Crown Castle
3530 Toringdon Way Suite 300
Charlotte NC 28277

Tel (704) 405-6600

September 5, 2014

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

RE: **T-Mobile-Exempt Modification - Crown Site BU: 828540**
T-Mobile Site ID: CT11369A
Located at: 218 Wheeler Road, Torrington, CT 06790

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. Elinor Carbone, Mayor for City of Torrington, and Lucille Lefrebvre, Property Owner.

T-Mobile plans to modify the existing wireless communications facility owned by Crown Castle and located at **218 Wheeler Road, Torrington, CT 06790**. 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 Elinor Carbone
City of Torrington
140 Main Street
Torrington, CT 06790

cc: Ms. Lucille Lefebvre
218 Wheeler Road
Litchfield, CT 06759

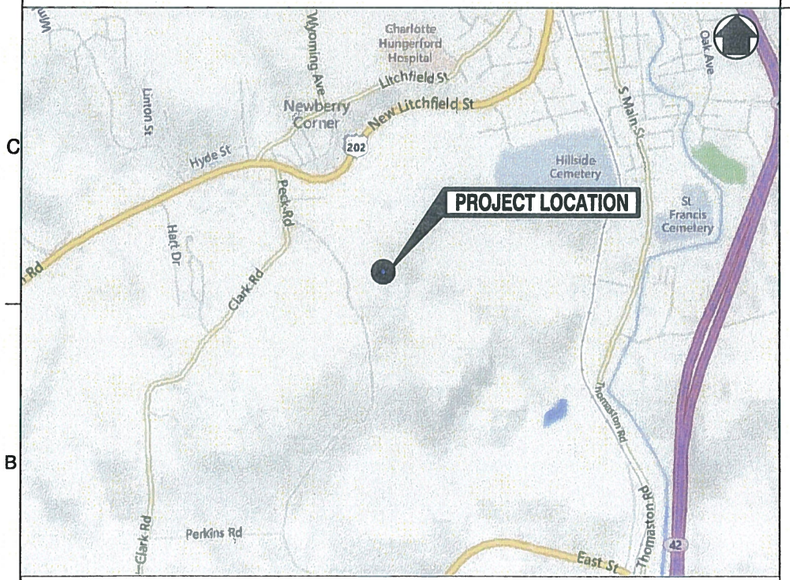
T-Mobile®

T-MOBILE NORTHEAST LLC

T-MOBILE SITE #: CT11369A
CROWN CASTLE BU #: 828540
SITE NAME: TORRINGTON / RT 8
218 WHEELER ROAD
TORRINGTON, CT 06790
LITCHFIELD COUNTY

SITE CONFIGURATION: 702CU

SITE INFORMATION



KEY MAP
N.T.S.

DIRECTIONS: (FROM PARSIPPANY):

START OUT GOING WEST ON SYLVAN WAY TOWARD CENTURY DR, TURN RIGHT ONTO LITTLETON RD/US-202 N, KEEP LEFT AT THE FORK TO GO ON LITTLETON RD E, MERGE ONTO I-287 N, MERGE ONTO I-87 S/I-287 E/NEW YORK TRWY S TOWARD I-87 S/TAPPAN ZEE BRG / NEW YORK CITY, KEEP LEFT TO TAKE I-287 E / CROSS WESTCHESTER EXPY E VIA EXIT 8 TOWARD WHITE PLAINS / RYE. STAY STRAIGHT TO GO ONTO I-95 / NEW ENGLAND TRWY N. CONTINUE TO FOLLOW I-95 N. TAKE THE CT-234 EXIT, EXIT 91, TOWARD NO MAIN ST / STONINGTON BOROUGH. TURN LEFT ONTO TAUGWONK RD, TURN LEFT ONTO SOMMER LN, TURN LEFT ONTO WHEELER RD. THE DESTINATION WILL BE ON THE LEFT.

PROJECT INFORMATION

T-MOBILE SITE #:	CT11369A
CROWN CASTLE BU #:	828540
SITE ADDRESS:	218 WHEELER ROAD TORRINGTON, CT 06790 LITCHFIELD COUNTY
LATITUDE:	N 41° 46' 50.33"
LONGITUDE:	W 73° 8' 10.02"
TOWER OWNER:	CROWN CASTLE 1200 MACARTHUR BLVD., SUITE 200 MAHWAH, NJ 07430
CONTACT:	PETER TISI (201) 236-9224
APPLICANT:	T-MOBILE NORTHEAST, LLC 4 SYLVAN WAY PARSIPPANY, NJ 07054
CONTACT:	PHONE #: (973) 397-4800 FAX #: (973) 292-8893
ENGINEER:	DEWBERRY ENGINEERS INC. 600 PARSIPPANY ROAD, SUITE 301 PARSIPPANY, NJ 07054
CONTACT:	GREG NAWROTZKI (973) 576-9653
SCOPE OF WORK:	ADD (3) NEW ANTENNAS, ADD (3) NEW RRU'S, ADD (4) NEW COAX CABLES

SHEET INDEX

SHEET NO.	SHEET DESCRIPTION
T-1	TITLE SHEET
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C-2	ANTENNA LAYOUTS & ELEVATIONS
C-3	CONSTRUCTION DETAILS
E-1	GROUNDING NOTES & DETAILS

APPROVALS

T-MOBILE — DATE

OWNER/ LANDLORD — DATE

RF ENGINEER — DATE

ZONING — DATE

CONSTRUCTION — DATE

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

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

TORRINGTON / RT 8

CT11369A

218 WHEELER ROAD
TORRINGTON, CT 06790
LITCHFIELD COUNTY

THIS DOCUMENT WAS REVISED TO REFLECT A SPECIFIC SITE AMONG SITE CONDITIONS AND IS NOT TO BE USED FOR ANY OTHER SITE. WHEN OTHER CONDITIONS EXIST, ANY USE OF THIS DOCUMENT IS AT THE SOLE RISK OF THE USER.

SEE SEAL

STATE OF CONNECTICUT
JIANG YU
No. 23222
LICENSED PROFESSIONAL ENGINEER
CONNECTICUT LICENSE NO. 0023222

SCALE
AS SHOWN

REV.	DATE	BY	DESCRIPTION
0	09/04/14	HMP	ISSUED AS FINAL
A	08/25/14	HMP	ISSUED FOR REVIEW

REVISIONS

DRAWN BY HMP
CHECKED BY BSH
APPROVED BY GHN
DATE 08/18/14

TITLE

TITLE SHEET

PROJECT NO. 50066258/50068454

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.

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.

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.

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) 397-4600
FAX: (973) 292-8893

TORRINGTON / RT 8

CT11369A

218 WHEELER ROAD
TORRINGTON, CT 06790
LITCHFIELD COUNTY

SEAL

SCALE

AS SHOWN

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A	08/25/14	HMP	ISSUED FOR REVIEW

REVISIONS

DRAWN BY HMP
CHECKED BY BSH
APPROVED BY GHN
DATE 08/18/14

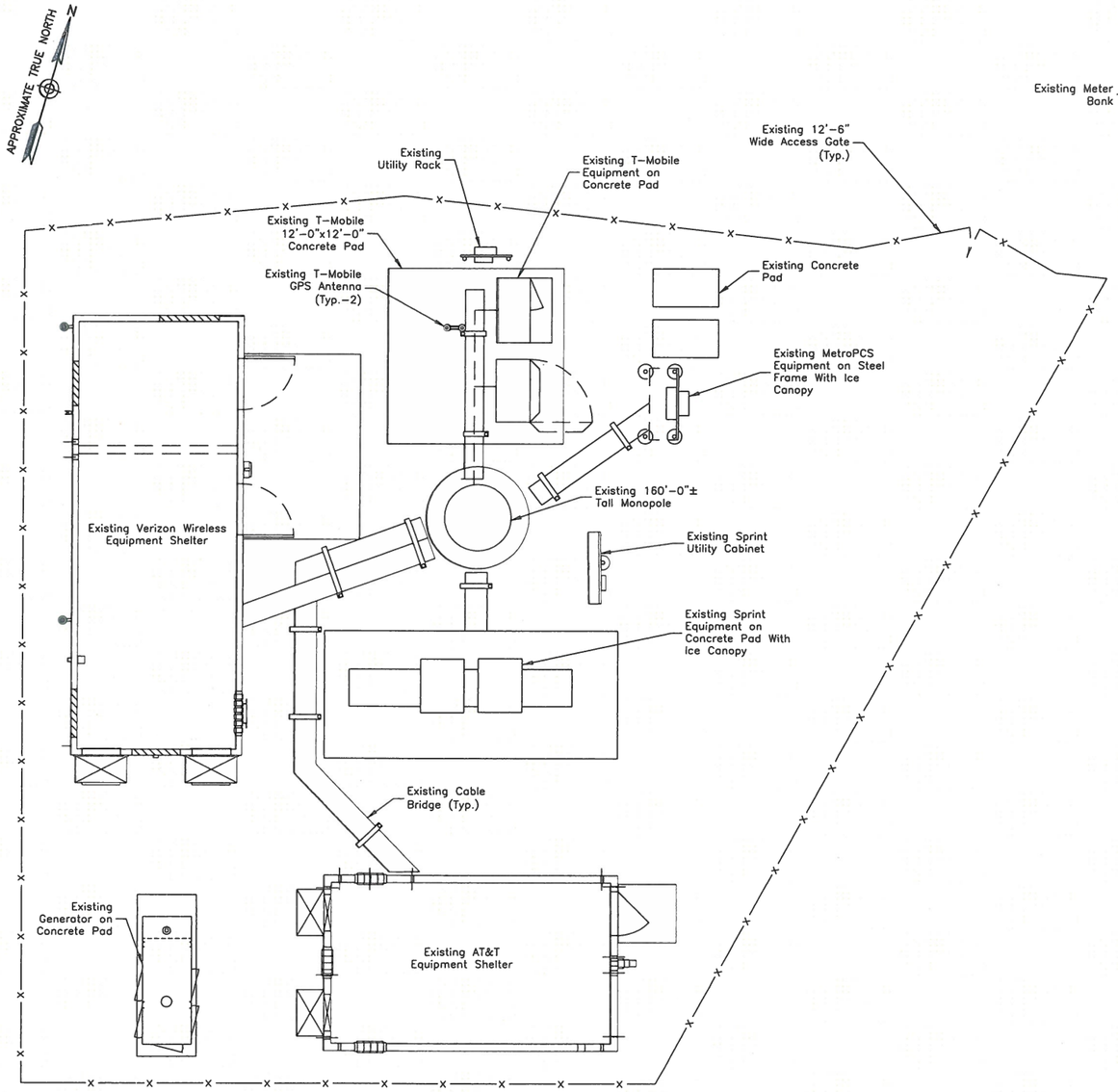
TITLE

GENERAL NOTES

PROJECT NO. 50066258/50068454

G - 1

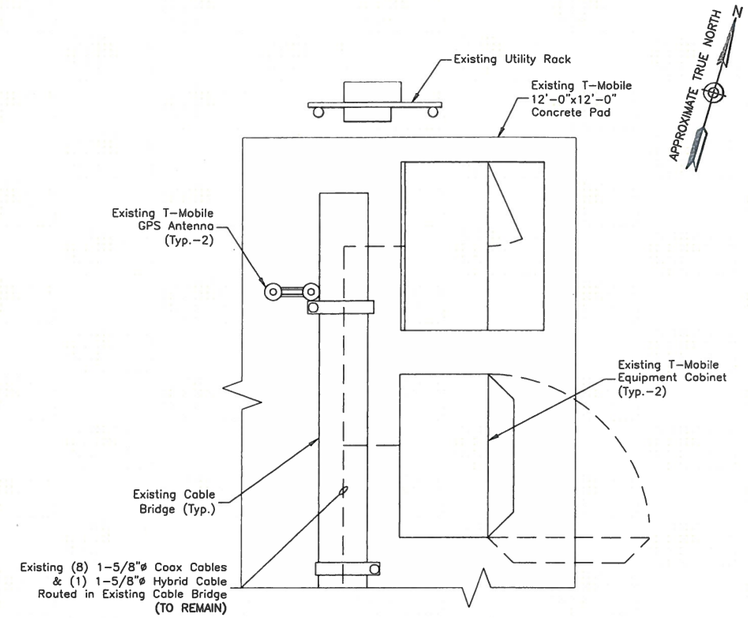
SHEET NO.



COMPOUND PLAN 1

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

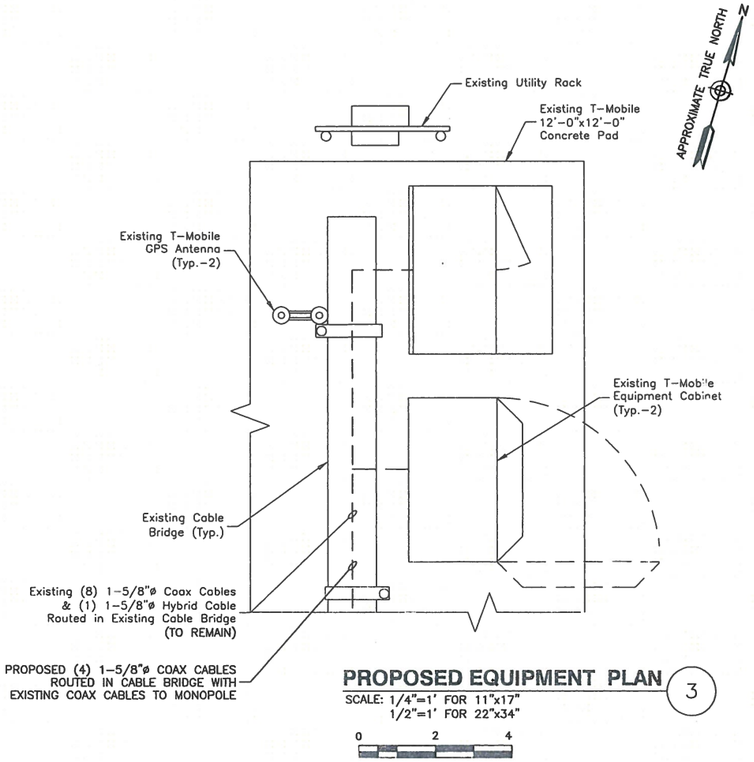
0' 5' 10'



EXISTING EQUIPMENT PLAN 2

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

0 2 4



PROPOSED EQUIPMENT PLAN 3

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

0 2 4

NOTES:

1. NORTH SHOWN AS APPROXIMATE.
2. NOT ALL INFORMATION IS SHOWN FOR CLARITY.
3. MOUNT ALL ANTENNAS, RRU'S, COAX, ETC. IN ACCORDANCE WITH STRUCTURAL ANALYSIS TO BE COMPLETED BY OTHERS.

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

T-Mobile
T-MOBILE NORTHEAST LLC
4 SYLVAN WAY
PARSIPPANY, NJ 07054
PHONE: (973) 397-4000
FAX: (973) 292-8883

TORRINGTON / RT 8

CT11369A

218 WHEELER ROAD
TORRINGTON, CT 06790
LITCHFIELD COUNTY

SEAL

STATE OF CONNECTICUT
JIANG YU
No. 20222
PROFESSIONAL ENGINEER
CONNECTICUT LICENSED PROFESSIONAL ENGINEER

SCALE
AS SHOWN

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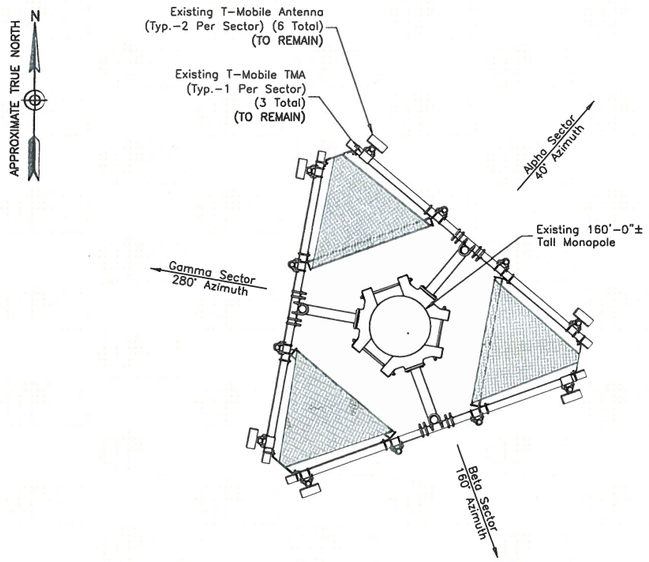
COMPOUND PLAN & EQUIPMENT PLANS

PROJECT NO. 50066258/50068454

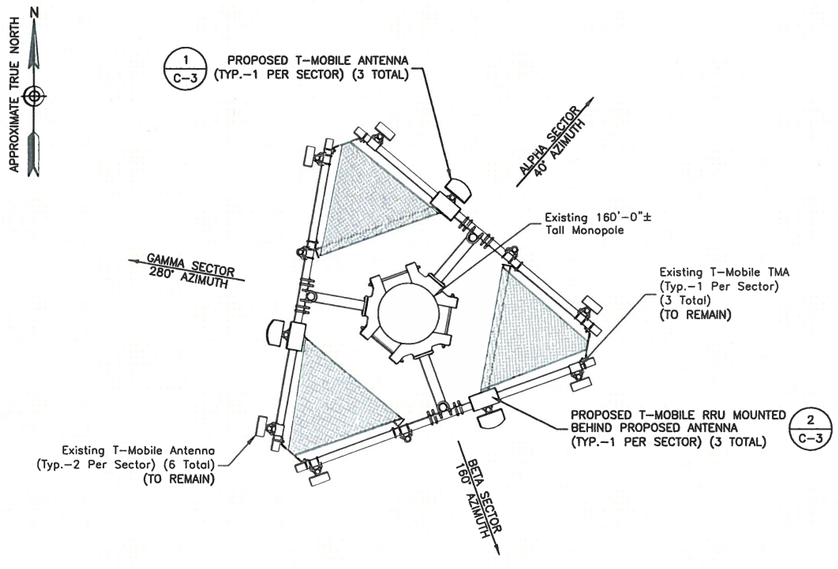
C - 1

SHEET NO.



