Crown Castle
12 Gill Street, Suite 5800
Woburn, MA 01801

November 22, 2016

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: 841289**
T-Mobile Site ID: CT11035E
Located at: 170 Ingham Hill Road, Old Saybrook, CT 06475
Latitude: 41° 18' 35.55"/ Longitude: -72° 23' 51.13"

Dear Ms. Bachman,

T-Mobile currently maintains an omnidirectional canister antenna at the 163-foot level of the existing 150-foot monopole tower located at 170 Ingham Hill Road, Old Saybrook, CT. The tower is owned by Crown Castle. The property is owned by Carlo and Robert Lorenz. T-Mobile now proposes to remove the existing antenna. They will then install nine (9) new antennas on a new mount at the 140-foot level. They also propose to install three (3) remote radio units (non-antennas), three (3) TMAs, and one (1) hybrid fiber cable. The existing cables will be relocated to the new 140-foot level. All work is to be completed within the existing area.

This facility was approved by the Connecticut Siting Council on September 26, 1985 in Docket No. 51.2. The approval contained the following conditions.

1. The tower shall be no taller than necessary to provide the proposed service, and in no event shall exceed 150'.
2. A fence not lower than eight feet shall surround each tower and its associated equipment building;
3. The applicant or its successor shall notify the Council if and when directional antennas or any other equipment is added to any of these facilities;

4. The applicant or its successor shall permit, in accordance with representations made by it during the proceeding, public or private entities to share space on the facilities, for due consideration received, or shall provide any requesting entity with specific legal, technical, environmental, or economic reasons precluding such tower sharing;
5. The facilities shall be constructed in accordance with all applicable federal, state, and municipal laws and regulations;
6. The applicant shall submit a development and management plan (D&M) for the Old Saybrook site pursuant to sections 16-50j-75 through 16-50j-77 of the regulations of state agencies, except that irrelevant items in section 16-50j-76 need only be identified as such. The D&M plan shall include erosion control measures, reseeding plans, and tree removal plans. The applicant shall comply with the reporting requirements of sections 16-50j-77 for both sites;
7. Construction activities shall take place during daylight working hours;
8. This decision and order shall be void and new the towers and associated equipment approved herein shall be dismantled and removed, or reapplication for any such new use shall be made to the Connecticut Siting Council before any such new use is made, if the towers do not provide or permanently cease to provide cellular service following completion of construction.
9. This decision and order shall be void if all construction authorized is not complete within three years of the issuance of this decision.

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 Mr. Carl Fortuna, Jr., First Selectman for the Town of Old Saybrook, as well as the property owner and the tower owner.

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

2. The proposed modification 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.

6. The existing structure and its foundation can support the proposed loading.

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

Sincerely,

Amanda Goodall
Real Estate Specialist
12 Gill Street, Suite 5800, Woburn, MA 01801
339-205-7017
Amanda.Goodall@crowncastle.com

Attachments:

Tab 1: Exhibit-1: Compound plan and elevation depicting the planned changes
Tab 2: Exhibit-2: Structural Modification Report
Tab 4: Exhibit-3: General Power Density Table report (RF Emissions Analysis Report)

cc: First Selectman Carl Fortuna, Jr.
Town of Old Saybrook
302 Main Street
Old Saybrook, CT 06475

Crown Castle (Tower Owner)
12 Gill Street, Suite 5800
Woburn, Ma 01801

Carol Lorenz (Property Owner)
PO BOX 351
CENTER OSSIPEE, NH 03814

DOCKET NO. 51

AN APPLICATION SUBMITTED BY THE SOUTHERN NEW ENGLAND TELEPHONE COMPANY FOR A CERTIFICATE OF ENVIRONMENTAL COMPATIBILITY AND PUBLIC NEED FOR THE CONSTRUCTION, MAINTENANCE, AND OPERATION OF FACILITIES TO PROVIDE CELLULAR SERVICE IN HARTFORD AND MIDDLESEX COUNTIES.	:	CONNECTICUT SITING COUNCIL
	:	September 26, 1985

D E C I S I O N A N D O R D E R

Pursuant to the foregoing opinion, the Council hereby directs that a certificate of environmental compatibility and public need as required by section 16-50k of the General Statutes of Connecticut be issued to Southern New England Telephone Company (SNET) for the construction, operation, and maintenance of a telecommunications tower and associated equipment building to provide cellular service at sites in Old Saybrook and Enfield, Connecticut.

The facilities shall be constructed, operated, and maintained as specified in this matter, and subject to the following conditions:

1. The towers shall be no taller than necessary to provide the proposed service, and in no event shall exceed
   a) 150' at the Old Saybrook site; and
   b) 150' at the Enfield site;
2. A fence not lower than eight feet shall surround each tower and its associated equipment building;
3. The applicant or its successor shall notify the Council if and when directional antennas or any other equipment is added to any of these facilities;
4. The applicant or its sucessor shall permit, in accordance with representations made by it during the proceeding, public or private entities to share space on the facilities, for due

consideration received, or shall provide any requesting entity with specific legal, technical, environmental, or economic reasons precluding such tower sharing;

5. The facilities shall be constructed in accordance with all applicable federal, state, and municipal laws and regulations;
6. The applicant shall submit a development and management plan (D&M) for the Old Saybrook site pursuant to sections 16-50j-75 through 16-50j-77 of the regulations of state agencies, except that irrelevant items in section 16-50j-76 need only be identified as such. The D&M plan shall include erosion control measures, reseeding plans, and tree removal plans. The applicant shall comply with the reporting requirements of section 16-50j-77 for both sites;
7. Construction activities shall take place during daylight working hours;
8. This decision and order shall be void and the towers and associated equipment approved herein shall be dismantled and removed, or reapplication for any new use shall be made to the Connecticut Siting Council before any such new use is made, if the towers do not provide or permanently cease to provide cellular service following completion of construction;
9. This decision and order shall be void if all construction authorized is not completed within three years of the issuance of this decision.

Pursuant to section 16-50p of the General Statutes, we hereby direct that a copy of the opinion and decision and order be served on each person listed below. A notice of the issuance shall be published in the

CERTIFICATION

The undersigned members of the Connecticut Siting Council hereby certify that they have heard this case or read the record thereof, and that we voted as follows:

Dated at New Britain, Connecticut, this 26th day of September, 1985.

Council Members	Vote Cast
Gloria Dibble Pond Chairperson	Yes
Commissioner John Downey Designee: Commissioner Peter G. Boucher	Absent
Commissioner Stanley Pac Designee: Christopher Cooper	Yes
Owen L. Clark	Yes
Mortimer A. Gelston	Yes
James G. Horsfall	Yes
Pamela B. Katz	Yes
William H. Smith	Yes
Colin C. Tait	Absent

STATE OF CONNECTICUT)
: ss. New Britain, September 26, 1985
COUNTY OF HARTFORD)

I hereby certify that the foregoing is a true and correct copy of the decision and order issued by the Connecticut Siting Council, State of Connecticut.

ATTEST:

Christopher S. Wood, Executive Director
Connecticut Siting Council

170 INGHAM HILL RD

Location	170 INGHAM HILL RD	**MBLU**	051/ 033/ / /
Acct#	00559800	**Owner**	LORENZ CAROL J & ROBERT A
Assessment	$164,300	**Appraisal**	$285,500
PID	3322	**Building Count**	1

Current Value

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2015	$145,700	$139,800	$285,500

Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2015	$102,000	$62,300	$164,300

Owner of Record

Owner	LORENZ CAROL J & ROBERT A	**Sale Price**	$0
Co-Owner		**Certificate**	
Address	P O BOX 351 CENTER OSSIPEE N H, NH 03814-0351	**Book & Page**	0211/0890
		Sale Date	03/15/1984

Ownership History

Ownership History				
Owner	**Sale Price**	**Certificate**	**Book & Page**	**Sale Date**
LORENZ CAROL J & ROBERT A	$0		0211/0890	03/15/1984

Building Information

Building 1 : Section 1

Year Built: 1959
Living Area: 1,383

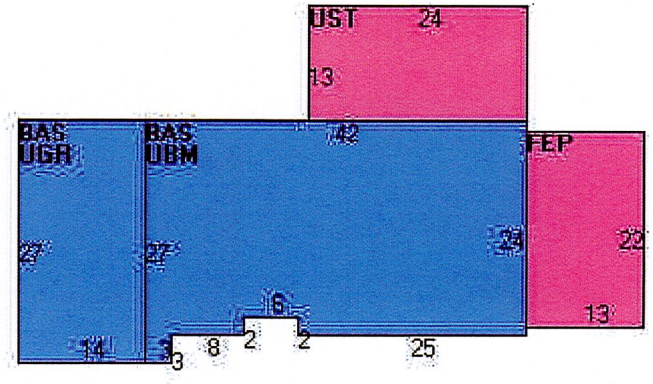
Building Attributes	
Field	**Description**
Style	Ranch
Model	Residential
Stories:	1 Story
Occupancy	1
Exterior Wall 1	Wood Shingle
Exterior Wall 2	
Roof Structure:	Gable/Hip
Roof Cover	Asph/F Gls/Cmp
Interior Wall 1	Plastered
Interior Wall 2	
Interior Flr 1	Vinyl/Asphalt
Interior Flr 2	

Building Photo

(http://images.vgsi.com/photos/OldSaybrookCTPhotos//\00\01\

Heat Fuel	Oil
Heat Type:	Hot Water
AC Type:	None
Total Bedrooms:	3 Bedrooms
Total Bthrms:	1
Total Half Baths:	1
Total Rooms:	6 Rooms

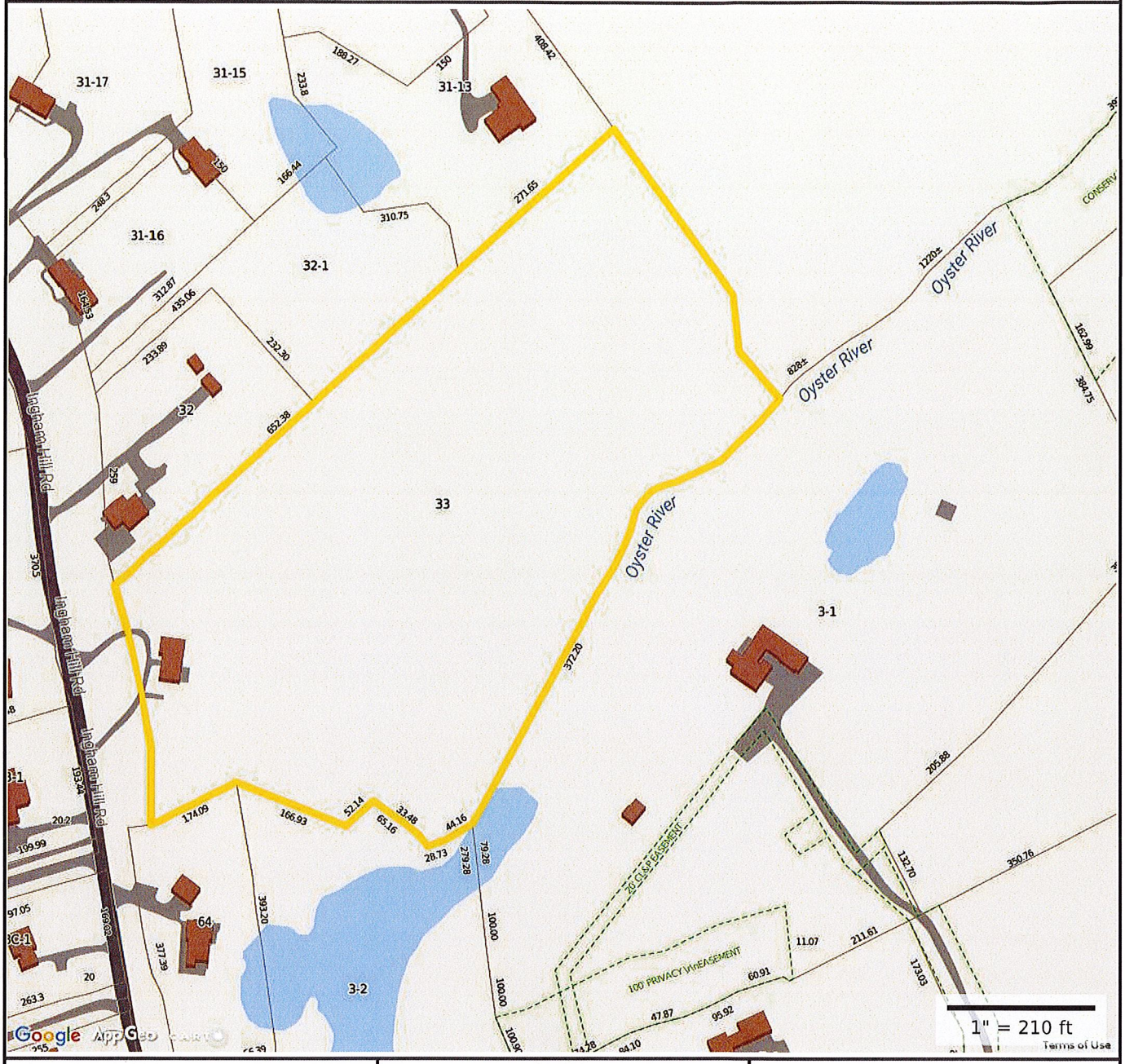
Building Layout



Building Sub-Areas (sq ft)			Legend
Code	**Description**	**Gross Area**	**Living Area**
BAS	First Floor	1,383	1,383
FEP	Porch, Enclosed,Framed	286	0
UBM	Basement, Unfinished	1,005	0
UGR	Garage, Unfinished	378	0
UST	Utility, Storage, Unfinished	312	0
		3,364	1,383

Extra Features

Extra Features	Legend



Property Information

Property ID	051/033-0000
Location	170 INGHAM HILL RD
Owner	LORENZ CAROL J & ROBERT A

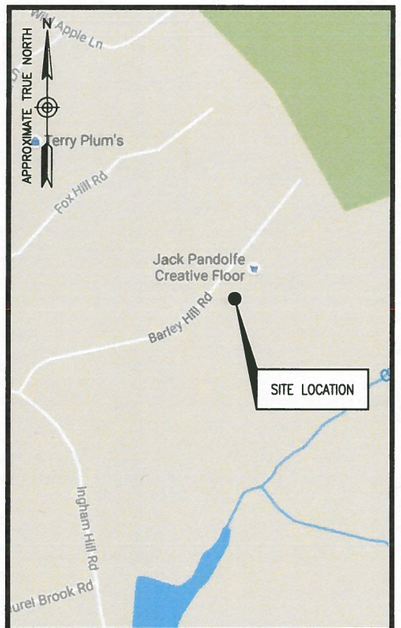
MAP FOR REFERENCE ONLY
NOT A LEGAL DOCUMENT

Town of Old Saybrook, CT makes no claims and no warranties, expressed or implied, concerning the validity or accuracy of the GIS data presented on this map.

Properties updated 11/22/2016

T-MOBILE NORTHEAST LLC

T-MOBILE SITE #: CT11035E
CROWN CASTLE BU #: 841289
SITE NAME: OLD SAYBROOK
170 INGHAM HILL ROAD
OLD SAYBROOK, CT 06475
MIDDLESEX COUNTY



VICINITY MAP

FROM BLOOMFIELD, CT:

HEAD NORTHEAST ON GRIFFIN RD S TOWARD W NEWBERRY RD. TURN RIGHT ONTO DAY HILL RD. USE THE RIGHT LANE TO MERGE ONTO I-91 S VIA THE RAMP TO HARTFORD. MERGE ONTO I-91 S. USE THE LEFT LANE TO TAKE EXIT 22S TO MERGE ONTO CT-9 S TOWARD MIDDLETOWN/OLD SAYBROOK. TAKE THE EXIT ONTO I-95 S/US-1 S TOWARD NEW HAVEN/N.Y. CITY. TAKE EXIT 67 TOWARD ELM ST. TURN RIGHT ONTO ELM ST/INGHAM HILL RD. TURN RIGHT ONTO BARLEY HILL 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, NY 12065

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

CONSULTANT TEAM

SITE NAME:
OLD SAYBROOK

SITE NUMBER:
CT11035E

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

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

COORDINATES:
LATITUDE: 41°-18'-35.55" N (NAD83)
LONGITUDE: 72°-23'-51.13" W (NAD83)
(PER CROWN CASTLE)

CONFIGURATION
702Cu

PROJECT SUMMARY

SITE ADDRESS:
170 INGHAM HILL ROAD
OLD SAYBROOK, CT 06475
MIDDLESEX COUNTY

PROJECT DIRECTORY

- REMOVE (1) EXISTING CANISTER ANTENNA.
- INSTALL (9) NEW ANTENNAS ON A NEW ANTENNA MOUNT.
- INSTALL (3) NEW RRU'S.
- INSTALL (3) NEW TMA'S.
- INSTALL (1) NEW HYBRID CABLE.

SCOPE OF WORK

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

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

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

SHEET INDEX

T-Mobile

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

CROWN CASTLE

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

CT11035E
OLD SAYBROOK

CONSTRUCTION DRAWINGS

0	11/22/16	ISSUED AS FINAL
A	11/02/16	ISSUED FOR REVIEW

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
CONNECTICUT LICENSE NO. 0023222

DRAWN BY:	JC
REVIEWED BY:	BSH
CHECKED BY:	GHN
PROJECT NUMBER:	50066258
JOB NUMBER:	50078136
SITE ADDRESS:	

170 INGHAM HILL ROAD
OLD SAYBROOK, CT 06475
MIDDLESEX 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.

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CONSTRUCTION DRAWINGS		
0	11/22/16	ISSUED AS FINAL
A	11/02/16	ISSUED FOR REVIEW

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

DRAWN BY:	JC
REVIEWED BY:	BSH
CHECKED BY:	GHN
PROJECT NUMBER:	50066258
JOB NUMBER:	50078136
SITE ADDRESS:	

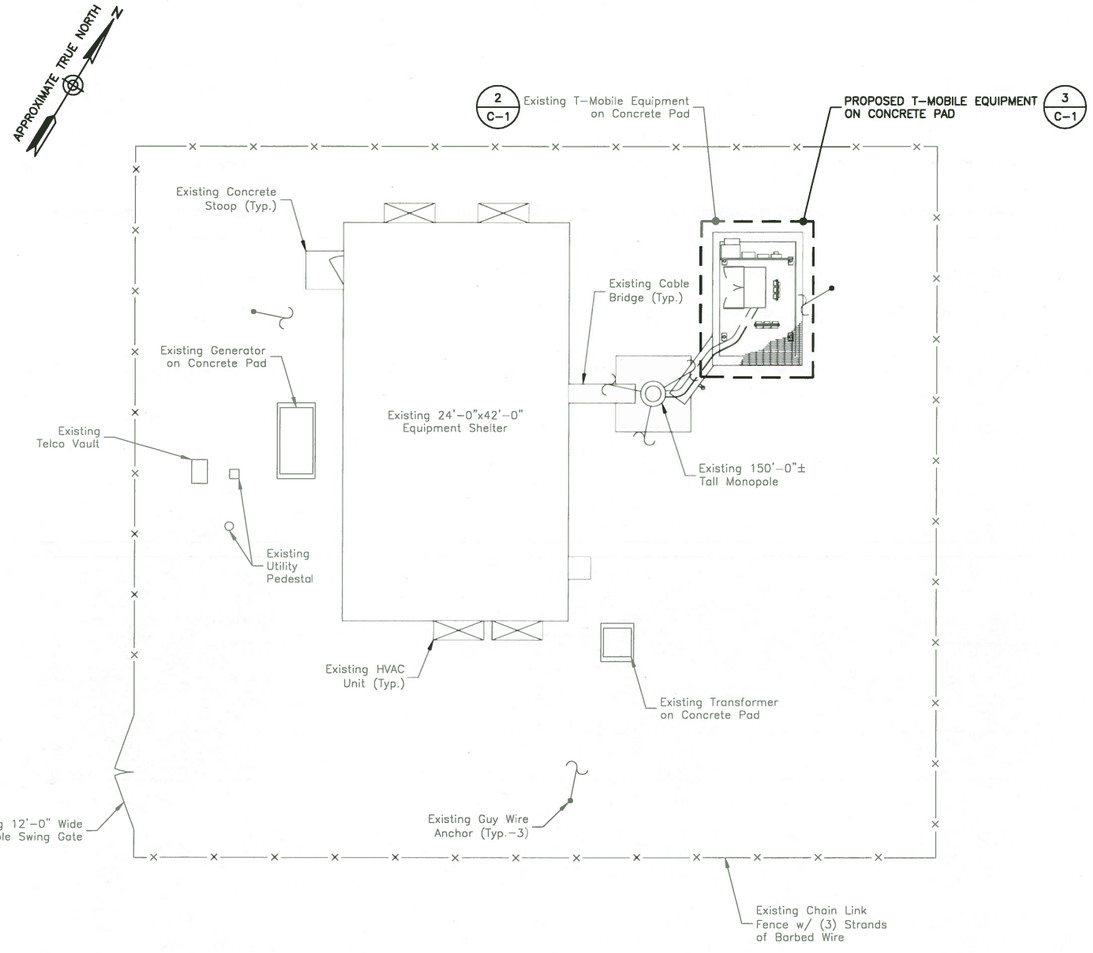
170 INGHAM HILL ROAD
OLD SAYBROOK, CT 06475
MIDDLESEX COUNTY

SHEET TITLE

GENERAL NOTES

SHEET NUMBER

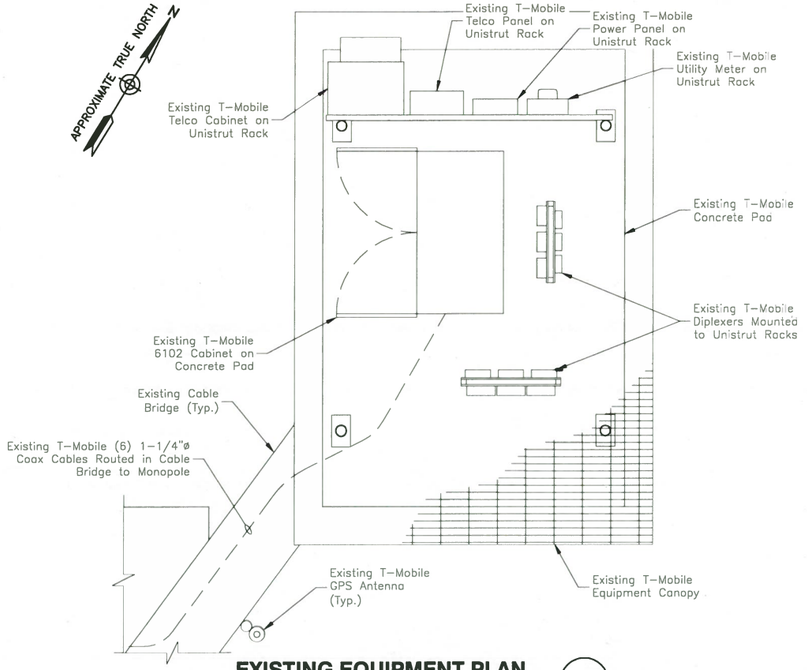
G–1



COMPOUND PLAN 1

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

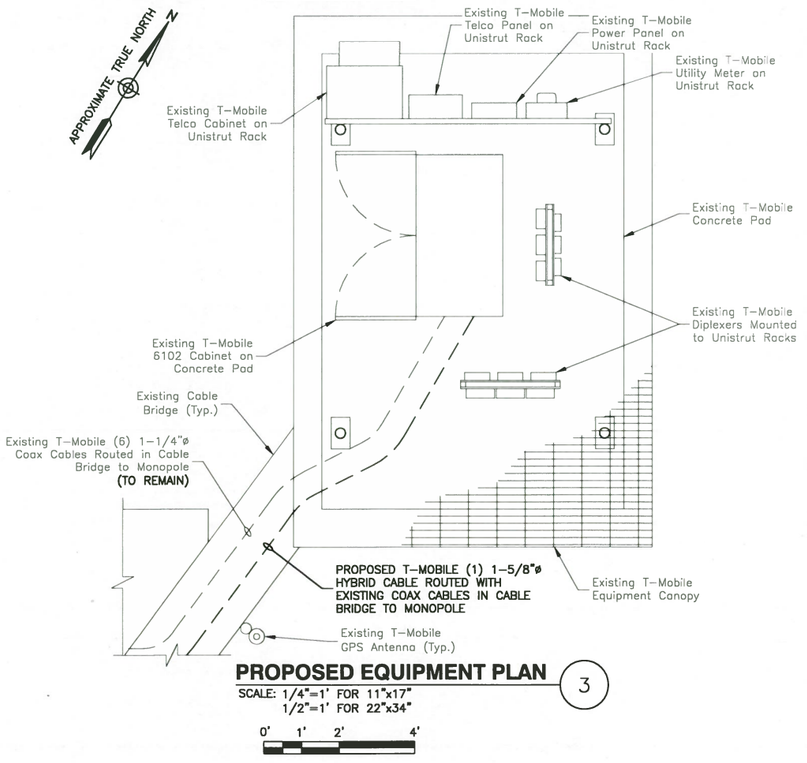
0' 4' 8' 16'



EXISTING EQUIPMENT PLAN 2

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

0' 1' 2' 4'



PROPOSED EQUIPMENT PLAN 3

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

0' 1' 2' 4'

NOTES:

1. NORTH ARROW SHOWN AS APPROXIMATE.
2. NOT ALL INFORMATION IS SHOWN FOR CLARITY.
3. ALL PROPOSED EQUIPMENT, INCLUDING ANTENNAS, COAX, TMA'S, RRU'S, ETC., SHALL BE MOUNTED IN ACCORDANCE WITH THE TOWER STRUCTURAL ANALYSIS BY B+T GROUP DATED OCTOBER 14, 2016.

