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

October 16, 2015

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

RE: **T-Mobile - Exempt Modification - Crown Site BU: 806384**
T-Mobile Site ID: CT11037B
Located at: 93 Roxbury Road, East Lyme, CT 06357

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 Mr. Paul M. Formica, First Selectman, Town of East Lyme. The Town of East Lyme is also the Property Owner.

T-Mobile plans to modify the existing wireless communications facility owned by Crown Castle and located at **93 Roxbury Road, East Lyme, CT 06357**. Attached are a compound plan and elevation depicting the planned changes (Exhibit-1), and documentation of the structural sufficiency of the structure to accommodate the revised antenna configuration (Exhibit-2). Also included is a power density table report reflecting the modification to T-Mobile's operations at the site (Exhibit-3).

The changes to the facility do not constitute a modification as defined in Connecticut General Statutes ("C.G.S.") § 16-50i(d) because the general physical characteristics of the facility will not be significantly changed. Rather, the planned changes to the facility fall squarely within those activities explicitly provided for in the R.C.S.A. § 16-50j-72(b)(2).

1. The proposed modifications will not result in an increase in the height of the existing tower. T-Mobile's additional antennas will be located at the same elevation on the existing tower.

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

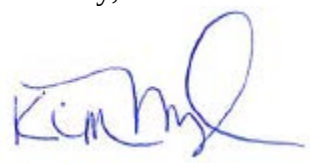
3. The proposed modifications will not increase noise levels at the facility by six decibels or more.

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

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

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

Sincerely,



Kimberly Myl
Real Estate Specialist

Enclosures

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

cc: Mr. Paul M. Formica, First Selectman
PO Box 519
Niantic, CT 06357

7213

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

32-61-1110

DATE 10/16/15

PAY TO THE ORDER OF Connecticut Siting Council $ 625.00

Six hundred twenty five & no/100 DOLLARS

Security Features Included. Details on Back.

VALID FOR 180 DAYS

TMO Zoning
CT11057B

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

FOR 802384 309933 345962

Wendy R Smith

MP

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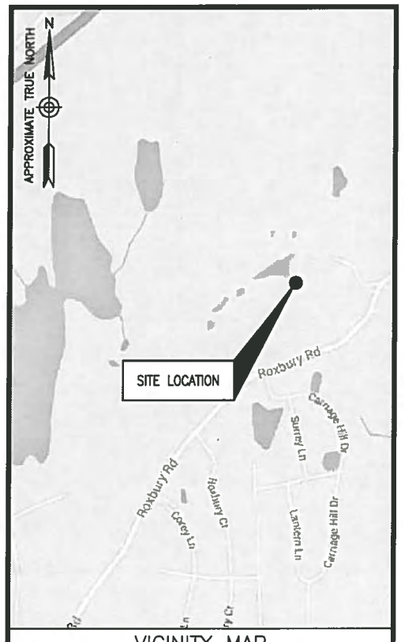
T-MOBILE NORTHEAST LLC

T-MOBILE SITE #: CT11037B
CROWN CASTLE BU #: 806384
SITE NAME: NLN 136 943455
93 ROXBURY ROAD
EAST LYME, CT 06357
NEW LONDON COUNTY



VICINITY MAP

FROM PARSIPPANY, NJ:

DEPART SYLVAN WAY AND TAKE I-287 N TOWARD ALBANY. USE THE RIGHT 2 LANES TO MERGE ONTO I-287 E/I87 S TOWARD TAPPAN ZEE BR. STAY ON I-287 E AND FOLLOW SIGNS FOR WHITE PLAINS. MERGE ONTO I-95 N. TAKE EXIT 73 FOR SOCIETY RD. TURN LEFT ON SOCIETY RD. TURN RIGHT ONTO RIVERVIEW RD. TURN RIGHT ONTO ROXBURY RD. SLIGHT ONTO DUMP RD. SITE WILL BE ON THE LEFT.

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

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

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

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

CONSULTANT TEAM

SITE NAME:
NLN 136 943455

SITE NUMBER:
CT11037B

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

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

COORDINATES:
LATITUDE: 41°-20'-8.35" N (NAD83)
LONGITUDE: 72°-13'-18.28" W (NAD83)
(PER CROWN CASTLE)

CONFIGURATION
702Cu

PROJECT SUMMARY

SITE ADDRESS:
93 ROXBURY ROAD
EAST LYME, CT 06357
NEW LONDON COUNTY

PROJECT DIRECTORY

- INSTALL (3) NEW ANTENNAS.
- INSTALL (3) NEW RRU'S.
- REMOVE (6) EXISTING LINES OF COAX.
- REMOVE EXISTING ANTENNAS, MOUNTS & CABLES AT A CENTERLINE ELEVATION OF 112'-0"± A.G.L.

SCOPE OF WORK

THIS DOCUMENT WAS DEVELOPED TO REFLECT A SPECIFIC SITE AND ITS SITE CONDITIONS AND IS NOT TO BE USED FOR ANOTHER SITE OR WHEN OTHER CONDITIONS PERTAIN. REUSE OF THIS DOCUMENT IS AT THE SOLE RISK OF THE USER.

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

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

SHEET INDEX

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

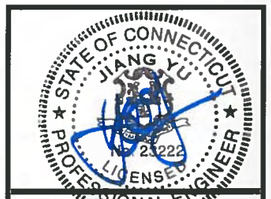
CROWN CASTLE
3 CORPORATE PARK DRIVE, SUITE 101
CLIFTON PARK, NY 12065

CT11037B
NLN 136 943455

CONSTRUCTION DRAWINGS

0	10/15/15	ISSUED AS FINAL
A	10/13/15	ISSUED FOR REVIEW

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



CONNECTICUT LICENSE NO. 0023222

IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER TO ALTER THIS DOCUMENT.

DRAWN BY:	RA
REVIEWED BY:	BSH
CHECKED BY:	GHN
PROJECT NUMBER:	50066258
JOB NUMBER:	50074605
SITE ADDRESS:	

93 ROXBURY ROAD
EAST LYME, CT 06357
NEW LONDON COUNTY

SHEET TITLE

TITLE SHEET

SHEET NUMBER

T-1

GENERAL NOTES:

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

SITE WORK GENERAL NOTES:

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

ELECTRICAL INSTALLATION NOTES:

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

CONCRETE AND REINFORCING STEEL NOTES:

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

   CONCRETE CAST AGAINST EARTH.....3 IN.
   CONCRETE EXPOSED TO EARTH OR WEATHER:
   #6 AND LARGER .....2 IN.
   #5 AND SMALLER & WWF.....1 1/2 IN.

   CONCRETE NOT EXPOSED TO EARTH OR WEATHER OR NOT CAST AGAINST THE GROUND:
   SLAB AND WALL .....3/4 IN.
   BEAMS AND COLUMNS.....1 1/2 IN.
5. A CHAMFER 3/4" SHALL BE PROVIDED AT ALL EXPOSED EDGES OF CONCRETE, UNO, IN ACCORDANCE WITH ACI 301 SECTION 4.2.4.
6. INSTALLATION OF CONCRETE EXPANSION/WEDGE ANCHOR, SHALL BE PER MANUFACTURER'S WRITTEN RECOMMENDED PROCEDURE. THE ANCHOR BOLT, DOWEL OR ROD SHALL CONFORM TO MANUFACTURER'S RECOMMENDATION FOR EMBEDMENT DEPTH OR AS SHOWN ON THE DRAWINGS. NO REBAR SHALL BE CUT WITHOUT PRIOR CONTRACTOR APPROVAL WHEN DRILLING HOLES IN CONCRETE. SPECIAL INSPECTIONS, REQUIRED BY GOVERNING CODES, SHALL BE PERFORMED IN ORDER TO MAINTAIN MANUFACTURER'S MAXIMUM ALLOWABLE LOADS. ALL EXPANSION/WEDGE ANCHORS SHALL BE STAINLESS STEEL OR HOT DIPPED GALVANIZED. EXPANSION BOLTS SHALL BE PROVIDED BY RAMSET/REDHEAD OR APPROVED EQUAL.
7. CONCRETE CYLINDER TEST IS NOT REQUIRED FOR SLAB ON GRADE WHEN CONCRETE IS LESS THAN 50 CUBIC YARDS (IBC 1905.6.2.3) IN THAT EVENT THE FOLLOWING RECORDS SHALL BE PROVIDED BY THE CONCRETE SUPPLIER;
   (A) RESULTS OF CONCRETE CYLINDER TESTS PERFORMED AT THE SUPPLIER'S PLANT,
   (B) CERTIFICATION OF MINIMUM COMPRESSIVE STRENGTH FOR THE CONCRETE GRADE SUPPLIED.
   FOR GREATER THAN 50 CUBIC YARDS THE GC SHALL PERFORM THE CONCRETE CYLINDER TEST.
8. AS AN ALTERNATIVE TO ITEM 7, TEST CYLINDERS SHALL BE TAKEN INITIALLY AND THEREAFTER FOR EVERY 50 YARDS OF CONCRETE FROM EACH DIFFERENT BATCH PLANT.
9. EQUIPMENT SHALL NOT BE PLACED ON NEW PADS FOR SEVEN DAYS AFTER PAD IS POURED, UNLESS IT IS VERIFIED BY CYLINDER TESTS THAT COMPRESSIVE STRENGTH HAS BEEN ATTAINED.

STRUCTURAL STEEL NOTES:

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

CONSTRUCTION NOTES:

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

T-Mobile
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CROWN CASTLE

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CT11037B
NLN 136 943455

CONSTRUCTION DRAWINGS

0	10/15/15	ISSUED AS FINAL
A	10/13/15	ISSUED FOR REVIEW

Dewberry
Dewberry Engineers Inc.
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STATE OF CONNECTICUT
JIANG YU
LICENSED
PROFESSIONAL ENGINEER

CONNECTICUT LICENSE NO. 0023222

DRAWN BY:	RA
REVIEWED BY:	BSH
CHECKED BY:	GHN
PROJECT NUMBER:	50066258
JOB NUMBER:	50074605
SITE ADDRESS:	

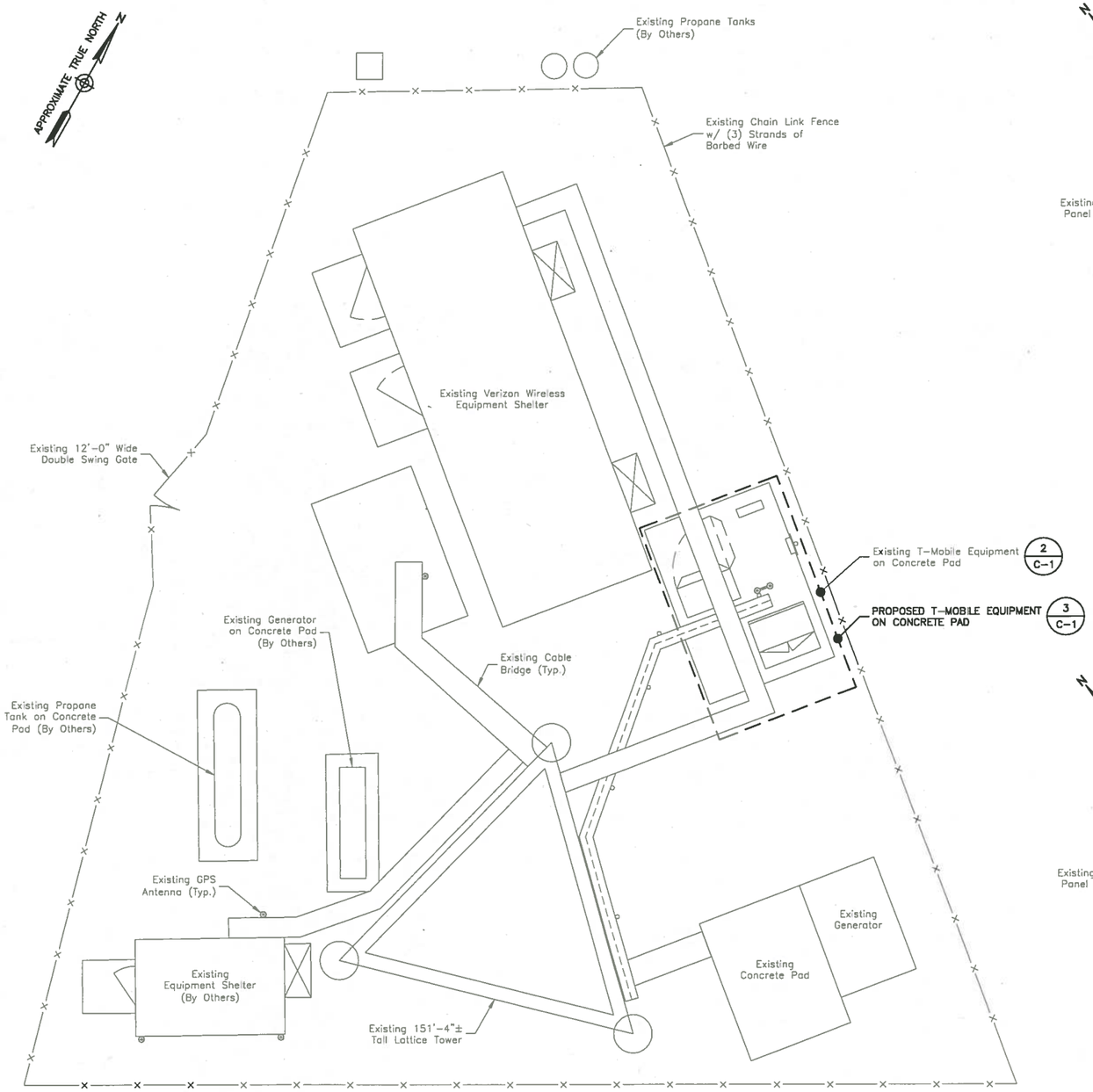
93 ROXBURY ROAD
EAST LYME, CT 06357
NEW LONDON COUNTY

SHEET TITLE

GENERAL NOTES

SHEET NUMBER

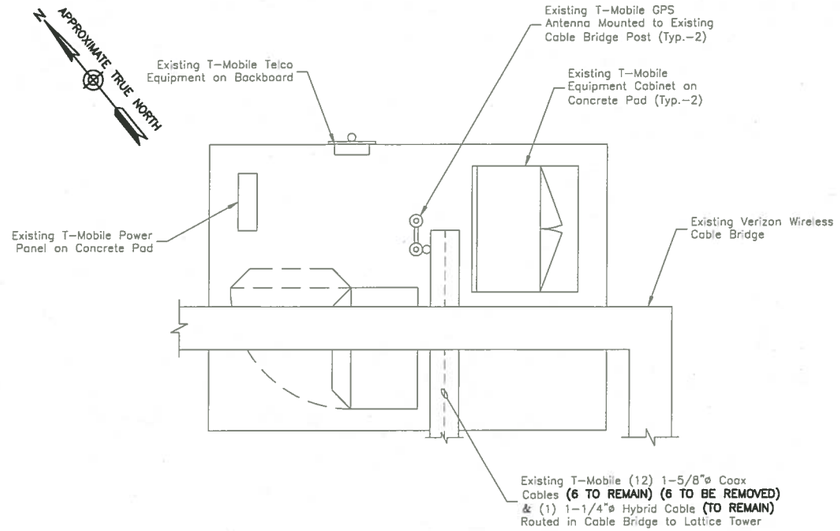
G–1



COMPOUND PLAN 1

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

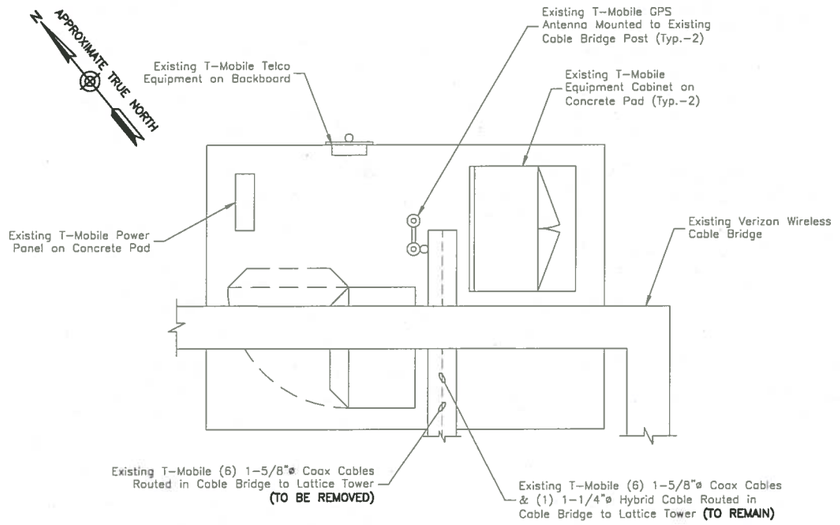
0' 5' 10'



EXISTING EQUIPMENT PLAN 2

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

0' 2' 4' 6'



NOTE:

1. NO EQUIPMENT IS PROPOSED AT GRADE.

PROPOSED EQUIPMENT PLAN 3

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

0' 2' 4' 6'

NOTES:

1. NORTH ARROW SHOWN AS APPROXIMATE.
2. NOT ALL INFORMATION IS SHOWN FOR CLARITY.
3. ALL PROPOSED EQUIPMENT, INCLUDING ANTENNAS, BIAS TEES, COAX, ETC., SHALL BE MOUNTED IN ACCORDANCE WITH THE TOWER STRUCTURAL ANALYSIS BY PAUL J. FORD & COMPANY DATED SEPTEMBER 10, 2015.