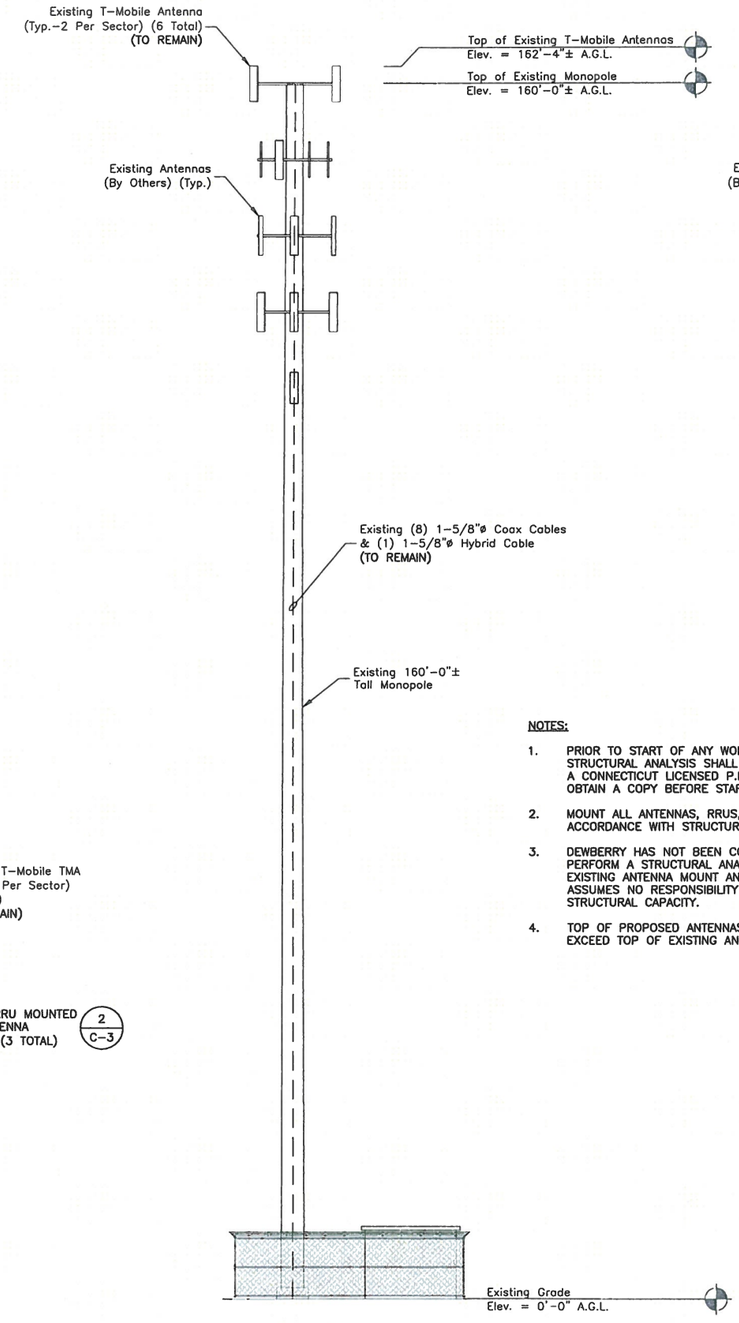
EXISTING ANTENNA LAYOUT 1

SCALE: N.T.S.



PROPOSED ANTENNA LAYOUT 2

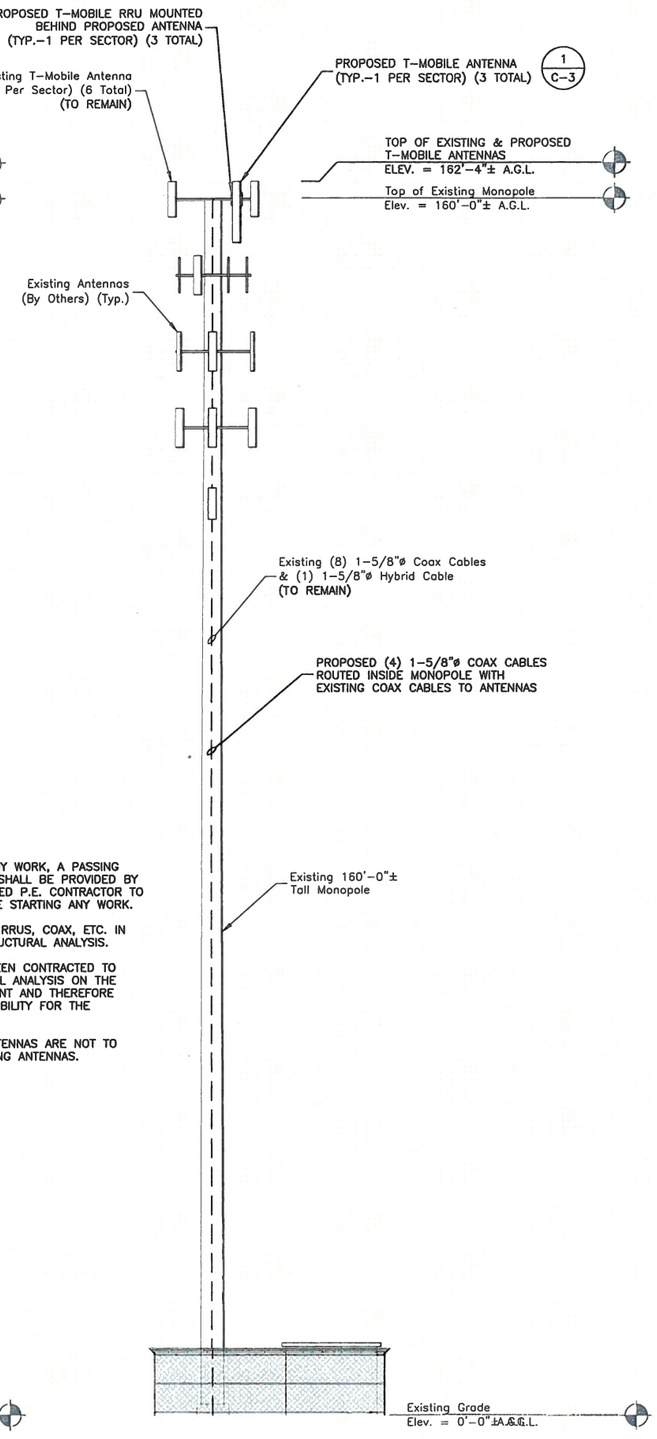
SCALE: N.T.S.



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. PRIOR TO START OF ANY WORK, A PASSING STRUCTURAL ANALYSIS SHALL BE PROVIDED BY A CONNECTICUT LICENSED P.E. CONTRACTOR TO OBTAIN A COPY BEFORE STARTING ANY WORK.
2. MOUNT ALL ANTENNAS, RRUS, COAX, ETC. IN ACCORDANCE WITH STRUCTURAL ANALYSIS.
3. DEWBERRY HAS NOT BEEN CONTRACTED TO PERFORM A STRUCTURAL ANALYSIS ON THE EXISTING ANTENNA MOUNT AND THEREFORE ASSUMES NO RESPONSIBILITY FOR THE STRUCTURAL CAPACITY.
4. TOP OF PROPOSED ANTENNAS ARE NOT TO EXCEED TOP OF EXISTING ANTENNAS.

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

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

TORRINGTON / RT 8

CT11369A

218 WHEELER ROAD
TORRINGTON, CT 06790
LITCHFIELD COUNTY

SEAL

STATE OF CONNECTICUT
JIANG YU
No. 23222
JIANG YU, P.E.
CONNECTICUT LICENSE NO. 023222
PROFESSIONAL ENGINEER

SCALE
AS SHOWN

REV.	DATE	BY	DESCRIPTION
0	09/04/14	HMP	ISSUED AS FINAL
A	08/25/14	HMP	ISSUED FOR REVIEW

REVISIONS

DRAWN BY HMP
CHECKED BY BSH
APPROVED BY GHN
DATE 08/18/14

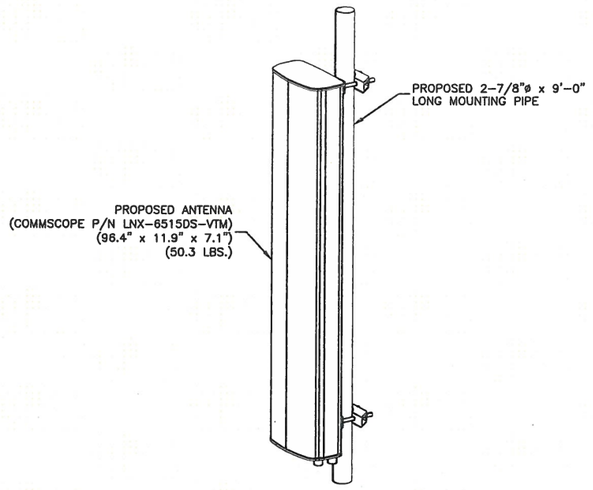
TITLE

ANTENNA LAYOUTS & ELEVATIONS

PROJECT NO. 50066258/50068454

C - 2

SHEET NO.

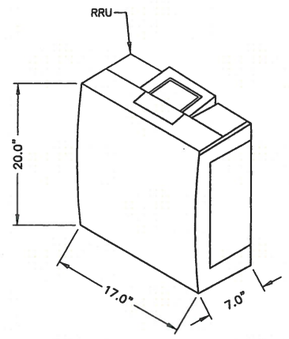


NOTES:

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

ISOMETRIC ANTENNA DETAIL 1

SCALE: N.T.S.



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

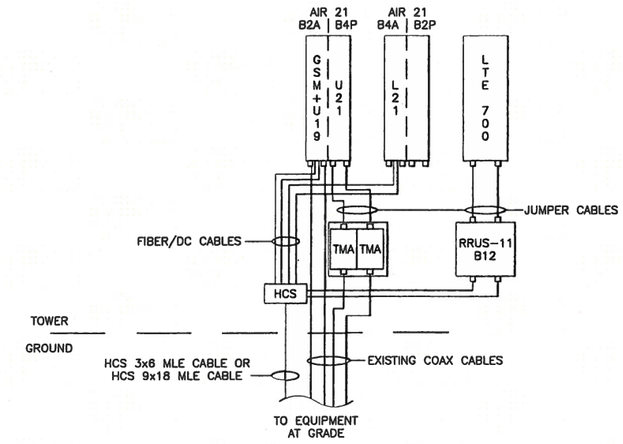
ERICSSON RRUS-11 B12

RRU NOTES:

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

RRUS-11 - REMOTE RADIO UNIT 2

SCALE: N.T.S.



SITE CONFIGURATION 700MHZ 3

SCALE: N.T.S.

DESIGN CONFIGURATION

	ANTENNAS		COAX		COAX LENGTH	HCS LENGTH
	EXISTING	PROPOSED	EXISTING	PROPOSED		
ALPHA	ERICSSON AIR21 B2A B4P	EXISTING TO REMAIN	(3) 1-5/8"	(4) 1-5/8"	210'	210'
	——	COMMSCOPE LNX-6515DS-VTM				
	ERICSSON AIR21 B4A B2P	EXISTING TO REMAIN				
BETA	ERICSSON AIR21 B2A B4P	EXISTING TO REMAIN	(3) 1-5/8"	(4) 1-5/8"	210'	
	——	COMMSCOPE LNX-6515DS-VTM				
	ERICSSON AIR21 B4A B2P	EXISTING TO REMAIN				
GAMMA	ERICSSON AIR21 B2A B4P	EXISTING TO REMAIN	(2) 1-5/8"	(4) 1-5/8"	210'	
	——	COMMSCOPE LNX-6515DS-VTM				
	ERICSSON AIR21 B4A B2P	EXISTING TO REMAIN				

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600 PARSIPPANY ROAD
SUITE 301
PARSIPPANY, NJ 07054
PHONE: 973.739.9400
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4 SYLVAN WAY
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APPROVED BY GHN
DATE 08/18/14

TITLE

CONSTRUCTION DETAILS

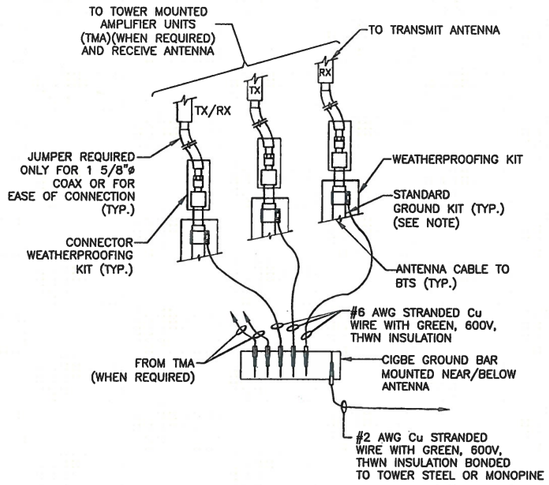
PROJECT NO. 50066258/50068454

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.

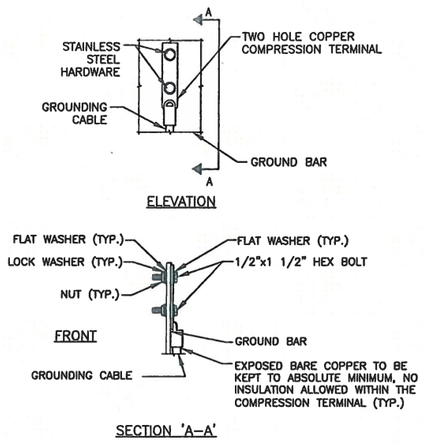


NOTE:

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.

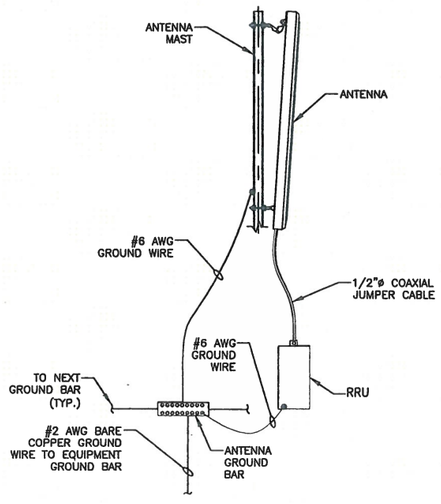


NOTES:

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

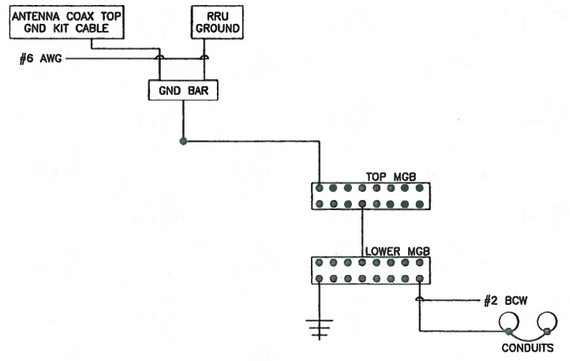
TYPICAL GROUND BAR MECHANICAL CONNECTION DETAIL — 2

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.

SCHEMATIC GROUNDING DIAGRAM — 4

SCALE: N.T.S.

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

T-Mobile
T-MOBILE NORTHEAST LLC
4 SYLVAN WAY
PARSIPPANY, NJ 07054
PHONE: (973) 397-4000
FAX: (973) 292-8833

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REV.	DATE	BY	DESCRIPTION
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A	08/25/14	HMP	ISSUED FOR REVIEW

REVISIONS

DRAWN BY HMP
CHECKED BY BSH
APPROVED BY GHN
DATE 08/18/14

TITLE

GROUNDING NOTES & DETAILS

PROJECT NO. 50066258/50068454

E - 1

SHEET NO.

Date: **August 13, 2014**

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

JACOBS
Jacobs Engineering Group. Inc.
5449 Bells Ferry Road
Acworth, GA 30102
770-701-2500

Subject: **Structural Analysis Report**

Carrier Designation:	***T-Mobile* Co-Locate**	
	Carrier Site Number:	CT11369A
	Carrier Site Name:	TORRINGTON/RT 8
Crown Castle Designation:	**Crown Castle BU Number:**	828540
	Crown Castle Site Name:	TORRINGTON/RT 8
	Crown Castle JDE Job Number:	302374
	Crown Castle Work Order Number:	907865
	Crown Castle Application Number:	261509 Rev. 1
Engineering Firm Designation:	**Jacobs Engineering Group Project Number:**	907865
Site Data:	**218 Wheeler Road, Torrington, Litchfield County, CT** **Latitude *41° 46' 50.33"*, Longitude *-73° 8' 10.02"*** **160 Foot - Monopole Tower**	

Dear Debra Elliott,

Jacobs Engineering Group 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 679111, in accordance with application 261509, 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:

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

This analysis has been performed in accordance with the TIA/EIA-222-F standard and 2005 CT State Building Code with 2009 amendment based upon a wind speed of 80 mph fastest mile.

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

We at *Jacobs Engineering Group* 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:

Di Wang
Structural Engineer

Reviewed By:

STATE OF CONNECTICUT
MATTHEW E. WATKINS
No. 29955
LICENSED
PROFESSIONAL ENGINEER
8/13/14

Matthew E. Watkins, PE, LEED[AP]
Project Engineer

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 160 ft Monopole tower designed by PIROD MANUFACTURES INC. in November of 2000. The tower was originally designed for a wind speed of 80 mph per TIA/EIA-222-F.

