



**QC Development**

PO Box 916

Storrs, CT 06268

860-670-9068

Mark.Roberts@QCDevelopment.net

March 30, 2018

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

**Notice of Exempt Modification – New Cingular Wireless PCS, LLC (AT&T) – CT2130**  
**363 Riversville Road, Greenwich, CT 06831**  
**N 41-03-58.76**  
**W 73-40-17.46**

Dear Ms. Bachman:

AT&T currently maintains nine (9) antennas at the 149-foot level of the existing 160-foot Monopole at 363 Riversville Road, Greenwich, CT. The tower is owned by Crown Castle. The property is owned by Greenwich Council of Boy Scouts Inc. AT&T now intends to remove (3) Powerwave antennas and replace them with (3) new Quintel QS66512-2 antennas. AT&T also intends to install (3) Ericsson RRUS-32 and (3) 4426-B66 Remote Radio Units (RRU). The new antennas and RRUs will also be installed at the 149-foot level of the tower.

This facility was approved by the Connecticut Siting Council in Docket # 050 on July 9, 1985. The approval included a tower height limitation of 167 feet. Since no further modification to the overall facility height is proposed, this modification complies with the aforementioned approvals.

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.C.S.A. § 16-50j-73, a copy of this letter is being sent to Peter Tesei, First Selectman of the Town of Greenwich, and the Greenwich Planning & Zoning Department, as well as the property owner and the tower owner.

The planned modifications to the facility fall squarely within those activities explicitly provided for in R.C.S.A. § 16-50j-72(b)(2).

1. The proposed modifications will not result in an increase in the height of the existing structure.
2. The proposed modifications will not require the extension of the site boundary.
3. The proposed modifications 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 Communications 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, AT&T respectfully submits that the proposed modifications to the above-referenced telecommunications facility constitute an exempt modification under R.C.S.A. § 16-50j-72(b)(2).

Please feel free to call me at (860) 670-9068 with any questions regarding this matter. Thank you for your consideration.

Sincerely,



Mark Roberts  
QC Development  
Consultant for AT&T

Attachments

cc: Peter Tesei - as Elected Official  
Katie DeLuca, AICP – Director of Planning & Zoning  
Greenwich Council of Boy Scouts Inc - as Property Owner  
Crown Castle - Tower Owner (via e-mail)

## Power Density

### Existing Loading on Tower

Carrier	# of Channels	ERP/Ch (W)	Antenna Centerline Height (ft)	Power Density (mW/cm <sup>2</sup> )	Freq. Band (MHz <sup>**</sup> )	Limit S (mW/cm <sup>2</sup> )	%MPE
Other Carriers*							5.04%
AT&T GSM	2	414	150	0.0144	850	0.5667	0.25%
AT&T UMTS	2	414	150	0.0144	850	0.5667	0.25%
AT&T UMTS	2	656	150	0.0228	1900	1.0000	0.23%
AT&T LTE	2	940	150	0.0326	700	0.4667	0.70%
AT&T LTE	2	1791	150	0.0621	1900	1.0000	0.62%
Site Total							7.09%

\*Per CSC Records (available upon request, includes calculation formulas)

\*\* If a range of frequencies are used, such as 880-894, enter the lowest value, i.e. 880

### Proposed Loading on Tower

Carrier	# of Channels	ERP/Ch (W)	Antenna Centerline Height (ft)	Power Density (mW/cm <sup>2</sup> )	Freq. Band (MHz <sup>**</sup> )	Limit S (mW/cm <sup>2</sup> )	%MPE
Other Carriers*							5.04%
AT&T UMTS	2	317	149	0.0111	850	0.5667	0.20%
AT&T LTE	1	1476	149	0.0260	700	0.4667	0.56%
AT&T LTE	2	4842	149	0.1703	1900	1.0000	1.70%
AT&T LTE	1	5070	149	0.0892	2100	1.0000	0.89%
AT&T LTE	1	1285	149	0.0226	2300	1.0000	0.23%
Site Total							8.61%

\*Per CSC Records (available upon request, includes calculation formulas)

\*\* If a range of frequencies are used, such as 880-894, enter the lowest value, i.e. 880

**PROJECT INFORMATION**

SCOPE OF WORK: TOWER – REPLACE GSM WITH 12–PORT QUINTEL ANTENNA. INSTALL (3) 2100–4426 & (3) WCS–32 ON TOWER. SWAP DIPLEXER FOR LOW BAND COMINER. ADD SQUID/DC/FIBER.

EQUIPMENT SHELTER – REPLACE BB WITH 5216. REUSE EXISTING XMU

SITE ADDRESS: 363 RIVERSVILLE RD  
GREENWICH, CT 06831

LATITUDE: 41° 03' 59.57" (NAD 83)\*  
LONGITUDE: 73° 40' 17.10" (NAD 83)\*  
\* PER EXISTING AT&T PLANS

JURISDICTION: TOWN OF GREENWICH, CT

CURRENT USE: COMMERCIAL BUILDING/TELECOMMUNICATIONS FACILITY  
PROPOSED USE: COMMERCIAL BUILDING/TELECOMMUNICATIONS FACILITY

NAME OF APPLICANT: AT&T MOBILITY  
500 ENTERPRISE DRIVE  
SUITE 3A  
ROCKY HILL, CT 06067



**at&t**  
Mobility

**SITE NAME: GREENWICH NORTH**  
**SITE NO.: CT2130 3C/4C**  
**PACE NO.: MRCTB027619 (3C) / MRCTB027654 (4C)**

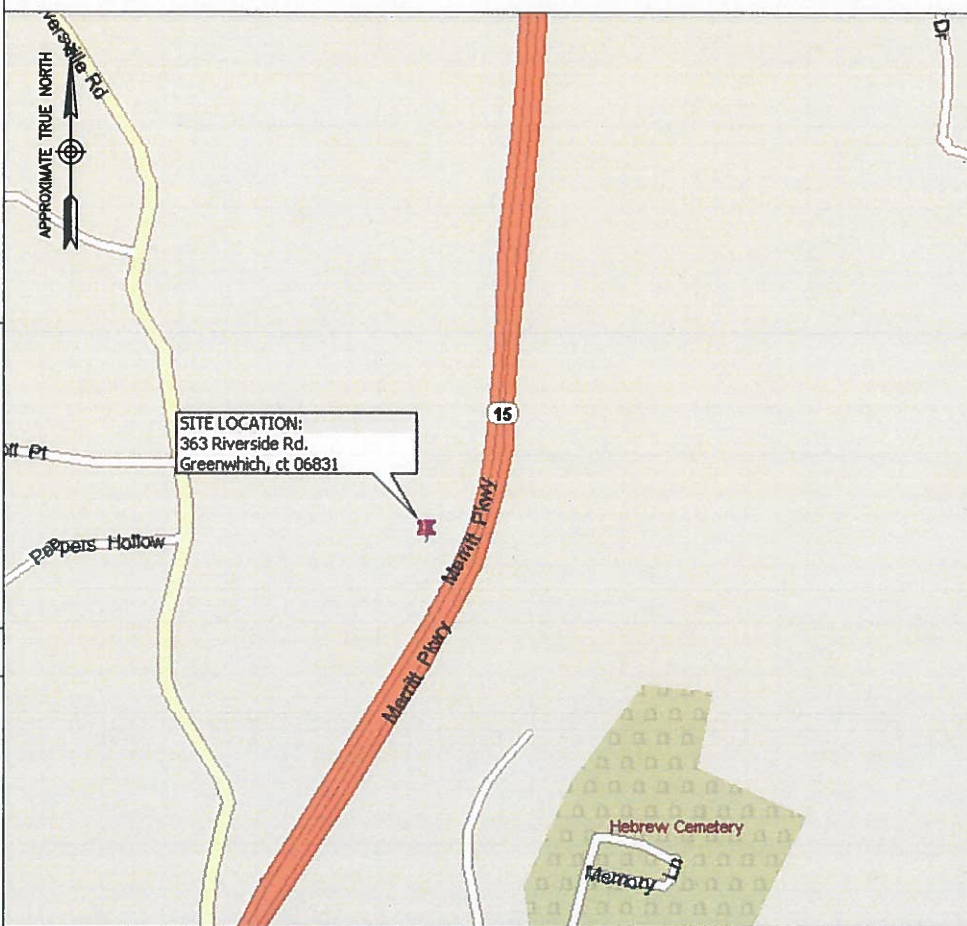
**DRAWING INDEX**

**REV**

T01	TITLE SHEET	0
G01	GENERAL NOTES	0
C01	PROPOSED SITE & SHELTER PLAN	0
C02	ANTENNA ORIENTATION PLANS & CONSTRUCTION DETAILS	0
C03	EQUIPMENT PLUMBING DIAGRAM	0
E01	GROUNDING DETAILS	0

**VICINITY MAP**

**DIRECTIONS:** TAKE GREENWICH RIVERSIDE MERRITT PARKWAY NORTH TO EXIT 28 MAKE LEFT AT THE END OF THE RAMP. TAKE TO FIRST LEFT PORCHUK RD MAKE LEFT FOLLOW TO FORK MAKE LEFT CONTINUE TILL END MAKE LEFT ON TO RIVERVILLE RD FOLLOW TO BOY SCOUT CAMP MAKE LEFT INTO CAMP DRIVE SLOW THRU CAMP. MAKE RIGHT AT SMALL BRIDGE FOLLOW TO MONO–POLE IN BACK OF CAMP UP HILL.



**APPLICABLE BUILDING CODES AND STANDARDS**

CONTRACTOR'S WORK SHALL COMPLY WITH PROJECT STANDARD NOTES, SYMBOLS AND DETAILS (SEE DRAWING INDEX FOR STANDARD NOTES AND DETAILS INCLUDED WITH TYPICAL DRAWING PACKAGE). CONTRACTOR WORK SHALL COMPLY WITH ALL APPLICABLE NATIONAL, STATE, AND LOCAL CODES AS ADOPTED BY THE LOCAL AUTHORITY HAVING JURISDICTION (AHJ) FOR THE LOCATION. THE EDITION OF THE AHJ ADOPTED CODES AND STANDARDS IN EFFECT ON THE DATE OF CONTRACT AWARD SHALL GOVERN THE DESIGN.

BUILDING CODE:  
INTERNATIONAL BUILDING CODE (IBC)

ELECTRICAL CODE:  
NATIONAL ELECTRICAL CODE (NEC)

CONTRACTOR'S WORK SHALL COMPLY WITH THE LATEST EDITION OF THE FOLLOWING STANDARDS.  
AMERICAN CONCRETE INSTITUTE (ACI) 318, BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE  
AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC), MANUAL OF STEEL CONSTRUCTION, ASD, NINTH EDITION  
TELECOMMUNICATIONS INDUSTRY ASSOCIATION (TIA) 222–H, STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWER AND ANTENNA SUPPORTING STRUCTURES:  
TIA 607, COMMERCIAL BUILDING GROUNDING AND BONDING REQUIREMENTS FOR TELECOMMUNICATIONS

INSTITUTE FOR ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE) 81, GUIDE FOR MEASURING EARTH RESISTIVITY, GROUND IMPEDANCE, AND EARTH SURFACE POTENTIALS OF A GROUND SYSTEM  
IEEE 1100 (1999) RECOMMENDED PRACTICE FOR POWERING AND GROUNDING OF ELECTRONIC EQUIPMENT

IEEE C62.41, RECOMMENDED PRACTICES ON SURGE VOLTAGES IN LOW VOLTAGE AC POWER CIRCUITS (FOR LOCATION CATEGORY "C3" AND "HIGH SYSTEM EXPOSURE")

TELCORDIA GR–1503, COAXIAL CABLE CONNECTIONS

ANSI T1.311, FOR TELECOM – DC POWER SYSTEMS – TELECOM, ENVIRONMENTAL PROTECTION

FOR ANY CONFLICTS BETWEEN SECTIONS OF LISTED CODES AND STANDARDS REGARDING MATERIAL, METHODS OF CONSTRUCTION, OR OTHER REQUIREMENTS, THE MOST RESTRICTIVE REQUIREMENT SHALL GOVERN. WHERE THERE IS CONFLICT BETWEEN A GENERAL REQUIREMENT AND A SPECIFIC REQUIREMENT, THE SPECIFIC REQUIREMENT SHALL GOVERN.

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.

STRUCTURAL NOTE:

- AS REQUIRED UNDER TIA/EIA 222H – STANDARD, SAI COMMUNICATIONS SHALL PROVIDE A STRUCTURAL ANALYSIS OF THE TOWER PREPARED BY A LICENSED CONNECTICUT STRUCTURAL ENGINEER CERTIFYING THAT, THE EXISTING TOWER AND ANY REQUIRED IMPROVEMENTS AND REINFORCEMENTS HAVE SUFFICIENT CAPACITY TO SUPPORT ALL EXISTING AND PROPOSED ANTENNAS, SUPPORTS AND APPURTENANCES AND COMPLIES WITH THE CURRENT CONNECTICUT STATE BUILDING CODE AND EIA/TIA CRITERIA. THE CONTRACTOR IS RESPONSIBLE TO CONFIRM THAT ANY IMPROVEMENTS AND REINFORCEMENTS REQUIRED BY THE STRUCTURAL ANALYSIS CERTIFICATION ARE PROPERLY INSTALLED PRIOR TO THE ADDITION OF ANTENNAS, SUPPORTS AND APPURTENANCES PROPOSED ON THESE DRAWINGS OR OTHERWISE NOTED IN THE STRUCTURAL ANALYSIS.