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STATE OF CONNECTICUT
JIANG YU
LICENSED
PROFESSIONAL ENGINEER

JIANG YU, P.E.
CONNECTICUT LICENSE NO. 0023222

DRAWN BY:	RA
REVIEWED BY:	BSH
CHECKED BY:	GHN
PROJECT NUMBER:	50066258
JOB NUMBER:	50074605
SITE ADDRESS:	

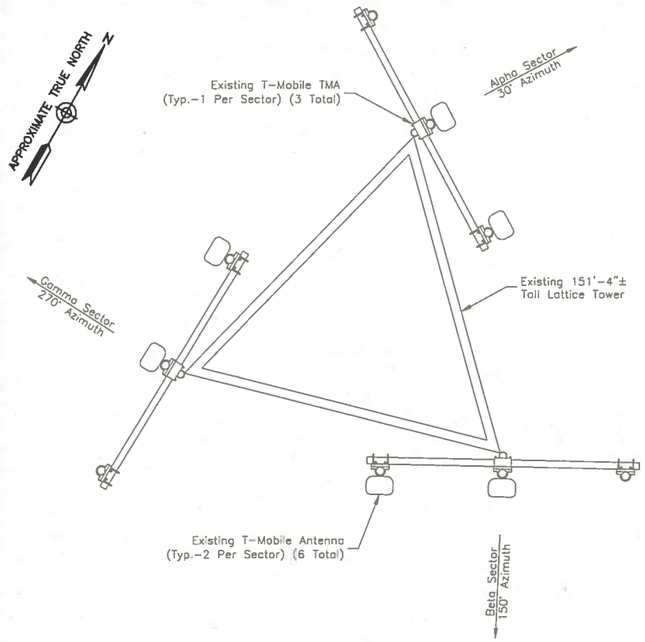
93 ROXBURY ROAD
EAST LYME, CT 06357
NEW LONDON COUNTY

SHEET TITLE

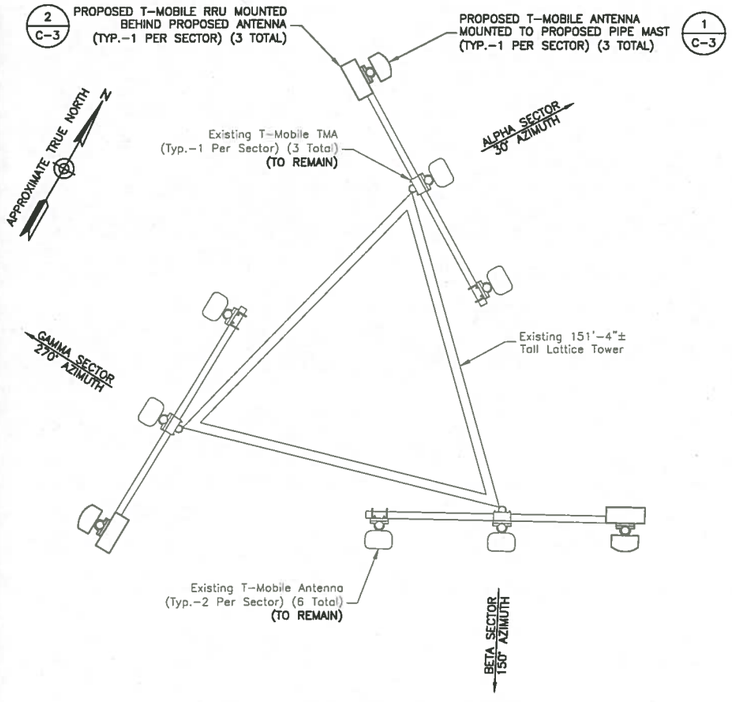
COMPOUND PLAN & EQUIPMENT PLANS

SHEET NUMBER

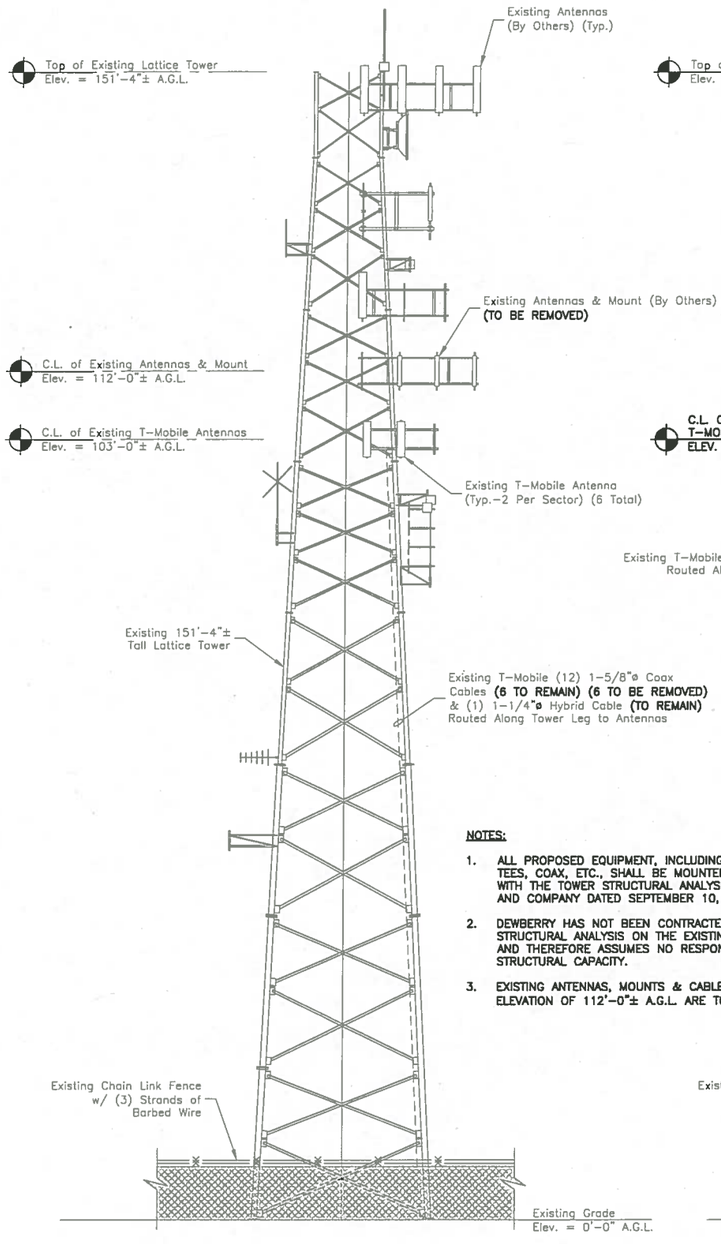
C-1



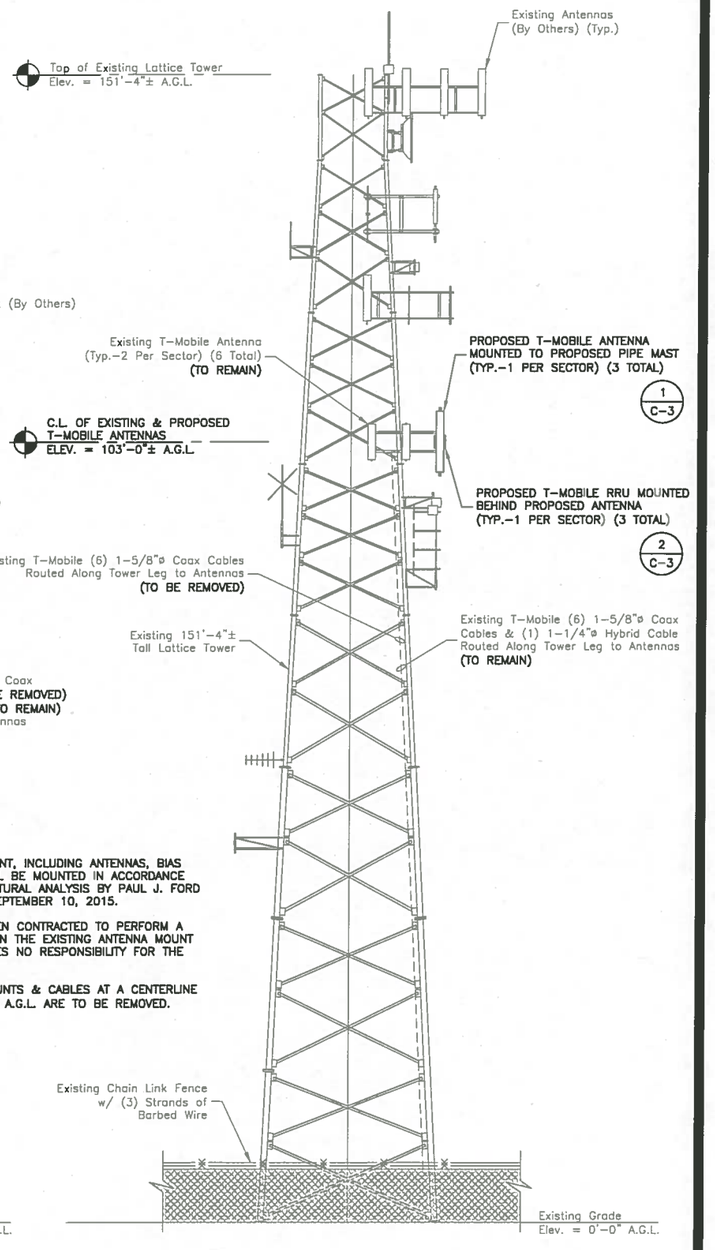
EXISTING ANTENNA LAYOUT (1)
SCALE: N.T.S.



PROPOSED ANTENNA LAYOUT (2)
SCALE: N.T.S.



EXISTING ELEVATION (3)
SCALE: 1"=20' FOR 11"x17"
1"=10' FOR 22"x34"
0' 10' 20'



PROPOSED ELEVATION (4)
SCALE: 1"=20' FOR 11"x17"
1"=10' FOR 22"x34"
0' 10' 20'

NOTES:

1. ALL PROPOSED EQUIPMENT, INCLUDING ANTENNAS, BIAS TEES, COAX, ETC., SHALL BE MOUNTED IN ACCORDANCE WITH THE TOWER STRUCTURAL ANALYSIS BY PAUL J. FORD AND COMPANY DATED SEPTEMBER 10, 2015.
2. DEWBERRY HAS NOT BEEN CONTRACTED TO PERFORM A STRUCTURAL ANALYSIS ON THE EXISTING ANTENNA MOUNT AND THEREFORE ASSUMES NO RESPONSIBILITY FOR THE STRUCTURAL CAPACITY.
3. EXISTING ANTENNAS, MOUNTS & CABLES AT A CENTERLINE ELEVATION OF 112'-0"± A.G.L. ARE TO BE REMOVED.

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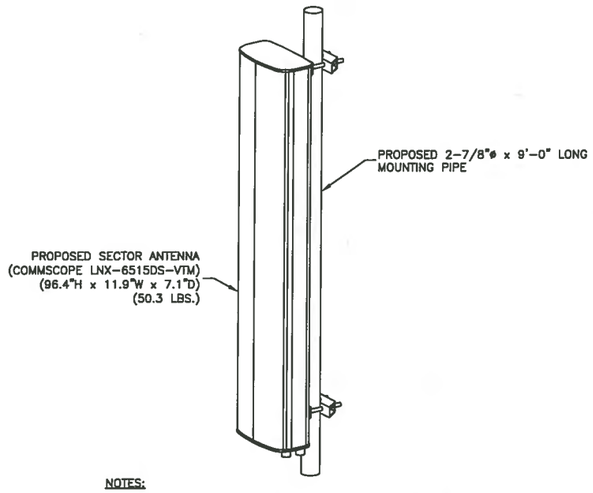
NEW LONDON COUNTY

SHEET TITLE

ANTENNA LAYOUTS & ELEVATIONS

SHEET NUMBER

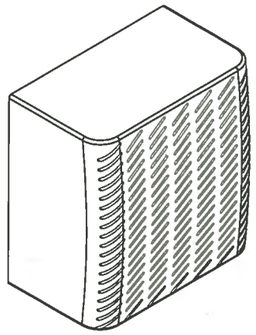
C-2



NOTES:

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

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



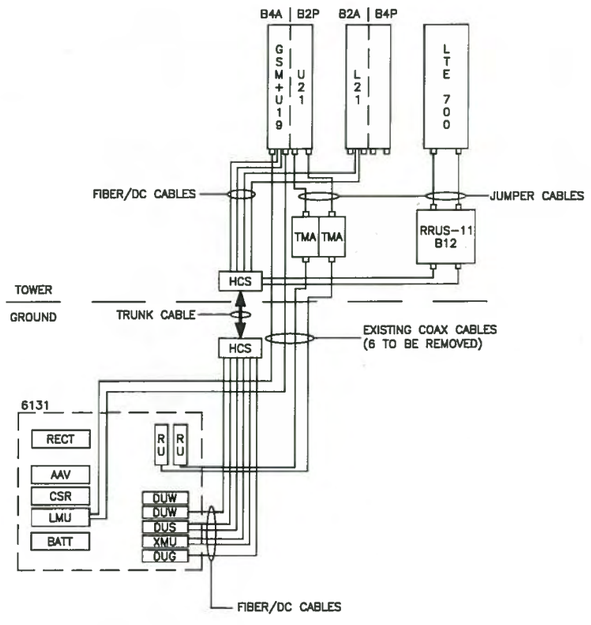
SPECIFICATIONS:
HEIGHT: 20.0"
WIDTH: 17.0"
DEPTH: 7.0"
WEIGHT: 50.7 LBS

ERICSSON RRUS-11 B12

RRU NOTES:

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

RRUS-11 - REMOTE RADIO UNIT (2)
SCALE: N.T.S.



SITE CONFIGURATION 702Cu (3)
SCALE: N.T.S.

DESIGN CONFIGURATION

	ANTENNAS		COAX		COAX LENGTH	EXISTING HYBRID	RRH	
	EXISTING	PROPOSED	EXISTING	PROPOSED			EXISTING	PROPOSED
ALPHA	–	COMMSCOPE LNX-6515DS-VTM	(4) 1-5/8"ø	(2) 1-5/8"ø TO BE REMOVED	153'-0"	(1) 1-1/4"ø @ 153'-0"	–	RRUS-11 B12
	ERICSSON AIR21 B4A B2P	EXISTING TO REMAIN					–	–
	ERICSSON AIR21 B2A B4P	EXISTING TO REMAIN					–	–
BETA	–	COMMSCOPE LNX-6515DS-VTM	(4) 1-5/8"ø	(2) 1-5/8"ø TO BE REMOVED	153'-0"		–	RRUS-11 B12
	ERICSSON AIR21 B4A B2P	EXISTING TO REMAIN					–	–
	ERICSSON AIR21 B2A B4P	EXISTING TO REMAIN					–	–
GAMMA	–	COMMSCOPE LNX-6515DS-VTM	(4) 1-5/8"ø	(2) 1-5/8"ø TO BE REMOVED	153'-0"		–	RRUS-11 B12
	ERICSSON AIR21 B4A B2P	EXISTING TO REMAIN					–	–
	ERICSSON AIR21 B2A B4P	EXISTING TO REMAIN					–	–

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STATE OF CONNECTICUT
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93 ROXBURY ROAD
EAST LYME, CT 06357
NEW LONDON COUNTY

SHEET TITLE

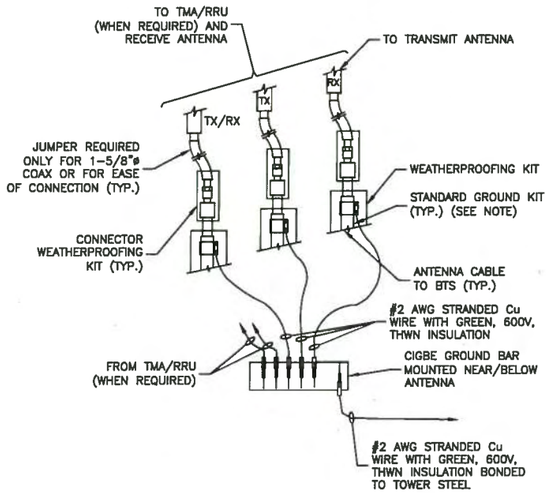
CONSTRUCTION DETAILS

SHEET NUMBER

C-3

GROUNDING NOTES:

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

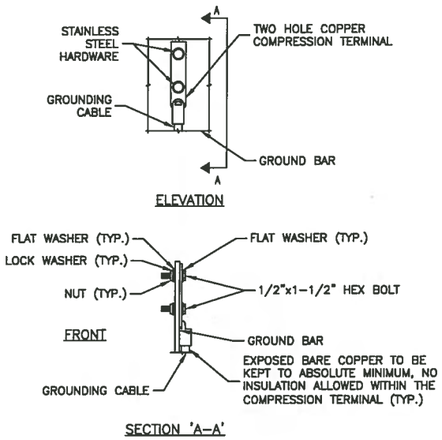


NOTE:

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

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

SCALE: N.T.S.

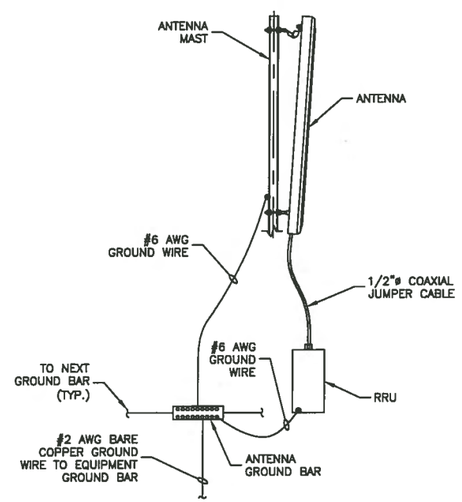


NOTES:

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

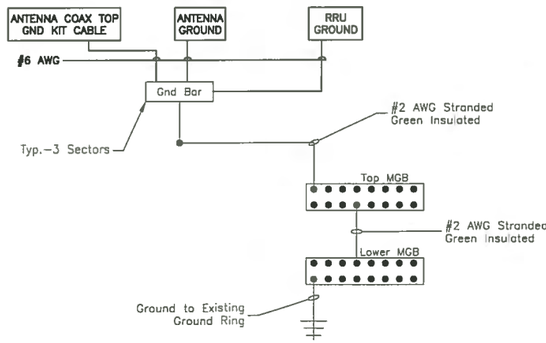
TYPICAL GROUND BAR MECHANICAL CONNECTION DETAIL — 2

SCALE: N.T.S.



TYPICAL ANTENNA GROUNDING DETAIL — 3

SCALE: N.T.S



NOTES:

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

SCHEMATIC GROUNDING DIAGRAM — 4

SCALE: N.T.S.