2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 80 mph with no ice, 28.1 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
160.0	160.0	3	commscope	LNX-6515DS-VTM w/ Mount Pipe	1	1-5/8	-
		3	ericsson	ERICSSON AIR 21 B2A B4P w/ Mount Pipe			
		3	ericsson	ERICSSON AIR 21 B4A B2P w/ Mount Pipe			
		3	ericsson	KRY 112 144/1			
		3	ericsson	RRUS 11 B12			

Table 2 – Existing and Reserved Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
160.0	170.0	1	rfi antennas	OA40-41	1	7/8	2
	160.0	6	andrew	ETW190VS12UB	13	1-5/8	3
		12	andrew	TMBXX-6516-R2M w/ Mount Pipe			
		1	andrew	HP4-102			
		1	tower mounts	Platform Mount [LP 405-1]	12	1-5/8	1
150.0	150.0	3	alcatel lucent	TD-RRH8x20-25	1	1-1/4	2
		3	rfs celwave	APXVTM14-C-120 w/ Mount Pipe			
		3	rfs celwave	APXVSPP18-C-A20 w/ Mount Pipe	3	1-1/4	1
		1	tower mounts	Platform Mount [LP 1201-1]			
148.0	148.0	3	alcatel lucent	800MHz 2X50W RRH W/FILTER	-	-	1
		3	alcatel lucent	PCS 1900MHz 4x45W-65MHz			
		1	tower mounts	Side Arm Mount [SO 102-3]			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
140.0	140.0	3	antel	BXA-171063/12CF w/ Mount Pipe	12	1-5/8	1
		2	antel	LPA-80063/6CF w/ Mount Pipe			
		1	gps	GPS_A			
		6	rfs celwave	FD9R6004/2C-3L			
		4	swedcom	SC-E 6014 rev2 w/ Mount Pipe			
		3	swedcom	SLXW 5512 w/ Mount Pipe			
		1	tower mounts	Platform Mount [LP 304-1]			
130.0	130.0	6	ericsson	RRUS 11	12 1 2	1-5/8 3/8 3/4	1
		3	kathrein	800 10764 w/ Mount Pipe			
		6	powerwave technologies	7770.00 w/ Mount Pipe			
		6	powerwave technologies	LGP 21403			
		6	powerwave technologies	LGP21903			
		1	raycap	DC6-48-60-18-8F			
		1	tower mounts	Platform Mount [LP 303-1]			
120.0	120.0	3	rfs celwave	APXV18-206517-C w/ Mount Pipe	6	1-5/8	1
100.0	100.0	2	maxrad	MPRC2449	4	1/4	2
		2	tower mounts	Pipe Mount [PM 601-1]			
79.0	79.0	1	gps	GPS_A	1	1/2	1
		1	tower mounts	Side Arm Mount [SO 701-1]			

Notes:
1) Existing Equipment
2) Reserved Equipment
3) Existing to be removed; Not considered in this analysis

Table 3 – Design Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
185	185	12	ems wireless	RR65-19	12	1-5/8
175	175	12	ems wireless	RR65-19	12	1-5/8
160	160	12	ems wireless	RR65-19	12	1-5/8
150	150	12	ems wireless	RR65-19	12	1-5/8

3) ANALYSIS PROCEDURE

Table 4 – Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	Jaworski Geotech, Inc.	3463255	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	Pirod	3464896	CCISITES
4-TOWER MANUFACTURER DRAWINGS	Pirod	3463264	CCISITES

3.1) Analysis Method

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

3.2) Assumptions

1) Tower and structures were built in accordance with the manufacturer's specifications.
2) The tower and structures have been maintained in accordance with the manufacturer's specification.
3) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
4) When applicable, transmission cables are considered as structural components for calculating wind loads as allowed by TIA/EIA-222-F.
5) Base and flange plate design methodology of the manufacturer has been reviewed and found to be an acceptable means of designing to resist the full capacity of the bolts and shaft.

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

4) ANALYSIS RESULTS

Table 5 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	160 - 140	Pole	P36x3/8	1	-9.20	1325.68	17.4	Pass
L2	140 - 120	Pole	P42x3/8	2	-17.13	1484.55	42.1	Pass
L3	120 - 100	Pole	P48x3/8	3	-22.06	1643.28	61.6	Pass
L4	100 - 80	Pole	P54x3/8	4	-27.54	1801.92	76.0	Pass
L5	80 - 60	Pole	P60x3/8	5	-33.49	1960.48	86.6	Pass
L6	60 - 40	Pole	P60x1/2	6	-40.95	2780.33	79.5	Pass
L7	40 - 20	Pole	P60x1/2	7	-48.49	2780.33	98.9	Pass
L8	20 - 0	Pole	P60x5/8	8	-57.63	3682.44	90.6	Pass
							Summary	
						Pole (L7)	98.9	Pass
						Rating =	98.9	Pass

Table 6 - Tower Component Stresses vs. Capacity – LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	66.8	Pass
1,2	Base Plate	0	90.6	Pass
1	Base Foundation Soil Interaction	0	74.3	Pass
1,2	Flange Connection	20	98.9	Pass
1,2	Flange Connection	40	86.6	Pass
1,2	Flange Connection	60	79.5	Pass
1,2	Flange Connection	80	76.0	Pass
1,2	Flange Connection	100	61.6	Pass
1,2	Flange Connection	120	42.1	Pass
1,2	Flange Connection	140	17.4	Pass

Structure Rating (max from all components) =	98.9%

Notes:
1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity consumed.
2) Flange plates have the same capacity as their respective splice bolts or shaft (greater of the 2).

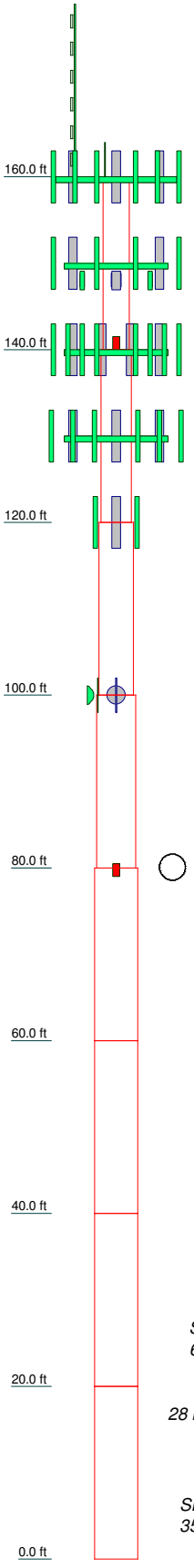
4.1) Recommendations

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

APPENDIX A

TNXTOWER OUTPUT

Section	Size	Length (ft)	Grade	Weight (K)
1	P36x3/8	20.00	A53-B-42	2.9
2	P42x3/8	20.00		3.3
3	P48x3/8	20.00		3.8
4	P54x3/8	20.00		4.3
5	P60x3/8	20.00		4.8
6	P60x1/2	20.00		6.4
7	P60x1/2	20.00		6.4
8	P60x5/8	20.00		7.9
				39.7



AXIAL
82 K

SHEAR
6 K

MOMENT
671 kip-ft

TORQUE 1 kip-ft
28 mph WIND - 0.7500 in ICE

AXIAL
58 K

SHEAR
35 K

MOMENT
4008 kip-ft

TORQUE 4 kip-ft
REACTIONS - 80 mph WIND

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Lighting Rod 3/4" x 4'	160	BXA-171063/12CF w/ Mount Pipe	140
OA40-41	160	BXA-171063/12CF w/ Mount Pipe	140
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	160	BXA-171063/12CF w/ Mount Pipe	140
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	160	(2) SC-E 6014 rev2 w/ Mount Pipe	140
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	160	SC-E 6014 rev2 w/ Mount Pipe	140
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	160	SC-E 6014 rev2 w/ Mount Pipe	140
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	160	SLXW 5512 w/ Mount Pipe	140
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	160	SLXW 5512 w/ Mount Pipe	140
LNX-6515DS-VTM w/ Mount Pipe	160	SLXW 5512 w/ Mount Pipe	140
LNX-6515DS-VTM w/ Mount Pipe	160	LPA-80063/6CF w/ Mount Pipe	140
LNX-6515DS-VTM w/ Mount Pipe	160	LPA-80063/6CF w/ Mount Pipe	140
KRY 112 144/1	160	(2) FD9R6004/2C-3L	140
KRY 112 144/1	160	(2) FD9R6004/2C-3L	140
KRY 112 144/1	160	(2) FD9R6004/2C-3L	140
RRUS 11 B12	160	GPS_A	140
RRUS 11 B12	160	Platform Mount [LP 304-1]	140
RRUS 11 B12	160	800 10764 w/ Mount Pipe	130
Platform Mount [LP 405-1]	160	800 10764 w/ Mount Pipe	130
APXVSPP18-C-A20 w/ Mount Pipe	150	800 10764 w/ Mount Pipe	130
APXVSPP18-C-A20 w/ Mount Pipe	150	(2) 7770.00 w/ Mount Pipe	130
APXVSPP18-C-A20 w/ Mount Pipe	150	(2) 7770.00 w/ Mount Pipe	130
APXVTM14-C-120 w/ Mount Pipe	150	(2) 7770.00 w/ Mount Pipe	130
APXVTM14-C-120 w/ Mount Pipe	150	(2) LGP21903	130
APXVTM14-C-120 w/ Mount Pipe	150	(2) LGP21903	130
TD-RRH8x20-25	150	(2) LGP21903	130
TD-RRH8x20-25	150	(2) LGP 21403	130
TD-RRH8x20-25	150	(2) LGP 21403	130
Platform Mount [LP 1201-1]	150	(2) LGP 21403	130
(2) 5' x 2" Pipe Mount	150	(2) RRUS 11	130
(2) 5' x 2" Pipe Mount	150	(2) RRUS 11	130
(2) 5' x 2" Pipe Mount	150	(2) RRUS 11	130
800MHz 2X50W RRH W/FILTER	148	DC6-48-60-18-8F	130
800MHz 2X50W RRH W/FILTER	148	Platform Mount [LP 303-1]	130
800MHz 2X50W RRH W/FILTER	148	APXV18-206517-C w/ Mount Pipe	120
PCS 1900MHz 4x45W-65MHz	148	APXV18-206517-C w/ Mount Pipe	120
PCS 1900MHz 4x45W-65MHz	148	APXV18-206517-C w/ Mount Pipe	120
PCS 1900MHz 4x45W-65MHz	148	Pipe Mount [PM 601-1]	100
Side Arm Mount [SO 102-3]	148	Pipe Mount [PM 601-1]	100
		MPRC2449	100
		MPRC2449	100
		4' ICE SHIELDS	80
		GPS_A	79
		Side Arm Mount [SO 701-1]	79

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A53-B-42	42 ksi	63 ksi			

TOWER DESIGN NOTES

1. Tower is located in Litchfield County, Connecticut.
2. Tower designed for a 80 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 28 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 98.9%

Jacobs Engineering Group
5449 Bells Ferry Road
Acworth, GA 30102
Phone: 770-701-2500
FAX: (770)701-2501

Job: ***TORRINGTON/RT 8***			
Project: ***BU# 828540 WO 907865***			
Client: Crown Castle	Drawn by: Di Wang		App'd:
Code: TIA/EIA-222-F	Date: 08/13/14		Scale: NTS
Path: N:\Design\EQ152000 - CrownCastle\Structural\WO\828540 TORRINGTONRT 8\WO 907865\Analysis\20140614_APP246016_828540.eri			Dwg No. E-1

Tower Input Data

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

3) Tower is located in Litchfield County, Connecticut.
4) Basic wind speed of 80 mph.
5) Nominal ice thickness of 0.7500 in.
6) Ice thickness is considered to increase with height.
7) Ice density of 56.00 pcf.
8) A wind speed of 28 mph is used in combination with ice.
9) Temperature drop of 50 °F.
10) Deflections calculated using a wind speed of 50 mph.
11) A non-linear (P-delta) analysis was used.
12) Pressures are calculated at each section.
13) Stress ratio used in pole design is 1.333.
14) 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	160.00-140.00	20.00	P36x3/8	A53-B-42 (42 ksi)	
L2	140.00-120.00	20.00	P42x3/8	A53-B-42 (42 ksi)	
L3	120.00-100.00	20.00	P48x3/8	A53-B-42 (42 ksi)	
L4	100.00-80.00	20.00	P54x3/8	A53-B-42 (42 ksi)	
L5	80.00-60.00	20.00	P60x3/8	A53-B-42 (42 ksi)	
L6	60.00-40.00	20.00	P60x1/2	A53-B-42 (42 ksi)	
L7	40.00-20.00	20.00	P60x1/2	A53-B-42 (42 ksi)	
L8	20.00-0.00	20.00	P60x5/8	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 160.00-140.00				1	1	1		
L2 140.00-120.00				1	1	1		
L3 120.00-100.00				1	1	1		
L4 100.00-80.00				1	1	1		
L5 80.00-60.00				1	1	1		
L6 60.00-40.00				1	1	1		
L7 40.00-20.00				1	1	1		
L8 20.00-0.00				1	1	1		

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number	Number Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
**										

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
LDF7-50A(1-5/8")	A	No	Inside Pole	160.00 - 0.00	12	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
						2" Ice	0.00	0.82
						4" Ice	0.00	0.82
MLE Hybrid 9Power/18Fiber RL 2(1 5/8)	A	No	Inside Pole	160.00 - 0.00	1	No Ice	0.00	1.07
						1/2" Ice	0.00	1.07
						1" Ice	0.00	1.07
						2" Ice	0.00	1.07
						4" Ice	0.00	1.07
130								
AVA7-50(1-5/8)	A	No	Inside Pole	130.00 - 0.00	12	No Ice	0.00	0.70
						1/2" Ice	0.00	0.70
						1" Ice	0.00	0.70
						2" Ice	0.00	0.70
						4" Ice	0.00	0.70
FB-L98-002-XXX(3/8)	A	No	Inside Pole	130.00 - 0.00	1	No Ice	0.00	0.06
						1/2" Ice	0.00	0.06
						1" Ice	0.00	0.06
						2" Ice	0.00	0.06
						4" Ice	0.00	0.06
WR-VG86T(3/4)	A	No	Inside Pole	130.00 - 0.00	2	No Ice	0.00	0.53
						1/2" Ice	0.00	0.53
						1" Ice	0.00	0.53
						2" Ice	0.00	0.53
						4" Ice	0.00	0.53
2" Rigid Conduit	A	No	Inside Pole	130.00 - 0.00	1	No Ice	0.00	2.80
						1/2" Ice	0.00	2.80
						1" Ice	0.00	2.80
						2" Ice	0.00	2.80

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
						4" Ice	0.00	2.80
120								
LDF7-50A(1-5/8")	A	No	CaAa (Out Of Face)	120.00 - 0.00	1	No Ice	0.20	0.82
						1/2" Ice	0.30	2.33
						1" Ice	0.40	4.46
						2" Ice	0.60	10.54
						4" Ice	1.00	30.04
LDF7-50A(1-5/8")	A	No	CaAa (Out Of Face)	120.00 - 0.00	5	No Ice	0.00	0.82
						1/2" Ice	0.00	2.33
						1" Ice	0.00	4.46
						2" Ice	0.00	10.54
						4" Ice	0.00	30.04
***								
LDF4-50A(1/2")	B	No	CaAa (Out Of Face)	79.00 - 0.00	1	No Ice	0.06	0.15
						1/2" Ice	0.16	0.84
						1" Ice	0.26	2.14
						2" Ice	0.46	6.58
						4" Ice	0.86	22.78
***								
HB114-1-08U4-M5J(1 1/4")	C	No	Inside Pole	150.00 - 0.00	3	No Ice	0.00	1.08
						1/2" Ice	0.00	1.08
						1" Ice	0.00	1.08
						2" Ice	0.00	1.08
						4" Ice	0.00	1.08
HB114-21U3M12-XXXF(1-1/4")	C	No	Inside Pole	150.00 - 0.00	1	No Ice	0.00	1.22
						1/2" Ice	0.00	1.22
						1" Ice	0.00	1.22
						2" Ice	0.00	1.22
						4" Ice	0.00	1.22
***								
810921-001(7/8")	C	No	CaAa (Out Of Face)	160.00 - 0.00	1	No Ice	0.11	0.40
						1/2" Ice	0.21	1.38
						1" Ice	0.31	2.98
						2" Ice	0.51	8.00
						4" Ice	0.91	25.38
CAT5e (1/4")	C	No	CaAa (Out Of Face)	100.00 - 0.00	1	No Ice	0.02	0.00
						1/2" Ice	0.12	0.00
						1" Ice	0.22	0.00
						2" Ice	0.42	0.00
						4" Ice	0.82	0.00
CAT5E(1/4")	C	No	CaAa (Out Of Face)	100.00 - 0.00	3	No Ice	0.00	0.10
						1/2" Ice	0.00	0.56
						1" Ice	0.00	1.63
						2" Ice	0.00	5.60
						4" Ice	0.00	20.87
***								
LDF7-50A(1-5/8")	C	No	CaAa (Out Of Face)	140.00 - 0.00	1	No Ice	0.20	0.82
						1/2" Ice	0.30	2.33
						1" Ice	0.40	4.46
						2" Ice	0.60	10.54
						4" Ice	1.00	30.04
LDF7-50A(1-5/8")	C	No	CaAa (Out Of Face)	140.00 - 0.00	11	No Ice	0.00	0.82
						1/2" Ice	0.00	2.33
						1" Ice	0.00	4.46
						2" Ice	0.00	10.54
						4" Ice	0.00	30.04
***								
Climbing Ladder (Round)	B	No	CaAa (Out Of Face)	160.00 - 0.00	1	No Ice	0.23	5.26
						1/2" Ice	0.55	7.93
						1" Ice	0.86	12.74
						2" Ice	1.48	28.78
						4" Ice	2.73	86.51
**								