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CONSTRUCTION DRAWINGS

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STATE OF CONNECTICUT
JIANG YU
No. 23222
LICENSED PROFESSIONAL ENGINEER

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

DRAWN BY:	JC
REVIEWED BY:	BSH
CHECKED BY:	GHN
PROJECT NUMBER:	50066258
JOB NUMBER:	50078136
SITE ADDRESS:	

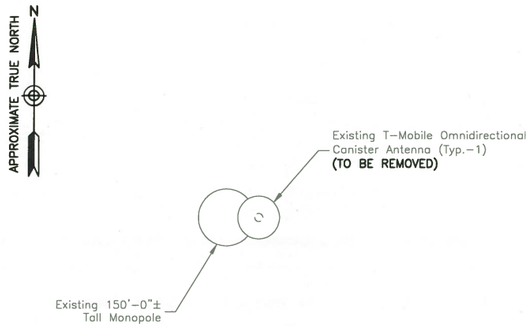
170 INGHAM HILL ROAD
OLD SAYBROOK, CT 06475
MIDDLESEX COUNTY

SHEET TITLE

COMPOUND PLAN & EQUIPMENT PLANS

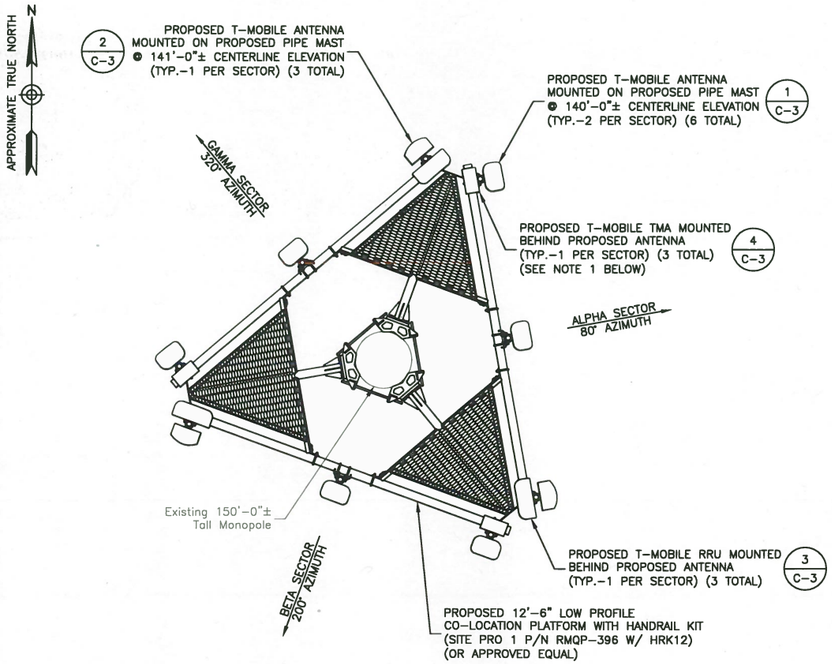
SHEET NUMBER

C-1



EXISTING ANTENNA LAYOUT 1

SCALE: N.T.S.

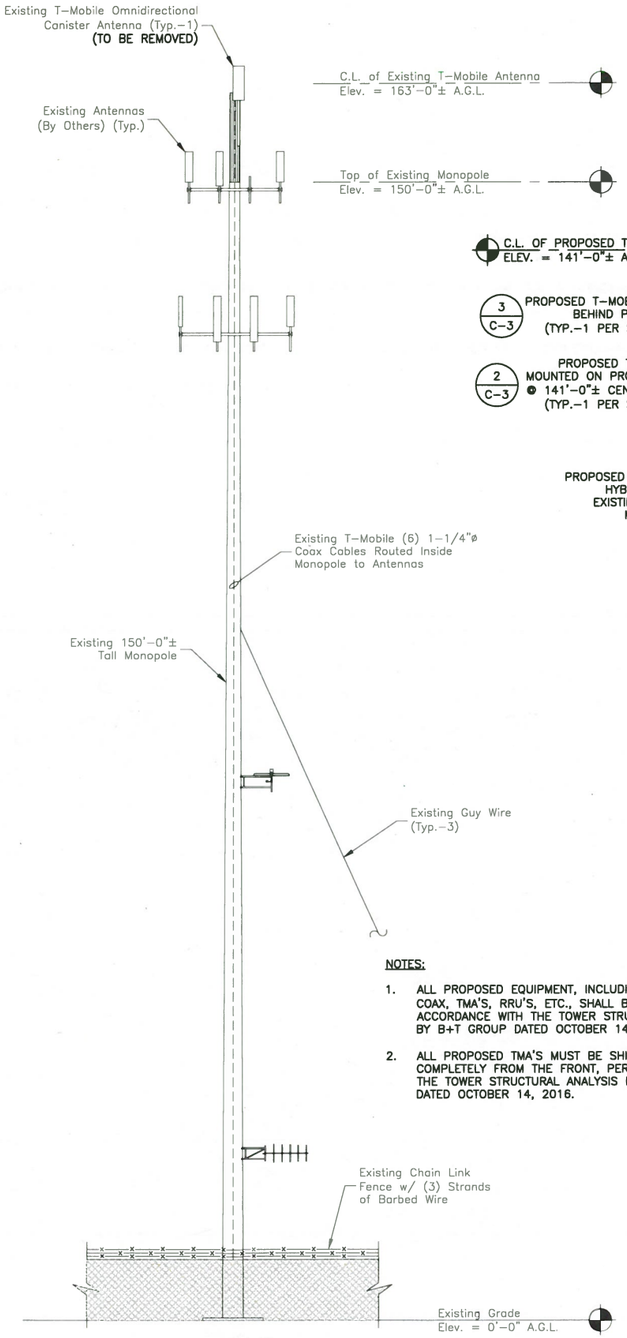


NOTE:

1. ALL PROPOSED TMA'S MUST BE SHIELDED COMPLETELY FROM THE FRONT, PER SECTION 4.1 OF THE TOWER STRUCTURAL ANALYSIS BY B+T GROUP DATED OCTOBER 14, 2016.

PROPOSED ANTENNA LAYOUT 2

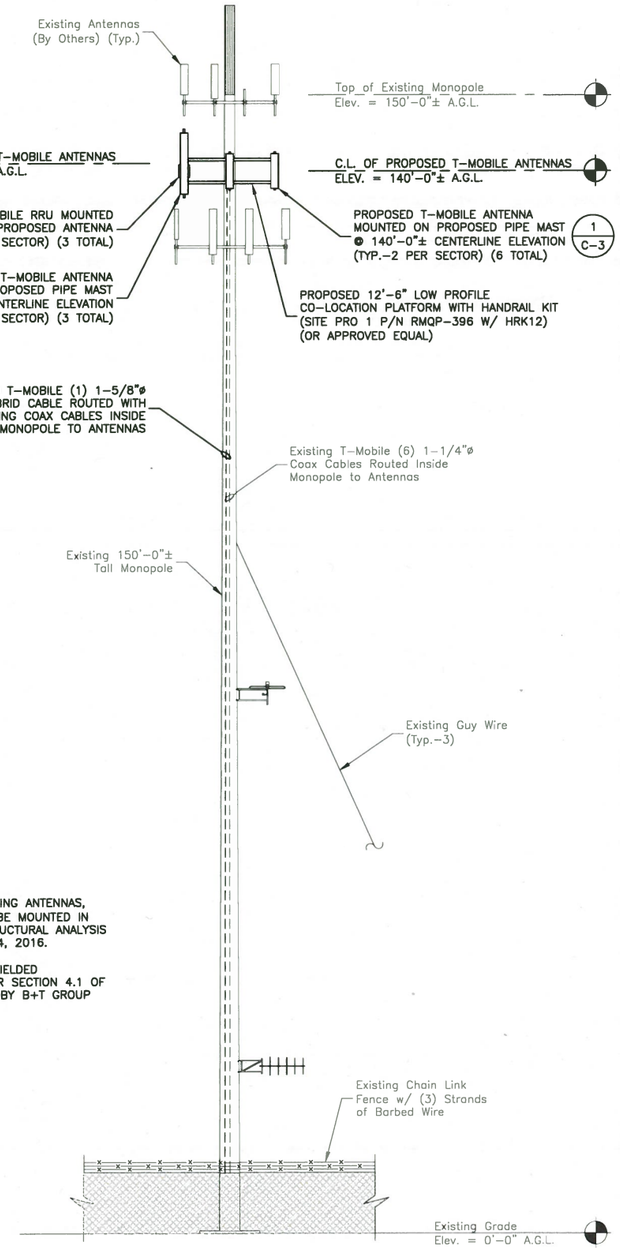
SCALE: N.T.S.



EXISTING ELEVATION 3

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

0' 10' 20'



NOTES:

1. ALL PROPOSED EQUIPMENT, INCLUDING ANTENNAS, COAX, TMA'S, RRU'S, ETC., SHALL BE MOUNTED IN ACCORDANCE WITH THE TOWER STRUCTURAL ANALYSIS BY B+T GROUP DATED OCTOBER 14, 2016.
2. ALL PROPOSED TMA'S MUST BE SHIELDED COMPLETELY FROM THE FRONT, PER SECTION 4.1 OF THE TOWER STRUCTURAL ANALYSIS BY B+T GROUP DATED OCTOBER 14, 2016.

PROPOSED ELEVATION 4

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

0' 10' 20'

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CONSTRUCTION DRAWINGS		
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A	11/02/16	ISSUED FOR REVIEW

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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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JOB NUMBER:	50078136
SITE ADDRESS:	

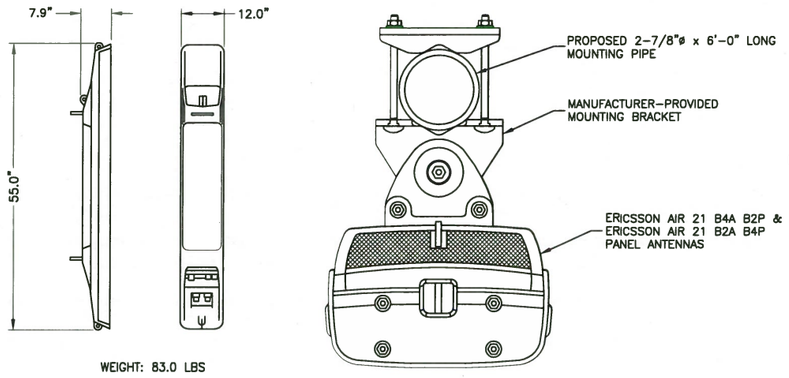
170 INGHAM HILL ROAD
OLD SAYBROOK, CT 06475
MIDDLESEX COUNTY

SHEET TITLE

ANTENNA LAYOUTS & ELEVATIONS

SHEET NUMBER

C-2

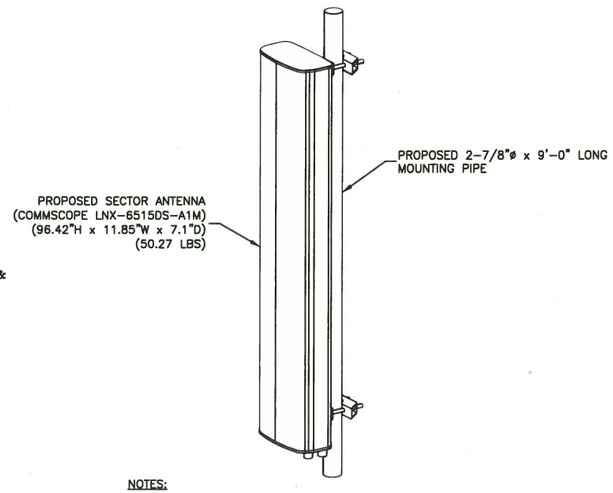


WEIGHT: 83.0 LBS

NOTES:

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

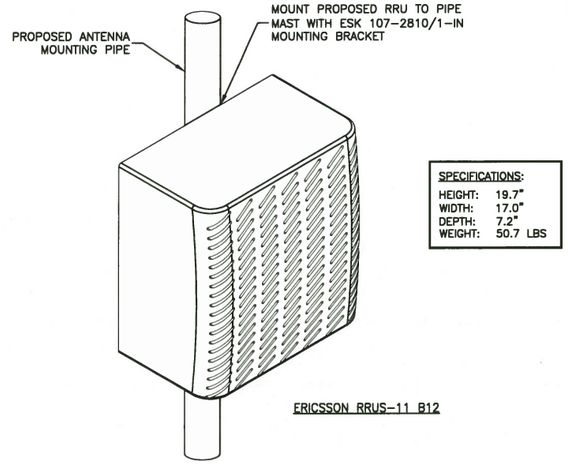
ANTENNA DETAIL (1)
SCALE: N.T.S.



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 (2)
SCALE: N.T.S.

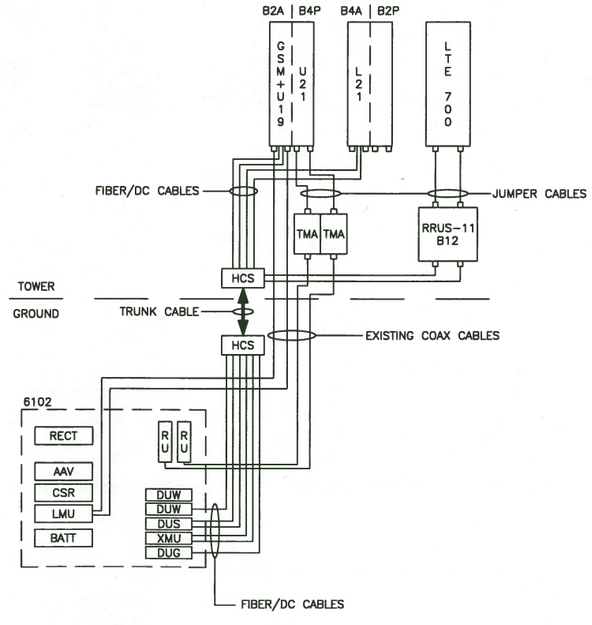


SPECIFICATIONS:
HEIGHT: 19.7"
WIDTH: 17.0"
DEPTH: 7.2"
WEIGHT: 50.7 LBS

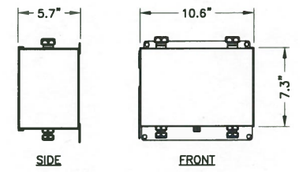
RRU NOTES:

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

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



SITE CONFIGURATION 702Cu (5)
SCALE: N.T.S.



WEIGHT: 22.0 LBS

COMMSCOPE TMAT7LA-11A

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.
4. ALL PROPOSED TMA'S MUST BE SHIELDED COMPLETELY FROM THE FRONT, PER SECTION 4.1 OF THE TOWER STRUCTURAL ANALYSIS BY B+T GROUP DATED OCTOBER 14, 2016.

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

DESIGN CONFIGURATION

	ANTENNAS		COAX		HYBRID	COAX/HYBRID LENGTH	TMA	RRU
	EXISTING	PROPOSED	EXISTING	PROPOSED	PROPOSED		PROPOSED	PROPOSED
ALPHA	ANDREW CSHAX-6516-R2	ERICSSON AIR 21 B2A B4P	(2) 1-1/4"ø	–	(1) 1-5/8"ø	192'-0"	(1) TMAT7LA-11A	–
	–	ERICSSON AIR 21 B4A B2P					–	–
	–	COMMSCOPE LNX-6515DS-A1M					–	(1) RRUS-11 B12
BETA	–	ERICSSON AIR 21 B2A B4P	(2) 1-1/4"ø	–		192'-0"	(1) TMAT7LA-11A	–
	–	ERICSSON AIR 21 B4A B2P					–	–
	–	COMMSCOPE LNX-6515DS-A1M					–	(1) RRUS-11 B12
GAMMA	–	ERICSSON AIR 21 B2A B4P	(2) 1-1/4"ø	–		192'-0"	(1) TMAT7LA-11A	–
	–	ERICSSON AIR 21 B4A B2P					–	–
	–	COMMSCOPE LNX-6515DS-A1M					–	(1) RRUS-11 B12

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OLD SAYBROOK

CONSTRUCTION DRAWINGS

0	11/22/16	ISSUED AS FINAL
A	11/02/16	ISSUED FOR REVIEW

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JIANG YU
No. 23222
LICENSED PROFESSIONAL ENGINEER

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

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JOB NUMBER:	50078136
SITE ADDRESS:	

170 INGHAM HILL ROAD
OLD SAYBROOK, CT 06475
MIDDLESEX COUNTY

SHEET TITLE

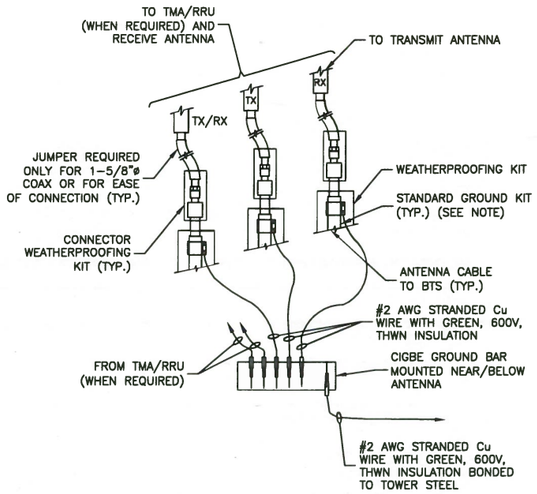
CONSTRUCTION DETAILS

SHEET NUMBER

C-3

GROUNDING NOTES:

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

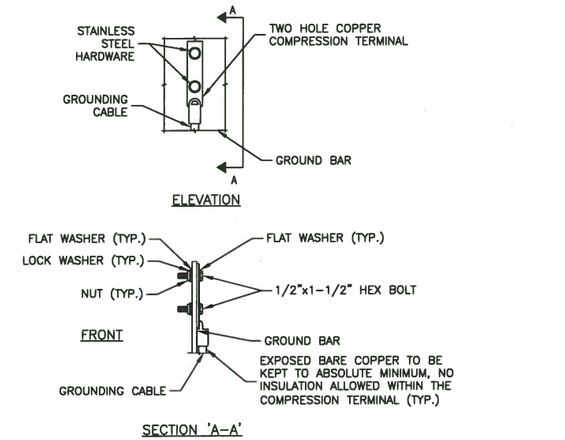


NOTE:

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

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

SCALE: N.T.S.

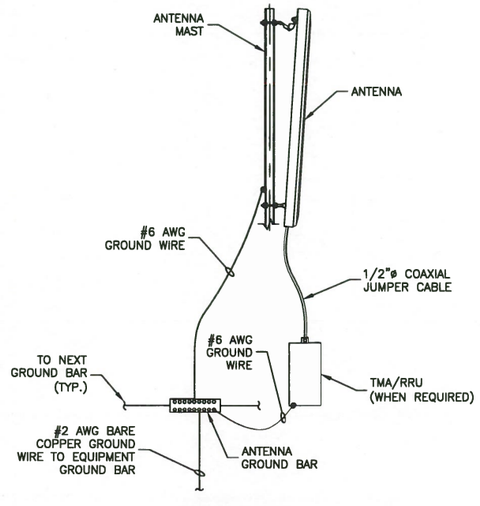


NOTES:

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

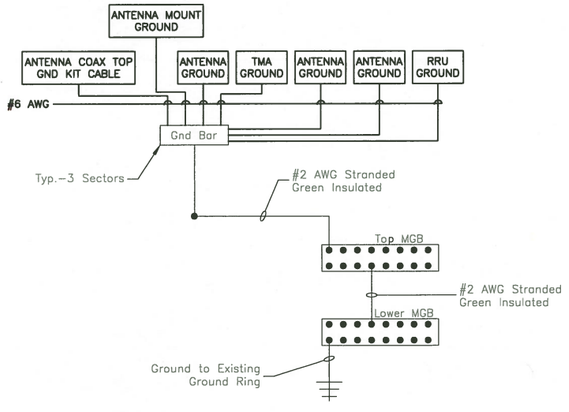
TYPICAL GROUND BAR MECHANICAL CONNECTION DETAIL — 2

SCALE: N.T.S.



TYPICAL ANTENNA GROUNDING DETAIL — 3

SCALE: N.T.S



NOTES:

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

SCHEMATIC GROUNDING DIAGRAM — 4

SCALE: N.T.S.

