q:	0.00	kips	
Total Bolt Tension=T+Q:	21.48	kips	
Prying Bolt Stress Ratio=(T+Q)/(B):	46.6%	**Pass**	

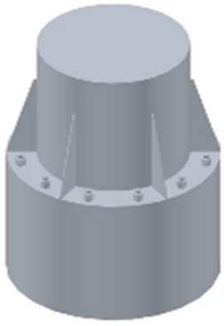
Exterior Flange Plate Results — Flexural Check — Rigid: Service ASD; 0.75*Fy*ASIF; Comp. Y.L. Length: 12.37

Compression Side Plate Stress:	Rohn/Pirod,	OK
Allowable Plate Stress:	36.0	ksi
Compression Plate Stress Ratio:	Rohn/Pirod,	OK
No Prying		
Tension Side Stress Ratio, (treq/t)^2:	35.4%	**Pass**

b/Le>2, Stiffeners are not fully effective

Stiffener Results	N/A for Rohn / Pirod
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

Stiffened or Unstiffened, Interior Flange Plate - Any Bolt Material TIA Rev F

Site Data

BU#: *823631*
Site Name: *Danubury/Rt 7*
App #:

Manufacturer:	Pirod

Reactions

Moment:	246.15	ft-kips
Axial:	8	kips
Shear:	6.74	kips
Exterior Flange Run, T+Q:	21.48	kips

Elevation: 60 feet

Bolt Data

Qty:	20		
Diam:	1	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:	0	<-- Disregard	Bolt Fty:
N/A:	0	<-- Disregard	44.00
Circle:	27	in	

Interior Flange Bolt Results

Maximum Bolt Tension:	21.5	Kips, Ext. T=Interior T
Allowable Tension:	46.1	Kips
Bolt Stress Ratio:	46.6%	**Pass**

Plate Data

Plate Outer Diam:	29.25	in
Plate Inner Diam:	Butt	in (Hole @ Ctr)
Thick:	1.25	in
Grade:	36	ksi
Effective Width:	4.59	in

Interior Flange Plate Results Flexural Check

Controlling Bolt Axial Force:	22.3	Kips, Ext. C= Interior C
Plate Stress:	Rohn/Pirod	OK
Allowable Plate Stress:	36.0	ksi
Plate Stress Ratio:	Rohn/Pirod	OK

Stiffener Data (Welding at Both Sides)

Config:	2	*
Weld Type:	Fillet	
Groove Depth:	0	<-- Disregard
Groove Angle:	0	<-- Disregard
Fillet H. Weld:	0.375	in
Fillet V. Weld:	0.3125	in
Width:	5	in
Height:	3	in
Thick:	0.375	in
Notch:	0.5	in
Grade:	36	ksi
Weld str.:	70	ksi

#VALUE!

Stiffener Results N/A for Rohn / Pirod

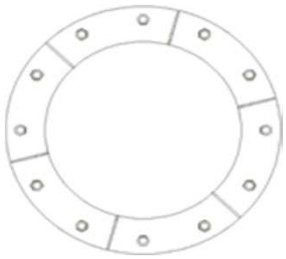
Horizontal Weld :	N/A
Vertical Weld:	N/A
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	N/A
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	N/A
Plate Comp. (AISC Bracket):	N/A

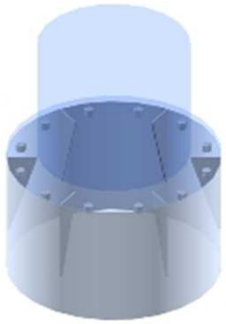
Pole Results

Pole Punching Shear Check: N/A

Pole Data

Pole OuterDiam:	30	in
Thick:	0.375	in
Pole Inner Diam:	29.25	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	63	ksi





Stress Increase Factor

ASIF:	1.3333333	

* 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

Stiffened or Unstiffened, Exterior Flange Plate - Any Bolt Material TIA Rev F

Site Data

BU#: *823631*
Site Name: *Danubury/Rt 7*
App #:

Pole Manufacturer:	Pirod

Reactions		
Moment:	391.07	ft-kips
Axial:	10.62	kips
Shear:	7.75	kips
Elevation:	40	feet

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

Bolt Data			
Qty:	24		
Diameter (in.):	1	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:	0	<-- Disregard	Bolt Fty:
N/A:	0	<-- Disregard	44.00
Circle (in.):	33		

Plate Data		
Diam:	36	in
Thick, t:	1.25	in
Grade (Fy):	36	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	3.93	in

Stiffener Data (Welding at Both Sides)		
Config:	2	*
Weld Type:	Fillet	
Groove Depth:	0	<-- Disregard
Groove Angle:	0	<-- Disregard
Fillet H. Weld:	0.375	in
Fillet V. Weld:	0.3125	in
Width:	5	in
Height:	3	in
Thick:	0.375	in
Notch:	0.5	in
Grade:	36	ksi
Weld str.:	70	ksi

Pole Data		
Diam:	30	in
Thick:	0.375	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	63	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor	
ASIF:	1.3333333

Flange Bolt Results

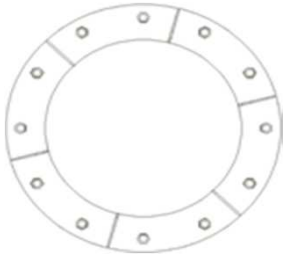
			Rigid
Bolt Tension Capacity, **B**:	46.08	kips	Service, ASD
Max Bolt directly applied T:	23.26	Kips	Fty*ASIF
Min. PL "tc" for **B** cap. **w/o** Pry:	1.398	in	
Min PL "treq" for actual **T w/ Pry**:	0.756	in	
Min PL "t1" for actual **T w/o Pry**:	0.994	in	
T allowable with Prying:	42.99	kips	0≤α'≤1 case
Prying Force, Q:	0.00	kips	
Total Bolt Tension=T+Q:	23.26	kips	
Prying Bolt Stress Ratio=(T+Q)/(B):	50.5%	**Pass**	

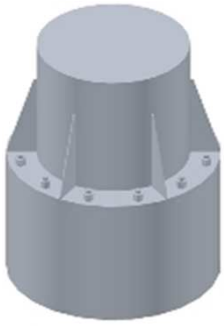
Exterior Flange Plate Results — Flexural Check

			Rigid
Compression Side Plate Stress:	Rohn/Pirod,	OK	Service ASD
Allowable Plate Stress:	36.0	ksi	0.75*Fy*ASIF
Compression Plate Stress Ratio:	Rohn/Pirod,	OK	Comp. Y.L. Length:
No Prying			13.75
Tension Side Stress Ratio, (treq/t)^2:	36.5%	**Pass**	

b/Le>2, Stiffeners are not fully effective

Stiffener Results	N/A for Rohn / Pirod
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

Stiffened or Unstiffened, Interior Flange Plate - Any Bolt Material TIA Rev F

Site Data

BU#: *823631*
Site Name: *Danubury/Rt 7*
App #:

Manufacturer:	Pirod

Reactions

Moment:	391.07	ft-kips
Axial:	10.62	kips
Shear:	7.75	kips
Exterior Flange Run, T+Q:	23.26	kips

Elevation: 40 feet

Bolt Data

Qty:	24		
Diam:	1	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:	0	<-- Disregard	Bolt Fty:
N/A:	0	<-- Disregard	44.00
Circle:	33	in	

Interior Flange Bolt Results

Maximum Bolt Tension:	23.3	Kips, Ext. Flange T+Q
Allowable Tension:	46.1	Kips
Bolt Stress Ratio:	50.5%	**Pass**

Plate Data

Plate Outer Diam:	35.25	in
Plate Inner Diam:	Butt	in (Hole @ Ctr)
Thick:	1.25	in
Grade:	36	ksi
Effective Width:	4.61	in