**CONTACT INFORMATION**

CONTACT	CONTACT	COMPANY	PHONE NO.
ENGINEERING:	BENJAMIN REVETTE	DEWBERRY	(617) 531–0823
SAI:	ANGIE BRUCE	SAI COMMUNICATIONS	(603) 952–8468

**Dewberry®**  
Dewberry Engineers Inc.  
280 SUMMER ST.  
10TH FLOOR  
BOSTON, MA 02210  
PHONE: 617.695.3400  
FAX: 617.695.3310

**SAI**  
12 INDUSTRIAL WAY  
SALEM, NH 03079

**GREENWICH NORTH 3C/4C**  
**SITE NO. CT2130**

363 RIVERSVILLE RD.  
GREENWICH, CT 06831



**at&t**  
Mobility  
500 ENTERPRISE DRIVE  
SUITE 3A  
ROCKY HILL, CT 06067

NO.	DATE	REVISIONS	BY	CHK	APP'D
0	02/12/18	ISSUED FOR SUBMITTAL	JCM	DAS	BBR
A	02/12/18	ISSUED FOR REVIEW	JCM	DAS	BBR

SCALE: AS SHOWN    DESIGNED BY: SMC    DRAWN BY: NMS



AT&T MOBILITY  
ROCKY HILL, CT

TITLE SHEET

DEWBERRY NO.	DRAWING NUMBER	REV
50019239/50083740	T01	0

**GENERAL NOTES:**

- FOR THE PURPOSE OF CONSTRUCTION DRAWING, THE FOLLOWING DEFINITIONS SHALL APPLY:  
PROJECT MANAGEMENT - SAI COMMUNICATIONS  
CONTRACTOR - GENERAL CONTRACTOR (CONSTRUCTION)  
OWNER - AT&T MOBILITY  
OEM - ORIGINAL EQUIPMENT MANUFACTURER
- 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.
- 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.
- ALL WORK CARRIED OUT SHALL COMPLY WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS AND LOCAL JURISDICTIONAL CODES, ORDINANCES AND APPLICABLE REGULATIONS.
- DRAWINGS PROVIDED HERE ARE NOT TO SCALE UNLESS OTHERWISE NOTED AND ARE INTENDED TO SHOW OUTLINE ONLY.
- UNLESS NOTED OTHERWISE, THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT, APPURTENANCES, AND LABOR NECESSARY TO COMPLETE ALL INSTALLATIONS AS INDICATED ON THE DRAWINGS.
- THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.
- IF THE SPECIFIED EQUIPMENT CANNOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE CONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION FOR APPROVAL BY PROJECT MANAGEMENT.
- 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.
- THE CONTRACTOR SHALL PROTECT EXISTING & PROPOSED IMPROVEMENTS, PAVEMENTS, CURBS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT CONTRACTOR'S EXPENSE TO THE SATISFACTION OF THE OWNER.
- 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.
- CONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION.
- 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.
- 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.
- 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.
- 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.
- 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.
- CONTRACTOR SHALL BE RESPONSIBLE FOR SITE SAFETY INCLUDING COMPLIANCE WITH ALL APPLICABLE OSHA STANDARDS AND RECOMMENDATIONS AND SHALL PROVIDE ALL NECESSARY SAFETY DEVICES INCLUDING PPE AND PPM AND CONSTRUCTION DEVICES SUCH AS WELDING AND FIRE PREVENTION, TEMPORARY SHORING, SCAFFOLDING, TRENCH BOXES/SLOPING, BARRIERS, ETC.

**SITE WORK GENERAL NOTES:**

- THE CONTRACTOR SHALL CONTACT UTILITY LOCATING SERVICES PRIOR TO THE START OF CONSTRUCTION.
- 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.
- ALL SITE WORK SHALL BE AS INDICATED ON THE DRAWINGS AND PROJECT SPECIFICATIONS.
- IF NECESSARY, RUBBISH, STUMPS, DEBRIS, STICKS, STONES, TOP SOIL AND OTHER REFUSE SHALL BE REMOVED FROM THE SITE AND DISPOSED OF LEGALLY.
- 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.
- CONTRACTOR SHALL MINIMIZE DISTURBANCE TO EXISTING SITE DURING CONSTRUCTION.
- THE CONTRACTOR SHALL PROVIDE SITE SIGNAGE IN ACCORDANCE WITH THE AT&T SPECIFICATION FOR SITE SIGNAGE.
- THE SITE SHALL BE GRADED TO CAUSE SURFACE WATER TO FLOW AWAY FROM THE TRANSMISSION EQUIPMENT AND TOWER AREAS.
- 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.
- THE SUB GRADE SHALL BE COMPACTED AND BROUGHT TO A SMOOTH UNIFORM GRADE PRIOR TO FINISHED SURFACE APPLICATION, SEE SOIL COMPACTION NOTES.
- 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.
- EROSION CONTROL MEASURES, IF REQUIRED DURING CONSTRUCTION, SHALL BE IN CONFORMANCE WITH THE LOCAL JURISDICTION'S GUIDELINES FOR EROSION AND SEDIMENT CONTROL.

**CONCRETE AND REINFORCING STEEL NOTES:**

- 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.
- 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.
- 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.
- 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.
- A CHAMFER 3/4" SHALL BE PROVIDED AT ALL EXPOSED EDGES OF CONCRETE, UNO, IN ACCORDANCE WITH ACI 301 SECTION 4.2.4.
- 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.
- 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.
- 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.
- 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:**

- 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".
- 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.
- BOLTED CONNECTIONS SHALL BE ASTM A325 BEARING TYPE 3/4"Ø CONNECTIONS AND SHALL HAVE MINIMUM OF TWO BOLTS UNLESS NOTED OTHERWISE.
- NON-STRUCTURAL CONNECTIONS FOR STEEL GRATING MAY USE 5/8" DIA. ASTM A 307 BOLTS UNLESS NOTED OTHERWISE.
- 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.
- CONTRACTOR SHALL SUBMIT SHOP DRAWINGS FOR ENGINEER REVIEW & APPROVAL ON PROJECTS REQUIRING STRUCTURAL STEEL.
- ALL STRUCTURAL STEEL WORK SHALL BE DONE IN ACCORDANCE WITH AISC SPECIFICATIONS.

**SOIL COMPACTION NOTES FOR SLAB ON GRADE:**

- EXCAVATE AS REQUIRED TO REMOVE VEGETATION & TOPSOIL EXPOSE UNDISTURBED NATURAL SUBGRADE AND PLACE CRUSHED STONE AS REQUIRED.
- COMPACTION CERTIFICATION: AN INSPECTION AND WRITTEN CERTIFICATION BY A QUALIFIED GEOTECHNICAL TECHNICIAN OR ENGINEER IS ACCEPTABLE.
- AS AN ALTERNATIVE TO INSPECTION AND WRITTEN CERTIFICATION, THE "UNDISTURBED SOIL" BASE SHALL BE COMPACTED WITH "COMPACTION EQUIPMENT", LISTED BELOW, TO AT LEAST 90% MODIFIED PROCTOR MAXIMUM DENSITY PER ASTM D 1557 METHOD C.
- COMPACTED SUBBASE SHALL BE UNIFORM & LEVELED. PROVIDE 6" MINIMUM CRUSHED STONE OR GRAVEL COMPACTED IN 3" LIFTS ABOVE COMPACTED SOIL. GRAVEL SHALL BE NATURAL OR CRUSHED WITH 100% PASSING 1" SIEVE.
- AS AN ALTERNATIVE TO ITEMS 2 AND 3 PROOFROLL THE SUBGRADE SOILS WITH 5 PASSES OF A MEDIUM SIZED VIBRATORY PLATE COMPACTOR (SUCH AS BOMAG BPR 30/38) OR HAND-OPERATED SINGLE DRUM VIBRATORY ROLLER (SUCH AS BOMAG BW 55E). ANY SOFT AREAS THAT ARE ENCOUNTERED SHOULD BE REMOVED AND REPLACED WITH A WELL-GRADED GRANULAR FILL, AND COMPACTED AS STATED ABOVE.

**COMPACTION EQUIPMENT:**

- HAND OPERATED DOUBLE DRUM, VIBRATORY ROLLER, VIBRATORY PLATE COMPACTOR OR JUMPING JACK COMPACTOR.

**CONSTRUCTION NOTES:**

- FIELD VERIFICATION:  
CONTRACTOR SHALL FIELD VERIFY SCOPE OF WORK, AT&T ANTENNA PLATFORM LOCATION AND ANTENNAS TO BE REPLACED.
- COORDINATION OF WORK:  
CONTRACTOR SHALL COORDINATE RF WORK AND PROCEDURES WITH PROJECT MANAGEMENT.
- CABLE LADDER RACK:  
CONTRACTOR SHALL FURNISH AND INSTALL CABLE LADDER RACK, CABLE TRAY, AND CONDUIT AS REQUIRED TO SUPPORT CABLES TO ANY NEW BTS LOCATION.

**ELECTRICAL INSTALLATION NOTES:**

- ALL ELECTRICAL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS, NEC AND ALL APPLICABLE LOCAL CODES.
- CONTRACTOR SHALL MODIFY EXISTING CABLE TRAY SYSTEM AS REQUIRED TO SUPPORT RF AND TRANSPORT CABLING TO NEW BTS EQUIPMENT. CONTRACTOR SHALL SUBMIT MODIFICATIONS TO PROJECT MANAGEMENT FOR APPROVAL.
- CONDUIT ROUTINGS ARE SCHEMATIC. CONTRACTOR SHALL INSTALL CONDUITS SO THAT ACCESS TO EQUIPMENT IS NOT BLOCKED.
- WIRING, RACEWAY AND SUPPORT METHODS AND MATERIALS SHALL COMPLY WITH THE REQUIREMENTS OF THE NEC AND TELCORDIA.
- ALL CIRCUITS SHALL BE SEGREGATED AND MAINTAIN MINIMUM CABLE SEPARATION AS REQUIRED BY THE NEC AND TELCORDIA.
- CABLES SHALL NOT BE ROUTED THROUGH LADDER-STYLE CABLE TRAY RUNGS.
- 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.
- 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).
- PANELBOARDS (ID NUMBERS) AND INTERNAL CIRCUIT BREAKERS (CIRCUIT ID NUMBERS) SHALL BE CLEARLY LABELED WITH ENGRAVED LAMACOID PLASTIC LABELS.
- ALL THE WRAPS SHALL BE CUT FLUSH WITH APPROVED CUTTING TOOL TO REMOVE SHARP EDGES.
- 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.
- 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.
- 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.
- SUPPLEMENTAL EQUIPMENT GROUND WIRING LOCATED OUTDOORS, OR BELOW GRADE, SHALL BE SINGLE CONDUCTOR #2 AWG SOLID TINNED COPPER CABLE, UNLESS OTHERWISE SPECIFIED.
- 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.
- 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).
- RACEWAY AND CABLE TRAY SHALL BE LISTED OR LABELED FOR ELECTRICAL USE IN ACCORDANCE WITH NEMA, UL, ANSI/IEEE, AND NEC.
- NEW RACEWAY OR CABLE TRAY WILL MATCH THE EXISTING INSTALLATION WHERE POSSIBLE.
- 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.
- ELECTRICAL METALLIC TUBING (EMT), ELECTRICAL NONMETALLIC TUBING (ENT), OR RIGID NONMETALLIC CONDUIT (RIGID PVC, SCHEDULE 40) SHALL BE USED FOR CONCEALED INDOOR LOCATIONS.
- GALVANIZED STEEL INTERMEDIATE METALLIC CONDUIT (IMC) SHALL BE USED FOR OUTDOOR LOCATIONS ABOVE GRADE.
- 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.
- LIQUID-TIGHT FLEXIBLE METALLIC CONDUIT (LIQUID-TITE FLEX) SHALL BE USED INDOORS AND OUTDOORS, WHERE VIBRATION OCCURS OR FLEXIBILITY IS NEEDED.
- CONDUIT AND TUBING FITTINGS SHALL BE THREADED OR COMPRESSION-TYPE AND APPROVED FOR THE LOCATION USED. SETSCREW FITTINGS ARE NOT ACCEPTABLE.
- CABINETS, BOXES, AND WIREWAYS SHALL BE LISTED OR LABELED FOR ELECTRICAL USE IN ACCORDANCE WITH NEMA, UL, ANSI/IEEE, AND NEC.
- CABINETS, BOXES, AND WIREWAYS TO MATCH THE EXISTING INSTALLATION WHERE POSSIBLE.
- 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.
- 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.
- 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.
- 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.
- THE CONTRACTOR SHALL NOTIFY AND OBTAIN NECESSARY AUTHORIZATION FROM PROJECT MANAGEMENT BEFORE COMMENCING WORK ON THE AC POWER DISTRIBUTION PANELS.
- THE CONTRACTOR SHALL PROVIDE NECESSARY TAGGING ON THE BREAKERS, CABLES AND DISTRIBUTION PANELS IN ACCORDANCE WITH THE APPLICABLE CODES AND STANDARDS TO SAFEGUARD AGAINST LIFE AND PROPERTY.