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

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

CT11035E
OLD SAYBROOK

CONSTRUCTION DRAWINGS		
0	11/22/16	ISSUED AS FINAL
A	11/02/16	ISSUED FOR REVIEW

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:	JC
REVIEWED BY:	BSH
CHECKED BY:	GHN
PROJECT NUMBER:	50066258
JOB NUMBER:	50078136
SITE ADDRESS:	

170 INGHAM HILL ROAD
OLD SAYBROOK, CT 06475
MIDDLESEX COUNTY

SHEET TITLE

GROUNDING NOTES & DETAILS

SHEET NUMBER

E-1

October 14th, 2016

Sean Dempsey
Crown Castle
3530 Toringdon Way Suite 300
Charlotte, NC 28277
(704) 405-6565

B+T Group
1717 S. Boulder, Suite 300
Tulsa, OK 74119
(918) 587-4630
btwo@btgrp.com

Subject:	**Structural Analysis Report**	
Carrier Designation:	***T-Mobile* Co-Locate**	
	Carrier Site Number:	CT11035E
	Carrier Site Name:	Old Saybrooksnetmobiliti_1
Crown Castle Designation:	**Crown Castle BU Number:**	841289
	Crown Castle Site Name:	Old Saybrook
	Crown Castle JDE Job Number:	397965
	Crown Castle Work Order Number:	1305063
	Crown Castle Application Number:	362261 Rev. 1
Engineering Firm Designation:	**B+T Group Project Number:**	93496.006.01
Site Data:	**170 Ingham Hill Road, Old Saybrook, Middlesex County, CT** **Latitude *41° 18' 35.55"*, Longitude *-72° 23' 51.13"*** **150 Foot - Monopole Tower**	

Dear Sean Dempsey,

B+T Group is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above mentioned tower. This analysis has been performed in accordance with the Crown Castle Structural 'Statement of Work' and the terms of Crown Castle Purchase Order Number 953486, in accordance with application 362261, revision 1.

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

LC7: Existing + Reserved + Proposed Equipment **Sufficient Capacity***

Note: See Table 1 and Table 2 for the proposed and existing/reserved loading, respectively.

***The structure has sufficient capacity once the loading condition specified in Section 4.1 has been satisfied.**

This analysis has been performed in accordance with the 2016 Connecticut State Building Code based upon an ultimate 3second gust wind speed of 135 mph converted to a nominal 3second gust wind speed of 105 mph per Section 1609.3 as required for use in the TIA222G Standard per Exception #5 of Section 1609.1.1. Exposure Category B and Risk Category II were used in this analysis.

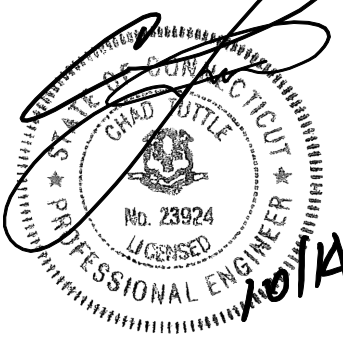
All equipment proposed in this report shall be installed in accordance with the attached drawings for the determined available structural capacity to be effective.

We at *B+T Group* appreciate the opportunity of providing our continuing professional services to you and Crown Castle. If you have any questions or need further assistance on this or any other projects, please give us a call.

Respectfully submitted by:
B+T Engineering, Inc.

Tharun Cheriyan
Project Engineer

Chad E. Tuttle, P.E.
Engineer of Record
COA: PEC.0001564 Expires: 02/10/2017



10/14/16

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 150 ft. monopole designed by Engineered Endeavors, Inc. in June of 1998. The tower was originally designed for a wind speed of 85 mph per TIA/EIA-222-E. The tower has been modified multiple times and those modifications were incorporated in this analysis.

2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of TIA-222-G Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a 3-second gust wind speed of 105 mph with no ice, 50 mph with 0.75-inch ice thickness and 60 mph under service loads, exposure category B with topographic category 1 and crest height of 0 feet.

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
140.0	141.0	3	Andrew	LNX-6515DS-A1M	1	1-5/8	--
	140.0	3	Commscope	TMAT7LA-11A			
		3	Ericsson	AIR 21 B2A/B4P			
		3	Ericsson	AIR 21 B4A/B2P			
		3	Ericsson	RRUS 11 B12			
		1	--	RMQP-396 W/ HRK12			

Table 2 - Existing and Reserved Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
160.0	163.0	**1**	**Andrew**	**CSHAX-6516-R2**	--	--	4
	160.0	**1**	**--**	**Pipe Mount [PM 701-1]**			
149.0	156.0	1	Andrew	KP4F-23A	--	--	1
	152.0	3	Andrew	SBNHH-1D65A	2 1	5/8 3/8	2
		1	Raycap	DC6-48-60-18-8F			
		3	Ericsson	WCS RRUS-32-B30			
		2	Kmw Comm.	AM-X-CD-14-65-00T-RET	12 1	1-1/4 7/8	1
		1	Kmw Comm.	AM-X-CW-14-65-00T-RET			
		6	Powerwave Tech.	TT19-08BP111-001			
		3	Powerwave Tech.	7770.00			
	149.0	1	--	Platform Mount [LP 403-1]			
148.0	150.0	6	Ericsson	RRUS 11	2 1	5/8 3/8	1
	148.0	1	--	Side Arm Mount [SO 102-3]			
	147.0	1	Raycap	DC6-48-60-18-8F			
140.0	140.0	--	--	--	6	1-1/4	3
130.0	133.0	3	alcatel lucent	RRH2X60-AWS	12 1	1-1/4 1-5/8	1
		3	Alcatel Lucent	RRH2X60-PCS			
		3	Antel	BXA-171085-8BF-EDIN-0			
		3	Antel	BXA-80080/4CF			
		3	Commscope	HBXX-6517DS-A2M			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
		3	Commscope	LNX-6514DS-A1M			
		1	Rfs Celwave	DB-T1-6Z-8AB-0Z			
		6	Rfs Celwave	FD9R6004/2C-3L			
	130.0	1	--	Platform Mount [LP 403-1]			
71.0	72.0	1	Kathrein	FMO	1	1/2	1
	71.0	1	--	Side Arm Mount [SO 301-1]			
22.0	22.0	1	Maxrad	MYA-43012N	1	5/16	1
		1	--	Side Arm Mount [SO 701-1]			

Notes:
1) Existing Equipment
2) Reserved Equipment
3) Coax To Be Relocated from 160'; Considered in This Analysis
4) Equipment To Be Removed; Not Considered in This Analysis

Table 3 - Design Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
158	158	1	Ems Wireless	TRR90-17	--	--
150	150	12	Allgon	7120.16	--	--
140	140	12	Allgon	7120.16	--	--
130	130	12	Allgon	7184.05	--	--
120	120	12	Allgon	7184.05	--	--

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
Online Application	T-Mobile, Co-Locate Re# 1	362261	CCI Sites
Tower Manufacturer Drawings	EEI, Job No. 3503	4287398	CCI Sites
Tower Mapping	ReliaPOLE, Project No. 14-0703NEd	5204147	CCI Sites
Tower Modification Drawings	GPD, Date: 10/02/2008	4489382	CCI Sites
Post Modification Inspection	GPD, Date:03/04/2009	4489415	CCI Sites
Tower Modification Drawings	GPD, Date:12/15/2011	4478711	CCI Sites
Post Modification Inspection	HDG, Date: 03/19/2012	4468635	CCI Sites
Tower Modification Drawings	B+T Group, Date: 08/20/2015	5293057	CCI Sites
Post Modification Inspection	SGS, Date: 09/01/2015	5874000	CCI Sites
Tower Modification Drawings	B+T Group, Date: 05/06/2016	6254746	CCI Sites
Post Modification Inspection	SGS, Date: 09/07/2016	6444911	CCI Sites
Foundation Drawings	FDH Project No. 08-04159E N1	4591935	CCI Sites
Geotech Report	FDH Project No. 08-04159E G1	4468634	CCI Sites
Antenna Configuration	Crown CAD Package	Date: 10/12/2016	CCI Sites

3.1) Analysis Method

tnxTower (version 7.0.5.1), 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) Mount areas and weights are assumed based on photographs provided.
5) The existing base plate grout was not considered in this analysis.

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

4) ANALYSIS RESULTS

Table 5 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	150 - 123.75	Pole	TP19.625x15.53x0.25	1	-9.265	1149.650	66.6	Pass
L2	123.75 - 110	Pole	TP21.77x19.625x0.482	2	-11.413	1427.660	89.9	Pass
L3	110 - 83	Pole	TP26.134x21.77x0.668	3	-253.777	2644.140	80.5	Pass
		Guy A@91.1	1 5/8	11	171.695	194.400	88.3	Pass
		Guy B@91.1	1 3/8	10	91.167	139.200	65.5	Pass
		Guy C@91.1	1 3/8	9	102.191	139.200	73.4	Pass
L4	83 - 67.5	Pole	TP28.64x26.134x0.545	4	-254.426	2190.530	98.4	Pass
L5	67.5 - 49.9	Pole	TP30.898x27.449x0.585	5	-258.029	2481.030	94.5	Pass
L6	49.9 - 33	Pole	TP33.66x30.898x0.644	6	-262.428	3057.690	80.4	Pass
L7	33 - 32.65	Pole	TP32.966x32.256x0.71	7	-268.417	3587.910	71.1	Pass
L8	32.65 - 0	Pole	TP38.29x32.966x0.438	8	-268.535	3377.690	74.4	Pass
							Summary	
						Pole (L4)	98.4	Pass
						Guy A (L3)	88.3	Pass
						Guy B (L3)	65.5	Pass
						Guy C (L3)	73.4	Pass
						RATING =	**98.4**	**Pass**

Table 6 - Tower Component Stresses vs. Capacity – LC7

Notes	Component		Elevation	% Capacity	Pass / Fail
1	Flange Connections		110’	57.9	Pass
1	Anchor Rods		Base	99.9	Pass
1	Base Plate		Base	62.3	Pass
1	Base Foundation	Structure	Base	21.1	Pass
		Soil	Base	75.0	Pass
1	Inner Guy Anchor Foundation	Anchor Rod	Base	88.9	Pass
		Soil	Base	72.4	Pass
1	Outer Guy Anchor Foundation	Anchor Rod	Base	53.0	Pass
		Soil	Base	68.6	Pass

Structure Rating (max from all components) =	99.9%

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

4.1) Recommendations

The tower and its foundations have sufficient capacity **ONCE** the following condition has been met:

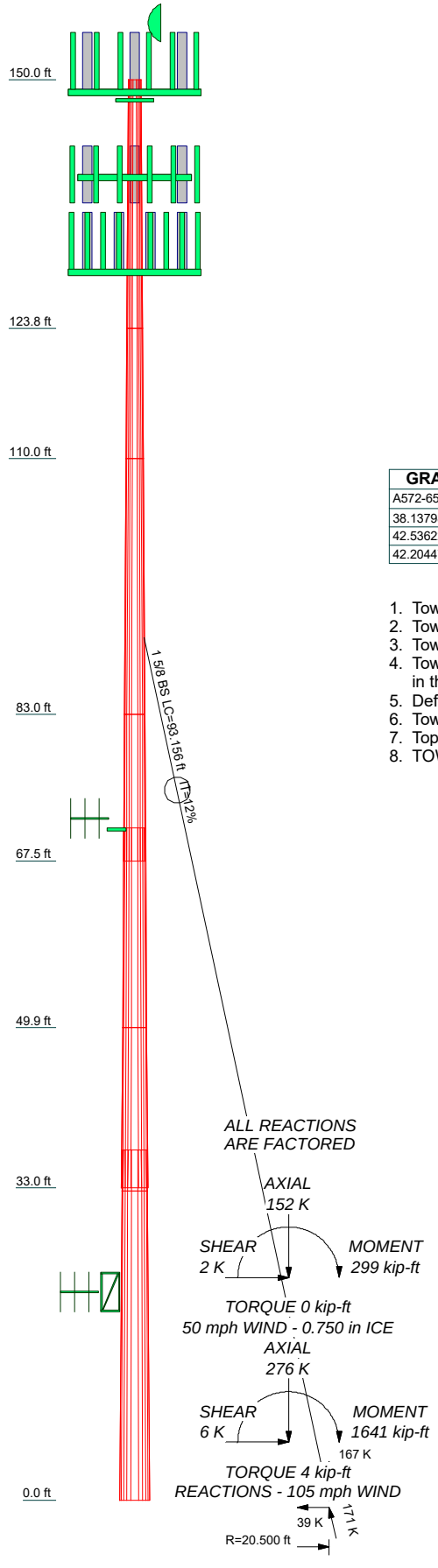
- Proposed TMEs at the 140’ elevation must be shielded completely from the front.

No structural modifications will be necessary at this time.

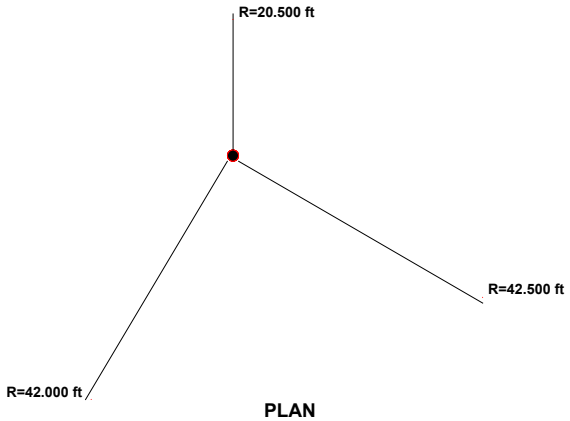
APPENDIX A

TNXTOWER OUTPUT

Section	1	2	3	4	5	6	7	8
Length (ft)	26.250	13.750	27.000	15.500	21.100	16.900	4.350	32.650
Number of Sides	12	12	12	12	12	12	12	12
Thickness (in)	0.250	0.482	0.668	0.545	0.585	0.644	0.710	0.438
Socket Length (ft)				3.500		4.000		
Top Dia (in)	15.530	19.625	21.770	26.134	27.449	30.898	32.256	32.966
Bot Dia (in)	19.625	21.770	26.134	28.640	30.898	33.660	32.966	38.290
Grade	A572-65		38.137985ksi	42.536229ksi	42.204474ksi	42.356853ksi	42.993126ksi	42.99819ksi A572-65
Weight (K)	1.2	1.4	4.2	2.4	3.7	3.6	1.0	5.5



ALL REACTIONS ARE FACTORED



PLAN

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-65	65 ksi	80 ksi	42.356853ksi	42 ksi	57 ksi
38.137985ksi	38 ksi	53 ksi	42.993126ksi	43 ksi	58 ksi
42.536229ksi	43 ksi	58 ksi	42.99819ksi	43 ksi	58 ksi
42.204474ksi	42 ksi	57 ksi			

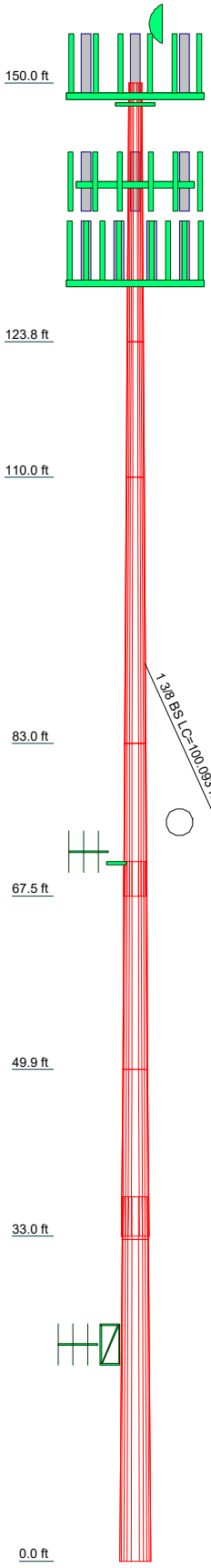
TOWER DESIGN NOTES

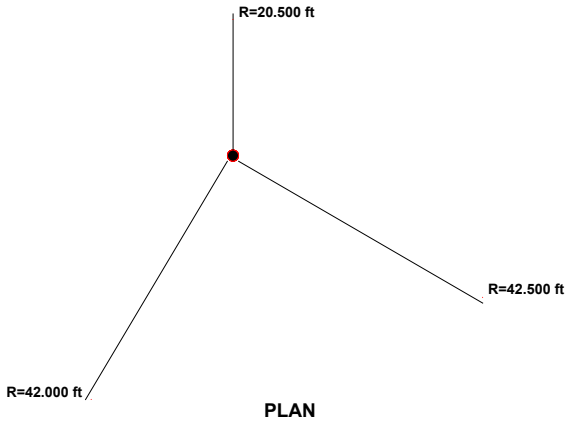
1. Tower is located in Middlesex County, Connecticut.
2. Tower designed for Exposure B to the TIA-222-G Standard.
3. Tower designed for a 105 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 50 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Structure Class II.
7. Topographic Category 1 with Crest Height of 0.000 ft
8. TOWER RATING: 98.4%

B+T Group
1717 S. Boulder, Suite 300
Tulsa, OK 74119
Phone: (918) 587 - 4630
FAX: (918) 295 - 0265

Job: 93496.006.01 - OLD SAYBROOK, CT (BU # 84128			
Project:			
Client: Crown Castle	Drawn by: T. Cheriyan	App'd:	
Code: TIA-222-G	Date: 10/14/16	Scale: NTS	
Path: S:\Projects\Crown Castle\93000\93496_841289_Old Saybrook\Engineering\tnxTower\93496_006_01_OLD SAYBROOK_CT_AS - Copy.eri		Dwg No. E-1	

Section	1	2	3	4	5	6	7	8
Length (ft)	26.250	13.750	27.000	15.500	21.100	16.900	4.350	32.650
Number of Sides	12	12	12	12	12	12	12	12
Thickness (in)	0.250	0.482	0.668	0.545	0.585	0.644	0.710	0.438
Socket Length (ft)				3.500		4.000		
Top Dia (in)	15.530	19.625	21.770	26.134	27.449	30.898	32.256	32.966
Bot Dia (in)	19.625	21.770	26.134	28.640	30.898	33.660	32.966	38.290
Grade	A572-65		38.137985ksi	42.536229ksi	42.204474ksi	42.356853ksi	42.993126ksi	42.99819ksi A572-65
Weight (K)	1.2	1.4	4.2	2.4	3.7	3.6	1.0	5.5





PLAN

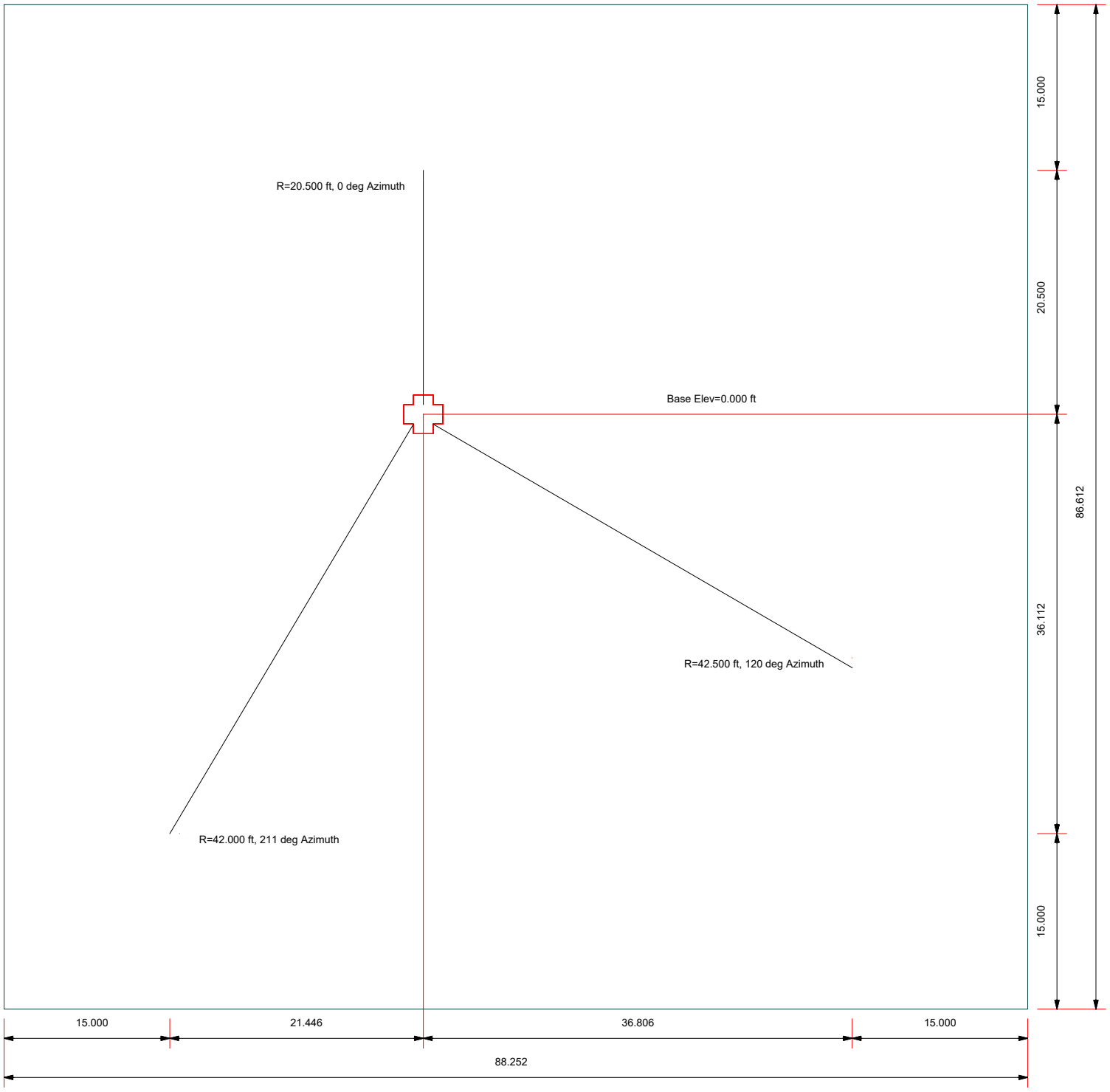
DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Lighting Rod 5/8" x 5' (E)	168	Platform Mount [LP 301-1] (P-Includes 4 Mount pipes per sector)	140
7770.00 w/ Mount Pipe (E)	149	AIR 21 B2A/B4P (P)	140
7770.00 w/ Mount Pipe (E)	149	BXA-80080/4CF w/ Mount Pipe (E)	130
7770.00 w/ Mount Pipe (E)	149	BXA-80080/4CF w/ Mount Pipe (E)	130
AM-X-CW-14-65-00T-RET w/ Mount Pipe (E)	149	HBXX-6517DS-A2M w/ Mount Pipe (E)	130
AM-X-CD-14-65-00T-RET w/ Mount Pipe (E)	149	HBXX-6517DS-A2M w/ Mount Pipe (E)	130
AM-X-CD-14-65-00T-RET w/ Mount Pipe (E)	149	HBXX-6517DS-A2M w/ Mount Pipe (E)	130
(2) TT19-08BP111-001 (E)	149	LNX-6514DS-A1M w/ Mount Pipe (E)	130
(2) TT19-08BP111-001 (E)	149	LNX-6514DS-A1M w/ Mount Pipe (E)	130
(2) TT19-08BP111-001 (E)	149	LNX-6514DS-A1M w/ Mount Pipe (E)	130
SBNHH-1D65A w/ Mount Pipe (R)	149	BXA-171085-8BF-EDIN-0 w/ Mount Pipe (E)	130
SBNHH-1D65A w/ Mount Pipe (R)	149	BXA-171085-8BF-EDIN-0 w/ Mount Pipe (E)	130
SBNHH-1D65A w/ Mount Pipe (R)	149	BXA-171085-8BF-EDIN-0 w/ Mount Pipe (E)	130
WCS RRUS-32-B30 (R)	149	RRH2X60-PCS (E)	130
WCS RRUS-32-B30 (R)	149	RRH2X60-PCS (E)	130
WCS RRUS-32-B30 (R)	149	RRH2X60-PCS (E)	130
DC6-48-60-18-8F (R)	149	RRH2X60-AWS (E)	130
Platform Mount [LP 403-1] (E)	149	RRH2X60-AWS (E)	130
KP4F-23A (E)	149	RRH2X60-AWS (E)	130
(2) RRUS 11 (E)	148	(2) FD9R6004/2C-3L (E)	130
(2) RRUS 11 (E)	148	(2) FD9R6004/2C-3L (E)	130
DC6-48-60-18-8F (E-Offset per photo)	148	(2) FD9R6004/2C-3L (E)	130
4' x 2" Pipe Mount (E)	148	DB-T1-6Z-8AB-0Z (E)	130
4' x 2" Pipe Mount (E)	148	Platform Mount [LP 403-1] (E)	130
4' x 2" Pipe Mount (E)	148	GPS (3"x7") (E-Per Photo)	130
Side Arm Mount [SO 102-3] (E)	148	3' x 2" Pipe Mount (E-Per Photo)	130
(2) RRUS 11 (E)	148	BXA-80080/4CF w/ Mount Pipe (E)	130
AIR 21 B2A/B4P (P)	140	Yagi (E-Per Photo)	71
AIR 21 B2A/B4P (P)	140	4' x 2" Pipe Mount (E-For Yagi Per photo)	71
AIR 21 B4A/B2P (P)	140	Side Arm Mount [SO 701-1] (E)	71
AIR 21 B4A/B2P (P)	140	FMO (E)	71
AIR 21 B4A/B2P (P)	140	Side Arm Mount [SO 301-1] (E)	71
LNX-6515DS-A1M (P)	140	Side Arm Mount [SO 701-1] (E)	22
LNX-6515DS-A1M (P)	140	4' x 2" Pipe Mount (E-For Yagi Per photo)	22
LNX-6515DS-A1M (P)	140	MYA-43012N (E)	22
TMAT7LA-11A (P)	140		
TMAT7LA-11A (P)	140		
TMAT7LA-11A (P)	140		
RRUS 11 B12 (P)	140		
RRUS 11 B12 (P)	140		
RRUS 11 B12 (P)	140		