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STATE OF CONNECTICUT — JIANG YU — REG. NO. 23222 — PROFESSIONAL ENGINEER — CONNECTICUT LICENSE NO. 0023222

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93 ROXBURY ROAD
EAST LYME, CT 06357
NEW LONDON COUNTY

SHEET TITLE

GROUNDING NOTES & DETAILS

SHEET NUMBER

E-1

PJF PAUL J. FORD & COMPANY

Date: **September 10, 2015**

Cheryl Schultz
Crown Castle
3530 Toringdon WaySuite 300
Charlotte, NC 28277

Paul J Ford and Company
250 E. Broad St Suite 600
Columbus, OH 43215
614-221-6679

Subject: **Structural Analysis Report**

Carrier Designation:	***T-Mobile* Co-Locate**	
	Carrier Site Number:	CT11037B
	Carrier Site Name:	Niantic/ I-95/ Rt 156_1
Crown Castle Designation:	**Crown Castle BU Number:**	806384
	Crown Castle Site Name:	NLN 136 943455
	Crown Castle JDE Job Number:	345962
	Crown Castle Work Order Number:	1116382
	Crown Castle Application Number:	309933 Rev. 1
Engineering Firm Designation:	**Paul J Ford and Company Project Number:**	37515-2682.001.8700
Site Data:	**93 ROXBURY ROAD, EAST LYME, New London County, CT** **Latitude *41° 20' 8.35"*, Longitude *-72° 13' 18.28"*** **151.292 Foot - Self Support Tower**	

Dear Cheryl Schultz,

Paul J Ford and Company is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above mentioned tower. This analysis has been performed in accordance with the Crown Castle Structural 'Statement of Work' and the terms of Crown Castle Purchase Order Number 823552, in accordance with application 309933, revision 1.

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

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

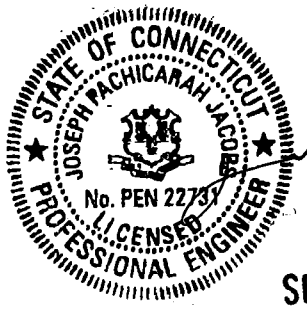
The analysis has been performed in accordance with the TIA/EIA-222-F standard and 2005 CT State Building Code with 2009 amendment with an importance factor of 1.15 based upon a wind speed of 91.2 mph fastest mile, 37.6 mph with 0.9375 inch ice thickness and 50 mph under service loads

All abandoned antennas, mounts and coax at 112' must be removed for the determined available structural capacity to be effective.

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

Respectfully submitted by:

Christina Hedges, PE
Project Engineer



SEP 10 2015

Date: **September 10, 2015**

Cheryl Schultz
Crown Castle
3530 Toringdon WaySuite 300
Charlotte, NC 28277

Paul J Ford and Company
250 E. Broad St Suite 600
Columbus, OH 43215
614-221-6679

Subject: **Structural Analysis Report**

Carrier Designation:	***T-Mobile* Co-Locate**	
	Carrier Site Number:	CT11037B
	Carrier Site Name:	Niantic/ I-95/ Rt 156_1
Crown Castle Designation:	**Crown Castle BU Number:**	806384
	Crown Castle Site Name:	NLN 136 943455
	Crown Castle JDE Job Number:	345962
	Crown Castle Work Order Number:	1116382
	Crown Castle Application Number:	309933 Rev. 1
Engineering Firm Designation:	**Paul J Ford and Company Project Number:**	37515-2682.001.8700
Site Data:	**93 ROXBURY ROAD, EAST LYME, New London County, CT**	
	Latitude *41° 20' 8.35"*, Longitude *-72° 13' 18.28"*	
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Respectfully submitted by:

Christina Hedges, PE
Project Engineer

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 151.292 ft Self Support tower designed by ROHN in March of 1990. The tower was originally designed for a wind speed of 85 mph per EIA-222-D.

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 91.2 mph with no ice, 37.6 mph with 0.9375 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
103.0	103.0	3	commscope	LNX-6515DS-VTM w/ Mount Pipe			
		3	ericsson	RRUS 11 B12			

Table 2 - Existing and Reserved Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
150.0	157.0	1	telewave	ANT150F2	2 1	7/8 5/16	1
	152.0	1	motorola	WB2618			
	150.0	1	tower mounts	Side Arm Mount [SO 304-1]			
148.0	149.0	3	alcatel lucent	RRH 2X40 700 MHz UPPER	6 6	1 5/8 7/8	1
		3	alcatel lucent	RRH2X60-AWS			
		3	alcatel lucent	RRH2X60-PCS			
		6	commscope	HBXX-6517DS-A2M w/ Mount Pipe			
		6	commscope	LNX-6514DS-AIM w/ Mount Pipe			
		2	rfs celwave	DB-T1-6Z-8AB-0Z			
	148.0	1	tower mounts	Sector Mount [SM 510-3]			
143.0	143.0	1	andrew	PL6-59W	1	EW52	1
		1	tower mounts	Pipe Mount [PM 601-1]			
133.0	133.0	3	kathrein	800 10504 w/ Mount Pipe	1 6	3/8 1 5/8	1
		1	tower mounts	Sector Mount [SM 104-3]			
128.0	130.0	1	til-tek	TA-2450	1	7/8	1
	128.0	1	tower mounts	Side Arm Mount [SO 305-1]			
126.0	126.0	1	motorola	WB2618	1	5/16	1
		1	tower mounts	Side Arm Mount [SO 305-1]			
121.0	122.0	1	rfs celwave	APXV9ERR18-C-A20 w/ Mount Pipe	3	1 1/4	1
		2	rfs celwave	APXVSPP18-C-A20 w/ Mount Pipe			
	121.0	3	alcatel lucent	1900MHz RRH (65MHz)			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
		3	alcatel lucent	800MHz 2X50W RRH W/FILTER			
		1	tower mounts	Sector Mount [SM 505-3]			
112.0	112.0	9	decibel	DB844H90E-XY w/Mount Pipe	9	7/8	2
		1	tower mounts	Sector Mount [SM 510-3]			
103.0	103.0	3	ericsson	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	1 6	1 1/4 1 5/8	1
		3	ericsson	ERICSSON AIR 21 B4A B2P w/ Mount Pipe			
		3	ericsson	KRY 112 144/1			
		1	tower mounts	Sector Mount [SM 701-3]			
		-	-	-	6	1 5/8	2
95.0	94.0	1	motorola	WB2618	1	5/16	1
90.0	96.0	1	sinclair	SRL-217 Ground Plane 10.67' x 4.83'	1	7/8	1
	90.0	1	tower mounts	Side Arm Mount [SO 302-1]			
85.0	90.0	1	telewave	ANT150D3	1	7/8	1
	85.0	1	tower mounts	Side Arm Mount [SO 305-1]			
61.0	61.0	1	bluewave	BW246Y	1	1/4	1
50.0	52.0	1	lucent	KS24019-L112A	1	1/2	1
	50.0	1	tower mounts	Side Arm Mount [SO 305-1]			

Notes:
1) Existing Equipment
2) Equipment to be Removed

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
Tower Drawings	March 5, 1990, Rohn	24792JC	258359
Foundation Drawings	March 5, 1990, Rohn	24792JC	958525
Geotechnical Report	July 19, 1989, Dr. Clarence Welti	-	258373
Modification Drawings	January 16, 2003, All Points Technology	CT105761	801526
Modification Drawings	February 26, 2008, (Revised July 9, 2008) Vertical Structures	2008-004-030	2215933
Modification Drawings	May 14, 2009, PJF	41709-0057	2457486
Modification Drawings	May 10, 2011, PJF	37511-0187Mod	2883931
Structural Analysis	May 10, 2011, PJF	37511-0187Mod	2883926

3.1) Analysis Method

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

3.2) Assumptions

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

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

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (lb)	SF*P_allow (lb)	% Capacity	Pass / Fail
T1	151.292 - 146.229	Leg	ROHN 2.5 STD	2	-2799.43	37965.40	18.5	Pass
T2	146.229 - 141.167	Leg	ROHN 2.5 STD	14	-9147.29	50607.87	22.2	Pass
T3	141.167 - 121.042	Leg	ROHN 2.5 EH	23	-34074.10	52977.02	64.3	Pass
T4	121.042 - 114.313	Leg	ROHN 2.5 EH (GR)	47	-39406.60	61869.99	63.7	Pass
T5	114.313 - 107.646	Leg	ROHN 2.5 EH (GR)	56	-49742.40	61867.72	80.4	Pass
T6	107.646 - 100.917	Leg	ROHN 2.5 EH (GR)	65	-65911.60	91492.98	72.0	Pass
T7	100.917 - 94.2014	Leg	ROHN 3 EH (GR)	77	-71325.90	102414.52	69.6	Pass
T8	94.2014 - 87.4861	Leg	ROHN 3 EH (GR)	86	-82920.20	132155.48	62.7	Pass
T9	87.4861 - 80.7708	Leg	ROHN 3 EH (GR)	98	-100905.00	132524.46	76.1	Pass
T10	80.7708 - 70.6875	Leg	ROHN 4 EH (GR)	110	-109093.00	136793.79	79.8	Pass
T11	70.6875 - 60.6041	Leg	ROHN 4 EH (GR)	119	-125765.00	193618.24	65.0 76.4 (b)	Pass
T12	60.6041 - 50.5104	Leg	ROHN 4 EH (GR)	131	-152128.00	194567.34	78.2	Pass
T13	50.5104 - 40.4166	Leg	ROHN 4 EH (GR)	143	-168797.00	194647.32	86.7	Pass
T14	40.4166 - 30.3125	Leg	ROHN 5 EH (GR)	155	-176603.00	231920.66	76.1	Pass
T15	30.3125 - 20.2083	Leg	ROHN 5 EH (GR)	163	171160.00	244417.54	70.0 83.5 (b)	Pass
T16	20.2083 - 10.1041	Leg	ROHN 5 EH (GR)	175	177166.00	244417.54	72.5	Pass
T17	10.1041 - 0	Leg	ROHN 5 EH (GR)	187	197302.00	244417.54	80.7	Pass
T1	151.292 - 146.229	Diagonal	L 1.5 x 1.5 x 3/16	9	-1003.62	2936.81	34.2	Pass
T2	146.229 - 141.167	Diagonal	L 2 x 2 x 3/16	18	-3657.78	7183.02	50.9 54.6 (b)	Pass
T3	141.167 - 121.042	Diagonal	L2 1/2x2 1/2x3/16	30	-4919.63	8577.46	57.4 89.5 (b)	Pass
T4	121.042 - 114.313	Diagonal	L2 1/2x2 1/2x3/16	51	-6106.79	7802.10	78.3	Pass

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (lb)	SF*P_allow (lb)	% Capacity	Pass / Fail
T5	114.313 - 107.646	Diagonal	L2 1/2x2 1/2x3/16	60	-5912.34	7121.94	83.0	Pass
T6	107.646 - 100.917	Diagonal	2L 2.5 x 2.5 x 3/16 (3/16)	69	-7100.45	27668.41	25.7 64.6 (b)	Pass
T7	100.917 - 94.2014	Diagonal	L3x3x3/16	81	-7827.70	10656.04	73.5	Pass
T8	94.2014 - 87.4861	Diagonal	L3x3x3/16	90	-7905.37	9740.18	81.2	Pass
T9	87.4861 - 80.7708	Diagonal	2L 3 x 3 x 3/16 (1/4)	102	-8514.77	35614.03	23.9 77.5 (b)	Pass
T10	80.7708 - 70.6875	Diagonal	2L3x3x3/16x1/4	114	-9520.32	29260.28	32.5 82.8 (b)	Pass
T11	70.6875 - 60.6041	Diagonal	2L3x3x3/16x1/4	123	-10172.80	26882.74	37.8 83.6 (b)	Pass
T12	60.6041 - 50.5104	Diagonal	2L3x3x1/4x1/4	135	-10311.80	32676.90	31.6 87.2 (b)	Pass
T13	50.5104 - 40.4166	Diagonal	2L3x3x1/4x1/4	147	-10907.90	29874.53	36.5 63.5 (b)	Pass
T14	40.4166 - 30.3125	Diagonal	2L3 1/2x3 1/2x1/4x1/4	159	-10889.90	43629.75	25.0 63.4 (b)	Pass
T15	30.3125 - 20.2083	Diagonal	2L3 1/2x3 1/2x1/4x1/4	168	-11958.80	40231.14	29.7 69.6 (b)	Pass
T16	20.2083 - 10.1041	Diagonal	2L 4 x 4 x 1/4 (1/4)	180	-11611.90	55366.02	21.0 67.6 (b)	Pass
T17	10.1041 - 0	Diagonal	2L 4 x 4 x 1/4 (1/4)	192	-13114.10	51311.17	25.6 76.4 (b)	Pass
T6	107.646 - 100.917	Secondary Horizontal	L 2 x 2 x 3/16	73	-1143.08	4253.63	26.9	Pass
T8	94.2014 - 87.4861	Secondary Horizontal	L 2 x 2 x 3/16	94	-1438.16	3443.41	41.8	Pass
T9	87.4861 - 80.7708	Secondary Horizontal	L 2 x 2 x 3/16	106	-1750.09	3111.40	56.2	Pass
T11	70.6875 - 60.6041	Secondary Horizontal	L2 1/2x2 1/2x3/16	127	-2180.99	4890.70	44.6	Pass
T12	60.6041 - 50.5104	Secondary Horizontal	L3x3x1/4	139	-2638.41	9857.64	26.8 48.0 (b)	Pass
T13	50.5104 - 40.4166	Secondary Horizontal	L3x3x1/4	151	-2927.51	8745.97	33.5 53.3 (b)	Pass
T15	30.3125 - 20.2083	Secondary Horizontal	L 3 x 3 x 3/16	173	-3505.25	5467.17	64.1	Pass
T16	20.2083 - 10.1041	Secondary Horizontal	L3x3x3/16	184	-3637.68	4943.07	73.6	Pass
T17	10.1041 - 0	Secondary Horizontal	L 3.5 x 3.5 x 1/4	196	-4083.01	9469.10	43.1 47.5 (b)	Pass
T1	151.292 - 146.229	Top Girt	L2 1/2x2 1/2x3/16	6	-177.54	4410.47	4.0	Pass
T3	141.167 - 121.042	Top Girt	L2 1/2x2 1/2x3/16	25	-751.84	4403.90	17.1	Pass
							Summary	
						Leg (T13)	86.7	Pass
						Diagonal (T3)	89.5	Pass
						Secondary Horizontal (T16)	73.6	Pass
						Top Girt (T3)	17.1	Pass
						Bolt Checks	89.5	Pass

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (lb)	SF*P_allow (lb)	% Capacity	Pass / Fail
						Rating =	89.5	Pass

Table 5 - Tower Component Stresses vs. Capacity – LC5

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods		76.4	Pass
1	Base Foundation		39.4	Pass
1	Base Foundation Soil Interaction		91.7	Pass

Structure Rating (max from all components) =	91.7%

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

4.1) Recommendations

Remove abandoned equipment at 112'.

APPENDIX A

TNXTOWER OUTPUT

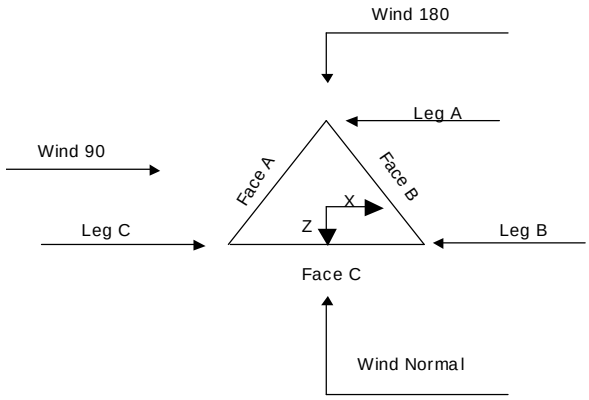
Tower Input Data

The main tower is a 3x free standing tower with an overall height of 151.29 ft above the ground line.
The base of the tower is set at an elevation of 0.00 ft above the ground line.
The face width of the tower is 8.56 ft at the top and 22.78 ft at the base.
This tower is designed using the TIA/EIA-222-F standard.
The following design criteria apply:

3) Tower is located in New London County, Connecticut.
4) Basic wind speed of 91 mph.
5) Nominal ice thickness of 0.9375 in.
6) Ice thickness is considered to increase with height.
7) Ice density of 56 pcf.
8) A wind speed of 38 mph is used in combination with ice.
9) Deflections calculated using a wind speed of 50 mph.
10) A non-linear (P-delta) analysis was used.
11) Grouted pipe f'_c is 7 ksi.
12) Pressures are calculated at each section.
13) Stress ratio used in tower member 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		



Triangular Tower

Tower Section Geometry

Tower Section	Tower Elevation	Assembly Database	Description	Section Width	Number of Sections	Section Length
	ft			ft		ft
T1	151.29-146.23			8.56	1	5.06
T2	146.23-141.17			8.56	1	5.06
T3	141.17-121.04			8.56	1	20.13
T4	121.04-114.31			10.56	1	6.73
T5	114.31-107.65			11.24	1	6.67
T6	107.65-100.92			11.92	1	6.73
T7	100.92-94.20			12.60	1	6.72
T8	94.20-87.49			13.30	1	6.72
T9	87.49-80.77			14.00	1	6.72
T10	80.77-70.69			14.70	1	10.08
T11	70.69-60.60			15.70	1	10.08
T12	60.60-50.51			16.70	1	10.09
T13	50.51-40.42			17.73	1	10.09
T14	40.42-30.31			18.77	1	10.10
T15	30.31-20.21			19.78	1	10.10
T16	20.21-10.10			20.78	1	10.10
T17	10.10-0.00			21.78	1	10.10

Tower Section Geometry *(cont'd)*

Tower Section	Tower Elevation	Diagonal Spacing	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset	Bottom Girt Offset
	ft	ft				in	in
T1	151.29-146.23	4.94	X Brace	No	No	0.7500	0.7500
T2	146.23-141.17	4.94	X Brace	No	No	0.7500	0.7500
T3	141.17-121.04	6.67	X Brace	No	No	0.7500	0.7500
T4	121.04-114.31	6.67	X Brace	No	No	0.7500	0.0000
T5	114.31-107.65	6.67	X Brace	No	No	0.0000	0.0000
T6	107.65-100.92	6.67	X Brace	No	Yes	0.0000	0.7500

Tower Section	Tower Elevation ft	Diagonal Spacing ft	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset in	Bottom Girt Offset in
T7	100.92-94.20	6.65	X Brace	No	No	0.7500	0.0000
T8	94.20-87.49	6.72	X Brace	No	Yes	0.0000	0.0000
T9	87.49-80.77	6.63	X Brace	No	Yes	0.0000	1.0000
T10	80.77-70.69	10.00	X Brace	No	No	1.0000	0.0000
T11	70.69-60.60	10.08	X Brace	No	Yes	0.0000	0.0000
T12	60.60-50.51	9.91	X Brace	No	Yes	1.0000	1.2500
T13	50.51-40.42	9.91	X Brace	No	Yes	1.0000	1.2500
T14	40.42-30.31	10.00	X Brace	No	No	1.2500	0.0000
T15	30.31-20.21	10.00	X Brace	No	Yes	0.0000	1.2500
T16	20.21-10.10	10.00	X Brace	No	Yes	1.2500	0.0000
T17	10.10-0.00	10.00	X Brace	No	Yes	0.0000	1.2500