Interior Flange Plate Results Flexural Check

Controlling Bolt Axial Force:	24.1	Kips, Ext. C= Interior C
Plate Stress:	Rohn/Pirod	OK
Allowable Plate Stress:	36.0	ksi
Plate Stress Ratio:	Rohn/Pirod	OK

Stiffener Data (Welding at Both Sides)

Config:	2	*
Weld Type:	Fillet	
Groove Depth:	0	<-- Disregard
Groove Angle:	0	<-- Disregard
Fillet H. Weld:	0.375	in
Fillet V. Weld:	0.3125	in
Width:	5	in
Height:	3	in
Thick:	0.375	in
Notch:	0.5	in
Grade:	36	ksi
Weld str.:	70	ksi

#VALUE!

Stiffener Results N/A for Rohn / Pirod

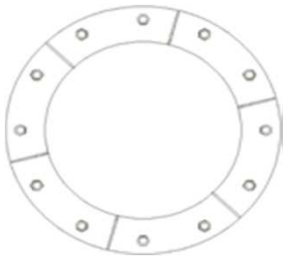
Horizontal Weld :	N/A
Vertical Weld:	N/A
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	N/A
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	N/A
Plate Comp. (AISC Bracket):	N/A

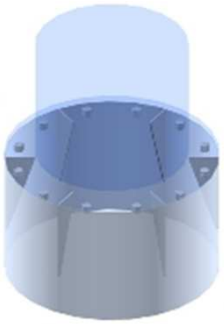
Pole Results

Pole Punching Shear Check: N/A

Pole Data

Pole OuterDiam:	36	in
Thick:	0.375	in
Pole Inner Diam:	35.25	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	63	ksi





Stress Increase Factor

ASIF:	1.3333333	

* 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

Stiffened or Unstiffened, Exterior Flange Plate - Any Bolt Material TIA Rev F

Site Data

BU#: *823631*
Site Name: *Danubury/Rt 7*
App #:

Pole Manufacturer:	Pirod

Reactions		
Moment:	556.54	ft-kips
Axial:	13.72	kips
Shear:	8.8	kips
Elevation:	20	feet

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

Bolt Data			
Qty:	28		
Diameter (in.):	1	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:	0	<-- Disregard	Bolt Fty:
N/A:	0	<-- Disregard	44.00
Circle (in.):	39		

Plate Data		
Diam:	42	in
Thick, t:	1.25	in
Grade (Fy):	36	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	4.04	in

Stiffener Data (Welding at Both Sides)		
Config:	2	*
Weld Type:	Fillet	
Groove Depth:	0	<-- Disregard
Groove Angle:	0	<-- Disregard
Fillet H. Weld:	0.375	in
Fillet V. Weld:	0.3125	in
Width:	5	in
Height:	3	in
Thick:	0.375	in
Notch:	0.5	in
Grade:	36	ksi
Weld str.:	70	ksi

Pole Data		
Diam:	36	in
Thick:	0.375	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	63	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor		
ASIF:	1.3333333	

Flange Bolt Results

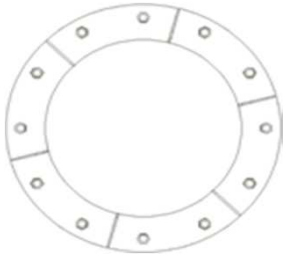
			Rigid
Bolt Tension Capacity, **B**:	46.08	kips	Service, ASD
Max Bolt directly applied T:	23.97	Kips	Fty*ASIF
Min. PL "tc" for **B** cap. **w/o** Pry:	1.379	in	
Min PL "treq" for actual **T w/ Pry**:	0.755	in	
Min PL "t1" for actual **T w/o Pry**:	0.995	in	
T allowable with Prying:	43.34	kips	0≤α'≤1 case
Prying Force, Q:	0.00	kips	
Total Bolt Tension=T+Q:	23.97	kips	
Prying Bolt Stress Ratio=(T+Q)/(B):	52.0%	**Pass**	