B+T Group
1717 S. Boulder, Suite 300
Tulsa, OK 74119
Phone: (918) 587 - 4630
FAX: (918) 295 - 0265

Job: 93496.006.01 - OLD SAYBROOK, CT (BU # 84128			
Project:			
Client: Crown Castle	Drawn by: T. Cheriyan	App'd:	
Code: TIA-222-G	Date: 10/14/16	Scale: NTS	
Path: S:\Projects\Crown Castle\93000\93496_841289_Old Saybrook\Engineering\tnxTower\93496_006_01_OLD SAYBROOK_CT_AS - Copy.eri		Dwg No. E-1	

Plot Plan
Total Area - 0.18 Acres



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Code: TIA-222-G	Date: 10/14/16	Scale: NTS	
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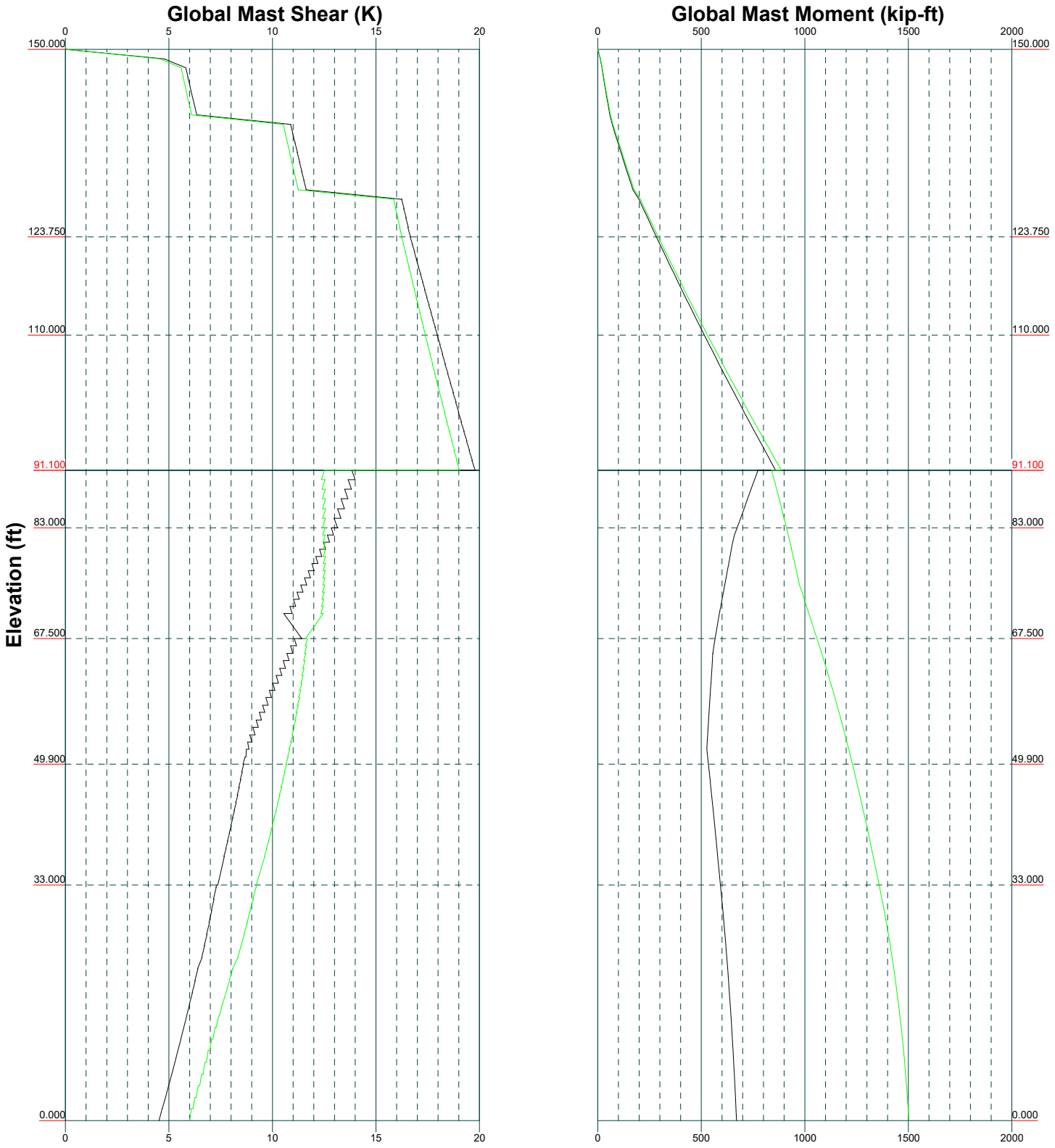
TIA-222-G - 105 mph/50 mph 0.750 in Ice Exposure B

Maximum Values

Vx Vz Mx Mz



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Job: 93496.006.01 - OLD SAYBROOK, CT (BU # 84128			
Project:			
Client: Crown Castle	Drawn by: T. Cheriyan	App'd:	
Code: TIA-222-G	Date: 10/14/16	Scale: NTS	
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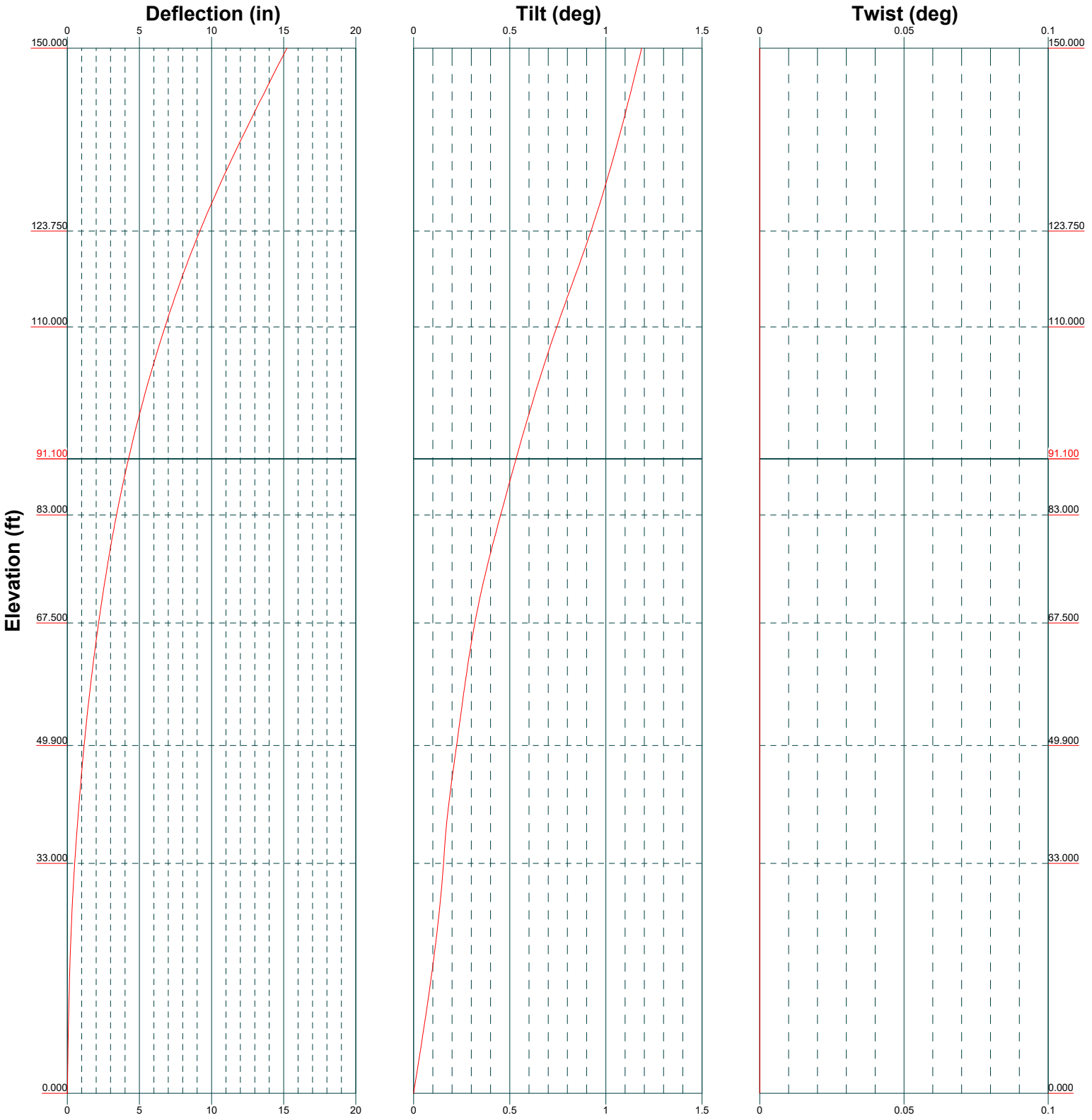
TIA-222-G - Service - 60 mph

Maximum Values



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Phone: (918) 587 - 4630
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Job: 93496.006.01 - OLD SAYBROOK, CT (BU # 841289			
Project:			
Client: Crown Castle	Drawn by: T. Cheriyan	App'd:	
Code: TIA-222-G	Date: 10/14/16	Scale: NTS	
Path: S:\Projects\Crown Castle\93000\93496_841289_Old Saybrook\Engineering\tnxTower\93496_006_01_OLD SAYBROOK_CT_AS - Copy.eri		Dwg No. E-5	

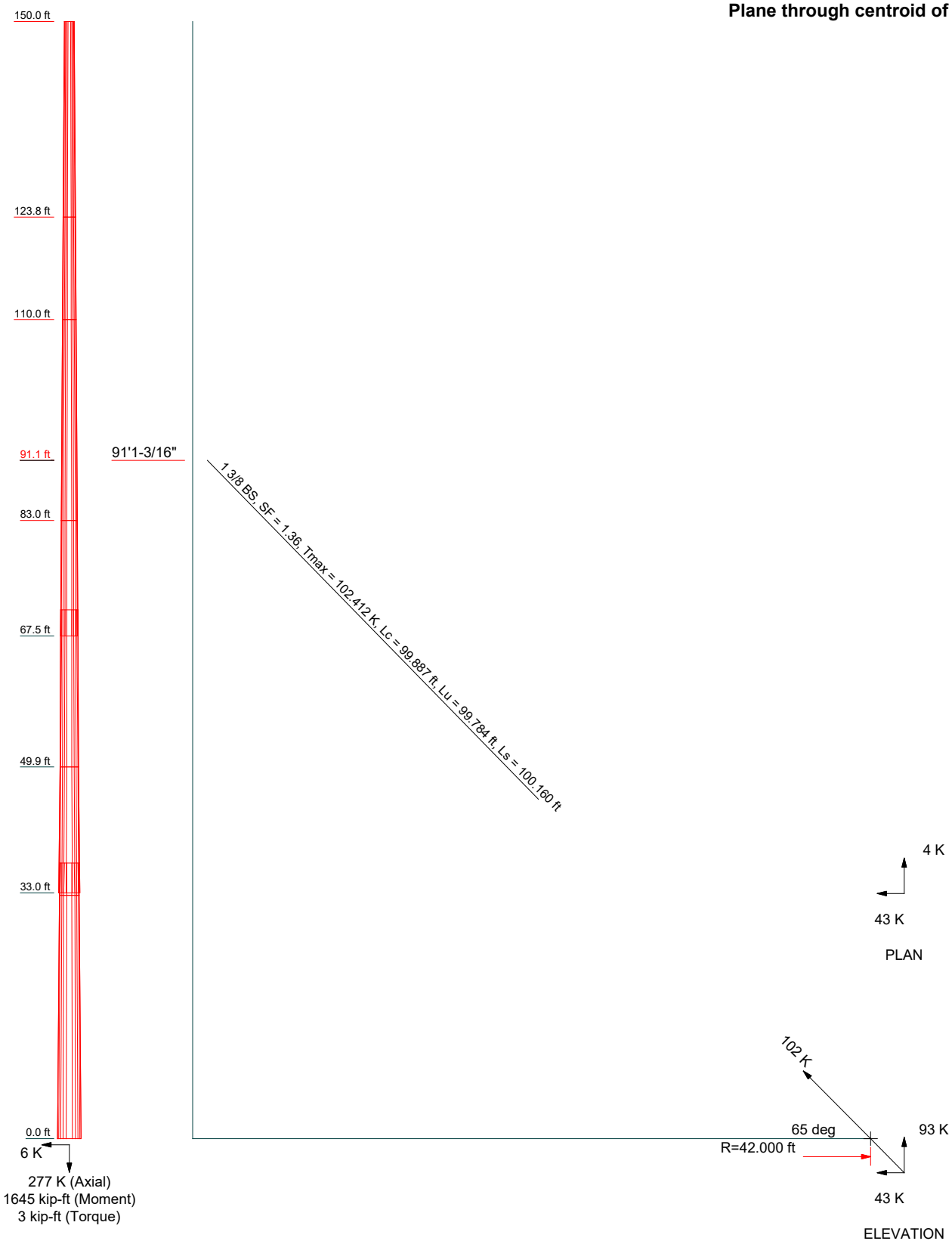
Guy Tensions and Tower Reactions

TIA-222-G - 105 mph/50 mph 0.750 in Ice Exposure B

Maximum Values

Anchor 'C'@42 ft Azimuth 211 deg Elev 0 ft

Plane through centroid of tower



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Job: 93496.006.01 - OLD SAYBROOK, CT (BU # 84128			
Project:			
Client: Crown Castle	Drawn by: T. Cheriyan	App'd:	
Code: TIA-222-G	Date: 10/14/16	Scale: NTS	
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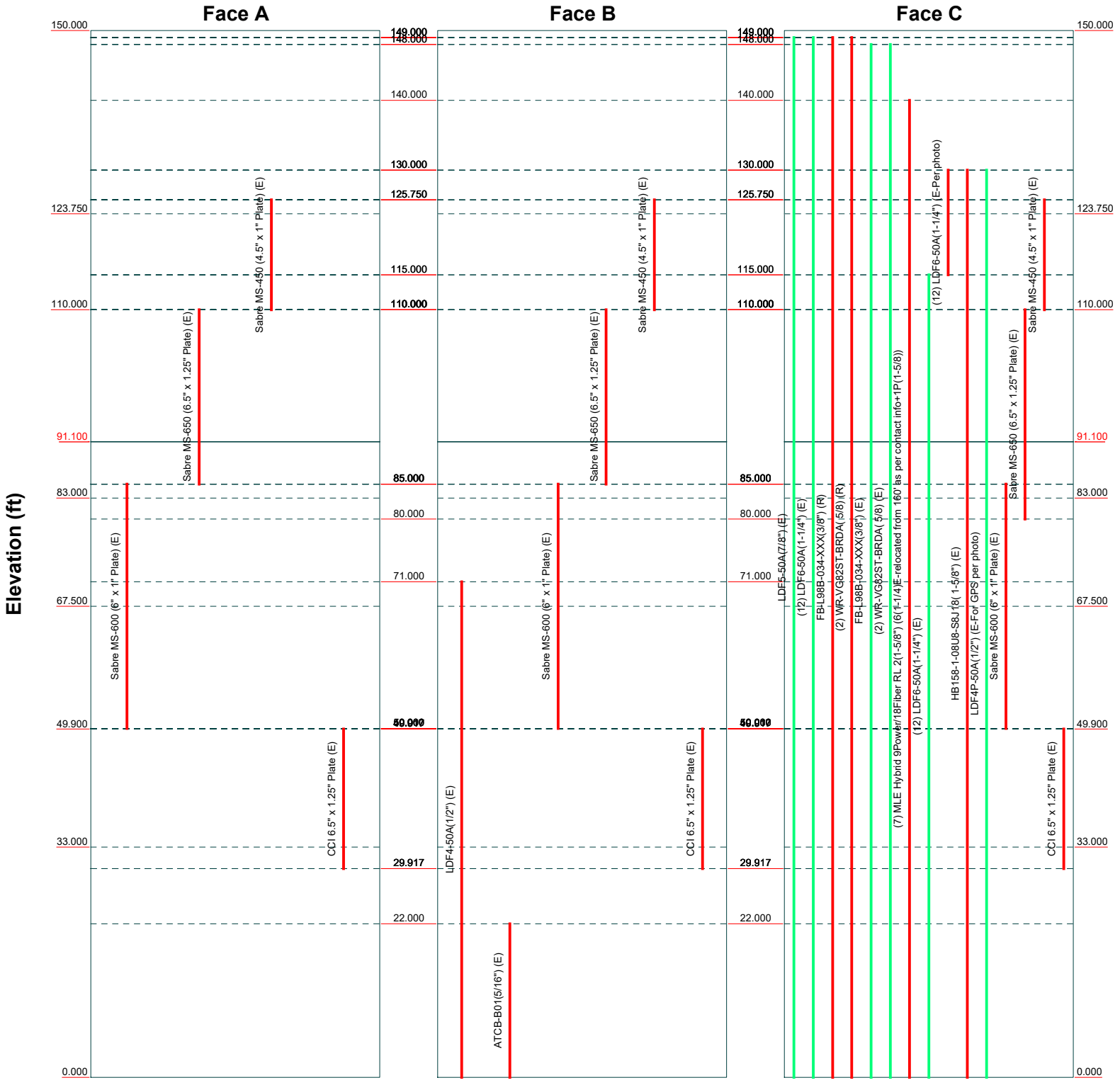
Feed Line Distribution Chart
0' - 150'

Round | Flat | App In Face | App Out Face | Truss Leg



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Job: 93496.006.01 - OLD SAYBROOK, CT (BU # 84128			
Project:			
Client: Crown Castle	Drawn by: T. Cheriyan	App'd:	
Code: TIA-222-G	Date: 10/14/16	Scale: NTS	
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Tower Input Data

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

Tower is located in Middlesex County, Connecticut.
Basic wind speed of 105 mph.
Structure Class II.
Exposure Category B.
Topographic Category 1.
Crest Height 0.000 ft.
Nominal ice thickness of 0.750 in.
Ice thickness is considered to increase with height.
Ice density of 56.000 pcf.
A wind speed of 50 mph is used in combination with ice.
Temperature drop of 50.000 °F.
Deflections calculated using a wind speed of 60 mph.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.
Safety factor used in guy design is 1.
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		Use ASCE 10 X-Brace Ly Rules
	Consider Moments - Horizontals		Assume Legs Pinned		Calculate Redundant Bracing Forces
	Consider Moments - Diagonals	√	Assume Rigid Index Plate		Ignore Redundant Members in FEA
	Use Moment Magnification	√	Use Clear Spans For Wind Area		SR Leg Bolts Resist Compression
√	Use Code Stress Ratios		Use Clear Spans For KL/r		All Leg Panels Have Same Allowable
√	Use Code Safety Factors - Guys		Retension Guys To Initial Tension		Offset Girt At Foundation
	Escalate Ice	√	Bypass Mast Stability Checks	√	Consider Feed Line Torque
	Always Use Max Kz	√	Use Azimuth Dish Coefficients		Include Angle Block Shear Check
	Use Special Wind Profile	√	Project Wind Area of Appurt.		Use TIA-222-G Bracing Resist. Exemption
	Include Bolts In Member Capacity		Autocalc Torque Arm Areas		Use TIA-222-G Tension Splice Exemption
	Leg Bolts Are At Top Of Section		Add IBC .6D+W Combination		Poles
	Secondary Horizontal Braces Leg		Sort Capacity Reports By Component	√	Include Shear-Torsion Interaction
	Use Diamond Inner Bracing (4 Sided)		Triangulate Diamond Inner Bracing		Always Use Sub-Critical Flow
	SR Members Have Cut Ends		Treat Feed Line Bundles As Cylinder		Use Top Mounted Sockets
	SR Members Are Concentric				

Tapered Pole Section Geometry

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*
L1	150.000-123.750	26.250	0.000	12	15.530	19.625	0.250	1.000	A572-65 (65 ksi)
L2	123.750-110.000	13.750	0.000	12	19.625	21.770	0.482	1.926	38.137985ksi (38 ksi)
L3	110.000-83.000	27.000	0.000	12	21.770	26.134	0.668	2.674	42.536229ksi (43 ksi)
L4	83.000-67.500	15.500	3.500	12	26.134	28.640	0.545	2.181	42.204474ksi