Dewberry Engineers Inc.  
280 SUMMER ST.  
10TH FLOOR  
BOSTON, MA 02210  
PHONE: 617.695.3400  
FAX: 617.695.3310



12 INDUSTRIAL WAY  
SALEM, NH 03079

GREENWICH NORTH 3C/4C  
SITE NO. CT2130

363 RIVERSVILLE RD.  
GREENWICH, CT 06831



at&t  
Mobility  
500 ENTERPRISE DRIVE  
SUITE 3A  
ROCKY HILL, CT 06067

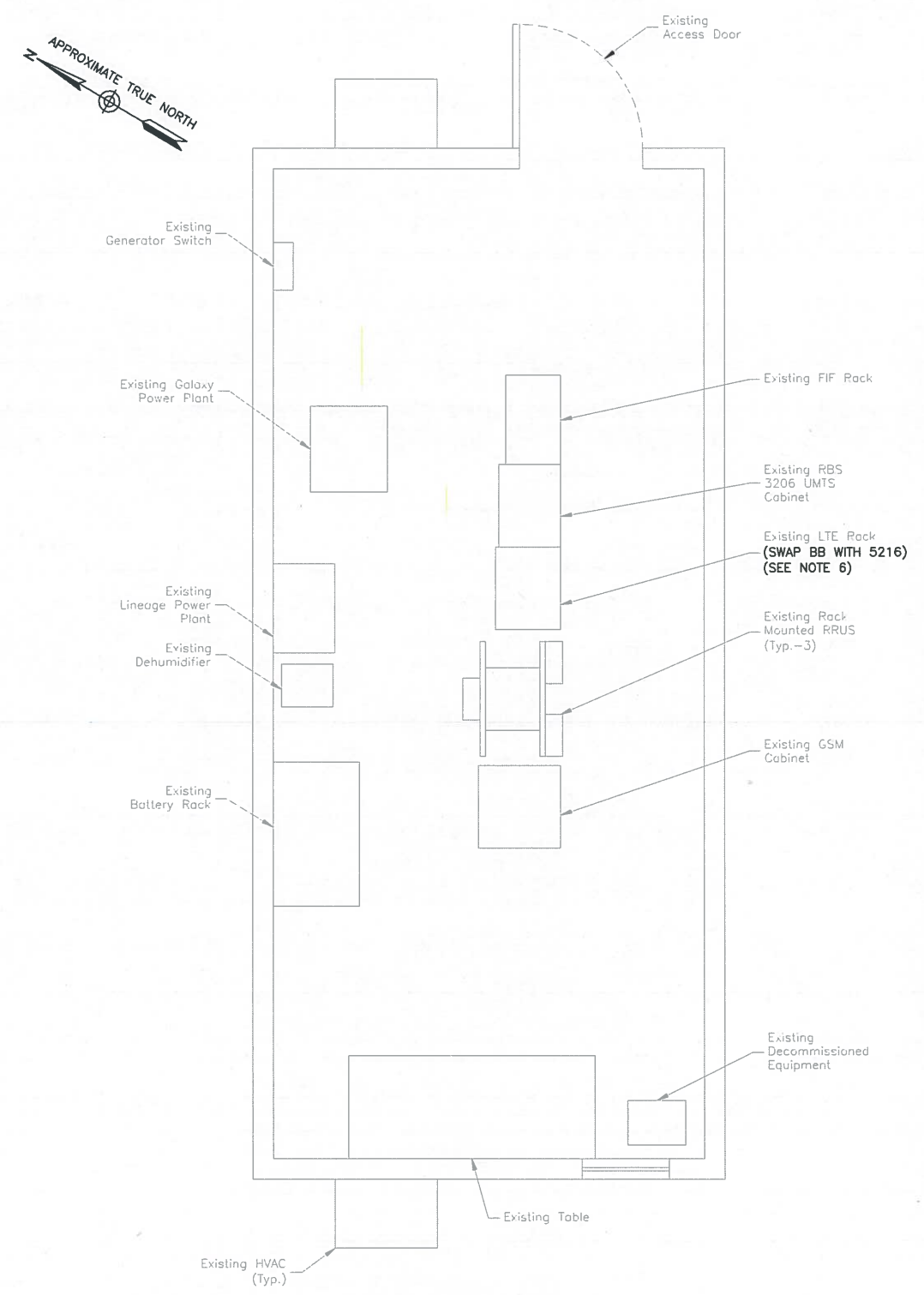
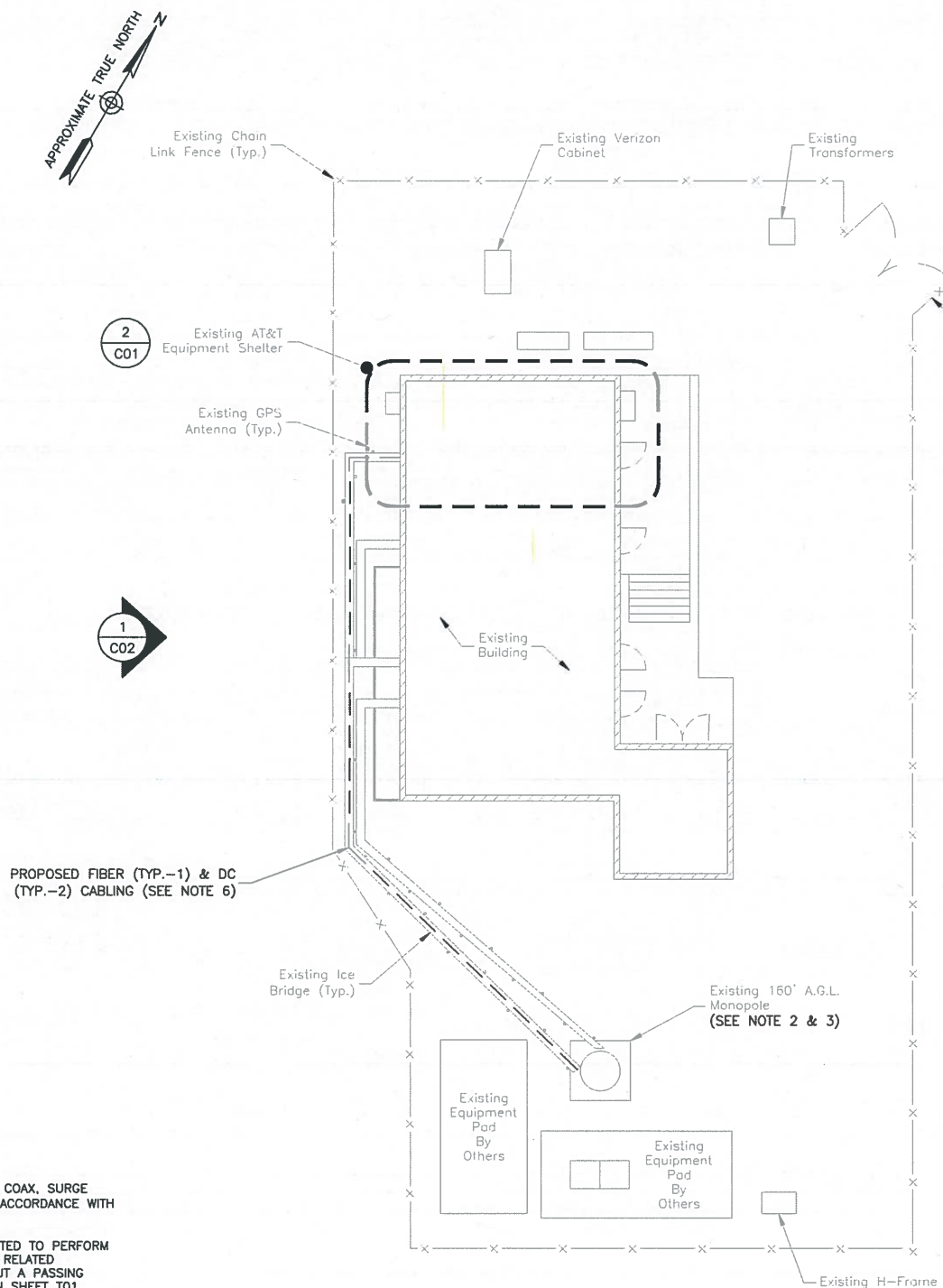
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AT&T MOBILITY  
ROCKY HILL, CT

GENERAL NOTES

DEWBERRY NO.	DRAWING NUMBER	REV
50019239/50083740	GO1	0



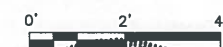
**NOTES:**

1. NORTH ARROW SHOWN AS APPROXIMATE.
2. ALL PROPOSED EQUIPMENT INCLUDING ANTENNAS, COAX, SURGE ARRESTORS, RRU'S, ETC. SHALL BE MOUNTED IN ACCORDANCE WITH THE TOWER STRUCTURAL ANALYSIS (BY OTHERS).
3. DEWBERRY WAS NOT PROVIDED WITH OR CONTRACTED TO PERFORM A STRUCTURAL ANALYSIS ON THIS TOWER. TOWER RELATED IMPROVEMENTS ARE NOT TO BE INSTALLED WITHOUT A PASSING STRUCTURAL ANALYSIS. SEE STRUCTURAL NOTE ON SHEET T01.
4. ALL EQUIPMENT SHALL BE MOUNTED IN ACCORDANCE WITH PASSING MOUNT ANALYSIS (BY OTHERS). ANY MOUNT MODIFICATIONS SHALL BE INSTALLED PRIOR TO PROPOSED EQUIPMENT INSTALLATION
5. NOT ALL INFORMATION SHOWN FOR CLARITY.
6. EQUIPMENT MODIFICATION SCOPE:  
TOWER - REPLACE GSM WITH 12-PORT QUINTEL ANTENNA. INSTALL (3) 2100-4426 & (3) WCS-32 ON TOWER. SWAP DIPLEXER FOR LOW BAND COMINER. ADD DC/FIBER SQUID.  
EQUIPMENT SHELTER - REPLACE BB WITH 5216. REUSE EXISTING XMU.
7. ANTENNA SPACING REQUIREMENTS:
  - 3'-0" MINIMUM SEPARATION BETWEEN LTE ANTENNAS
  - 6'-0" MINIMUM SEPARATION BETWEEN 700BC & 700DE

**PROPOSED SITE PLAN**  
SCALE: 1"=20' FOR 11"x17"  
1"=10' FOR 22"x34"



**PROPOSED SHELTER PLAN**  
SCALE: 1"=4' FOR 11"x17"  
1"=2' FOR 22"x34"



**Dewberry®**  
Dewberry Engineers Inc.  
280 SUMMER ST.  
10TH FLOOR  
BOSTON, MA 02210  
PHONE: 617.695.3400  
FAX: 617.695.3310

**SAI**  
12 INDUSTRIAL WAY  
SALEM, NH 03079

**GREENWICH NORTH 3C/4C  
SITE NO. CT2130**  
363 RIVERSVILLE RD.  
GREENWICH, CT 06831

**at&t**  
Mobility  
500 ENTERPRISE DRIVE  
SUITE 3A  
ROCKY HILL, CT 06067

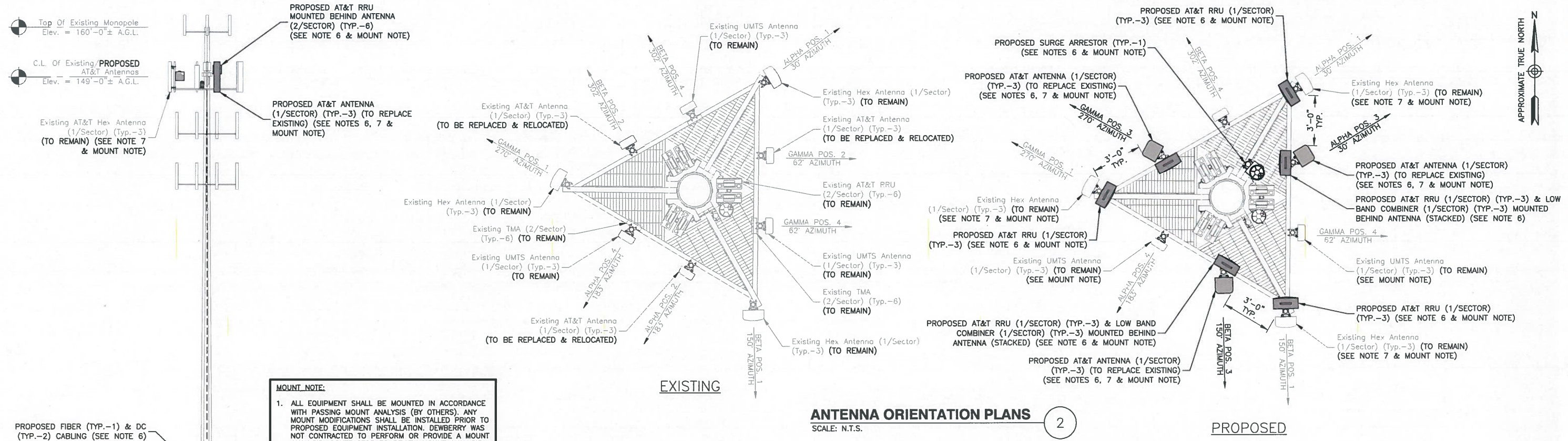
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PROPOSED SITE & SHELTER PLAN

DEWBERRY NO.	DRAWING NUMBER	REV
50019239/50083740	C01	0



**MOUNT NOTE:**

1. ALL EQUIPMENT SHALL BE MOUNTED IN ACCORDANCE WITH PASSING MOUNT ANALYSIS (BY OTHERS). ANY MOUNT MODIFICATIONS SHALL BE INSTALLED PRIOR TO PROPOSED EQUIPMENT INSTALLATION. DEWBERRY WAS NOT CONTRACTED TO PERFORM OR PROVIDE A MOUNT ANALYSIS. CONTRACTOR TO REVIEW MOUNT ANALYSIS (BY OTHERS) PRIOR TO INSTALLATION.

