Crown Castle
3 Corporate Park Drive, Suite 101
Clifton Park, NY 12065

December 23, 2015

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

RE: **Notice of Exempt Modification for T-Mobile / L700 Crown Site BU: 801367**
T-Mobile Site ID: CT11352C
1121 Summit Road, Cheshire, CT 06410
Latitude: 41° 32' 11.2"/ Longitude: -72° 57' 26.3"

Dear Ms. Bachman:

T-Mobile currently maintains three (3) antennas at the 138 foot level of the existing 167 foot monopole at 1121 Summit Road in Cheshire, CT. The tower is owned by Crown Castle and the property is owned by Thomas and Mary DiDomizio. T-Mobile now intends to replace three (3) antennas and install three (3) Bias T's new 700MHz antennas. These antennas would be installed at the 138 foot level of the tower.

Please be advised I did reach out to the Town of Cheshire and received the enclosed email from Mr. Voelker, AICP, Town Planner / Development Coordinator, that they do not have the original zoning resolution on file. I have enclosed an email from myself as the Tower Owner on behalf of Crown Castle. In response to my December 10, 2015 email I have enclosed an email from Cymon Holzschuh outlining the below:

Per the Council website, the Council approved the construction, maintenance and operation at a facility at 1119 Summit Road, Cheshire in Docket 199. This appears to be the facility in question.

This approval includes no conditions that restrict exempt modification filings. (There are no restrictions meriting special consideration regarding maximum appurtenance height, mounting configuration, coloration, et cetera. The Decision and Order for Docket 199 only lists conditions regarding facility construction and the standard requirements of facility operation.)

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies § 16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.S.C.A. § 16-50j-73, a copy of this letter is being sent to The Honorable Rob Oris, Jr., Chairman for the Town of Cheshire and Thomas and Mary DiDomizio as the property owners.

1. The proposed modifications will not result in an increase in the height of the existing tower.

2. The proposed modifications will not require the extension of the site boundary.

3. The proposed modification will not increase noise levels at the facility by six decibels or more, or to levels that exceed state and local criteria.

4. The operation of the replacement antennas will not increase radio frequency emissions at the facility to a level at or above the Federal Communication Commission safety standard.

5. The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site.

For the foregoing reasons, T-Mobile respectfully submits that 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
Crown Castle
1200 MacArthur Boulevard, Suite 200
Mahwah, New Jersey 07430
201-236-9069
kimberly.myl@crowncastle.com

Attachments:

Tab 1: Exhibit-1: Compound plan and elevation depicting the planned changes

Tab 2: Exhibit-2: Structural Modification Report
Tab 3: Exhibit-3: General Power Density Table Report (RF Emissions Analysis Report)

cc: The Honorable Rob Oris, Jr., Chairman, Town of Cheshire
Town of Cheshire
Town Hall
84 South Main Street
Cheshire, CT 06410

Thomas & Mary DiDomizio
1119 Summit Road
Cheshire, CT 06410

From:	Holzschuh, Cymon
To:	Myl, Kimberly
Cc:	Cunliffe, Fred; Bachman, Melanie; Mathews, Lisa A
Subject:	RE: Existing Telecommunication Tower located at 1121 Summit Road (Crown Castle 801367 / TMO CT11352C) - CSC Requirement
Date:	Friday, December 11, 2015 9:55:10 AM
Attachments:	image003.png

Hello,

Be advised that, per the Council website, the Council approved the construction, maintenance and operation at a facility at 1119 Summit Road, Cheshire in Docket 199. This appears to be the facility in question.

This approval includes no conditions that restrict exempt modification filings. (There are no restrictions meriting special consideration regarding maximum appurtenance height, mounting configuration, coloration, et cetera. The Decision and Order for Docket 199 only lists conditions regarding facility construction and the standard requirements of facility operation.)

No change to your current filing is required at this time – this information is simply being provided for future filings regarding this facility.

Thanks,

Cymon Holzschuh
Siting Analyst
Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051
P: 860.827.2941 | F: 860.827.2950

www.ct.gov/deep

Conserving, improving and protecting our natural resources and environment;
Ensuring a clean, affordable, reliable, and sustainable energy supply.

From: Myl, Kimberly [mailto:Kimberly.Myl@crowncastle.com]
Sent: Thursday, December 10, 2015 3:33 PM
To: CSC-DL Siting Council
Subject: Existing Telecommunication Tower located at 1121 Summit Road (Crown Castle 801367 / TMO CT11352C) - CSC Requirement

To Whom It May Concern:

Please be advised both the township (email below) and Crown Castle as the tower owner, do not have the original zoning resolution on file. Please use this email as notification to waive this requirement as we will include this and the email from the township within our submission.

Please let me know if you have any questions or need additional information. Thank you in advance.

KIMBERLY MYL
Real Estate Specialist
T: (201) 236-9069 | M: (201) 993-3697

CROWN CASTLE
1200 MacArthur Blvd, Suite 200
Mahwah, NJ 07430

From: Voelker, William [mailto:wvoelker@cheshirect.org]
Sent: Thursday, December 10, 2015 3:15 PM
To: Myl, Kimberly
Subject: RE: Existing Telecommunication Tower located at 1121 Summit Road (Crown Castle 801367 / TMO CT11352C)

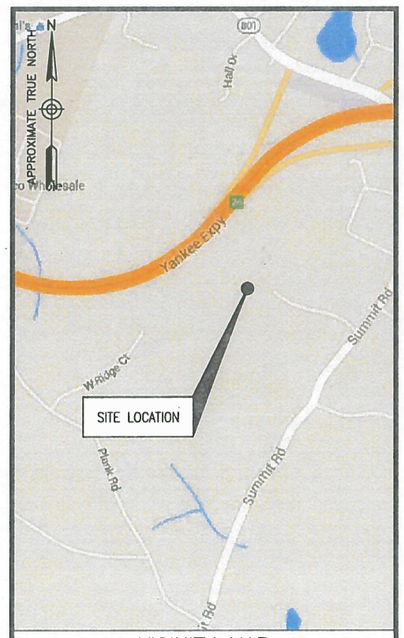
Hi, Kimberly. We have no zoning resolution regarding this tower. It appears that it was approved by the Siting Council and not subject to local review. This tower was approved and constructed before my tenure began here in 2005. Hope that does it for you. Good luck with this.

Bill Voelker

William S. Voelker, AICP
Town Planner/Development Coordinator
Town of Cheshire
203 271-6670

T-MOBILE NORTHEAST LLC

T-MOBILE SITE #: CT11352C
CROWN CASTLE BU #: 801367
SITE NAME: CT NHV-2075 CAC
1121 SUMMIT ROAD
CHESHIRE, CT 06410
NEW HAVEN COUNTY



VICINITY MAP

FROM BLOOMFIELD, CT:

HEAD NORTHEAST ON GRIFFIN RD S TOWARD W NEWBERRY RD. TURN RIGHT ONTO W NEWBERRY RD. TURN RIGHT ONTO WOODLAND AVE. TURN RIGHT ONTO WINTONBURY AVE. TURN LEFT ONTO CT-189 S. TURN RIGHT ONTO CT-218 W. TURN LEFT ONTO TUMBLEBROOK LN. TURN RIGHT ONTO KING PHILIP DR. CONTINUE ONTO TROUT BROOK DR. TURN RIGHT ONTO PARK RD. TURN LEFT ONTO THE RAMP TO WATERBURY. MERGE ONTO I-84. TAKE EXIT 26 FOR CT-70 TOWARD CHESHIRE/PROSPECT. TURN LEFT ONTO CT-70 E/STATE HWY 801. TURN RIGHT ONTO SUMMIT RD. SITE WILL BE ON THE RIGHT.

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, NJ 12065

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

CONSULTANT TEAM

SITE NAME:
CT NHV-2075 CAC

SITE NUMBER:
CT11352C

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

APPLICANT/DEVELOPER:
T-MOBILE NORTHEAST LLC
35 GRIFFIN RD SOUTH
BLOOMFIELD, CT 06002

COORDINATES:
LATITUDE: 41°-32'-11.2" N (NAD83)
LONGITUDE: 72°-57'-26.3" W (NAD83)
(PER CROWN CASTLE)

CONFIGURATION
704Bu

PROJECT SUMMARY

SITE ADDRESS:
1121 SUMMIT ROAD
CHESHIRE, CT 06410
NEW HAVEN COUNTY

PROJECT DIRECTORY

- REMOVE AND REPLACE (3) EXISTING ANTENNAS WITH (3) NEW ANTENNAS.
- INSTALL (3) NEW BIAS TEE'S.
- INSTALL (3) NEW RRU'S ON A UNISTRUT RACK INSIDE EXISTING EQUIPMENT SHELTER AT GRADE.
- REMOVE EXISTING METROPCS ANTENNAS, MOUNTS & COAX AT A CENTERLINE ELEVATION OF 120'-0"± A.G.L.
- REMOVE EXISTING ABANDONED MOUNTS AND PIPE MASTS AT A CENTERLINE ELEVATION OF 128'-0"± A.G.L.

SCOPE OF WORK

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

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

SHEET INDEX

T-MOBILE NORTHEAST LLC
35 GRIFFIN RD SOUTH
BLOOMFIELD, CT 06002

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

CT11352C
CT NHV-2075 CAC

CONSTRUCTION DRAWINGS

1	11/23/15	ISSUED AS FINAL
0	11/18/15	ISSUED AS FINAL

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

STATE OF CONNECTICUT
JIANG YU
No. 23222
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:	50078104
SITE ADDRESS:	

1121 SUMMIT ROAD
CHESHIRE, CT 06410
NEW HAVEN 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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CT11352C
CT NHV-2075 CAC

CONSTRUCTION DRAWINGS

1	11/23/15	ISSUED AS FINAL
0	11/18/15	ISSUED AS FINAL

Dewberry®

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STATE OF CONNECTICUT · JIANG YU · No. 23222 · 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:	50078104
SITE ADDRESS:	

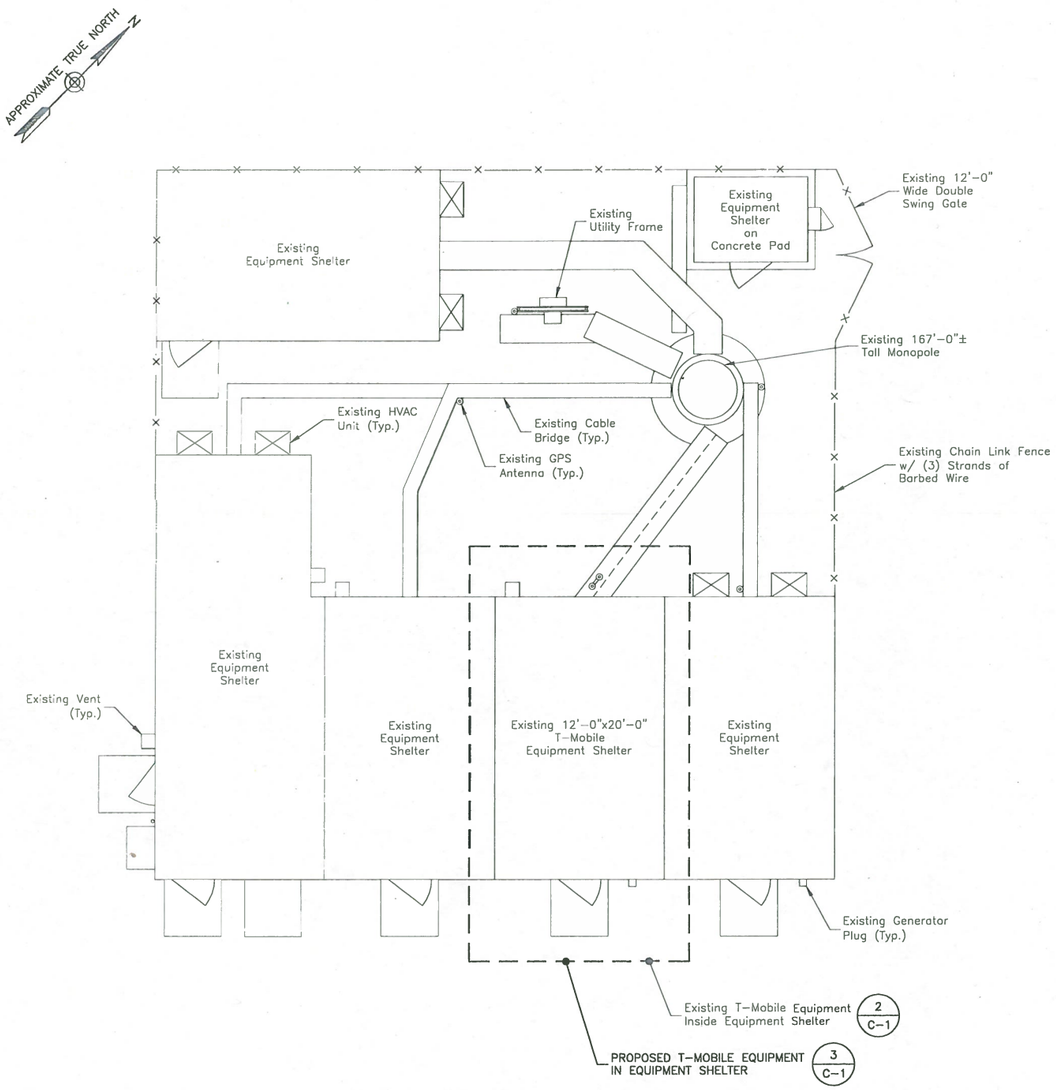
1121 SUMMIT ROAD
CHESHIRE, CT 06410
NEW HAVEN COUNTY

SHEET TITLE

GENERAL NOTES

SHEET NUMBER

G–1



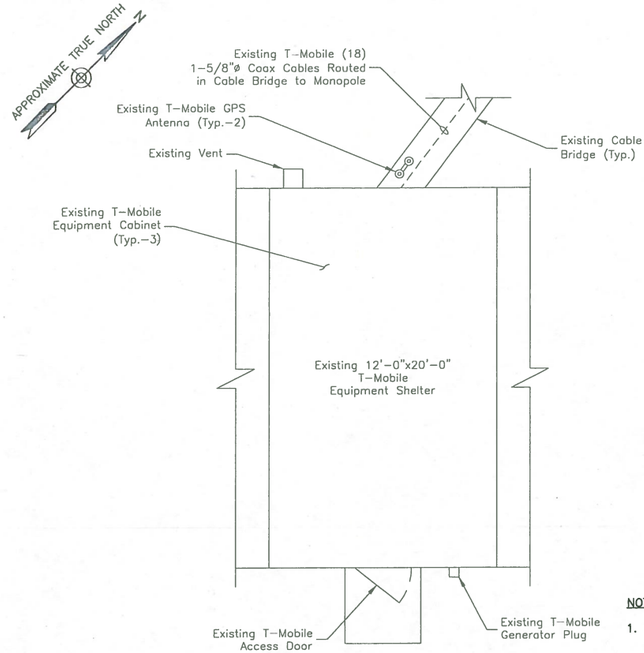
COMPOUND PLAN 1

SCALE: 3/32"=1' FOR 11"x17"
3/16"=1' FOR 22"x34"

0' 4' 8' 12'

NOTES:

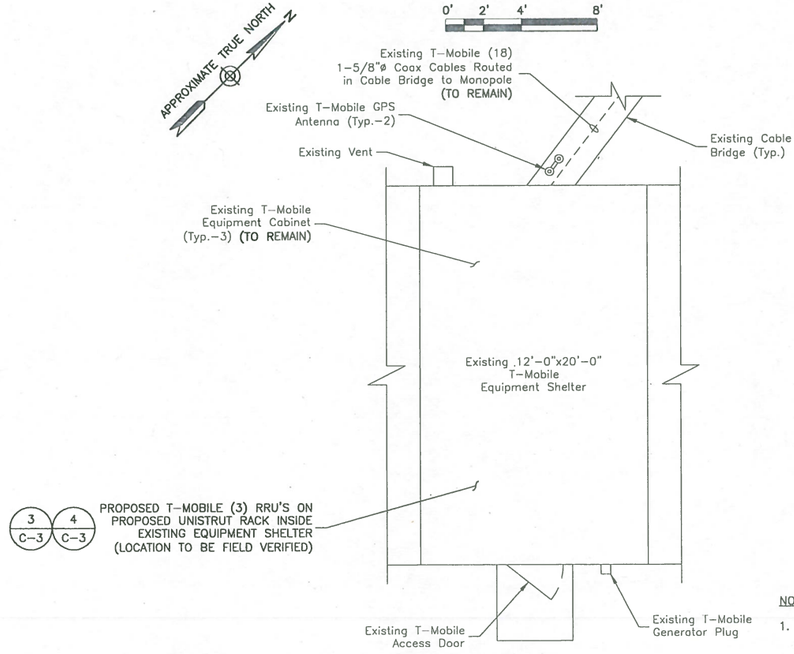
1. NORTH ARROW SHOWN AS APPROXIMATE.
2. NOT ALL INFORMATION IS SHOWN FOR CLARITY.
3. ALL PROPOSED EQUIPMENT, INCLUDING ANTENNAS, BIAS TEE'S, COAX, ETC., SHALL BE MOUNTED IN ACCORDANCE WITH THE TOWER STRUCTURAL ANALYSIS BY PAUL J. FORD AND COMPANY DATED NOVEMBER 4, 2015.



EXISTING EQUIPMENT PLAN 2

SCALE: 1/8"=1' FOR 11"x17"
1/4"=1' FOR 22"x34"

0' 2' 4' 8'



PROPOSED EQUIPMENT PLAN 3

SCALE: 1/8"=1' FOR 11"x17"
1/4"=1' FOR 22"x34"

0' 2' 4' 8'

NOTE:

1. NO ACCESS WAS AVAILABLE TO EXISTING T-MOBILE SHELTER AT TIME OF SITE VISIT.

NOTES:

1. NO ACCESS WAS AVAILABLE TO EXISTING T-MOBILE SHELTER AT TIME OF SITE VISIT.
2. PROPOSED EQUIPMENT TO BE FIELD LOCATED BY T-MOBILE CONSTRUCTION MANAGER.