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	160.00-140.00	A	0.000	0.000	0.000	0.000	0.22
		B	0.000	0.000	0.000	4.688	0.11
		C	0.000	0.000	0.000	2.224	0.05
L2	140.00-120.00	A	0.000	0.000	0.000	0.000	0.34
		B	0.000	0.000	0.000	4.688	0.11
		C	0.000	0.000	0.000	6.184	0.29
L3	120.00-100.00	A	0.000	0.000	0.000	3.960	0.56
		B	0.000	0.000	0.000	4.688	0.11
		C	0.000	0.000	0.000	6.184	0.29
L4	100.00-80.00	A	0.000	0.000	0.000	3.960	0.56
		B	0.000	0.000	0.000	4.688	0.11
		C	0.000	0.000	0.000	6.656	0.30
L5	80.00-60.00	A	0.000	0.000	0.000	3.960	0.56
		B	0.000	0.000	0.000	5.885	0.11
		C	0.000	0.000	0.000	6.656	0.30
L6	60.00-40.00	A	0.000	0.000	0.000	3.960	0.56
		B	0.000	0.000	0.000	5.948	0.11
		C	0.000	0.000	0.000	6.656	0.30
L7	40.00-20.00	A	0.000	0.000	0.000	3.960	0.56
		B	0.000	0.000	0.000	5.948	0.11
		C	0.000	0.000	0.000	6.656	0.30
L8	20.00-0.00	A	0.000	0.000	0.000	3.960	0.56
		B	0.000	0.000	0.000	5.948	0.11
		C	0.000	0.000	0.000	6.656	0.30

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	160.00-140.00	A	0.899	0.000	0.000	0.000	0.000	0.22
		B		0.000	0.000	0.000	15.931	0.24
		C		0.000	0.000	0.000	5.822	0.10
L2	140.00-120.00	A	0.884	0.000	0.000	0.000	0.000	0.34
		B		0.000	0.000	0.000	15.739	0.23
		C		0.000	0.000	0.000	13.257	1.09
L3	120.00-100.00	A	0.867	0.000	0.000	0.000	7.426	0.93
		B		0.000	0.000	0.000	15.520	0.23
		C		0.000	0.000	0.000	13.117	1.07
L4	100.00-80.00	A	0.846	0.000	0.000	0.000	7.344	0.92
		B		0.000	0.000	0.000	15.262	0.23
		C		0.000	0.000	0.000	16.807	1.13
L5	80.00-60.00	A	0.821	0.000	0.000	0.000	7.243	0.91
		B		0.000	0.000	0.000	19.264	0.25
		C		0.000	0.000	0.000	16.506	1.10
L6	60.00-40.00	A	0.788	0.000	0.000	0.000	7.113	0.89
		B		0.000	0.000	0.000	18.956	0.25
		C		0.000	0.000	0.000	16.116	1.06
L7	40.00-20.00	A	0.750	0.000	0.000	0.000	6.960	0.87
		B		0.000	0.000	0.000	18.323	0.24
		C		0.000	0.000	0.000	15.656	1.01
L8	20.00-0.00	A	0.750	0.000	0.000	0.000	6.960	0.87
		B		0.000	0.000	0.000	18.323	0.24
		C		0.000	0.000	0.000	15.656	1.01

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	160.00-140.00	0.1435	0.2324	0.4649	0.5775
L2	140.00-120.00	-0.0841	0.3529	0.1107	0.7466

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
L3	120.00-100.00	-0.0820	0.0934	0.1050	0.3476
L4	100.00-80.00	-0.1093	0.1097	-0.0683	0.4436
L5	80.00-60.00	-0.0430	0.1487	0.1229	0.5476
L6	60.00-40.00	-0.0395	0.1507	0.1274	0.5398
L7	40.00-20.00	-0.0395	0.1507	0.1208	0.5244
L8	20.00-0.00	-0.0395	0.1507	0.1208	0.5244

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
Lighting Rod 3/4" x 4'	C	From Leg	0.00 0.00 2.00	0.0000	160.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.30 0.71 1.00 1.52 2.72	0.30 0.71 1.00 1.52 2.72	0.03 0.03 0.04 0.06 0.14
***									
OA40-41	C	From Leg	4.00 0.00 10.00	0.0000	160.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	9.55 14.83 20.11 30.67 51.79	9.55 14.83 20.11 30.67 51.79	0.07 0.11 0.15 0.23 0.39
160									
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	160.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.83 7.35 7.86 8.93 11.18	5.64 6.48 7.26 8.86 12.29	0.11 0.17 0.23 0.38 0.81
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	160.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.83 7.35 7.86 8.93 11.18	5.64 6.48 7.26 8.86 12.29	0.11 0.17 0.23 0.38 0.81
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	160.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.83 7.35 7.86 8.93 11.18	5.64 6.48 7.26 8.86 12.29	0.11 0.17 0.23 0.38 0.81
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	160.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.83 7.35 7.86 8.93 11.18	5.64 6.48 7.26 8.86 12.29	0.11 0.17 0.23 0.38 0.81
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	160.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.83 7.35 7.86 8.93 11.18	5.64 6.48 7.26 8.86 12.29	0.11 0.17 0.23 0.38 0.81
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	160.00	No Ice 1/2" Ice 1" Ice 2" Ice	6.83 7.35 7.86 8.93 11.18	5.64 6.48 7.26 8.86 12.29	0.11 0.17 0.23 0.38 0.81

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						4" Ice			
LNX-6515DS-VTM w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	160.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	11.68 12.40 13.14 14.60 17.87	9.84 11.37 12.91 15.27 20.14	0.08 0.17 0.27 0.51 1.15
LNX-6515DS-VTM w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	160.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	11.68 12.40 13.14 14.60 17.87	9.84 11.37 12.91 15.27 20.14	0.08 0.17 0.27 0.51 1.15
LNX-6515DS-VTM w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	160.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	11.68 12.40 13.14 14.60 17.87	9.84 11.37 12.91 15.27 20.14	0.08 0.17 0.27 0.51 1.15
KRY 112 144/1	A	From Leg	4.00 0.00 0.00	0.0000	160.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.41 0.50 0.60 0.82 1.36	0.19 0.26 0.33 0.51 0.97	0.01 0.01 0.02 0.03 0.08
KRY 112 144/1	B	From Leg	4.00 0.00 0.00	0.0000	160.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.41 0.50 0.60 0.82 1.36	0.19 0.26 0.33 0.51 0.97	0.01 0.01 0.02 0.03 0.08
KRY 112 144/1	C	From Leg	4.00 0.00 0.00	0.0000	160.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.41 0.50 0.60 0.82 1.36	0.19 0.26 0.33 0.51 0.97	0.01 0.01 0.02 0.03 0.08
RRUS 11 B12	A	From Leg	4.00 0.00 0.00	0.0000	160.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.31 3.55 3.80 4.33 5.50	1.36 1.54 1.73 2.13 3.04	0.05 0.07 0.10 0.15 0.31
RRUS 11 B12	B	From Leg	4.00 0.00 0.00	0.0000	160.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.31 3.55 3.80 4.33 5.50	1.36 1.54 1.73 2.13 3.04	0.05 0.07 0.10 0.15 0.31
RRUS 11 B12	C	From Leg	4.00 0.00 0.00	0.0000	160.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.31 3.55 3.80 4.33 5.50	1.36 1.54 1.73 2.13 3.04	0.05 0.07 0.10 0.15 0.31
Platform Mount [LP 405-1]	C	None		0.0000	160.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	20.80 28.10 35.40 50.00 79.20	20.80 28.10 35.40 50.00 79.20	1.80 2.07 2.33 2.86 3.93
150 APXVSPP18-C-A20 w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	150.00	No Ice 1/2" Ice	8.50 9.15 9.77	6.95 8.13 9.02	0.08 0.15 0.23

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
						1" Ice	11.03	10.84	0.41
						2" Ice	13.68	14.85	0.91
						4" Ice			
APXVSPP18-C-A20 w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	150.00	No Ice	8.50	6.95	0.08
						1/2" Ice	9.15	8.13	0.15
						1" Ice	9.77	9.02	0.23
						2" Ice	11.03	10.84	0.41
						4" Ice	13.68	14.85	0.91
APXVSPP18-C-A20 w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	150.00	No Ice	8.50	6.95	0.08
						1/2" Ice	9.15	8.13	0.15
						1" Ice	9.77	9.02	0.23
						2" Ice	11.03	10.84	0.41
						4" Ice	13.68	14.85	0.91
APXVTM14-C-120 w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	150.00	No Ice	7.13	4.96	0.08
						1/2" Ice	7.66	5.75	0.13
						1" Ice	8.18	6.47	0.19
						2" Ice	9.26	8.01	0.34
						4" Ice	11.53	11.41	0.75
APXVTM14-C-120 w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	150.00	No Ice	7.13	4.96	0.08
						1/2" Ice	7.66	5.75	0.13
						1" Ice	8.18	6.47	0.19
						2" Ice	9.26	8.01	0.34
						4" Ice	11.53	11.41	0.75
APXVTM14-C-120 w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	150.00	No Ice	7.13	4.96	0.08
						1/2" Ice	7.66	5.75	0.13
						1" Ice	8.18	6.47	0.19
						2" Ice	9.26	8.01	0.34
						4" Ice	11.53	11.41	0.75
TD-RRH8x20-25	A	From Leg	4.00 0.00 0.00	0.0000	150.00	No Ice	4.72	1.70	0.07
						1/2" Ice	5.01	1.92	0.10
						1" Ice	5.32	2.14	0.13
						2" Ice	5.95	2.62	0.20
						4" Ice	7.31	3.68	0.40
TD-RRH8x20-25	B	From Leg	4.00 0.00 0.00	0.0000	150.00	No Ice	4.72	1.70	0.07
						1/2" Ice	5.01	1.92	0.10
						1" Ice	5.32	2.14	0.13
						2" Ice	5.95	2.62	0.20
						4" Ice	7.31	3.68	0.40
TD-RRH8x20-25	C	From Leg	4.00 0.00 0.00	0.0000	150.00	No Ice	4.72	1.70	0.07
						1/2" Ice	5.01	1.92	0.10
						1" Ice	5.32	2.14	0.13
						2" Ice	5.95	2.62	0.20
						4" Ice	7.31	3.68	0.40
Platform Mount [LP 1201-1]	C	None		0.0000	150.00	No Ice	23.10	23.10	2.10
						1/2" Ice	26.80	26.80	2.50
						1" Ice	30.50	30.50	2.90
						2" Ice	37.90	37.90	3.70
						4" Ice	52.70	52.70	5.30
(2) 5' x 2" Pipe Mount	A	From Leg	4.00 0.00 0.00	0.0000	150.00	No Ice	1.00	1.00	0.03
						1/2" Ice	1.39	1.39	0.04
						1" Ice	1.70	1.70	0.05
						2" Ice	2.35	2.35	0.08
						4" Ice	3.78	3.78	0.20
(2) 5' x 2" Pipe Mount	B	From Leg	4.00 0.00	0.0000	150.00	No Ice	1.00	1.00	0.03
						1/2" Ice	1.39	1.39	0.04

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00			Ice	1.70	1.70	0.05
						1" Ice	2.35	2.35	0.08
						2" Ice	3.78	3.78	0.20
						4" Ice			
(2) 5' x 2" Pipe Mount	C	From Leg	4.00	0.0000	150.00	No Ice	1.00	1.00	0.03
			0.00			1/2"	1.39	1.39	0.04
			0.00			Ice	1.70	1.70	0.05
						1" Ice	2.35	2.35	0.08
						2" Ice	3.78	3.78	0.20
						4" Ice			
***									
***									
800MHz 2X50W RRH W/FILTER	A	From Leg	3.00	0.0000	148.00	No Ice	2.40	2.25	0.06
			0.00			1/2"	2.61	2.46	0.09
			0.00			Ice	2.83	2.68	0.11
						1" Ice	3.30	3.13	0.17
						2" Ice	4.34	4.15	0.34
						4" Ice			
800MHz 2X50W RRH W/FILTER	B	From Leg	3.00	0.0000	148.00	No Ice	2.40	2.25	0.06
			0.00			1/2"	2.61	2.46	0.09
			0.00			Ice	2.83	2.68	0.11
						1" Ice	3.30	3.13	0.17
						2" Ice	4.34	4.15	0.34
						4" Ice			
800MHz 2X50W RRH W/FILTER	C	From Leg	3.00	0.0000	148.00	No Ice	2.40	2.25	0.06
			0.00			1/2"	2.61	2.46	0.09
			0.00			Ice	2.83	2.68	0.11
						1" Ice	3.30	3.13	0.17
						2" Ice	4.34	4.15	0.34
						4" Ice			
PCS 1900MHz 4x45W-65MHz	A	From Leg	3.00	0.0000	148.00	No Ice	2.71	2.61	0.06
			0.00			1/2"	2.95	2.85	0.08
			0.00			Ice	3.20	3.09	0.11
						1" Ice	3.72	3.61	0.17
						2" Ice	4.86	4.74	0.35
						4" Ice			
PCS 1900MHz 4x45W-65MHz	B	From Leg	3.00	0.0000	148.00	No Ice	2.71	2.61	0.06
			0.00			1/2"	2.95	2.85	0.08
			0.00			Ice	3.20	3.09	0.11
						1" Ice	3.72	3.61	0.17
						2" Ice	4.86	4.74	0.35
						4" Ice			
PCS 1900MHz 4x45W-65MHz	C	From Leg	3.00	0.0000	148.00	No Ice	2.71	2.61	0.06
			0.00			1/2"	2.95	2.85	0.08
			0.00			Ice	3.20	3.09	0.11
						1" Ice	3.72	3.61	0.17
						2" Ice	4.86	4.74	0.35
						4" Ice			
Side Arm Mount [SO 102-3]	C	None		0.0000	148.00	No Ice	3.00	3.00	0.08
						1/2"	3.48	3.48	0.11
						Ice	3.96	3.96	0.14
						1" Ice	4.92	4.92	0.20
						2" Ice	6.84	6.84	0.32
						4" Ice			
140									
BXA-171063/12CF w/ Mount Pipe	A	From Leg	4.00	0.0000	140.00	No Ice	5.03	5.29	0.04
			0.00			1/2"	5.58	6.46	0.09
			0.00			Ice	6.10	7.35	0.14
						1" Ice	7.17	9.15	0.27
						2" Ice	9.44	12.95	0.68
						4" Ice			
BXA-171063/12CF w/ Mount Pipe	B	From Leg	4.00	0.0000	140.00	No Ice	5.03	5.29	0.04
			0.00			1/2"	5.58	6.46	0.09
			0.00			Ice	6.10	7.35	0.14
						1" Ice	7.17	9.15	0.27

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
						2" Ice	9.44	12.95	0.68
						4" Ice			
BXA-171063/12CF w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	140.00	No Ice	5.03	5.29	0.04
						1/2" Ice	5.58	6.46	0.09
						1" Ice	6.10	7.35	0.14
						2" Ice	7.17	9.15	0.27
						4" Ice	9.44	12.95	0.68
(2) SC-E 6014 rev2 w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	140.00	No Ice	3.78	4.40	0.03
						1/2" Ice	4.18	5.01	0.07
						1" Ice	4.59	5.64	0.12
						2" Ice	5.44	6.96	0.22
						4" Ice	7.29	9.90	0.54
SC-E 6014 rev2 w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	140.00	No Ice	3.78	4.40	0.03
						1/2" Ice	4.18	5.01	0.07
						1" Ice	4.59	5.64	0.12
						2" Ice	5.44	6.96	0.22
						4" Ice	7.29	9.90	0.54
SC-E 6014 rev2 w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	140.00	No Ice	3.78	4.40	0.03
						1/2" Ice	4.18	5.01	0.07
						1" Ice	4.59	5.64	0.12
						2" Ice	5.44	6.96	0.22
						4" Ice	7.29	9.90	0.54
SLXW 5512 w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	140.00	No Ice	7.86	6.25	0.05
						1/2" Ice	8.39	7.10	0.11
						1" Ice	8.92	7.89	0.18
						2" Ice	10.01	9.51	0.34
						4" Ice	12.31	12.97	0.80
SLXW 5512 w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	140.00	No Ice	7.86	6.25	0.05
						1/2" Ice	8.39	7.10	0.11
						1" Ice	8.92	7.89	0.18
						2" Ice	10.01	9.51	0.34
						4" Ice	12.31	12.97	0.80
SLXW 5512 w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	140.00	No Ice	7.86	6.25	0.05
						1/2" Ice	8.39	7.10	0.11
						1" Ice	8.92	7.89	0.18
						2" Ice	10.01	9.51	0.34
						4" Ice	12.31	12.97	0.80
LPA-80063/6CF w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	140.00	No Ice	10.58	10.67	0.05
						1/2" Ice	11.24	11.93	0.14
						1" Ice	11.87	12.91	0.25
						2" Ice	13.16	14.92	0.48
						4" Ice	15.87	19.16	1.09
LPA-80063/6CF w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	140.00	No Ice	10.58	10.67	0.05
						1/2" Ice	11.24	11.93	0.14
						1" Ice	11.87	12.91	0.25
						2" Ice	13.16	14.92	0.48
						4" Ice	15.87	19.16	1.09
(2) FD9R6004/2C-3L	A	From Leg	4.00 0.00 0.00	0.0000	140.00	No Ice	0.37	0.08	0.00
						1/2" Ice	0.45	0.14	0.01
						1" Ice	0.54	0.20	0.01
						2" Ice	0.75	0.34	0.02
						4" Ice	1.28	0.74	0.06
(2) FD9R6004/2C-3L	B	From Leg	4.00 0.00 0.00	0.0000	140.00	No Ice	0.37	0.08	0.00
						1/2" Ice	0.45	0.14	0.01
						1" Ice	0.54	0.20	0.01