- NOTES:**
1. NORTH ARROW SHOWN AS APPROXIMATE.
  2. ALL PROPOSED EQUIPMENT INCLUDING ANTENNAS, COAX, SURGE ARRESTORS, RRU'S, ETC. SHALL BE MOUNTED IN ACCORDANCE WITH THE TOWER STRUCTURAL ANALYSIS (BY OTHERS).
  3. DEWBERRY WAS NOT PROVIDED WITH OR CONTRACTED TO PERFORM A STRUCTURAL ANALYSIS ON THIS TOWER. TOWER RELATED IMPROVEMENTS ARE NOT TO BE INSTALLED WITHOUT A PASSING STRUCTURAL ANALYSIS. SEE STRUCTURAL NOTE ON SHEET T01.
  4. ALL EQUIPMENT SHALL BE MOUNTED IN ACCORDANCE WITH PASSING MOUNT ANALYSIS (BY OTHERS). ANY MOUNT MODIFICATIONS SHALL BE INSTALLED PRIOR TO PROPOSED EQUIPMENT INSTALLATION.
  5. NOT ALL INFORMATION SHOWN FOR CLARITY.
  6. EQUIPMENT MODIFICATION SCOPE:  
TOWER - REPLACE GSM WITH 12-PORT QUINTEL ANTENNA. INSTALL (3) 2100-4426 & (3) WCS-32 ON TOWER. SWAP DIPLEXER FOR LOW BAND COMINER. ADD DC/FIBER SQUID.  
EQUIPMENT SHELTER - REPLACE BB WITH 5216. REUSE EXISTING XMU.
  7. ANTENNA SPACING REQUIREMENTS:
    - 3'-0" MINIMUM SEPARATION BETWEEN LTE ANTENNAS
    - 6'-0" MINIMUM SEPARATION BETWEEN 700BC & 700DE

**FINAL EQUIPMENT CONFIGURATION**

SECTOR	BAND	ANTENNA	SIZE (INCHES) (LxWxD)	RAD. CENTER	AZIMUTH	TMA	RRU	SIZE (INCHES) (LxWxD)	FEEDERS	FIBER
ALPHA	LTE 700/WCS	(E) CCI HPA-65R-BUU-H6	72.0x14.8x9.0	149'±	30'	-	(P) RRUS-32 WCS (E) RRUS-11	27.2 x 12.1 x 7.0 19.7 x 17.0 x 7.2	-	-
	LTE 1900/AWS	(P) QUINTEL Q566512-2	72.0x12.0x9.6	149'±	30'	-	(P) RRUS-4426 B66 (E) RRUS-32 B6	15.0 x 13.2 x 5.8 27.2 x 12.1 x 7.0	E (2)	P (1)
	UMTS 850	(E) POWERWAVE 7770	55.0x11.0x5.0	149'±	183'	(E) LGP21401 (E) LGP21401	-	-	E (2)	-
BETA	LTE 700/WCS	(E) CCI HPA-65R-BUU-H6	72.0x14.8x9.0	149'±	150'	-	(P) RRUS-32 WCS (E) RRUS-11	27.2 x 12.1 x 7.0 19.7 x 17.0 x 7.2	-	-
	LTE 1900/AWS	(P) QUINTEL Q566512-2	72.0x12.0x9.6	149'±	150'	-	(P) RRUS-4426 B66 (E) RRUS-32 B6	15.0 x 13.2 x 5.8 27.2 x 12.1 x 7.0	E (2)	P (1)
	UMTS 850	(E) POWERWAVE 7770	55.0x11.0x5.0	149'±	302'	(E) LGP21401 (E) LGP21401	-	-	E (2)	-
GAMMA	LTE 700/WCS	(E) CCI HPA-65R-BUU-H6	72.0x14.8x9.0	149'±	270'	-	(P) RRUS-32 WCS (E) RRUS-11	27.2 x 12.1 x 7.0 19.7 x 17.0 x 7.2	-	-
	LTE 1900/AWS	(P) QUINTEL Q566512-2	72.0x12.0x9.6	149'±	270'	-	(P) RRUS-4426 B66 (E) RRUS-32 B6	15.0 x 13.2 x 5.8 27.2 x 12.1 x 7.0	E (2)	P (1)
	UMTS 850	(E) POWERWAVE 7770	55.0x11.0x5.0	149'±	62'	(E) LGP21401 (E) LGP21401	-	-	E (2)	-

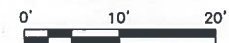
**FINAL EQUIPMENT CONFIGURATION**  
SCALE: N.T.S.

PROPOSED FIBER (TYP.-1) & DC (TYP.-2) CABLING (SEE NOTE 6)

Existing AT&T Equipment Shelter

Existing Grade Elev. = 0'-0" A.G.L.

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



**Dewberry**  
Dewberry Engineers Inc.  
280 SUMMER ST.  
10TH FLOOR  
BOSTON, MA 02210  
PHONE: 617.695.3400  
FAX: 617.695.3310

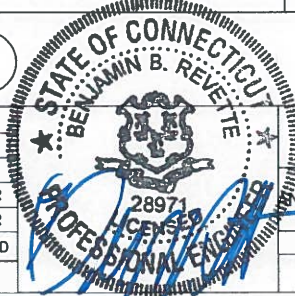
**SAI**  
12 INDUSTRIAL WAY  
SALEM, NH 03079

**GREENWICH NORTH 3C/4C  
SITE NO. CT2130**  
363 RIVERSVILLE RD.  
GREENWICH, CT 06831

**at&t**  
at&t Mobility  
500 ENTERPRISE DRIVE  
SUITE 3A  
ROCKY HILL, CT 06067

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A	02/12/18	ISSUED FOR REVIEW	JCM	DAS	BBR

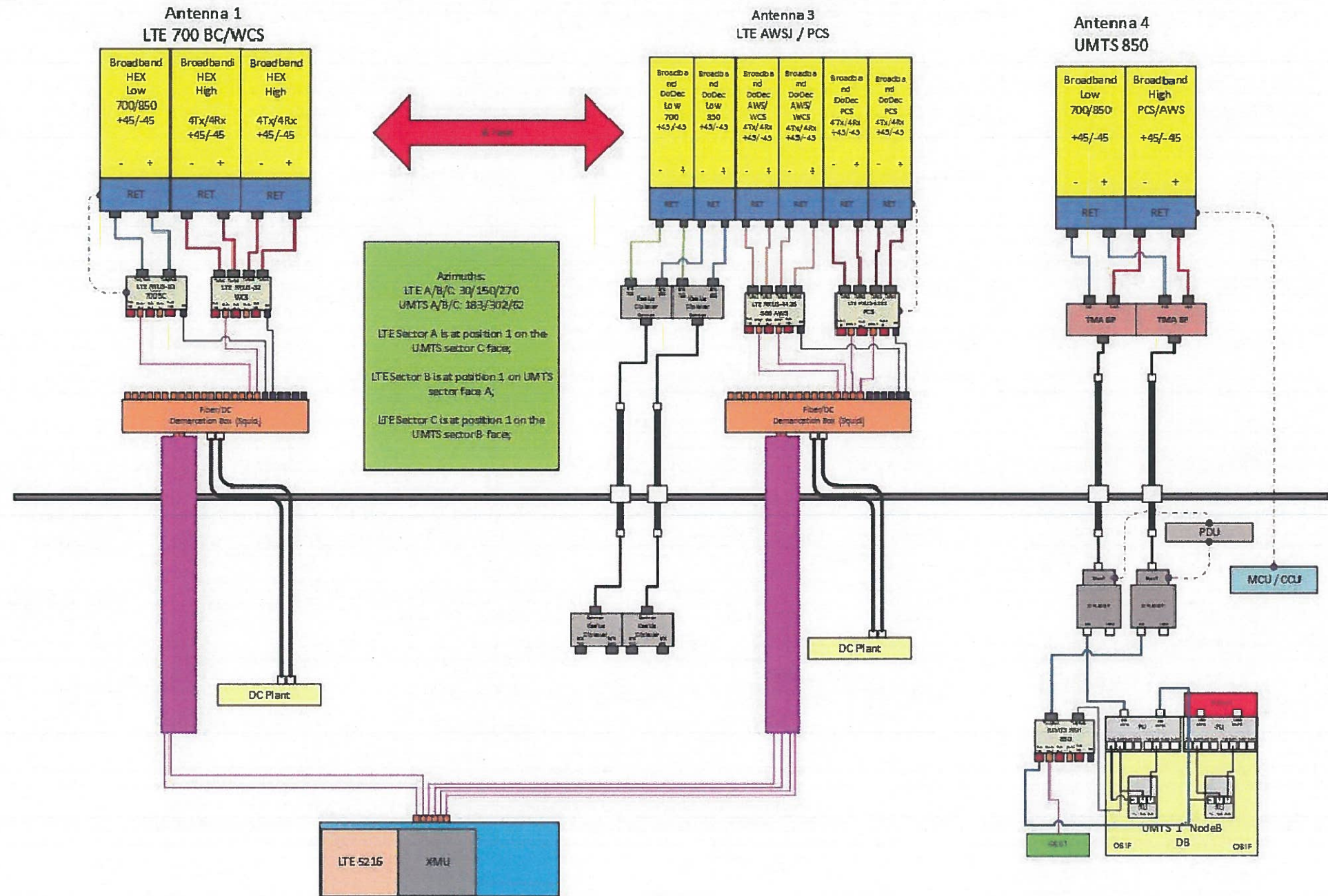
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ROCKY HILL, CT

**ANTENNA ORIENTATION PLAN & CONSTRUCTION DETAILS**

DEWBERRY NO.	DRAWING NUMBER	REV
50019239/50083740	C02	0



**EQUIPMENT PLUMBING DIAGRAM**  
SCALE: N.T.S.

- NOTES:
- EQUIPMENT PLUMBING DIAGRAM PER RFDS VERSION 1 DATED 04/19/17.
  - CONTRACTOR TO VERIFY FINAL EQUIPMENT CONFIGURATION AND SEPARATIONS WITH AT&T PRIOR TO CONSTRUCTION.