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 151.29-146.23	Pipe	ROHN 2.5 STD	A572-50 (50 ksi)	Single Angle	L 1.5 x 1.5 x 3/16	A36 (36 ksi)
T2 146.23-141.17	Pipe	ROHN 2.5 STD	A572-50 (50 ksi)	Single Angle	L 2 x 2 x 3/16	A36 (36 ksi)
T3 141.17-121.04	Pipe	ROHN 2.5 EH	A572-50 (50 ksi)	Single Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T4 121.04-114.31	Grouted Pipe	ROHN 2.5 EH	A572-50 (50 ksi)	Single Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T5 114.31-107.65	Grouted Pipe	ROHN 2.5 EH	A572-50 (50 ksi)	Single Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T6 107.65-100.92	Grouted Pipe	ROHN 2.5 EH	A572-50 (50 ksi)	Double Angle	2L 2.5 x 2.5 x 3/16 (3/16)	A36 (36 ksi)
T7 100.92-94.20	Grouted Pipe	ROHN 3 EH	A572-50 (50 ksi)	Single Angle	L3x3x3/16	A36 (36 ksi)
T8 94.20-87.49	Grouted Pipe	ROHN 3 EH	A572-50 (50 ksi)	Single Angle	L3x3x3/16	A36 (36 ksi)
T9 87.49-80.77	Grouted Pipe	ROHN 3 EH	A572-50 (50 ksi)	Double Angle	2L 3 x 3 x 3/16 (1/4)	A36 (36 ksi)
T10 80.77-70.69	Grouted Pipe	ROHN 4 EH	A572-50 (50 ksi)	Double Angle	2L3x3x3/16x1/4	A36 (36 ksi)
T11 70.69-60.60	Grouted Pipe	ROHN 4 EH	A572-50 (50 ksi)	Double Angle	2L3x3x3/16x1/4	A36 (36 ksi)
T12 60.60-50.51	Grouted Pipe	ROHN 4 EH	A572-50 (50 ksi)	Double Angle	2L3x3x1/4x1/4	A572-50 (50 ksi)
T13 50.51-40.42	Grouted Pipe	ROHN 4 EH	A572-50 (50 ksi)	Double Angle	2L3x3x1/4x1/4	A572-50 (50 ksi)
T14 40.42-30.31	Grouted Pipe	ROHN 5 EH	A572-50 (50 ksi)	Double Angle	2L3 1/2x3 1/2x1/4x1/4	A572-50 (50 ksi)
T15 30.31-20.21	Grouted Pipe	ROHN 5 EH	A572-50 (50 ksi)	Double Angle	2L3 1/2x3 1/2x1/4x1/4	A572-50 (50 ksi)
T16 20.21-10.10	Grouted Pipe	ROHN 5 EH	A572-50 (50 ksi)	Double Angle	2L 4 x 4 x 1/4 (1/4)	A572-50 (50 ksi)
T17 10.10-0.00	Grouted Pipe	ROHN 5 EH	A572-50 (50 ksi)	Double Angle	2L 4 x 4 x 1/4 (1/4)	A572-50 (50 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Top Girt Type	Top Girt Size	Top Girt Grade	Bottom Girt Type	Bottom Girt Size	Bottom Girt Grade
T1 151.29-146.23	Single Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)	Single Angle		A36 (36 ksi)
T3 141.17-	Single Angle	L2 1/2x2 1/2x3/16	A36	Single Angle		A36

Tower Elevation ft	*Top Girt Type*	*Top Girt Size*	*Top Girt Grade*	*Bottom Girt Type*	*Bottom Girt Size*	*Bottom Girt Grade*
121.04			(36 ksi)			(36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	*Secondary Horizontal Type*	*Secondary Horizontal Size*	*Secondary Horizontal Grade*	*Inner Bracing Type*	*Inner Bracing Size*	*Inner Bracing Grade*
T6 107.65-100.92	Single Angle	L 2 x 2 x 3/16	A36 (36 ksi)	Single Angle		A36 (36 ksi)
T8 94.20-87.49	Single Angle	L 2 x 2 x 3/16	A36 (36 ksi)	Single Angle		A36 (36 ksi)
T9 87.49-80.77	Single Angle	L 2 x 2 x 3/16	A36 (36 ksi)	Single Angle		A36 (36 ksi)
T11 70.69-60.60	Single Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)	Single Angle		A36 (36 ksi)
T12 60.60-50.51	Single Angle	L3x3x1/4	A36 (36 ksi)	Single Angle		A36 (36 ksi)
T13 50.51-40.42	Single Angle	L3x3x1/4	A36 (36 ksi)	Single Angle		A36 (36 ksi)
T15 30.31-20.21	Single Angle	L 3 x 3 x 3/16	A36 (36 ksi)	Single Angle		A36 (36 ksi)
T16 20.21-10.10	Single Angle	L3x3x3/16	A36 (36 ksi)	Single Angle		A36 (36 ksi)
T17 10.10-0.00	Single Angle	L 3.5 x 3.5 x 1/4	A36 (36 ksi)	Single Angle		A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	*Gusset Area (per face) ft^2*	*Gusset Thickness in*	*Gusset Grade*	*Adjust. Factor A_f*	*Adjust. Factor A_r*	*Weight Mult.*	*Double Angle Stitch Bolt Spacing Diagonals in*	*Double Angle Stitch Bolt Spacing Horizontals in*
T1 151.29-146.23	0.30	0.1875	A36 (36 ksi)	1	1	1	Mid-Pt	30.0000
T2 146.23-141.17	0.30	0.1875	A36 (36 ksi)	1	1	1	Mid-Pt	30.0000
T3 141.17-121.04	0.80	0.1875	A36 (36 ksi)	1	1	1	Mid-Pt	30.0000
T4 121.04-114.31	0.27	0.4375	A36 (36 ksi)	1	1	1	Mid-Pt	30.0000
T5 114.31-107.65	0.27	0.4375	A36 (36 ksi)	1	1	1	Mid-Pt	30.0000
T6 107.65-100.92	1.25	0.4375	A36 (36 ksi)	1	1	1	Mid-Pt	30.0000
T7 100.92-94.20	0.93	0.4375	A36 (36 ksi)	1	1	1	Mid-Pt	30.0000
T8 94.20-87.49	0.47	0.4375	A36 (36 ksi)	1	1	1	Mid-Pt	30.0000
T9 87.49-80.77	0.47	0.4375	A36 (36 ksi)	1	1	1	Mid-Pt	30.0000
T10 80.77-70.69	0.45	0.2500	A36 (36 ksi)	1	1	1	Mid-Pt	30.0000
T11 70.69-60.60	0.45	0.2500	A36 (36 ksi)	1	1	1	Mid-Pt	30.0000
T12 60.60-50.51	0.45	0.2500	A36 (36 ksi)	1	1	1	Mid-Pt	30.0000
T13 50.51-40.42	0.45	0.5000	A36 (36 ksi)	1	1	1	Mid-Pt	30.0000

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
T14 40.42-30.31	0.45	0.5000	A36 (36 ksi)	1	1	1	Mid-Pt	30.0000
T15 30.31-20.21	0.45	0.5000	A36 (36 ksi)	1	1	1	Mid-Pt	30.0000
T16 20.21-10.10	1.50	0.5000	A36 (36 ksi)	1	1	1	Mid-Pt	30.0000
T17 10.10-0.00	1.50	0.5000	A36 (36 ksi)	1	1	1	Mid-Pt	30.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	K Factors[1] Legs	X Brace Diags X Y	K Brace Diags X Y	Single Diags X Y	Girts X Y	Horiz. X Y	Sec. Horiz. X Y	Inner Brace X Y
T1 151.29-146.23	No	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T2 146.23-141.17	No	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T3 141.17-121.04	No	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T4 121.04-114.31	No	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T5 114.31-107.65	No	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T6 107.65-100.92	No	No	1	1	1	1	1	1	0.5	1
				1	1	1	1	1	0.5	1
T7 100.92-94.20	No	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T8 94.20-87.49	No	No	1	1	1	1	1	1	0.5	1
				1	1	1	1	1	0.5	1
T9 87.49-80.77	No	No	1	1	1	1	1	1	0.5	1
				1	1	1	1	1	0.5	1
T10 80.77-70.69	No	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T11 70.69-60.60	No	No	1	1	1	1	1	1	0.5	1
				1	1	1	1	1	0.5	1
T12 60.60-50.51	No	No	1	1	1	1	1	1	0.5	1
				1	1	1	1	1	0.5	1
T13 50.51-40.42	No	No	1	1	1	1	1	1	0.5	1
				1	1	1	1	1	0.5	1
T14 40.42-30.31	No	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T15 30.31-20.21	No	No	1	1	1	1	1	1	0.5	1
				1	1	1	1	1	0.5	1
T16 20.21-10.10	No	No	1	1	1	1	1	1	0.5	1
				1	1	1	1	1	0.5	1
T17 10.10-0.00	No	No	1	1	1	1	1	1	0.5	1
				1	1	1	1	1	0.5	1

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

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U
T1 151.29-146.23	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T2 146.23-141.17	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T3 141.17-121.04	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T4 121.04-114.31	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T5 114.31-107.65	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T6 107.65-100.92	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T7 100.92-94.20	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T8 94.20-87.49	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T9 87.49-80.77	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T10 80.77-70.69	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T11 70.69-60.60	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T12 60.60-50.51	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T13 50.51-40.42	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T14 40.42-30.31	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T15 30.31-20.21	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T16 20.21-10.10	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T17 10.10-0.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75

Tower Section Geometry *(cont'd)*

Tower Elevation	Connection Offsets							
	Diagonal				K-Bracing			
	Vert. Top	Horiz. Top	Vert. Bot.	Horiz. Bot.	Vert. Top	Horiz. Top	Vert. Bot.	Horiz. Bot.
ft	in	in	in	in	in	in	in	in
T1 151.29-146.23	2.5000	3.0000	2.5000	3.0000	0.0000	0.0000	0.0000	0.0000
T2 146.23-141.17	2.5000	3.0000	2.5000	3.0000	0.0000	0.0000	0.0000	0.0000
T3 141.17-121.04	2.5000	3.0000	2.5000	3.0000	0.0000	0.0000	0.0000	0.0000
T4 121.04-114.31	2.5000	3.0000	2.5000	3.0000	0.0000	0.0000	0.0000	0.0000
T5 114.31-107.65	2.5000	3.0000	2.5000	3.0000	0.0000	0.0000	0.0000	0.0000
T6 107.65-100.92	2.5000	3.0000	2.5000	3.0000	0.0000	0.0000	0.0000	0.0000
T7 100.92-94.20	2.5000	3.8438	2.5000	3.8438	0.0000	0.0000	0.0000	0.0000
T8 94.20-87.49	2.5000	3.8438	2.5000	3.8438	0.0000	0.0000	0.0000	0.0000

Tower Elevation	*Connection Offsets*							
	Diagonal				*K-Bracing*			
	Vert. Top	*Horiz. Top*	*Vert. Bot.*	*Horiz. Bot.*	*Vert. Top*	*Horiz. Top*	*Vert. Bot.*	*Horiz. Bot.*
ft	in	in	in	in	in	in	in	in
T9 87.49-80.77	2.5000	3.8438	2.5000	3.8438	0.0000	0.0000	0.0000	0.0000
T10 80.77-70.69	2.5000	4.3438	2.5000	4.3438	0.0000	0.0000	0.0000	0.0000
T11 70.69-60.60	2.5000	4.3438	2.5000	4.3438	0.0000	0.0000	0.0000	0.0000
T12 60.60-50.51	2.5000	4.3438	2.5000	4.3438	0.0000	0.0000	0.0000	0.0000
T13 50.51-40.42	2.5000	4.3438	2.5000	4.3438	0.0000	0.0000	0.0000	0.0000
T14 40.42-30.31	2.5000	4.8750	2.5000	4.8750	0.0000	0.0000	0.0000	0.0000
T15 30.31-20.21	2.5000	4.8750	2.5000	4.8750	0.0000	0.0000	0.0000	0.0000
T16 20.21-10.10	2.5000	4.8750	2.5000	4.8750	0.0000	0.0000	0.0000	0.0000
T17 10.10-0.00	2.5000	4.8750	2.5000	4.8750	0.0000	0.0000	0.0000	0.0000

Tower Section Geometry *(cont'd)*

Tower Elevation	*Leg Connection Type*	*Leg*		*Diagonal*		*Top Girt*		*Bottom Girt*		*Mid Girt*		*Long Horizontal*		*Short Horizontal*	
ft		*Bolt Size* in	*No.*	*Bolt Size* in	*No.*	*Bolt Size* in	*No.*	*Bolt Size* in	*No.*	*Bolt Size* in	*No.*	*Bolt Size* in	*No.*	*Bolt Size* in	*No.*
T1 151.29-146.23	Flange	0.6250 A325N	0	0.5000 A325N	1	0.5000 A325N	1	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	1
T2 146.23-141.17	Flange	0.6250 A325N	4	0.5000 A325X	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	1
T3 141.17-121.04	Flange	0.6250 A325N	4	0.5000 A325N	1	0.5000 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	1
T4 121.04-114.31	Flange	0.7500 A325N	0	0.5000 A325N	2	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	1
T5 114.31-107.65	Flange	0.7500 A325N	0	0.5000 A325N	2	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	1
T6 107.65-100.92	Flange	0.7500 A325N	4	0.5000 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	1
T7 100.92-94.20	Flange	0.8750 A325N	0	0.5000 A325N	2	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	1
T8 94.20-87.49	Flange	0.8750 A325N	0	0.5000 A325N	2	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	1
T9 87.49-80.77	Flange	0.8750 A325N	4	0.5000 A325N	1	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	1
T10 80.77-70.69	Flange	0.8750 A325N	0	0.6250 A325N	1	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	1
T11 70.69-60.60	Flange	0.8750 A325N	4	0.6250 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	1
T12 60.60-50.51	Flange	1.0000 A325N	0	0.6250 A325N	1	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.5000 A325N	1
T13 50.51-40.42	Flange	1.0000 A325N	4	0.6250 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.5000 A325N	1
T14 40.42-30.31	Flange	1.0000 A325N	0	0.6250 A325N	1	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	1
T15 30.31-20.21	Flange	1.0625 A325N	4	0.6250 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	1
T16 20.21-10.10	Flange	1.0000 A325N	0	0.6250 A325N	1	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	1
T17 10.10-0.00	Flange	1.0000 A354-BC	6	0.6250 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	1

Grouted Pipe Properties

Size	F_y *ksi*	A_s in^2	A_c in^2	*Wt plf*	E_c *ksi*	E_m *ksi*	F_{ym} *ksi*
ROHN 2.5 EH (GR)	50	2.2535	4.2383	16.498	4769	36175	61
ROHN 3 EH (GR)	50	3.0159	6.6052	24.023	4769	37356	63
ROHN 4 EH (GR)	50	4.4074	11.4969	38.949	4769	38952	66
ROHN 5 EH (GR)	50	6.1120	18.1937	58.701	4769	40357	68

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	*Face or Leg*	*Allow Shield*	*Component Type*	*Placement ft*	*Face Offset in*	*Lateral Offset (Frac FW)*	*#*	*# Per Row*	*Clear Spacing in*	*Width or Diameter in*	*Perimeter in*	*Weight plf*
1.5'' flat Cable Ladder Rail	B	Yes	Af (CfAe)	103.00 - 8.00	0.0000	0.45	2	2	12.0000 1.5000	1.5000	6.0000	1.80
LDF7-50A (1-5/8 FOAM)	B	Yes	Ar (CfAe)	103.00 - 8.00	0.0000	0.45	7	3	0.2700	1.9800		0.82
LDF4P-50A (1/2 FOAM) **	B	Yes	Ar (CfAe)	50.00 - 8.00	-1.0000	0.49	1	1	0.6300	0.6300		0.15
LDF5-50A (7/8 FOAM)	B	Yes	Ar (CfAe)	90.00 - 8.00	-1.0000	-0.4	8	8	1.0000	1.0900		0.33
LDF5-50A (7/8 FOAM)	B	Yes	Ar (CfAe)	148.00 - 90.00	-1.0000	-0.4	7	7	1.0000	1.0900		0.33
LDF7-50A (1-5/8 FOAM)	B	Yes	Ar (CfAe)	148.00 - 8.00	2.0000	-0.45	3	2	0.2700 1.0000	1.9800		0.82
LDF7-50A (1-5/8 FOAM)	B	Yes	Ar (CfAe)	148.00 - 8.00	2.0000	-0.35	5	3	0.2700 1.0000	1.9800		0.82
1.5'' flat Cable Ladder Rail	B	Yes	Af (CfAe)	148.00 - 8.00	0.0000	-0.4	2	2	30.0000 1.5000	1.5000	6.0000	1.80
1.5'' flat Cable Ladder Rail	B	Yes	Af (CfAe)	121.00 - 8.00	-1.0000	-0.35	1	1	30.0000 1.5000	1.5000	6.0000	1.80
HB114-1-08U4-M5J(1 1/4") **	B	Yes	Ar (CfAe)	121.00 - 8.00	-2.0000	-0.35	3	3	0.7600 1.5400	1.5400		1.08
1.5'' flat Cable Ladder Rail	A	Yes	Af (CfAe)	133.00 - 8.00	0.0000	0.4	2	2	12.0000 1.5000	1.5000	6.0000	1.80
LDF5-50A (7/8 FOAM)	A	Yes	Ar (CfAe)	85.00 - 8.00	0.0000	0.45	2	2	1.0000	1.0900		0.33
LDF5-50A (7/8 FOAM)	A	Yes	Ar (CfAe)	128.00 - 85.00	0.0000	0.45	1	1	1.0000	1.0900		0.33
9207 (5/16")	A	Yes	Ar (CfAe)	95.00 - 8.00	0.0000	0.4	3	3	0.3300	0.3300		0.06
9207 (5/16")	A	Yes	Ar (CfAe)	126.00 - 95.00	0.0000	0.4	2	2	0.3300	0.3300		0.06
9207 (5/16")	A	Yes	Ar (CfAe)	151.29 - 126.00	0.0000	0.4	1	1	0.3300	0.3300		0.06
FXL 1873 PE(1 5/8") **	A	Yes	Ar (CfAe)	133.00 - 8.00	0.0000	0.4	6	6	0.2700	1.9800		0.01