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CT11352C
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STATE OF CONNECTICUT
JIANG YU
No 23222
LICENSED PROFESSIONAL ENGINEER

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

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DRAWN BY:	RA
REVIEWED BY:	BSH
CHECKED BY:	GHN
PROJECT NUMBER:	50066258
JOB NUMBER:	50078104
SITE ADDRESS:	

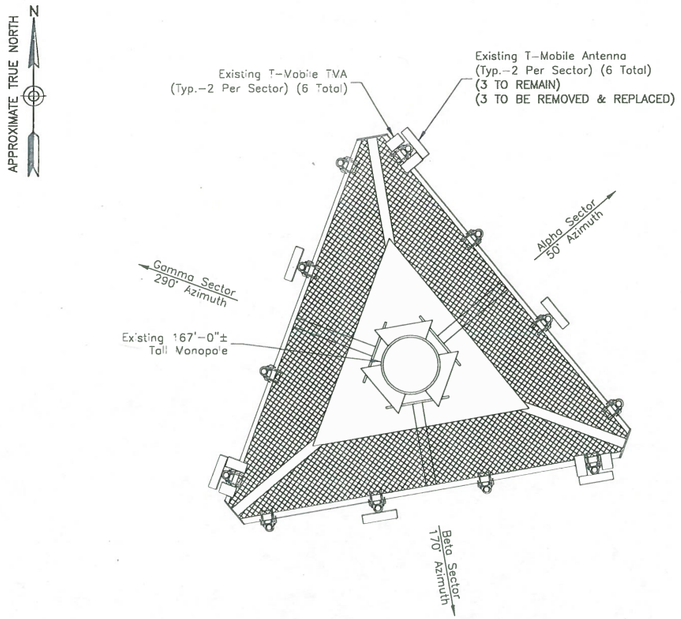
1121 SUMMIT ROAD
CHESHIRE, CT 06410
NEW HAVEN COUNTY

SHEET TITLE

COMPOUND PLAN & EQUIPMENT PLANS

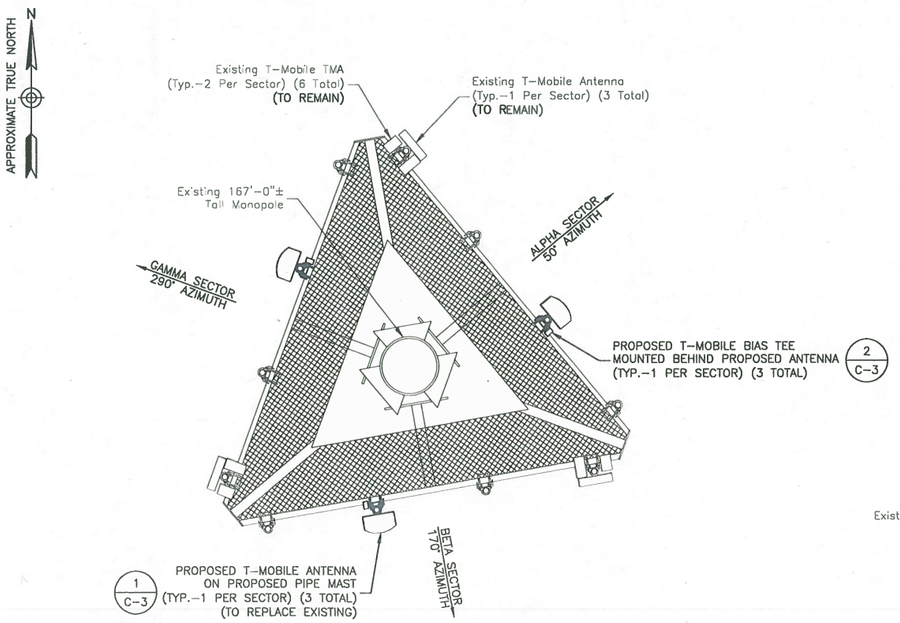
SHEET NUMBER

C-1



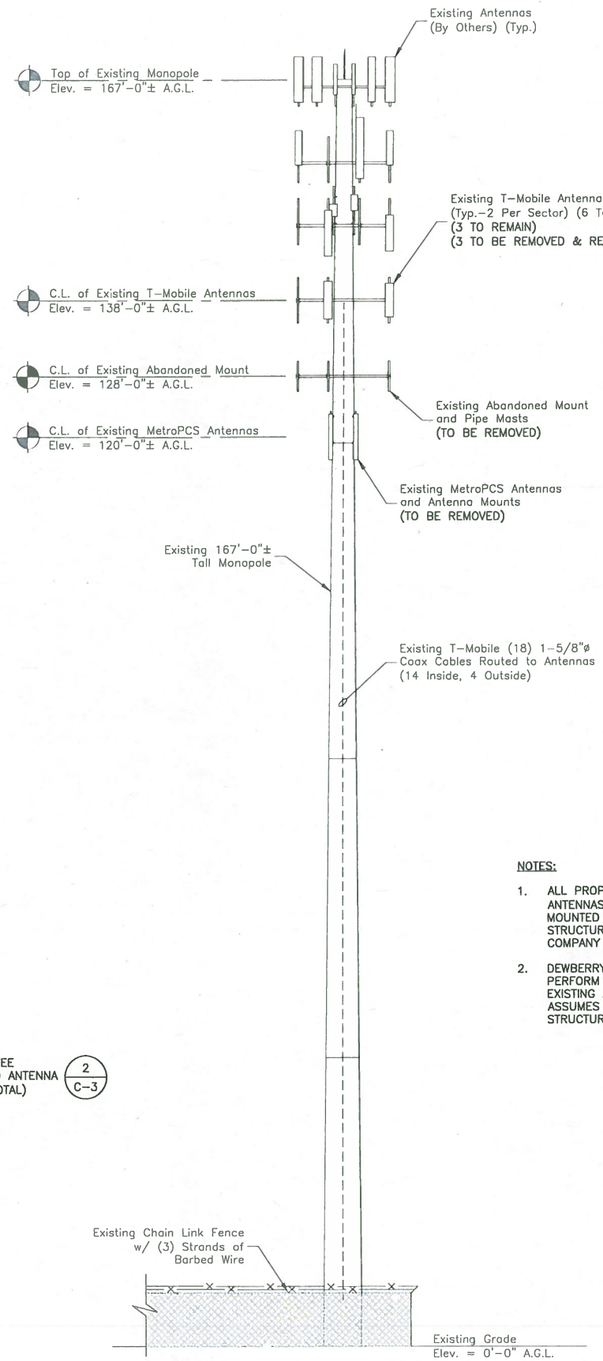
EXISTING ANTENNA LAYOUT (1)

SCALE: N.T.S.



PROPOSED ANTENNA LAYOUT (2)

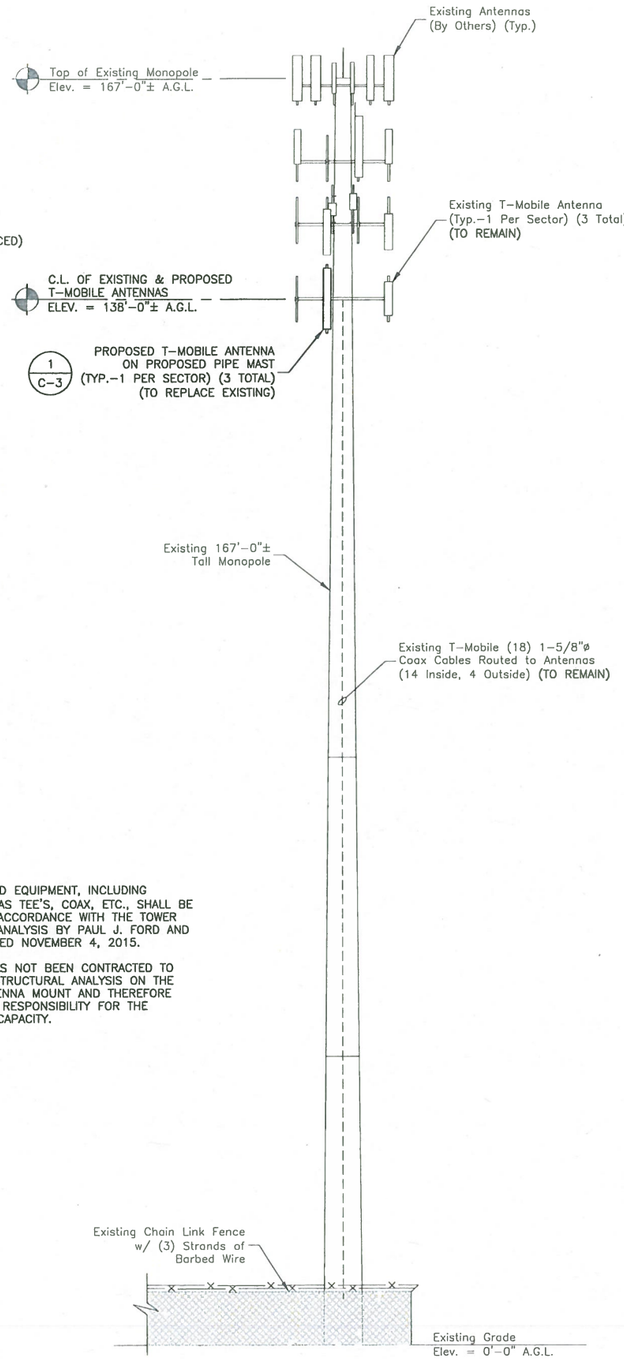
SCALE: N.T.S.



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 TEE'S, COAX, ETC., SHALL BE MOUNTED IN ACCORDANCE WITH THE TOWER STRUCTURAL ANALYSIS BY PAUL J. FORD AND COMPANY DATED NOVEMBER 4, 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.

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CONSTRUCTION DRAWINGS

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STATE OF CONNECTICUT
JIANG YU
No. 23222
PROFESSIONAL ENGINEER
LICENSED

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

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REVIEWED BY:	BSH
CHECKED BY:	GHN
PROJECT NUMBER:	50066258
JOB NUMBER:	50078104
SITE ADDRESS:	

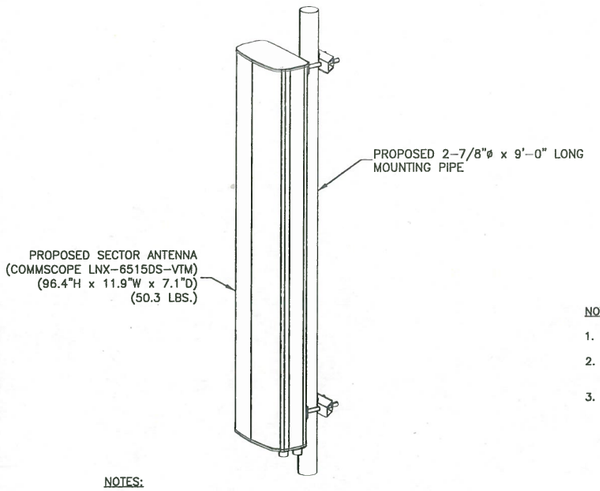
1121 SUMMIT ROAD
CHESHIRE, CT 06410
NEW HAVEN COUNTY

SHEET TITLE

ANTENNA LAYOUTS & ELEVATIONS

SHEET NUMBER

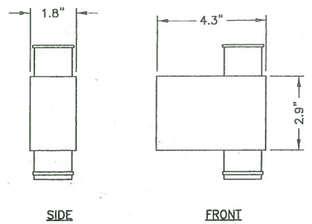
C-2



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.

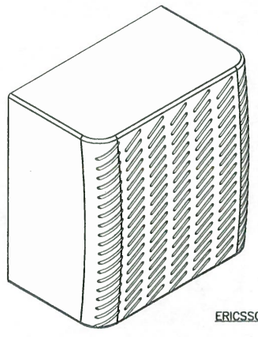


COMMSCOPE ATBT-BOTTOM-24V

NOTES:

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

BIAS TEE DETAIL 2
SCALE: N.T.S.



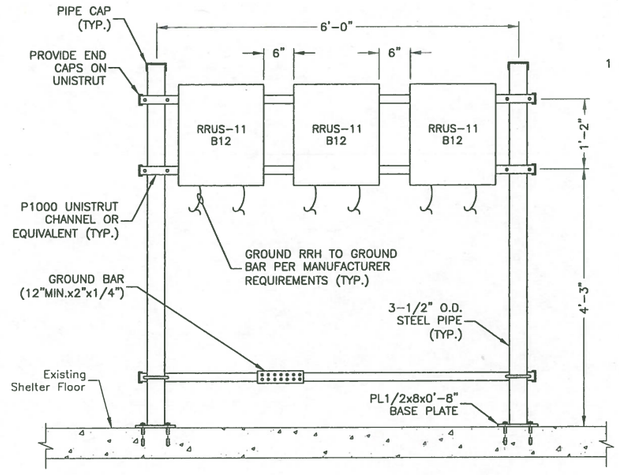
SPECIFICATIONS:	
HEIGHT:	20.0"
WIDTH:	17.0"
DEPTH:	7.0"
WEIGHT:	50.7 LBS

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.

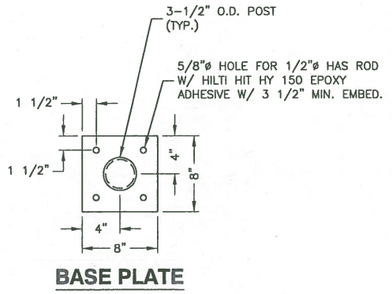
RRUS-11 - REMOTE RADIO UNIT 3
SCALE: N.T.S.



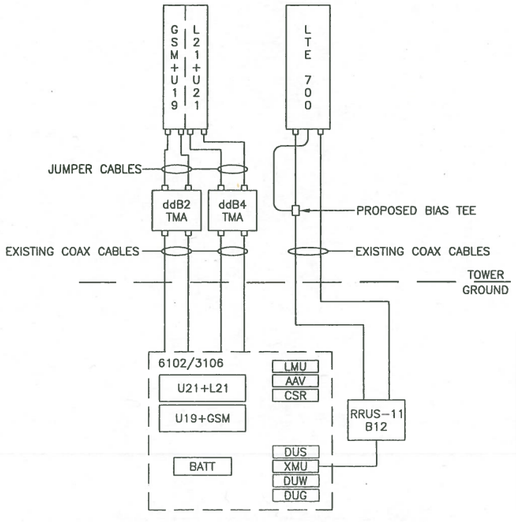
NOTES:

1. CONTRACTOR SHALL SUPPLY AND INSTALL UNISTRUT (OR EQUIVALENT) MOUNTING CHANNELS.
2. CONTRACTOR SHALL SUPPLY (BUT NOT INSTALL) 3/8"ø UNISTRUT BOLTING HARDWARE AND SPRING NUTS. TYPICAL FOUR PER RRU. CONTRACTOR SHALL BAG THE BOLTING HARDWARE AND HANG FROM INSTALLED UNISTRUT FRAME.
3. SPACING MAY VARY BASED ON SELECTED EQUIPMENT. ADJUSTMENTS TO SPACING WILL BE MADE BY RRU INSTALLER.
4. NO PAINTING OF THE RRU OR SOLAR SHIELD IS ALLOWED.

RRU RACK DETAIL 4
SCALE: N.T.S



BASE PLATE



SITE CONFIGURATION 704Bu 5
SCALE: N.T.S.

DESIGN CONFIGURATION

	ANTENNAS				COAX		COAX LENGTH	RRU (AT GRADE)		TMA	BIAS TEE
	EXISTING	PROPOSED	AZIMUTH	C.L.	EXISTING	PROPOSED		EXISTING	PROPOSED	EXISTING	PROPOSED
ALPHA	RFS APX16PV-16PVL-E	EXISTING TO REMAIN	50°	138'-0"	(6) 1-5/8"ø	–	160'-0"	–	–	(2) KRY 112 TMA'S	–
	RFS APX16DWV-16DWV-S-E	COMMSCOPE LNX-6515DS-VTM	50°	138'-0"				–	RRUS-11 B12	–	(1) ATBT-BOTTOM-24V
BETA	RFS APX16PV-16PVL-E	EXISTING TO REMAIN	170°	138'-0"	(6) 1-5/8"ø	–	160'-0"	–	–	(2) KRY 112 TMA'S	–
	RFS APX16DWV-16DWV-S-E	COMMSCOPE LNX-6515DS-VTM	170°	138'-0"				–	RRUS-11 B12	–	(1) ATBT-BOTTOM-24V
GAMMA	RFS APX16PV-16PVL-E	EXISTING TO REMAIN	290°	138'-0"	(6) 1-5/8"ø	–	160'-0"	–	–	(2) KRY 112 TMA'S	–
	RFS APX16DWV-16DWV-S-E	COMMSCOPE LNX-6515DS-VTM	290°	138'-0"				–	RRUS-11 B12	–	(1) ATBT-BOTTOM-24V

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CONSTRUCTION DRAWINGS

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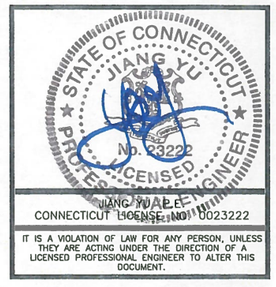

JIANG YU, P.E.
CONNECTICUT LICENSE NO. 0023222

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PROJECT NUMBER:	50066258
JOB NUMBER:	50078104
SITE ADDRESS:	

1121 SUMMIT ROAD
CHESHIRE, CT 06410
NEW HAVEN COUNTY

SHEET TITLE

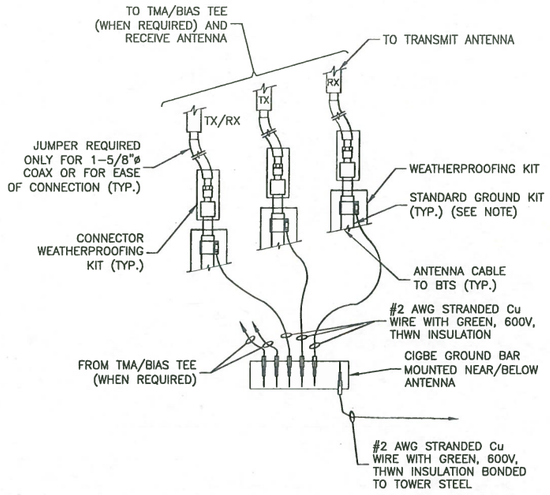
CONSTRUCTION DETAILS

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.

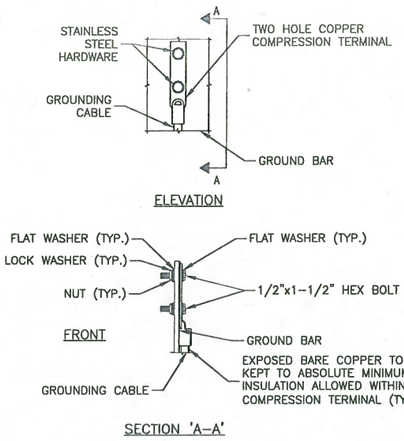


NOTE:

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.

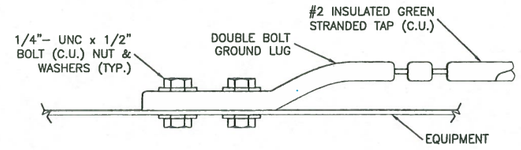


NOTES:

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

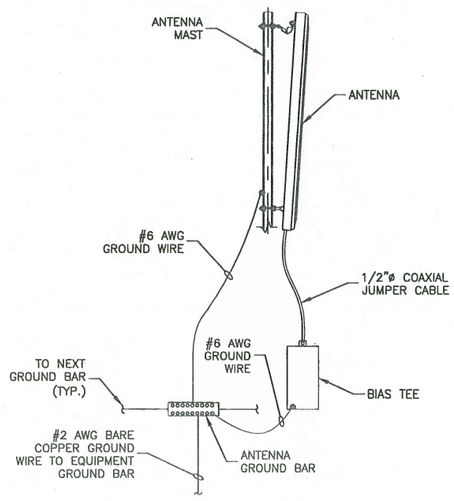
TYPICAL GROUND BAR MECHANICAL CONNECTION DETAIL 2

SCALE: N.T.S.



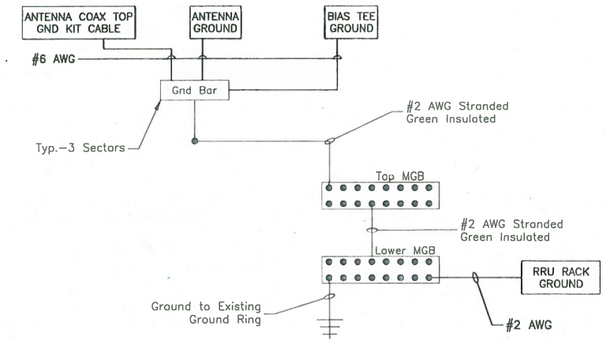
CONNECTION TO EQUIPMENT DETAIL 3

SCALE: N.T.S.