**Dewberry**  
Dewberry Engineers Inc.  
280 SUMMER ST.  
10TH FLOOR  
BOSTON, MA 02210  
PHONE: 617.695.3400  
FAX: 617.695.3310

**SAI**  
12 INDUSTRIAL WAY  
SALEM, NH 03079

**GREENWICH NORTH 3C/4C**  
SITE NO. CT2130  
363 RIVERSVILLE RD.  
GREENWICH, CT 06831

**at&t**  
at&t Mobility  
500 ENTERPRISE DRIVE  
SUITE 3A  
ROCKY HILL, CT 06067

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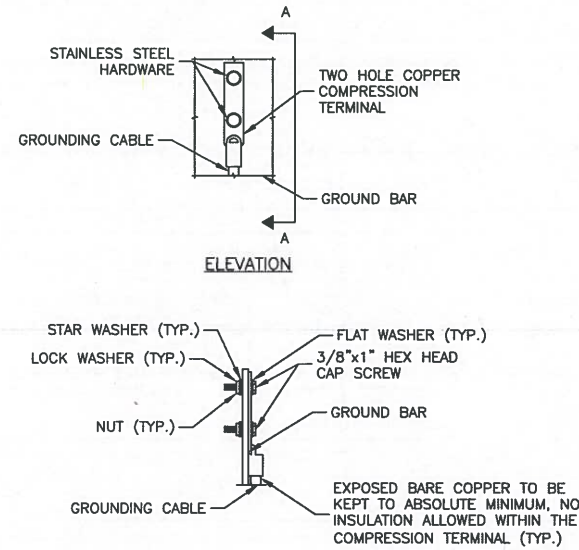


AT&T MOBILITY ROCKY HILL, CT		
EQUIPMENT PLUMBING DIAGRAM		
DEWBERRY NO.	DRAWING NUMBER	REV
50019239/50083740	C03	0



**GROUNDING NOTES:**

- 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 CONTRACTOR FOR RESOLUTION.
- 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.
- 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 CONTRACTOR IN WRITING.
- 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.
- 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.
- METAL CONDUIT AND TRAY SHALL BE GROUNDING 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.
- 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.
- 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.
- ALUMINUM CONDUCTOR OR COPPER CLAD STEEL CONDUCTOR SHALL NOT BE USED FOR GROUNDING CONNECTIONS.
- 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.
- 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.
- ALL EXTERIOR GROUND CONDUCTORS BETWEEN EQUIPMENT/GROUND BARS AND THE GROUND RING, SHALL BE 2 AWG SOLID TIN-PLATED COPPER UNLESS OTHERWISE INDICATED.
- 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 CENTERLINE COMMUNICATIONS COMMUNICATIONS MARKET REPRESENTATIVE.
- EXOTHERMIC WELDS SHALL BE PERMITTED ON TOWERS ONLY WITH THE EXPRESS APPROVAL OF THE TOWER MANUFACTURER OR THE CONTRACTORS STRUCTURAL ENGINEER.
- 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.
- ON ROOFTOP SITES WHERE EXOTHERMIC WELDS ARE A FIRE HAZARD COPPER COMPRESSION CAP CONNECTORS MAY BE USED FOR WIRE TO WIRE CONNECTIONS. 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.
- 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.
- APPROVED ANTIOXIDANT COATINGS (I.E., CONDUCTIVE GEL OR PASTE) SHALL BE USED ON ALL COMPRESSION AND BOLTED GROUND CONNECTIONS.
- ALL EXTERIOR GROUND CONNECTIONS SHALL BE COATED WITH A CORROSION RESISTANT MATERIAL.
- MISCELLANEOUS ELECTRICAL AND NON-ELECTRICAL METAL BOXES, FRAMES AND SUPPORTS SHALL BE BONDED TO THE GROUND RING, IN ACCORDANCE WITH THE NEC.
- 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.
- 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.



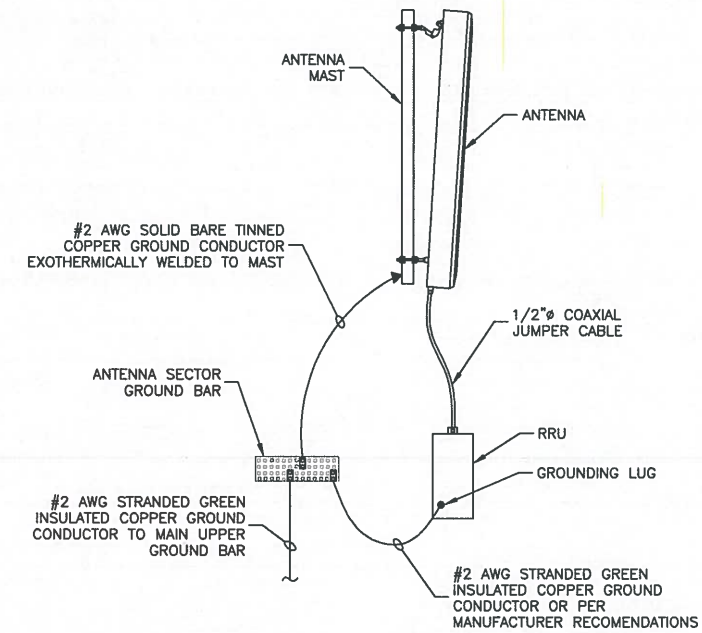
**NOTES:**

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

**TYPICAL GROUND BAR MECHANICAL CONNECTION DETAIL**

SCALE: N.T.S.

1



**NOTES:**

- VERIFY EXISTING GROUNDING SYSTEM IS INSTALLED PER AT&T STANDARDS.
- BOND NEW EQUIPMENT INTO EXISTING GROUND SYSTEM IN ACCORDANCE WITH AT&T STANDARDS & MANUFACTURER RECOMMENDATIONS.

**TYPICAL ANTENNA/RRU GROUNDING DETAIL**

SCALE: N.T.S.

2

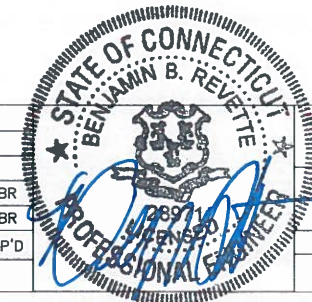
**Dewberry**  
Dewberry Engineers Inc.  
280 SUMMER ST.  
10TH FLOOR  
BOSTON, MA 02210  
PHONE: 617.695.3400  
FAX: 617.695.3310

**SAI**  
12 INDUSTRIAL WAY  
SALEM, NH 03079

**GREENWICH NORTH 3C/4C  
SITE NO. CT2130**  
363 RIVERSVILLE RD.  
GREENWICH, CT 06831

**at&t**  
Mobility  
500 ENTERPRISE DRIVE  
SUITE 3A  
ROCKY HILL, CT 06067

0	02/12/18	ISSUED FOR SUBMITTAL	JCM	DAS	BBR
A	02/12/18	ISSUED FOR REVIEW	JCM	DAS	BBR
NO.	DATE	REVISIONS	BY	CHK	APP'D
SCALE: AS SHOWN		DESIGNED BY: SMC	DRAWN BY: NMS		



AT&T MOBILITY  
ROCKY HILL, CT

GROUNDING DETAILS

DEWBERRY NO.	DRAWING NUMBER	REV
50019239/50083740	E01	0



Date: **January 30, 2018**

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

Crown Castle  
2000 Corporate Drive  
Canonsburg, PA 15317  
(724) 416-2000

**Subject:** **Structural Analysis Report**

**Carrier Designation:** **AT&T Mobility Co-Locate**  
**Carrier Site Number:** CT2130  
**Carrier Site Name:** GREENWICH NORTH

**Crown Castle Designation:** **Crown Castle BU Number:** 841290  
**Crown Castle Site Name:** GREENWICH NORTH  
**Crown Castle JDE Job Number:** 478488  
**Crown Castle Work Order Number:** 1517661  
**Crown Castle Application Number:** 421390 Rev. 1

**Engineering Firm Designation:** **Crown Castle Project Number:** 1517661

**Site Data:** **363 RIVERSVILLE ROAD, GREENWICH, Fairfield County, CT**  
**Latitude 41° 3' 58.6", Longitude -73° 40' 17.4"**  
**160 Foot - Monopole Tower**

Dear Rebecca Klein,

Crown Castle 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 1517661, in accordance with application 421390, revision 1.

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

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

This analysis has been performed in accordance with the 2016 Connecticut State Building Code based upon an ultimate 3-second gust wind speed of 120 mph converted to a nominal 3-second gust wind speed of 93 mph per Section 1609.3 and Appendix N as required for use in the TIA-222-G Standard per Exception #5 of Section 1609.1.1. Exposure Category B and Risk Category II were used in this analysis.

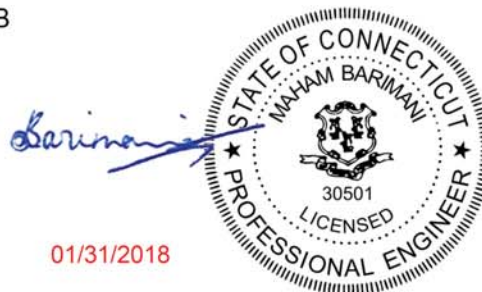
All modifications and equipment proposed in this report shall be installed in accordance with the attached drawings for the determined available structural capacity to be effective.

We at Crown Castle 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.

Structural analysis prepared by: Mahdis Arianpour / CD/ KB

Respectfully submitted by:

Maham Barimani, P.E.  
Senior Project Engineer



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## 1) INTRODUCTION

This tower is a 160 ft Monopole tower designed by Engineered Endeavors in April of 2003. The tower was originally designed for a wind speed of 85 mph per TIA/EIA-222-F.

## 2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of TIA-222-G Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a 3-second gust wind speed of 93 mph with no ice, 50 mph with 0.75 inch ice thickness and 60 mph under service loads, exposure category B.

**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
149.0	149.0	3	cci antennas	HPA-65R-BUU-H6 w/ Mount Pipe	4 2	3/4 3/8	-
		3	ericsson	RADIO 4426			
		3	ericsson	RRUS 32			
		3	kaelus	DBC0061F1V51-2			
		3	quintel technology	QS66512-2 w/ Mount Pipe			
		1	raycap	DC6-48-60-18-8C			
		1	raycap	DC6-48-60-18-8F			

**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	3	commscope	LNx-6515DS-VTM w/ Mount Pipe	13	1-5/8	1
		3	ericsson	ERICSSON AIR 21 B2A B4P w/ Mount Pipe			
		3	ericsson	ERICSSON AIR 21 B4A B2P w/ Mount Pipe			
		3	ericsson	RRUS 11 B12			
		3	rfs celwave	ATMAA1412D-1A20			
	1	tower mounts	Platform Mount [LP 1201-1]				
153.0	153.0	3	ericsson	RRUS 11	-	-	1
		3	ericsson	RRUS 32 B2			
		1	tower mounts	Side Arm Mount [SO 102-3]			
		-	-	-			
149.0	154.0	1	raycap	DC6-48-60-18-8F	2 1 1	7/8 3/8 conduit	3
	149.0	2	cci antennas	HPA-65R-BUU-H6 w/ Mount Pipe			
		3	powerwave technologies	7770.00 w/ Mount Pipe			
		3	powerwave technologies	7770.00 w/ Mount Pipe			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
		12	powerwave technologies	LGP21401			
		1	tower mounts	Platform Mount [LP 1201-1]			
140.0	142.0	3	alcatel lucent	B13 RRH 4X30	2	1-5/8	2
		3	alcatel lucent	RRH2X60-AWS			
		3	amphenol	QUAD656C0000G w/ Mount Pipe			
		3	amphenol	WWX063X19G00 w/ Mount Pipe			
		1	commscope	RC2DC-3315-PF-48			
	3	alcatel lucent	RRH2X60-PCS	18	1-5/8	1	
	3	amphenol	WWX063X19G00 w/ Mount Pipe				
	1	commscope	RC2DC-3315-PF-48				
	2	decibel	DB844H80E-XY w/ Mount Pipe				
	4	rfs celwave	APL868013-42T0 w/ Mount Pipe				
	140.0	1	tower mounts	Platform Mount [LP 1201-1]			
120.0	122.0	1	tower mounts	Miscellaneous [NA 510-1]	-	-	1
	122.0	3	alcatel lucent	TD-RRH8x20-25	1	1-1/4	2
		3	rfs celwave	APXVTM14-ALU-I20 w/ Mount Pipe			
		3	rfs celwave	APXVSP18-C-A20 w/ Mount Pipe			
	120.0	1	tower mounts	Platform Mount [LP 1201-1]	3 2	1-1/4 1/2	1
119.0	122.0	3	alcatel lucent	1900MHz RRH	-	-	1
		3	alcatel lucent	800MHZ RRH			
	119.0	1	tower mounts	Side Arm Mount [SO 102-3]			
72.0	73.0	2	gps	GPS_A	1	1/2	1
	72.0	1	tower mounts	Side Arm Mount [SO 701-1]			

- Notes:  
 1) Existing Equipment  
 2) Reserved Equipment  
 3) 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)
160	160	3	-	Panel Antenna	-	-
150	150	12	Allgon	ALP 11011	-	-
140	140	12	Allgon	ALP 11011	-	-
130	130	12	Allgon	ALP 11011	-	-

### 3) ANALYSIS PROCEDURE

**Table 4 - Documents Provided**

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	WEI Geotechnical Engineers	5121535	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	WEI Geotechnical Engineers (Mapping)	4468638	CCISITES
4-TOWER MANUFACTURER DRAWINGS	Engineered Endeavors, Inc.	5121537	CCISITES

#### 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.

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

### 4) ANALYSIS RESULTS

**Table 5 - Section Capacity (Summary)**

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	160 - 152	Pole	TP30.62x29x0.1875	1	-4.68	1135.55	7.4	Pass
L2	152 - 111.29	Pole	TP38.86x30.62x0.25	2	-21.83	1934.28	40.6	Pass
L3	111.29 - 77.42	Pole	TP45.09x37.263x0.3125	3	-29.90	2892.94	53.4	Pass
L4	77.42 - 36.46	Pole	TP52.62x43.2359x0.4375	4	-44.26	5028.09	46.7	Pass
L5	36.46 - 0	Pole	TP59x50.3353x0.5	5	-64.46	6604.55	47.1	Pass
							Summary	
						Pole (L3)	53.4	Pass
						Rating =	53.4	Pass