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#		C_AA_A ft^2/ft	Weight plf
EW52	B	No	CaAa (In Face)	143.00 - 8.00	0.0000	-0.35	1	No Ice	0.00	0.59
								1/2" Ice	0.00	1.95
								1" Ice	0.00	3.93
								2" Ice	0.00	9.71
								4" Ice	0.00	28.60
**										

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 lb
Side Arm Mount [SO 304-1]	A	From Leg	1.00 0.00 0.00	0.0000	150.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.63 1.00 1.37 2.11 3.59	0.94 1.45 1.96 2.98 5.02	23.00 31.92 40.83 58.66 94.32
WB2618	A	From Leg	2.00 0.00 2.00	0.0000	150.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.04 2.24 2.44 2.87 3.82	0.53 0.65 0.78 1.07 1.75	12.10 23.53 37.28 72.51 179.32
ANT150F2	A	From Leg	2.00 0.00 7.00	0.0000	150.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.29 1.60 1.91 2.57 4.06	1.29 1.60 1.91 2.57 4.06	13.00 23.28 37.06 75.67 201.46
**									
Sector Mount [SM 510-3]	B	None		0.0000	148.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	40.10 57.33 74.56 109.02 177.94	40.10 57.33 74.56 109.02 177.94	2396.40 3089.00 3781.60 5166.80 7937.20
(2) LNX-6514DS-AIM w/ Mount Pipe	A	From Face	4.00 0.00 1.00	0.0000	148.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.65 9.31 9.93 11.20 13.87	7.08 8.27 9.18 11.02 15.06	64.56 133.71 210.90 393.00 902.39
(2) LNX-6514DS-AIM w/ Mount Pipe	B	From Face	4.00 0.00 1.00	0.0000	148.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.65 9.31 9.93 11.20 13.87	7.08 8.27 9.18 11.02 15.06	64.56 133.71 210.90 393.00 902.39
(2) LNX-6514DS-AIM w/ Mount Pipe	C	From Face	4.00 0.00 1.00	0.0000	148.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.65 9.31 9.93 11.20 13.87	7.08 8.27 9.18 11.02 15.06	64.56 133.71 210.90 393.00 902.39
(2) HBXX-6517DS-A2M w/ Mount Pipe	A	From Face	4.00 0.00 1.00	0.0000	148.00	No Ice 1/2" Ice 1" Ice	8.98 9.65 10.29 11.59	6.96 8.18 9.14 11.02	67.23 136.85 214.64 398.47

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 lb
						2" Ice	14.32	15.03	913.98
						4" Ice			
(2) HBXX-6517DS-A2M w/ Mount Pipe	B	From Face	4.00 0.00 1.00	0.0000	148.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.98 9.65 10.29 11.59 14.32	6.96 8.18 9.14 11.02 15.03	67.23 136.85 214.64 398.47 913.98
(2) HBXX-6517DS-A2M w/ Mount Pipe	C	From Face	4.00 0.00 1.00	0.0000	148.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.98 9.65 10.29 11.59 14.32	6.96 8.18 9.14 11.02 15.03	67.23 136.85 214.64 398.47 913.98
RRH 2X40 700 MHz UPPER	A	From Face	4.00 0.00 1.00	0.0000	148.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.20 3.44 3.69 4.21 5.37	1.92 2.12 2.33 2.76 3.74	50.70 74.82 102.16 167.23 344.42
RRH 2X40 700 MHz UPPER	B	From Face	4.00 0.00 1.00	0.0000	148.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.20 3.44 3.69 4.21 5.37	1.92 2.12 2.33 2.76 3.74	50.70 74.82 102.16 167.23 344.42
RRH 2X40 700 MHz UPPER	C	From Face	4.00 0.00 1.00	0.0000	148.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.20 3.44 3.69 4.21 5.37	1.92 2.12 2.33 2.76 3.74	50.70 74.82 102.16 167.23 344.42
RRH2X60-AWS	A	From Face	4.00 0.00 1.00	0.0000	148.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.19 2.40 2.61 3.07 4.09	1.43 1.61 1.80 2.21 3.13	44.00 60.01 78.72 125.00 258.50
RRH2X60-AWS	B	From Face	4.00 0.00 1.00	0.0000	148.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.19 2.40 2.61 3.07 4.09	1.43 1.61 1.80 2.21 3.13	44.00 60.01 78.72 125.00 258.50
RRH2X60-AWS	C	From Face	4.00 0.00 1.00	0.0000	148.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.19 2.40 2.61 3.07 4.09	1.43 1.61 1.80 2.21 3.13	44.00 60.01 78.72 125.00 258.50
RRH2X60-PCS	A	From Face	4.00 0.00 1.00	0.0000	148.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.57 2.79 3.02 3.52 4.61	2.01 2.22 2.43 2.89 3.92	55.00 75.35 98.71 155.23 312.91
RRH2X60-PCS	B	From Face	4.00 0.00 1.00	0.0000	148.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.57 2.79 3.02 3.52 4.61	2.01 2.22 2.43 2.89 3.92	55.00 75.35 98.71 155.23 312.91
RRH2X60-PCS	C	From Face	4.00 0.00 1.00	0.0000	148.00	No Ice 1/2" Ice	2.57 2.79 3.02	2.01 2.22 2.43	55.00 75.35 98.71

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* *lb*
						1" Ice	3.52	2.89	155.23
						2" Ice	4.61	3.92	312.91
						4" Ice			
(2) DB-T1-6Z-8AB-0Z	A	From Face	0.50	0.0000	148.00	No Ice	5.60	2.33	44.00
			0.00			1/2"	5.92	2.56	80.13
			1.00			Ice	6.24	2.79	120.22
						1" Ice	6.91	3.28	213.04
						2" Ice	8.37	4.37	454.67
						4" Ice			
**									
Pipe Mount [PM 601-1]	A	From Leg	0.50	0.0000	143.00	No Ice	3.00	0.90	65.00
			0.00			1/2"	3.74	1.12	79.14
			0.00			Ice	4.48	1.34	93.27
						1" Ice	5.96	1.78	121.55
						2" Ice	8.92	2.66	178.10
						4" Ice			
**									
Sector Mount [SM 104-3]	A	None		0.0000	133.00	No Ice	30.02	30.02	952.50
						1/2"	40.48	40.48	1404.60
						Ice	50.94	50.94	1856.70
						1" Ice	71.86	71.86	2760.90
						2" Ice	113.70	113.70	4569.30
						4" Ice			
800 10504 w/ Mount Pipe	A	From Leg	3.50	44.0000	133.00	No Ice	3.59	3.18	37.75
			3.50			1/2"	4.01	3.91	70.42
			0.00			Ice	4.42	4.58	108.95
						1" Ice	5.34	5.98	206.66
						2" Ice	7.38	8.98	513.56
						4" Ice			
800 10504 w/ Mount Pipe	B	From Leg	3.50	44.0000	133.00	No Ice	3.59	3.18	37.75
			3.50			1/2"	4.01	3.91	70.42
			0.00			Ice	4.42	4.58	108.95
						1" Ice	5.34	5.98	206.66
						2" Ice	7.38	8.98	513.56
						4" Ice			
800 10504 w/ Mount Pipe	C	From Leg	3.50	44.0000	133.00	No Ice	3.59	3.18	37.75
			3.50			1/2"	4.01	3.91	70.42
			0.00			Ice	4.42	4.58	108.95
						1" Ice	5.34	5.98	206.66
						2" Ice	7.38	8.98	513.56
						4" Ice			
**									
Side Arm Mount [SO 305-1]	C	From Leg	1.50	0.0000	128.00	No Ice	0.94	1.41	30.00
			0.00			1/2"	1.48	2.17	43.27
			0.00			Ice	2.02	2.93	56.54
						1" Ice	3.10	4.45	83.07
						2" Ice	5.26	7.49	136.14
						4" Ice			
TA-2450	C	From Leg	3.00	0.0000	128.00	No Ice	0.84	0.84	15.00
			0.00			1/2"	1.08	1.08	21.99
			2.00			Ice	1.34	1.34	31.80
						1" Ice	1.87	1.87	60.52
						2" Ice	3.19	3.19	158.57
						4" Ice			
Side Arm Mount [SO 305-1]	A	From Leg	1.50	0.0000	126.00	No Ice	0.94	1.41	30.00
			0.00			1/2"	1.48	2.17	43.27
			0.00			Ice	2.02	2.93	56.54
						1" Ice	3.10	4.45	83.07
						2" Ice	5.26	7.49	136.14
						4" Ice			
WB2618	A	From Leg	3.00	0.0000	126.00	No Ice	2.04	0.53	12.10
			0.00			1/2"	2.24	0.65	23.53
			0.00			Ice	2.44	0.78	37.28
						1" Ice	2.87	1.07	72.51
						2" Ice	3.82	1.75	179.32

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 lb
						4" Ice			
**									
Sector Mount [SM 505-3]	A	None		0.0000	121.00	No Ice	34.86	34.86	1725.30
						1/2" Ice	49.79	49.79	2316.90
						1" Ice	64.72	64.72	2908.50
						2" Ice	94.58	94.58	4091.70
						4" Ice	154.30	154.30	6458.10
1900MHz RRH (65MHz)	A	From Leg	4.00 0.00 0.00	0.0000	121.00	No Ice	2.71	2.61	59.50
						1/2" Ice	2.95	2.84	82.62
						1" Ice	3.20	3.09	108.98
						2" Ice	3.72	3.61	172.17
						4" Ice	4.86	4.74	345.91
800MHz 2X50W RRH W/FILTER	A	From Leg	4.00 0.00 0.00	0.0000	121.00	No Ice	2.40	2.25	64.00
						1/2" Ice	2.61	2.46	86.12
						1" Ice	2.83	2.68	111.30
						2" Ice	3.30	3.13	171.62
						4" Ice	4.34	4.15	337.52
APXVSPP18-C-A20 w/ Mount Pipe	A	From Leg	4.00 0.00 1.00	0.0000	121.00	No Ice	8.50	6.95	82.55
						1/2" Ice	9.15	8.13	150.56
						1" Ice	9.77	9.02	226.53
						2" Ice	11.03	10.84	405.98
						4" Ice	13.68	14.85	908.95
1900MHz RRH (65MHz)	B	From Leg	4.00 0.00 0.00	0.0000	121.00	No Ice	2.71	2.61	59.50
						1/2" Ice	2.95	2.84	82.62
						1" Ice	3.20	3.09	108.98
						2" Ice	3.72	3.61	172.17
						4" Ice	4.86	4.74	345.91
800MHz 2X50W RRH W/FILTER	B	From Leg	4.00 0.00 0.00	0.0000	121.00	No Ice	2.40	2.25	64.00
						1/2" Ice	2.61	2.46	86.12
						1" Ice	2.83	2.68	111.30
						2" Ice	3.30	3.13	171.62
						4" Ice	4.34	4.15	337.52
APXV9ERR18-C-A20 w/ Mount Pipe	B	From Leg	4.00 0.00 1.00	0.0000	121.00	No Ice	8.50	7.47	87.55
						1/2" Ice	9.15	8.66	158.03
						1" Ice	9.77	9.56	236.54
						2" Ice	11.03	11.39	421.23
						4" Ice	13.68	15.53	935.37
1900MHz RRH (65MHz)	C	From Leg	4.00 0.00 0.00	0.0000	121.00	No Ice	2.71	2.61	59.50
						1/2" Ice	2.95	2.84	82.62
						1" Ice	3.20	3.09	108.98
						2" Ice	3.72	3.61	172.17
						4" Ice	4.86	4.74	345.91
800MHz 2X50W RRH W/FILTER	C	From Leg	4.00 0.00 0.00	0.0000	121.00	No Ice	2.40	2.25	64.00
						1/2" Ice	2.61	2.46	86.12
						1" Ice	2.83	2.68	111.30
						2" Ice	3.30	3.13	171.62
						4" Ice	4.34	4.15	337.52
APXVSPP18-C-A20 w/ Mount Pipe	C	From Leg	4.00 0.00 1.00	0.0000	121.00	No Ice	8.50	6.95	82.55
						1/2" Ice	9.15	8.13	150.56
						1" Ice	9.77	9.02	226.53
						2" Ice	11.03	10.84	405.98
						4" Ice	13.68	14.85	908.95
**									
**									
Sector Mount [SM 701-3]	A	None		0.0000	103.00	No Ice	19.73	19.73	825.00

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
						1/2" Ice	27.41	27.41	1165.99
						1" Ice	35.09	35.09	1506.98
						2" Ice	50.45	50.45	2188.96
						4" Ice	81.17	81.17	3552.92
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	103.00	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	112.18 169.02 232.59 383.07 806.82
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	103.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.82 7.34 7.85 8.92 11.16	5.63 6.47 7.25 8.85 12.28	112.18 168.96 232.45 382.76 806.09
KRY 112 144/1	A	From Leg	4.00 0.00 0.00	0.0000	103.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.41 0.50 0.59 0.81 1.36	0.20 0.27 0.35 0.53 1.00	11.00 14.18 18.58 31.87 81.78
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	103.00	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	112.18 169.02 232.59 383.07 806.82
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	103.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.82 7.34 7.85 8.92 11.16	5.63 6.47 7.25 8.85 12.28	112.18 168.96 232.45 382.76 806.09
KRY 112 144/1	B	From Leg	4.00 0.00 0.00	0.0000	103.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.41 0.50 0.59 0.81 1.36	0.20 0.27 0.35 0.53 1.00	11.00 14.18 18.58 31.87 81.78
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	103.00	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	112.18 169.02 232.59 383.07 806.82
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	103.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.82 7.34 7.85 8.92 11.16	5.63 6.47 7.25 8.85 12.28	112.18 168.96 232.45 382.76 806.09
KRY 112 144/1	C	From Leg	4.00 0.00 0.00	0.0000	103.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.41 0.50 0.59 0.81 1.36	0.20 0.27 0.35 0.53 1.00	11.00 14.18 18.58 31.87 81.78
LNX-6515DS-VTM w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	103.00	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	83.27 172.93 272.55 506.06 1151.11

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 lb
RRUS 11 B12	A	From Leg	4.00 0.00 0.00	0.0000	103.00	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	50.70 71.57 95.49 153.24 313.85
LNX-6515DS-VTM w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	103.00	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	83.27 172.93 272.55 506.06 1151.11
RRUS 11 B12	B	From Leg	4.00 0.00 0.00	0.0000	103.00	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	50.70 71.57 95.49 153.24 313.85
LNX-6515DS-VTM w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	103.00	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	83.27 172.93 272.55 506.06 1151.11
RRUS 11 B12	C	From Leg	4.00 0.00 0.00	0.0000	103.00	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	50.70 71.57 95.49 153.24 313.85
**									
3'x2" Pipe Mount	A	From Leg	1.50 0.00 0.00	0.0000	95.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.52 0.71 0.90 1.33 2.44	0.52 0.71 0.90 1.33 2.44	27.00 31.81 38.81 59.99 135.33
WB2618	A	From Leg	3.00 0.00 -1.00	0.0000	95.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.04 2.24 2.44 2.87 3.82	0.53 0.65 0.78 1.07 1.75	12.10 23.53 37.28 72.51 179.32
10'x2" Pipe Mount	A	From Leg	3.00 0.00 0.00	0.0000	95.00 - 85.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.00 3.02 4.07 5.70 8.26	2.00 3.02 4.07 5.70 8.26	70.00 85.50 107.47 171.40 383.58
Side Arm Mount [SO 305-1]	A	From Leg	1.50 0.00 0.00	0.0000	85.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.94 1.48 2.02 3.10 5.26	1.41 2.17 2.93 4.45 7.49	30.00 43.27 56.54 83.07 136.14
ANT150D3	A	From Leg	3.00 0.00 5.00	0.0000	85.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.60 2.88 4.16 6.72 11.84	1.60 2.88 4.16 6.72 11.84	18.00 23.40 28.80 39.60 61.20
**									
Side Arm Mount [SO 302-1]	B	From Leg	2.00 0.00 0.00	0.0000	90.00	No Ice 1/2" Ice	1.67 2.51 3.35	3.27 4.99 6.71	55.00 88.07 121.14

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 lb
						1" Ice	5.03	10.15	187.28
						2" Ice	8.39	17.03	319.57
						4" Ice			
SRL-217 Ground Plane 10.67' x 4.83'	B	From Leg	4.00 0.00 6.00	0.0000	90.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.21 3.30 4.41 6.27 8.98	2.21 3.30 4.41 6.27 8.98	6.50 23.49 47.35 116.33 343.56
BW246Y	A	From Leg	1.50 0.00 0.00	0.0000	61.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.35 2.73 4.11 6.88 12.41	0.39 0.88 1.36 2.32 4.25	7.00 24.00 41.00 75.00 143.00
**									
Side Arm Mount [SO 305-1]	B	From Leg	1.50 0.00 0.00	0.0000	50.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.94 1.48 2.02 3.10 5.26	1.41 2.17 2.93 4.45 7.49	30.00 43.27 56.54 83.07 136.14
KS24019-L112A	B	From Leg	3.00 0.00 2.00	0.0000	50.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.16 0.22 0.30 0.48 0.95	0.16 0.22 0.30 0.48 0.95	5.00 6.59 9.15 17.96 55.81
**									

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 lb
PL6-59W	A	Paraboloid w/Radome	From Leg	1.00 0.00 0.00	-90.0000		143.00	6.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	28.27 29.05 29.83 31.39 34.51	143.00 292.13 441.25 739.50 1336.01

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

Comb. No.	Description
13	Dead+Wind 330 deg - No Ice
14	Dead+Ice
15	Dead+Wind 0 deg+Ice
16	Dead+Wind 30 deg+Ice
17	Dead+Wind 60 deg+Ice
18	Dead+Wind 90 deg+Ice
19	Dead+Wind 120 deg+Ice
20	Dead+Wind 150 deg+Ice
21	Dead+Wind 180 deg+Ice
22	Dead+Wind 210 deg+Ice
23	Dead+Wind 240 deg+Ice
24	Dead+Wind 270 deg+Ice
25	Dead+Wind 300 deg+Ice
26	Dead+Wind 330 deg+Ice
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 Reactions