TYPICAL ANTENNA GROUNDING DETAIL 4

SCALE: N.T.S



NOTES:

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

SCHEMATIC GROUNDING DIAGRAM 5

SCALE: N.T.S.

T-MOBILE NORTHEAST LLC
35 GRIFFIN RD SOUTH
BLOOMFIELD, CT 06002

CROWN CASTLE

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

CT11352C
CT NHV-2075 CAC

CONSTRUCTION DRAWINGS		
1	11/23/15	ISSUED AS FINAL
0	11/18/15	ISSUED AS FINAL

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

STATE OF CONNECTICUT JIANG YU No. 23222 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:	50078104
SITE ADDRESS:	

1121 SUMMIT ROAD
CHESHIRE, CT 06410
NEW HAVEN COUNTY

SHEET TITLE

GROUNDING NOTES & DETAILS

SHEET NUMBER

E-1

PJF PAUL J. FORD & COMPANY

Date: **November 04, 2015**

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

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

Subject: **Structural Analysis Report**

Carrier Designation:	***T-Mobile* Co-Locate**	
	Carrier Site Number:	CT11352C
	Carrier Site Name:	Crowne Cheshire
Crown Castle Designation:	**Crown Castle BU Number:**	801367
	Crown Castle Site Name:	CT NHV-2075 CAC 801367
	Crown Castle JDE Job Number:	347083
	Crown Castle Work Order Number:	1143564
	Crown Castle Application Number:	310454 Rev. 1
Engineering Firm Designation:	**Paul J Ford and Company Project Number:**	37515-3126.001.7805
Site Data:	**1121 Summit Road, Cheshire, New Haven County, CT** **Latitude *41° 32' 11.2"*, Longitude *-72° 57' 26.3"*** **167 Foot - Monopole Tower**	

Dear Timothy Howell,

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 841215, in accordance with application 310454, revision 1.

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

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

The structural analysis was performed for this tower in accordance with the requirements of the 2005 Connecticut Building Code and the TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 85 mph with no ice, 37.6 mph with 0.75 inch ice thickness and 50 mph under service loads.

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

Respectfully submitted by:

John J. Woolley, E.I.
Structural Designer

STATE OF CONNECTICUT
JUSTIN T. KLINE
No. 30301
LICENSED
PROFESSIONAL ENGINEER

11.5.15

Date: **November 04, 2015**

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

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

Carrier Designation:	***T-Mobile* Co-Locate**	
	Carrier Site Number:	CT11352C
	Carrier Site Name:	Crowne Cheshire
Crown Castle Designation:	**Crown Castle BU Number:**	801367
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John J. Woolley, E.I.
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TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 167 ft Monopole tower designed by SUMMIT in June of 2001. The tower was originally designed for a wind speed of 85 mph per TIA/EIA-222-F.

2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of the 2005 Connecticut Building Code and the TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 85 mph with no ice, 37.6 mph with 0.75 inch ice thickness and 50 mph under service loads.

Table 1 - Proposed Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
138.0	138.0	3	commscope	ATBT-BOTTOM-24V	-	-	-
		3	commscope	LNX-6515DS-VTM w/ Mount Pipe			

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
167.0	171.0	1	gps	GPS_A	1 19	12 1-5/8	1
	168.0	3	alcatel lucent	RRH2X40-AWS			
		3	antel	BXA-171063-8CF-EDIN-X w/ Mount Pipe			
		3	antel	BXA-70063-6CF-EDIN-2 w/ Mount Pipe			
		3	antel	BXA-171063-8BF-2 w/ Mount Pipe			
		6	antel	LPA-80063-6CF-EDIN w/ Mount Pipe			
		1	rfs celwave	DB-T1-6Z-8AB-0Z			
	167.0	1	tower mounts	Platform Mount [LP 1201-1]			
158.0	160.0	3	andrew	SBNH-1D6565C w/ Mount Pipe	2 1 12	3/4 3/8 1-5/8	1
		6	powerwave technologies	7770.00 w/ Mount Pipe			
		6	powerwave technologies	LGP13519			
		3	ericsson	RRUS-11			
		6	powerwave technologies	LGP21401			
		1	raycap	DC6-48-60-18-8F			
	158.0	1	tower mounts	Platform Mount [LP 1201-1]			

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	151.0	3	alcatel lucent	PCS 1900MHz 4x45W-65MHz w/Mount Pipe	-	-	1
	150.0	3	alcatel lucent	TME-800MHz RRH w/ mount pipe			
		2	tower mounts	Pipe Mount [PM 601-3]			
148.0	148.0	1	tower mounts	Platform Mount [LP 1201-1]	3 1	1/2 5/8	1
	147.0	3	alcatel lucent	800 EXTERNAL NOTCH FILTER			
		3	alcatel lucent	TD-RRH8x20-25			
		9	rfs celwave	ACU-A20-N			
		3	rfs celwave	APXVSPP18-C-A20 w/ Mount Pipe			
		3	rfs celwave	APXVTM14-C-120 w/ Mount Pipe			
138.0	139.0	1	remec	S20057A-1	-	-	3
		3	rfs celwave	APX16DWV-16DWV-S-E-A20 w/ Mount Pipe			
		3	ericsson	KRY 112 134/1	18	1-5/8	1
		3	ericsson	KRY 112 89/5			
		3	rfs celwave	APX16PV-16PVL-E w/ Mount Pipe			
	138.0	1	tower mounts	Platform Mount [LP 1201-1]			
128.0	128.0	1	tower mounts	Platform Mount [LP 1201-1]	-	-	3
120.0	120.0	1	tower mounts	Pipe Mount [PM 601-3]	6	1-5/8	3
	119.0	3	rfs celwave	APXV18-206517S-C w/ Mount Pipe			

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

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
Original Tower Drawings	Summit, Job #: 14620, dated 6/12/2001	799210	CCISITES
Foundation Drawings	PJF Job #: 29201-0692, dated 6/6/2001	842573	CCISITES
Geotechnical Report	CHA Project #: 8961.07.08, dated 5/15/2001	445076	CCISITES
4-POST-MODIFICATION INSPECTION	TEP, 127148, 11/20/2012	3379750	CCISITES
4-POST-MODIFICATION INSPECTION	TEP, 131001.801367, 5/20/13	3847627	CCISITES

3.1) Analysis Method

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

3.2) Assumptions

1) Tower and structures were built in accordance with the manufacturer's specifications.
2) The tower and structures have been maintained in accordance with the manufacturer's specification.
3) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
4) Monopole has been reinforced in conformance with the referenced modification drawings.
5) This analysis provides an analysis of both foundation options since it is not clear which was installed.

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

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	167 - 118.25	Pole	TP35.36x24x0.25	1	-15.28	1405.09	84.5	Pass
L2	118.25 - 90.5	Pole	TP41.3282x33.8114x0.3125	2	-22.05	2114.96	97.3	Pass
L3	90.5 - 77.75	Pole	TP44.3x41.3282x0.3819	3	-23.84	2347.81	95.0	Pass
L4	77.75 - 63.5	Pole	TP46.9913x42.2543x0.375	4	-29.82	2884.51	93.2	Pass
L5	63.5 - 51.5	Pole	TP49.7851x46.9913x0.4599	5	-33.57	3276.31	89.6	Pass
L6	51.5 - 45	Pole	TP51.2985x49.7851x0.4572	6	-35.66	3358.00	91.1	Pass
L7	45 - 0	Pole	TP61.04x51.2985x0.4375	7	-51.01	4374.92	88.5	Pass
							Summary	
						Pole (L2)	97.3	Pass
						RATING =	**97.3**	**Pass**

Table 5 - Tower Component Stresses vs. Capacity

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	84.9	Pass
1	Base Plate	0	72.9	Pass
1, 2	Base Foundation Structural Steel (Caisson)	0	91.1	Pass
1, 2	Base Foundation Soil Interaction (Caisson)	0	82.4	Pass
1	Base Foundation Structural Steel (Spread Footing)	0	58.9	Pass
1	Base Foundation Soil Interaction (Spread Footing)	0	82.0	Pass

Structure Rating (max from all components) =	**97.3%**

Notes:

1) See additional documentation in “Appendix C – Additional Calculations” for calculations supporting the % capacity consumed.
2) Foundation Analysis Notes: According to the procedures prescribed and agreed to by the Crown Castle Engineering Foundation Committee, held in January 2010, the existing caisson foundation was analyzed using the methodology in the software ‘PLS-Caisson’ (Version 8.10, or newer, by Power Line Systems, Inc.). Per the methods in PLS-Caisson, the soil reactions of cohesive soils are calculated using 8CD independent of the depth of the soil layer. The depth of soil to be ignored at the top of the caisson is the greater of the geotechnical report’s recommendation, the frost depth of the site or half of the caisson diameter.

APPENDIX A

TNXTOWER OUTPUT

Tower Input Data

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

Tower is located in New Haven County, Connecticut.
Basic wind speed of 85.00 mph.
Nominal ice thickness of 0.7500 in.
Ice thickness is considered to increase with height.
Ice density of 56.00 pcf.
A wind speed of 37.60 mph is used in combination with ice.
Temperature drop of 50.00 °F.
Deflections calculated using a wind speed of 50.00 mph.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.333.
Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

	Consider Moments - Legs		Distribute Leg Loads As Uniform		Treat Feedline Bundles As Cylinder
	Consider Moments - Horizontals		Assume Legs Pinned		Use ASCE 10 X-Brace Ly Rules
	Consider Moments - Diagonals	√	Assume Rigid Index Plate		Calculate Redundant Bracing Forces
	Use Moment Magnification	√	Use Clear Spans For Wind Area		Ignore Redundant Members in FEA
√	Use Code Stress Ratios		Use Clear Spans For KL/r		SR Leg Bolts Resist Compression
√	Use Code Safety Factors - Guys		Retension Guys To Initial Tension		All Leg Panels Have Same Allowable
√	Escalate Ice	√	Bypass Mast Stability Checks		Offset Girt At Foundation
	Always Use Max Kz	√	Use Azimuth Dish Coefficients	√	Consider Feedline Torque
	Use Special Wind Profile	√	Project Wind Area of Appurt.		Include Angle Block Shear Check
	Include Bolts In Member Capacity		Autocalc Torque Arm Areas		Poles
	Leg Bolts Are At Top Of Section		SR Members Have Cut Ends	√	Include Shear-Torsion Interaction
	Secondary Horizontal Braces Leg		Sort Capacity Reports By Component		Always Use Sub-Critical Flow
	Use Diamond Inner Bracing (4 Sided)		Triangulate Diamond Inner Bracing		Use Top Mounted Sockets
	Add IBC .6D+W Combination		Use TIA-222-G Tension Splice Capacity Exemption		

Tapered Pole Section Geometry

Section	*Elevation*	*Section Length*	*Splice Length*	*Number of Sides*	*Top Diameter*	*Bottom Diameter*	*Wall Thickness*	*Bend Radius*	*Pole Grade*
	ft	*ft*	*ft*		*in*	*in*	*in*	*in*	
L1	167.0000-118.2500	48.7500	4.50	18	24.0000	35.3600	0.2500	1.0000	A607-65 (65 ksi)
L2	118.2500-90.5000	32.2500	0.00	18	33.8114	41.3282	0.3125	1.2500	A607-65 (65 ksi)
L3	90.5000-77.7500	12.7500	5.50	18	41.3282	44.3000	0.3819	1.5276	Reinf 56.80 ksi (57 ksi)
L4	77.7500-63.5000	19.7500	0.00	18	42.2542	46.9913	0.3750	1.5000	A607-65 (65 ksi)
L5	63.5000-51.5000	12.0000	0.00	18	46.9913	49.7851	0.4599	1.8397	Reinf 56.89 ksi (57 ksi)
L6	51.5000-45.0000	6.5000	0.00	18	49.7851	51.2985	0.4572	1.8287	Reinf 56.91 ksi (57 ksi)

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L7	45.0000-0.0000	45.0000		18	51.2985	61.0400	0.4375	1.7500	A607-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	24.3702	18.8456	1342.9976	8.4313	12.1920	110.1540	2687.7623	9.4246	3.7840	15.136
	35.9055	27.8598	4338.8723	12.4641	17.9629	241.5466	8683.4538	13.9325	5.7834	23.133
L2	35.3980	33.2267	4710.6979	11.8921	17.1762	274.2576	9427.5943	16.6165	5.4008	17.283
	41.9658	40.6825	8646.6072	14.5606	20.9947	411.8463	17304.5919	20.3451	6.7238	21.516
L3	41.9658	49.6331	10513.2981	14.5359	20.9947	500.7586	21040.4298	24.8213	6.6016	17.286
	44.9834	53.2354	12972.5293	15.5909	22.5044	576.4441	25962.1282	26.6227	7.1247	18.656
L4	44.2456	49.8468	11045.1680	14.8671	21.4652	514.5626	22104.8696	24.9281	6.7767	18.071
	47.7162	55.4851	15233.1262	16.5488	23.8716	638.1281	30486.2966	27.7478	7.6105	20.295
L5	47.7162	67.9273	18581.1945	16.5186	23.8716	778.3814	37186.8386	33.9701	7.4610	16.222
	50.5532	72.0058	22133.1353	17.5104	25.2909	875.1439	44295.3940	36.0098	7.9527	17.291
L6	50.5532	71.5793	22004.4775	17.5114	25.2909	870.0568	44037.9092	35.7964	7.9575	17.406
	52.0898	73.7753	24092.4674	18.0487	26.0596	924.5133	48216.6363	36.8946	8.2239	17.988
L7	52.0898	70.6268	23082.1546	18.0556	26.0596	885.7440	46194.6813	35.3201	8.2585	18.877
	61.9816	84.1541	39047.5735	21.5139	31.0083	1259.2612	78146.5267	42.0851	9.9730	22.796

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
L1 167.0000-118.2500				1	1	1		
L2 118.2500-90.5000				1	1	1		
L3 90.5000-77.7500				1	1	1		
L4 77.7500-63.5000				1	1	1		
L5 63.5000-51.5000				1	1	1		
L6 51.5000-45.0000				1	1	1		
L7 45.0000-0.0000				1	1	1		

Feed Line/Linear Appurtenances - Entered As Round Or Flat

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

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
HJ7-50A(1-5/8")	C	No	Inside Pole	167.0000 - 0.0000	6	No Ice	0.0000	1.04
						1/2" Ice	0.0000	1.04
						1" Ice	0.0000	1.04
						2" Ice	0.0000	1.04
						4" Ice	0.0000	1.04
LDF7-50A(1-5/8")	C	No	Inside Pole	167.0000 - 0.0000	6	No Ice	0.0000	0.82
						1/2" Ice	0.0000	0.82
						1" Ice	0.0000	0.82
						2" Ice	0.0000	0.82
						4" Ice	0.0000	0.82
LDF4-50A(1/2")	C	No	Inside Pole	167.0000 - 0.0000	1	No Ice	0.0000	0.15
						1/2" Ice	0.0000	0.15
						1" Ice	0.0000	0.15
						2" Ice	0.0000	0.15
						4" Ice	0.0000	0.15
LDF5-50A(7/8")	C	No	Inside Pole	167.0000 - 0.0000	1	No Ice	0.0000	0.33
						1/2" Ice	0.0000	0.33
						1" Ice	0.0000	0.33
						2" Ice	0.0000	0.33
						4" Ice	0.0000	0.33
561(1-5/8")	C	No	CaAa (Out Of Face)	167.0000 - 138.0000	1	No Ice	0.1625	1.35
						1/2" Ice	0.2625	2.65
						1" Ice	0.3625	4.56
						2" Ice	0.5625	10.21
						4" Ice	0.9625	28.84
561(1-5/8")	C	No	CaAa (Out Of Face)	138.0000 - 0.0000	1	No Ice	0.0000	1.35
						1/2" Ice	0.0000	2.65
						1" Ice	0.0000	4.56
						2" Ice	0.0000	10.21
						4" Ice	0.0000	28.84
561(1-5/8")	C	No	CaAa (Out Of Face)	167.0000 - 0.0000	5	No Ice	0.0000	1.35
						1/2" Ice	0.0000	2.65
						1" Ice	0.0000	4.56
						2" Ice	0.0000	10.21
						4" Ice	0.0000	28.84
***								
LDF7-50A(1-5/8")	C	No	Inside Pole	158.0000 - 0.0000	12	No Ice	0.0000	0.82
						1/2" Ice	0.0000	0.82
						1" Ice	0.0000	0.82
						2" Ice	0.0000	0.82
						4" Ice	0.0000	0.82
FB-L98B-002-75000(3/8")	C	No	Inside Pole	158.0000 - 0.0000	1	No Ice	0.0000	0.06
						1/2" Ice	0.0000	0.06
						1" Ice	0.0000	0.06
						2" Ice	0.0000	0.06
						4" Ice	0.0000	0.06
WR-VG86ST-BRD(	C	No	Inside Pole	158.0000 - 0.0000	1	No Ice	0.0000	0.59

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
3/4)						1/2" Ice	0.0000	0.59
						1" Ice	0.0000	0.59
						2" Ice	0.0000	0.59
						4" Ice	0.0000	0.59
WR-VG86ST-BRD(	C	No	Inside Pole	158.0000 - 0.0000	1	No Ice	0.0000	0.59
3/4)						1/2" Ice	0.0000	0.59
						1" Ice	0.0000	0.59
						2" Ice	0.0000	0.59
						4" Ice	0.0000	0.59
2" (Nominal) Conduit	C	No	Inside Pole	158.0000 - 0.0000	1	No Ice	0.0000	0.72
						1/2" Ice	0.0000	0.72
						1" Ice	0.0000	0.72
						2" Ice	0.0000	0.72
						4" Ice	0.0000	0.72
***								
241568(5/8")	C	No	Inside Pole	148.0000 - 0.0000	1	No Ice	0.0000	0.19
						1/2" Ice	0.0000	0.19
						1" Ice	0.0000	0.19
						2" Ice	0.0000	0.19
						4" Ice	0.0000	0.19
HYBRIFLEX RRH 1-	C	No	Inside Pole	148.0000 - 0.0000	3	No Ice	0.0000	0.15
SECTOR(1/2")						1/2" Ice	0.0000	0.15
						1" Ice	0.0000	0.15
						2" Ice	0.0000	0.15
						4" Ice	0.0000	0.15
***								
FLC 158-50J(1-5/8")	C	No	Inside Pole	138.0000 - 0.0000	14	No Ice	0.0000	0.92
						1/2" Ice	0.0000	0.92
						1" Ice	0.0000	0.92
						2" Ice	0.0000	0.92
						4" Ice	0.0000	0.92
FLC 158-50J(1-5/8")	C	No	CaAa (Out Of Face)	138.0000 - 0.0000	3	No Ice	0.0000	0.92
						1/2" Ice	0.0000	2.46
						1" Ice	0.0000	4.60
						2" Ice	0.0000	10.73
						4" Ice	0.0000	30.31
FLC 158-50J(1-5/8")	C	No	CaAa (Out Of Face)	138.0000 - 0.0000	1	No Ice	0.2015	0.92
						1/2" Ice	0.3015	2.46
						1" Ice	0.4015	4.60
						2" Ice	0.6015	10.73
						4" Ice	1.0015	30.31
LDF6-50A(1-1/4")	C	No	Inside Pole	128.0000 - 0.0000	12	No Ice	0.0000	0.66
						1/2" Ice	0.0000	0.66
						1" Ice	0.0000	0.66
						2" Ice	0.0000	0.66
						4" Ice	0.0000	0.66
**********								
Aero MP3-04	C	No	CaAa (Out Of Face)	65.0000 - 43.0000	1	No Ice	0.2690	0.00
						1/2" Ice	0.3801	0.00
						1" Ice	0.4913	0.00
						2" Ice	0.7135	0.00
						4" Ice	1.1579	0.00
Aero MP3-03	C	No	CaAa (Out Of Face)	91.5000 - 81.5000	1	No Ice	0.2625	0.00
						1/2" Ice	0.3736	0.00
						1" Ice	0.4847	0.00
						2" Ice	0.7069	0.00
						4" Ice	1.1514	0.00
***								