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						1" Ice	0.75	0.34	0.02
						2" Ice	1.28	0.74	0.06
						4" Ice			
(2) FD9R6004/2C-3L	C	From Leg	4.00	0.0000	140.00	No Ice	0.37	0.08	0.00
			0.00			1/2"	0.45	0.14	0.01
			0.00			Ice	0.54	0.20	0.01
						1" Ice	0.75	0.34	0.02
						2" Ice	1.28	0.74	0.06
						4" Ice			
GPS_A	A	From Leg	4.00	0.0000	140.00	No Ice	0.30	0.30	0.00
			0.00			1/2"	0.37	0.37	0.00
			0.00			Ice	0.46	0.46	0.01
						1" Ice	0.65	0.65	0.02
						2" Ice	1.15	1.15	0.08
						4" Ice			
Platform Mount [LP 304-1]	C	None		0.0000	140.00	No Ice	17.46	17.46	1.35
						1/2"	22.44	22.44	1.62
						Ice	27.42	27.42	1.90
						1" Ice	37.38	37.38	2.45
						2" Ice	57.30	57.30	3.55
						4" Ice			
130									
800 10764 w/ Mount Pipe	A	From Leg	4.00	0.0000	130.00	No Ice	6.20	4.29	0.06
			0.00			1/2"	6.69	4.99	0.11
			0.00			Ice	7.18	5.66	0.17
						1" Ice	8.19	7.10	0.30
						2" Ice	10.33	10.30	0.67
						4" Ice			
800 10764 w/ Mount Pipe	B	From Leg	4.00	0.0000	130.00	No Ice	6.20	4.29	0.06
			0.00			1/2"	6.69	4.99	0.11
			0.00			Ice	7.18	5.66	0.17
						1" Ice	8.19	7.10	0.30
						2" Ice	10.33	10.30	0.67
						4" Ice			
800 10764 w/ Mount Pipe	C	From Leg	4.00	0.0000	130.00	No Ice	6.20	4.29	0.06
			0.00			1/2"	6.69	4.99	0.11
			0.00			Ice	7.18	5.66	0.17
						1" Ice	8.19	7.10	0.30
						2" Ice	10.33	10.30	0.67
						4" Ice			
(2) 7770.00 w/ Mount Pipe	A	From Leg	4.00	0.0000	130.00	No Ice	6.12	4.25	0.06
			0.00			1/2"	6.63	5.01	0.10
			0.00			Ice	7.13	5.71	0.16
						1" Ice	8.16	7.16	0.29
						2" Ice	10.36	10.41	0.66
						4" Ice			
(2) 7770.00 w/ Mount Pipe	B	From Leg	4.00	0.0000	130.00	No Ice	6.12	4.25	0.06
			0.00			1/2"	6.63	5.01	0.10
			0.00			Ice	7.13	5.71	0.16
						1" Ice	8.16	7.16	0.29
						2" Ice	10.36	10.41	0.66
						4" Ice			
(2) 7770.00 w/ Mount Pipe	C	From Leg	4.00	0.0000	130.00	No Ice	6.12	4.25	0.06
			0.00			1/2"	6.63	5.01	0.10
			0.00			Ice	7.13	5.71	0.16
						1" Ice	8.16	7.16	0.29
						2" Ice	10.36	10.41	0.66
						4" Ice			
(2) LGP21903	A	From Leg	4.00	0.0000	130.00	No Ice	0.27	0.18	0.01
			0.00			1/2"	0.34	0.25	0.01
			0.00			Ice	0.43	0.32	0.02
						1" Ice	0.62	0.49	0.03
						2" Ice	1.10	0.94	0.07
						4" Ice			
(2) LGP21903	B	From Leg	4.00	0.0000	130.00	No Ice	0.27	0.18	0.01

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00			1/2"	0.34	0.25	0.01
			0.00			Ice	0.43	0.32	0.02
						1" Ice	0.62	0.49	0.03
						2" Ice	1.10	0.94	0.07
						4" Ice			
(2) LGP21903	C	From Leg	4.00	0.0000	130.00	No Ice	0.27	0.18	0.01
			0.00			1/2"	0.34	0.25	0.01
			0.00			Ice	0.43	0.32	0.02
						1" Ice	0.62	0.49	0.03
						2" Ice	1.10	0.94	0.07
						4" Ice			
(2) LGP 21403	A	From Leg	4.00	0.0000	130.00	No Ice	0.95	0.37	0.02
			0.00			1/2"	1.09	0.48	0.02
			0.00			Ice	1.24	0.60	0.03
						1" Ice	1.57	0.87	0.05
						2" Ice	2.32	1.51	0.12
						4" Ice			
(2) LGP 21403	B	From Leg	4.00	0.0000	130.00	No Ice	0.95	0.37	0.02
			0.00			1/2"	1.09	0.48	0.02
			0.00			Ice	1.24	0.60	0.03
						1" Ice	1.57	0.87	0.05
						2" Ice	2.32	1.51	0.12
						4" Ice			
(2) LGP 21403	C	From Leg	4.00	0.0000	130.00	No Ice	0.95	0.37	0.02
			0.00			1/2"	1.09	0.48	0.02
			0.00			Ice	1.24	0.60	0.03
						1" Ice	1.57	0.87	0.05
						2" Ice	2.32	1.51	0.12
						4" Ice			
(2) RRUS 11	A	From Leg	4.00	0.0000	130.00	No Ice	3.25	1.37	0.05
			0.00			1/2"	3.49	1.55	0.07
			0.00			Ice	3.74	1.74	0.10
						1" Ice	4.27	2.14	0.15
						2" Ice	5.43	3.04	0.31
						4" Ice			
(2) RRUS 11	B	From Leg	4.00	0.0000	130.00	No Ice	3.25	1.37	0.05
			0.00			1/2"	3.49	1.55	0.07
			0.00			Ice	3.74	1.74	0.10
						1" Ice	4.27	2.14	0.15
						2" Ice	5.43	3.04	0.31
						4" Ice			
(2) RRUS 11	C	From Leg	4.00	0.0000	130.00	No Ice	3.25	1.37	0.05
			0.00			1/2"	3.49	1.55	0.07
			0.00			Ice	3.74	1.74	0.10
						1" Ice	4.27	2.14	0.15
						2" Ice	5.43	3.04	0.31
						4" Ice			
DC6-48-60-18-8F	B	From Leg	4.00	0.0000	130.00	No Ice	1.47	1.47	0.03
			0.00			1/2"	1.67	1.67	0.05
			0.00			Ice	1.88	1.88	0.07
						1" Ice	2.33	2.33	0.12
						2" Ice	3.38	3.38	0.25
						4" Ice			
Platform Mount [LP 303-1]	C	None		0.0000	130.00	No Ice	14.66	14.66	1.25
						1/2"	18.87	18.87	1.48
						Ice	23.08	23.08	1.71
						1" Ice	31.50	31.50	2.18
						2" Ice	48.34	48.34	3.10
						4" Ice			
120 APXV18-206517-C w/ Mount Pipe	A	From Leg	1.00	0.0000	120.00	No Ice	5.40	4.70	0.05
			0.00			1/2"	5.96	5.86	0.10
			0.00			Ice	6.48	6.73	0.15
						1" Ice	7.55	8.51	0.28
						2" Ice	9.92	12.28	0.68

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
						4" Ice			
APXV18-206517-C w/ Mount Pipe	B	From Leg	1.00 0.00 0.00	0.0000	120.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.40 5.96 6.48 7.55 9.92	4.70 5.86 6.73 8.51 12.28	0.05 0.10 0.15 0.28 0.68
APXV18-206517-C w/ Mount Pipe	C	From Leg	1.00 0.00 0.00	0.0000	120.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.40 5.96 6.48 7.55 9.92	4.70 5.86 6.73 8.51 12.28	0.05 0.10 0.15 0.28 0.68
100									
Pipe Mount [PM 601-1]	A	From Leg	0.50 0.00 0.00	0.0000	100.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.00 3.74 4.48 5.96 8.92	0.90 1.12 1.34 1.78 2.66	0.07 0.08 0.09 0.12 0.18
Pipe Mount [PM 601-1]	C	From Leg	0.50 0.00 0.00	0.0000	100.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.00 3.74 4.48 5.96 8.92	0.90 1.12 1.34 1.78 2.66	0.07 0.08 0.09 0.12 0.18
***									
GPS_A	A	From Leg	3.00 0.00 0.00	0.0000	79.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.30 0.37 0.46 0.65 1.15	0.30 0.37 0.46 0.65 1.15	0.00 0.00 0.01 0.02 0.08
Side Arm Mount [SO 701-1]	A	From Leg	1.50 0.00 0.00	0.0000	79.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.85 1.14 1.43 2.01 3.17	1.67 2.34 3.01 4.35 7.03	0.07 0.08 0.09 0.12 0.18
***									
4' ICE SHIELDS	C	From Leg	0.50 0.00 0.00	0.0000	80.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.40 1.88 2.38 3.39 5.51	0.47 0.64 0.82 1.21 2.09	0.03 0.10 0.17 0.33 0.75
**									

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
***											
MPRC2449	A	Paraboloid w/o Radome	From Leg	1.00 0.00 0.00	7.0000		100.00	2.17	No Ice 1/2" Ice 1" Ice	3.69 3.98 4.27	0.02 0.04 0.06

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
									2" Ice	4.84	0.11
									4" Ice	6.00	0.19
MPRC2449	C	Paraboloid w/o Radome	From Leg	1.00	63.0000		100.00	2.17	No Ice	3.69	0.02
				0.00					1/2" Ice	3.98	0.04
				0.00					1" Ice	4.27	0.06
									2" Ice	4.84	0.11
									4" Ice	6.00	0.19
***											

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	160 - 140	Pole	Max Tension	14	0.00	-0.00	0.00
			Max. Compression	14	-14.49	0.49	-0.64
			Max. Mx	11	-9.20	161.81	-0.27
			Max. My	8	-9.20	0.15	-161.89

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vy	11	-11.06	161.81	-0.27
			Max. Vx	8	11.06	0.15	-161.89
			Max. Torque	13			2.36
L2	140 - 120	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-27.93	1.38	-2.55
			Max. Mx	11	-17.13	519.77	-0.72
			Max. My	8	-17.13	0.17	-519.90
			Max. Vy	11	-20.74	519.77	-0.72
			Max. Vx	8	20.72	0.17	-519.90
			Max. Torque	12			3.32
L3	120 - 100	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-35.43	2.76	-2.86
			Max. Mx	11	-22.06	971.97	-0.89
			Max. My	8	-22.06	0.35	-971.65
			Max. Vy	11	-23.84	971.97	-0.89
			Max. Vx	8	23.82	0.35	-971.65
			Max. Torque	12			3.34
L4	100 - 80	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-43.42	4.71	-3.08
			Max. Mx	11	-27.55	1480.85	-2.87
			Max. My	8	-27.54	-1.57	-1484.32
			Max. Vy	5	26.75	-1480.55	-1.99
			Max. Vx	8	26.90	-1.57	-1484.32
			Max. Torque	6			-3.87
L5	80 - 60	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-51.93	6.70	-3.35
			Max. Mx	5	-33.49	-2043.10	-2.75
			Max. My	8	-33.49	-3.28	-2049.10
			Max. Vy	5	29.42	-2043.10	-2.75
			Max. Vx	8	29.52	-3.28	-2049.10
			Max. Torque	6			-3.92
L6	60 - 40	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-61.66	8.27	-3.80
			Max. Mx	5	-40.95	-2654.04	-3.72
			Max. My	8	-40.95	-5.07	-2662.39
			Max. Vy	5	31.69	-2654.04	-3.72
			Max. Vx	8	31.79	-5.07	-2662.39
			Max. Torque	6			-3.71
L7	40 - 20	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-71.25	9.76	-4.23
			Max. Mx	5	-48.49	-3306.26	-4.68
			Max. My	8	-48.49	-6.85	-3316.95
			Max. Vy	5	33.54	-3306.26	-4.68
			Max. Vx	8	33.64	-6.85	-3316.95
			Max. Torque	6			-3.74
L8	20 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-82.42	11.25	-4.67
			Max. Mx	5	-57.63	-3994.51	-5.63
			Max. My	8	-57.63	-8.63	-4007.52
			Max. Vy	5	35.29	-3994.51	-5.63
			Max. Vx	8	35.39	-8.63	-4007.52
			Max. Torque	6			-3.77

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	14	82.42	0.00	-0.00
	Max. H_x	11	57.64	35.22	-0.11
	Max. H_z	2	57.64	-0.03	35.24
	Max. M_x	2	3991.04	-0.03	35.24
	Max. M_z	5	3994.51	-35.28	-0.04
	Max. Torsion	12	3.44	30.50	17.61
	Min. Vert	33	57.64	-0.04	-13.82

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
	Min. H_x	5	57.64	-35.28	-0.04
	Min. H_z	8	57.64	-0.10	-35.38
	Min. M_x	8	-4007.52	-0.10	-35.38
	Min. M_z	11	-3991.60	35.22	-0.11
	Min. Torsion	6	-3.77	-30.53	-17.79

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	57.64	0.00	0.00	1.27	1.76	0.00
Dead+Wind 0 deg - No Ice	57.64	0.03	-35.24	-3991.04	-1.23	-2.22
Dead+Wind 30 deg - No Ice	57.64	17.63	-30.51	-3455.06	-1995.49	-0.69
Dead+Wind 60 deg - No Ice	57.64	30.65	-17.52	-1984.66	-3468.87	1.63
Dead+Wind 90 deg - No Ice	57.64	35.28	0.04	5.63	-3994.51	3.05
Dead+Wind 120 deg - No Ice	57.64	30.53	17.79	2015.29	-3457.12	3.77
Dead+Wind 150 deg - No Ice	57.64	17.64	30.63	3470.43	-1996.19	3.65
Dead+Wind 180 deg - No Ice	57.64	0.10	35.38	4007.52	-8.63	2.65
Dead+Wind 210 deg - No Ice	57.64	-17.59	30.62	3469.07	1994.01	0.57
Dead+Wind 240 deg - No Ice	57.64	-30.51	17.80	2015.00	3457.70	-1.27
Dead+Wind 270 deg - No Ice	57.64	-35.22	0.11	12.18	3991.60	-2.60
Dead+Wind 300 deg - No Ice	57.64	-30.50	-17.61	-1993.93	3457.08	-3.44
Dead+Wind 330 deg - No Ice	57.64	-17.59	-30.50	-3454.08	1995.47	-3.21
Dead+Ice+Temp	82.42	-0.00	0.00	4.67	11.25	0.00
Dead+Wind 0 deg+Ice+Temp	82.42	0.01	-5.77	-653.08	10.86	-0.49
Dead+Wind 30 deg+Ice+Temp	82.42	2.89	-5.00	-564.88	-317.62	-0.15
Dead+Wind 60 deg+Ice+Temp	82.42	5.01	-2.87	-322.87	-559.94	0.32
Dead+Wind 90 deg+Ice+Temp	82.42	5.77	0.00	5.19	-646.63	0.64
Dead+Wind 120 deg+Ice+Temp	82.42	5.00	2.91	336.05	-558.09	0.80
Dead+Wind 150 deg+Ice+Temp	82.42	2.88	5.01	576.04	-317.39	0.78
Dead+Wind 180 deg+Ice+Temp	82.42	0.01	5.79	664.58	10.19	0.55
Dead+Wind 210 deg+Ice+Temp	82.42	-2.88	5.01	576.03	339.85	0.13
Dead+Wind 240 deg+Ice+Temp	82.42	-4.99	2.91	336.34	580.80	-0.27
Dead+Wind 270 deg+Ice+Temp	82.42	-5.76	0.02	6.50	668.66	-0.58
Dead+Wind 300 deg+Ice+Temp	82.42	-4.99	-2.88	-323.86	580.52	-0.76
Dead+Wind 330 deg+Ice+Temp	82.42	-2.88	-4.99	-564.56	339.73	-0.71
Dead+Wind 0 deg - Service	57.64	0.01	-13.77	-1558.57	0.62	-0.87
Dead+Wind 30 deg - Service	57.64	6.89	-11.92	-1349.15	-778.57	-0.27
Dead+Wind 60 deg - Service	57.64	11.97	-6.85	-774.64	-1354.25	0.64
Dead+Wind 90 deg - Service	57.64	13.78	0.02	3.00	-1559.62	1.19
Dead+Wind 120 deg - Service	57.64	11.93	6.95	788.21	-1349.66	1.47
Dead+Wind 150 deg - Service	57.64	6.89	11.97	1356.75	-778.85	1.43
Dead+Wind 180 deg - Service	57.64	0.04	13.82	1566.60	-2.28	1.04
Dead+Wind 210 deg - Service	57.64	-6.87	11.96	1356.22	780.19	0.22
Dead+Wind 240 deg - Service	57.64	-11.92	6.95	788.09	1352.07	-0.50
Dead+Wind 270 deg - Service	57.64	-13.76	0.04	5.56	1560.68	-1.02

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
Dead+Wind 300 deg - Service	57.64	-11.91	-6.88	-778.26	1351.83	-1.34
Dead+Wind 330 deg - Service	57.64	-6.87	-11.91	-1348.77	780.76	-1.25