Location	Condition	Gov. Load Comb.	Vertical lb	Horizontal, X lb	Horizontal, Z lb
Leg C	Max. Vert	10	230021.63	24684.35	-15990.33
	Max. H_x	10	230021.63	24684.35	-15990.33
	Max. H_z	4	-196157.07	-21226.45	13860.96
	Min. Vert	4	-196157.07	-21226.45	13860.96
	Min. H_x	4	-196157.07	-21226.45	13860.96
	Min. H_z	10	230021.63	24684.35	-15990.33
Leg B	Max. Vert	6	234155.48	-24697.61	-16544.58
	Max. H_x	12	-194368.11	20953.89	14106.50
	Max. H_z	12	-194368.11	20953.89	14106.50
	Min. Vert	12	-194368.11	20953.89	14106.50
	Min. H_x	6	234155.48	-24697.61	-16544.58
	Min. H_z	6	234155.48	-24697.61	-16544.58
Leg A	Max. Vert	2	231849.40	379.46	29402.85
	Max. H_x	11	15141.67	5479.87	1229.17
	Max. H_z	2	231849.40	379.46	29402.85
	Min. Vert	8	-191780.91	-378.15	-25079.33
	Min. H_x	5	13788.85	-5491.23	1125.07
	Min. H_z	8	-191780.91	-378.15	-25079.33

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
150.00	Side Arm Mount [SO 304-1]	27	3.423	0.1963	0.0384	41238
148.00	Sector Mount [SM 510-3]	27	3.342	0.1962	0.0384	41238
143.00	PL6-59W	27	3.137	0.1950	0.0376	142521
133.00	Sector Mount [SM 104-3]	27	2.727	0.1888	0.0342	66572
128.00	Side Arm Mount [SO 305-1]	27	2.529	0.1842	0.0321	66178
126.00	Side Arm Mount [SO 305-1]	27	2.451	0.1822	0.0312	65785
121.00	Sector Mount [SM 505-3]	27	2.259	0.1764	0.0291	60333

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
103.00	Sector Mount [SM 701-3]	27	1.629	0.1484	0.0220	76686
95.00	3'x2" Pipe Mount	27	1.379	0.1359	0.0191	31992
90.00	10'x2" Pipe Mount	27	1.233	0.1281	0.0168	24720
85.00	10'x2" Pipe Mount	27	1.099	0.1190	0.0151	31784
61.00	BW246Y	27	0.566	0.0841	0.0098	41694
50.00	Side Arm Mount [SO 305-1]	27	0.381	0.0670	0.0078	30966

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	151.292 - 146.229	11.535	6	0.6488	0.1273
T2	146.229 - 141.167	10.864	6	0.6481	0.1271
T3	141.167 - 121.042	10.168	6	0.6428	0.1233
T4	121.042 - 114.313	7.511	6	0.5854	0.0967
T5	114.313 - 107.646	6.679	6	0.5561	0.0868
T6	107.646 - 100.917	5.905	6	0.5208	0.0769
T7	100.917 - 94.2014	5.195	6	0.4800	0.0714
T8	94.2014 - 87.4861	4.502	6	0.4470	0.0621
T9	87.4861 - 80.7708	3.869	6	0.4103	0.0525
T10	80.7708 - 70.6875	3.301	6	0.3693	0.0472
T11	70.6875 - 60.6041	2.526	6	0.3250	0.0398
T12	60.6041 - 50.5104	1.856	6	0.2770	0.0324
T13	50.5104 - 40.4166	1.291	6	0.2249	0.0263
T14	40.4166 - 30.3125	0.847	6	0.1704	0.0201
T15	30.3125 - 20.2083	0.498	6	0.1299	0.0148
T16	20.2083 - 10.1041	0.242	6	0.0881	0.0094
T17	10.1041 - 0	0.065	6	0.0444	0.0047

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
150.00	Side Arm Mount [SO 304-1]	6	11.365	0.6489	0.1275	12592
148.00	Sector Mount [SM 510-3]	6	11.101	0.6487	0.1275	12592
143.00	PL6-59W	6	10.421	0.6453	0.1250	44498
133.00	Sector Mount [SM 104-3]	6	9.061	0.6257	0.1136	20496
128.00	Side Arm Mount [SO 305-1]	6	8.402	0.6108	0.1067	20263
126.00	Side Arm Mount [SO 305-1]	6	8.143	0.6040	0.1038	20064
121.00	Sector Mount [SM 505-3]	6	7.505	0.5852	0.0967	18245
103.00	Sector Mount [SM 701-3]	6	5.411	0.4922	0.0732	23403
95.00	3'x2" Pipe Mount	6	4.583	0.4509	0.0633	9596
90.00	10'x2" Pipe Mount	6	4.097	0.4250	0.0557	7423

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
85.00	10'x2" Pipe Mount	6	3.652	0.3947	0.0502	9525
61.00	BW246Y	6	1.881	0.2790	0.0326	12401
50.00	Side Arm Mount [SO 305-1]	6	1.265	0.2221	0.0260	9426

Bolt Design Data

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt lb	Allowable Load lb	Ratio Load / Allowable	Allowable Ratio	Criteria
T1	151.292	Diagonal	A325N	0.5000	1	1060.76	3126.56	0.339 ✔	1.333	Member Block Shear
		Top Girt	A325N	0.5000	1	177.54	4123.34	0.043 ✔	1.333	Bolt Shear
T2	146.229	Leg	A325N	0.6250	4	1586.77	13276.40	0.120 ✔	1.333	Bolt Tension
		Diagonal	A325X	0.5000	1	3464.30	4757.81	0.728 ✔	1.333	Gusset Bearing
T3	141.167	Leg	A325N	0.6250	4	7107.94	13205.60	0.538 ✔	1.333	Bolt Tension
		Diagonal	A325N	0.5000	1	4919.63	4123.34	1.193 ✔	1.333	Bolt Shear
		Top Girt	A325N	0.5000	1	871.09	4078.13	0.214 ✔	1.333	Member Bearing
T4	121.042	Diagonal	A325N	0.5000	2	3053.40	4123.34	0.741 ✔	1.333	Bolt Shear
T5	114.313	Diagonal	A325N	0.5000	2	2980.56	4123.34	0.723 ✔	1.333	Bolt Shear
T6	107.646	Leg	A325N	0.7500	4	13702.00	18899.20	0.725 ✔	1.333	Bolt Tension
		Diagonal	A325N	0.5000	1	7100.45	8246.68	0.861 ✔	1.333	Bolt Shear
		Secondary Horizontal	A325N	0.6250	1	1143.08	4553.91	0.251 ✔	1.333	Member Block Shear
T7	100.917	Diagonal	A325N	0.5000	2	3932.45	4123.34	0.954 ✔	1.333	Bolt Shear
T8	94.2014	Diagonal	A325N	0.5000	2	3952.69	4123.34	0.959 ✔	1.333	Bolt Shear
		Secondary Horizontal	A325N	0.6250	1	1438.16	4553.91	0.316 ✔	1.333	Member Block Shear
T9	87.4861	Leg	A325N	0.8750	4	21507.90	25960.00	0.828 ✔	1.333	Bolt Tension
		Diagonal	A325N	0.5000	1	8514.77	8246.68	1.033 ✔	1.333	Bolt Shear
		Secondary Horizontal	A325N	0.6250	1	1750.09	4553.91	0.384 ✔	1.333	Member Block Shear
T10	80.7708	Diagonal	A325N	0.6250	1	9498.02	8609.38	1.103 ✔	1.333	Gusset Bearing
T11	70.6875	Leg	A325N	0.8750	4	26929.30	26457.90	1.018 ✔	1.333	Bolt Tension
		Diagonal	A325N	0.6250	1	9598.00	8609.38	1.115 ✔	1.333	Gusset Bearing
		Secondary Horizontal	A325N	0.6250	1	2180.99	5097.66	0.428 ✔	1.333	Member Bearing
T12	60.6041	Diagonal	A325N	0.6250	1	10010.80	8609.38	1.163 ✔	1.333	Gusset Bearing
		Secondary Horizontal	A325N	0.5000	1	2638.41	4123.34	0.640 ✔	1.333	Bolt Shear
T13	50.5104	Leg	A325N	1.0000	4	36017.90	34021.00	1.059 ✔	1.333	Bolt Tension
		Diagonal	A325N	0.6250	1	10907.90	12885.40	0.847 ✔	1.333	Bolt Shear
		Secondary Horizontal	A325N	0.5000	1	2927.51	4123.34	0.710 ✔	1.333	Bolt Shear
T14	40.4166	Diagonal	A325N	0.6250	1	10889.90	12885.40	0.845 ✔	1.333	Bolt Shear
T15	30.3125	Leg	A325N	1.0625	4	42790.00	38442.30	1.113 ✔	1.333	Bolt Tension
		Diagonal	A325N	0.6250	1	11958.80	12885.40	0.928 ✔	1.333	Bolt Shear
		Secondary Horizontal	A325N	0.6250	1	3505.25	5097.66	0.688 ✔	1.333	Member Bearing
T16	20.2083	Diagonal	A325N	0.6250	1	11611.90	12885.40	0.901 ✔	1.333	Bolt Shear
		Secondary Horizontal	A325N	0.6250	1	3637.68	5097.66	0.714 ✔	1.333	Member Bearing

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt lb	Allowable Load lb	Ratio Load / Allowable	Allowable Ratio	Criteria
T17	10.1041	Leg	A354-BC	1.0000	6	32883.70	32397.70	1.015 ✔	1.333	Bolt Tension
		Diagonal	A325N	0.6250	1	13114.10	12885.40	1.018 ✔	1.333	Bolt Shear
		Secondary Horizontal	A325N	0.6250	1	4083.01	6442.72	0.634 ✔	1.333	Bolt Shear

Compression Checks

Leg Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio P / P_a
T1	151.292 - 146.229	ROHN 2.5 STD	5.06	4.94	62.5 K=1.00	22.279	1.7040	-3225.63	37965.40	0.085* ✔
T2	146.229 - 141.167	ROHN 2.5 STD	5.06	4.94	62.5 K=1.00	22.279	1.7040	-9355.80	37965.40	0.246 ✔
T3	141.167 - 121.042	ROHN 2.5 EH	20.16	6.68	86.7 K=1.00	17.636	2.2535	-34074.10	39742.70	0.857 ✔
T4	121.042 - 114.313	ROHN 2.5 EH (GR)	6.74	6.68	86.7 K=1.00	20.596	2.2535	-39406.60	46414.10	0.849 ✔
T5	114.313 - 107.646	ROHN 2.5 EH (GR)	6.68	6.68	86.7 K=1.00	20.595	2.2535	-49742.40	46412.40	1.072 ✔
T6	107.646 - 100.917	ROHN 2.5 EH (GR)	6.74	3.43	44.6 K=1.00	30.457	2.2535	-65911.60	68636.90	0.960 ✔
T7	100.917 - 94.2014	ROHN 3 EH (GR)	6.73	6.66	70.4 K=1.00	25.475	3.0159	-71325.90	76830.10	0.928 ✔
T8	94.2014 - 87.4861	ROHN 3 EH (GR)	6.73	3.45	36.4 K=1.00	32.873	3.0159	-82920.20	99141.40	0.836 ✔
T9	87.4861 - 80.7708	ROHN 3 EH (GR)	6.73	3.40	35.9 K=1.00	32.964	3.0159	-100905.00	99418.20	1.015 ✔
T10	80.7708 - 70.6875	ROHN 4 EH (GR)	10.10	10.02	81.4 K=1.00	23.284	4.4074	-109093.00	102621.00	1.063 ✔
T11	70.6875 - 60.6041	ROHN 4 EH (GR)	10.10	5.21	42.3 K=1.00	32.956	4.4074	-125765.00	145250.00	0.866 ✔
T12	60.6041 - 50.5104	ROHN 4 EH (GR)	10.11	5.11	41.5 K=1.00	33.117	4.4074	-152128.00	145962.00	1.042 ✔
T13	50.5104 - 40.4166	ROHN 4 EH (GR)	10.11	5.10	41.4 K=1.00	33.131	4.4074	-168797.00	146022.00	1.156 ✔
T14	40.4166 - 30.3125	ROHN 5 EH (GR)	10.12	10.02	65.4 K=1.00	28.466	6.1120	-176603.00	173984.00	1.015 ✔
T15	30.3125 - 20.2083	ROHN 5 EH (GR)	10.12	5.13	33.5 K=1.00	35.792	6.1120	-202126.00	218759.00	0.924 ✔
T16	20.2083 - 10.1041	ROHN 5 EH (GR)	10.12	5.12	33.4 K=1.00	35.800	6.1120	-209765.00	218809.00	0.959 ✔
T17	10.1041 - 0	ROHN 5 EH (GR)	10.12	5.12	33.4 K=1.00	35.807	6.1120	-235445.00	218848.00	1.076 ✔

* DL controls

Diagonal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T1	151.292 - 146.229	L 1.5 x 1.5 x 3/16	9.24	4.62	189.1 K=1.00	4.178	0.5273	-1003.62	2203.16	0.456 ✔
T2	146.229 - 141.167	L 2 x 2 x 3/16	9.24	4.62	140.8 K=1.00	7.537	0.7150	-3657.78	5388.61	0.679 ✔
T3	141.167 - 121.042	L2 1/2x2 1/2x3/16	11.56	5.97	144.7 K=1.00	7.134	0.9020	-4919.63	6434.70	0.765 ✔
T4	121.042 - 114.313	L2 1/2x2 1/2x3/16	12.14	6.26	151.7 K=1.00	6.489	0.9020	-6106.79	5853.04	1.043 ✔
T5	114.313 - 107.646	L2 1/2x2 1/2x3/16	12.73	6.55	158.8 K=1.00	5.923	0.9020	-5912.34	5342.79	1.107 ✔
T6	107.646 - 100.917	2L 2.5 x 2.5 x 3/16 (3/16)	13.32	6.84	111.3 K=1.00	11.501	1.8047	-7100.45	20756.50	0.342 ✔
T7	100.917 - 94.2014	2L 'a' > 39.1618 in - 69 L3x3x3/16	13.81	7.09	142.7 K=1.00	7.334	1.0900	-7827.70	7994.03	0.979 ✔
T8	94.2014 - 87.4861	L3x3x3/16	14.46	7.41	149.3 K=1.00	6.704	1.0900	-7905.37	7306.96	1.082 ✔
T9	87.4861 - 80.7708	2L 3 x 3 x 3/16 (1/4)	15.05	7.71	104.1 K=1.00	12.257	2.1797	-8514.77	26717.20	0.319 ✔
T10	80.7708 - 70.6875	2L 'a' > 44.0220 in - 102 2L3x3x3/16x1/4	17.36	8.97	121.1 K=1.00	10.071	2.1797	-9520.32	21950.70	0.434 ✔
T11	70.6875 - 60.6041	2L 'a' > 51.2231 in - 114 2L3x3x3/16x1/4	18.25	9.41	127.0 K=1.00	9.252	2.1797	-10172.80	20167.10	0.504 ✔
T12	60.6041 - 50.5104	2L 'a' > 53.7356 in - 123 2L3x3x1/4x1/4	19.03	9.80	132.3 K=1.00	8.527	2.8750	-10311.80	24513.80	0.421 ✔
T13	50.5104 - 40.4166	2L 'a' > 56.1325 in - 135 2L3x3x1/4x1/4	19.93	10.24	138.4 K=1.00	7.795	2.8750	-10907.90	22411.50	0.487 ✔
T14	40.4166 - 30.3125	2L 'a' > 58.7062 in - 147 2L3 1/2x3 1/2x1/4x1/4	20.81	10.67	124.1 K=1.00	9.698	3.3750	-10889.90	32730.50	0.333 ✔
T15	30.3125 - 20.2083	2L 'a' > 61.0427 in - 159 2L3 1/2x3 1/2x1/4x1/4	21.69	11.11	129.2 K=1.00	8.942	3.3750	-11958.80	30180.90	0.396 ✔
T16	20.2083 - 10.1041	2L 'a' > 63.5688 in - 168 2L 4 x 4 x 1/4 (1/4)	22.61	11.57	118.0 K=1.00	10.719	3.8750	-11611.90	41534.90	0.280 ✔
T17	10.1041 - 0	2L 'a' > 66.0834 in - 180 2L 4 x 4 x 1/4 (1/4)	23.51	12.01	122.6 K=1.00	9.934	3.8750	-13114.10	38493.00	0.341 ✔
		2L 'a' > 68.6449 in - 192								

Secondary Horizontal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T6	107.646 - 100.917	L 2 x 2 x 3/16	12.25	12.01	182.9 K=0.50	4.463	0.7150	-1143.08	3191.02	0.358 ✔
T8	94.2014 - 87.4861	L 2 x 2 x 3/16	13.64	13.35	203.3 K=0.50	3.613	0.7150	-1438.16	2583.20	0.557 ✔
T9	87.4861 - 80.7708	L 2 x 2 x 3/16	14.34	14.04	213.9 K=0.50	3.265	0.7150	-1750.09	2334.13	0.750 ✔
T11	70.6875 - 60.6041	L2 1/2x2 1/2x3/16	16.18	15.81	191.6 K=0.50	4.068	0.9020	-2180.99	3668.94	0.594

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T12	60.6041 - 50.5104	L3x3x1/4	17.20	16.82	170.5 K=0.50	5.135	1.4400	-2638.41	7395.08	0.357 ✓
T13	50.5104 - 40.4166	L3x3x1/4	18.24	17.86	181.0 K=0.50	4.556	1.4400	-2927.51	6561.12	0.446 ✓
T15	30.3125 - 20.2083	L 3 x 3 x 3/16	20.26	19.80	199.2 K=0.50	3.763	1.0898	-3505.25	4101.40	0.855 ✓
T16	20.2083 - 10.1041	L3x3x3/16	21.27	20.81	209.5 K=0.50	3.402	1.0900	-3637.68	3708.23	0.981 ✓
T17	10.1041 - 0	L 3.5 x 3.5 x 1/4	22.27	21.80	188.5 K=0.50	4.203	1.6900	-4083.01	7103.60	0.575 ✓

Top Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T1	151.292 - 146.229	L2 1/2x2 1/2x3/16	8.56	8.32	201.8 K=1.00	3.668	0.9020	-177.54	3308.68	0.054 ✓
		KL/R > 200 (C) - 6								
T3	141.167 - 121.042	L2 1/2x2 1/2x3/16	8.57	8.33	201.9 K=1.00	3.663	0.9020	-751.84	3303.75	0.228 ✓
		KL/R > 200 (C) - 25								