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	167.0000-118.2500	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	8.692	1.85
L2	118.2500-90.5000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	5.854	1.57
L3	90.5000-77.7500	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	4.931	0.72
L4	77.7500-63.5000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	3.275	0.81
L5	63.5000-51.5000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	5.646	0.68
L6	51.5000-45.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	3.058	0.37
L7	45.0000-0.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	9.606	2.55

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	167.0000-118.2500	A	0.893	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	17.399	2.93
L2	118.2500-90.5000	A	0.861	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	11.009	2.40
L3	90.5000-77.7500	A	0.839	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	8.749	1.07
L4	77.7500-63.5000	A	0.822	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	5.946	1.20
L5	63.5000-51.5000	A	0.802	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	9.708	0.99
L6	51.5000-45.0000	A	0.785	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	5.213	0.53
L7	45.0000-0.0000	A	0.750	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	16.689	3.63

Feed Line Center of Pressure

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
L1	167.0000-118.2500	-0.2182	0.1260	-0.3869	0.2234
L2	118.2500-90.5000	-0.2579	0.1489	-0.4413	0.2548
L3	90.5000-77.7500	-0.4511	0.2604	-0.7204	0.4159
L4	77.7500-63.5000	-0.2826	0.1631	-0.4741	0.2737
L5	63.5000-51.5000	-0.5474	0.3160	-0.8518	0.4918
L6	51.5000-45.0000	-0.5498	0.3174	-0.8529	0.4924
L7	45.0000-0.0000	-0.2640	0.1524	-0.4337	0.2504

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Lightning Rod 5/8x4'	C	From Face	0.0000 0.00 2.00	0.0000	167.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.2500 0.6635 0.9732 1.4936 2.6833	0.2500 0.6635 0.9732 1.4936 2.6833	0.03 0.03 0.04 0.06 0.14
****									
(2) LPA-80063-6CF-EDIN w/ Mount Pipe	A	From Leg	4.0000 0.00 1.00	0.0000	167.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	10.7445 11.4117 12.0450 13.3414 16.0541	10.7001 11.9672 12.9479 14.9632 19.2085	0.05 0.15 0.25 0.48 1.10
(2) LPA-80063-6CF-EDIN w/ Mount Pipe	B	From Leg	4.0000 0.00 1.00	0.0000	167.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	10.7445 11.4117 12.0450 13.3414 16.0541	10.7001 11.9672 12.9479 14.9632 19.2085	0.05 0.15 0.25 0.48 1.10
(2) LPA-80063-6CF-EDIN w/ Mount Pipe	C	From Leg	4.0000 0.00 1.00	0.0000	167.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	10.7445 11.4117 12.0450 13.3414 16.0541	10.7001 11.9672 12.9479 14.9632 19.2085	0.05 0.15 0.25 0.48 1.10
GPS_A	A	From Leg	4.0000 0.00 4.00	0.0000	167.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.2975 0.3739 0.4589 0.6549 1.1506	0.2975 0.3739 0.4589 0.6549 1.1506	0.00 0.00 0.01 0.02 0.08
BXA-171063-8CF-EDIN-X w/ Mount Pipe	A	From Leg	4.0000 0.00 1.00	0.0000	167.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.1574 3.5312 3.9415 4.8273 6.7342	3.3303 3.9423 4.5633 5.8553 8.8407	0.03 0.06 0.10 0.19 0.48
BXA-171063-8CF-EDIN-X	B	From Leg	4.0000	0.0000	167.0000	No Ice	3.1574	3.3303	0.03

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
w/ Mount Pipe			0.00 1.00			1/2" Ice 1" Ice 2" Ice 4" Ice	3.5312 3.9415 4.8273 6.7342	3.9423 4.5633 5.8553 8.8407	0.06 0.10 0.19 0.48
BXA-171063-8CF-EDIN-X w/ Mount Pipe	C	From Leg	4.0000 0.00 1.00	0.0000	167.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.1574 3.5312 3.9415 4.8273 6.7342	3.3303 3.9423 4.5633 5.8553 8.8407	0.03 0.06 0.10 0.19 0.48
BXA-70063-6CF-EDIN-2 w/ Mount Pipe	A	From Leg	4.0000 0.00 1.00	0.0000	167.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.9686 8.6091 9.2158 10.4591 13.0655	5.8008 6.9529 7.8191 9.6015 13.3662	0.04 0.10 0.17 0.34 0.80
BXA-70063-6CF-EDIN-2 w/ Mount Pipe	B	From Leg	4.0000 0.00 1.00	0.0000	167.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.9686 8.6091 9.2158 10.4591 13.0655	5.8008 6.9529 7.8191 9.6015 13.3662	0.04 0.10 0.17 0.34 0.80
BXA-70063-6CF-EDIN-2 w/ Mount Pipe	C	From Leg	4.0000 0.00 1.00	0.0000	167.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.9686 8.6091 9.2158 10.4591 13.0655	5.8008 6.9529 7.8191 9.6015 13.3662	0.04 0.10 0.17 0.34 0.80
Platform Mount [LP 1201-1]	C	None		0.0000	167.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	23.1000 26.8000 30.5000 37.9000 52.7000	23.1000 26.8000 30.5000 37.9000 52.7000	2.10 2.50 2.90 3.70 5.30
BXA-171063-8BF-2 w/ Mount Pipe	A	From Leg	4.0000 0.00 1.00	0.0000	167.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.1789 3.5550 3.9637 4.8533 6.7671	3.3530 3.9709 4.5951 5.8933 8.8855	0.03 0.06 0.10 0.19 0.49
BXA-171063-8BF-2 w/ Mount Pipe	B	From Leg	4.0000 0.00 1.00	0.0000	167.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.1789 3.5550 3.9637 4.8533 6.7671	3.3530 3.9709 4.5951 5.8933 8.8855	0.03 0.06 0.10 0.19 0.49
BXA-171063-8BF-2 w/ Mount Pipe	C	From Leg	4.0000 0.00 1.00	0.0000	167.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.1789 3.5550 3.9637 4.8533 6.7671	3.3530 3.9709 4.5951 5.8933 8.8855	0.03 0.06 0.10 0.19 0.49
RRH2X40-AWS	A	From Leg	4.0000 0.00 1.00	0.0000	167.0000	No Ice 1/2" Ice	2.5217 2.7530 2.9930	1.5894 1.7953 2.0098	0.04 0.06 0.08

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment ° 	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						1" Ice	3.4990	2.4648	0.13
						2" Ice	4.6146	3.4785	0.28
						4" Ice			
RRH2X40-AWS	B	From Leg	4.0000 0.00 1.00	0.0000	167.0000	No Ice	2.5217	1.5894	0.04
						1/2" Ice	2.7530	1.7953	0.06
						1" Ice	2.9930	2.0098	0.08
						2" Ice	3.4990	2.4648	0.13
						4" Ice	4.6146	3.4785	0.28
DB-T1-6Z-8AB-0Z	A	From Leg	4.0000 0.00 1.00	0.0000	167.0000	No Ice	5.6000	2.3333	0.04
						1/2" Ice	5.9154	2.5580	0.08
						1" Ice	6.2395	2.7914	0.12
						2" Ice	6.9136	3.2840	0.21
						4" Ice	8.3654	4.3728	0.45
RRH2X40-AWS	C	From Leg	4.0000 0.00 1.00	0.0000	167.0000	No Ice	2.5217	1.5894	0.04
						1/2" Ice	2.7530	1.7953	0.06
						1" Ice	2.9930	2.0098	0.08
						2" Ice	3.4990	2.4648	0.13
						4" Ice	4.6146	3.4785	0.28
***									
(2) 7770.00 w/ Mount Pipe	A	From Leg	4.0000 0.00 2.00	0.0000	158.0000	No Ice	6.2208	4.8204	0.09
						1/2" Ice	6.7144	5.5082	0.14
						1" Ice	7.2182	6.2127	0.21
						2" Ice	8.2568	7.6716	0.36
						4" Ice	10.4762	11.0613	0.76
(2) 7770.00 w/ Mount Pipe	B	From Leg	4.0000 0.00 2.00	0.0000	158.0000	No Ice	6.2208	4.8204	0.09
						1/2" Ice	6.7144	5.5082	0.14
						1" Ice	7.2182	6.2127	0.21
						2" Ice	8.2568	7.6716	0.36
						4" Ice	10.4762	11.0613	0.76
(2) 7770.00 w/ Mount Pipe	C	From Leg	4.0000 0.00 2.00	0.0000	158.0000	No Ice	6.2208	4.8204	0.09
						1/2" Ice	6.7144	5.5082	0.14
						1" Ice	7.2182	6.2127	0.21
						2" Ice	8.2568	7.6716	0.36
						4" Ice	10.4762	11.0613	0.76
(2) LGP13519	A	From Leg	4.0000 0.00 2.00	0.0000	158.0000	No Ice	0.3379	0.2074	0.01
						1/2" Ice	0.4220	0.2804	0.01
						1" Ice	0.5147	0.3621	0.01
						2" Ice	0.7260	0.5513	0.02
						4" Ice	1.2523	1.0335	0.07
(2) LGP13519	B	From Leg	4.0000 0.00 2.00	0.0000	158.0000	No Ice	0.3379	0.2074	0.01
						1/2" Ice	0.4220	0.2804	0.01
						1" Ice	0.5147	0.3621	0.01
						2" Ice	0.7260	0.5513	0.02
						4" Ice	1.2523	1.0335	0.07
(2) LGP13519	C	From Leg	4.0000 0.00 2.00	0.0000	158.0000	No Ice	0.3379	0.2074	0.01
						1/2" Ice	0.4220	0.2804	0.01
						1" Ice	0.5147	0.3621	0.01
						2" Ice	0.7260	0.5513	0.02

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						2" Ice 4" Ice	1.2523	1.0335	0.07
(2) LGP21401	A	From Leg	4.0000 0.00 2.00	0.0000	158.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.2880 1.4453 1.6112 1.9690 2.7882	0.3640 0.4785 0.6017 0.8739 1.5220	0.01 0.02 0.03 0.05 0.14
(2) LGP21401	B	From Leg	4.0000 0.00 2.00	0.0000	158.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.2880 1.4453 1.6112 1.9690 2.7882	0.3640 0.4785 0.6017 0.8739 1.5220	0.01 0.02 0.03 0.05 0.14
(2) LGP21401	C	From Leg	4.0000 0.00 2.00	0.0000	158.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.2880 1.4453 1.6112 1.9690 2.7882	0.3640 0.4785 0.6017 0.8739 1.5220	0.01 0.02 0.03 0.05 0.14
SBNH-1D6565C w/ Mount Pipe	A	From Leg	4.0000 0.00 2.00	0.0000	158.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	11.5561 12.2227 12.8929 14.2911 17.4280	9.7151 11.1857 12.5942 14.8689 19.6184	0.10 0.19 0.28 0.51 1.15
SBNH-1D6565C w/ Mount Pipe	B	From Leg	4.0000 0.00 2.00	0.0000	158.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	11.5561 12.2227 12.8929 14.2911 17.4280	9.7151 11.1857 12.5942 14.8689 19.6184	0.10 0.19 0.28 0.51 1.15
SBNH-1D6565C w/ Mount Pipe	C	From Leg	4.0000 0.00 2.00	0.0000	158.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	11.5561 12.2227 12.8929 14.2911 17.4280	9.7151 11.1857 12.5942 14.8689 19.6184	0.10 0.19 0.28 0.51 1.15
RRUS-11	A	From Leg	4.0000 0.00 2.00	0.0000	158.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.2486 3.4905 3.7411 4.2682 5.4260	1.3726 1.5510 1.7380 2.1381 3.0418	0.05 0.07 0.09 0.15 0.31
RRUS-11	B	From Leg	4.0000 0.00 2.00	0.0000	158.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.2486 3.4905 3.7411 4.2682 5.4260	1.3726 1.5510 1.7380 2.1381 3.0418	0.05 0.07 0.09 0.15 0.31
RRUS-11	C	From Leg	4.0000 0.00 2.00	0.0000	158.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.2486 3.4905 3.7411 4.2682 5.4260	1.3726 1.5510 1.7380 2.1381 3.0418	0.05 0.07 0.09 0.15 0.31

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment ° 	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
DC6-48-60-18-8F	A	From Leg	4.0000 0.00 2.00	0.0000	158.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.4667 1.6667 1.8778 2.3333 3.3778	1.4667 1.6667 1.8778 2.3333 3.3778	0.02 0.04 0.06 0.11 0.24
Platform Mount [LP 1201-1]	C	None		0.0000	158.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	23.1000 26.8000 30.5000 37.9000 52.7000	23.1000 26.8000 30.5000 37.9000 52.7000	2.10 2.50 2.90 3.70 5.30
6' x 2" Mount Pipe	A	From Leg	4.0000 0.00 1.00	0.0000	158.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.4250 1.9250 2.2939 3.0596 4.7022	1.4250 1.9250 2.2939 3.0596 4.7022	0.02 0.03 0.05 0.09 0.23
6' x 2" Mount Pipe	B	From Leg	4.0000 0.00 1.00	0.0000	158.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.4250 1.9250 2.2939 3.0596 4.7022	1.4250 1.9250 2.2939 3.0596 4.7022	0.02 0.03 0.05 0.09 0.23
6' x 2" Mount Pipe	C	From Leg	4.0000 0.00 1.00	0.0000	158.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.4250 1.9250 2.2939 3.0596 4.7022	1.4250 1.9250 2.2939 3.0596 4.7022	0.02 0.03 0.05 0.09 0.23
****									
(2) Pipe Mount [PM 601-3]	C	None		0.0000	150.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.3900 5.4800 6.5700 8.7500 13.1100	4.3900 5.4800 6.5700 8.7500 13.1100	0.20 0.24 0.28 0.36 0.53
PCS 1900MHz 4x45W-65MHz w/Mount Pipe	A	From Leg	4.0000 0.00 1.00	0.0000	150.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.1217 3.4775 3.8464 4.6232 6.4022	3.4768 3.9581 4.4572 5.5092 7.9717	0.07 0.11 0.15 0.24 0.51
TME-800MHz RRH w/ mount pipe	A	From Leg	4.0000 0.00 0.00	0.0000	150.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.5250 4.1044 4.5973 5.6293 7.8776	3.4935 4.1955 4.7751 5.9880 8.6287	0.07 0.11 0.15 0.25 0.56
PCS 1900MHz 4x45W-65MHz w/Mount Pipe	B	From Leg	4.0000 0.00 1.00	0.0000	150.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.1217 3.4775 3.8464 4.6232 6.4022	3.4768 3.9581 4.4572 5.5092 7.9717	0.07 0.11 0.15 0.24 0.51
TME-800MHz RRH w/	B	From Leg	4.0000	0.0000	150.0000	No Ice	3.5250	3.4935	0.07

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment ° 	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
mount pipe			0.00 0.00			1/2" Ice 1" Ice 2" Ice 4" Ice	4.1044 4.5973 5.6293 7.8776	4.1955 4.7751 5.9880 8.6287	0.11 0.15 0.25 0.56
PCS 1900MHz 4x45W-65MHz w/Mount Pipe	C	From Leg	4.0000 0.00 1.00	0.0000	150.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.1217 3.4775 3.8464 4.6232 6.4022	3.4768 3.9581 4.4572 5.5092 7.9717	0.07 0.11 0.15 0.24 0.51
TME-800MHz RRH w/ mount pipe	C	From Leg	4.0000 0.00 0.00	0.0000	150.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.5250 4.1044 4.5973 5.6293 7.8776	3.4935 4.1955 4.7751 5.9880 8.6287	0.07 0.11 0.15 0.25 0.56
***									
800 EXTERNAL NOTCH FILTER	A	From Leg	4.0000 0.00 -1.00	0.0000	148.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.7701 0.8898 1.0181 1.3007 1.9696	0.3747 0.4647 0.5634 0.7868 1.3372	0.01 0.02 0.02 0.04 0.11
(3) ACU-A20-N	A	From Leg	4.0000 0.00 -1.00	0.0000	148.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.0778 0.1210 0.1728 0.3025 0.6654	0.1361 0.1890 0.2506 0.3997 0.8015	0.00 0.00 0.00 0.01 0.04
APXVSPP18-C-A20 w/ Mount Pipe	A	From Leg	4.0000 0.00 -1.00	30.0000	148.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.4975 9.1490 9.7672 11.0311 13.6786	6.9458 8.1266 9.0212 10.8440 14.8507	0.08 0.15 0.23 0.41 0.91
800 EXTERNAL NOTCH FILTER	B	From Leg	4.0000 0.00 -1.00	0.0000	148.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.7701 0.8898 1.0181 1.3007 1.9696	0.3747 0.4647 0.5634 0.7868 1.3372	0.01 0.02 0.02 0.04 0.11
(3) ACU-A20-N	B	From Leg	4.0000 0.00 -1.00	0.0000	148.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.0778 0.1210 0.1728 0.3025 0.6654	0.1361 0.1890 0.2506 0.3997 0.8015	0.00 0.00 0.00 0.01 0.04
APXVSPP18-C-A20 w/ Mount Pipe	B	From Leg	4.0000 0.00 -1.00	70.0000	148.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.4975 9.1490 9.7672 11.0311 13.6786	6.9458 8.1266 9.0212 10.8440 14.8507	0.08 0.15 0.23 0.41 0.91
800 EXTERNAL NOTCH FILTER	C	From Leg	4.0000 0.00	0.0000	148.0000	No Ice 1/2"	0.7701 0.8898	0.3747 0.4647	0.01 0.02