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
L5	67.500-49.900	21.100	0.000	12	27.449	30.898	0.585	2.339	(42 ksi) 42.356853ksi
L6	49.900-33.000	16.900	4.000	12	30.898	33.660	0.644	2.575	(42 ksi) 42.993126ksi
L7	33.000-32.650	4.350	0.000	12	32.256	32.966	0.710	2.839	(43 ksi) 42.99819ksi
L8	32.650-0.000	32.650		12	32.966	38.290	0.438	1.750	(43 ksi) A572-65 (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	16.078	12.300	366.566	5.470	8.045	45.567	742.762	6.054	3.492	13.968
	20.317	15.597	747.321	6.936	10.166	73.514	1514.274	7.676	4.590	18.358
L2	20.317	29.685	1388.536	6.853	10.166	136.590	2813.551	14.610	3.969	8.242
	22.538	33.011	1909.540	7.621	11.277	169.333	3869.246	16.247	4.544	9.435
L3	22.538	45.422	2581.534	7.554	11.277	228.923	5230.889	22.355	4.043	6.048
	27.056	54.817	4537.520	9.117	13.538	335.178	9194.246	26.979	5.212	7.797
L4	27.056	44.918	3754.287	9.161	13.538	277.322	7607.202	22.107	5.543	10.168
	29.650	49.316	4968.568	10.058	14.836	334.910	10067.666	24.272	6.215	11.4
L5	29.010	50.576	4658.971	9.618	14.219	327.665	9440.338	24.892	5.789	9.902
	31.988	57.068	6693.369	10.852	16.005	418.203	13562.580	28.087	6.714	11.483
L6	31.988	62.716	7327.136	10.831	16.005	457.801	14846.764	30.867	6.555	10.182
	34.847	68.442	9522.811	11.820	17.436	546.162	19295.797	33.685	7.296	11.332
L7	34.069	72.092	9157.532	11.294	16.709	548.069	18555.644	35.482	6.743	9.501
	34.129	73.714	9789.294	11.548	17.076	573.272	19835.764	36.280	6.933	9.768
L8	34.129	45.824	6188.656	11.645	17.076	362.414	12539.896	22.553	7.662	17.514
	39.641	53.325	9752.222	13.551	19.834	491.687	19760.646	26.245	9.089	20.775

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	Double Angle Stitch Bolt Spacing Redundants in
L1 150.000-123.750				1	1	1			
L2 123.750-110.000				1	1	0.931736			
L3 110.000-83.000				1	1	0.916808			
L4 83.000-67.500				1	1	0.948412			
L5 67.500-49.900				1	1	0.958676			
L6 49.900-33.000				1	1	0.94843			
L7 33.000-32.650				1	1	0.949707			
L8 32.650-0.000				1	1	1			

Guy Data

Guy Elevation ft	Guy Grade		Guy Size	Initial Tension K	%	Guy Modulus ksi	Guy Weight plf	L_u ft	Anchor Radius ft	Anchor Azimuth Adj. °	Anchor Elevation ft	End Fitting Efficiency %
91.1	BS	A	1 5/8	38.880	12%	24000.000	5.550	93.061	20.500	0.000	0.000	100%
		B	1 3/8	27.840	12%	24000.000	3.970	99.990	42.500	0.000	0.000	100%
		C	1 3/8	27.840	12%	24000.000	3.970	99.784	42.000	-30.000	0.000	100%

Guy Data*(cont'd)*

Guy Elevation ft	Mount Type	Torque-Arm Spread ft	Torque-Arm Leg Angle °	Torque-Arm Style	Torque-Arm Grade	Torque-Arm Type	Torque-Arm Size
91.1	Corner						

Guy Data *(cont'd)*

Guy Elevation ft	Diagonal Grade	Diagonal Type	Upper Diagonal Size	Lower Diagonal Size	Is Strap.	Pull-Off Grade	Pull-Off Type	Pull-Off Size
91.100	A572-50 (50 ksi)	Solid Round				A572-50 (50 ksi)	Solid Round	

Guy Data *(cont'd)*

Guy Elevation ft	Cable Weight A K	Cable Weight B K	Cable Weight C K	Cable Weight D K	Tower Intercept A ft	Tower Intercept B ft	Tower Intercept C ft	Tower Intercept D ft
91.1	0.516	0.397	0.396		0.615 1.4 sec/pulse	0.709 1.5 sec/pulse	0.706 1.5 sec/pulse	

Guy Data *(cont'd)*

Guy Elevation ft	Calc K Single Angles	Calc K Solid Rounds	Torque Arm K_x	Torque Arm K_y	Pull Off K_x	Pull Off K_y	Diagonal K_x	Diagonal K_y

Guy Elevation ft	Calc K Single Angles	Calc K Solid Rounds	Torque Arm K_x	Torque Arm K_y	Pull Off K_x	Pull Off K_y	Diagonal K_x	Diagonal K_y
91.1	No	No			1	1	1	1

Guy Data *(cont'd)*

Guy Elevation ft	Torque-Arm Bolt Size in	Torque-Arm Number	Torque-Arm Net Width Deduct in	Torque-Arm U	Pull Off Bolt Size in	Pull Off Number	Pull Off Net Width Deduct in	Pull Off U	Diagonal Bolt Size in	Diagonal Number	Diagonal Net Width Deduct in	Diagonal U
91.1	0.625 A325N	0	0.000	0.75	0.625 A325N	0	0.000	0.75	0.625 A325N	0	0.000	0.75

Guy Pressures

Guy Elevation ft	Guy Location	z ft	q_z ksf	q_z Ice ksf	Ice Thickness in
91.1	A	45.550	0.021	0.005	1.549
	B	45.550	0.021	0.005	1.549
	C	45.550	0.021	0.005	1.549

Guy-Mast Forces (Excluding Wind) - No Ice

Guy Elevation ft	Guy Location	Chord Angle °	Guy Tension Top / Bottom K	F_x K	F_y K	F_z K	M_x kip-ft	M_y kip-ft	M_z kip-ft
91.1	A	77.939	39.385 38.880	0.000	38.527	-8.177	-39.851	0.000	0.000
	B	65.527	28.201 27.840	10.053	25.702	5.804	13.293	0.000	-23.023
	C	65.788	28.201 27.840	-5.868	25.754	9.881	22.904	0.000	13.603
			Sum:	**4.185**	89.982	**7.508**	**-3.654**	0.000	**-9.421**

Guy-Mast Forces (Excluding Wind) - Ice

Guy Elevation ft	Guy Location	Chord Angle °	Guy Tension Top / Bottom K	F_x K	F_y K	F_z K	M_x kip-ft	M_y kip-ft	M_z kip-ft
91.1	A	77.939	52.098	0.000	50.971	-10.776	-52.724	0.000	0.000

Guy Elevation	Guy Location	Chord Angle	Guy Tension Top Bottom K	F_x	F_y	F_z	M_x	M_y	M_z
ft		°		K	K	K	kip-ft	kip-ft	kip-ft
			51.046						
	B	65.527	37.370	13.251	34.093	7.651	17.633	0.000	-30.541
			36.505						
	C	65.788	37.367	-7.734	34.160	13.023	30.380	0.000	18.043
			36.502						
			Sum:	**5.517**	119.225	**9.898**	**-4.711**	0.000	**-12.498**

Guy-Mast Forces (Excluding Wind) - Service

Guy Elevation	Guy Location	Chord Angle	Guy Tension Top Bottom K	F_x	F_y	F_z	M_x	M_y	M_z
ft		°		K	K	K	kip-ft	kip-ft	kip-ft
91.1	A	77.939	39.385	0.000	38.527	-8.177	-39.851	0.000	0.000
			38.880						
	B	65.527	28.201	10.053	25.702	5.804	13.293	0.000	-23.023
			27.840						
	C	65.788	28.201	-5.868	25.754	9.881	22.904	0.000	13.603
			27.840						
			Sum:	**4.185**	89.982	**7.508**	**-3.654**	0.000	**-9.421**

Guy-Tensioning Information

				Temperature At Time Of Tensioning													
				0 F		20 F		40 F		60 F		80 F		100 F		120 F	
Guy Elevation		H	V	Initial Tension	Intercept	Initial Tension	Intercept	Initial Tension	Intercept	Initial Tension	Intercept	Initial Tension	Intercept	Initial Tension	Intercept	Initial Tension	Intercept
ft		ft	ft	K	ft	K	ft	K	ft	K	ft	K	ft	K	ft	K	ft
91.1	A	19.47	91.10	39.531	0.60	39.314	0.61	39.097	0.61	38.880	0.61	38.663	0.62	38.447	0.62	38.230	0.63
	B	41.47	91.10	29.654	0.67	29.049	0.68	28.444	0.69	27.840	0.71	27.236	0.72	26.633	0.74	26.029	0.76
	C	40.97	91.10	29.618	0.66	29.025	0.68	28.432	0.69	27.840	0.71	27.248	0.72	26.657	0.74	26.065	0.75

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Sector	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight klf
FB-L98B-034-XXX(3/8") (R)	C	Surface Ar (CaAa)	149.000 - 0.000	1	1	0.200 0.210	0.394		0.000
WR-VG82ST-BRDA(5/8) (R) *M*	C	Surface Ar (CaAa)	149.000 - 0.000	2	2	0.220 0.240	0.645		0.000
MLE Hybrid 9Power/18Fiber RL 2(1-5/8") (6(1-1/4)E-relocated from 160' as	C	Surface Ar (CaAa)	140.000 - 0.000	7	7	-0.450 -0.200	1.625		0.001

Description	Sector	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight klf
per contact info+1P(1-5/8))									
LDF6-50A(1-1/4") (E-Per photo)	C	Surface Ar (CaAa)	130.000 - 115.000	12	6	0.000 0.150	1.550		0.001
HB158-1-08U8-S8J18(1-5/8") (E) *M*	C	Surface Ar (CaAa)	130.000 - 0.000	1	1	0.250 0.270	1.980		0.001
LDF4-50A(1/2") (E) *M*	B	Surface Ar (CaAa)	71.000 - 0.000	1	1	0.450 0.460	0.630		0.000
ATCB-B01(5/16") (E) *M* *M*	B	Surface Ar (CaAa)	22.000 - 0.000	1	1	0.470 0.480	0.315		0.000
2014 Mod									
Sabre MS-600 (6" x 1" Plate) (E)	A	Surface Af (CaAa)	85.000 - 50.000	1	1	0.000 0.100	6.000	14.000	0.000
Sabre MS-600 (6" x 1" Plate) (E)	B	Surface Af (CaAa)	85.000 - 50.000	1	1	0.000 0.100	6.000	14.000	0.000
Sabre MS-600 (6" x 1" Plate) (E) *M*	C	Surface Af (CaAa)	85.000 - 50.000	1	1	0.000 0.100	6.000	14.000	0.000
Sabre MS-650 (6.5" x 1.25" Plate) (E)	A	Surface Af (CaAa)	110.000 - 85.000	1	1	0.120 0.140	6.500	15.500	0.000
Sabre MS-650 (6.5" x 1.25" Plate) (E)	B	Surface Af (CaAa)	110.000 - 85.000	1	1	0.120 0.140	6.500	15.500	0.000
Sabre MS-650 (6.5" x 1.25" Plate) (E) *M*	C	Surface Af (CaAa)	110.000 - 80.000	1	1	0.120 0.140	6.500	15.500	0.000
Sabre MS-450 (4.5" x 1" Plate) (E)	A	Surface Af (CaAa)	125.750 - 110.000	1	1	0.200 0.240	4.500	11.000	0.000
Sabre MS-450 (4.5" x 1" Plate) (E)	B	Surface Af (CaAa)	125.750 - 110.000	1	1	0.200 0.240	4.500	11.000	0.000
Sabre MS-450 (4.5" x 1" Plate) (E) *M*	C	Surface Af (CaAa)	125.750 - 110.000	1	1	0.200 0.240	4.500	11.000	0.000
2016 Mod									
CCI 6.5" x 1.25" Plate (E)	A	Surface Af (CaAa)	49.917 - 29.917	1	1	-0.240 -0.200	6.500	15.500	0.000
CCI 6.5" x 1.25" Plate (E)	B	Surface Af (CaAa)	49.917 - 29.917	1	1	-0.240 -0.200	6.500	15.500	0.000
CCI 6.5" x 1.25" Plate (E) *M*	C	Surface Af (CaAa)	49.917 - 29.917	1	1	-0.240 -0.200	6.500	15.500	0.000

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight klf
M								
LDF5-50A(7/8") (E)	C	No	Inside Pole	149.000 - 0.000	1	No Ice 1/2" Ice 1" Ice	0.000 0.000 0.000	0.000 0.000 0.000
LDF6-50A(1-1/4") (E)	C	No	Inside Pole	149.000 - 0.000	12	No Ice 1/2" Ice	0.000 0.000	0.001 0.001

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight klf
						1" Ice	0.000	0.001
M								
FB-L98B-034-XXX(3/8")	C	No	Inside Pole	148.000 - 0.000	1	No Ice	0.000	0.000
)						1/2" Ice	0.000	0.000
(E)						1" Ice	0.000	0.000
WR-VG82ST-BRDA(	C	No	Inside Pole	148.000 - 0.000	2	No Ice	0.000	0.000
5/8)						1/2" Ice	0.000	0.000
(E)						1" Ice	0.000	0.000
M								
LDF6-50A(1-1/4")	C	No	Inside Pole	115.000 - 0.000	12	No Ice	0.000	0.001
(E)						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
M								
LDF4P-50A(1/2")	C	No	Inside Pole	130.000 - 0.000	1	No Ice	0.000	0.000
(E-For GPS per photo)						1/2" Ice	0.000	0.000
						1" Ice	0.000	0.000
M								
M								
M								

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	150.000-123.750	A	0.000	0.000	1.500	0.000	0.000
		B	0.000	0.000	1.500	0.000	0.000
		C	0.000	0.000	31.286	0.000	0.422
L2	123.750-110.000	A	0.000	0.000	10.313	0.000	0.000
		B	0.000	0.000	10.313	0.000	0.000
		C	0.000	0.000	39.128	0.000	0.364
L3	110.000-83.000	A	0.000	0.000	29.083	0.000	0.000
		B	0.000	0.000	29.083	0.000	0.000
		C	0.000	0.000	71.854	0.000	0.714
L4	83.000-67.500	A	0.000	0.000	15.500	0.000	0.000
		B	0.000	0.000	15.720	0.000	0.001
		C	0.000	0.000	42.060	0.000	0.410
L5	67.500-49.900	A	0.000	0.000	17.518	0.000	0.000
		B	0.000	0.000	18.627	0.000	0.003
		C	0.000	0.000	43.987	0.000	0.466
L6	49.900-33.000	A	0.000	0.000	18.308	0.000	0.000
		B	0.000	0.000	19.373	0.000	0.003
		C	0.000	0.000	43.724	0.000	0.447
L7	33.000-32.650	A	0.000	0.000	0.379	0.000	0.000
		B	0.000	0.000	0.401	0.000	0.000
		C	0.000	0.000	0.906	0.000	0.009
L8	32.650-0.000	A	0.000	0.000	2.961	0.000	0.000
		B	0.000	0.000	5.711	0.000	0.007
		C	0.000	0.000	52.062	0.000	0.864

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

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	150.000-123.750	A	1.729	0.000	0.000	2.181	0.000	0.024
		B		0.000	0.000	2.181	0.000	0.024
		C		0.000	0.000	70.382	0.000	1.257
L2	123.750-110.000	A	1.702	0.000	0.000	14.936	0.000	0.159
		B		0.000	0.000	14.936	0.000	0.159
		C		0.000	0.000	74.926	0.000	1.266
L3	110.000-83.000	A	1.669	0.000	0.000	38.097	0.000	0.380
		B		0.000	0.000	38.097	0.000	0.380
		C		0.000	0.000	130.646	0.000	2.147
L4	83.000-67.500	A	1.629	0.000	0.000	20.549	0.000	0.198
		B		0.000	0.000	21.909	0.000	0.214
		C		0.000	0.000	75.713	0.000	1.218
L5	67.500-49.900	A	1.589	0.000	0.000	23.224	0.000	0.224
		B		0.000	0.000	30.066	0.000	0.305
		C		0.000	0.000	81.062	0.000	1.336
L6	49.900-33.000	A	1.534	0.000	0.000	23.494	0.000	0.215
		B		0.000	0.000	29.744	0.000	0.286
		C		0.000	0.000	77.594	0.000	1.236
L7	33.000-32.650	A	1.499	0.000	0.000	0.487	0.000	0.004
		B		0.000	0.000	0.616	0.000	0.006
		C		0.000	0.000	1.607	0.000	0.026
L8	32.650-0.000	A	1.395	0.000	0.000	3.723	0.000	0.031
		B		0.000	0.000	21.715	0.000	0.214
		C		0.000	0.000	104.141	0.000	1.875

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	150.000-123.750	0.275	0.859	0.089	0.968
L2	123.750-110.000	0.200	0.831	0.075	0.944
L3	110.000-83.000	0.230	0.593	0.119	0.807
L4	83.000-67.500	0.230	0.708	0.135	0.942
L5	67.500-49.900	0.325	0.671	0.275	0.955
L6	49.900-33.000	0.331	0.684	0.292	0.989
L7	33.000-32.650	0.335	0.692	0.296	1.003
L8	32.650-0.000	0.578	1.166	0.560	1.545

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L1	5	FB-L98B-034-XXX(3/8")	123.75 - 149.00	1.0000	1.0000
L1	6	WR-VG82ST-BRDA(5/8)	123.75 - 149.00	1.0000	1.0000
L1	11	MLE Hybrid 9Power/18Fiber RL 2(1-5/8")	123.75 - 140.00	1.0000	1.0000
L1	15	LDF6-50A(1-1/4")	123.75 - 130.00	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L1	18	HB158-1-08U8-S8J18(1-5/8")	123.75 - 130.00	1.0000	1.0000
L1	37	Sabre MS-450 (4.5" x 1" Plate)	123.75 - 125.75	1.0000	1.0000
L1	38	Sabre MS-450 (4.5" x 1" Plate)	123.75 - 125.75	1.0000	1.0000
L1	39	Sabre MS-450 (4.5" x 1" Plate)	123.75 - 125.75	1.0000	1.0000
L2	5	FB-L98B-034-XXX(3/8")	110.00 - 123.75	1.0000	1.0000
L2	6	WR-VG82ST-BRDA(5/8)	110.00 - 123.75	1.0000	1.0000
L2	11	MLE Hybrid 9Power/18Fiber RL 2(1-5/8")	110.00 - 123.75	1.0000	1.0000
L2	15	LDF6-50A(1-1/4")	115.00 - 123.75	1.0000	1.0000
L2	18	HB158-1-08U8-S8J18(1-5/8")	110.00 - 123.75	1.0000	1.0000
L2	37	Sabre MS-450 (4.5" x 1" Plate)	110.00 - 123.75	1.0000	1.0000
L2	38	Sabre MS-450 (4.5" x 1" Plate)	110.00 - 123.75	1.0000	1.0000
L2	39	Sabre MS-450 (4.5" x 1" Plate)	110.00 - 123.75	1.0000	1.0000
L3	5	FB-L98B-034-XXX(3/8")	83.00 - 110.00	1.0000	1.0000
L3	6	WR-VG82ST-BRDA(5/8)	83.00 - 110.00	1.0000	1.0000
L3	11	MLE Hybrid 9Power/18Fiber RL 2(1-5/8")	83.00 - 110.00	1.0000	1.0000
L3	18	HB158-1-08U8-S8J18(1-5/8")	83.00 - 110.00	1.0000	1.0000
L3	29	Sabre MS-600 (6" x 1" Plate)	83.00 - 85.00	1.0000	1.0000
L3	30	Sabre MS-600 (6" x 1" Plate)	83.00 - 85.00	1.0000	1.0000
L3	31	Sabre MS-600 (6" x 1" Plate)	83.00 - 85.00	1.0000	1.0000
L3	33	Sabre MS-650 (6.5" x 1.25" Plate)	85.00 - 110.00	1.0000	1.0000
L3	34	Sabre MS-650 (6.5" x 1.25" Plate)	85.00 - 110.00	1.0000	1.0000
L3	35	Sabre MS-650 (6.5" x 1.25" Plate)	83.00 - 110.00	1.0000	1.0000
L4	5	FB-L98B-034-XXX(3/8")	67.50 - 83.00	1.0000	1.0000
L4	6	WR-VG82ST-BRDA(5/8)	67.50 - 83.00	1.0000	1.0000
L4	11	MLE Hybrid 9Power/18Fiber RL 2(1-5/8")	67.50 - 83.00	1.0000	1.0000
L4	18	HB158-1-08U8-S8J18(1-5/8")	67.50 - 83.00	1.0000	1.0000
L4	20	LDF4-50A(1/2")	67.50 - 71.00	1.0000	1.0000
L4	29	Sabre MS-600 (6" x 1" Plate)	67.50 - 83.00	1.0000	1.0000
L4	30	Sabre MS-600 (6" x 1" Plate)	67.50 - 83.00	1.0000	1.0000
L4	31	Sabre MS-600 (6" x 1" Plate)	67.50 - 83.00	1.0000	1.0000
L4	35	Sabre MS-650 (6.5" x 1.25" Plate)	80.00 - 83.00	1.0000	1.0000
L4	42	CCI 6.5" x 1.25" Plate	67.50 - 49.92	1.0000	1.0000
L4	43	CCI 6.5" x 1.25" Plate	67.50 - 49.92	1.0000	1.0000
L4	44	CCI 6.5" x 1.25" Plate	67.50 - 49.92	1.0000	1.0000
L6	5	FB-L98B-034-XXX(3/8")	33.00 - 49.90	1.0000	1.0000
L6	6	WR-VG82ST-BRDA(5/8)	33.00 - 49.90	1.0000	1.0000
L6	11	MLE Hybrid 9Power/18Fiber RL 2(1-5/8")	33.00 - 49.90	1.0000	1.0000
L6	18	HB158-1-08U8-S8J18(1-5/8")	33.00 - 49.90	1.0000	1.0000
L6	20	LDF4-50A(1/2")	33.00 - 49.90	1.0000	1.0000
L6	42	CCI 6.5" x 1.25" Plate	33.00 - 49.90	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L6	43	CCI 6.5" x 1.25" Plate	33.00 - 49.90	1.0000	1.0000
L6	44	CCI 6.5" x 1.25" Plate	33.00 - 49.90	1.0000	1.0000
L8	5	FB-L98B-034-XXX(3/8")	0.00 - 32.65	1.0000	1.0000
L8	6	WR-VG82ST-BRDA(5/8)	0.00 - 32.65	1.0000	1.0000
L8	11	MLE Hybrid 9Power/18Fiber RL 2(1-5/8")	0.00 - 32.65	1.0000	1.0000
L8	18	HB158-1-08U8-S8J18(1-5/8")	0.00 - 32.65	1.0000	1.0000
L8	20	LDF4-50A(1/2")	0.00 - 32.65	1.0000	1.0000
L8	22	ATCB-B01(5/16")	0.00 - 22.00	1.0000	1.0000
L8	42	CCI 6.5" x 1.25" Plate	29.92 - 32.65	1.0000	1.0000
L8	43	CCI 6.5" x 1.25" Plate	29.92 - 32.65	1.0000	1.0000
L8	44	CCI 6.5" x 1.25" Plate	29.92 - 32.65	1.0000	1.0000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
M									
M									
7770.00 w/ Mount Pipe	A	From Leg	4.000	0.000	149.000	No Ice	5.746	4.254	0.055
(E)			0.000			1/2" Ice	6.179	5.014	0.103
			3.000			1" Ice	6.607	5.711	0.157
7770.00 w/ Mount Pipe	B	From Leg	4.000	0.000	149.000	No Ice	5.746	4.254	0.055
(E)			0.000			1/2" Ice	6.179	5.014	0.103
			3.000			1" Ice	6.607	5.711	0.157
7770.00 w/ Mount Pipe	C	From Leg	4.000	0.000	149.000	No Ice	5.746	4.254	0.055
(E)			0.000			1/2" Ice	6.179	5.014	0.103
			3.000			1" Ice	6.607	5.711	0.157
AM-X-CW-14-65-00T-RET w/ Mount Pipe	A	From Leg	4.000	0.000	149.000	No Ice	5.232	4.015	0.049
			0.000			1/2" Ice	5.618	4.633	0.094
(E)			3.000			1" Ice	6.012	5.257	0.145
AM-X-CD-14-65-00T-RET w/ Mount Pipe	B	From Leg	4.000	0.000	149.000	No Ice	5.232	4.015	0.035
			0.000			1/2" Ice	5.618	4.633	0.080
(E)			3.000			1" Ice	6.012	5.257	0.131
AM-X-CD-14-65-00T-RET w/ Mount Pipe	C	From Leg	4.000	0.000	149.000	No Ice	5.232	4.015	0.035
			0.000			1/2" Ice	5.618	4.633	0.080
(E)			3.000			1" Ice	6.012	5.257	0.131
(2) TT19-08BP111-001	A	From Leg	4.000	0.000	149.000	No Ice	0.000	0.442	0.016
(E)			0.000			1/2" Ice	0.000	0.530	0.022
			3.000			1" Ice	0.000	0.626	0.029
(2) TT19-08BP111-001	B	From Leg	4.000	0.000	149.000	No Ice	0.000	0.442	0.016
(E)			0.000			1/2" Ice	0.000	0.530	0.022
			3.000			1" Ice	0.000	0.626	0.029
(2) TT19-08BP111-001	C	From Leg	4.000	0.000	149.000	No Ice	0.000	0.442	0.016
(E)			0.000			1/2" Ice	0.000	0.530	0.022
			3.000			1" Ice	0.000	0.626	0.029
SBNHH-1D65A w/ Mount Pipe	A	From Leg	4.000	0.000	149.000	No Ice	5.954	5.190	0.061
			0.000			1/2" Ice	6.390	5.961	0.114
(R)			3.000			1" Ice	6.820	6.658	0.174