Tension Checks

Leg Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T1	151.292 - 146.229	ROHN 2.5 STD	5.06	4.94	62.5	30.000	1.7040	758.73	51121.50	0.015 ✓
T2	146.229 - 141.167	ROHN 2.5 STD	5.06	4.94	62.5	30.000	1.7040	6347.07	51121.50	0.124 ✓
T3	141.167 - 121.042	ROHN 2.5 EH	20.16	6.68	86.7	30.000	2.2535	28431.80	67606.20	0.421 ✓
T4	121.042 - 114.313	ROHN 2.5 EH (GR)	6.74	6.68	86.7	30.000	2.2535	31871.40	67606.20	0.471 ✓
T5	114.313 - 107.646	ROHN 2.5 EH (GR)	6.68	6.68	86.7	30.000	2.2535	41432.20	67606.20	0.613 ✓
T6	107.646 - 100.917	ROHN 2.5 EH (GR)	6.74	3.43	44.6	30.000	2.2535	54808.20	67606.20	0.811 ✓
T7	100.917 - 94.2014	ROHN 3 EH (GR)	6.73	6.66	70.4	30.000	3.0159	59590.90	90477.90	0.659 ✓
T8	94.2014 - 87.4861	ROHN 3 EH (GR)	6.73	3.45	36.4	30.000	3.0159	70141.80	90477.90	0.775 ✓
T9	87.4861 - 80.7708	ROHN 3 EH (GR)	6.73	3.40	35.9	30.000	3.0159	86031.40	90477.90	0.951 ✓
T10	80.7708 - 70.6875	ROHN 4 EH (GR)	10.10	10.02	81.4	30.000	4.4074	93111.10	132223.00	0.704 ✓
T11	70.6875 - 60.6041	ROHN 4 EH (GR)	10.10	5.21	42.3	30.000	4.4074	107867.00	132223.00	0.816 ✓

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T12	60.6041 - 50.5104	ROHN 4 EH (GR)	10.11	5.11	41.5	30.000	4.4074	130188.00	132223.00	0.985 ✔
T13	50.5104 - 40.4166	ROHN 4 EH (GR)	10.11	5.10	41.4	30.000	4.4074	144071.00	132223.00	1.090 ✔
T14	40.4166 - 30.3125	ROHN 5 EH (GR)	10.12	10.02	65.4	30.000	6.1120	150461.00	183359.00	0.821 ✔
T15	30.3125 - 20.2083	ROHN 5 EH (GR)	10.12	5.13	33.5	30.000	6.1120	171160.00	183359.00	0.933 ✔
T16	20.2083 - 10.1041	ROHN 5 EH (GR)	10.12	5.12	33.4	30.000	6.1120	177166.00	183359.00	0.966 ✔
T17	10.1041 - 0	ROHN 5 EH (GR)	10.12	5.12	33.4	30.000	6.1120	197302.00	183359.00	1.076 ✔

Diagonal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T1	151.292 - 146.229	L 1.5 x 1.5 x 3/16	9.24	4.62	121.4	29.000	0.3076	1060.76	8920.90	0.119 ✔
T2	146.229 - 141.167	L 2 x 2 x 3/16	9.24	4.62	89.9	29.000	0.4484	3464.30	13002.40	0.266 ✔
T3	141.167 - 121.042	L2 1/2x2 1/2x3/16	11.56	5.97	92.1	29.000	0.5886	4714.10	17069.70	0.276 ✔
T4	121.042 - 114.313	L2 1/2x2 1/2x3/16	12.14	6.26	96.5	29.000	0.5886	5893.73	17069.70	0.345 ✔
T5	114.313 - 107.646	L2 1/2x2 1/2x3/16	12.73	6.55	101.0	29.000	0.5886	5961.13	17069.70	0.349 ✔
T6	107.646 - 100.917	2L 2.5 x 2.5 x 3/16 (3/16)	13.32	6.84	105.5	29.000	1.1777	6442.35	34154.30	0.189 ✔
T7	100.917 - 94.2014	2L 'a' > 39.1618 in - 70 L3x3x3/16	13.81	7.09	90.6	29.000	0.7296	7864.90	21158.70	0.372 ✔
T8	94.2014 - 87.4861	L3x3x3/16	14.46	7.41	94.7	29.000	0.7296	7699.12	21158.70	0.364 ✔
T9	87.4861 - 80.7708	2L 3 x 3 x 3/16 (1/4)	15.05	7.71	98.4	29.000	1.4590	8338.21	42310.50	0.197 ✔
T10	80.7708 - 70.6875	2L 'a' > 44.0220 in - 103 2L3x3x3/16x1/4	17.36	8.97	114.5	29.000	1.4238	9498.02	41291.00	0.230 ✔
T11	70.6875 - 60.6041	2L 'a' > 51.2231 in - 115 2L3x3x3/16x1/4	18.25	9.41	120.2	29.000	1.4238	9598.00	41291.00	0.232 ✔
T12	60.6041 - 50.5104	2L 'a' > 53.7356 in - 124 2L3x3x1/4x1/4	19.03	9.80	126.3	32.500	1.8750	10010.80	60937.50	0.164 ✔
T13	50.5104 - 40.4166	2L 'a' > 56.1325 in - 136 2L3x3x1/4x1/4	19.93	10.24	132.1	32.500	1.8750	10379.60	60937.50	0.170 ✔
T14	40.4166 - 30.3125	2L 'a' > 58.7062 in - 148 2L3 1/2x3 1/2x1/4x1/4	20.81	10.67	117.3	32.500	2.2500	10864.40	73125.00	0.149 ✔
T15	30.3125 - 20.2083	2L 'a' > 61.0427 in - 160 2L3 1/2x3 1/2x1/4x1/4	21.69	11.11	122.2	32.500	2.2500	11047.20	73125.00	0.151 ✔
T16	20.2083 - 10.1041	2L 'a' > 63.5688 in - 169 2L 4 x 4 x 1/4 (1/4)	22.61	11.57	110.8	32.500	2.6250	11556.60	85312.50	0.135 ✔

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T17	10.1041 - 0	2L 'a' > 66.0834 in - 181 2L 4 x 4 x 1/4 (1/4) 2L 'a' > 68.6449 in - 193	23.51	12.01	115.1	32.500	2.6250	11779.70	85312.50	0.138 ✔

Secondary Horizontal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T6	107.646 - 100.917	L 2 x 2 x 3/16	12.25	12.01	233.6	29.000	0.4308	1143.08	12492.70	0.092 ✔
T8	94.2014 - 87.4861	L 2 x 2 x 3/16	13.64	13.35	259.7	29.000	0.4308	1438.16	12492.70	0.115 ✔
T9	87.4861 - 80.7708	L 2 x 2 x 3/16	14.34	14.04	273.2	29.000	0.4308	1750.09	12492.70	0.140 ✔
T11	70.6875 - 60.6041	L2 1/2x2 1/2x3/16	16.18	15.81	243.8	29.000	0.5710	2180.99	16559.90	0.132 ✔
T12	60.6041 - 50.5104	L3x3x1/4	17.20	16.82	217.1	29.000	0.9628	2638.41	27921.60	0.094 ✔
T13	50.5104 - 40.4166	L3x3x1/4	18.24	17.86	230.5	29.000	0.9628	2927.51	27921.60	0.105 ✔
T15	30.3125 - 20.2083	L 3 x 3 x 3/16	20.26	19.80	252.9	29.000	0.7119	3505.25	20645.50	0.170 ✔
T16	20.2083 - 10.1041	L3x3x3/16	21.27	20.81	266.0	29.000	0.7120	3637.68	20648.90	0.176 ✔
T17	10.1041 - 0	L 3.5 x 3.5 x 1/4	22.27	21.80	239.9	29.000	1.1269	4083.01	32679.40	0.125 ✔

Top Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T1	151.292 - 146.229	L2 1/2x2 1/2x3/16	8.56	8.32	128.4	29.000	0.5886	127.84	17069.70	0.007 ✔
T3	141.167 - 121.042	L2 1/2x2 1/2x3/16	8.57	8.33	128.5	29.000	0.5886	871.09	17069.70	0.051 ✔

Section Capacity Table

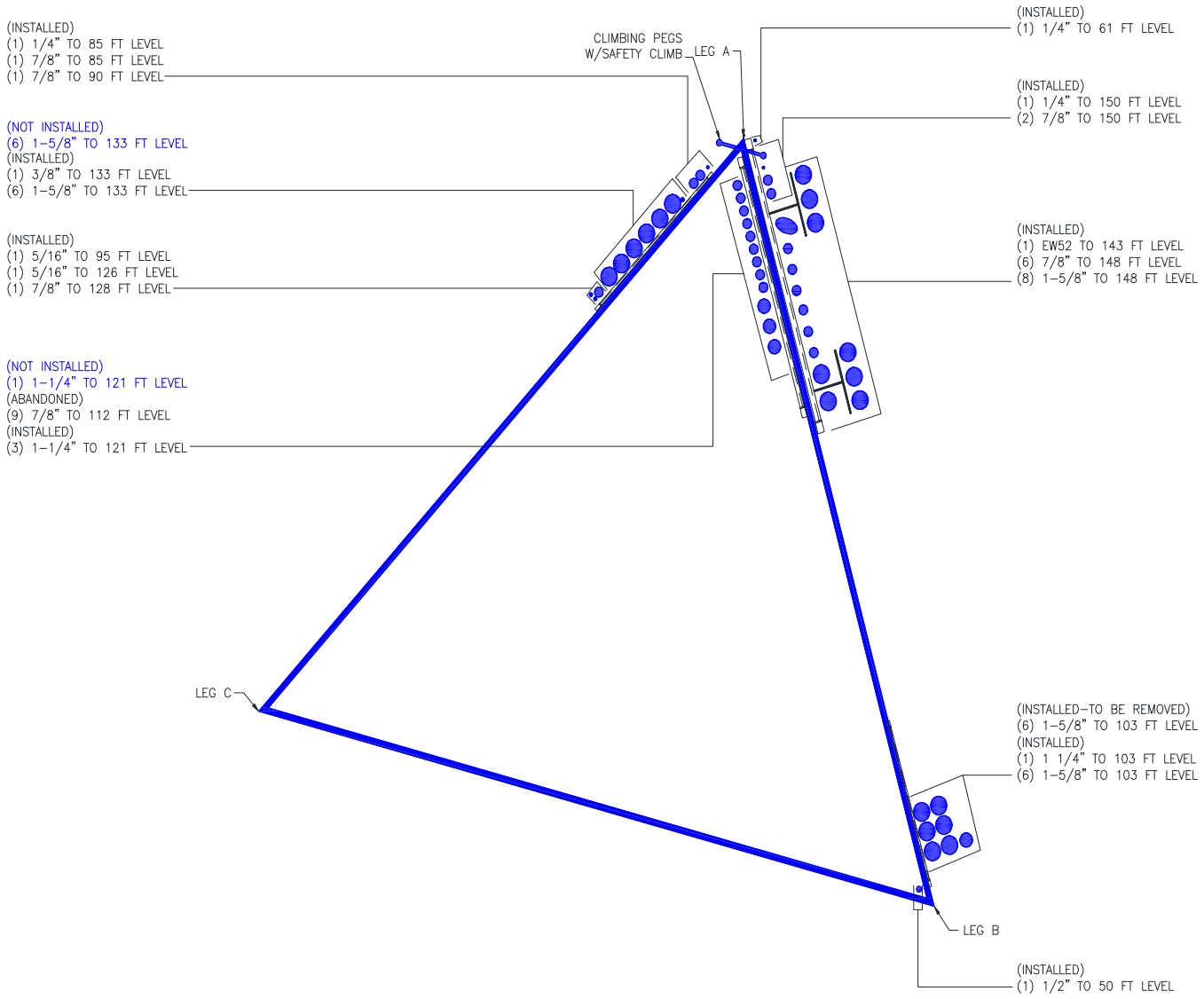
Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	$SF*P_{allow}$ lb	% Capacity	Pass Fail
T1	151.292 - 146.229	Leg	ROHN 2.5 STD	2	-2799.43	37965.40	18.5	Pass
T2	146.229 - 141.167	Leg	ROHN 2.5 STD	14	-9147.29	50607.87	22.2	Pass
T3	141.167 - 121.042	Leg	ROHN 2.5 EH	23	-34074.10	52977.02	64.3	Pass
T4	121.042 - 114.313	Leg	ROHN 2.5 EH (GR)	47	-39406.60	61869.99	63.7	Pass
T5	114.313 - 107.646	Leg	ROHN 2.5 EH (GR)	56	-49742.40	61867.72	80.4	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	SF*P_{allow} lb	% Capacity	Pass Fail
T6	107.646 - 100.917	Leg	ROHN 2.5 EH (GR)	65	-65911.60	91492.98	72.0	Pass
T7	100.917 - 94.2014	Leg	ROHN 3 EH (GR)	77	-71325.90	102414.52	69.6	Pass
T8	94.2014 - 87.4861	Leg	ROHN 3 EH (GR)	86	-82920.20	132155.48	62.7	Pass
T9	87.4861 - 80.7708	Leg	ROHN 3 EH (GR)	98	-100905.00	132524.46	76.1	Pass
T10	80.7708 - 70.6875	Leg	ROHN 4 EH (GR)	110	-109093.00	136793.79	79.8	Pass
T11	70.6875 - 60.6041	Leg	ROHN 4 EH (GR)	119	-125765.00	193618.24	65.0 76.4 (b)	Pass
T12	60.6041 - 50.5104	Leg	ROHN 4 EH (GR)	131	-152128.00	194567.34	78.2	Pass
T13	50.5104 - 40.4166	Leg	ROHN 4 EH (GR)	143	-168797.00	194647.32	86.7	Pass
T14	40.4166 - 30.3125	Leg	ROHN 5 EH (GR)	155	-176603.00	231920.66	76.1	Pass
T15	30.3125 - 20.2083	Leg	ROHN 5 EH (GR)	163	171160.00	244417.54	70.0 83.5 (b)	Pass
T16	20.2083 - 10.1041	Leg	ROHN 5 EH (GR)	175	177166.00	244417.54	72.5	Pass
T17	10.1041 - 0	Leg	ROHN 5 EH (GR)	187	197302.00	244417.54	80.7	Pass
T1	151.292 - 146.229	Diagonal	L 1.5 x 1.5 x 3/16	9	-1003.62	2936.81	34.2	Pass
T2	146.229 - 141.167	Diagonal	L 2 x 2 x 3/16	18	-3657.78	7183.02	50.9 54.6 (b)	Pass
T3	141.167 - 121.042	Diagonal	L2 1/2x2 1/2x3/16	30	-4919.63	8577.46	57.4 89.5 (b)	Pass
T4	121.042 - 114.313	Diagonal	L2 1/2x2 1/2x3/16	51	-6106.79	7802.10	78.3	Pass
T5	114.313 - 107.646	Diagonal	L2 1/2x2 1/2x3/16	60	-5912.34	7121.94	83.0	Pass
T6	107.646 - 100.917	Diagonal	2L 2.5 x 2.5 x 3/16 (3/16)	69	-7100.45	27668.41	25.7 64.6 (b)	Pass
T7	100.917 - 94.2014	Diagonal	L3x3x3/16	81	-7827.70	10656.04	73.5	Pass
T8	94.2014 - 87.4861	Diagonal	L3x3x3/16	90	-7905.37	9740.18	81.2	Pass
T9	87.4861 - 80.7708	Diagonal	2L 3 x 3 x 3/16 (1/4)	102	-8514.77	35614.03	23.9 77.5 (b)	Pass
T10	80.7708 - 70.6875	Diagonal	2L3x3x3/16x1/4	114	-9520.32	29260.28	32.5 82.8 (b)	Pass
T11	70.6875 - 60.6041	Diagonal	2L3x3x3/16x1/4	123	-10172.80	26882.74	37.8 83.6 (b)	Pass
T12	60.6041 - 50.5104	Diagonal	2L3x3x1/4x1/4	135	-10311.80	32676.90	31.6 87.2 (b)	Pass
T13	50.5104 - 40.4166	Diagonal	2L3x3x1/4x1/4	147	-10907.90	29874.53	36.5 63.5 (b)	Pass
T14	40.4166 - 30.3125	Diagonal	2L3 1/2x3 1/2x1/4x1/4	159	-10889.90	43629.75	25.0 63.4 (b)	Pass
T15	30.3125 - 20.2083	Diagonal	2L3 1/2x3 1/2x1/4x1/4	168	-11958.80	40231.14	29.7 69.6 (b)	Pass
T16	20.2083 - 10.1041	Diagonal	2L 4 x 4 x 1/4 (1/4)	180	-11611.90	55366.02	21.0 67.6 (b)	Pass
T17	10.1041 - 0	Diagonal	2L 4 x 4 x 1/4 (1/4)	192	-13114.10	51311.17	25.6 76.4 (b)	Pass
T6	107.646 - 100.917	Secondary Horizontal	L 2 x 2 x 3/16	73	-1143.08	4253.63	26.9	Pass
T8	94.2014 - 87.4861	Secondary Horizontal	L 2 x 2 x 3/16	94	-1438.16	3443.41	41.8	Pass
T9	87.4861 - 80.7708	Secondary Horizontal	L 2 x 2 x 3/16	106	-1750.09	3111.40	56.2	Pass
T11	70.6875 - 60.6041	Secondary Horizontal	L2 1/2x2 1/2x3/16	127	-2180.99	4890.70	44.6	Pass
T12	60.6041 - 50.5104	Secondary Horizontal	L3x3x1/4	139	-2638.41	9857.64	26.8 48.0 (b)	Pass
T13	50.5104 - 40.4166	Secondary Horizontal	L3x3x1/4	151	-2927.51	8745.97	33.5 53.3 (b)	Pass
T15	30.3125 -	Secondary	L 3 x 3 x 3/16	173	-3505.25	5467.17	64.1	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	SF*P_{allow} lb	% Capacity	Pass Fail
	20.2083	Horizontal						
T16	20.2083 - 10.1041	Secondary Horizontal	L3x3x3/16	184	-3637.68	4943.07	73.6	Pass
T17	10.1041 - 0	Secondary Horizontal	L 3.5 x 3.5 x 1/4	196	-4083.01	9469.10	43.1 47.5 (b)	Pass
T1	151.292 - 146.229	Top Girt	L2 1/2x2 1/2x3/16	6	-177.54	4410.47	4.0	Pass
T3	141.167 - 121.042	Top Girt	L2 1/2x2 1/2x3/16	25	-751.84	4403.90	17.1	Pass
							Summary	
						Leg (T13)	86.7	Pass
						Diagonal (T3)	89.5	Pass
						Secondary Horizontal (T16)	73.6	Pass
						Top Girt (T3)	17.1	Pass
						Bolt Checks	89.5	Pass
						RATING =	**89.5**	**Pass**