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment ° 	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			-1.00			Ice	1.0181	0.5634	0.02
						1" Ice	1.3007	0.7868	0.04
						2" Ice	1.9696	1.3372	0.11
						4" Ice			
(3) ACU-A20-N	C	From Leg	4.0000	0.0000	148.0000	No Ice	0.0778	0.1361	0.00
			0.00			1/2"	0.1210	0.1890	0.00
			-1.00			Ice	0.1728	0.2506	0.00
						1" Ice	0.3025	0.3997	0.01
						2" Ice	0.6654	0.8015	0.04
						4" Ice			
APXVSPP18-C-A20 w/ Mount Pipe	C	From Leg	4.0000	30.0000	148.0000	No Ice	8.4975	6.9458	0.08
			0.00			1/2"	9.1490	8.1266	0.15
			-1.00			Ice	9.7672	9.0212	0.23
						1" Ice	11.0311	10.8440	0.41
						2" Ice	13.6786	14.8507	0.91
						4" Ice			
TD-RRH8x20-25	A	From Leg	4.0000	0.0000	148.0000	No Ice	4.7198	1.7027	0.07
			0.00			1/2"	5.0138	1.9196	0.10
			-1.00			Ice	5.3165	2.1453	0.13
						1" Ice	5.9478	2.6224	0.20
						2" Ice	7.3141	3.6805	0.40
						4" Ice			
APXVTM14-C-120 w/ Mount Pipe	A	From Leg	4.0000	0.0000	148.0000	No Ice	7.1342	4.9591	0.08
			0.00			1/2"	7.6618	5.7544	0.13
			-1.00			Ice	8.1830	6.4723	0.19
						1" Ice	9.2563	8.0099	0.34
						2" Ice	11.5262	11.4120	0.75
						4" Ice			
TD-RRH8x20-25	B	From Leg	4.0000	0.0000	148.0000	No Ice	4.7198	1.7027	0.07
			0.00			1/2"	5.0138	1.9196	0.10
			-1.00			Ice	5.3165	2.1453	0.13
						1" Ice	5.9478	2.6224	0.20
						2" Ice	7.3141	3.6805	0.40
						4" Ice			
APXVTM14-C-120 w/ Mount Pipe	B	From Leg	4.0000	0.0000	148.0000	No Ice	7.1342	4.9591	0.08
			0.00			1/2"	7.6618	5.7544	0.13
			-1.00			Ice	8.1830	6.4723	0.19
						1" Ice	9.2563	8.0099	0.34
						2" Ice	11.5262	11.4120	0.75
						4" Ice			
TD-RRH8x20-25	C	From Leg	4.0000	0.0000	148.0000	No Ice	4.7198	1.7027	0.07
			0.00			1/2"	5.0138	1.9196	0.10
			-1.00			Ice	5.3165	2.1453	0.13
						1" Ice	5.9478	2.6224	0.20
						2" Ice	7.3141	3.6805	0.40
						4" Ice			
APXVTM14-C-120 w/ Mount Pipe	C	From Leg	4.0000	0.0000	148.0000	No Ice	7.1342	4.9591	0.08
			0.00			1/2"	7.6618	5.7544	0.13
			-1.00			Ice	8.1830	6.4723	0.19
						1" Ice	9.2563	8.0099	0.34
						2" Ice	11.5262	11.4120	0.75
						4" Ice			
6' x 2" Mount Pipe	A	From Leg	4.0000	0.0000	148.0000	No Ice	1.4250	1.4250	0.02
			0.00			1/2"	1.9250	1.9250	0.03
			0.00			Ice	2.2939	2.2939	0.05
						1" Ice	3.0596	3.0596	0.09

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment ° 	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						2" Ice 4" Ice	4.7022	4.7022	0.23
6' x 2" Mount Pipe	B	From Leg	4.0000 0.00 0.00	0.0000	148.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.4250 1.9250 2.2939 3.0596 4.7022	1.4250 1.9250 2.2939 3.0596 4.7022	0.02 0.03 0.05 0.09 0.23
6' x 2" Mount Pipe	C	From Leg	4.0000 0.00 0.00	0.0000	148.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.4250 1.9250 2.2939 3.0596 4.7022	1.4250 1.9250 2.2939 3.0596 4.7022	0.02 0.03 0.05 0.09 0.23
Platform Mount [LP 1201-1]	C	None		0.0000	148.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	23.1000 26.8000 30.5000 37.9000 52.7000	23.1000 26.8000 30.5000 37.9000 52.7000	2.10 2.50 2.90 3.70 5.30
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APX16PV-16PVL-E w/ Mount Pipe	A	From Leg	4.0000 0.00 1.00	0.0000	138.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.9361 7.4389 7.9415 8.9779 11.1750	3.2893 3.9953 4.6615 6.0439 9.0230	0.06 0.11 0.16 0.28 0.65
APX16PV-16PVL-E w/ Mount Pipe	B	From Leg	4.0000 0.00 1.00	0.0000	138.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.9361 7.4389 7.9415 8.9779 11.1750	3.2893 3.9953 4.6615 6.0439 9.0230	0.06 0.11 0.16 0.28 0.65
APX16PV-16PVL-E w/ Mount Pipe	C	From Leg	4.0000 0.00 1.00	0.0000	138.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.9361 7.4389 7.9415 8.9779 11.1750	3.2893 3.9953 4.6615 6.0439 9.0230	0.06 0.11 0.16 0.28 0.65
KRY 112 134/1	A	From Leg	4.0000 0.00 1.00	0.0000	138.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.0082 1.1488 1.2980 1.6223 2.3747	0.4869 0.6009 0.7236 0.9950 1.6413	0.01 0.02 0.03 0.05 0.13
KRY 112 134/1	B	From Leg	4.0000 0.00 1.00	0.0000	138.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.0082 1.1488 1.2980 1.6223 2.3747	0.4869 0.6009 0.7236 0.9950 1.6413	0.01 0.02 0.03 0.05 0.13
KRY 112 134/1	C	From Leg	4.0000 0.00 1.00	0.0000	138.0000	No Ice 1/2" Ice 1" Ice 2" Ice	1.0082 1.1488 1.2980 1.6223 2.3747	0.4869 0.6009 0.7236 0.9950 1.6413	0.01 0.02 0.03 0.05 0.13

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						4" Ice			
KRY 112 89/5	A	From Leg	4.0000 0.00 1.00	0.0000	138.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.2333 0.3025 0.3802 0.5617 1.0284	0.4278 0.5293 0.6395 0.8858 1.4821	0.02 0.02 0.03 0.05 0.11
KRY 112 89/5	B	From Leg	4.0000 0.00 1.00	0.0000	138.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.2333 0.3025 0.3802 0.5617 1.0284	0.4278 0.5293 0.6395 0.8858 1.4821	0.02 0.02 0.03 0.05 0.11
KRY 112 89/5	C	From Leg	4.0000 0.00 1.00	0.0000	138.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.2333 0.3025 0.3802 0.5617 1.0284	0.4278 0.5293 0.6395 0.8858 1.4821	0.02 0.02 0.03 0.05 0.11
Platform Mount [LP 1201-1]	C	None		0.0000	138.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	23.1000 26.8000 30.5000 37.9000 52.7000	23.1000 26.8000 30.5000 37.9000 52.7000	2.10 2.50 2.90 3.70 5.30
ATBT-BOTTOM-24V	A	From Leg	4.0000 0.00 0.00	0.0000	138.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.1212 0.1722 0.2319 0.3770 0.7711	0.0752 0.1191 0.1716 0.3025 0.6681	0.00 0.00 0.01 0.01 0.04
LNX-6515DS-VTM w/ Mount Pipe	A	From Leg	4.0000 0.00 0.00	0.0000	138.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	11.6828 12.4043 13.1351 14.6007 17.8748	9.8418 11.3657 12.9138 15.2672 20.1392	0.08 0.17 0.27 0.51 1.15
ATBT-BOTTOM-24V	B	From Leg	4.0000 0.00 0.00	0.0000	138.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.1212 0.1722 0.2319 0.3770 0.7711	0.0752 0.1191 0.1716 0.3025 0.6681	0.00 0.00 0.01 0.01 0.04
LNX-6515DS-VTM w/ Mount Pipe	B	From Leg	4.0000 0.00 0.00	0.0000	138.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	11.6828 12.4043 13.1351 14.6007 17.8748	9.8418 11.3657 12.9138 15.2672 20.1392	0.08 0.17 0.27 0.51 1.15
ATBT-BOTTOM-24V	C	From Leg	4.0000 0.00 0.00	0.0000	138.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.1212 0.1722 0.2319 0.3770 0.7711	0.0752 0.1191 0.1716 0.3025 0.6681	0.00 0.00 0.01 0.01 0.04
LNX-6515DS-VTM w/	C	From Leg	4.0000	0.0000	138.0000	No Ice	11.6828	9.8418	0.08

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Mount Pipe			0.00 0.00			1/2" Ice 1" Ice 2" Ice 4" Ice	12.4043 13.1351 14.6007 17.8748	11.3657 12.9138 15.2672 20.1392	0.17 0.27 0.51 1.15
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Tower Forces - No Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
L1 167.0000-118.2500	1.85	3.87	A	1	0.65	1	1	1	120.575	4.12	84.48	C
			B	1	0.65	1	1	1	120.575			
			C	1	0.65	1	1	1	120.575			
L2 118.2500-90.5000	1.57	4.06	A	1	0.65	1	1	1	88.093	2.74	98.68	C
			B	1	0.65	1	1	1	88.093			
			C	1	0.65	1	1	1	88.093			
L3 90.5000-77.7500	0.72	2.23	A	1	0.65	1	1	1	45.490	1.41	110.48	C
			B	1	0.65	1	1	1	45.490			
			C	1	0.65	1	1	1	45.490			
L4 77.7500-63.5000	0.81	3.54	A	1	0.65	1	1	1	53.773	1.48	104.18	C
			B	1	0.65	1	1	1	53.773			
			C	1	0.65	1	1	1	53.773			
L5 63.5000-51.5000	0.68	2.86	A	1	0.65	1	1	1	48.388	1.36	113.22	C
			B	1	0.65	1	1	1	48.388			
			C	1	0.65	1	1	1	48.388			
L6 51.5000-45.0000	0.37	1.61	A	1	0.65	1	1	1	27.377	0.73	111.77	C
			B	1	0.65	1	1	1	27.377			
			C	1	0.65	1	1	1	27.377			
L7 45.0000-0.0000	2.55	11.85	A	1	0.65	1	1	1	210.635	4.59	102.02	C
			B	1	0.65	1	1	1	210.635			
			C	1	0.65	1	1	1	210.635			
Sum Weight:	8.55	30.02						OTM	1303.61 kip-ft	16.43		

Tower Forces - No Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
L1 167.0000-118.2500	1.85	3.87	A	1	0.65	1	1	1	120.575	4.12	84.48	C
			B	1	0.65	1	1	1	120.575			
			C	1	0.65	1	1	1	120.575			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
L2 118.2500-90.5000	1.57	4.06	A	1	0.65	1	1	1	88.093	2.74	98.68	C
			B	1	0.65	1	1	1	88.093			
			C	1	0.65	1	1	1	88.093			
L3 90.5000-77.7500	0.72	2.23	A	1	0.65	1	1	1	45.490	1.41	110.48	C
			B	1	0.65	1	1	1	45.490			
			C	1	0.65	1	1	1	45.490			
L4 77.7500-63.5000	0.81	3.54	A	1	0.65	1	1	1	53.773	1.48	104.18	C
			B	1	0.65	1	1	1	53.773			
			C	1	0.65	1	1	1	53.773			
L5 63.5000-51.5000	0.68	2.86	A	1	0.65	1	1	1	48.388	1.36	113.22	C
			B	1	0.65	1	1	1	48.388			
			C	1	0.65	1	1	1	48.388			
L6 51.5000-45.0000	0.37	1.61	A	1	0.65	1	1	1	27.377	0.73	111.77	C
			B	1	0.65	1	1	1	27.377			
			C	1	0.65	1	1	1	27.377			
L7 45.0000-0.0000	2.55	11.85	A	1	0.65	1	1	1	210.635	4.59	102.02	C
			B	1	0.65	1	1	1	210.635			
			C	1	0.65	1	1	1	210.635			
Sum Weight:	8.55	30.02						OTM	1303.61 kip-ft	16.43		

Tower Forces - No Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
L1 167.0000-118.2500	1.85	3.87	A	1	0.65	1	1	1	120.575	4.12	84.48	C
			B	1	0.65	1	1	1	120.575			
			C	1	0.65	1	1	1	120.575			
L2 118.2500-90.5000	1.57	4.06	A	1	0.65	1	1	1	88.093	2.74	98.68	C
			B	1	0.65	1	1	1	88.093			
			C	1	0.65	1	1	1	88.093			
L3 90.5000-77.7500	0.72	2.23	A	1	0.65	1	1	1	45.490	1.41	110.48	C
			B	1	0.65	1	1	1	45.490			
			C	1	0.65	1	1	1	45.490			
L4 77.7500-63.5000	0.81	3.54	A	1	0.65	1	1	1	53.773	1.48	104.18	C
			B	1	0.65	1	1	1	53.773			
			C	1	0.65	1	1	1	53.773			
L5 63.5000-51.5000	0.68	2.86	A	1	0.65	1	1	1	48.388	1.36	113.22	C
			B	1	0.65	1	1	1	48.388			
			C	1	0.65	1	1	1	48.388			
L6 51.5000-45.0000	0.37	1.61	A	1	0.65	1	1	1	27.377	0.73	111.77	C
			B	1	0.65	1	1	1	27.377			
			C	1	0.65	1	1	1	27.377			
L7 45.0000-0.0000	2.55	11.85	A	1	0.65	1	1	1	210.635	4.59	102.02	C
			B	1	0.65	1	1	1	210.635			
			C	1	0.65	1	1	1	210.635			
Sum Weight:	8.55	30.02						OTM	1303.61 kip-ft	16.43		

Tower Forces - With Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
L1 167.0000-118.2500	2.93	5.52	A	1	0.65	1	1	1	127.831	0.93	19.08	C
			B	1	0.65	1	1	1	127.831			
			C	1	0.65	1	1	1	127.831			
L2 118.2500-90.5000	2.40	5.20	A	1	0.65	1	1	1	92.223	0.60	21.71	C
			B	1	0.65	1	1	1	92.223			
			C	1	0.65	1	1	1	92.223			
L3 90.5000-77.7500	1.07	2.81	A	1	0.65	1	1	1	47.273	0.32	24.74	C
			B	1	0.65	1	1	1	47.273			
			C	1	0.65	1	1	1	47.273			
L4 77.7500-63.5000	1.20	4.21	A	1	0.65	1	1	1	55.766	0.32	22.50	C
			B	1	0.65	1	1	1	55.766			
			C	1	0.65	1	1	1	55.766			
L5 63.5000-51.5000	0.99	3.44	A	1	0.65	1	1	1	49.991	0.30	25.20	C
			B	1	0.65	1	1	1	49.991			
			C	1	0.65	1	1	1	49.991			
L6 51.5000-45.0000	0.53	1.93	A	1	0.65	1	1	1	28.227	0.16	24.71	C
			B	1	0.65	1	1	1	28.227			
			C	1	0.65	1	1	1	28.227			
L7 45.0000-0.0000	3.63	14.22	A	1	0.65	1	1	1	216.260	0.96	21.43	C
			B	1	0.65	1	1	1	216.260			
			C	1	0.65	1	1	1	216.260			
Sum Weight:	12.75	37.33						OTM	289.47 kip-ft	3.60		

Tower Forces - With Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
L1 167.0000-118.2500	2.93	5.52	A	1	0.65	1	1	1	127.831	0.93	19.08	C
			B	1	0.65	1	1	1	127.831			
			C	1	0.65	1	1	1	127.831			
L2 118.2500-90.5000	2.40	5.20	A	1	0.65	1	1	1	92.223	0.60	21.71	C
			B	1	0.65	1	1	1	92.223			
			C	1	0.65	1	1	1	92.223			
L3 90.5000-77.7500	1.07	2.81	A	1	0.65	1	1	1	47.273	0.32	24.74	C
			B	1	0.65	1	1	1	47.273			
			C	1	0.65	1	1	1	47.273			
L4 77.7500-63.5000	1.20	4.21	A	1	0.65	1	1	1	55.766	0.32	22.50	C
			B	1	0.65	1	1	1	55.766			
			C	1	0.65	1	1	1	55.766			
L5 63.5000-51.5000	0.99	3.44	A	1	0.65	1	1	1	49.991	0.30	25.20	C
			B	1	0.65	1	1	1	49.991			
			C	1	0.65	1	1	1	49.991			
L6 51.5000-45.0000	0.53	1.93	A	1	0.65	1	1	1	28.227	0.16	24.71	C
			B	1	0.65	1	1	1	28.227			
			C	1	0.65	1	1	1	28.227			
L7 45.0000-0.0000	3.63	14.22	A	1	0.65	1	1	1	216.260	0.96	21.43	C
			B	1	0.65	1	1	1	216.260			
			C	1	0.65	1	1	1	216.260			
Sum Weight:	12.75	37.33						OTM	289.47 kip-ft	3.60		

Tower Forces - With Ice - Wind 90 To Face

Section Elevation	Add Weight	Self Weight	Face	e	C_F	R_R	D_F	D_R	A_E	F	w	Ctrl. Face
ft	K	K							ft^2	K	plf	
L1 167.0000-118.2500	2.93	5.52	A	1	0.65	1	1	1	127.831	0.93	19.08	C
			B	1	0.65	1	1	1	127.831			
			C	1	0.65	1	1	1	127.831			
L2 118.2500-90.5000	2.40	5.20	A	1	0.65	1	1	1	92.223	0.60	21.71	C
			B	1	0.65	1	1	1	92.223			
			C	1	0.65	1	1	1	92.223			
L3 90.5000-77.7500	1.07	2.81	A	1	0.65	1	1	1	47.273	0.32	24.74	C
			B	1	0.65	1	1	1	47.273			
			C	1	0.65	1	1	1	47.273			
L4 77.7500-63.5000	1.20	4.21	A	1	0.65	1	1	1	55.766	0.32	22.50	C
			B	1	0.65	1	1	1	55.766			
			C	1	0.65	1	1	1	55.766			
L5 63.5000-51.5000	0.99	3.44	A	1	0.65	1	1	1	49.991	0.30	25.20	C
			B	1	0.65	1	1	1	49.991			
			C	1	0.65	1	1	1	49.991			
L6 51.5000-45.0000	0.53	1.93	A	1	0.65	1	1	1	28.227	0.16	24.71	C
			B	1	0.65	1	1	1	28.227			
			C	1	0.65	1	1	1	28.227			
L7 45.0000-0.0000	3.63	14.22	A	1	0.65	1	1	1	216.260	0.96	21.43	C
			B	1	0.65	1	1	1	216.260			
			C	1	0.65	1	1	1	216.260			
Sum Weight:	12.75	37.33						OTM	289.47 kip-ft	3.60		

Tower Forces - Service - Wind Normal To Face

Section Elevation	Add Weight	Self Weight	Face	e	C_F	R_R	D_F	D_R	A_E	F	w	Ctrl. Face
ft	K	K							ft^2	K	plf	
L1 167.0000-118.2500	1.85	3.87	A	1	0.65	1	1	1	120.575	1.43	29.23	C
			B	1	0.65	1	1	1	120.575			
			C	1	0.65	1	1	1	120.575			
L2 118.2500-90.5000	1.57	4.06	A	1	0.65	1	1	1	88.093	0.95	34.15	C
			B	1	0.65	1	1	1	88.093			
			C	1	0.65	1	1	1	88.093			
L3 90.5000-77.7500	0.72	2.23	A	1	0.65	1	1	1	45.490	0.49	38.23	C
			B	1	0.65	1	1	1	45.490			
			C	1	0.65	1	1	1	45.490			
L4 77.7500-63.5000	0.81	3.54	A	1	0.65	1	1	1	53.773	0.51	36.05	C
			B	1	0.65	1	1	1	53.773			
			C	1	0.65	1	1	1	53.773			
L5 63.5000-51.5000	0.68	2.86	A	1	0.65	1	1	1	48.388	0.47	39.18	C
			B	1	0.65	1	1	1	48.388			
			C	1	0.65	1	1	1	48.388			
L6 51.5000-45.0000	0.37	1.61	A	1	0.65	1	1	1	27.377	0.25	38.67	C
			B	1	0.65	1	1	1	27.377			
			C	1	0.65	1	1	1	27.377			
L7 45.0000-0.0000	2.55	11.85	A	1	0.65	1	1	1	210.635	1.59	35.30	C
			B	1	0.65	1	1	1	210.635			
			C	1	0.65	1	1	1	210.635			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
Sum Weight:	8.55	30.02						OTM	451.08 kip-ft	5.68		