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
SBNHH-1D65A w/ Mount Pipe	B	From Leg	4.000 0.000	0.000	149.000	No Ice 1/2" Ice	5.954 6.390	5.190 5.961	0.061 0.114
(R)			3.000			1" Ice	6.820	6.658	0.174
SBNHH-1D65A w/ Mount Pipe	C	From Leg	4.000 0.000	0.000	149.000	No Ice 1/2" Ice	5.954 6.390	5.190 5.961	0.061 0.114
(R)			3.000			1" Ice	6.820	6.658	0.174
WCS RRUS-32-B30	A	From Leg	4.000	0.000	149.000	No Ice	3.314	2.424	0.077
(R)			0.000 3.000			1/2" Ice 1" Ice	3.558 3.809	2.638 2.860	0.105 0.136
WCS RRUS-32-B30	B	From Leg	4.000	0.000	149.000	No Ice	3.314	2.424	0.077
(R)			0.000 3.000			1/2" Ice 1" Ice	3.558 3.809	2.638 2.860	0.105 0.136
WCS RRUS-32-B30	C	From Leg	4.000	0.000	149.000	No Ice	3.314	2.424	0.077
(R)			0.000 3.000			1/2" Ice 1" Ice	3.558 3.809	2.638 2.860	0.105 0.136
DC6-48-60-18-8F	A	From Leg	4.000	0.000	149.000	No Ice	0.917	0.917	0.019
(R)			0.000 3.000			1/2" Ice 1" Ice	1.458 1.643	1.458 1.643	0.037 0.057
Platform Mount [LP 403-1]	C	None		0.000	149.000	No Ice	18.850	18.850	1.500
(E)						1/2" Ice	24.300	24.300	1.797
M						1" Ice	29.750	29.750	2.093
(2) RRUS 11	A	From Leg	2.000	0.000	148.000	No Ice	2.784	1.187	0.048
(E)			0.000 2.000			1/2" Ice 1" Ice	2.992 3.207	1.334 1.490	0.068 0.092
(2) RRUS 11	B	From Leg	2.000	0.000	148.000	No Ice	2.784	1.187	0.048
(E)			0.000 2.000			1/2" Ice 1" Ice	2.992 3.207	1.334 1.490	0.068 0.092
(2) RRUS 11	C	From Leg	2.000	0.000	148.000	No Ice	2.784	1.187	0.048
(E)			0.000 2.000			1/2" Ice 1" Ice	2.992 3.207	1.334 1.490	0.068 0.092
DC6-48-60-18-8F	A	From Leg	2.000	0.000	148.000	No Ice	0.917	0.917	0.019
(E-Offset per photo)			0.000 -1.000			1/2" Ice 1" Ice	1.458 1.643	1.458 1.643	0.037 0.057
4' x 2" Pipe Mount	A	From Leg	2.000	0.000	148.000	No Ice	0.785	0.785	0.029
(E)			0.000 0.000			1/2" Ice 1" Ice	1.028 1.281	1.028 1.281	0.035 0.044
4' x 2" Pipe Mount	B	From Leg	2.000	0.000	148.000	No Ice	0.785	0.785	0.029
(E)			0.000 0.000			1/2" Ice 1" Ice	1.028 1.281	1.028 1.281	0.035 0.044
4' x 2" Pipe Mount	C	From Leg	2.000	0.000	148.000	No Ice	0.785	0.785	0.029
(E)			0.000 0.000			1/2" Ice 1" Ice	1.028 1.281	1.028 1.281	0.035 0.044
Side Arm Mount [SO 102-3]	C	None		0.000	148.000	No Ice	3.000	3.000	0.081
(E)						1/2" Ice	3.480	3.480	0.111
M						1" Ice	3.960	3.960	0.141
AIR 21 B2A/B4P	A	From Leg	4.000	0.000	140.000	No Ice	5.924	4.219	0.083
(P)			0.000 0.000			1/2" Ice 1" Ice	6.288 6.659	4.562 4.913	0.124 0.170
AIR 21 B2A/B4P	B	From Leg	4.000	0.000	140.000	No Ice	5.924	4.219	0.083
(P)			0.000 0.000			1/2" Ice 1" Ice	6.288 6.659	4.562 4.913	0.124 0.170
AIR 21 B2A/B4P	C	From Leg	4.000	0.000	140.000	No Ice	5.924	4.219	0.083
(P)			0.000 0.000			1/2" Ice 1" Ice	6.288 6.659	4.562 4.913	0.124 0.170
AIR 21 B4A/B2P	A	From Leg	4.000	0.000	140.000	No Ice	5.924	4.219	0.083

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
(P)			0.000			1/2" Ice	6.288	4.562	0.124
			0.000			1" Ice	6.659	4.913	0.170
AIR 21 B4A/B2P	B	From Leg	4.000	0.000	140.000	No Ice	5.924	4.219	0.083
(P)			0.000			1/2" Ice	6.288	4.562	0.124
			0.000			1" Ice	6.659	4.913	0.170
AIR 21 B4A/B2P	C	From Leg	4.000	0.000	140.000	No Ice	5.924	4.219	0.083
(P)			0.000			1/2" Ice	6.288	4.562	0.124
			0.000			1" Ice	6.659	4.913	0.170
LNX-6515DS-A1M	A	From Leg	4.000	0.000	140.000	No Ice	11.409	7.698	0.050
(P)			0.000			1/2" Ice	12.027	8.291	0.116
			1.000			1" Ice	12.653	8.891	0.189
LNX-6515DS-A1M	B	From Leg	4.000	0.000	140.000	No Ice	11.409	7.698	0.050
(P)			0.000			1/2" Ice	12.027	8.291	0.116
			1.000			1" Ice	12.653	8.891	0.189
LNX-6515DS-A1M	C	From Leg	4.000	0.000	140.000	No Ice	11.409	7.698	0.050
(P)			0.000			1/2" Ice	12.027	8.291	0.116
			1.000			1" Ice	12.653	8.891	0.189
TMAT7LA-11A	A	From Leg	4.000	0.000	140.000	No Ice	0.000	0.347	0.022
(P)			0.000			1/2" Ice	0.000	0.423	0.029
			0.000			1" Ice	0.000	0.506	0.037
TMAT7LA-11A	B	From Leg	4.000	0.000	140.000	No Ice	0.000	0.347	0.022
(P)			0.000			1/2" Ice	0.000	0.423	0.029
			0.000			1" Ice	0.000	0.506	0.037
TMAT7LA-11A	C	From Leg	4.000	0.000	140.000	No Ice	0.000	0.347	0.022
(P)			0.000			1/2" Ice	0.000	0.423	0.029
			0.000			1" Ice	0.000	0.506	0.037
RRUS 11 B12	A	From Leg	4.000	0.000	140.000	No Ice	0.000	1.182	0.051
(P)			0.000			1/2" Ice	0.000	1.330	0.072
			0.000			1" Ice	0.000	1.485	0.095
RRUS 11 B12	B	From Leg	4.000	0.000	140.000	No Ice	0.000	1.182	0.051
(P)			0.000			1/2" Ice	0.000	1.330	0.072
			0.000			1" Ice	0.000	1.485	0.095
RRUS 11 B12	C	From Leg	4.000	0.000	140.000	No Ice	0.000	1.182	0.051
(P)			0.000			1/2" Ice	0.000	1.330	0.072
			0.000			1" Ice	0.000	1.485	0.095
Platform Mount [LP 301-1]	C	None		0.000	140.000	No Ice	30.100	30.100	1.589
(P-Includes 4 Mount pipes per sector)						1/2" Ice	40.800	40.800	2.029
M						1" Ice	51.500	51.500	2.470
BXA-80080/4CF w/ Mount Pipe	A	From Leg	4.000	0.000	130.000	No Ice	5.037	4.033	0.033
			0.000			1/2" Ice	5.421	4.655	0.077
(E)			3.000			1" Ice	5.813	5.281	0.127
BXA-80080/4CF w/ Mount Pipe	B	From Leg	4.000	0.000	130.000	No Ice	5.037	4.033	0.033
			0.000			1/2" Ice	5.421	4.655	0.077
(E)			3.000			1" Ice	5.813	5.281	0.127
BXA-80080/4CF w/ Mount Pipe	C	From Leg	4.000	0.000	130.000	No Ice	5.037	4.033	0.033
			0.000			1/2" Ice	5.421	4.655	0.077
(E)			3.000			1" Ice	5.813	5.281	0.127
HBXX-6517DS-A2M w/ Mount Pipe	A	From Leg	4.000	0.000	130.000	No Ice	8.765	6.963	0.067
			0.000			1/2" Ice	9.342	8.182	0.137
(E)			3.000			1" Ice	9.889	9.144	0.215
HBXX-6517DS-A2M w/ Mount Pipe	B	From Leg	4.000	0.000	130.000	No Ice	8.765	6.963	0.067
			0.000			1/2" Ice	9.342	8.182	0.137
(E)			3.000			1" Ice	9.889	9.144	0.215
HBXX-6517DS-A2M w/ Mount Pipe	C	From Leg	4.000	0.000	130.000	No Ice	8.765	6.963	0.067
			0.000			1/2" Ice	9.342	8.182	0.137
(E)			3.000			1" Ice	9.889	9.144	0.215

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
LNX-6514DS-A1M w/ Mount Pipe	A	From Leg	4.000	0.000	130.000	No Ice	8.411	7.082	0.065
			0.000			1/2" Ice	8.975	8.273	0.134
(E)			3.000			1" Ice	9.505	9.185	0.211
LNX-6514DS-A1M w/ Mount Pipe	B	From Leg	4.000	0.000	130.000	No Ice	8.411	7.082	0.065
			0.000			1/2" Ice	8.975	8.273	0.134
(E)			3.000			1" Ice	9.505	9.185	0.211
LNX-6514DS-A1M w/ Mount Pipe	C	From Leg	4.000	0.000	130.000	No Ice	8.411	7.082	0.065
			0.000			1/2" Ice	8.975	8.273	0.134
(E)			3.000			1" Ice	9.505	9.185	0.211
BXA-171085-8BF-EDIN-0 w/ Mount Pipe	A	From Leg	4.000	0.000	130.000	No Ice	3.179	3.353	0.029
			0.000			1/2" Ice	3.555	3.971	0.061
(E)			3.000			1" Ice	3.930	4.595	0.099
BXA-171085-8BF-EDIN-0 w/ Mount Pipe	B	From Leg	4.000	0.000	130.000	No Ice	3.179	3.353	0.029
			0.000			1/2" Ice	3.555	3.971	0.061
(E)			3.000			1" Ice	3.930	4.595	0.099
BXA-171085-8BF-EDIN-0 w/ Mount Pipe	C	From Leg	4.000	0.000	130.000	No Ice	3.179	3.353	0.029
			0.000			1/2" Ice	3.555	3.971	0.061
(E)			3.000			1" Ice	3.930	4.595	0.099
RRH2X60-PCS	A	From Leg	4.000	0.000	130.000	No Ice	0.000	1.723	0.055
(E)			0.000			1/2" Ice	0.000	1.901	0.075
			3.000			1" Ice	0.000	2.087	0.099
RRH2X60-PCS	B	From Leg	4.000	0.000	130.000	No Ice	0.000	1.723	0.055
(E)			0.000			1/2" Ice	0.000	1.901	0.075
			3.000			1" Ice	0.000	2.087	0.099
RRH2X60-PCS	C	From Leg	4.000	0.000	130.000	No Ice	0.000	1.723	0.055
(E)			0.000			1/2" Ice	0.000	1.901	0.075
			3.000			1" Ice	0.000	2.087	0.099
RRH2X60-AWS	A	From Leg	4.000	0.000	130.000	No Ice	0.000	1.816	0.060
(E)			0.000			1/2" Ice	0.000	2.052	0.083
			3.000			1" Ice	0.000	2.289	0.109
RRH2X60-AWS	B	From Leg	4.000	0.000	130.000	No Ice	0.000	1.816	0.060
(E)			0.000			1/2" Ice	0.000	2.052	0.083
			3.000			1" Ice	0.000	2.289	0.109
RRH2X60-AWS	C	From Leg	4.000	0.000	130.000	No Ice	0.000	1.816	0.060
(E)			0.000			1/2" Ice	0.000	2.052	0.083
			3.000			1" Ice	0.000	2.289	0.109
(2) FD9R6004/2C-3L	A	From Leg	4.000	0.000	130.000	No Ice	0.314	0.076	0.003
(E)			0.000			1/2" Ice	0.386	0.119	0.005
			3.000			1" Ice	0.466	0.169	0.009
(2) FD9R6004/2C-3L	B	From Leg	4.000	0.000	130.000	No Ice	0.314	0.076	0.003
(E)			0.000			1/2" Ice	0.386	0.119	0.005
			3.000			1" Ice	0.466	0.169	0.009
(2) FD9R6004/2C-3L	C	From Leg	4.000	0.000	130.000	No Ice	0.314	0.076	0.003
(E)			0.000			1/2" Ice	0.386	0.119	0.005
			3.000			1" Ice	0.466	0.169	0.009
DB-T1-6Z-8AB-0Z	A	From Leg	4.000	0.000	130.000	No Ice	4.800	2.000	0.044
(E)			0.000			1/2" Ice	5.070	2.193	0.080
			3.000			1" Ice	5.348	2.393	0.120
Platform Mount [LP 403-1]	C	None		0.000	130.000	No Ice	18.850	18.850	1.500
(E)						1/2" Ice	24.300	24.300	1.797
						1" Ice	29.750	29.750	2.093
M FMO	C	From Leg	2.000	0.000	71.000	No Ice	8.400	8.400	0.010
(E)			0.000			1/2" Ice	8.815	8.815	0.181
			1.000			1" Ice	9.237	9.237	0.361
Side Arm Mount [SO 301-1]	C	From Leg	1.000	0.000	71.000	No Ice	1.000	0.900	0.023
(E)			0.000			1/2" Ice	1.390	1.420	0.033

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.000			1" Ice	1.780	1.940	0.042
M									
MYA-43012N	C	From Leg	3.000	0.000	22.000	No Ice	0.620	0.620	0.005
(E)			0.000			1/2" Ice	1.116	1.116	0.006
			0.000			1" Ice	1.612	1.612	0.008
4' x 2" Pipe Mount	C	From Leg	3.000	0.000	22.000	No Ice	0.785	0.785	0.029
(E-For Yagi Per photo)			0.000			1/2" Ice	1.028	1.028	0.035
			0.000			1" Ice	1.281	1.281	0.044
Side Arm Mount [SO 701-1]	C	From Leg	1.500	0.000	22.000	No Ice	0.850	1.670	0.065
(E)			0.000			1/2" Ice	1.140	2.340	0.079
			0.000			1" Ice	1.430	3.010	0.093
M									
Yagi	A	From Leg	3.000	0.000	71.000	No Ice	0.058	0.058	0.010
(E-Per Photo)			0.000			1/2" Ice	0.095	0.095	0.011
			0.000			1" Ice	0.140	0.140	0.013
4' x 2" Pipe Mount	A	From Leg	3.000	0.000	71.000	No Ice	0.785	0.785	0.029
(E-For Yagi Per photo)			0.000			1/2" Ice	1.028	1.028	0.035
			0.000			1" Ice	1.281	1.281	0.044
Side Arm Mount [SO 701-1]	A	From Leg	1.500	0.000	71.000	No Ice	0.850	1.670	0.065
(E)			0.000			1/2" Ice	1.140	2.340	0.079
			0.000			1" Ice	1.430	3.010	0.093
M									
GPS (3"x7")	C	From Leg	4.000	0.000	130.000	No Ice	0.175	0.175	0.008
(E-Per Photo)			0.000			1/2" Ice	0.234	0.234	0.010
			4.000			1" Ice	0.301	0.301	0.013
M									

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
KP4F-23A	B	Grid	From	1.000	0.000		149.000	4.000	No Ice	12.570	0.070
(E)			Leg	0.000					1/2" Ice	13.090	0.140
				7.000					1" Ice	16.130	0.200
M											

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.6 Wind 0 deg - No Ice+1.0 Guy
3	1.2 Dead+1.6 Wind 30 deg - No Ice+1.0 Guy
4	1.2 Dead+1.6 Wind 60 deg - No Ice+1.0 Guy
5	1.2 Dead+1.6 Wind 90 deg - No Ice+1.0 Guy

Comb. No.	Description
6	1.2 Dead+1.6 Wind 120 deg - No Ice+1.0 Guy
7	1.2 Dead+1.6 Wind 150 deg - No Ice+1.0 Guy
8	1.2 Dead+1.6 Wind 180 deg - No Ice+1.0 Guy
9	1.2 Dead+1.6 Wind 210 deg - No Ice+1.0 Guy
10	1.2 Dead+1.6 Wind 240 deg - No Ice+1.0 Guy
11	1.2 Dead+1.6 Wind 270 deg - No Ice+1.0 Guy
12	1.2 Dead+1.6 Wind 300 deg - No Ice+1.0 Guy
13	1.2 Dead+1.6 Wind 330 deg - No Ice+1.0 Guy
14	1.2 Dead+1.0 Ice+1.0 Temp+Guy
15	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp+1.0 Guy
16	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp+1.0 Guy
17	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp+1.0 Guy
18	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp+1.0 Guy
19	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp+1.0 Guy
20	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp+1.0 Guy
21	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp+1.0 Guy
22	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp+1.0 Guy
23	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp+1.0 Guy
24	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp+1.0 Guy
25	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp+1.0 Guy
26	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp+1.0 Guy
27	Dead+Wind 0 deg - Service+Guy
28	Dead+Wind 30 deg - Service+Guy
29	Dead+Wind 60 deg - Service+Guy
30	Dead+Wind 90 deg - Service+Guy
31	Dead+Wind 120 deg - Service+Guy
32	Dead+Wind 150 deg - Service+Guy
33	Dead+Wind 180 deg - Service+Guy
34	Dead+Wind 210 deg - Service+Guy
35	Dead+Wind 240 deg - Service+Guy
36	Dead+Wind 270 deg - Service+Guy
37	Dead+Wind 300 deg - Service+Guy
38	Dead+Wind 330 deg - Service+Guy

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	150 - 123.75	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-25.933	-1.015	0.157
			Max. Mx	5	-9.519	-290.813	-4.794
			Max. My	8	-10.222	-2.540	-282.072
			Max. Vy	5	16.612	-290.813	-4.794
			Max. Vx	8	16.206	-2.540	-282.072
			Max. Torque	7			0.662
L2	123.75 - 110	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-29.885	-1.575	-1.124
			Max. Mx	5	-11.748	-527.990	-8.945
			Max. My	8	-12.500	-3.827	-512.752
			Max. Vy	5	17.918	-527.990	-8.945
			Max. Vx	8	17.343	-3.827	-512.752
			Max. Torque	13			-0.657
L3	110 - 83	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	6	-253.777	-873.943	-386.591
			Max. Mx	5	-237.191	-908.446	-35.052
			Max. My	8	-16.824	-5.709	-855.949
			Max. Vy	5	19.735	-883.396	-15.527
			Max. Vx	8	18.987	-5.709	-855.949

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Torque	6			4.645
		Guy A	Bottom Tension	6	171.216		
			Top Tension	6	171.695		
			Top Cable Vert	6	167.208		
			Top Cable Norm	6	38.470		
			Top Cable Tan	6	6.371		
			Bot Cable Vert	6	-166.635		
			Bot Cable Norm	6	38.738		
			Bot Cable Tan	6	6.857		
		Guy B	Bottom Tension	12	90.809		
			Top Tension	12	91.167		
			Top Cable Vert	12	82.921		
			Top Cable Norm	12	37.888		
			Top Cable Tan	12	0.128		
			Bot Cable Vert	12	-82.349		
			Bot Cable Norm	12	38.274		
			Bot Cable Tan	12	0.128		
		Guy C	Bottom Tension	4	101.838		
			Top Tension	4	102.191		
			Top Cable Vert	4	93.045		
			Top Cable Norm	4	42.212		
			Top Cable Tan	4	1.934		
			Bot Cable Vert	4	-92.493		
			Bot Cable Norm	4	42.558		
			Bot Cable Tan	4	2.167		
L4	83 - 67.5	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	6	-256.414	-1015.527	-443.755
			Max. Mx	6	-256.414	-1015.527	-443.755
			Max. My	2	-132.073	-2.917	670.658
			Max. Vy	6	12.886	-886.747	-391.732
			Max. Vx	2	12.536	-4.429	633.187
			Max. Torque	6			4.639
L5	67.5 - 49.9	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	6	-262.419	-1225.948	-532.469
			Max. Mx	6	-262.419	-1225.948	-532.469
			Max. My	8	-167.287	-22.723	-564.603
			Max. Vy	6	11.119	-1066.278	-464.490
			Max. Vx	2	11.661	-10.601	480.537
			Max. Torque	6			3.889
L6	49.9 - 33	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	6	-266.109	-1325.695	-577.217
			Max. Mx	6	-266.109	-1325.695	-577.217
			Max. My	6	-266.109	-1325.695	-577.217
			Max. Vy	12	8.580	298.645	130.391
			Max. Vx	2	10.644	-19.155	283.275
			Max. Torque	6			3.880
L7	33 - 32.65	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	6	-268.527	-1356.762	-591.702
			Max. Mx	6	-268.527	-1356.762	-591.702
			Max. My	6	-268.527	-1356.762	-591.702
			Max. Vy	12	7.268	164.022	33.000
			Max. Vx	2	9.205	-26.908	114.828
			Max. Torque	6			3.876
L8	32.65 - 0	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	6	-276.412	-1498.710	-668.590
			Max. Mx	6	-276.412	-1498.710	-668.590
			Max. My	6	-276.412	-1498.710	-668.590
			Max. Vy	12	7.253	161.481	31.134
			Max. Vx	2	9.169	-27.065	111.610
			Max. Torque	6			3.876