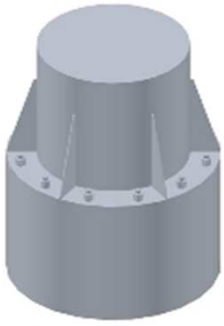
Exterior Flange Plate Results — Flexural Check

		Rigid
Compression Side Plate Stress:	Rohn/Pirod, OK	Service ASD
Allowable Plate Stress:	36.0 ksi	0.75*Fy*ASIF
Compression Plate Stress Ratio:	Rohn/Pirod, OK	Comp. Y.L. Length:
No Prying		15.00
Tension Side Stress Ratio, (treq/t)^2:	36.4% **Pass**	

b/Le>2, Stiffeners are not fully effective

Stiffener Results	N/A for Rohn / Pirod
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

Stiffened or Unstiffened, Interior Flange Plate - Any Bolt Material TIA Rev F

Site Data

BU#: *823631*
Site Name: *Danubury/Rt 7*
App #:

Manufacturer:	Pirod

Reactions

Moment:	556.54	ft-kips
Axial:	13.72	kips
Shear:	8.8	kips
Exterior Flange Run, T+Q:	23.97	kips

Elevation: 20 feet

Bolt Data

Qty:	28		
Diam:	1	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:	0	<-- Disregard	Bolt Fty:
N/A:	0	<-- Disregard	44.00
Circle:	39	in	

Interior Flange Bolt Results

Maximum Bolt Tension:	24.0	Kips, Ext. T=Interior T
Allowable Tension:	46.1	Kips
Bolt Stress Ratio:	52.0%	**Pass**

Plate Data

Plate Outer Diam:	41.25	in
Plate Inner Diam:	Butt	in (Hole @ Ctr)
Thick:	1.25	in
Grade:	36	ksi
Effective Width:	4.63	in

Interior Flange Plate Results Flexural Check

Controlling Bolt Axial Force:	25.0	Kips, Ext. C= Interior C
Plate Stress:	Rohn/Pirod	OK
Allowable Plate Stress:	36.0	ksi
Plate Stress Ratio:	Rohn/Pirod	OK

Stiffener Data (Welding at Both Sides)

Config:	2	*
Weld Type:	Fillet	
Groove Depth:	0	<-- Disregard
Groove Angle:	0	<-- Disregard
Fillet H. Weld:	0.375	in
Fillet V. Weld:	0.3125	in
Width:	5	in
Height:	3	in
Thick:	0.375	in
Notch:	0.5	in
Grade:	36	ksi
Weld str.:	70	ksi

#VALUE!

Stiffener Results N/A for Rohn / Pirod

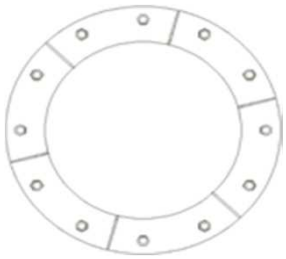
Horizontal Weld :	N/A
Vertical Weld:	N/A
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	N/A
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	N/A
Plate Comp. (AISC Bracket):	N/A

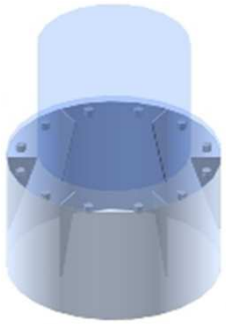
Pole Results

Pole Punching Shear Check: N/A

Pole Data

Pole OuterDiam:	42	in
Thick:	0.375	in
Pole Inner Diam:	41.25	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	63	ksi





Stress Increase Factor

ASIF:	1.3333333	

* 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

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

TIA Rev F

Site Data

BU#:	*823631*
Site Name:	*Danbury/Rt 7*
App #:	
Pole Manufacturer:	*Pirod*

Reactions		
Moment:	745	ft-kips
Axial:	17	kips
Shear:	10	kips

Anchor Rod Data		
Qty:	32	
Diam:	1	in
Rod Material:	Other	
Strength (Fu):	150	ksi
Yield (Fy):	105	ksi
Bolt Circle:	45	in