**Table 6 - Tower Component Stresses vs. Capacity – LC7**

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Flange Bolts	152	9.7	Pass
1	Flange Plate	152	7.3	Pass
1	Anchor Rods	0	44.0	Pass
1	Base Plate	0	51.8	Pass
1	Base Foundation (Structure)	0	68.9	Pass
1	Base Foundation (Soil Interaction)	0	39.1	Pass

<b>Structure Rating (max from all components) =</b>	<b>68.9%</b>
---	--------------

Notes:

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

#### 4.1) Recommendations

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

**APPENDIX A**  
**TNXTOWER OUTPUT**



**DESIGNED APPURTENANCE LOADING**

TYPE	ELEVATION	TYPE	ELEVATION
Lightning Rod 5/8x4'	160	DBC0061F1V51-2	149
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	160	DBC0061F1V51-2	149
		DC6-48-60-18-8F	149
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	160	DC6-48-60-18-8C	149
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	160	Platform Mount [LP 1201-1]	149
		(2) APL868013-42T0 w/ Mount Pipe	140
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	160	(2) APL868013-42T0 w/ Mount Pipe	140
		(2) DB844H80E-XY w/ Mount Pipe	140
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	160	WWX063X19G00 w/ Mount Pipe	140
		WWX063X19G00 w/ Mount Pipe	140
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	160	WWX063X19G00 w/ Mount Pipe	140
		RC2DC-3315-PF-48	140
LNX-6515DS-VTM w/ Mount Pipe	160	RRH2X60-PCS	140
LNX-6515DS-VTM w/ Mount Pipe	160	RRH2X60-PCS	140
LNX-6515DS-VTM w/ Mount Pipe	160	RRH2X60-PCS	140
ATMAA1412D-1A20	160	Platform Mount [LP 1201-1]	140
ATMAA1412D-1A20	160	QUAD656C0000G w/ Mount Pipe	140
ATMAA1412D-1A20	160	QUAD656C0000G w/ Mount Pipe	140
RRUS 11 B12	160	QUAD656C0000G w/ Mount Pipe	140
RRUS 11 B12	160	WWX063X19G00 w/ Mount Pipe	140
RRUS 11 B12	160	WWX063X19G00 w/ Mount Pipe	140
Platform Mount [LP 1201-1]	160	WWX063X19G00 w/ Mount Pipe	140
6' x 2" Mount Pipe	160	B13 RRH 4X30	140
6' x 2" Mount Pipe	160	B13 RRH 4X30	140
6' x 2" Mount Pipe	160	B13 RRH 4X30	140
RRUS 32 B2	153	RRH2X60-AWS	140
RRUS 32 B2	153	RRH2X60-AWS	140
RRUS 32 B2	153	RRH2X60-AWS	140
RRUS 11	153	RC2DC-3315-PF-48	140
RRUS 11	153	Miscellaneous [NA 510-1]	122
RRUS 11	153	APXVSP18-C-A20 w/ Mount Pipe	120
Side Arm Mount [SO 102-3]	153	APXVSP18-C-A20 w/ Mount Pipe	120
7770.00 w/ Mount Pipe	149	APXVTM14-ALU-I20 w/ Mount Pipe	120
7770.00 w/ Mount Pipe	149	APXVTM14-ALU-I20 w/ Mount Pipe	120
7770.00 w/ Mount Pipe	149	APXVTM14-ALU-I20 w/ Mount Pipe	120
(4) LGP21401	149	TD-RRH8x20-25	120
(4) LGP21401	149	TD-RRH8x20-25	120
(4) LGP21401	149	TD-RRH8x20-25	120
HPA-65R-BUU-H6 w/ Mount Pipe	149	APXVSP18-C-A20 w/ Mount Pipe	120
HPA-65R-BUU-H6 w/ Mount Pipe	149	Platform Mount [LP 1201-1]	120
HPA-65R-BUU-H6 w/ Mount Pipe	149	(2) 6' x 2" Mount Pipe	120
QS66512-2 w/ Mount Pipe	149	(2) 6' x 2" Mount Pipe	120
QS66512-2 w/ Mount Pipe	149	(2) 6' x 2" Mount Pipe	120
QS66512-2 w/ Mount Pipe	149	800MHZ RRH	119
RRUS 32	149	800MHZ RRH	119
RRUS 32	149	800MHZ RRH	119
RRUS 32	149	1900MHz RRH	119
RADIO 4426	149	1900MHz RRH	119
RADIO 4426	149	1900MHz RRH	119
RADIO 4426	149	Side Arm Mount [SO 102-3]	119
DBC0061F1V51-2	149	Side Arm Mount [SO 701-1]	72
		(2) GPS_A	72

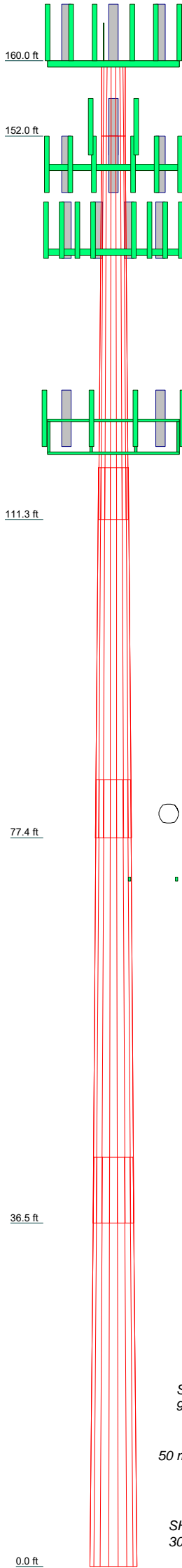
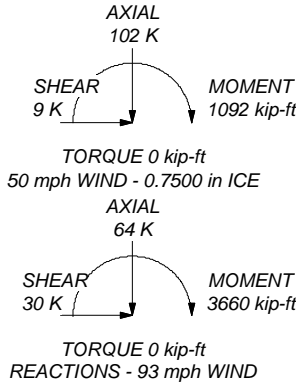
**MATERIAL STRENGTH**

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-65	65 ksi	80 ksi			

**TOWER DESIGN NOTES**

1. Tower is located in Fairfield County, Connecticut.
2. Tower designed for Exposure B to the TIA-222-G Standard.
3. Tower designed for a 93 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 0.00 ft
8. TOWER RATING: 53.4%

ALL REACTIONS ARE FACTORED



Section	Length (ft)	Number of Sides	Thickness (in)	Socket Length (ft)	Top Dia (in)	Bot Dia (in)	Grade	Weight (K)
1	160.0	18	0.1875	29.0000	30.6200		A572-65	0.5
2	152.0	18	0.2500	5.42	30.6200	38.8600	A572-65	3.8
3	111.3	18	0.3125	6.17	37.2630	45.0900	A572-65	5.4
4	77.4	18	0.4375	7.08	43.2359	52.6200	A572-65	10.6
5	36.5	18	0.5000	50.3353	59.0000		A572-65	12.7
	0.0						A572-65	33.0

**Crown Castle**  
 2000 Corporate Drive  
 Canonsburg, PA 15317  
 Phone: (724) 416-2000  
 FAX: (724) 416-4623

Job: **BU# 841290**

Project:	Client: Crown Castle	Drawn by: Cindy Dostatni	App'd:
Code: TIA-222-G	Date: 01/30/18	Scale: NTS	Dwg No. E-1

Path: C:\Users\cdostani\Documents\QA projects\028 - BU841290 - WO1517661\Production\841290.dwg

## Tower Input Data

There is a pole section.

This tower is designed using the TIA-222-G standard.

The following design criteria apply:

- 1) Tower is located in Fairfield County, Connecticut.
- 2) Basic wind speed of 93 mph.
- 3) Structure Class II.
- 4) Exposure Category B.
- 5) Topographic Category 1.
- 6) Crest Height 0.00 ft.
- 7) Nominal ice thickness of 0.7500 in.
- 8) Ice thickness is considered to increase with height.
- 9) Ice density of 56 pcf.
- 10) A wind speed of 50 mph is used in combination with ice.
- 11) Temperature drop of 50 °F.
- 12) Deflections calculated using a wind speed of 60 mph.
- 13) A non-linear (P-delta) analysis was used.
- 14) Pressures are calculated at each section.
- 15) Stress ratio used in pole design is 1.
- 16) Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

## Options

Consider Moments - Legs Consider Moments - Horizontals Consider Moments - Diagonals Use Moment Magnification ✓ Use Code Stress Ratios ✓ Use Code Safety Factors - Guys Escalate Ice Always Use Max Kz Use Special Wind Profile  Include Bolts In Member Capacity  Leg Bolts Are At Top Of Section Secondary Horizontal Braces Leg Use Diamond Inner Bracing (4 Sided) SR Members Have Cut Ends SR Members Are Concentric	Distribute Leg Loads As Uniform Assume Legs Pinned ✓ Assume Rigid Index Plate ✓ Use Clear Spans For Wind Area Use Clear Spans For KL/r Retension Guys To Initial Tension ✓ Bypass Mast Stability Checks ✓ Use Azimuth Dish Coefficients ✓ Project Wind Area of Appurt.  Autocalc Torque Arm Areas  Add IBC .6D+W Combination ✓ Sort Capacity Reports By Component Triangulate Diamond Inner Bracing Treat Feed Line Bundles As Cylinder	Use ASCE 10 X-Brace Ly Rules Calculate Redundant Bracing Forces Ignore Redundant Members in FEA SR Leg Bolts Resist Compression All Leg Panels Have Same Allowable Offset Girt At Foundation ✓ Consider Feed Line Torque Include Angle Block Shear Check Use TIA-222-G Bracing Resist. Exemption Use TIA-222-G Tension Splice Exemption  <div style="text-align: center; background-color: #e0e0e0; padding: 2px;"><b>Poles</b></div> ✓ Include Shear-Torsion Interaction Always Use Sub-Critical Flow Use Top Mounted Sockets
--	--	---

## Tapered Pole Section Geometry

Section	Elevation <small>ft</small>	Section Length <small>ft</small>	Splice Length <small>ft</small>	Number of Sides	Top Diameter <small>in</small>	Bottom Diameter <small>in</small>	Wall Thickness <small>in</small>	Bend Radius <small>in</small>	Pole Grade
L1	160.00-152.00	8.00	0.00	18	29.0000	30.6200	0.1875	0.7500	A572-65 (65 ksi)
L2	152.00-111.29	40.71	5.42	18	30.6200	38.8600	0.2500	1.0000	A572-65 (65 ksi)
L3	111.29-77.42	39.29	6.17	18	37.2630	45.0900	0.3125	1.2500	A572-65 (65 ksi)
L4	77.42-36.46	47.13	7.08	18	43.2359	52.6200	0.4375	1.7500	A572-65 (65 ksi)
L5	36.46-0.00	43.54		18	50.3353	59.0000	0.5000	2.0000	A572-65 (65 ksi)

### Tapered Pole Properties

Section	Tip Dia. in	Area in <sup>2</sup>	I in <sup>4</sup>	r in	C in	I/C in <sup>3</sup>	J in <sup>4</sup>	I/Q in <sup>2</sup>	w in	w/t
L1	29.4474	17.1470	1798.4090	10.2284	14.7320	122.0750	3599.1844	8.5751	4.7740	25.461
	31.0924	18.1111	2119.1346	10.8035	15.5550	136.2353	4241.0576	9.0573	5.0591	26.982
L2	31.0924	24.0986	2808.1400	10.7814	15.5550	180.5302	5619.9750	12.0516	4.9491	19.796
	39.4595	30.6370	5770.1059	13.7066	19.7409	292.2922	11547.804	15.3214	6.3994	25.597
L3	38.9342	36.6502	6321.9882	13.1174	18.9296	333.9740	12652.295	18.3286	6.0083	19.226
	45.7856	44.4137	11250.554	15.8960	22.9057	491.1679	22515.912	22.2111	7.3858	23.635
L4	45.1503	59.4309	13753.202	15.1934	21.9638	626.1754	27524.501	29.7211	6.8395	15.633
	53.4317	72.4619	24928.553	18.5248	26.7310	932.5723	49889.908	36.2378	8.4911	19.408
L5	52.5425	79.0886	24815.630	17.6915	25.5703	970.4855	49663.913	39.5518	7.9790	15.958
	59.9102	92.8395	40140.425	20.7675	29.9720	1339.2642	80333.669	46.4286	9.5040	19.008

Tower Elevation	Gusset Area (per face)	Gusset Thickness	Gusset Grade	Adjust. Factor A <sub>r</sub>	Adjust. Factor A <sub>r</sub>	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals	Double Angle Stitch Bolt Spacing Horizontal	Double Angle Stitch Bolt Spacing Redundants
ft	ft <sup>2</sup>	in					in	in	in
L1 160.00-152.00				1	1	1			
L2 152.00-111.29				1	1	1			
L3 111.29-77.42				1	1	1			
L4 77.42-36.46				1	1	1			
L5 36.46-0.00				1	1	1			