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Mast	Max. Vert	6	276.414	-2.015	-1.508
	Max. H_x	3	133.398	1.660	-5.014
	Max. H_z	8	185.304	-0.353	1.951
	Max. M_x	21	-41.419	-0.384	0.695
	Max. M_z	6	1498.710	-2.015	-1.508
	Max. Torsion	6	3.555	-2.015	-1.508
	Min. Vert	32	106.743	0.017	-0.134
	Min. H_x	12	153.950	-4.488	-3.468
	Min. H_z	4	205.275	-0.560	-5.935
	Min. M_x	6	-668.591	-2.015	-1.508
	Min. M_z	9	-268.824	-0.930	1.094
	Min. Torsion	9	-2.119	-0.930	1.094
Guy C @ 42 ft Elev 0 ft Azimuth 211 deg	Max. Vert	9	-0.556	-0.056	0.091
	Max. H_x	10	-0.701	-0.001	0.222
	Max. H_z	4	-92.493	-23.595	35.485
	Min. Vert	4	-92.493	-23.595	35.485
	Min. H_x	5	-88.357	-23.750	33.141
	Min. H_z	9	-0.556	-0.056	0.091
Guy B @ 42.5 ft Elev 0 ft Azimuth 120 deg	Max. Vert	6	-0.298	-0.005	-0.001
	Max. H_x	12	-82.349	33.210	19.026
	Max. H_z	12	-82.349	33.210	19.026
	Min. Vert	12	-82.349	33.210	19.026
	Min. H_x	6	-0.298	-0.005	-0.001
	Min. H_z	7	-0.457	0.128	-0.051
Guy A @ 20.5 ft Elev 0 ft Azimuth 0 deg	Max. Vert	2	-4.315	-0.004	-0.686
	Max. H_x	10	-127.419	1.745	-28.876
	Max. H_z	2	-4.315	-0.004	-0.686
	Min. Vert	6	-166.635	-6.857	-38.738
	Min. H_x	6	-166.635	-6.857	-38.738
	Min. H_z	6	-166.635	-6.857	-38.738

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	111.994	0.340	0.855	66.889	-40.150	-0.012
1.2 Dead+1.6 Wind 0 deg - No Ice+1.0 Guy	154.188	0.328	5.713	134.698	-39.431	-0.828
1.2 Dead+1.6 Wind 30 deg - No Ice+1.0 Guy	133.398	-1.660	5.014	141.956	-69.232	-0.661
1.2 Dead+1.6 Wind 60 deg - No Ice+1.0 Guy	205.275	0.560	5.935	446.927	-769.956	-0.327
1.2 Dead+1.6 Wind 90 deg - No Ice+1.0 Guy	259.683	1.118	4.269	633.795	-1286.445	-1.854

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
1.2 Dead+1.6 Wind 120 deg - No Ice+1.0 Guy	276.414	2.015	1.508	668.591	-1498.710	-3.555
1.2 Dead+1.6 Wind 150 deg - No Ice+1.0 Guy	224.562	3.894	-0.732	445.398	-1081.558	-2.613
1.2 Dead+1.6 Wind 180 deg - No Ice+1.0 Guy	185.304	0.353	-1.951	283.717	-57.518	0.668
1.2 Dead+1.6 Wind 210 deg - No Ice+1.0 Guy	226.202	0.930	-1.094	384.371	268.824	2.119
1.2 Dead+1.6 Wind 240 deg - No Ice+1.0 Guy	237.791	3.313	0.550	398.163	239.998	1.732
1.2 Dead+1.6 Wind 270 deg - No Ice+1.0 Guy	200.471	4.402	2.341	271.977	104.912	0.451
1.2 Dead+1.6 Wind 300 deg - No Ice+1.0 Guy	153.950	4.488	3.468	114.254	-32.401	-0.583
1.2 Dead+1.6 Wind 330 deg - No Ice+1.0 Guy	157.015	2.680	5.168	133.707	-41.891	-0.730
1.2 Dead+1.0 Ice+1.0 Temp+Guy	129.413	0.270	0.585	54.727	-33.685	-0.005
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp+1.0 Guy	134.063	0.450	2.042	81.572	-35.623	-0.264
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp+1.0 Guy	131.557	-0.293	1.750	77.020	-39.580	-0.085
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp+1.0 Guy	136.749	-0.328	1.572	100.317	-103.881	-0.008
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp+1.0 Guy	147.490	0.302	1.261	134.858	-211.728	-0.017
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp+1.0 Guy	151.570	0.801	0.716	144.657	-261.987	-0.092
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp+1.0 Guy	137.965	0.488	-0.212	83.037	-146.266	-0.114
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp+1.0 Guy	128.372	0.384	-0.695	41.419	-50.203	0.016
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp+1.0 Guy	132.205	0.781	-0.428	50.049	-22.083	0.118
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp+1.0 Guy	136.351	1.469	0.132	59.646	-26.024	0.271
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp+1.0 Guy	136.886	1.582	0.744	62.434	-29.221	0.170
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp+1.0 Guy	137.648	1.440	1.324	66.758	-30.126	-0.097
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp+1.0 Guy	136.108	1.059	1.820	77.113	-36.609	-0.229
Dead+Wind 0 deg - Service+Guy	115.937	0.341	1.707	81.403	-40.180	-0.156
Dead+Wind 30 deg - Service+Guy	113.194	-0.042	1.578	79.176	-41.071	-0.182
Dead+Wind 60 deg - Service+Guy	110.304	-0.322	1.289	74.897	-43.086	-0.132
Dead+Wind 90 deg - Service+Guy	109.096	-0.336	0.905	72.352	-53.483	-0.071
Dead+Wind 120 deg - Service+Guy	109.727	-0.106	0.535	73.176	-71.884	-0.027
Dead+Wind 150 deg - Service+Guy	106.743	-0.017	0.134	56.056	-44.311	0.055
Dead+Wind 180 deg - Service+Guy	108.033	0.339	0.014	52.874	-40.581	0.129
Dead+Wind 210 deg - Service+Guy	110.734	0.713	0.129	54.661	-39.411	0.177
Dead+Wind 240 deg - Service+Guy	113.852	1.020	0.423	59.599	-39.164	0.129
Dead+Wind 270 deg -	116.455	1.131	0.851	66.821	-39.246	0.038

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
Service+Guy Dead+Wind 300 deg - Service+Guy	118.143	1.044	1.299	74.010	-38.222	-0.037
Service+Guy Dead+Wind 330 deg - Service+Guy	117.650	0.732	1.604	79.758	-39.659	-0.099

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
1	0.000	-36.069	0.000	-0.000	36.069	0.000	0.000%
2	-0.049	-43.156	-29.586	0.049	43.156	29.586	0.000%
3	14.748	-43.097	-25.545	-14.748	43.097	25.545	0.000%
4	25.810	-43.025	-14.862	-25.810	43.025	14.861	0.001%
5	29.704	-42.960	0.053	-29.704	42.960	-0.053	0.000%
6	27.098	-42.905	15.685	-27.098	42.904	-15.685	0.000%
7	14.857	-42.871	25.697	-14.857	42.871	-25.696	0.000%
8	0.069	-42.885	29.595	-0.069	42.885	-29.595	0.000%
9	-14.689	-42.944	25.579	14.689	42.944	-25.579	0.000%
10	-25.793	-43.017	14.874	25.793	43.017	-14.874	0.000%
11	-29.704	-43.081	-0.032	29.704	43.081	0.032	0.000%
12	-27.064	-43.137	-15.665	27.064	43.137	15.665	0.000%
13	-14.839	-43.170	-25.707	14.839	43.170	25.707	0.000%
14	0.000	-76.429	0.000	0.000	76.429	0.000	0.000%
15	-0.207	-76.497	-6.532	0.207	76.497	6.532	0.000%
16	3.354	-76.469	-5.813	-3.354	76.469	5.813	0.000%
17	5.805	-76.434	-3.321	-5.805	76.434	3.321	0.000%
18	6.954	-76.401	0.013	-6.955	76.401	-0.013	0.000%
19	6.458	-76.373	3.732	-6.458	76.373	-3.732	0.000%
20	3.262	-76.355	5.631	-3.262	76.355	-5.631	0.000%
21	0.030	-76.361	6.466	-0.030	76.361	-6.466	0.000%
22	-3.351	-76.389	5.815	3.351	76.389	-5.815	0.000%
23	-5.949	-76.424	3.199	5.949	76.424	-3.199	0.000%
24	-7.027	-76.457	-0.130	7.027	76.457	0.130	0.000%
25	-6.525	-76.485	-3.771	6.525	76.485	3.771	0.000%
26	-3.400	-76.503	-5.635	3.400	76.503	5.635	0.000%
27	-0.009	-36.094	-5.402	0.009	36.094	5.402	0.000%
28	2.693	-36.083	-4.664	-2.693	36.083	4.664	0.000%
29	4.713	-36.070	-2.714	-4.713	36.070	2.714	0.000%
30	5.424	-36.058	0.010	-5.424	36.058	-0.010	0.000%
31	4.948	-36.048	2.864	-4.948	36.048	-2.864	0.001%
32	2.713	-36.041	4.692	-2.713	36.041	-4.692	0.000%
33	0.013	-36.044	5.404	-0.013	36.044	-5.404	0.000%
34	-2.682	-36.055	4.671	2.682	36.055	-4.671	0.000%
35	-4.710	-36.068	2.716	4.710	36.068	-2.716	0.000%
36	-5.424	-36.080	-0.006	5.424	36.080	0.006	0.000%
37	-4.942	-36.090	-2.860	4.942	36.090	2.860	0.000%
38	-2.710	-36.096	-4.694	2.710	36.096	4.694	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00028035
2	Yes	5	0.00000001	0.00056951
3	Yes	6	0.00000001	0.00046512
4	Yes	8	0.00000001	0.00055372
5	Yes	10	0.00001998	0.00058266
6	Yes	11	0.00000001	0.00045521
7	Yes	9	0.00000001	0.00062715
8	Yes	7	0.00000001	0.00013406
9	Yes	8	0.00000001	0.00022309
10	Yes	8	0.00000001	0.00024555
11	Yes	7	0.00000001	0.00021682
12	Yes	6	0.00000001	0.00014677
13	Yes	6	0.00000001	0.00018485
14	Yes	5	0.00000001	0.00044921
15	Yes	5	0.00000001	0.00085939
16	Yes	6	0.00000001	0.00018082
17	Yes	8	0.00000001	0.00018073
18	Yes	8	0.00000001	0.00051729
19	Yes	8	0.00000001	0.00059832
20	Yes	8	0.00000001	0.00029900
21	Yes	7	0.00000001	0.00009855
22	Yes	6	0.00000001	0.00081406
23	Yes	6	0.00000001	0.00077116
24	Yes	6	0.00000001	0.00015063
25	Yes	6	0.00000001	0.00010530
26	Yes	5	0.00000001	0.00090585
27	Yes	4	0.00000001	0.00066111
28	Yes	4	0.00000001	0.00091753
29	Yes	5	0.00000001	0.00006393
30	Yes	6	0.00000001	0.00015111
31	Yes	6	0.00000001	0.00058356
32	Yes	5	0.00000001	0.00020056
33	Yes	4	0.00000001	0.00092114
34	Yes	4	0.00000001	0.00077709
35	Yes	4	0.00000001	0.00079631
36	Yes	4	0.00000001	0.00066515
37	Yes	4	0.00000001	0.00067571
38	Yes	4	0.00000001	0.00061501

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	150 - 123.75	13.473	31	1.110	0.003
L2	123.75 - 110	7.863	31	0.847	0.001
L3	110 - 83	5.666	31	0.672	0.001
L4	83 - 67.5	2.726	31	0.383	0.000
L5	71 - 49.9	1.901	31	0.282	0.000
L6	49.9 - 33	0.896	31	0.174	0.000
L7	37 - 32.65	0.493	31	0.127	0.000
L8	32.65 - 0	0.380	31	0.120	0.000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
156.000	KP4F-23A	31	13.473	1.110	0.003	16638
149.000	7770.00 w/ Mount Pipe	31	13.244	1.101	0.003	16638
148.000	(2) RRUS 11	31	13.014	1.092	0.003	16638
140.000	AIR 21 B2A/B4P	31	11.200	1.019	0.002	8319
130.000	BXA-80080/4CF w/ Mount Pipe	31	9.066	0.918	0.002	4159
91.100	Guy	31	3.437	0.461	0.000	5529
71.000	FMO	31	1.901	0.282	0.000	9389
22.000	MYA-43012N	31	0.182	0.093	0.000	15777

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	150 - 123.75	135.231	6	8.818	0.119
L2	123.75 - 110	89.746	6	7.350	0.082
L3	110 - 83	70.014	6	6.364	0.059
L4	83 - 67.5	38.950	6	4.655	0.020
L5	71 - 49.9	28.338	6	3.814	0.009
L6	49.9 - 33	14.014	6	2.616	0.004
L7	37 - 32.65	7.819	6	1.986	0.003
L8	32.65 - 0	6.055	6	1.881	0.003

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
156.000	KP4F-23A	6	135.231	8.818	0.145	3238
149.000	7770.00 w/ Mount Pipe	6	133.411	8.768	0.143	3238
148.000	(2) RRUS 11	6	131.591	8.718	0.142	3238
140.000	AIR 21 B2A/B4P	6	117.151	8.311	0.128	1617
130.000	BXA-80080/4CF w/ Mount Pipe	6	99.837	7.750	0.111	805
91.100	Guy	6	47.228	5.178	0.041	882
71.000	FMO	6	28.338	3.814	0.017	990
22.000	MYA-43012N	6	2.937	1.466	0.004	1019

Guy Design Data

Section No.	Elevation ft	Size	Initial Tension K	Breaking Load K	Actual T_u K	Allowable ϕT_n K	Required S.F.	Actual S.F.
L3	91.100 (A) (11)	1 5/8 BS	38.880	324.001	171.695	194.400	1.000	1.132 ✔
	91.100 (B) (10)	1 3/8 BS	27.840	232.000	91.167	139.200	1.000	1.527 ✔
	91.100 (C) (9)	1 3/8 BS	27.840	232.000	102.191	139.200	1.000	1.362 ✔

Section No.	Elevation ft	Size	Initial Tension K	Breaking Load K	Actual T_u K	Allowable ϕT_n K	Required S.F.	Actual S.F.

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
L1	150 - 123.75 (1)	TP19.625x15.53x0.25	26.250	0.000	0.0	15.597	-9.265	1149.650	0.008
L2	123.75 - 110 (2)	TP21.77x19.625x0.482	13.750	0.000	0.0	33.011	-11.413	1427.660	0.008
L3	110 - 83 (3)	TP26.134x21.77x0.668	27.000	0.000	0.0	54.817	-253.777	2644.140	0.096
L4	83 - 67.5 (4)	TP28.64x26.134x0.545	15.500	0.000	0.0	45.770	-254.426	2190.530	0.116
L5	67.5 - 49.9 (5)	TP30.898x27.449x0.585	21.100	0.000	0.0	51.653	-258.029	2481.030	0.104
L6	49.9 - 33 (6)	TP33.66x30.898x0.644	16.900	0.000	0.0	62.716	-262.428	3057.690	0.086
L7	33 - 32.65 (7)	TP32.966x32.256x0.71	4.350	0.000	0.0	73.583	-268.417	3587.910	0.075
L8	32.65 - 0 (8)	TP38.29x32.966x0.438	32.650	0.000	0.0	45.824	-268.535	3377.690	0.080

Pole Bending Design Data

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L1	150 - 123.75 (1)	TP19.625x15.53x0.25	296.534	451.558	0.657	0.000	451.558	0.000
L2	123.75 - 110 (2)	TP21.77x19.625x0.482	543.503	610.282	0.891	0.000	610.282	0.000
L3	110 - 83 (3)	TP26.134x21.77x0.668	955.633	1347.308	0.709	0.000	1347.308	0.000
L4	83 - 67.5 (4)	TP28.64x26.134x0.545	996.392	1148.817	0.867	0.000	1148.817	0.000
L5	67.5 - 49.9 (5)	TP30.898x27.449x0.585	1150.625	1368.608	0.841	0.000	1368.608	0.000
L6	49.9 - 33 (6)	TP33.66x30.898x0.644	1336.567	1859.975	0.719	0.000	1859.975	0.000
L7	33 - 32.65 (7)	TP32.966x32.256x0.71	1477.367	2321.067	0.637	0.000	2321.067	0.000
L8	32.65 - 0 (8)	TP38.29x32.966x0.438	1480.150	2226.133	0.665	0.000	2226.133	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	150 - 123.75 (1)	TP19.625x15.53x0.25	16.991	574.823	0.030	0.556	915.617	0.001
L2	123.75 - 110 (2)	TP21.77x19.625x0.482	19.022	713.832	0.027	0.406	1237.458	0.000

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L3	110 - 83 (3)	TP26.134x21.77x0.668	14.104	1322.070	0.011	4.640	2731.917	0.002
L4	83 - 67.5 (4)	TP28.64x26.134x0.545	13.501	1095.260	0.012	4.637	2329.433	0.002
L5	67.5 - 49.9 (5)	TP30.898x27.449x0.585	12.057	1248.160	0.010	3.889	2775.117	0.001
L6	49.9 - 33 (6)	TP33.66x30.898x0.644	9.204	1537.720	0.006	3.880	3771.450	0.001
L7	33 - 32.65 (7)	TP32.966x32.256x0.71	8.038	1797.130	0.004	3.876	4706.400	0.001
L8	32.65 - 0 (8)	TP38.29x32.966x0.438	7.797	1702.660	0.005	3.876	4513.900	0.001

Pole Interaction Design Data

Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	150 - 123.75 (1)	0.008	0.657	0.000	0.030	0.001	0.666 ✔	1.000	4.8.2 ✔
L2	123.75 - 110 (2)	0.008	0.891	0.000	0.027	0.000	0.899 ✔	1.000	4.8.2 ✔
L3	110 - 83 (3)	0.096	0.709	0.000	0.011	0.002	0.805 ✔	1.000	4.8.2 ✔
L4	83 - 67.5 (4)	0.116	0.867	0.000	0.012	0.002	0.984 ✔	1.000	4.8.2 ✔
L5	67.5 - 49.9 (5)	0.104	0.841	0.000	0.010	0.001	0.945 ✔	1.000	4.8.2 ✔
L6	49.9 - 33 (6)	0.086	0.719	0.000	0.006	0.001	0.804 ✔	1.000	4.8.2 ✔
L7	33 - 32.65 (7)	0.075	0.637	0.000	0.004	0.001	0.711 ✔	1.000	4.8.2 ✔
L8	32.65 - 0 (8)	0.080	0.665	0.000	0.005	0.001	0.744 ✔	1.000	4.8.2 ✔

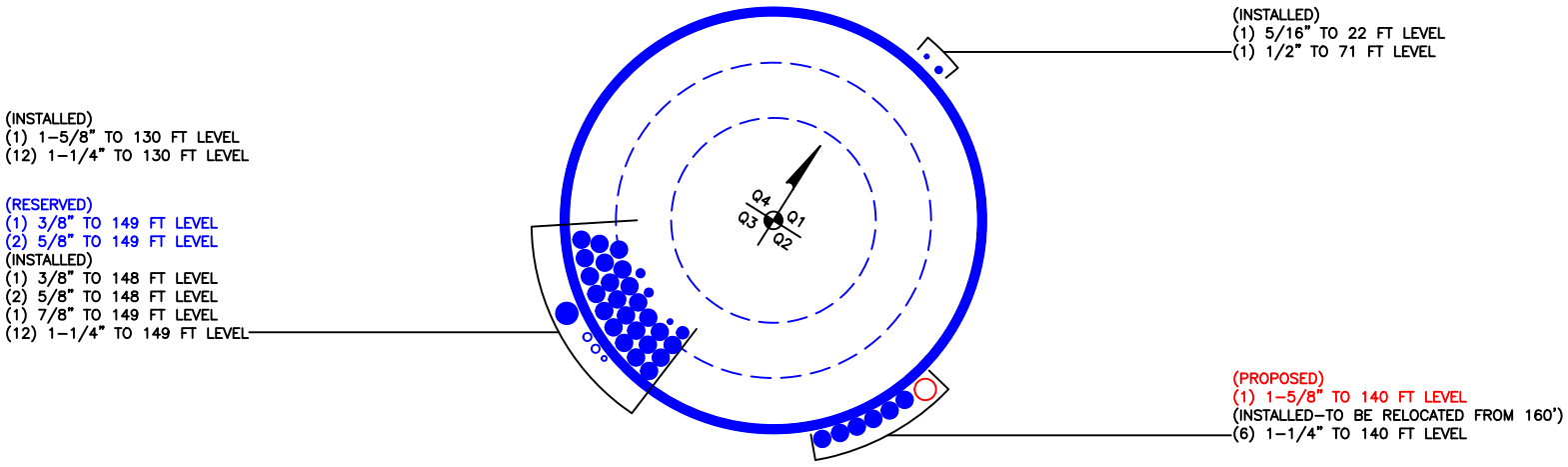
Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L1	150 - 123.75	Pole	TP19.625x15.53x0.25	1	-9.265	1149.650	66.6	Pass
L2	123.75 - 110	Pole	TP21.77x19.625x0.482	2	-11.413	1427.660	89.9	Pass
L3	110 - 83	Pole	TP26.134x21.77x0.668	3	-253.777	2644.140	80.5	Pass
		Guy A@91.1	1 5/8	11	171.695	194.400	88.3	Pass
		Guy B@91.1	1 3/8	10	91.167	139.200	65.5	Pass
		Guy C@91.1	1 3/8	9	102.191	139.200	73.4	Pass
L4	83 - 67.5	Pole	TP28.64x26.134x0.545	4	-254.426	2190.530	98.4	Pass
L5	67.5 - 49.9	Pole	TP30.898x27.449x0.585	5	-258.029	2481.030	94.5	Pass
L6	49.9 - 33	Pole	TP33.66x30.898x0.644	6	-262.428	3057.690	80.4	Pass
L7	33 - 32.65	Pole	TP32.966x32.256x0.71	7	-268.417	3587.910	71.1	Pass
L8	32.65 - 0	Pole	TP38.29x32.966x0.438	8	-268.535	3377.690	74.4	Pass
							Summary	
						Pole (L4)	98.4	Pass
						Guy A (L3)	88.3	Pass
						Guy B (L3)	65.5	Pass
						Guy C (L3)	73.4	Pass
						RATING =	**98.4**	**Pass**

Program Version 7.0.5.1

APPENDIX B

BASE LEVEL DRAWING



BUSINESS UNIT: 841289

APPENDIX C

ADDITIONAL CALCULATIONS

PROJECT	**93496.007.01 - OLD SAYBROOK, CT**				
SUBJECT	**Bridge Stiffeners @ 110'**				
DATE	**10/14/16**	PAGE	1	OF	1

B+T GRP
1717 S. Boulder, Suite 300
Tulsa, OK 74159
(918) 587-4630

0

Determine Load to Bridge Stiffener:

M =	**545.8 k-ft**	From Risa Model	**Stiffener Width**	**6.500 in**
I =	**3417.9 in^4**	From AutoCAD Sketch	**Stiffener Thickness**	**1.250 in**
ybar =	**14.630 in**		**Stiffener Height**	**166.000 in**
S =	233.63 in^3	I/y	**Fy**	**65 ksi**
fc =	28.04 ksi	M/S	**Fu**	**80 ksi**
Ag =	8.125 in^2		**Step Width**	**3.00 in**
Pu =	227.79 k	fc x Ag	**Bolt Circle**	**25.50 in**
			Number of Bolts	**12**
			Bolt Size	**1**
			Gap @ Flange	**6.00 in**

Determine ΦPn (Allowable Axial Load):

Pn = Fcr x Ag — Eqn E3-1, AISC 13th Edition, Section E3.