Plate Data		
Diam:	48	in
Thick:	1.25	in
Grade:	36	ksi
Single-Rod B-eff:	4.12	in

Stiffener Data (Welding at both sides)		
Config:	2	*
Weld Type:	Fillet	
Groove Depth:		<-- Disregard
Groove Angle:		<-- Disregard
Fillet H. Weld:	0.375	in
Fillet V. Weld:	0.3125	in
Width:	3	in
Height:	5	in
Thick:	0.375	in
Notch:	0.5	in
Grade:	36	ksi
Weld str.:	70	ksi

Pole Data		
Diam:	42	in
Thick:	0.375	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	63	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:	24.3 Kips	Rigid
Allowable Tension:	51.8 Kips	Service, ASD
Anchor Rod Stress Ratio:	46.9% **Pass**	Fty*ASIF

Base Plate Results Flexural Check

Base Plate Stress:	Rohn/Pirod, OK	Rigid
Allowable Plate Stress:	36.0 ksi	Service ASD
Base Plate Stress Ratio:	Rohn/Pirod, OK	0.75*Fy*ASIF
		Y.L. Length: 16.16

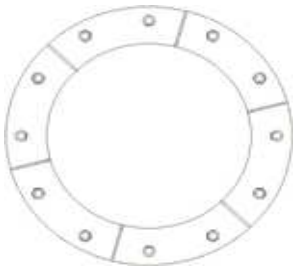
b/Le>2, Stiffeners are not fully effective

Stiffener Results N/A for Rohn / Pirod

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

Foundation Loads:

Pole weight or tower leg compression =	**17**	(kips)
Horizontal load at top of pier =	**10**	(kips)
Overturning moment at top of pier=	**745**	(ft-kips)

Design criteria:

Safety factor against overturning =	**2**	

Soil Properties:

Soil density =	**125**	(pcf)
Allowable soil bearing =	**8**	(ksf)
Depth to water table =	**99**	(ft)

Dimensions:

Pier shape (round or square)	**R**	("R" or "S")
Pier width =	**5**	(ft)
Pier height above grade =	**0.5**	(ft)
depth to bottom of footing =	**8.5**	(ft)
Footing thickness =	**3**	(ft)
Footing width =	**15**	(ft)
Footing length =	**15**	(ft)

Concrete:

Concrete strength =	**3**	(ksi)
Rebar strength =	**60**	(ksi)
ultimate load factor =	**1.3**	

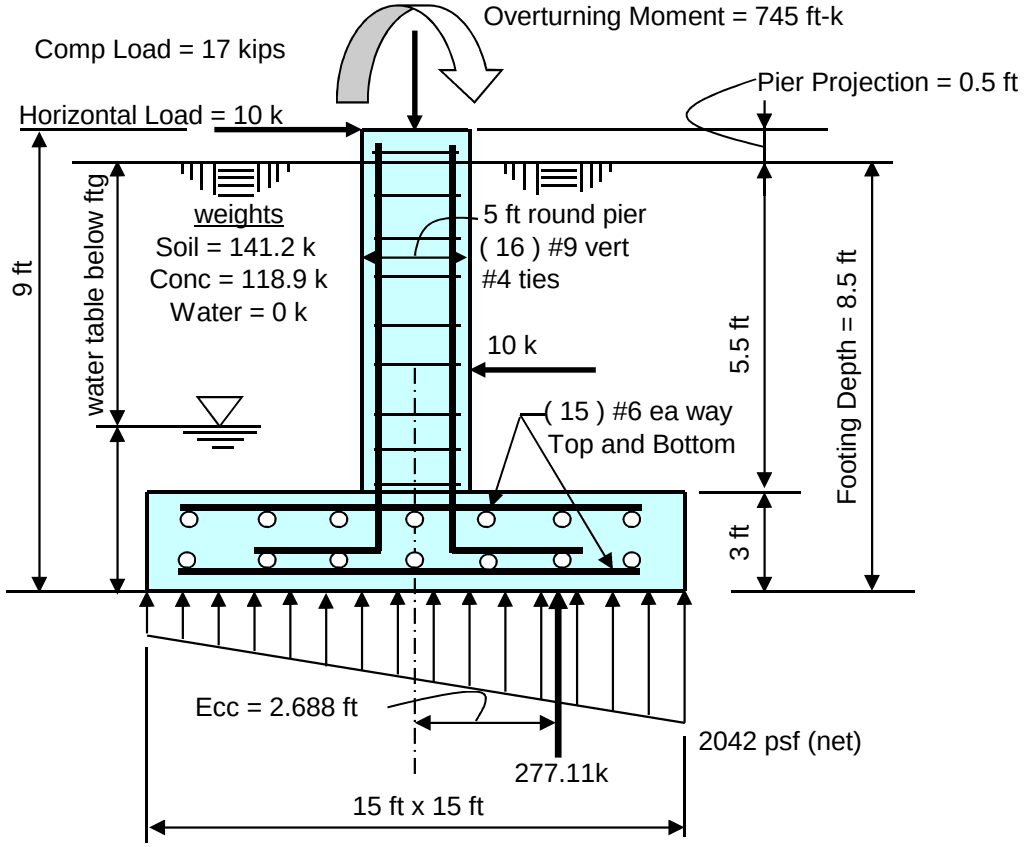
Reinforcing Steel:

	Pad	
minimum cover over rebar =	**3**	inches
size of pad rebar =	**#6**	bar
quantity of pad rebar =	**15**	(ea direction)

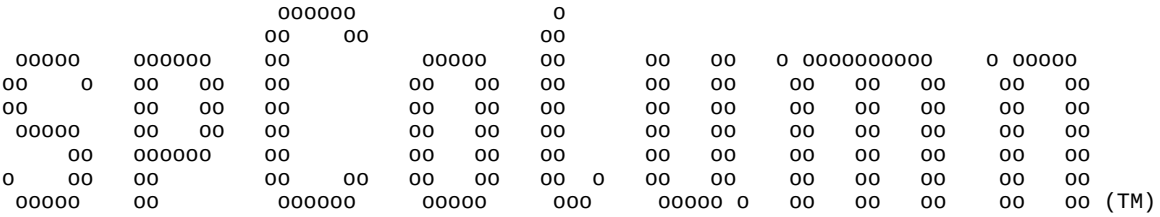
Reinforcing Steel:

	Pier	
size of vert rebar in pier=	**#9**	bar
vertical rebar quantity =	**16**	
size of pier ties =	**#4**	bar
minimum cover over rebar =	**3**	inches

Total volume of concrete = 29.4 cu yd



Summary of analysis results	
Maximum Net Soil Bearing = 2.042 ksf Allowable Net Soil Bearing = 8 ksf **Soil Bearing Stress Ratio = 0.26 Okay**	Ult Bending Shear Capacity = 110 psi Ult Bending Shear Stress = 16 psi **Bending Shear Stress Ratio = 0.15 Okay**
Ftg Overturning Resistance = 2078 ft-kips Overturning Moment = 745 ft-kips Required Overturning Safety Factor = 2 Overturning Safety Factor = 2.79 **Ratio = 0.72 Okay**	Pad Bending Moment Capacity= 934 ft-k Pad Bending Moment = 275 ft-k **Bending Moment Stress Ratio = 0.29 OK**



spColumn v4.80 (TM)
Computer program for the Strength Design of Reinforced Concrete Sections

General Information:
==========
File Name: G:\TOWER\375_Crown_Castle\2015\37515-1122_823631_DANBURY-RT 7\...\37515-1122.001.7805.col
Project: 37515-1122.001.7805
Column: Engineer: JWM
Code: ACI 318-02 Units: English

Run Option: Investigation Slenderness: Not considered
Run Axis: X-axis Column Type: Structural

Material Properties:
==========
f'c = 3 ksi fy = 60 ksi
Ec = 3122.02 ksi Es = 29000 ksi
Ultimate strain = 0.003 in/in
Beta1 = 0.85