Tower Forces - Service - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
L1 167.0000-118.2500	1.85	3.87	A	1	0.65	1	1	1	120.575	1.43	29.23	C
			B	1	0.65	1	1	1	120.575			
			C	1	0.65	1	1	1	120.575			
L2 118.2500-90.5000	1.57	4.06	A	1	0.65	1	1	1	88.093	0.95	34.15	C
			B	1	0.65	1	1	1	88.093			
			C	1	0.65	1	1	1	88.093			
L3 90.5000-77.7500	0.72	2.23	A	1	0.65	1	1	1	45.490	0.49	38.23	C
			B	1	0.65	1	1	1	45.490			
			C	1	0.65	1	1	1	45.490			
L4 77.7500-63.5000	0.81	3.54	A	1	0.65	1	1	1	53.773	0.51	36.05	C
			B	1	0.65	1	1	1	53.773			
			C	1	0.65	1	1	1	53.773			
L5 63.5000-51.5000	0.68	2.86	A	1	0.65	1	1	1	48.388	0.47	39.18	C
			B	1	0.65	1	1	1	48.388			
			C	1	0.65	1	1	1	48.388			
L6 51.5000-45.0000	0.37	1.61	A	1	0.65	1	1	1	27.377	0.25	38.67	C
			B	1	0.65	1	1	1	27.377			
			C	1	0.65	1	1	1	27.377			
L7 45.0000-0.0000	2.55	11.85	A	1	0.65	1	1	1	210.635	1.59	35.30	C
			B	1	0.65	1	1	1	210.635			
			C	1	0.65	1	1	1	210.635			
Sum Weight:	8.55	30.02						OTM	451.08 kip-ft	5.68		

Tower Forces - Service - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
L1 167.0000-118.2500	1.85	3.87	A	1	0.65	1	1	1	120.575	1.43	29.23	C
			B	1	0.65	1	1	1	120.575			
			C	1	0.65	1	1	1	120.575			
L2 118.2500-90.5000	1.57	4.06	A	1	0.65	1	1	1	88.093	0.95	34.15	C
			B	1	0.65	1	1	1	88.093			
			C	1	0.65	1	1	1	88.093			
L3 90.5000-77.7500	0.72	2.23	A	1	0.65	1	1	1	45.490	0.49	38.23	C
			B	1	0.65	1	1	1	45.490			
			C	1	0.65	1	1	1	45.490			
L4 77.7500-63.5000	0.81	3.54	A	1	0.65	1	1	1	53.773	0.51	36.05	C
			B	1	0.65	1	1	1	53.773			
			C	1	0.65	1	1	1	53.773			
L5 63.5000-	0.68	2.86	A	1	0.65	1	1	1	48.388	0.47	39.18	C

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
51.5000			B	1	0.65	1	1	1	48.388			
			C	1	0.65	1	1	1	48.388			
L6 51.5000-45.0000	0.37	1.61	A	1	0.65	1	1	1	27.377	0.25	38.67	C
			B	1	0.65	1	1	1	27.377			
			C	1	0.65	1	1	1	27.377			
L7 45.0000-0.0000	2.55	11.85	A	1	0.65	1	1	1	210.635	1.59	35.30	C
			B	1	0.65	1	1	1	210.635			
			C	1	0.65	1	1	1	210.635			
Sum Weight:	8.55	30.02						OTM	451.08 kip-ft	5.68		

Load Combinations

Comb. No.	Description
1	Dead Only
2	Dead+Wind 0 deg - No Ice
3	Dead+Wind 30 deg - No Ice
4	Dead+Wind 60 deg - No Ice
5	Dead+Wind 90 deg - No Ice
6	Dead+Wind 120 deg - No Ice
7	Dead+Wind 150 deg - No Ice
8	Dead+Wind 180 deg - No Ice
9	Dead+Wind 210 deg - No Ice
10	Dead+Wind 240 deg - No Ice
11	Dead+Wind 270 deg - No Ice
12	Dead+Wind 300 deg - No Ice
13	Dead+Wind 330 deg - No Ice
14	Dead+Ice+Temp
15	Dead+Wind 0 deg+Ice+Temp
16	Dead+Wind 30 deg+Ice+Temp
17	Dead+Wind 60 deg+Ice+Temp
18	Dead+Wind 90 deg+Ice+Temp
19	Dead+Wind 120 deg+Ice+Temp
20	Dead+Wind 150 deg+Ice+Temp
21	Dead+Wind 180 deg+Ice+Temp
22	Dead+Wind 210 deg+Ice+Temp
23	Dead+Wind 240 deg+Ice+Temp
24	Dead+Wind 270 deg+Ice+Temp
25	Dead+Wind 300 deg+Ice+Temp
26	Dead+Wind 330 deg+Ice+Temp
27	Dead+Wind 0 deg - Service
28	Dead+Wind 30 deg - Service
29	Dead+Wind 60 deg - Service
30	Dead+Wind 90 deg - Service
31	Dead+Wind 120 deg - Service
32	Dead+Wind 150 deg - Service
33	Dead+Wind 180 deg - Service
34	Dead+Wind 210 deg - Service
35	Dead+Wind 240 deg - Service
36	Dead+Wind 270 deg - Service
37	Dead+Wind 300 deg - Service
38	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	167 - 118.25	Pole	Max Tension	14	0.00	-0.00	0.00
			Max. Compression	14	-28.86	1.72	-0.10
			Max. Mx	11	-15.31	812.26	-1.20
			Max. My	2	-15.28	-0.66	820.25
			Max. Vy	11	-26.01	812.26	-1.20
			Max. Vx	8	26.22	1.66	-820.24
			Max. Torque	11			-1.02
L2	118.25 - 90.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-37.49	3.63	-1.17
			Max. Mx	11	-22.07	1701.63	-2.99
			Max. My	8	-22.05	3.70	-1716.03
			Max. Vy	11	-29.11	1701.63	-2.99
			Max. Vx	8	29.31	3.70	-1716.03
			Max. Torque	11			-0.82
L3	90.5 - 77.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-39.68	4.10	-1.44
			Max. Mx	11	-23.87	1915.39	-3.41
			Max. My	8	-23.84	4.18	-1931.22
			Max. Vy	11	-29.85	1915.39	-3.41
			Max. Vx	8	30.06	4.18	-1931.22
			Max. Torque	11			-0.79
L4	77.75 - 63.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-47.04	5.43	-2.19
			Max. Mx	11	-29.84	2526.02	-4.56
			Max. My	8	-29.82	5.50	-2545.73
			Max. Vy	11	-31.85	2526.02	-4.56
			Max. Vx	8	32.05	5.50	-2545.73
			Max. Torque	11			-0.76
L5	63.5 - 51.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-51.47	6.23	-2.65
			Max. Mx	11	-33.58	2915.64	-5.26
			Max. My	8	-33.57	6.31	-2937.69
			Max. Vy	11	-33.08	2915.64	-5.26
			Max. Vx	8	33.29	6.31	-2937.69
			Max. Torque	11			-0.74
L6	51.5 - 45	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-53.93	6.67	-2.90
			Max. Mx	11	-35.67	3132.80	-5.64
			Max. My	8	-35.66	6.76	-3156.11
			Max. Vy	11	-33.72	3132.80	-5.64
			Max. Vx	8	33.93	6.76	-3156.11
			Max. Torque	11			-0.70
L7	45 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-71.78	9.92	-4.79
			Max. Mx	11	-51.01	4730.37	-8.33
			Max. My	8	-51.01	9.91	-4762.19
			Max. Vy	11	-37.29	4730.37	-8.33
			Max. Vx	8	37.49	9.91	-4762.19
			Max. Torque	11			-0.68

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	21	71.78	0.00	-8.67
	Max. H_x	11	51.04	37.26	-0.04
	Max. H_z	2	51.04	-0.04	37.46
	Max. M_x	2	4759.29	-0.04	37.46
	Max. M_z	5	4724.34	-37.26	0.04
	Max. Torsion	4	0.65	-32.29	18.77
	Min. Vert	1	51.04	0.00	0.00
	Min. H_x	5	51.04	-37.26	0.04
	Min. H_z	8	51.04	0.04	-37.46
	Min. M_x	8	-4762.19	0.04	-37.46
	Min. M_z	11	-4730.37	37.26	-0.04
	Min. Torsion	10	-0.65	32.29	-18.77

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	51.04	0.00	0.00	1.41	2.93	0.00
Dead+Wind 0 deg - No Ice	51.04	0.04	-37.46	-4759.29	-3.83	-0.23
Dead+Wind 30 deg - No Ice	51.04	18.67	-32.46	-4124.94	-2366.53	-0.51
Dead+Wind 60 deg - No Ice	51.04	32.29	-18.77	-2384.92	-4094.37	-0.65
Dead+Wind 90 deg - No Ice	51.04	37.26	-0.04	-5.40	-4724.34	-0.62
Dead+Wind 120 deg - No Ice	51.04	32.25	18.69	2375.97	-4087.53	-0.42
Dead+Wind 150 deg - No Ice	51.04	18.59	32.41	4121.02	-2354.65	-0.11
Dead+Wind 180 deg - No Ice	51.04	-0.04	37.46	4762.19	9.91	0.22
Dead+Wind 210 deg - No Ice	51.04	-18.67	32.46	4127.84	2372.59	0.50
Dead+Wind 240 deg - No Ice	51.04	-32.29	18.77	2387.83	4100.42	0.65
Dead+Wind 270 deg - No Ice	51.04	-37.26	0.04	8.33	4730.37	0.62
Dead+Wind 300 deg - No Ice	51.04	-32.25	-18.69	-2373.04	4093.60	0.43
Dead+Wind 330 deg - No Ice	51.04	-18.59	-32.41	-4118.10	2360.73	0.11
Dead+Ice+Temp	71.78	-0.00	0.00	4.79	9.92	0.00
Dead+Wind 0 deg+Ice+Temp	71.78	0.00	-8.67	-1147.73	9.37	-0.13
Dead+Wind 30 deg+Ice+Temp	71.78	4.32	-7.51	-993.67	-563.54	-0.19
Dead+Wind 60 deg+Ice+Temp	71.78	7.48	-4.34	-572.05	-982.75	-0.20
Dead+Wind 90 deg+Ice+Temp	71.78	8.63	-0.00	4.15	-1135.93	-0.15
Dead+Wind 120 deg+Ice+Temp	71.78	7.47	4.33	580.54	-982.04	-0.06
Dead+Wind 150 deg+Ice+Temp	71.78	4.31	7.51	1002.68	-562.30	0.04
Dead+Wind 180 deg+Ice+Temp	71.78	-0.00	8.67	1157.45	10.80	0.13
Dead+Wind 210 deg+Ice+Temp	71.78	-4.32	7.51	1003.39	583.71	0.19
Dead+Wind 240 deg+Ice+Temp	71.78	-7.48	4.34	581.78	1002.92	0.20
Dead+Wind 270 deg+Ice+Temp	71.78	-8.63	0.00	5.58	1156.10	0.15
Dead+Wind 300 deg+Ice+Temp	71.78	-7.47	-4.33	-570.82	1002.21	0.07
Dead+Wind 330 deg+Ice+Temp	71.78	-4.31	-7.51	-992.96	582.48	-0.04

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
Dead+Wind 0 deg - Service	51.04	0.02	-12.96	-1648.62	0.66	-0.08
Dead+Wind 30 deg - Service	51.04	6.46	-11.23	-1428.75	-818.25	-0.18
Dead+Wind 60 deg - Service	51.04	11.17	-6.49	-825.65	-1417.09	-0.23
Dead+Wind 90 deg - Service	51.04	12.89	-0.02	-0.92	-1635.41	-0.22
Dead+Wind 120 deg - Service	51.04	11.16	6.47	824.44	-1414.71	-0.15
Dead+Wind 150 deg - Service	51.04	6.43	11.22	1429.29	-814.12	-0.04
Dead+Wind 180 deg - Service	51.04	-0.02	12.96	1651.53	5.42	0.08
Dead+Wind 210 deg - Service	51.04	-6.46	11.23	1431.66	824.33	0.18
Dead+Wind 240 deg - Service	51.04	-11.17	6.49	828.56	1423.18	0.23
Dead+Wind 270 deg - Service	51.04	-12.89	0.02	3.84	1641.49	0.22
Dead+Wind 300 deg - Service	51.04	-11.16	-6.47	-821.53	1420.80	0.15
Dead+Wind 330 deg - Service	51.04	-6.43	-11.22	-1426.37	820.21	0.04

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX	PY	PZ	PX	PY	PZ	% Error
	K	K	K	K	K	K	
1	0.00	-51.04	0.00	0.00	51.04	0.00	0.000%
2	0.04	-51.04	-37.46	-0.04	51.04	37.46	0.000%
3	18.67	-51.04	-32.46	-18.67	51.04	32.46	0.000%
4	32.29	-51.04	-18.77	-32.29	51.04	18.77	0.000%
5	37.26	-51.04	-0.04	-37.26	51.04	0.04	0.000%
6	32.25	-51.04	18.69	-32.25	51.04	-18.69	0.000%
7	18.59	-51.04	32.41	-18.59	51.04	-32.41	0.000%
8	-0.04	-51.04	37.46	0.04	51.04	-37.46	0.000%
9	-18.67	-51.04	32.46	18.67	51.04	-32.46	0.000%
10	-32.29	-51.04	18.77	32.29	51.04	-18.77	0.000%
11	-37.26	-51.04	0.04	37.26	51.04	-0.04	0.000%
12	-32.25	-51.04	-18.69	32.25	51.04	18.69	0.000%
13	-18.59	-51.04	-32.41	18.59	51.04	32.41	0.000%
14	0.00	-71.78	0.00	0.00	71.78	-0.00	0.000%
15	0.00	-71.78	-8.67	-0.00	71.78	8.67	0.000%
16	4.32	-71.78	-7.51	-4.32	71.78	7.51	0.000%
17	7.48	-71.78	-4.34	-7.48	71.78	4.34	0.000%
18	8.63	-71.78	-0.00	-8.63	71.78	0.00	0.000%
19	7.47	-71.78	4.33	-7.47	71.78	-4.33	0.000%
20	4.31	-71.78	7.51	-4.31	71.78	-7.51	0.000%
21	-0.00	-71.78	8.67	0.00	71.78	-8.67	0.000%
22	-4.32	-71.78	7.51	4.32	71.78	-7.51	0.000%
23	-7.48	-71.78	4.34	7.48	71.78	-4.34	0.000%
24	-8.63	-71.78	0.00	8.63	71.78	-0.00	0.000%
25	-7.47	-71.78	-4.33	7.47	71.78	4.33	0.000%
26	-4.31	-71.78	-7.51	4.31	71.78	7.51	0.000%
27	0.02	-51.04	-12.96	-0.02	51.04	12.96	0.000%
28	6.46	-51.04	-11.23	-6.46	51.04	11.23	0.000%
29	11.17	-51.04	-6.49	-11.17	51.04	6.49	0.000%
30	12.89	-51.04	-0.02	-12.89	51.04	0.02	0.000%
31	11.16	-51.04	6.47	-11.16	51.04	-6.47	0.000%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
32	6.43	-51.04	11.22	-6.43	51.04	-11.22	0.000%
33	-0.02	-51.04	12.96	0.02	51.04	-12.96	0.000%
34	-6.46	-51.04	11.23	6.46	51.04	-11.23	0.000%
35	-11.17	-51.04	6.49	11.17	51.04	-6.49	0.000%
36	-12.89	-51.04	0.02	12.89	51.04	-0.02	0.000%
37	-11.16	-51.04	-6.47	11.16	51.04	6.47	0.000%
38	-6.43	-51.04	-11.22	6.43	51.04	11.22	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	4	0.00000001	0.00082053
3	Yes	6	0.00000001	0.00010526
4	Yes	6	0.00000001	0.00010657
5	Yes	5	0.00000001	0.00005480
6	Yes	6	0.00000001	0.00010460
7	Yes	6	0.00000001	0.00010571
8	Yes	4	0.00000001	0.00089166
9	Yes	6	0.00000001	0.00010660
10	Yes	6	0.00000001	0.00010518
11	Yes	4	0.00000001	0.00096136
12	Yes	6	0.00000001	0.00010613
13	Yes	6	0.00000001	0.00010511
14	Yes	4	0.00000001	0.00009488
15	Yes	5	0.00000001	0.00091076
16	Yes	6	0.00000001	0.00008836
17	Yes	6	0.00000001	0.00008821
18	Yes	5	0.00000001	0.00089967
19	Yes	6	0.00000001	0.00008846
20	Yes	6	0.00000001	0.00008881
21	Yes	5	0.00000001	0.00091623
22	Yes	6	0.00000001	0.00009034
23	Yes	6	0.00000001	0.00009003
24	Yes	5	0.00000001	0.00091527
25	Yes	6	0.00000001	0.00008950
26	Yes	6	0.00000001	0.00008961
27	Yes	4	0.00000001	0.00041970
28	Yes	5	0.00000001	0.00019160
29	Yes	5	0.00000001	0.00019577
30	Yes	4	0.00000001	0.00043733
31	Yes	5	0.00000001	0.00018945
32	Yes	5	0.00000001	0.00019355
33	Yes	4	0.00000001	0.00042190
34	Yes	5	0.00000001	0.00019741
35	Yes	5	0.00000001	0.00019206
36	Yes	4	0.00000001	0.00043228
37	Yes	5	0.00000001	0.00019507
38	Yes	5	0.00000001	0.00019211

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	167 - 118.25	41.202	33	2.2955	0.0029
L2	122.75 - 90.5	21.522	34	1.7964	0.0009
L3	90.5 - 77.75	11.182	34	1.2226	0.0004
L4	83.25 - 63.5	9.414	34	1.1058	0.0003
L5	63.5 - 51.5	5.362	34	0.8205	0.0002
L6	51.5 - 45	3.502	34	0.6606	0.0002
L7	45 - 0	2.661	34	0.5757	0.0001

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
167.0000	Lightning Rod 5/8x4'	33	41.202	2.2955	0.0029	26369
158.0000	(2) 7770.00 w/ Mount Pipe	33	36.942	2.2135	0.0024	14649
150.0000	(2) Pipe Mount [PM 601-3]	33	33.210	2.1365	0.0020	7755
148.0000	800 EXTERNAL NOTCH FILTER	33	32.290	2.1162	0.0019	6938
138.0000	APX16PV-16PVL-E w/ Mount Pipe	34	27.811	2.0058	0.0014	4545

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	167 - 118.25	118.546	8	6.6100	0.0083
L2	122.75 - 90.5	61.971	8	5.1734	0.0025
L3	90.5 - 77.75	32.213	8	3.5221	0.0011
L4	83.25 - 63.5	27.123	8	3.1858	0.0009
L5	63.5 - 51.5	15.452	8	2.3642	0.0006
L6	51.5 - 45	10.093	8	1.9037	0.0004
L7	45 - 0	7.669	8	1.6591	0.0004