K =	0.99	
l =	16.000 in	Unsupported Length
Iy =	1.058 in^4	Local Weak Axis Moment of Intertia
Ag =	8.125 in^2	Stiffener Cross Sectional Area
ry =	.361 in	Radius of Gyration (Weak Axis)
kl/r =	43.90	

4.71 x √(E/Fy) = 99.49 — Limit State Equation for Flexural Buckling - AISC 13th Edition, Section E3.

Fe =	148.53 ksi	Eqn E3-4 - AISC 13th Edition, Section E3. Elastic Critical Buckling Stress
Fcr =	54.12 ksi	Eqn E3-2, AISC 13th Edition, Section E3 Critical Buckling Stress
Pn =	439.73 k	Nominal Compressive Strength
ΦPn =	395.76 k	Allowable Compressive Strength

Unity% = 57.6 %

Tension Rupture Check: AISC 13th Edition, Chapter J4.1

Hole Size	1.25	
U =	1	Shear Lag Factor - Table D3.1 and TIA222-G
Ag =	8.125 in^2	Gross Area
An =	6.563 in^2	Net Area
Ae =	6.563 in^2	Effective Area
ΦRn =	475.31 k	Tension Yielding: Eqn J4-1
ΦRn =	393.75 k	Tension Rupture: Eqn J4-2
ΦRn(Equiv)	393.75 ksi	

Unity% 57.85 %

Moment to Existing Bolt Group:

S_{BG} =	268.07 in^3	# Bolts Acting	3
ft =	24.43 ksi		
Ab =	.785 in^2		
T =	57.57 k		
Arm =	25.50 ksi		
M_{EQ} =	122.3 k-ft	**<-------Insert into Flange Spreadsheet**	

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

Reactions		
Mu	122.3	ft-kips
Axial, Pu:	11.422	kips
Shear, Vu:	19.12	kips
Elevation:	110	feet

Bolt Threads:
X-Excluded
φVn=φ(0.55*Ab*Fu)
φ=0.75, φ*Vn (kips):
38.88

Site Data

BU#: *841289*
Site Name: *OLD SAYBROOK, CT*
App #: *362261, Rev. 1*

Pole Manufacturer:	Other

If No stiffeners, Criteria:	TIA G	<-Only Applcable to Unstiffened Cases

Bolt Data			
Qty:	12		
Diameter (in.):	1	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:	75	<-- Disregard	
N/A:	55	<-- Disregard	
Circle (in.):	25.5		

Plate Data		
Diam:	28	in
Thick, t:	1	in
Grade (Fy):	36	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	5.83	in

Stiffener Data (Welding at Both Sides)		
Config:	0	*
Weld Type:	Fillet	
Groove Depth:	0.25	<-- Disregard
Groove Angle:	45	<-- Disregard
Fillet H. Weld:	0.3125	in
Fillet V. Weld:	0.3125	in
Width:	3	in
Height:	18	in
Thick:	0.75	in
Notch:	0.5	in
Grade:	36	ksi
Weld str.:	70	ksi

Pole Data		
Diam:	21.77	in
Thick:	0.22	in
Grade:	65	ksi
# of Sides:	12	"0" IF Round
Fu	80	ksi
Reinf. Fillet Weld	0	"0" if None

Flange Bolt Results

			Rigid
Bolt Tension Capacity, φ*Tn,**B1**:	54.54	kips	φ*Tn
Adjusted φ*Tn (due to Vu=Vu/Qty), **B**:	54.49	kips	φTn[(1-(Vu/φVn)^2]^0.5
Max Bolt directly applied Tu:	18.23	Kips	
Min. PL "tc" for **B** cap. **w/o** Pry:	1.000	in	
Min PL "treq" for actual **T w/ Pry**:	0.429	in	
Min PL "t1" for actual **T w/o Pry**:	0.578	in	
T allowable w/o Prying:	54.54	kips	α'<0 case
Prying Force, q:	0.00	kips	
Total Bolt Tension=Tu+q:	18.23	kips	
Non-Prying Bolt Stress Ratio, Tu/B:	33.5%	**Pass**	

Exterior Flange Plate Results Flexural Check

			Rigid
Compression Side Plate Stress:	16.8	ksi	TIA G
Allowable Plate Stress:	32.4	ksi	φ*Fy
Compression Plate Stress Ratio:	51.8%	**Pass**	Comp. Y.L. Length:
No Prying			13.28
Tension Side Stress Ratio, (treq/t)^2:	18.4%	**Pass**	

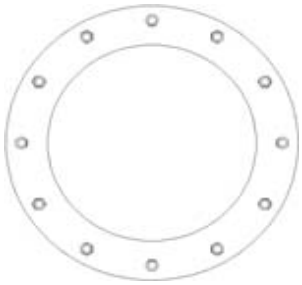
n/a

Stiffener Results

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

Pole Results

Pole Punching Shear Check: n/a



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

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

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#: *841289*
Site Name: *OLD SAYBROOK*
App #: *362261 Rev. 1*

Base Reactions		
TIA Revision:	G	
Factored Moment, Mu:	1641	ft-kips
Factored Axial, Pu:	276	kips
Factored Shear, Vu:	6	kips

Anchor Rod Data		
Eta Factor, η	0.5	TIA G (Fig. 4-4)
Qty:	8	
Diam:	2.25	in
Rod Material:	A615-J	
Yield, Fy:	75	ksi
Strength, Fu:	100	ksi
Bolt Circle:	44	in
Anchor Spacing:	6	in

Anchor Rod Results

TIA G --> Max Rod (Cu+ Vu/η):	259.8	Kips
Axial Design Strength, Φ*Fu*Anet:	260.0	Kips
Anchor Rod Stress Ratio:	99.9%	**Pass**

Plate Data		
W=Side:	49	in
Thick:	2.5	in
Grade:	50	ksi
Clip Distance:	6	in

Base Plate Results Flexural Check

Base Plate Stress:	28.0	ksi
PL Design Bending Strength, Φ*Fy:	45.0	ksi
Base Plate Stress Ratio:	62.3%	**Pass**

PL Ref. Data	
Yield Line (in):	31.00
Max PL Length:	31.01

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

N/A - Unstiffened

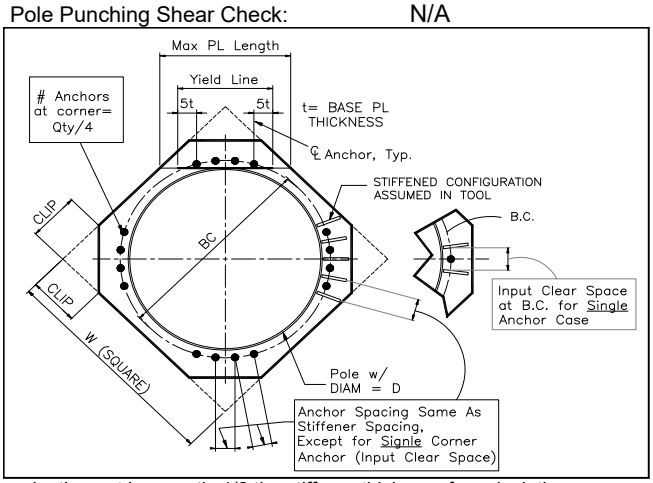
Stiffener Results

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

Pole Data		
Diam:	38.29	in
Thick:	0.4375	in
Grade:	65	ksi
# of Sides:	12	"0" IF Round



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

PROJECT	**841289 - OLD SAYBROOK,CT**				
SUBJECT	**Foundation Analysis**				
DATE	**10/14/16**	PAGE	1	OF	1

B+T GRP
1717 S. Boulder, Suite 300
Tulsa, OK 74119
(918) 587-4630

Monopole Pad & Pier Foundation Analysis

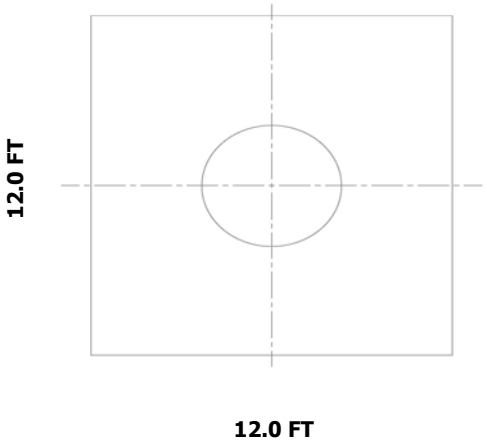
Rev. Type: G

Design Loads:

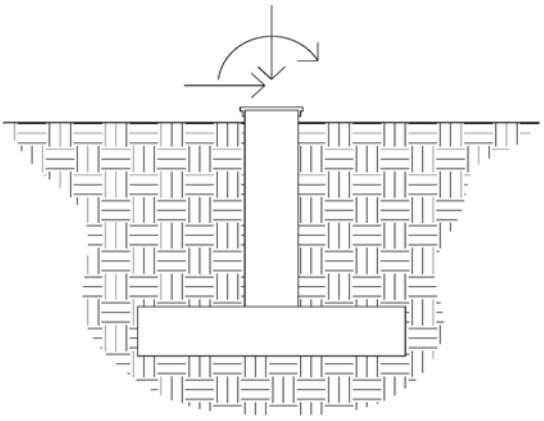
	Input factored loads	
Shear:	6.0	kips
Moment:	1,641.0	ft-kips
Tower Height:	150.0	ft
Tower Weight:	276.0	kips

Pad & Pier Dimensions / Properties:

Pole Diameter at Base:	38.29	in
Bearing Depth:	8.7	ft
Pad Width:	12.0	ft
Neglected Depth:	3.3	ft
Thickness:	2.5	ft
Pier Diameter:	8.0	ft
Pier Height Above Grade:	0.3	ft
BP Dist. Above Pier:	0.0	in
Clear Cover:	3.0	in
Pier Rebar Size:	11	
Pier Rebar Quanity:	44	
Pier Tie Size:	4	
Tie Quanity:	7	
Rebar Yield Strength:	60000	psi
Concrete Strength:	3000	psi
Concrete Unit Weight:	0.131502	kcf



Elevation Overview



Soil Data:

	Allowable Values	
Soil Unit Weight:	0.081	kcf
Ult. Bearing Capacity:	30.000	ksf
Angle of Friction:	42.000	deg
Cohesion:	0.000	ksf
Passive Pressure:	0.000	ksf
Base Friction:	0.400	

** Notes:

Minimum steel has been assumed for Pad.

Summary of Results

Req'd Pier Diam.	OK
Overturning	75.0%
Shear Capacity	4.0%
Bearing	45.2%
Pad Shear - 2-way	20.1%
Pad Moment Capacity	21.1%
Pier Moment Capacity	13.4%

PROJECT	**841289 - OLD SAYBROOK, CT**
SUBJECT	**Guy Anchor Analysis**
DATE	**10/14/16**

B+T GRP
1717 S. Boulder, Suite 300
Tulsa, OK 74119
(918) 587-4630

Deadman Guy Anchor Analysis Rev G

Design Loads:

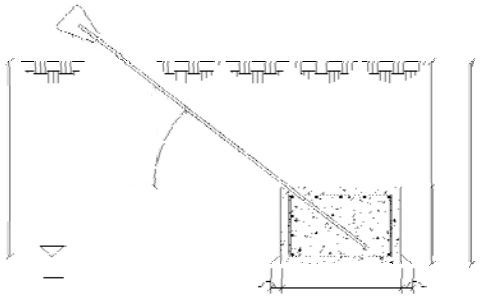
Uplift (Pv)	=	167.00	k
Shear (Ph)	=	39.00	k

Rev. G Reduction Factors:

Soil Friction	=	0.75
Soil Lateral	=	0.75
Soil Uplift	=	0.75
Dead Weight	=	0.90

Anchor Dims / Properties:

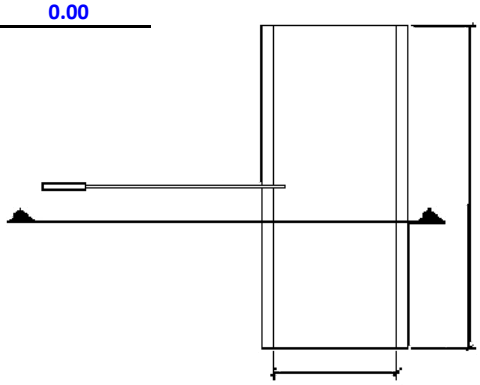
Anchor Radius	=	20.50	ft
Deadman Block Width (W)	=	5.00	ft
Deadman Block Thickness (H)	=	2.00	ft
Deadman Block Length (L)	=	37.00	ft
Depth to BOC (D)	=	8.00	ft
Concrete Density	=	0.09	kcf
Concrete Strength	=	4000	psi



Soil Data:

Frost Depth	=	3.33	ft
Ultimate Soil Friction	=	0.00	ksf

	Unit Wt. (pcf)	Angle (deg)	Cohesion (kcf)
Berm: 3'	0.12	0.00	0.00
Layer 1: 2.7'	0.11	0.00	0.00
Layer 2: 3.33'	0.05	0.00	0.00
Layer 3: 4'	0.05	31.00	0.00
Layer 4: 8'	0.07	42.00	0.00



Steel Reinforcement:

Bar Size	=	9	
No. of Bars in Top of Block	=	13	
No. of Bars in Front of Block	=	4	
Rebar Tensile Strength	=	60000	psi
Clear Cover	=	3.00	in
Strength Reduction Factor	=	0.90	

Anchor Shaft:

Shaft Diameter	=	1.75	in
Shaft Grade	=	50	ksi

Summary of Results

Uplift	72.4%
Lateral	22.9%
Anchor Rod	88.9%
Rebar	OK

PROJECT	**841289 - OLD SAYBROOK, CT**
SUBJECT	**Guy Anchor Analysis**
DATE	**10/14/16**

B+T GRP
1717 S. Boulder, Suite 300
Tulsa, OK 74119
(918) 587-4630

Deadman Guy Anchor Analysis Rev G

Design Loads:

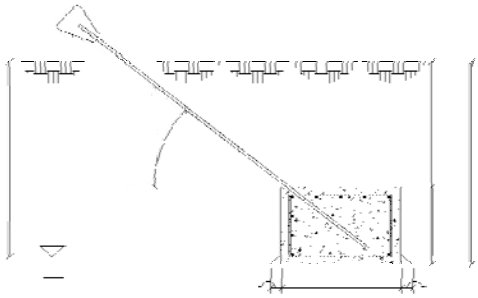
Uplift (Pv)	=	92.00	k
Shear (Ph)	=	43.00	k

Rev. G Reduction Factors:

Soil Friction	=	0.75
Soil Lateral	=	0.75
Soil Uplift	=	0.75
Dead Weight	=	0.90

Anchor Dims / Properties:

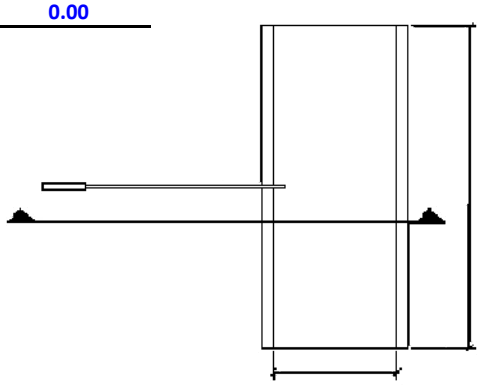
Anchor Radius	=	42.00	ft
Deadman Block Width (W)	=	5.00	ft
Deadman Block Thickness (H)	=	2.00	ft
Deadman Block Length (L)	=	30.00	ft
Depth to BOC (D)	=	8.00	ft
Concrete Density	=	0.09	kcf
Concrete Strength	=	4000	psi



Soil Data:

Frost Depth	=	3.33	ft
Ultimate Soil Friction	=	0.00	ksf

	Unit Wt. (pcf)	Angle (deg)	Cohesion (kcf)
Layer 1: 2.7'	0.11	0.00	0.00
Layer 2: 3.33'	0.05	0.00	0.00
Layer 3: 4'	0.05	31.00	0.00
Layer 4: 8'	0.07	42.00	0.00



Steel Reinforcement:

Bar Size	=	9	
No. of Bars in Top of Block	=	13	
No. of Bars in Front of Block	=	4	
Rebar Tensile Strength	=	60000	psi
Clear Cover	=	3.00	in
Strength Reduction Factor	=	0.90	

Anchor Shaft:

Shaft Diameter	=	1.75	in
Shaft Grade	=	50	ksi

Summary of Results

Uplift	68.6%
Lateral	32.7%
Anchor Rod	53.0%
Rebar	OK

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

T-Mobile Existing Facility

Site ID: CT11035E

Old Saybrook
170 Ingham Hill Road
Old Saybrook, CT 06475

November 22, 2016

EBI Project Number: 6216005486

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general public allowable limit:	6.02 %

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

EBI Consulting
environmental | engineering | due diligence

November 22, 2016

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

Emissions Analysis for Site: **CT11035E – Old Saybrook**

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **170 Ingham Hill Road, Old Saybrook, 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 1900 MHz (PCS) and 2100 MHz (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 **170 Ingham Hill Road, Old Saybrook, CT**, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since T-Mobile is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was focused at the base of the tower. For this report the sample point is the top of a 6-foot person standing at the base of the tower.

For all calculations, all equipment was calculated using the following assumptions:

1) 2 GSM channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

2) 2 UMTS channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

3) 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.

4) 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

5) 1 LTE channel (700 MHz Band) was considered for each sector of the proposed installation. This channel has a transmit power of 30 Watts.

6) Since the 2100 MHz UMTS radios are ground mounted there are additional cabling losses accounted for. For each ground mounted 2100 MHz UMTS RF path an additional 2.18 dB of loss was factored into the calculations for this cable loss. This is based on manufacturers Specifications for 169 feet of 1-1/4" coax cable on each path.

7) 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.

8) For the following calculations the sample point was the top of a 6-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.

9) The antennas used in this modeling are the **Ericsson AIR21 B4A/B2P** & **Ericsson AIR21 B2A/B4P** for 1900 MHz (PCS) and 2100 MHz (AWS) channels and the **Commscope LNX-6515DS-VTM** for 700 MHz channels. This is based on feedback from the carrier with regards to anticipated antenna selection. The **Ericsson AIR21 B4A/B2P** has a maximum gain of **15.9 dBd** at its main lobe at 1900 MHz and 2100 MHz. The **Ericsson AIR21 B2A/B4P** has a maximum gain of **15.9 dBd** at its main lobe at 1900 MHz and 2100 MHz. The **Commscope LNX-6515DS-VTM** has a maximum gain of **14.6 dBd** at its main lobe at 700 MHz. 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.

10) The antenna mounting height centerline of the proposed antennas is **169 feet** above ground level (AGL).

11) 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.

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

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T-Mobile Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	**1**	Antenna #:	**1**	Antenna #:	**1**
Make / Model:	Ericsson AIR21 B4A/B2P	Make / Model:	Ericsson AIR21 B4A/B2P	Make / Model:	Ericsson AIR21 B4A/B2P
Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	169	Height (AGL):	169	Height (AGL):	169
Frequency Bands	1900 MHz (PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz (PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz (PCS) / 2100 MHz (AWS)
Channel Count	2	Channel Count	2	Channel Count	2
Total TX Power(W):	120	Total TX Power(W):	120	Total TX Power(W):	120
ERP (W):	4,668.54	ERP (W):	4,668.54	ERP (W):	4,668.54
Antenna A1 MPE%	0.63	Antenna B1 MPE%	0.63	Antenna C1 MPE%	0.63
Antenna #:	**2**	Antenna #:	**2**	Antenna #:	**2**
Make / Model:	Ericsson AIR21 B2A/B4P	Make / Model:	Ericsson AIR21 B2A/B4P	Make / Model:	Ericsson AIR21 B2A/B4P
Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	169	Height (AGL):	169	Height (AGL):	169
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	Channel Count	6
Total TX Power(W):	180	Total TX Power(W):	180	Total TX Power(W):	180
ERP (W):	6,081.57	ERP (W):	6,081.57	ERP (W):	6,081.57
Antenna A2 MPE%	0.82	Antenna B2 MPE%	0.82	Antenna C2 MPE%	0.82
Antenna #:	**3**	Antenna #:	**3**	Antenna #:	**3**
Make / Model:	Commscope LNX-6515DS-VTM	Make / Model:	Commscope LNX-6515DS-VTM	Make / Model:	Commscope LNX-6515DS-VTM
Gain:	14.6 dBd	Gain:	14.6 dBd	Gain:	14.6 dBd
Height (AGL):	169	Height (AGL):	169	Height (AGL):	169
Frequency Bands	700 MHz	Frequency Bands	700 MHz	Frequency Bands	700 MHz
Channel Count	1	Channel Count	1	Channel Count	1
Total TX Power(W):	30	Total TX Power(W):	30	Total TX Power(W):	30
ERP (W):	865.21	ERP (W):	865.21	ERP (W):	865.21
Antenna A3 MPE%	0.25	Antenna B3 MPE%	0.25	Antenna C3 MPE%	0.25

Site Composite MPE%	
Carrier	**MPE%**
T-Mobile (Per Sector Max)	**1.71 %**
AT&T	1.82 %
Verizon	2.24 %
Paging	0.25 %
Site Total MPE %:	**6.02 %**

T-Mobile Sector A Total:	1.71 %
T-Mobile Sector B Total:	1.71 %
T-Mobile Sector C Total:	1.71 %
Site Total:	6.02 %

T-Mobile _per sector	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density (μW/cm²)	Frequency (MHz)	Allowable MPE (μW/cm²)	Calculated % MPE
T-Mobile AWS - 2100 MHz LTE	2	2,334.27	169	6.32	AWS - 2100 MHz	1000	0.63%
T-Mobile AWS - 2100 MHz UMTS	2	706.51	169	1.91	AWS - 2100 MHz	1000	0.19%
T-Mobile PCS - 1950 MHz UMTS	2	1,167.14	169	3.16	PCS - 1950 MHz	1000	0.32%
T-Mobile PCS - 1950 MHz GSM	2	1,167.14	169	3.16	PCS - 1950 MHz	1000	0.32%
T-Mobile 700 MHz LTE	1	865.21	169	1.17	700 MHz	467	0.25%
						Total:	**1.71%**

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 A:	1.71 %
Sector B:	1.71 %
Sector C:	1.71 %
T-Mobile Per Sector Maximum:	1.71 %
Site Total:	6.02 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **6.02%** 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.