Section:
========
Circular: Diameter = 60 in

Gross section area, Ag = 2827.43 in^2
Ix = 636173 in^4 Iy = 636173 in^4
rx = 15 in ry = 15 in
Xo = 0 in Yo = 0 in

Reinforcement:
==========
Bar Set: ASTM A615

Size	Diam (in)	Area (in^2)	Size	Diam (in)	Area (in^2)	Size	Diam (in)	Area (in^2)
# 3	0.38	0.11	# 4	0.50	0.20	# 5	0.63	0.31
# 6	0.75	0.44	# 7	0.88	0.60	# 8	1.00	0.79
# 9	1.13	1.00	# 10	1.27	1.27	# 11	1.41	1.56
# 14	1.69	2.25	# 18	2.26	4.00			

Confinement: Tied; #4 ties with #9 bars, #4 with larger bars.
phi(a) = 0.8, phi(b) = 0.9, phi(c) = 0.65

Layout: Circular
Pattern: All Sides Equal (Cover to longitudinal reinforcement)
Total steel area: As = 16.00 in^2 at rho = 0.57% (Note: rho < 1.0%)
Minimum clear spacing = 8.77 in

16 #9 Cover = 4.064 in

Factored Loads and Moments with Corresponding Capacities:
==========

No.	Pu kip	Mux k-ft	PhiMnx k-ft	PhiMn/Mu	NA depth in	Dt depth in	eps_t	Phi
1	17.00	1046.50	1773.14	1.694	9.93	55.37	0.01372	0.900

*** End of output ***

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

T-Mobile Existing Facility

Site ID: CT11092J

Danbury/Rt 7
36 Sugar Hollow Lake Road
Danbury, CT 06810

March 27, 2015

EBI Project Number: 6215001906

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general public allowable limit:	25.50 %

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

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March 27, 2015

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

Emissions Analysis for Site: **CT11092J – Danbury/Rt 7**

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **36 Sugar Hollow Lake Road, Danbury, CT**, for the purpose of determining whether the emissions from the Proposed T-Mobile Antenna Installation located on this property are within specified federal limits.

All information used in this report was analyzed as a percentage of current Maximum Permissible Exposure (% MPE) as listed in the FCC OET Bulletin 65 Edition 97-01and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter (μW/cm2). The number of $\mu W/cm^2$ calculated at each sample point is called the power density. The exposure limit for power density varies depending upon the frequencies being utilized. Wireless Carriers and Paging Services use different frequency bands each with different exposure limits, therefore it is necessary to report results and limits in terms of percent MPE rather than power density.

All results were compared to the FCC (Federal Communications Commission) radio frequency exposure rules, 47 CFR 1.1307(b)(1) – (b)(3), to determine compliance with the Maximum Permissible Exposure (MPE) limits for General Population/Uncontrolled environments as defined below.

General population/uncontrolled exposure limits apply to situations in which the general public may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Therefore, members of the general public would always be considered under this category when exposure is not employment related, for example, in the case of a telecommunications tower that exposes persons in a nearby residential area.

Public exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ($\mu W/cm^2$). The general population exposure limit for the 700 MHz Band is 467 $\mu W/cm^2$, and the general population exposure limit for the PCS and AWS bands is 1000 $\mu W/cm^2$. Because each carrier will be using different frequency bands, and each frequency band has different exposure limits, it is necessary to report percent of MPE rather than power density.

Occupational/controlled exposure limits apply to situations in which persons are exposed as a consequence of their employment and in which those persons who are exposed have been made fully aware of the potential for exposure and can exercise control over their exposure. Occupational/controlled exposure limits also apply where exposure is of a transient nature as a result of incidental passage through a location where exposure levels may be above general population/uncontrolled limits (see below), as long as the exposed person has been made fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means.

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were done for the proposed T-Mobile Wireless antenna facility located at **36 Sugar Hollow Lake Road, Danbury, 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) 1 LTE channel (700 MHz Band) was considered for each sector of the proposed installation. This channel has a transmit power of 30 Watts.