### Feed Line/Linear Appurtenances - Entered As Round Or Flat

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

### Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement	Total Number	C <sub>A</sub> A <sub>A</sub>	Weight
				ft		ft <sup>2</sup> /ft	plf
***							
LDF7-50A(1-5/8)	A	No	Inside Pole	160.00 - 0.00	12	No Ice	0.82
						1/2" Ice	0.82
						1" Ice	0.82
MLE Hybrid	A	No	Inside Pole	160.00 - 0.00	1	No Ice	1.07
9Power/18Fiber RL						1/2" Ice	1.07
2(1-5/8)						1" Ice	1.07
***							
LDF7-50A(1-5/8)	A	No	Inside Pole	149.00 - 0.00	12	No Ice	0.82

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C <sub>A</sub> A <sub>A</sub> ft <sup>2</sup> /ft	Weight plf
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
FB-L98B-034-XXX(3/8)	A	No	Inside Pole	149.00 - 0.00	2	No Ice	0.00	0.06
						1/2" Ice	0.00	0.06
						1" Ice	0.00	0.06
WR-VG86ST-BRD(3/4)	A	No	Inside Pole	149.00 - 0.00	4	No Ice	0.00	0.58
						1/2" Ice	0.00	0.58
						1" Ice	0.00	0.58
***								
LDF7-50A(1-5/8)	A	No	Inside Pole	140.00 - 0.00	18	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
HB158-1-08U8-S8J18(1-5/8)	A	No	Inside Pole	140.00 - 0.00	2	No Ice	0.00	1.30
						1/2" Ice	0.00	1.30
						1" Ice	0.00	1.30
***								
LDF4-50A(1/2)	C	No	Inside Pole	120.00 - 0.00	2	No Ice	0.00	0.15
						1/2" Ice	0.00	0.15
						1" Ice	0.00	0.15
HB114-1-05U3-S3J(1-1/4)	C	No	Inside Pole	120.00 - 0.00	3	No Ice	0.00	0.90
						1/2" Ice	0.00	0.90
						1" Ice	0.00	0.90
LDF4-50A(1/2)	C	No	Inside Pole	73.00 - 0.00	1	No Ice	0.00	0.15
						1/2" Ice	0.00	0.15
						1" Ice	0.00	0.15
HB114-21U3M12-XXXF(1-1/4)	C	No	Inside Pole	120.00 - 0.00	1	No Ice	0.00	1.22
						1/2" Ice	0.00	1.22
						1" Ice	0.00	1.22
***								

### Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A <sub>R</sub> ft <sup>2</sup>	A <sub>F</sub> ft <sup>2</sup>	C <sub>A</sub> A <sub>A</sub> In Face ft <sup>2</sup>	C <sub>A</sub> A <sub>A</sub> Out Face ft <sup>2</sup>	Weight K
L1	160.00-152.00	A	0.000	0.000	0.000	0.000	0.09
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00
L2	152.00-111.29	A	0.000	0.000	0.000	0.000	1.41
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.04
L3	111.29-77.42	A	0.000	0.000	0.000	0.000	1.37
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.14
L4	77.42-36.46	A	0.000	0.000	0.000	0.000	1.66
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.18
L5	36.46-0.00	A	0.000	0.000	0.000	0.000	1.48
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.16

### Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A <sub>R</sub> ft <sup>2</sup>	A <sub>F</sub> ft <sup>2</sup>	C <sub>A</sub> A <sub>A</sub> In Face ft <sup>2</sup>	C <sub>A</sub> A <sub>A</sub> Out Face ft <sup>2</sup>	Weight K
L1	160.00-152.00	A	1.752	0.000	0.000	0.000	0.000	0.09
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.00
L2	152.00-111.29	A	1.722	0.000	0.000	0.000	0.000	1.41
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.04
L3	111.29-77.42	A	1.666	0.000	0.000	0.000	0.000	1.37

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A <sub>R</sub> ft <sup>2</sup>	A <sub>F</sub> ft <sup>2</sup>	C <sub>A</sub> A <sub>A</sub> In Face ft <sup>2</sup>	C <sub>A</sub> A <sub>A</sub> Out Face ft <sup>2</sup>	Weight K
L4	77.42-36.46	B	1.584	0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.14
		A		0.000	0.000	0.000	0.000	1.66
		B		0.000	0.000	0.000	0.000	0.00
L5	36.46-0.00	C	1.410	0.000	0.000	0.000	0.000	0.18
		A		0.000	0.000	0.000	0.000	1.48
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.16

### Feed Line Center of Pressure

Section	Elevation ft	CP <sub>x</sub> in	CP <sub>z</sub> in	CP <sub>x</sub> Ice in	CP <sub>z</sub> Ice in
L1	160.00-152.00	0.0000	0.0000	0.0000	0.0000
L2	152.00-111.29	0.0000	0.0000	0.0000	0.0000
L3	111.29-77.42	0.0000	0.0000	0.0000	0.0000
L4	77.42-36.46	0.0000	0.0000	0.0000	0.0000
L5	36.46-0.00	0.0000	0.0000	0.0000	0.0000

### Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K <sub>a</sub> No Ice	K <sub>a</sub> Ice
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### Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment t °	Placement ft	C <sub>A</sub> A <sub>A</sub> Front ft <sup>2</sup>	C <sub>A</sub> A <sub>A</sub> Side ft <sup>2</sup>	Weight K	
Lightning Rod 5/8x4'	C	From Leg	0.00	0.0000	160.00	No Ice	0.25	0.25	0.03
			0.00			1/2"	0.66	0.66	0.03
			2.00			Ice	0.97	0.97	0.04
						1" Ice			
***160*** ERICSSON AIR 21 B4A B2P w/ Mount Pipe	A	From Leg	4.00	0.0000	160.00	No Ice	6.33	5.64	0.11
			0.00			1/2"	6.78	6.43	0.17
			3.00			Ice	7.21	7.13	0.23
						1" Ice			
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	B	From Leg	4.00	0.0000	160.00	No Ice	6.33	5.64	0.11
			0.00			1/2"	6.78	6.43	0.17
			3.00			Ice	7.21	7.13	0.23
						1" Ice			
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	C	From Leg	4.00	0.0000	160.00	No Ice	6.33	5.64	0.11
			0.00			1/2"	6.78	6.43	0.17
			3.00			Ice	7.21	7.13	0.23
						1" Ice			
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	A	From Leg	4.00	0.0000	160.00	No Ice	6.33	5.64	0.11
			0.00			1/2"	6.78	6.43	0.17
			3.00			Ice	7.21	7.13	0.23
						1" Ice			
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	B	From Leg	4.00	0.0000	160.00	No Ice	6.33	5.64	0.11
			0.00			1/2"	6.78	6.43	0.17

Description	Face or Leg	Offset Type	Offsets:			Azimuth Adjustment	Placement	C <sub>AA</sub>		Weight
			Horz	Lateral	Vert			Front	Side	
			ft	ft	ft	°	ft	ft <sup>2</sup>	ft <sup>2</sup>	K
			3.00				Ice	7.21	7.13	0.23
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	C	From Leg	4.00		0.0000	160.00	1" Ice	6.33	5.64	0.11
			0.00				No Ice	6.78	6.43	0.17
			3.00				1/2"	7.21	7.13	0.23
LNX-6515DS-VTM w/ Mount Pipe	A	From Leg	4.00		0.0000	160.00	1" Ice	11.68	9.84	0.08
			0.00				No Ice	12.40	11.37	0.17
			3.00				1/2"	13.14	12.91	0.27
LNX-6515DS-VTM w/ Mount Pipe	B	From Leg	4.00		0.0000	160.00	1" Ice	11.68	9.84	0.08
			0.00				No Ice	12.40	11.37	0.17
			3.00				1/2"	13.14	12.91	0.27
LNX-6515DS-VTM w/ Mount Pipe	C	From Leg	4.00		0.0000	160.00	1" Ice	11.68	9.84	0.08
			0.00				No Ice	12.40	11.37	0.17
			3.00				1/2"	13.14	12.91	0.27
ATMAA1412D-1A20	A	From Leg	4.00		0.0000	160.00	1" Ice	0.41	1.00	0.01
			0.00				No Ice	0.50	1.13	0.02
			3.00				1/2"	0.59	1.26	0.03
ATMAA1412D-1A20	B	From Leg	4.00		0.0000	160.00	1" Ice	0.41	1.00	0.01
			0.00				No Ice	0.50	1.13	0.02
			3.00				1/2"	0.59	1.26	0.03
ATMAA1412D-1A20	C	From Leg	4.00		0.0000	160.00	1" Ice	0.41	1.00	0.01
			0.00				No Ice	0.50	1.13	0.02
			3.00				1/2"	0.59	1.26	0.03
RRUS 11 B12	A	From Leg	4.00		0.0000	160.00	1" Ice	2.83	1.18	0.05
			0.00				No Ice	3.04	1.33	0.07
			3.00				1/2"	3.26	1.48	0.10
RRUS 11 B12	B	From Leg	4.00		0.0000	160.00	1" Ice	2.83	1.18	0.05
			0.00				No Ice	3.04	1.33	0.07
			3.00				1/2"	3.26	1.48	0.10
RRUS 11 B12	C	From Leg	4.00		0.0000	160.00	1" Ice	2.83	1.18	0.05
			0.00				No Ice	3.04	1.33	0.07
			3.00				1/2"	3.26	1.48	0.10
Platform Mount [LP 1201-1]	C	None			0.0000	160.00	1" Ice	23.10	23.10	2.10
							No Ice	26.80	26.80	2.50
							1/2"	30.50	30.50	2.90
6' x 2" Mount Pipe	A	From Leg	4.00		0.0000	160.00	1" Ice	1.43	1.43	0.02
			0.00				No Ice	1.92	1.92	0.03
			0.00				1/2"	2.29	2.29	0.05
6' x 2" Mount Pipe	B	From Leg	4.00		0.0000	160.00	1" Ice	1.43	1.43	0.02
			0.00				No Ice	1.92	1.92	0.03
			0.00				1/2"	2.29	2.29	0.05
6' x 2" Mount Pipe	C	From Leg	4.00		0.0000	160.00	1" Ice	1.43	1.43	0.02
			0.00				No Ice	1.92	1.92	0.03
			0.00				1/2"	2.29	2.29	0.05
***153*** RRUS 32 B2	A	From Leg	1.50		0.0000	153.00	1" Ice	2.73	1.67	0.05
			0.00				No Ice	2.95	1.86	0.07
			0.00				1/2"	3.18	2.05	0.10
RRUS 32 B2	B	From Leg	1.50		0.0000	153.00	1" Ice	2.73	1.67	0.05
			0.00				No Ice	2.95	1.86	0.07

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment t °	Placement ft	C <sub>AA</sub> Front ft <sup>2</sup>	C <sub>AA</sub> Side ft <sup>2</sup>	Weight K	
			0.00			Ice 3.18	2.05	0.10	
RRUS 32 B2	C	From Leg	1.50	0.0000	153.00	1" Ice	2.73	1.67	0.05
			0.00			No Ice	2.95	1.86	0.07
			0.00			1/2"	3.18	2.05	0.10
RRUS 11	A	From Leg	1.50	0.0000	153.00	1" Ice	2.78	1.19	0.05
			0.00			No Ice	2.99	1.33	0.07
			0.00			1/2"	3.21	1.49	0.09
RRUS 11	B	From Leg	1.50	0.0000	153.00	1" Ice	2.78	1.19	0.05
			0.00			No Ice	2.99	1.33	0.07
			0.00			1/2"	3.21	1.49	0.09
RRUS 11	C	From Leg	1.50	0.0000	153.00	1" Ice	2.78	1.19	0.05
			0.00			No Ice	2.99	1.33	0.07
			0.00			1/2"	3.21	1.49	0.09
Side Arm Mount [SO 102-3]	C	None		0.0000	153.00	1" Ice	3.00	3.00	0.08
						No Ice	3.48	3.48	0.11
						1/2"	3.96	3.96	0.14
***149*** 7770.00 w/ Mount Pipe	A	From Leg	4.00	0.0000	149.00	1" Ice	5.75	4.25	0.06
			0.00			No Ice	6.18	5.01	0.10
			0.00			1/2"	6.61	5.71	0.16
7770.00 w/ Mount Pipe	B	From Leg	4.00	0.0000	149.00	1" Ice	5.75	4.25	0.06
			0.00			No Ice	6.18	5.01	0.10
			0.00			1/2"	6.61	5.71	0.16
7770.00 w/ Mount Pipe	C	From Leg	4.00	0.0000	149.00	1" Ice	5.75	4.25	0.06
			0.00			No Ice	6.18	5.01	0.10
			0.00			1/2"	6.61	5.71	0.16
(4) LGP21401	A	From Leg	4.00	0.0000	149.00	1" Ice	1.10	0.21	0.01
			0.00			No Ice	1.24	0.27	0.02
			0.00			1/2"	1.38	0.35	0.03
(4) LGP21401	B	From Leg	4.00	0.0000	149.00	1" Ice	1.10	0.21	0.01
			0.00			No Ice	1.24	0.27	0.02
			0.00			1/2"	1.38	0.35	0.03
(4) LGP21401	C	From Leg	4.00	0.0000	149.00	1" Ice	1.10	0.21	0.01
			0.00			No Ice	1.24	0.27	0.02
			0.00			1/2"	1.38	0.35	0.03
HPA-65R-BUU-H6 w/ Mount Pipe	A	From Leg	4.00	0.0000	149.00	1" Ice	9.90	8.11	0.08
			0.00			No Ice	10.47	9.30	0.16
			0.00			1/2"	11.01	10.21	0.25
HPA-65R-BUU-H6 w/ Mount Pipe	B	From Leg	4.00	0.0000	149.00	1" Ice	9.90	8.11	0.08
			0.00			No Ice	10.47	9.30	0.16
			0.00			1/2"	11.01	10.21	0.25
HPA-65R-BUU-H6 w/ Mount Pipe	C	From Leg	4.00	0.0000	149.00	1" Ice	9.90	8.11	0.08
			0.00			No Ice	10.47	9.30	0.16
			0.00			1/2"	11.01	10.21	0.25
QS66512-2 w/ Mount Pipe	A	From Leg	4.00	0.0000	149.00	1" Ice	8.37	8.46	0.14
			0.00			No Ice	8.93	9.66	0.21
			0.00			1/2"	9.46	10.55	0.30
QS66512-2 w/ Mount Pipe	B	From Leg	4.00	0.0000	149.00	1" Ice	8.37	8.46	0.14
			0.00			No Ice	8.93	9.66	0.21