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX	PY	PZ	PX	PY	PZ	% Error
	K	K	K	K	K	K	
1	0.00	-57.64	0.00	0.00	57.64	0.00	0.000%
2	0.03	-57.64	-35.24	-0.03	57.64	35.24	0.000%
3	17.63	-57.64	-30.51	-17.63	57.64	30.51	0.000%
4	30.65	-57.64	-17.52	-30.65	57.64	17.52	0.000%
5	35.28	-57.64	0.04	-35.28	57.64	-0.04	0.000%
6	30.53	-57.64	17.79	-30.53	57.64	-17.79	0.000%
7	17.64	-57.64	30.63	-17.64	57.64	-30.63	0.000%
8	0.10	-57.64	35.38	-0.10	57.64	-35.38	0.000%
9	-17.59	-57.64	30.62	17.59	57.64	-30.62	0.000%
10	-30.51	-57.64	17.80	30.51	57.64	-17.80	0.000%
11	-35.22	-57.64	0.11	35.22	57.64	-0.11	0.000%
12	-30.50	-57.64	-17.61	30.50	57.64	17.61	0.000%
13	-17.59	-57.64	-30.50	17.59	57.64	30.50	0.000%
14	0.00	-82.42	0.00	0.00	82.42	-0.00	0.000%
15	0.01	-82.42	-5.77	-0.01	82.42	5.77	0.000%
16	2.89	-82.42	-5.00	-2.89	82.42	5.00	0.000%
17	5.01	-82.42	-2.87	-5.01	82.42	2.87	0.000%
18	5.77	-82.42	0.00	-5.77	82.42	-0.00	0.000%
19	5.00	-82.42	2.91	-5.00	82.42	-2.91	0.000%
20	2.88	-82.42	5.01	-2.88	82.42	-5.01	0.000%
21	0.01	-82.42	5.79	-0.01	82.42	-5.79	0.000%
22	-2.88	-82.42	5.01	2.88	82.42	-5.01	0.000%
23	-4.99	-82.42	2.91	4.99	82.42	-2.91	0.000%
24	-5.76	-82.42	0.02	5.76	82.42	-0.02	0.000%
25	-4.99	-82.42	-2.88	4.99	82.42	2.88	0.000%
26	-2.88	-82.42	-4.99	2.88	82.42	4.99	0.000%
27	0.01	-57.64	-13.77	-0.01	57.64	13.77	0.000%
28	6.89	-57.64	-11.92	-6.89	57.64	11.92	0.000%
29	11.97	-57.64	-6.85	-11.97	57.64	6.85	0.000%
30	13.78	-57.64	0.02	-13.78	57.64	-0.02	0.000%
31	11.93	-57.64	6.95	-11.93	57.64	-6.95	0.000%
32	6.89	-57.64	11.97	-6.89	57.64	-11.97	0.000%
33	0.04	-57.64	13.82	-0.04	57.64	-13.82	0.000%
34	-6.87	-57.64	11.96	6.87	57.64	-11.96	0.000%
35	-11.92	-57.64	6.95	11.92	57.64	-6.95	0.000%
36	-13.76	-57.64	0.04	13.76	57.64	-0.04	0.000%
37	-11.91	-57.64	-6.88	11.91	57.64	6.88	0.000%
38	-6.87	-57.64	-11.91	6.87	57.64	11.91	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	4	0.00000001	0.00075320
3	Yes	5	0.00000001	0.00016087
4	Yes	5	0.00000001	0.00015675
5	Yes	5	0.00000001	0.00002659
6	Yes	5	0.00000001	0.00018257
7	Yes	5	0.00000001	0.00015169
8	Yes	4	0.00000001	0.00082891
9	Yes	5	0.00000001	0.00016615

10	Yes	5	0.00000001	0.00017094
11	Yes	4	0.00000001	0.00095974
12	Yes	5	0.00000001	0.00015127
13	Yes	5	0.00000001	0.00017849
14	Yes	4	0.00000001	0.00004109
15	Yes	5	0.00000001	0.00008459
16	Yes	5	0.00000001	0.00008545
17	Yes	5	0.00000001	0.00008528
18	Yes	5	0.00000001	0.00008388
19	Yes	5	0.00000001	0.00008647
20	Yes	5	0.00000001	0.00008722
21	Yes	5	0.00000001	0.00008657
22	Yes	5	0.00000001	0.00008900
23	Yes	5	0.00000001	0.00008924
24	Yes	5	0.00000001	0.00008700
25	Yes	5	0.00000001	0.00008805
26	Yes	5	0.00000001	0.00008733
27	Yes	4	0.00000001	0.00018281
28	Yes	4	0.00000001	0.00055283
29	Yes	4	0.00000001	0.00053184
30	Yes	4	0.00000001	0.00022746
31	Yes	4	0.00000001	0.00070607
32	Yes	4	0.00000001	0.00051899
33	Yes	4	0.00000001	0.00019752
34	Yes	4	0.00000001	0.00058765
35	Yes	4	0.00000001	0.00061750
36	Yes	4	0.00000001	0.00021167
37	Yes	4	0.00000001	0.00051707
38	Yes	4	0.00000001	0.00067990

Maximum Tower Deflections - Service Wind

Section No.	Elevation	Horz. Deflection	Gov. Load Comb.	Tilt	Twist
	ft	in		°	°
L1	160 - 140	18.093	33	0.8872	0.0039
L2	140 - 120	14.407	33	0.8640	0.0031
L3	120 - 100	10.907	33	0.7950	0.0022
L4	100 - 80	7.772	33	0.6911	0.0016
L5	80 - 60	5.111	33	0.5712	0.0011
L6	60 - 40	2.967	33	0.4456	0.0007
L7	40 - 20	1.355	33	0.3191	0.0005
L8	20 - 0	0.342	33	0.1584	0.0002

Critical Deflections and Radius of Curvature - Service Wind

Elevation	Appurtenance	Gov. Load Comb.	Deflection	Tilt	Twist	Radius of Curvature
ft			in	°	°	ft
160.00	Lighting Rod 3/4" x 4'	33	18.093	0.8872	0.0039	105217
150.00	APXVSPP18-C-A20 w/ Mount Pipe	33	16.239	0.8794	0.0035	52608
148.00	800MHz 2X50W RRH W/FILTER	33	15.870	0.8771	0.0034	43840
140.00	BXA-171063/12CF w/ Mount Pipe	33	14.407	0.8640	0.0031	26197
130.00	800 10764 w/ Mount Pipe	33	12.622	0.8354	0.0026	16984
120.00	APXV18-206517-C w/ Mount Pipe	33	10.907	0.7950	0.0022	12678
100.00	MPRC2449	33	7.772	0.6911	0.0016	9984
80.00	4' ICE SHIELDS	33	5.111	0.5712	0.0011	9186
79.00	GPS_A	33	4.991	0.5649	0.0010	9170

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	160 - 140	46.259	8	2.2679	0.0101
L2	140 - 120	36.839	8	2.2088	0.0079
L3	120 - 100	27.891	8	2.0327	0.0056
L4	100 - 80	19.877	8	1.7675	0.0040
L5	80 - 60	13.072	8	1.4609	0.0027
L6	60 - 40	7.590	8	1.1396	0.0019
L7	40 - 20	3.465	8	0.8161	0.0012
L8	20 - 0	0.875	8	0.4052	0.0005

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
160.00	Lighting Rod 3/4" x 4'	8	46.259	2.2679	0.0101	41471
150.00	APXVSPP18-C-A20 w/ Mount Pipe	8	41.520	2.2479	0.0090	20735
148.00	800MHz 2X50W RRH W/FILTER	8	40.578	2.2423	0.0088	17279
140.00	BXA-171063/12CF w/ Mount Pipe	8	36.839	2.2088	0.0079	10322
130.00	800 10764 w/ Mount Pipe	8	32.275	2.1358	0.0067	6677
120.00	APXV18-206517-C w/ Mount Pipe	8	27.891	2.0327	0.0056	4978
100.00	MPRC2449	8	19.877	1.7675	0.0040	3915
80.00	4' ICE SHIELDS	8	13.072	1.4609	0.0027	3597
79.00	GPS_A	8	12.766	1.4448	0.0027	3590

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	160 - 140 (1)	P36x3/8	20.00	0.00	0.0	23.696	41.9697	-9.20	994.51	0.009
L2	140 - 120 (2)	P42x3/8	20.00	0.00	0.0	22.711	49.0383	-17.13	1113.69	0.015
L3	120 - 100 (3)	P48x3/8	20.00	0.00	0.0	21.972	56.1069	-22.06	1232.77	0.018
L4	100 - 80 (4)	P54x3/8	20.00	0.00	0.0	21.397	63.1755	-27.54	1351.78	0.020
L5	80 - 60 (5)	P60x3/8	20.00	0.00	0.0	20.938	70.2440	-33.49	1470.73	0.023
L6	60 - 40 (6)	P60x1/2	20.00	0.00	0.0	22.317	93.4624	-40.95	2085.77	0.020
L7	40 - 20 (7)	P60x1/2	20.00	0.00	0.0	22.317	93.4624	-48.49	2085.77	0.023
L8	20 - 0 (8)	P60x5/8	20.00	0.00	0.0	23.696	116.583 0	-57.63	2762.52	0.021

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	160 - 140 (1)	P36x3/8	161.96	5.253	23.696	0.222	0.00	0.000	23.696	0.000

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 $\frac{f_{by}}{F_{by}}$
L2	140 - 120 (2)	P42x3/8	520.03	12.338	22.711	0.543	0.00	0.000	22.711	0.000
L3	120 - 100 (3)	P48x3/8	972.18	17.600	21.972	0.801	0.00	0.000	21.972	0.000
L4	100 - 80 (4)	P54x3/8	1484.32	21.177	21.397	0.990	0.00	0.000	21.397	0.000
L5	80 - 60 (5)	P60x3/8	2049.11	23.631	20.938	1.129	0.00	0.000	20.938	0.000
L6	60 - 40 (6)	P60x1/2	2662.40	23.172	22.317	1.038	0.00	0.000	22.317	0.000
L7	40 - 20 (7)	P60x1/2	3316.95	28.869	22.317	1.294	0.00	0.000	22.317	0.000
L8	20 - 0 (8)	P60x5/8	4007.53	28.079	23.696	1.185	0.00	0.000	23.696	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	160 - 140 (1)	P36x3/8	11.06	0.527	16.800	0.031	1.14	0.019	11.901	0.002
L2	140 - 120 (2)	P42x3/8	20.74	0.846	16.800	0.050	1.59	0.019	9.661	0.002
L3	120 - 100 (3)	P48x3/8	23.84	0.850	16.800	0.051	1.59	0.014	8.740	0.002
L4	100 - 80 (4)	P54x3/8	26.90	0.851	16.800	0.051	2.58	0.018	8.001	0.002
L5	80 - 60 (5)	P60x3/8	29.52	0.840	16.800	0.050	2.63	0.015	7.394	0.002
L6	60 - 40 (6)	P60x1/2	31.79	0.680	16.800	0.040	2.64	0.011	10.593	0.001
L7	40 - 20 (7)	P60x1/2	33.64	0.720	16.800	0.043	2.64	0.011	10.593	0.001
L8	20 - 0 (8)	P60x5/8	35.39	0.607	16.800	0.036	2.65	0.009	14.001	0.001

Pole Interaction Design Data

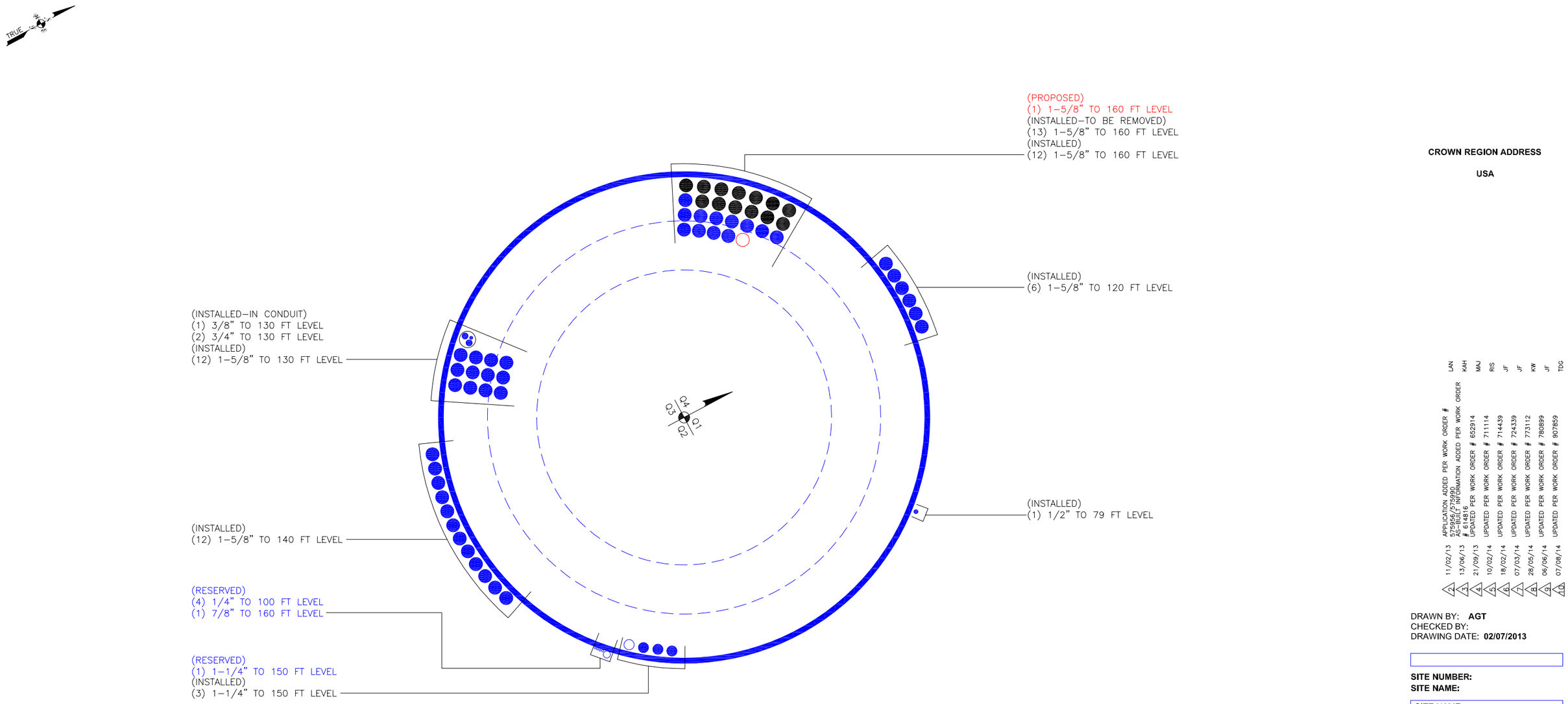
Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	160 - 140 (1)	0.009	0.222	0.000	0.031	0.002	0.232 ✔	1.333	H1-3+VT ✔
L2	140 - 120 (2)	0.015	0.543	0.000	0.050	0.002	0.561 ✔	1.333	H1-3+VT ✔
L3	120 - 100 (3)	0.018	0.801	0.000	0.051	0.002	0.822 ✔	1.333	H1-3+VT ✔
L4	100 - 80 (4)	0.020	0.990	0.000	0.051	0.002	1.013 ✔	1.333	H1-3+VT ✔
L5	80 - 60 (5)	0.023	1.129	0.000	0.050	0.002	1.154 ✔	1.333	H1-3+VT ✔
L6	60 - 40 (6)	0.020	1.038	0.000	0.040	0.001	1.060 ✔	1.333	H1-3+VT ✔
L7	40 - 20 (7)	0.023	1.294	0.000	0.043	0.001	1.319 ✔	1.333	H1-3+VT ✔
L8	20 - 0 (8)	0.021	1.185	0.000	0.036	0.001	1.207 ✔	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	160 - 140	Pole	P36x3/8	1	-9.20	1325.68	17.4	Pass
L2	140 - 120	Pole	P42x3/8	2	-17.13	1484.55	42.1	Pass
L3	120 - 100	Pole	P48x3/8	3	-22.06	1643.28	61.6	Pass
L4	100 - 80	Pole	P54x3/8	4	-27.54	1801.92	76.0	Pass
L5	80 - 60	Pole	P60x3/8	5	-33.49	1960.48	86.6	Pass
L6	60 - 40	Pole	P60x1/2	6	-40.95	2780.33	79.5	Pass
L7	40 - 20	Pole	P60x1/2	7	-48.49	2780.33	98.9	Pass
L8	20 - 0	Pole	P60x5/8	8	-57.63	3682.44	90.6	Pass
							Summary	
						Pole (L7)	98.9	Pass
						RATING =	**98.9**	**Pass**

APPENDIX B

BASE LEVEL DRAWING



BUSINESS UNIT: 828540 TOWER ID: C_BASELEVEL

BASE LEVEL DRAWING | 1" = 1'–0" | 1

PLOT DATE: 8/7/2014 FILE NAME: 828540_BASELEVEL.dwg

CROWN REGION ADDRESS

USA

A	11/02/13	APPLICATION ADDED PER WORK ORDER # 652914
B	13/06/13	RFDS/CI INFORMATION ADDED PER WORK ORDER # 711114
C	21/09/13	UPDATED PER WORK ORDER # 652914
D	10/02/14	UPDATED PER WORK ORDER # 711114
E	18/02/14	UPDATED PER WORK ORDER # 714439
F	07/03/14	UPDATED PER WORK ORDER # 724339
G	28/05/14	UPDATED PER WORK ORDER # 773112
H	06/06/14	UPDATED PER WORK ORDER # 780899
I	07/08/14	UPDATED PER WORK ORDER # 907859

DRAWN BY: **AGT**
CHECKED BY:
DRAWING DATE: **02/07/2013**

SITE NUMBER:
SITE NAME:

SITE NAME

TORRINGTON/RT 8

BUSINESS UNIT NUMBER

828540

SITE ADDRESS

218 WHEELER ROAD
TORRINGTON, CT 06790
LITCHFIELD COUNTY
USA

SHEET TITLE

BASE LEVEL

SHEET NUMBER

A1-0

APPENDIX C

ADDITIONAL CALCULATIONS

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

Site Data

BU#: *828540*
Site Name: *TORRINGTON/RT 8*
App #: *261509 Rev 1*

Pole Manufacturer:	Pirod

Reactions		
Moment:	161.95	ft-kips
Axial:	9.20	kips
Shear:	11.06	kips
Elevation:	140	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:	100	<-- Disregard	Bolt Fty:
N/A:	75	<-- Disregard	44.00
Circle (in.):	39		

Plate Data		
Diam:	42.125	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:	0	*
Weld Type:		
Groove Depth:		<-- Disregard
Groove Angle:		<-- Disregard
Fillet H. Weld:		in
Fillet V. Weld:		in
Width:		in
Height:		in
Thick:		in
Notch:		in
Grade:		ksi
Weld str.:		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:	1.333	