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

6) For the following calculations the sample point was the top of a six foot person standing at the base of the tower. The maximum gain of the antenna per the antenna manufactures supplied specifications minus 10 dB was used in this direction. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

7) The antennas used in this modeling are the **Ericsson AIR21 B4A/B2P** for 1900 MHz (PCS) and 2100 MHz (AWS) channels and the **Commscope LNX-6515DS-VTM** for 700 MHz channels. This is based on feedback from the carrier with regards to anticipated antenna selection. The **Ericsson AIR21 B4A/B2P** has a maximum gain of **15.9 dBd** at its main lobe. The **Commscope LNX-6515DS-VTM** has a maximum gain of **14.6 dBd** at its main lobe. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

8) The antenna mounting height centerline of the proposed antennas is **105 feet** above ground level (AGL).

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

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

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T-Mobile Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	**1**	Antenna #:	**1**	Antenna #:	**1**
Make / Model:	Ericsson AIR21 B4A/B2P	Make / Model:	Ericsson AIR21 B4A/B2P	Make / Model:	Ericsson AIR21 B4A/B2P
Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	105	Height (AGL):	105	Height (AGL):	105
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):	4,668.54	ERP (W):	4,668.54	ERP (W):	4,668.54
Antenna A1 MPE%	1.71	Antenna B1 MPE%	1.71	Antenna C1 MPE%	1.71
Antenna #:	**2**	Antenna #:	**2**	Antenna #:	**2**
Make / Model:	Ericsson AIR21 B2A/B4P	Make / Model:	Ericsson AIR21 B2A/B4P	Make / Model:	Ericsson AIR21 B2A/B4P
Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	105	Height (AGL):	105	Height (AGL):	105
Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)
Channel Count	4	Channel Count	4	Channel Count	4
Total TX Power:	120	Total TX Power:	120	Total TX Power:	120
ERP (W):	4,668.54	ERP (W):	4,668.54	ERP (W):	4,668.54
Antenna A2 MPE%	1.71	Antenna B2 MPE%	1.71	Antenna C2 MPE%	1.71
Antenna #:	**3**	Antenna #:	**3**	Antenna #:	**3**
Make / Model:	Commscope LNX-6515DS-VTM	Make / Model:	Commscope LNX-6515DS-VTM	Make / Model:	Commscope LNX-6515DS-VTM
Gain:	14.6 dBd	Gain:	14.6 dBd	Gain:	14.6 dBd
Height (AGL):	105	Height (AGL):	105	Height (AGL):	105
Frequency Bands	700 MHz	Frequency Bands	700 MHz	Frequency Bands	700 MHz
Channel Count	1	Channel Count	1	Channel Count	1
Total TX Power:	30	Total TX Power:	30	Total TX Power:	30
ERP (W):	865.21	ERP (W):	865.21	ERP (W):	865.21
Antenna A3 MPE%	0.68	Antenna B3 MPE%	0.68	Antenna C3 MPE%	0.68

Site Composite MPE%	
Carrier	**MPE%**
T-Mobile	**12.31**
MetroPCS	5.30 %
Nextel	7.89 %
Site Total MPE %:	**25.50 %**

T-Mobile Sector 1 Total:	4.10 %
T-Mobile Sector 2 Total:	4.10 %
T-Mobile Sector 3 Total:	4.10 %
Site Total:	25.50 %

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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:	4.10 %
Sector 2:	4.10 %
Sector 3 :	4.10 %
T-Mobile Total:	12.31 %
Site Total:	25.50 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **25.50%** of the allowable FCC established general public limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions.

FCC guidelines state that if a site is found to be out of compliance (over allowable thresholds), that carriers over a 5% contribution to the composite value will require measures to bring the site into compliance. For this facility, the composite values calculated were well within the allowable 100% threshold standard per the federal government.

Scott Heffernan
RF Engineering Director

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Burlington, MA 01803