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
167.0000	Lightning Rod 5/8x4'	8	118.546	6.6100	0.0084	9369
158.0000	(2) 7770.00 w/ Mount Pipe	8	106.305	6.3738	0.0070	5204
150.0000	(2) Pipe Mount [PM 601-3]	8	95.577	6.1522	0.0057	2753
148.0000	800 EXTERNAL NOTCH FILTER	8	92.934	6.0938	0.0054	2462
138.0000	APX16PV-16PVL-E w/ Mount Pipe	8	80.060	5.7760	0.0041	1611

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
L1	167 - 118.25 (1)	TP35.36x24x0.25	48.7500	0.0000	0.0	39.000	27.0277	-15.28	1054.08	0.014
L2	118.25 - 90.5 (2)	TP41.3282x33.8114x0.3125	32.2500	0.0000	0.0	39.000	40.6825	-22.05	1586.62	0.014
L3	90.5 - 77.75 (3)	TP44.3x41.3282x0.3819	12.7500	0.0000	0.0	34.080	51.6814	-23.84	1761.30	0.014
L4	77.75 - 63.5 (4)	TP46.9913x42.2543x0.375	19.7500	0.0000	0.0	39.000	55.4851	-29.82	2163.92	0.014
L5	63.5 - 51.5 (5)	TP49.7851x46.9913x0.4599	12.0000	0.0000	0.0	34.134	72.0058	-33.57	2457.85	0.014
L6	51.5 - 45 (6)	TP51.2985x49.7851x0.4572	6.5000	0.0000	0.0	34.146	73.7753	-35.66	2519.13	0.014
L7	45 - 0 (7)	TP61.04x51.2985x0.4375	45.0000	0.0000	0.0	39.000	84.1541	-51.01	3282.01	0.016

Pole Bending Design Data

Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
L1	167 - 118.25 (1)	TP35.36x24x0.25	820.25	43.307	39.000	1.110	0.00	0.000	39.000	0.000
L2	118.25 - 90.5 (2)	TP41.3282x33.8114x0.3125	1716.04	50.000	39.000	1.282	0.00	0.000	39.000	0.000
L3	90.5 - 77.75 (3)	TP44.3x41.3282x0.3819	1931.22	42.668	34.080	1.252	0.00	0.000	34.080	0.000
L4	77.75 - 63.5 (4)	TP46.9913x42.2543x0.375	2545.74	47.873	39.000	1.227	0.00	0.000	39.000	0.000
L5	63.5 - 51.5 (5)	TP49.7851x46.9913x0.4599	2937.70	40.282	34.134	1.180	0.00	0.000	34.134	0.000
L6	51.5 - 45 (6)	TP51.2985x49.7851x0.4572	3156.12	40.966	34.146	1.200	0.00	0.000	34.146	0.000
L7	45 - 0 (7)	TP61.04x51.2985x0.4375	4762.21	45.381	39.000	1.164	0.00	0.000	39.000	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V K	Actual f_v ksi	Allow. F_v ksi	Ratio $\frac{f_v}{F_v}$	Actual T kip-ft	Actual f_{vt} ksi	Allow. F_{vt} ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
L1	167 - 118.25 (1)	TP35.36x24x0.25	26.22	0.970	26.000	0.075	0.12	0.003	26.000	0.000
L2	118.25 - 90.5 (2)	TP41.3282x33.8114x0.3125	29.31	0.721	26.000	0.055	0.06	0.001	26.000	0.000
L3	90.5 - 77.75 (3)	TP44.3x41.3282x0.3819	30.06	0.582	22.720	0.051	0.03	0.000	22.720	0.000
L4	77.75 - 63.5 (4)	TP46.9913x42.2543x0.375	32.05	0.578	26.000	0.044	0.03	0.000	26.000	0.000
L5	63.5 - 51.5 (5)	TP49.7851x46.9913x0.4599	33.29	0.462	22.756	0.041	0.09	0.001	22.756	0.000

Section No.	Elevation ft	Size	Actual V K	Actual f_v ksi	Allow. F_v ksi	Ratio $\frac{f_v}{F_v}$	Actual T kip-ft	Actual f_{vt} ksi	Allow. F_{vt} ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
L6	51.5 - 45 (6)	TP51.2985x49.7851x0.4572	33.93	0.460	22.764	0.040	0.12	0.001	22.764	0.000
L7	45 - 0 (7)	TP61.04x51.2985x0.4375	37.49	0.445	26.000	0.034	0.22	0.001	26.000	0.000

Pole Interaction Design Data

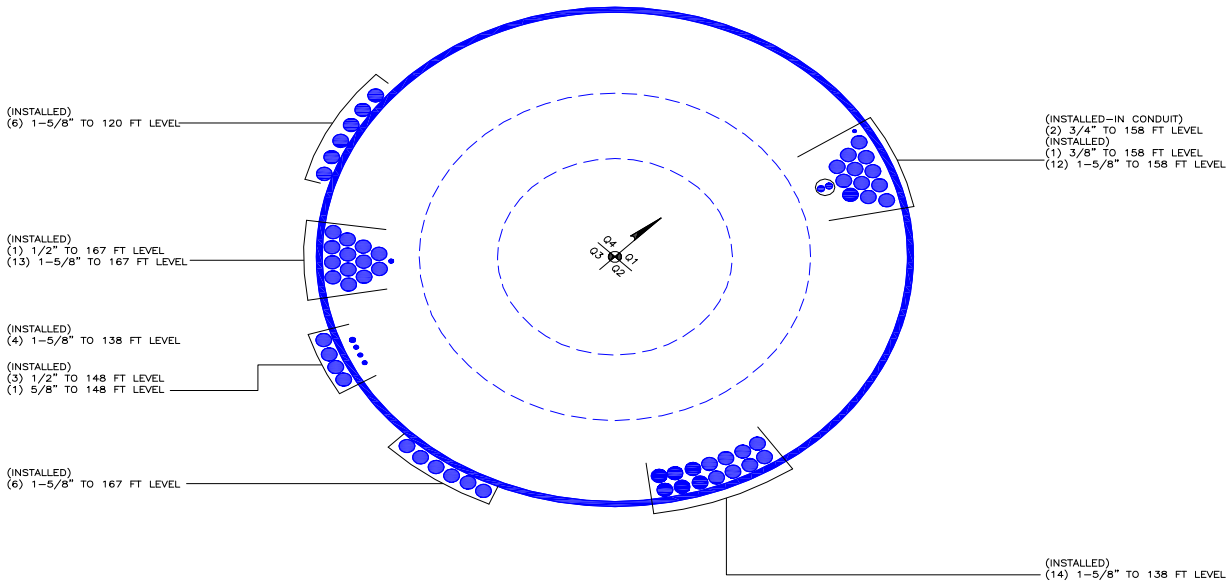
Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	167 - 118.25 (1)	0.014	1.110	0.000	0.075	0.000	1.126 ✔	1.333	H1-3+VT ✔
L2	118.25 - 90.5 (2)	0.014	1.282	0.000	0.055	0.000	1.297 ✔	1.333	H1-3+VT ✔
L3	90.5 - 77.75 (3)	0.014	1.252	0.000	0.051	0.000	1.266 ✔	1.333	H1-3+VT ✔
L4	77.75 - 63.5 (4)	0.014	1.227	0.000	0.044	0.000	1.242 ✔	1.333	H1-3+VT ✔
L5	63.5 - 51.5 (5)	0.014	1.180	0.000	0.041	0.000	1.194 ✔	1.333	H1-3+VT ✔
L6	51.5 - 45 (6)	0.014	1.200	0.000	0.040	0.000	1.214 ✔	1.333	H1-3+VT ✔
L7	45 - 0 (7)	0.016	1.164	0.000	0.034	0.000	1.179 ✔	1.333	H1-3+VT ✔

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
L1	167 - 118.25	Pole	TP35.36x24x0.25	1	-15.28	1405.09	84.5	Pass
L2	118.25 - 90.5	Pole	TP41.3282x33.8114x0.3125	2	-22.05	2114.96	97.3	Pass
L3	90.5 - 77.75	Pole	TP44.3x41.3282x0.3819	3	-23.84	2347.81	95.0	Pass
L4	77.75 - 63.5	Pole	TP46.9913x42.2543x0.375	4	-29.82	2884.51	93.2	Pass
L5	63.5 - 51.5	Pole	TP49.7851x46.9913x0.4599	5	-33.57	3276.31	89.6	Pass
L6	51.5 - 45	Pole	TP51.2985x49.7851x0.4572	6	-35.66	3358.00	91.1	Pass
L7	45 - 0	Pole	TP61.04x51.2985x0.4375	7	-51.01	4374.92	88.5	Pass
							Summary	
						Pole (L2)	97.3	Pass
						RATING =	**97.3**	**Pass**

APPENDIX B

BASE LEVEL DRAWING

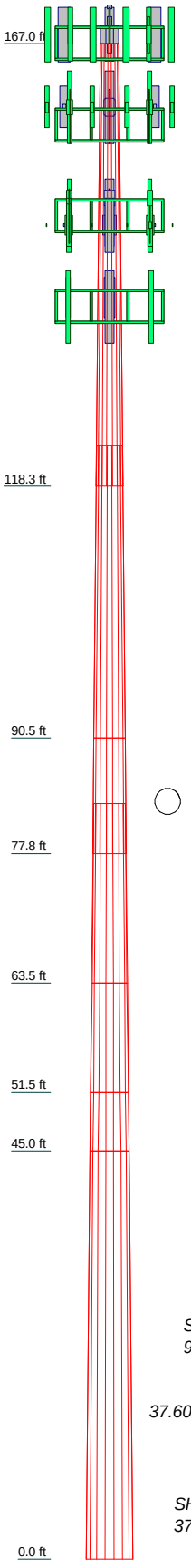

(INSTALLED)
(6) 1-5/8" TO 120 FT LEVEL
(INSTALLED)
(1) 1/2" TO 167 FT LEVEL
(13) 1-5/8" TO 167 FT LEVEL
(INSTALLED)
(4) 1-5/8" TO 138 FT LEVEL
(INSTALLED)
(3) 1/2" TO 148 FT LEVEL
(1) 5/8" TO 148 FT LEVEL
(INSTALLED)
(6) 1-5/8" TO 167 FT LEVEL
(INSTALLED-IN CONDUIT)
(2) 3/4" TO 158 FT LEVEL
(INSTALLED)
(1) 3/8" TO 158 FT LEVEL
(12) 1-5/8" TO 158 FT LEVEL
(INSTALLED)
(14) 1-5/8" TO 138 FT LEVEL
Q4
Q1
Q3
Q2

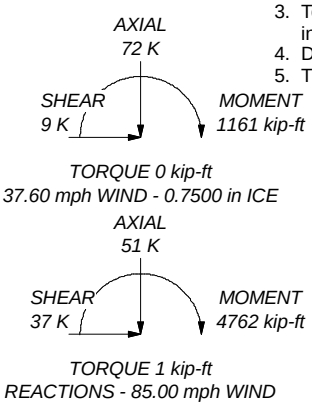
APPENDIX C

ADDITIONAL CALCULATIONS

Program Version 6.1.4.1 - 12/17/2013 File:G:/TOWER/375_Crown_Castle/2015/37515-3126_801367_CT NHV-2075 CAC 801367/37515-3126.001.7700_SDD_1143564/Existing/37515-3126.001.7700 Existing.eri

Section	1	2	3	4	5	6	7
Length (ft)	48.7500	32.2500	12.7500	19.7500	12.0000	6.5000	45.0000
Number of Sides	18	18	18	18	18	18	18
Thickness (in)	0.2500	0.3125	0.3819	0.3750	0.4599	0.4572	0.4375
Socket Length (ft)	4.5000		5.5000				
Top Dia (in)	24.0000	33.8114	41.3282	42.2542	46.9913	49.7851	51.2985
Bot Dia (in)	35.3600	41.3282	44.3000	46.9913	49.7851	51.2985	61.0400
Grade	A607-65			Reinf 56.80 ksi	A607-65	Reinf 56.89 ksi	Reinf 56.91 ksi / A607-65
Weight (K)	3.9	4.1	2.2	3.5	2.9	1.6	11.9
							30.0





DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Lightning Rod 5/8x4'	167	6' x 2" Mount Pipe	158
(2) LPA-80063-6CF-EDIN w/ Mount Pipe	167	(2) Pipe Mount [PM 601-3]	150
(2) LPA-80063-6CF-EDIN w/ Mount Pipe	167	PCS 1900MHz 4x45W-65MHz w/Mount Pipe	150
(2) LPA-80063-6CF-EDIN w/ Mount Pipe	167	TME-800MHz RRH w/ mount pipe	150
GPS_A	167	PCS 1900MHz 4x45W-65MHz w/Mount Pipe	150
BXA-171063-8CF-EDIN-X w/ Mount Pipe	167	TME-800MHz RRH w/ mount pipe	150
BXA-171063-8CF-EDIN-X w/ Mount Pipe	167	PCS 1900MHz 4x45W-65MHz w/Mount Pipe	150
BXA-171063-8CF-EDIN-X w/ Mount Pipe	167	TME-800MHz RRH w/ mount pipe	150
BXA-70063-6CF-EDIN-2 w/ Mount Pipe	167	800 EXTERNAL NOTCH FILTER	148
BXA-70063-6CF-EDIN-2 w/ Mount Pipe	167	(3) ACU-A20-N	148
BXA-70063-6CF-EDIN-2 w/ Mount Pipe	167	APXVSPP18-C-A20 w/ Mount Pipe	148
Platform Mount [LP 1201-1]	167	800 EXTERNAL NOTCH FILTER	148
BXA-171063-8BF-2 w/ Mount Pipe	167	(3) ACU-A20-N	148
BXA-171063-8BF-2 w/ Mount Pipe	167	APXVSPP18-C-A20 w/ Mount Pipe	148
BXA-171063-8BF-2 w/ Mount Pipe	167	800 EXTERNAL NOTCH FILTER	148
RRH2X40-AWS	167	(3) ACU-A20-N	148
RRH2X40-AWS	167	APXVSPP18-C-A20 w/ Mount Pipe	148
DB-T1-6Z-8AB-0Z	167	TD-RRH8x20-25	148
RRH2X40-AWS	167	APXVTM14-C-120 w/ Mount Pipe	148
(2) 7770.00 w/ Mount Pipe	158	TD-RRH8x20-25	148
(2) 7770.00 w/ Mount Pipe	158	APXVTM14-C-120 w/ Mount Pipe	148
(2) 7770.00 w/ Mount Pipe	158	TD-RRH8x20-25	148
(2) LGP13519	158	APXVTM14-C-120 w/ Mount Pipe	148
(2) LGP13519	158	6' x 2" Mount Pipe	148
(2) LGP13519	158	6' x 2" Mount Pipe	148
(2) LGP21401	158	6' x 2" Mount Pipe	148
(2) LGP21401	158	Platform Mount [LP 1201-1]	148
(2) LGP21401	158	APX16PV-16PVL-E w/ Mount Pipe	138
SBNH-1D6565C w/ Mount Pipe	158	APX16PV-16PVL-E w/ Mount Pipe	138
SBNH-1D6565C w/ Mount Pipe	158	APX16PV-16PVL-E w/ Mount Pipe	138
SBNH-1D6565C w/ Mount Pipe	158	KRY 112 134/1	138
RRUS-11	158	KRY 112 134/1	138
RRUS-11	158	KRY 112 134/1	138
RRUS-11	158	KRY 112 89/5	138
DC6-48-60-18-8F	158	KRY 112 89/5	138
Platform Mount [LP 1201-1]	158	KRY 112 89/5	138
6' x 2" Mount Pipe	158	Platform Mount [LP 1201-1]	138
6' x 2" Mount Pipe	158	ATBT-BOTTOM-24V	138
		LNX-6515DS-VTM w/ Mount Pipe	138
		ATBT-BOTTOM-24V	138
		LNX-6515DS-VTM w/ Mount Pipe	138
		ATBT-BOTTOM-24V	138
		LNX-6515DS-VTM w/ Mount Pipe	138

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A607-65	65 ksi	80 ksi	Reinf 56.89 ksi	57 ksi	72 ksi
Reinf 56.80 ksi	57 ksi	71 ksi	Reinf 56.91 ksi	57 ksi	72 ksi

TOWER DESIGN NOTES

1. Tower is located in New Haven County, Connecticut.
2. Tower designed for a 85.00 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 37.60 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50.00 mph wind.
5. TOWER RATING: 97.3%

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

Job:	***Ex. 167-ft Monopole / Cheshire, CT***		
Project:	***BU# 801367 / PJF# 37512-1657***		
Client: Crown Castle	Drawn by: John J Woolley	App'd:	
Code: TIA/EIA-222-F	Date: 11/05/15	Scale: NTS	
Path:		Dwg No. E-1	

Square, Stiffened / Unstiffened Base Plate, Any Rod Material - Rev. F /G

Assumptions: 1) Rod groups at corners. Total # rods divisible by 4. Maximum total # of rods = 48 (12 per Corner).
2) Rod Spacing = Straight Center-to-Center distance between any (2) adjacent rods (same corner)
3) Clear space between bottom of leveling nut and top of concrete **not** exceeding (1)*(Rod Diameter)

Site Data

BU#:
Site Name:
App #:

Anchor Rod Data		
Qty:	20	
Diam:	2.25	in
Rod Material:	A615-J	
Yield, Fy:	75	ksi
Strength, Fu:	100	ksi
Bolt Circle:	68	in
Anchor Spacing:	6	in

Plate Data		
W=Side:	67	in
Thick:	3	in
Grade:	55	ksi
Clip Distance:	14	in

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

Pole Data		
Diam:	61.04	in
Thick:	0.4375	in
Grade:	65	ksi
# of Sides:	18	"0" IF Round

Stress Increase Factor		
ASD ASIF:	1.333	

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

Base Reactions		
TIA Revision:	F	
Unfactored Moment, M:	4762	ft-kips
Unfactored Axial, P:	51	kips
Unfactored Shear, V:	37	kips

Anchor Rod Results

TIA F --> Maximum Rod Tension	165.5 Kips
Allowable Tension:	195.0 Kips
Anchor Rod Stress Ratio:	84.9% **Pass**

Base Plate Results Flexural Check

Base Plate Stress:	40.1 ksi
Allowable PL Bending Stress:	55.0 ksi
Base Plate Stress Ratio:	72.9% **Pass**

PL Ref. Data
Yield Line (in):
33.71
Max PL Length:
33.71

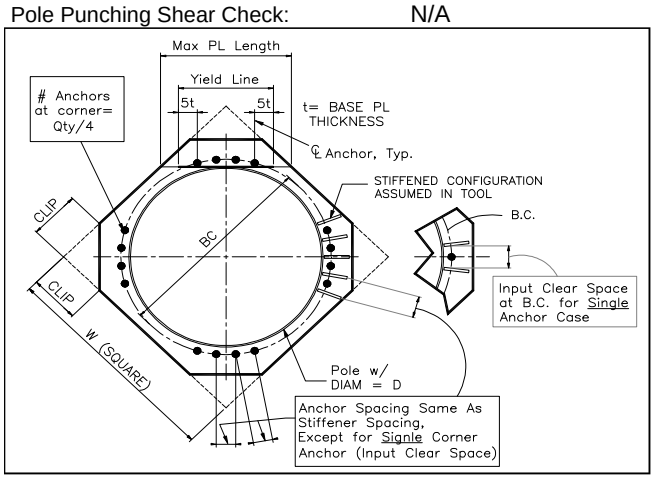
N/A - Unstiffened

Stiffener Results

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

Pole Results

Pole Punching Shear Check: N/A



Foundation Loads:

Pole weight or tower leg compression =	**51**	(kips)
Horizontal load at top of pier =	**37**	(kips)
Overturning moment at top of pier=	**4762**	(ft-kips)

Design criteria:

Safety factor against overturning =	**1.5**	

Soil Properties:

Soil density =	**100**	(pcf)
Allowable soil bearing =	**8**	(ksf)
Depth to water table =	**99**	(ft)

Dimensions:

Pier shape (round or square)	**R**	("R" or "S")
Pier width =	**8**	(ft)
Pier height above grade =	**0.5**	(ft)
depth to bottom of footing =	**7**	(ft)
Footing thickness =	**4**	(ft)
Footing width =	**26**	(ft)
Footing length =	**26**	(ft)

Concrete:

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

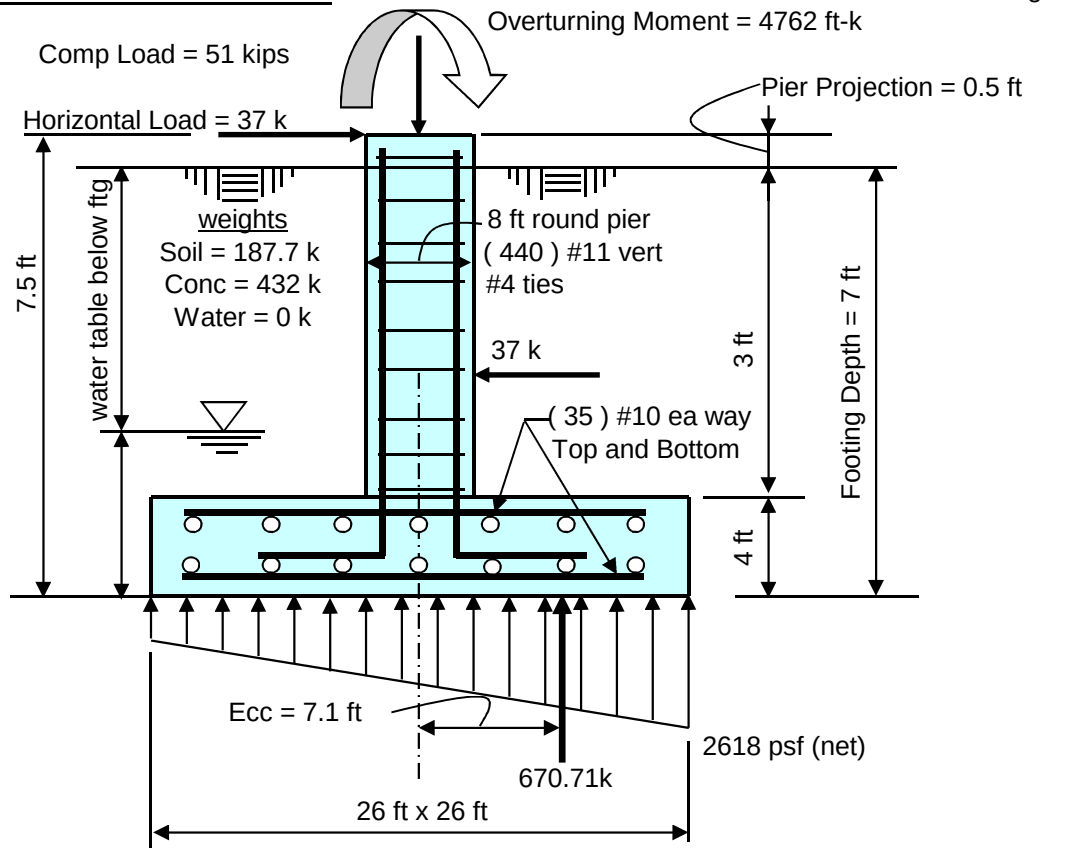
Reinforcing Steel:

	Pad	
minimum cover over rebar =	**3**	inches
size of pad rebar =	**#10**	bar
quantity of pad rebar =	**35**	(ea direction)

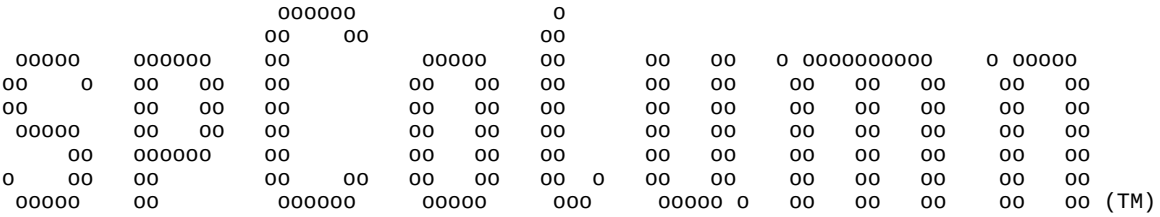
Reinforcing Steel:

	Pier	
size of vert rebar in pier=	**#11**	bar
vertical rebar quantity =	**440**	
size of pier ties =	**#4**	bar
minimum cover over rebar =	**3**	inches

Total volume of concrete = #### cu yd



Summary of analysis results	
Maximum Net Soil Bearing = 2.618 ksf Allowable Net Soil Bearing = 8 ksf **Soil Bearing Stress Ratio = 0.33 Okay**	Ult Bending Shear Capacity = 110 psi Ult Bending Shear Stress = 30 psi **Bending Shear Stress Ratio = 0.28 Okay**
Ftg Overturning Resistance = 8719 ft-kips Overturning Moment = 4762 ft-kips Required Overturning Safety Factor = 1.5 Overturning Safety Factor = 1.831 **Ratio = 0.82 Okay**	Pad Bending Moment Capacity= 8291 ft-k Pad Bending Moment = 2082 ft-k **Bending Moment Stress Ratio = 0.25 OK**



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

General Information:
==========
File Name: g:\tower\375_crown_castle\2015\37515-3126_801367_ct nhv-2075 cac 801367...\37512-1657.col
Project:
Column: Engineer:
Code: ACI 318-02 Units: English

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

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

Section:
========
Circular: Diameter = 96 in

Gross section area, Ag = 7238.23 in^2
Ix = 4.16922e+006 in^4 Iy = 4.16922e+006 in^4
rx = 24 in ry = 24 in
Xo = 0 in Yo = 0 in

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

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

Confinement: Tied; #4 ties with #10 bars, #4 with larger bars.
phi(a) = 0.8, phi(b) = 0.9, phi(c) = 0.65

Layout: Circular
Pattern: All Sides Equal (Cover to transverse reinforcement)
Total steel area: As = 62.40 in^2 at rho = 0.86% (Note: rho < 1.0%)
Minimum clear spacing = 5.46 in

40 #11 Cover = 3 in

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

No.	Pu kip	Mux k-ft	PhiMnx k-ft	PhiMn/Mu	NA depth in	Dt depth in	eps_t	Phi
1	51.00	6359.00	10799.59	1.698	19.55	91.79	0.01109	0.900

*** End of output ***

PAUL J. FORD & COMPANY
250 E Broad St, Ste 600 • Columbus, OH 43215
Phone 614.221.6679 www.pauljford.com

Job Number: 37515-3126.001.7805 **Page:** 1
Site Number: 801367 **By:** JJW
Site Name: CT NHV-2075 CAC 801367 **Date:** 11/5/2015

DRILLED PIER SOIL AND STEEL ANALYSIS - TIA/EIA-222-F

Unfactored Base Reactions from RISA

	Comp. (+)	Tension (-)	
Moment, M =	4762.0		k-ft
Shear, V =	37.0		kips
Axial Load, P =	51.0		kips
OTM =	4780.5	0.0	k-ft @ Ground

Safety Factors / Load Factors / Φ Factors

Tower Type =	Monopole DP
ACI Code =	ACI 318-02
Seismic Design Category =	D
Reference Standard =	TIA/EIA-222-F
Use 1.3 Load Factor?	Yes
Load Factor =	1.30

Drilled Pier Parameters

Diameter =	8	ft
Height Above Grade =	0.5	ft
Depth Below Grade =	23	ft
fc' =	3	ksi
εc =	0.003	in/in
Mat Ftdn. Cap Width =		ft
Mat Ftdn. Cap Length =		ft
Depth Below Grade =		ft

	Safety Factor	Φ Factor
Soil Lateral Resistance =	2.00	0.75
Skin Friction =	2.00	0.75
End Bearing =	2.00	0.75
Concrete Wt. Resist Uplift =	1.25	

Load Combinations Checked per TIA/EIA-222-F

1. Ult. Skin Friction/2.00 + Ult. End Bearing/2.00
 + Effective Soil Wt. - Buoyant Conc. Wt. ≥ Comp.
2. Ult. Skin Friction/2.00 + Buoyant Conc. Wt./1.25 ≥ Uplift
3. Ult. Skin Friction/1.50 + Buoyant Conc. Wt./1.50 ≥ Uplift

Steel Parameters

Number of Bars =	24	
Rebar Size =	#11	
Rebar Fy =	60	ksi
Rebar MOE =	29000	ksi
Tie Size =	#5	
Side Clear Cover to Ties =	4	in

Soil Parameters

Water Table Depth =	99.00	ft
Depth to Ignore Soil =	4.00	ft
Depth to Full Cohesion =	0	ft
Full Cohesion Starts at?	Ground	

Above Full Cohesion Lateral Resistance = 4(Cohesion)(Dia)(H)
Below Full Cohesion Lateral Resistance = 8(Cohesion)(Dia)(H)

Direct Embed Pole Shaft Parameters

Dia @ Grade =		in
Dia @ Depth Below Grade =		in
Number of Sides =		
Thickness =		in
Fy =		ksi
Backfill Condition =		

Maximum Capacity Ratios

Maximum Soil Ratio =	100.0%
Maximum Steel Ratio =	100.0%

Define Soil Layers

Note: Cohesion = Undrained Shear Strengh = Unconfined Compressive Strength / 2

Layer	Thickness ft	Unit Weight pcf	Cohesion psf	Friction Angle degrees	Soil Type	Ultimate End Bearing psf	Comp. Ult. Skin Friction psf	Tension Ult. Skin Friction psf	Depth ft
1	13.5	135	0	35	Sand				13.5
2	15.5	150	0	35	Sand	80000			29
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									

Soil Results: Overturning

Depth to COR =	16.85	ft, from Grade	Shear, V =	37.00	kips
Bending Moment, M =	5403.79	k-ft, from COR	Resisting Shear, Va =	44.88	kips
Resisting Moment, Ma =	6554.31	k-ft, from COR			

MOMENT RATIO = 82.4% OK **SHEAR RATIO = 82.4% OK**

Soil Results: Uplift

Uplift, T =	0.00	kips
Allowable Uplift Cap., Ta =	141.75	kips

UPLIFT RATIO = 0.0% OK

Soil Results: Compression

Compression, C =	51.00	kips
Allowable Comp. Cap., Ca =	1996.67	kips

COMPRESSION RATIO = 2.6% OK

Steel Results (ACI 318-02):

Minimum Steel Area =	24.13	sq in	Axial Load, P =	90.58	kips @ 4.75 ft Below Grade
Actual Steel Area =	37.44	sq in	Moment, M =	4950.36	k-ft @ 4.75 ft Below Grade
			Allowable Moment, Ma =	5431.02	k-ft
Allowable Min Axial, Pa =	-1555.20	kips, Where Ma = 0 k-ft			
Allowable Max Axial, Pa =	8243.37	kips, Where Ma = 0 k-ft			

MOMENT RATIO = 91.1% OK

Moment Capacity of Drilled Concrete Shaft (Caisson) for TIA Rev F or G

Note: Shaft assumed to have ties, not spiral, transverse reinforcing

Site Data

BU#: *801367*
Site Name: *CT NHV-2075 CAC 801367*
App #:

Enter Load Factors Below:		
For M (WL)	1.3	<---- Enter Factor
For P (DL)	1.3	<---- Enter Factor

Pier Properties

Concrete:

Pier Diameter =	8.0	ft
Concrete Area =	7238.2	in^2

Reinforcement:

Clear Cover to **Tie**=	4.00	in
Horiz. **Tie** Bar Size=	5	
Vert. Cage Diameter =	7.11	ft
Vert. Cage Diameter =	85.34	in
Vertical Bar Size =	11	
Bar Diameter =	1.41	in
Bar Area =	1.56	in^2
Number of Bars =	24	
As Total=	37.44	in^2
A s/ Aconc, Rho:	0.0052	0.52%

ACI 10.5 , ACI 21.10.4, and IBC 1810.
Min As for Flexural, Tension Controlled, Shafts:

(3)*(Sqrt(f'c)/Fy:	0.0027
200 / Fy:	0.0033

Minimum Rho Check:

Actual Req'd Min. Rho:	0.33%	Flexural
Provided Rho:	0.52%	**OK**

Ref. Shaft Max Axial Capacities, ϕ Max(Pn or Tn):		
Max Pu = (φ=0.65) Pn.		
Pn per ACI 318 (10-2)	10716.37	kips
at Mu=(ϕ=0.65)Mn=	7467.49	ft-kips
Max Tu, (φ=0.9) Tn =	2021.76	kips
at Mu=ϕ=(0.90)Mn=	0.00	ft-kips

Maximum Shaft Superimposed Forces

TIA Revision:	F	
Max. Service Shaft M:	4950.36	ft-kips **(* Note)**
Max. Service Shaft P:	90.58	kips
Max Axial Force Type:	Comp.	

(*) Note: Max Shaft Superimposed Moment does not necessarily equal to the shaft top reaction moment

Load Factor	**Shaft Factored Loads**		
1.30	Mu:	6435.468	ft-kips
1.30	Pu:	117.754	kips

Material Properties

Concrete Comp. strength, f'c =	3000	psi
Reinforcement yield strength, Fy =	60	ksi
Reinforcing Modulus of Elasticity, E =	29000	ksi
Reinforcement yield strain =	0.00207	
Limiting compressive strain =	0.003	

ACI 318 Code

Select Analysis ACI Code=	2002

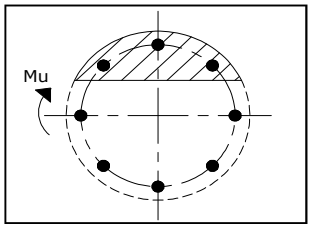
Seismic Properties

Seismic Design Category =	D
Seismic Risk =	**High**

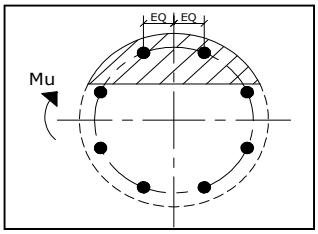
Solve (Run) <-- Press Upon Completing All Input

Results:

Governing Orientation Case: **2**



Case 1



Case 2

Dist. From Edge to Neutral Axis:	**15.08**	in
Extreme Steel Strain, ϵt:	**0.0150**	
	ϵt > 0.0050, Tension Controlled	
Reduction Factor,φ:	**0.900**	

Output Note: Negative Pu=Tension

For Axial Compression, φ Pn = Pu:	117.75	kips
Drilled Shaft Moment Capacity, φMn:	**7060.32**	ft-kips
Drilled Shaft Superimposed Mu:	**6435.47**	ft-kips

(Mu/φMn, Drilled Shaft Flexure CSR:	**91.1%**

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

T-Mobile Existing Facility

Site ID: CT11352C

Crowne Cheshire
1119 Summit Road
Cheshire, CT 06410

October 5, 2015

EBI Project Number: 6215004948

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general public allowable limit:	6.37 %

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

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October 5, 2015

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

Emissions Analysis for Site: **CT11352C – Crowne Cheshire**

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **1119 Summit Road, Cheshire, 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 **1119 Summit Road, Cheshire, 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) Since the radios are ground mounted there are additional cabling losses accounted for. For each RF path the following losses were calculated. 1.65 dB of additional cable loss for all 1900 MHz channels, 1.70 dB of additional cable loss for all 2100 MHz channels and 0.90 dB of additional cable loss at 700 MHz. This is based on manufacturers Specifications for 160 feet of 1-5/8” coax cable on each path.

6) 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.

7) 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.

8) The antennas used in this modeling are the **RFS APX16PV-16PVL** 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 **RFS APX16PV-16PVL** has a maximum gain of **16.3 dBd** at its main lobe. The **Commscope LNX-6515DS-VTM** has a maximum gain of **14.6 dBd** at its main lobe. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

9) The antenna mounting height centerline of the proposed antennas is **138 feet** above ground level (AGL).

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

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

T-Mobile Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	**1**	Antenna #:	**1**	Antenna #:	**1**
Make / Model:	RFS APX16PV-16PVL	Make / Model:	RFS APX16PV-16PVL	Make / Model:	RFS APX16PV-16PVL
Gain:	16.3 dBd	Gain:	16.3 dBd	Gain:	16.3 dBd
Height (AGL):	138	Height (AGL):	138	Height (AGL):	138
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	6	Channel Count	6	# PCS Channels:	6
Total TX Power:	240	Total TX Power:	240	# AWS Channels:	240
ERP (W):	6,961.75	ERP (W):	6,961.75	ERP (W):	6,961.75
Antenna A1 MPE%	1.44	Antenna B1 MPE%	1.44	Antenna C1 MPE%	1.44
Antenna #:	**2**	Antenna #:	**2**	Antenna #:	**2**
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):	138	Height (AGL):	138	Height (AGL):	138
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):	703.27	ERP (W):	703.27	ERP (W):	703.27
Antenna A2 MPE%	0.31	Antenna B2 MPE%	0.31	Antenna C2 MPE%	0.31

Site Composite MPE%	
Carrier	**MPE%**
T-Mobile (Per Sector Max)	**1.75 %**
MetroPCS	0.87 %
Verizon Wireless	1.31 %
Sprint	0.71 %
AT&T	1.27 %
Nextel	0.46 %
Site Total MPE %:	**6.37 %**

T-Mobile Sector 1 Total:	1.75 %
T-Mobile Sector 2 Total:	1.75 %
T-Mobile Sector 3 Total:	1.75 %
Site Total:	6.37 %

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**	**1750.46**	**138**	**7.22**	**2100**	**1000**	**0.72 %**
T-Mobile 700 MHz LTE	**1**	**703.27**	**138**	**1.45**	**700**	**467**	**0.31 %**
T-Mobile 1900 MHz (PCS) GSM/UMTS	**2**	**865.21**	**138**	**3.57**	**1900**	**1000**	**0.36 %**
T-Mobile 2100 MHz (AWS) UMTS	**2**	**865.21**	**138**	**3.57**	**2100**	**1000**	**0.36 %**
						Total:	**1.75%**

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Summary

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

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

T-Mobile Sector	Power Density Value (%)
Sector 1:	1.75 %
Sector 2:	1.75 %
Sector 3 :	1.75 %
T-Mobile Per Sector Maximum:	1.75 %
Site Total:	6.37 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **6.37%** of the allowable FCC established general public limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions.

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

Scott Heffernan
RF Engineering Director

EBI Consulting
21 B Street
Burlington, MA 01803