Flange Bolt Results

			Rigid
Bolt Tension Capacity, **B**:	46.07	kips	Service, ASD
Max Bolt directly applied T:	6.79	Kips	Fty*ASIF
Min. PL "tc" for **B** cap. **w/o** Pry:	1.379	in	
Min PL "treq" for actual **T w/ Pry**:	0.402	in	
Min PL "t1" for actual **T w/o Pry**:	0.529	in	
T allowable with Prying:	43.39	kips	0≤α'≤1 case
Prying Force, Q:	0.00	kips	
Total Bolt Tension=T+Q:	6.79	kips	
Prying Bolt Stress Ratio=(T+Q)/(B):	14.7%	**Pass**	

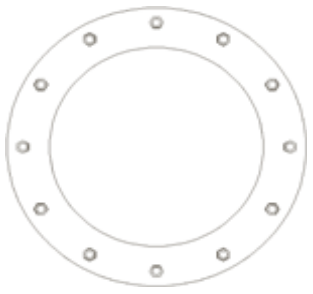
Exterior Flange Plate Results	Flexural Check		Rigid
Compression Side Plate Stress:	Rohn/Pirod	OK	Service ASD
Allowable Plate Stress:	36.0	ksi	0.75*Fy*ASIF
Compression Plate Stress Ratio:	Rohn/Pirod	OK	Comp. Y.L. Length: 15.00
No Prying			
Tension Side Stress Ratio, (treq/t)^2:	Rohn/Pirod	OK	

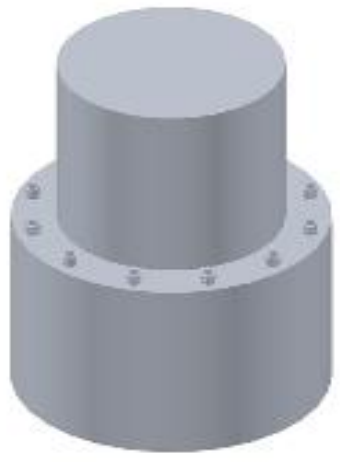
n/a

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, Exterior Flange Plate - Any Bolt Material TIA Rev F

Site Data

BU#: *828540*
Site Name: *TORRINGTON/RT 8*
App #: *261509 Rev 1*

Pole Manufacturer:	Pirod

Reactions		
Moment:	520.03	ft-kips
Axial:	17.13	kips
Shear:	20.74	kips
Elevation:	120	feet

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

Bolt Data			
Qty:	32		
Diameter (in.):	1	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:	100	<-- Disregard	Bolt Fty:
N/A:	75	<-- Disregard	44.00
Circle (in.):	45		

Plate Data		
Diam:	48.125	in
Thick, t:	1.25	in
Grade (Fy):	36	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	4.12	in

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

Flange Bolt Results

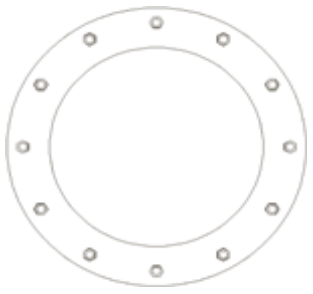
			Rigid
Bolt Tension Capacity, **B**:	46.07	kips	Service, ASD
Max Bolt directly applied T:	16.80	Kips	Fty*ASIF
Min. PL "tc" for **B** cap. **w/o** Pry:	1.365	in	
Min PL "treq" for actual **T w/ Pry**:	0.624	in	
Min PL "t1" for actual **T w/o Pry**:	0.824	in	
T allowable with Prying:	43.64	kips	0≤α'≤1 case
Prying Force, Q:	0.00	kips	
Total Bolt Tension=T+Q:	16.80	kips	
Prying Bolt Stress Ratio=(T+Q)/(B):	36.5%	**Pass**	

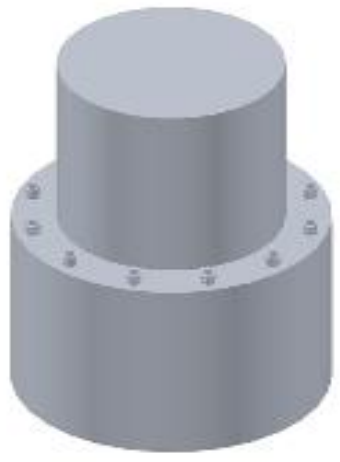
Exterior Flange Plate Results

	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: 16.16
No Prying			
Tension Side Stress Ratio, (treq/t)^2:	Rohn/Pirod	OK	

n/a

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, Exterior Flange Plate - Any Bolt Material TIA Rev F

Site Data

BU#: *828540*
Site Name: *TORRINGTON/RT 8*
App #: *261509 Rev 1*

Pole Manufacturer:	Pirod

Bolt Data			
Qty:	36		
Diameter (in.):	1	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:	100	<-- Disregard	Bolt Fty:
N/A:	75	<-- Disregard	44.00
Circle (in.):	51		

Plate Data		
Diam:	54.125	in
Thick, t:	1.25	in
Grade (Fy):	36	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	4.19	in

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

Pole Data		
Diam:	48	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	

Reactions		
Moment:	972.19	ft-kips
Axial:	22.06	kips
Shear:	23.84	kips
Elevation:	100	feet

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

Flange Bolt Results

Bolt Tension Capacity, **B**:	46.07	kips	Rigid
Max Bolt directly applied T:	24.80	Kips	Service, ASD
Min. PL "tc" for **B** cap. **w/o** Pry:	1.354	in	Fty*ASIF
Min PL "treq" for actual **T w/ Pry**:	0.752	in	
Min PL "t1" for actual **T w/o Pry**:	0.994	in	
T allowable with Prying:	43.84	kips	0≤α'≤1 case
Prying Force, Q:	0.00	kips	
Total Bolt Tension=T+Q:	24.80	kips	
Prying Bolt Stress Ratio=(T+Q)/(B):	53.8%	**Pass**	

Exterior Flange Plate Results

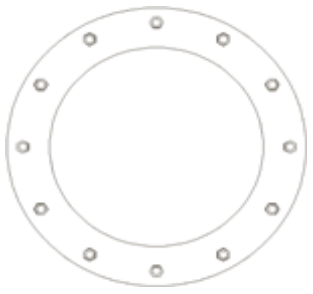
	Flexural Check		Rigid
Compression Side Plate Stress:	Rohn/Pirod	OK	Service ASD
Allowable Plate Stress:	36.0	ksi	0.75*Fy*ASIF
Compression Plate Stress Ratio:	Rohn/Pirod	OK	Comp. Y.L. Length:
No Prying			17.23
Tension Side Stress Ratio, (treq/t)^2:	Rohn/Pirod	OK	

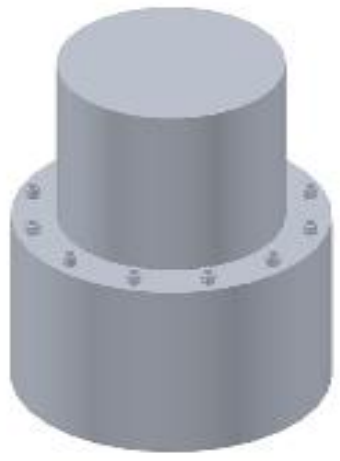
n/a

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, Exterior Flange Plate - Any Bolt Material TIA Rev F

Site Data

BU#: *828540*
Site Name: *TORRINGTON/RT 8*
App #: *261509 Rev 1*

Pole Manufacturer:	Pirod

Reactions		
Moment:	1484.32	ft-kips
Axial:	27.54	kips
Shear:	26.90	kips
Elevation:	80	feet

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

Bolt Data			
Qty:	48		
Diameter (in.):	1	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:	100	<-- Disregard	Bolt Fty:
N/A:	75	<-- Disregard	44.00
Circle (in.):	57		

Plate Data		
Diam:	60.125	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:	0	*
Weld Type:		
Groove Depth:		<-- Disregard
Groove Angle:		<-- Disregard
Fillet H. Weld:		in
Fillet V. Weld:		in
Width:		in
Height:		in
Thick:		in
Notch:		in
Grade:		ksi
Weld str.:		ksi

Pole Data		
Diam:	54	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	

Flange Bolt Results

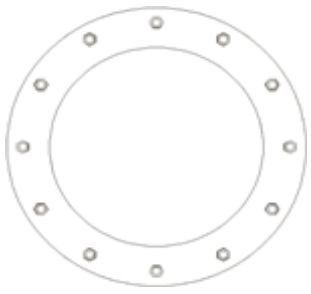
			Rigid
Bolt Tension Capacity, **B**:	46.07	kips	Service, ASD
Max Bolt directly applied T:	25.47	Kips	Fty*ASIF
Min. PL "tc" for **B** cap. **w/o** Pry:	1.474	in	
Min PL "treq" for actual **T w/ Pry**:	0.841	in	
Min PL "t1" for actual **T w/o Pry**:	1.096	in	
T allowable with Prying:	41.84	kips	0≤α'≤1 case
Prying Force, Q:	0.00	kips	
Total Bolt Tension=T+Q:	25.47	kips	
Prying Bolt Stress Ratio=(T+Q)/(B):	55.3%	**Pass**	

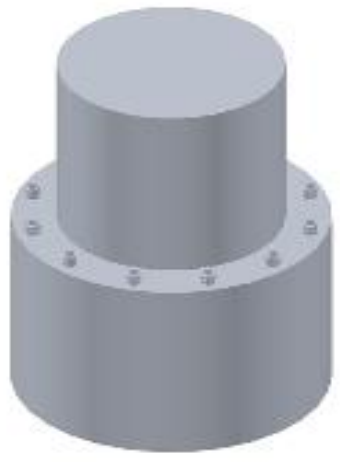
Exterior Flange Plate Results

	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: 18.25
No Prying			
Tension Side Stress Ratio, (treq/t)^2:	Rohn/Pirod	OK	

n/a

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

Project Name:	828540
Project Number:	TORRINGTON/RT 8
Job Number:	WO 907865
Date:	8/13/2014

Jacobs Engineering Group. Inc.

Moment Distribution @ 60 ft

Anchor Bolts?	Yes	
Code:	F	

Total Moment of Inertia	19449.77	in^4

Moment (M)	**Axial (P)**	**Shear (V)**
2049.11	33.49	29.52
kip-ft	kips	kips

Outer Bolts		
Number of Bolts	32	
Bolt Circle	53	in
y	26.5	in
Moment of Inertia (I)	10887.684	in^4
Diameter (d)	1.25	in
Ag	1.23	in^2
Ae	0.969	in^2
Total Moment	1147.1	kips-ft
Total Axial	16.75	kips
Total Shear	14.76	kips

Inner Bolts		
Number of Bolts	32	
Bolt Circle	47	in
y	23.5	in
Moment of Inertia (I)	8,562	in^4
Diameter (d)	1.25	
Ag	1.23	in^2
Ae	0.969	in^2
Total Moment	902.0	kips-ft
Total Axial	16.75	kips
Total Shear	14.76	kips

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

Site Data

BU#: *828540*
Site Name: *TORRINGTON/RT 8*
App #: *261509 Rev 1*

Manufacturer:	Pirod

Bolt Data			
Qty:	32		
Diam:	1.25	Bolt Fu:	105
Bolt Material:	A325	Bolt Fy:	81
N/A:	100	<-- Disregard	Bolt Fty:
N/A:	75	<-- Disregard	44.00
Circle:	53	in	

Plate Data		
Plate Outer Diam:	59	in
Plate Inner Diam:	43	in (Hole @ Ctr)
Thick:	1.25	in
Grade:	36	ksi
Effective Width:	5.79	in

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

Pole Data		
Pole OuterDiam:	60	in
Thick:	0.5	in
Pole Inner Diam:	59	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	63	ksi

Stress Increase Factor		
ASIF:	1.333	

Reactions		
Moment:	1147.1	ft-kips
Axial:	16.75	kips
Shear:	14.76	kips
Exterior Flange Run, T+Q:	0.00	kips

Elevation: 60 feet

Interior Flange Bolt Results

Maximum Bolt Tension:	31.9	Kips, Ext. T=Interior T
Allowable Tension:	72.0	Kips
Bolt Stress Ratio:	44.4%	**Pass**

Interior Flange Plate Results Flexural Check

Controlling Bolt Axial Force:	33.0	Kips, Ext. C= Interior C
Plate Stress:	Rohn/Pirod	OK
Allowable Plate Stress:	36.0	ksi
Plate Stress Ratio:	Rohn/Pirod	OK

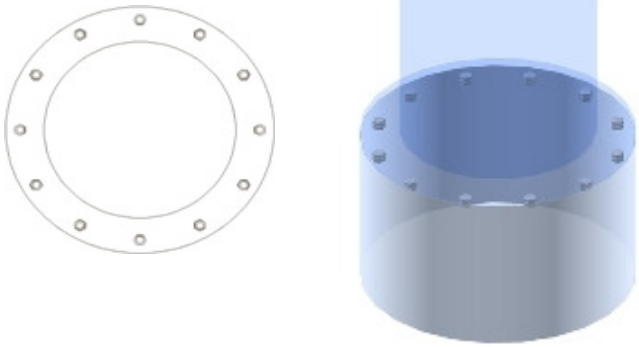
n/a

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#: *828540*
Site Name: *TORRINGTON/RT 8*
App #: *261509 Rev 1*

Manufacturer:	Pirod

Bolt Data

Qty:	32		
Diam:	1.25	Bolt Fu:	105
Bolt Material:	A325	Bolt Fy:	81
N/A:	100	<-- Disregard	Bolt Fty:
N/A:	75	<-- Disregard	44.00
Circle:	47	in	

Plate Data

Plate Outer Diam:	59	in
Plate Inner Diam:	43	in (Hole @ Ctr)
Thick:	1.25	in
Grade:	36	ksi
Effective Width:	5.79	in

Stiffener Data (Welding at Both Sides)

Config:	0	*
Weld Type:		
Groove Depth:		<-- Disregard
Groove Angle:		<-- Disregard
Fillet H. Weld:		in
Fillet V. Weld:		in
Width:		in
Height:		in
Thick:		in
Notch:		in
Grade:		ksi
Weld str.:		ksi

Pole Data

Pole OuterDiam:	60	in
Thick:	0.5	in
Pole Inner Diam:	59	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	63	ksi

Stress Increase Factor

ASIF:	1.333

Reactions

Moment:	902.0	ft-kips
Axial:	16.75	kips
Shear:	14.76	kips
Exterior Flange Run, T+Q:	0.00	kips

Elevation: 60 feet

Interior Flange Bolt Results

Maximum Bolt Tension:	28.3	Kips, Ext. T=Interior T
Allowable Tension:	72.0	Kips
Bolt Stress Ratio:	39.3%	**Pass**

Interior Flange Plate Results Flexural Check

Controlling Bolt Axial Force:	29.3	Kips, Ext. C= Interior C
Plate Stress:	Rohn/Pirod	OK
Allowable Plate Stress:	36.0	ksi
Plate Stress Ratio:	Rohn/Pirod	OK

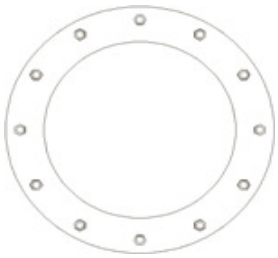
n/a

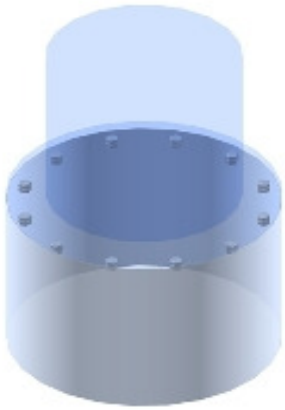
Stiffener Results N/A for Rohn / Pirod

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

Project Name:	828540
Project Number:	TORRINGTON/RT 8
Job Number:	WO 907865
Date:	8/13/2014

JACOBS
Jacobs Engineering Group. Inc.