APPENDIX B

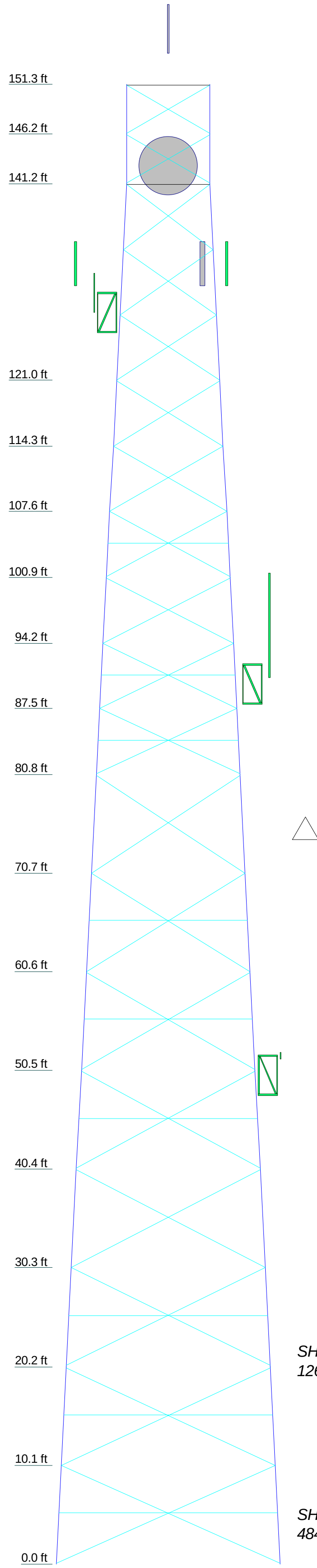
BASE LEVEL DRAWING



APPENDIX C

ADDITIONAL CALCULATIONS

Section	Legs	Leg Grade	Diagonals	Diagonal Grade	Top Girts	Sec. Horizontals	Face Width (ft)	# Panels @ (ft)	Weight (lb)
T1	ROHN 2.5 STD	A572-50	A	A36	E	N.A.	8.5625	2 @ 4.9375	273.3
T2			B		N.A.				229.9
T3	ROHN 2.5 EH		L2 1/2x2 1/2x3/16		L2 1/2x2 1/2x3/16			6 @ 6.66667	1169.5
T4	ROHN 2.5 EH (GR)				N.A.		10.5625		482.2
T5							11.243		490.7
T6			C			B	11.9236		891.5
T7	ROHN 3 EH (GR)		L3x3x3/16			N.A.	12.6041	1 @ 6.65278	703.2
T8						L 2 x 2 x 3/16	13.302	1 @ 6.71528	792.3
T9			D				14	1 @ 6.63194	1145.3
T10	ROHN 4 EH (GR)		2L3x3x3/16x1/4			N.A.	14.6979	1 @ 10	1603.8
T11						E	15.6979	1 @ 10.0833	1792.1
T12			2L3x3x1/4x1/4	A572-50		L3x3x1/4	16.6979	2 @ 9.90625	2201.8
T13							17.7343		2283.9
T14	ROHN 5 EH (GR)		2L3 1/2x3 1/2x1/4x1/4			N.A.	18.7708	3 @ 10	2668.2
T15						L 3 x 3 x 3/16	19.7761		2954.8
T16			2L 4 x 4 x 1/4 (1/4)			L3x3x3/16	20.7813		3324.1
T17						L 3.5 x 3.5 x 1/4	21.7813	1 @ 9.99997	3542.7
							22.7813		26549.4



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Side Arm Mount [SO 304-1]	150	1900MHz RRH (65MHz)	121
WB2618	150	800MHz 2X50W RRH W/FILTER	121
ANT150F2	150	APXVSPP18-C-A20 w/ Mount Pipe	121
Sector Mount [SM 510-3]	148	Sector Mount [SM 505-3]	121
(2) LNX-6514DS-AIM w/ Mount Pipe	148	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	103
(2) LNX-6514DS-AIM w/ Mount Pipe	148	ERICSSON AIR 21 B4A B2P w/ Mount Pipe	103
(2) LNX-6514DS-AIM w/ Mount Pipe	148	KRY 112 144/1	103
(2) HBXX-6517DS-A2M w/ Mount Pipe	148	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	103
(2) HBXX-6517DS-A2M w/ Mount Pipe	148	ERICSSON AIR 21 B4A B2P w/ Mount Pipe	103
(2) HBXX-6517DS-A2M w/ Mount Pipe	148	KRY 112 144/1	103
RRH 2X40 700 MHz UPPER	148	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	103
RRH 2X40 700 MHz UPPER	148	ERICSSON AIR 21 B4A B2P w/ Mount Pipe	103
RRH 2X40 700 MHz UPPER	148	KRY 112 144/1	103
RRH2X60-AWS	148	LNX-6515DS-VTM w/ Mount Pipe	103
RRH2X60-AWS	148	RRUS 11 B12	103
RRH2X60-AWS	148	LNX-6515DS-VTM w/ Mount Pipe	103
RRH2X60-PCS	148	RRUS 11 B12	103
RRH2X60-PCS	148	LNX-6515DS-VTM w/ Mount Pipe	103
RRH2X60-PCS	148	RRUS 11 B12	103
(2) DB-T1-6Z-8AB-0Z	148	Sector Mount [SM 701-3]	103
Pipe Mount [PM 601-1]	143	WB2618	95
PL6-59W	143	10'x2" Pipe Mount	95 - 85
800 10504 w/ Mount Pipe	133	3'x2" Pipe Mount	95
800 10504 w/ Mount Pipe	133	Side Arm Mount [SO 302-1]	90
800 10504 w/ Mount Pipe	133	SRL-217 Ground Plane 10.67' x 4.83'	90
Sector Mount [SM 104-3]	133	ANT150D3	85
TA-2450	128	Side Arm Mount [SO 305-1]	85
Side Arm Mount [SO 305-1]	128	BW246Y	61
WB2618	126	KS24019-L112A	50
Side Arm Mount [SO 305-1]	126	Side Arm Mount [SO 305-1]	50
1900MHz RRH (65MHz)	121		
800MHz 2X50W RRH W/FILTER	121		
APXVSPP18-C-A20 w/ Mount Pipe	121		
1900MHz RRH (65MHz)	121		
800MHz 2X50W RRH W/FILTER	121		
APXV9ERR18-C-A20 w/ Mount Pipe	121		

SYMBOL LIST

MARK	SIZE	MARK	SIZE
A	L 1.5 x 1.5 x 3/16	D	2L 3 x 3 x 3/16 (1/4)
B	L 2 x 2 x 3/16	E	L2 1/2x2 1/2x3/16
C	2L 2.5 x 2.5 x 3/16 (3/16)		

MATERIAL STRENGTH

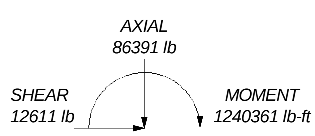
GRADE	Fy	Fu	GRADE	Fy	Fu
A572-50	50 ksi	65 ksi	A36	36 ksi	58 ksi

TOWER DESIGN NOTES

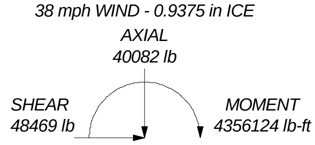
1. Tower is located in New London County, Connecticut.
2. Tower designed for a 91 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 38 mph basic wind with 0.94 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.
5. Grouted pipe f'c is 7 ksi
6. TOWER RATING: 89.5%

MAX. CORNER REACTIONS AT BASE:
DOWN: 234155 lb
SHEAR: 29727 lb

UPLIFT: -196157 lb
SHEAR: 25351 lb



TORQUE 14118 lb-ft
38 mph WIND - 0.9375 in ICE



TORQUE 77872 lb-ft
REACTIONS - 91 mph WIND

Paul J Ford and Company
250 E. Broad St Suite 600
Columbus, OH 43215
Phone: 614-221-6679
FAX: 614-448-4105

Job: **Modified 152-ft S/S Tower; East Lyme, CT**		
Project: **BU #806384 (PJF #37513-1269)**		
Client: Crown Castle	Drawn by: chedges	App'd:
Code: TIA/EIA-222-F	Date: 09/10/15	Scale: NTS
Path: T:\375_Crown_Castle\2015\37515-2682_806384_NLN 136 943459\37515-2682.001.8700_SA_1116382\37515-2682.001.eri		Dwg No. E-1

Foundation Loads:

Tower leg compression =	**234.16**	(kips)
Tower leg tension =	**196.16**	(kips)
Horizontal load at top of pier =	**0**	(kips)
Overturning moment at top of pier=	**0**	(ft-kips)

Design criteria:

Safety factor against overturning =	**1.5**	
Uplift safety factor: conc. weight =	**1.25**	
Uplift safety factor for soil weight =	**2**	

Soil Properties:

Soil density =	**125**	(pcf)
Allowable soil bearing =	**6**	(ksf)
Soil cone of uplift =	**31**	(degrees)
Uplift cone from top or bottom of ftg	**B**	("T" or "B")
Depth to water table =	**99**	(ft)

Dimensions:

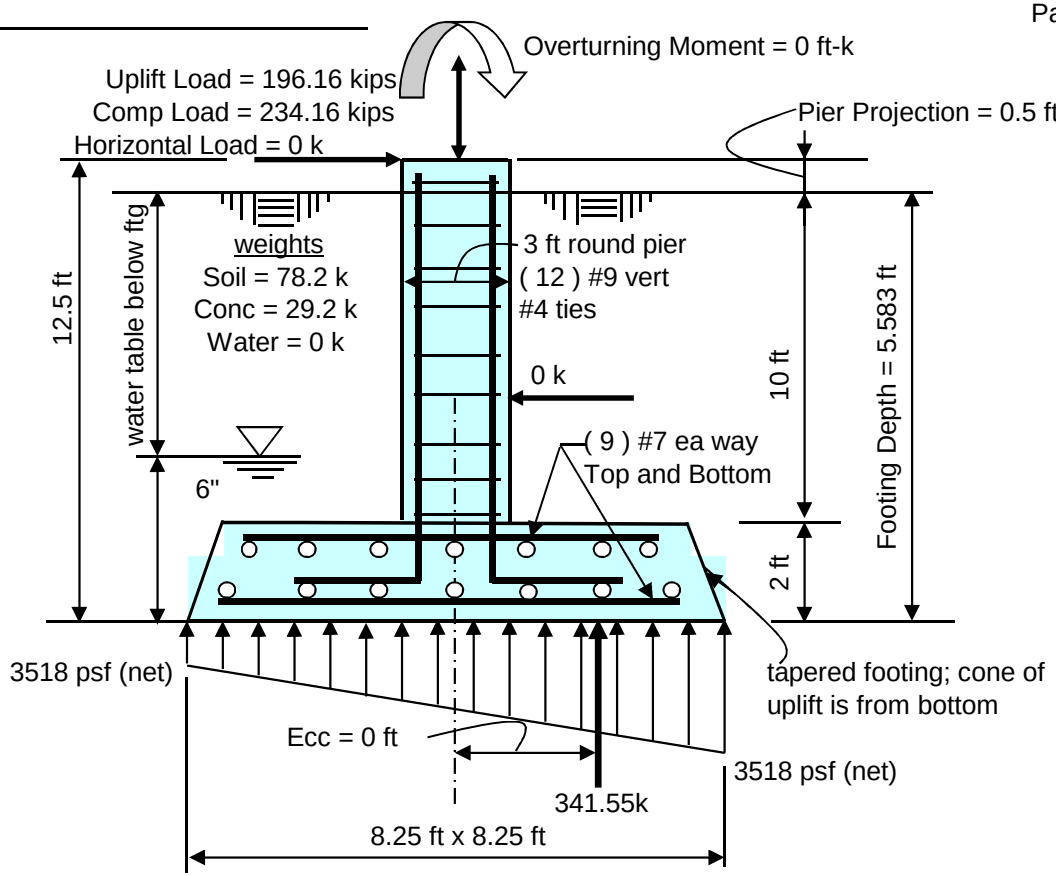
Pier shape (round or square)	**R**	("R" or "S")
Pier width =	**3**	(ft)
Pier height above grade =	**0.5**	(ft)
depth to bottom of footing =	**12**	(ft)
Footing thickness =	**2**	(ft)
Footing width =	**8.25**	(ft)
Footing length =	**8.25**	(ft)

Concrete:

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

Reinforcing Steel:

	Pad	
minimum cover over rebar =	**3**	inches
size of pad rebar =	**#7**	bar
quantity of pad rebar =	**9**	(ea direction)
	Pier	
size of vert rebar in pier=	**#9**	bar
vertical rebar quantity =	**12**	
size of pier ties =	**#4**	bar
minimum cover over rebar =	**3**	inches
Total volume of concrete =	7.2	cu yd each
(Total volume of concrete =	21.6	cu yd for 3)



Summary of analysis results	
Maximum Net Soil Bearing = 3.518 ksf Allowable Net Soil Bearing = 6 ksf **Soil Bearing Stress Ratio = 0.59 Okay**	Ult Punching Shear Capacity = 641 kips Ult Punching Shear Force = 117 kips **Punching Shear Stress Ratio = 0.18 OK**
Net Ftg Uplift Resistance = 213.8 kips Uplift Force = 196.157 kips Net Uplift Safety Factor = 2.02 **Ratio to Required Safety factor = 0.92 OK**	Ult Bending Shear Capacity = 110 psi Ult Bending Shear Stress = 41 psi **Bending Shear Stress Ratio = 0.37 Okay**
Ftg Overturning Resistance = 1409 ft-kips Overturning Moment = 0 ft-kips Required Overturning Safety Factor = 1.5 Overturning Safety Factor = 999 **Ratio = 0 Okay**	Pad Bending Moment Capacity= 463 ft-k Pad Bending Moment = 128 ft-k **Bending Moment Stress Ratio = 0.28 OK**
	Allow Tension in Pier Rebar = 41.54 ksi Calc Vert Rebar Tension = 16.35 ksi **Ratio = 0.394 Okay**

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

T-Mobile Existing Facility

Site ID: CT11037B

Niantic/ I-95/ Rt 156_1
93 Roxbury Road
East Lyme, CT 06357

September 16, 2015

EBI Project Number: 6215004794

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general public allowable limit:	8.90 %

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

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September 16, 2015

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

Emissions Analysis for Site: **CT11037B – Niantic/ I-95/ Rt 156_1**

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **93 Roxbury Road, East Lyme, CT**, for the purpose of determining whether the emissions from the Proposed T-Mobile Antenna Installation located on this property are within specified federal limits.

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

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

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

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

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

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were done for the proposed T-Mobile Wireless antenna facility located at **93 Roxbury Road, East Lyme, 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 / UMTS channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel

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

3) 2 LTE channels (AWS Band – 2100 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.

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

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

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

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

8) The antenna mounting height centerline of the proposed antennas is **103 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):	103	Height (AGL):	103	Height (AGL):	103
Frequency Bands	2100 MHz (AWS)	Frequency Bands	2100 MHz (AWS)	Frequency Bands	2100 MHz (AWS)
Channel Count	2	Channel Count	2	# PCS Channels:	2
Total TX Power:	120	Total TX Power:	120	# AWS Channels:	120
ERP (W):	4,668.54	ERP (W):	4,668.54	ERP (W):	4,668.54
Antenna A1 MPE%	1.78	Antenna B1 MPE%	1.78	Antenna C1 MPE%	1.78
Antenna #:	**2**	Antenna #:	**2**	Antenna #:	**2**
Make / Model:	Ericsson AIR21 B2A/B4P	Make / Model:	Ericsson AIR21 B2A/B4P	Make / Model:	Ericsson AIR21 B2A/B4P
Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	103	Height (AGL):	103	Height (AGL):	103
Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)
Channel Count	4	Channel Count	4	Channel Count	4
Total TX Power:	120	Total TX Power:	120	Total TX Power:	120
ERP (W):	4,668.54	ERP (W):	4,668.54	ERP (W):	4,668.54
Antenna A2 MPE%	1.78	Antenna B2 MPE%	1.78	Antenna C2 MPE%	1.78
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):	103	Height (AGL):	103	Height (AGL):	103
Frequency Bands	700 MHz	Frequency Bands	700 MHz	Frequency Bands	700 MHz
Channel Count	1	Channel Count	1	Channel Count	1
Total TX Power:	30	Total TX Power:	30	Total TX Power:	30
ERP (W):	865.21	ERP (W):	865.21	ERP (W):	865.21
Antenna A3 MPE%	0.71	Antenna B3 MPE%	0.71	Antenna C3 MPE%	0.71

Site Composite MPE%	
Carrier	**MPE%**
T-Mobile (Per Sector Max)	**4.28 %**
Verizon Wireless	2.85 %
MetroPCS	0.44 %
Sprint	1.00 %
Nextel	0.25 %
Town	0.08 %
Site Total MPE %:	**8.90 %**

T-Mobile Sector 1 Total:	4.28 %
T-Mobile Sector 2 Total:	4.28 %
T-Mobile Sector 3 Total:	4.28 %
Site Total:	8.90 %

T-Mobile _per sector	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ($\mu W/cm^2$)	Frequency (MHz)	Allowable MPE ($\mu W/cm^2$)	Calculated % MPE
T-Mobile 2100 MHz (AWS) LTE	**2**	**2334.27**	**103**	**17.84**	**2100**	**1000**	**1.78 %**
T-Mobile 700 MHz LTE	**1**	**865.21**	**103**	**3.31**	**700**	**467**	**0.71 %**
T-Mobile 1900 MHz (PCS) UMTS	**2**	**1167.14**	**103**	**8.92**	**1900**	**1000**	**0.89%**
T-Mobile 2100 MHz (AWS) UMTS	**2**	**1167.14**	**103**	**8.92**	**2100**	**1000**	**0.89 %**
						Total:	**4.28%**

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Summary

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

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

T-Mobile Sector	Power Density Value (%)
Sector 1:	4.28 %
Sector 2:	4.28 %
Sector 3 :	4.28 %
T-Mobile Per Sector Maximum:	4.28 %
Site Total:	8.90 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **8.90%** 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
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