Moment Distribution @ 40 ft

Anchor Bolts?	Yes	
Code:	F	

Total Moment of Inertia	19449.77	in^4

Moment (M)	**Axial (P)**	**Shear (V)**
2662.4	40.95	31.79
kip-ft	kips	kips

Outer Bolts		
Number of Bolts	32	
Bolt Circle	53	in
y	26.5	in
Moment of Inertia (I)	10887.684	in^4
Diameter (d)	1.25	in
Ag	1.23	in^2
Ae	0.969	in^2
Total Moment	1490.4	kips-ft
Total Axial	20.48	kips
Total Shear	15.90	kips

Inner Bolts		
Number of Bolts	32	
Bolt Circle	47	in
y	23.5	in
Moment of Inertia (I)	8,562	in^4
Diameter (d)	1.25	
Ag	1.23	in^2
Ae	0.969	in^2
Total Moment	1172.0	kips-ft
Total Axial	20.48	kips
Total Shear	15.90	kips

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

Site Data

BU#: *828540*
Site Name: *TORRINGTON/RT 8*
App #: *261509 Rev 1*

Manufacturer:	Pirod

Bolt Data			
Qty:	32		
Diam:	1.25	Bolt Fu:	105
Bolt Material:	A325	Bolt Fy:	81
N/A:	100	<-- Disregard	Bolt Fty:
N/A:	75	<-- Disregard	44.00
Circle:	53	in	

Plate Data		
Plate Outer Diam:	59	in
Plate Inner Diam:	43	in (Hole @ Ctr)
Thick:	1.25	in
Grade:	36	ksi
Effective Width:	5.79	in

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

Pole Data		
Pole OuterDiam:	60	in
Thick:	0.5	in
Pole Inner Diam:	59	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	63	ksi

Stress Increase Factor		
ASIF:	1.333	

Reactions		
Moment:	1490.4	ft-kips
Axial:	20.48	kips
Shear:	15.90	kips
Exterior Flange Run, T+Q:	0.00	kips

Elevation: 40 feet

Interior Flange Bolt Results

Maximum Bolt Tension:	41.5	Kips, Ext. T=Interior T
Allowable Tension:	72.0	Kips
Bolt Stress Ratio:	57.7%	**Pass**

Interior Flange Plate Results Flexural Check

Controlling Bolt Axial Force:	42.8	Kips, Ext. C= Interior C
Plate Stress:	Rohn/Pirod	OK
Allowable Plate Stress:	36.0	ksi
Plate Stress Ratio:	Rohn/Pirod	OK

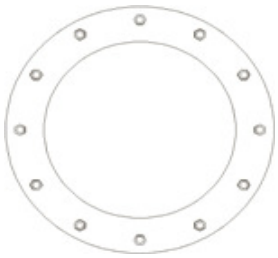
n/a

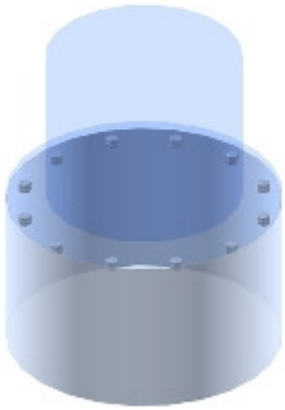
Stiffener Results N/A for Rohn / Pirod

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#: *828540*
Site Name: *TORRINGTON/RT 8*
App #: *261509 Rev 1*

Manufacturer:	Pirod

Bolt Data			
Qty:	32		
Diam:	1.25	Bolt Fu:	105
Bolt Material:	A325	Bolt Fy:	81
N/A:	100	<-- Disregard	Bolt Fty:
N/A:	75	<-- Disregard	44.00
Circle:	47	in	

Plate Data		
Plate Outer Diam:	59	in
Plate Inner Diam:	43	in (Hole @ Ctr)
Thick:	1.25	in
Grade:	36	ksi
Effective Width:	5.79	in

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

Pole Data		
Pole OuterDiam:	60	in
Thick:	0.5	in
Pole Inner Diam:	59	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	63	ksi

Stress Increase Factor		
ASIF:	1.333	

Reactions		
Moment:	1172.0	ft-kips
Axial:	20.48	kips
Shear:	15.90	kips
Exterior Flange Run, T+Q:	0.00	kips

Elevation: 40 feet

Interior Flange Bolt Results

Maximum Bolt Tension:	36.8	Kips, Ext. T=Interior T
Allowable Tension:	72.0	Kips
Bolt Stress Ratio:	51.1%	**Pass**

Interior Flange Plate Results Flexural Check

Controlling Bolt Axial Force:	38.0	Kips, Ext. C= Interior C
Plate Stress:	Rohn/Pirod	OK
Allowable Plate Stress:	36.0	ksi
Plate Stress Ratio:	Rohn/Pirod	OK

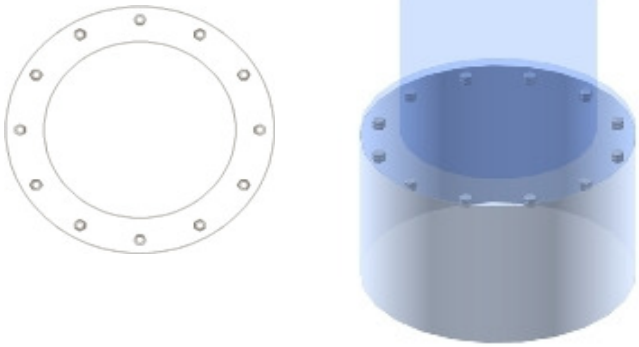
n/a

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

Project Name:	828540
Project Number:	TORRINGTON/RT 8
Job Number:	WO 907865
Date:	8/13/2014

Jacobs Engineering Group. Inc.

Moment Distribution @ 20 ft

Anchor Bolts?	Yes	
Code:	F	

Total Moment of Inertia	19449.77	in^4

Moment (M)	**Axial (P)**	**Shear (V)**
3316.95	48.49	33.64
kip-ft	kips	kips

Outer Bolts		
Number of Bolts	32	
Bolt Circle	53	in
y	26.5	in
Moment of Inertia (I)	10887.684	in^4
Diameter (d)	1.25	in
Ag	1.23	in^2
Ae	0.969	in^2
Total Moment	1856.8	kips-ft
Total Axial	24.25	kips
Total Shear	16.82	kips

Inner Bolts		
Number of Bolts	32	
Bolt Circle	47	in
y	23.5	in
Moment of Inertia (I)	8,562	in^4
Diameter (d)	1.25	
Ag	1.23	in^2
Ae	0.969	in^2
Total Moment	1460.2	kips-ft
Total Axial	24.25	kips
Total Shear	16.82	kips

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

Site Data

BU#: *828540*
Site Name: *TORRINGTON/RT 8*
App #: *261509 Rev 1*

Manufacturer:	Pirod

Bolt Data			
Qty:	32		
Diam:	1.25	Bolt Fu:	105
Bolt Material:	A325	Bolt Fy:	81
N/A:	100	<-- Disregard	Bolt Fty:
N/A:	75	<-- Disregard	44.00
Circle:	53	in	

Plate Data		
Plate Outer Diam:	58.75	in
Plate Inner Diam:	43	in (Hole @ Ctr)
Thick:	1.25	in
Grade:	36	ksi
Effective Width:	5.77	in

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

Pole Data		
Pole OuterDiam:	60	in
Thick:	0.625	in
Pole Inner Diam:	58.75	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	63	ksi

Stress Increase Factor		
ASIF:	1.333	

Reactions		
Moment:	1856.8	ft-kips
Axial:	24.25	kips
Shear:	16.82	kips
Exterior Flange Run, T+Q:	0.00	kips

Elevation: 20 feet

Interior Flange Bolt Results

Maximum Bolt Tension:	51.8	Kips, Ext. T=Interior T
Allowable Tension:	72.0	Kips
Bolt Stress Ratio:	72.0%	**Pass**

Interior Flange Plate Results Flexural Check

Controlling Bolt Axial Force:	53.3	Kips, Ext. C= Interior C
Plate Stress:	Rohn/Pirod	OK
Allowable Plate Stress:	36.0	ksi
Plate Stress Ratio:	Rohn/Pirod	OK

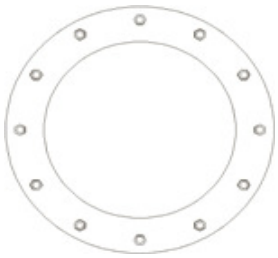
n/a

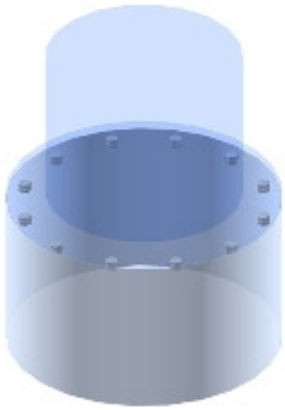
Stiffener Results N/A for Rohn / Pirod

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#: *828540*
Site Name: *TORRINGTON/RT 8*
App #: *261509 Rev 1*

Manufacturer:	Pirod

Reactions

Moment:	1460.2	ft-kips
Axial:	24.25	kips
Shear:	16.82	kips
Exterior Flange Run, T+Q:	0.00	kips

Elevation: 20 feet

Bolt Data

Qty:	32		
Diam:	1.25	Bolt Fu:	105
Bolt Material:	A325	Bolt Fy:	81
N/A:	100	<-- Disregard	Bolt Fty:
N/A:	75	<-- Disregard	44.00
Circle:	47	in	

Interior Flange Bolt Results

Maximum Bolt Tension:	45.8	Kips, Ext. T=Interior T
Allowable Tension:	72.0	Kips
Bolt Stress Ratio:	63.7%	**Pass**

Plate Data

Plate Outer Diam:	58.75	in
Plate Inner Diam:	43	in (Hole @ Ctr)
Thick:	1.25	in
Grade:	36	ksi
Effective Width:	5.77	in

Interior Flange Plate Results Flexural Check

Controlling Bolt Axial Force:	47.4	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:	0	*
Weld Type:		
Groove Depth:		<-- Disregard
Groove Angle:		<-- Disregard
Fillet H. Weld:		in
Fillet V. Weld:		in
Width:		in
Height:		in
Thick:		in
Notch:		in
Grade:		ksi
Weld str.:		ksi

n/a

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

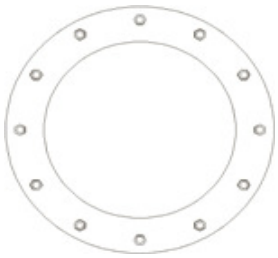
Pole Punching Shear Check:	N/A

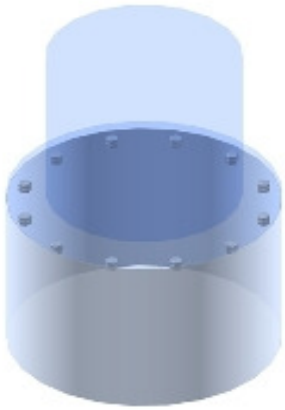
Pole Data

Pole OuterDiam:	60	in
Thick:	0.625	in
Pole Inner Diam:	58.75	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	63	ksi

Stress Increase Factor

ASIF:	1.333





* 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#: *828540*
Site Name: *TORRINGTON/RT 8*
App #: *261509 Rev 1*

Pole Manufacturer:	*Pirod*

Reactions		
Moment:	4008	ft-kips
Axial:	58	kips
Shear:	35	kips

Anchor Rod Data		
Qty:	52	
Diam:	1.25	in
Rod Material:	Other	
Strength (Fu):	150	ksi
Yield (Fy):	105	ksi
Bolt Circle:	67	in

Plate Data		
Diam:	70	in
Thick:	1	in
Grade:	36	ksi
Single-Rod B-eff:	3.62	in

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

Pole Data		
Diam:	60	in
Thick:	0.625	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:	54.1 Kips	Non-Rigid
Allowable Tension:	81.0 Kips	Service, ASD
Anchor Rod Stress Ratio:	66.8% **Pass**	Fty*ASIF

Base Plate Results

Base Plate Stress:	Flexural Check	Non-Rigid
Allowable Plate Stress:	Rohn/Pirod, OK	Service ASD
Base Plate Stress Ratio:	36.0 ksi	0.75*Fy*ASIF
	Rohn/Pirod, OK	Y.L. Length: 29.82

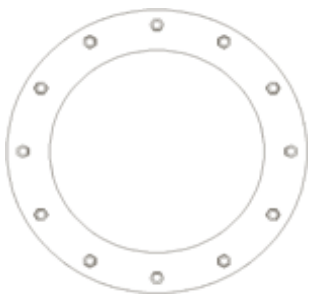
n/a

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

(Bearing and Stability Checks) Tool for TIA Rev F or G - Application (MP, SST with unitbase)

Site Data

BU#: *828540*
Site Name: *TORRINGTON/RT 8*
App #: *261509 Rev 1*

Enter Load Factors Below:		
For P (DL)	1.2	<---- Enter Factor
For P,V, and M (WL)	1.35	<---- Enter Factor

Pad & Pier Data		
Base PL Dist. Above Pier:	0	in
Pier Dist. Above Grade:	30	in
Pad Bearing Depth, D:	5	ft
Pad Thickness, T:	3	ft
Pad Width=Length, L:	28	ft
Pier Cross Section Shape:	Round	<--Pull Down
Enter Pier Diameter:	7	ft
Concrete Density:	150.0	pcf
Pier Cross Section Area:	38.48	ft^2
Pier Height:	4.50	ft
Soil (above pad) Height:	2.00	ft

Soil Parameters		
Unit Weight, γ:	125.0	pcf
Ultimate Bearing Capacity, qn:	16.00	ksf
Strength Reduct. factor, ϕ:	0.75	
Angle of Friction, Φ:	30.0	degrees
Undrained Shear Strength, Cu:	0.00	ksf
Allowable Bearing: ϕ*qn:	12.00	ksf
Passive Pres. Coeff., Kp	3.00	

Forces/Moments due to Wind and Lateral Soil		
Minimum of (φ*Ultimate Pad Passive Force, Vu):	47.3	kips
Pad Force Location Above D:	1.29	ft
ϕ(Passive Pressure Moment):	60.75	ft-kips
Factored O.T. M(WL), "1.6W":	5765.2	ft-kips
Factored OT (MW-Msoil), M1	5704.43	ft-kips

Resistance due to Foundation Gravity		
Soil Wedge Projection grade, a:	1.15	ft
Sum of Soil Wedges Wt:	9.97	kips
Soil Wedges ecc, K1:	8.51	ft
Ftg+Soil above Pad wt:	565.2	kips
Unfactored (Total ftg-soil Wt):	575.12	kips
1.2D. **No Soil Wedges**.	747.79	kips
0.9D. **With Soil Wedges**	569.81	kips

Resistance due to Cohesion (Vertical)		
ϕ*(1/2*Cu)(Total Vert. Planes)	0.00	kips
Cohesion Force Eccentricity, K2	0.00	ft

Monopole Base Reaction Forces		
TIA Revision:	F	<--Pull Down
Unfactored DL Axial, PD:	58	kips
Unfactored WL Axial, PW:	0	kips
Unfactored WL Shear, V:	35	kips
Unfactored WL Moment, M:	4008	ft-kips

Load Factor	Shaft Factored Loads		
1.20	1.2D+1.6W, Pu:	69.6	kips
0.90	0.9D+1.6W, Pu:	52.2	kips
1.35	Vu:	47.25	kips
	Mu:	5410.8	ft-kips

1.2D+1.6W Load Combination, Bearing Results:

(**No Soil Wedges**) [Reaction+Conc+Soil]	747.79	P1="1.2D+1.6W" (Kips)
Factored "1.6W" Overturning Moment (MW-Msoil), M1	5704.43	ft-kips

Orthogonal Direction:

ecc1 = M1/P1 =	7.63	ft
Orthogonal qu=	2.10	ksf
qu/ϕ*qn Ratio=	**17.46%**	**Pass**

Diagonal Direction:

ecc2 = (0.707M1)/P1 =	5.39	ft
Diagonal qu=	2.52	ksf
qu/ϕ*qn Ratio=	**21.03%**	**Pass**

Run <-- Press Upon Completing All Input

Overturning Stability Check

0.9D+1.6W Load Combination, Bearing Results:

(**w/ Soil Wedges**) [Reaction+Conc+Soil]	569.81	P2="0.9D+1.6W" (Kips)
Factored "1.6W" Overturning Moment (MW-Msoil) - 0.9(M of Wedge + M of Cohesion), M2	5628.06	ft-kips

Orthogonal ecc3 = M2/P2 =	9.88	ft
Ortho Non Bearing Length,NBL=	19.75	ft
Orthogonal qu=	2.47	ksf
Diagonal qu=	2.89	ksf

Max Reaction Moment (ft-kips) so that qu=φ*qn = 100% Capacity Rating			
Actual M:	4008.00		
M Orthogonal:	5394.44	**74.30%**	**Pass**
M Diagonal:	5394.44	**74.30%**	**Pass**

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

T-Mobile Existing Facility

Site ID: CT11369A

Torrington / RT 8
218 Wheeler Road
Torrington, CT 06790

August 28, 2014

Site Compliance Summary	
Compliance Status:	**COMPLIANT**
Site total MPE% of FCC general public allowable limit:	**43.22 %**

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

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August 28, 2014

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

Emissions Analysis for Site: **CT11369A – Torrington / RT 8**

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **218 Wheeler Road, Torrington, 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 µW/cm2 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 (µW/cm2). The general population exposure limit for the 700 MHz Band is 567 µW/cm2, and the general population exposure limit for the PCS and AWS bands is 1000 µW/cm2. 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 **218 Wheeler Road, Torrington, 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 **160 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):	160	Height (AGL):	160	Height (AGL):	160
Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)
Channel Count	2	Channel Count	2	# PCS Channels:	2
Total TX Power:	120	Total TX Power:	120	# AWS Channels:	120
ERP (W):	1,906.06	ERP (W):	1,906.06	ERP (W):	1,906.06
Antenna A1 MPE%	0.71	Antenna B1 MPE%	0.71	Antenna C1 MPE%	0.71
Antenna #:	**2**	Antenna #:	**2**	Antenna #:	**2**
Make / Model:	Ericsson AIR21 B4A/B2P	Make / Model:	Ericsson AIR21 B4A/B2P	Make / Model:	Ericsson AIR21 B4A/B2P
Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	160	Height (AGL):	160	Height (AGL):	160
Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)
Channel Count	4	Channel Count	4	Channel Count	4
Total TX Power:	120	Total TX Power:	120	Total TX Power:	120
ERP (W):	1,906.06	ERP (W):	1,906.06	ERP (W):	1,906.06
Antenna A2 MPE%	0.71	Antenna B2 MPE%	0.71	Antenna C2 MPE%	0.71
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):	160	Height (AGL):	160	Height (AGL):	160
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):	445.37	ERP (W):	445.37	ERP (W):	445.37
Antenna A3 MPE%	0.28	Antenna B3 MPE%	0.28	Antenna C3 MPE%	0.28

Site Composite MPE%	
Carrier	**MPE%**
T-Mobile	**5.09**
Sprint	4.40 %
Verizon Wireless	14.71 %
AT&T	19.02 %
Site Total MPE %:	**43.22 %**

T-Mobile Sector 1 Total:	1.70 %
T-Mobile Sector 2 Total:	1.70 %
T-Mobile Sector 3 Total:	1.70 %
Site Total:	43.22 %

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Summary

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

The anticipated maximum composite contributions from the T-Mobile facility as well as the site composite emissions value with regards to compliance with FCC's allowable limits for general public exposure to RF Emissions are shown here:

T-Mobile Sector	Power Density Value (%)
Sector 1:	1.70 %
Sector 2:	1.70 %
Sector 3 :	1.70 %
T-Mobile Total:	5.09 %
Site Total:	43.22 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **43.22%** 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

EBI Consulting
21 B Street
Burlington, MA 01803`