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment t °	Placement ft	C <sub>AA</sub> Front ft <sup>2</sup>	C <sub>AA</sub> Side ft <sup>2</sup>	Weight K
			0.00			Ice 9.46	10.55	0.30
QS66512-2 w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	149.00	1" Ice No Ice 8.37 8.93 9.46	8.46 9.66 10.55	0.14 0.21 0.30
RRUS 32	A	From Leg	4.00 0.00 0.00	0.0000	149.00	1" Ice No Ice 2.86 3.08 3.32	1.78 1.97 2.17	0.06 0.08 0.10
RRUS 32	B	From Leg	4.00 0.00 0.00	0.0000	149.00	1" Ice No Ice 2.86 3.08 3.32	1.78 1.97 2.17	0.06 0.08 0.10
RRUS 32	C	From Leg	4.00 0.00 0.00	0.0000	149.00	1" Ice No Ice 2.86 3.08 3.32	1.78 1.97 2.17	0.06 0.08 0.10
RADIO 4426	A	From Leg	4.00 0.00 0.00	0.0000	149.00	1" Ice No Ice 1.64 1.80 1.97	0.73 0.84 0.97	0.05 0.06 0.08
RADIO 4426	B	From Leg	4.00 0.00 0.00	0.0000	149.00	1" Ice No Ice 1.64 1.80 1.97	0.73 0.84 0.97	0.05 0.06 0.08
RADIO 4426	C	From Leg	4.00 0.00 0.00	0.0000	149.00	1" Ice No Ice 1.64 1.80 1.97	0.73 0.84 0.97	0.05 0.06 0.08
DBC0061F1V51-2	A	From Leg	4.00 0.00 0.00	0.0000	149.00	1" Ice No Ice 0.41 0.50 0.59	0.43 0.52 0.61	0.03 0.03 0.04
DBC0061F1V51-2	B	From Leg	4.00 0.00 0.00	0.0000	149.00	1" Ice No Ice 0.41 0.50 0.59	0.43 0.52 0.61	0.03 0.03 0.04
DBC0061F1V51-2	C	From Leg	4.00 0.00 0.00	0.0000	149.00	1" Ice No Ice 0.41 0.50 0.59	0.43 0.52 0.61	0.03 0.03 0.04
DC6-48-60-18-8F	A	From Leg	4.00 0.00 0.00	0.0000	149.00	1" Ice No Ice 0.79 1.27 1.45	0.79 1.27 1.45	0.02 0.04 0.05
DC6-48-60-18-8C	B	From Leg	4.00 0.00 0.00	0.0000	149.00	1" Ice No Ice 2.74 2.96 3.20	2.74 2.96 3.20	0.03 0.05 0.08
Platform Mount [LP 1201-1]	C	None		0.0000	149.00	1" Ice No Ice 23.10 26.80 30.50	23.10 26.80 30.50	2.10 2.50 2.90
***140*** (2) APL868013-42T0 w/ Mount Pipe	A	From Leg	4.00 0.00 2.00	0.0000	140.00	1" Ice No Ice 3.10 3.48 3.85	4.80 5.42 6.04	0.02 0.06 0.11
(2) APL868013-42T0 w/ Mount Pipe	B	From Leg	4.00 0.00 2.00	0.0000	140.00	1" Ice No Ice 3.10 3.48 3.85	4.80 5.42 6.04	0.02 0.06 0.11
(2) DB844H80E-XY w/ Mount Pipe	C	From Leg	4.00 0.00	0.0000	140.00	1" Ice No Ice 3.30 3.67	4.80 5.42	0.03 0.07



Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment t °	Placement ft	C <sub>AA</sub> Front ft <sup>2</sup>	C <sub>AA</sub> Side ft <sup>2</sup>	Weight K	
			2.00			Ice 4.03	6.04	0.12	
WWX063X19G00 w/ Mount Pipe	A	From Leg	4.00	0.0000	140.00	1" Ice			
			0.00			No Ice	8.84	7.28	0.06
			2.00			1/2"	9.41	8.50	0.13
						Ice	9.96	9.47	0.21
						1" Ice			
WWX063X19G00 w/ Mount Pipe	B	From Leg	4.00	0.0000	140.00	No Ice	8.84	7.28	0.06
			0.00			1/2"	9.41	8.50	0.13
			2.00			Ice	9.96	9.47	0.21
						1" Ice			
WWX063X19G00 w/ Mount Pipe	C	From Leg	4.00	0.0000	140.00	No Ice	8.84	7.28	0.06
			0.00			1/2"	9.41	8.50	0.13
			2.00			Ice	9.96	9.47	0.21
						1" Ice			
RC2DC-3315-PF-48	A	From Leg	4.00	0.0000	140.00	No Ice	3.79	2.51	0.03
			0.00			1/2"	4.04	2.72	0.06
			2.00			Ice	4.30	2.94	0.10
						1" Ice			
RRH2X60-PCS	A	From Leg	4.00	0.0000	140.00	No Ice	2.20	1.72	0.06
			0.00			1/2"	2.39	1.90	0.08
			2.00			Ice	2.59	2.09	0.10
						1" Ice			
RRH2X60-PCS	B	From Leg	4.00	0.0000	140.00	No Ice	2.20	1.72	0.06
			0.00			1/2"	2.39	1.90	0.08
			2.00			Ice	2.59	2.09	0.10
						1" Ice			
RRH2X60-PCS	C	From Leg	4.00	0.0000	140.00	No Ice	2.20	1.72	0.06
			0.00			1/2"	2.39	1.90	0.08
			2.00			Ice	2.59	2.09	0.10
						1" Ice			
Platform Mount [LP 1201-1]	C	None		0.0000	140.00	No Ice	23.10	23.10	2.10
						1/2"	26.80	26.80	2.50
						Ice	30.50	30.50	2.90
						1" Ice			
QUAD656C0000G w/ Mount Pipe	A	From Leg	4.00	0.0000	140.00	No Ice	13.48	7.33	0.08
			0.00			1/2"	14.10	8.55	0.17
			2.00			Ice	14.68	9.50	0.28
						1" Ice			
QUAD656C0000G w/ Mount Pipe	B	From Leg	4.00	0.0000	140.00	No Ice	13.48	7.33	0.08
			0.00			1/2"	14.10	8.55	0.17
			2.00			Ice	14.68	9.50	0.28
						1" Ice			
QUAD656C0000G w/ Mount Pipe	C	From Leg	4.00	0.0000	140.00	No Ice	13.48	7.33	0.08
			0.00			1/2"	14.10	8.55	0.17
			2.00			Ice	14.68	9.50	0.28
						1" Ice			
WWX063X19G00 w/ Mount Pipe	A	From Leg	4.00	0.0000	140.00	No Ice	8.84	7.28	0.06
			0.00			1/2"	9.41	8.50	0.13
			2.00			Ice	9.96	9.47	0.21
						1" Ice			
WWX063X19G00 w/ Mount Pipe	B	From Leg	4.00	0.0000	140.00	No Ice	8.84	7.28	0.06
			0.00			1/2"	9.41	8.50	0.13
			2.00			Ice	9.96	9.47	0.21
						1" Ice			
WWX063X19G00 w/ Mount Pipe	C	From Leg	4.00	0.0000	140.00	No Ice	8.84	7.28	0.06
			0.00			1/2"	9.41	8.50	0.13
			2.00			Ice	9.96	9.47	0.21
						1" Ice			
B13 RRH 4X30	A	From Leg	4.00	0.0000	140.00	No Ice	2.06	1.32	0.06
			0.00			1/2"	2.24	1.48	0.07
			2.00			Ice	2.43	1.64	0.09
						1" Ice			
B13 RRH 4X30	B	From Leg	4.00	0.0000	140.00	No Ice	2.06	1.32	0.06
			0.00			1/2"	2.24	1.48	0.07
			2.00			Ice	2.43	1.64	0.09

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C <sub>AA</sub> Front	C <sub>AA</sub> Side	Weight
			Horz	Lateral					
B13 RRH 4X30	C	From Leg	4.00	0.0000	140.00	1" Ice			
			0.00			No Ice	2.06	1.32	0.06
			2.00			1/2"	2.24	1.48	0.07
RRH2X60-AWS	A	From Leg	4.00	0.0000	140.00	Ice	2.43	1.64	0.09
			0.00			1" Ice			
			2.00			No Ice	3.50	1.82	0.06
RRH2X60-AWS	B	From Leg	4.00	0.0000	140.00	1/2"	3.76	2.05	0.08
			0.00			Ice	4.03	2.29	0.11
			2.00			1" Ice			
RRH2X60-AWS	C	From Leg	4.00	0.0000	140.00	No Ice	3.50	1.82	0.06
			0.00			1/2"	3.76	2.05	0.08
			2.00			Ice	4.03	2.29	0.11
RC2DC-3315-PF-48	C	From Leg	4.00	0.0000	140.00	1" Ice			
			0.00			No Ice	3.79	2.51	0.03
			2.00			1/2"	4.04	2.72	0.06
***120*** APXVSP18-C-A20 w/ Mount Pipe	A	From Leg	4.00	0.0000	120.00	Ice	4.30	2.94	0.10
			0.00			1" Ice			
			2.00			No Ice	8.26	6.95	0.08
APXVSP18-C-A20 w/ Mount Pipe	B	From Leg	4.00	0.0000	120.00	1/2"	8.82	8.13	0.15
			0.00			Ice	9.35	9.02	0.23
			2.00			1" Ice			
APXVSP18-C-A20 w/ Mount Pipe	C	From Leg	4.00	0.0000	120.00	No Ice	8.26	6.95	0.08
			0.00			1/2"	8.82	8.13	0.15
			2.00			Ice	9.35	9.02	0.23
APXVTM14-ALU-I20 w/ Mount Pipe	A	From Leg	4.00	0.0000	120.00	1" Ice			
			0.00			No Ice	6.58	4.96	0.08
			2.00			1/2"	7.03	5.75	0.13
APXVTM14-ALU-I20 w/ Mount Pipe	B	From Leg	4.00	0.0000	120.00	Ice	7.47	6.47	0.19
			0.00			1" Ice			
			2.00			No Ice	6.58	4.96	0.08
APXVTM14-ALU-I20 w/ Mount Pipe	C	From Leg	4.00	0.0000	120.00	1/2"	7.03	5.75	0.13
			0.00			Ice	7.47	6.47	0.19
			2.00			1" Ice			
TD-RRH8x20-25	A	From Leg	4.00	0.0000	120.00	No Ice	4.05	1.53	0.07
			0.00			1/2"	4.30	1.71	0.10
			2.00			Ice	4.56	1.90	0.13
TD-RRH8x20-25	B	From Leg	4.00	0.0000	120.00	1" Ice			
			0.00			No Ice	4.05	1.53	0.07
			2.00			1/2"	4.30	1.71	0.10
TD-RRH8x20-25	C	From Leg	4.00	0.0000	120.00	Ice	4.56	1.90	0.13
			0.00			1" Ice			
			2.00			No Ice	4.05	1.53	0.07
Miscellaneous [NA 510-1]	C	None		0.0000	122.00	1/2"	8.50	8.50	0.34
						Ice	11.00	11.00	0.42
						1" Ice			
Platform Mount [LP 1201-1]	C	None		0.0000	120.00	No Ice	23.10	23.10	2.10
						1/2"	26.80	26.80	2.50
						Ice	30.50	30.50	2.90

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment t °	Placement ft		C <sub>AA</sub> Front ft <sup>2</sup>	C <sub>AA</sub> Side ft <sup>2</sup>	Weight K
(2) 6' x 2" Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	120.00	1" Ice			
						No Ice	1.43	1.43	0.02
						1/2"	1.92	1.92	0.03
(2) 6' x 2" Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	120.00	Ice	2.29	2.29	0.05
						1" Ice			
						No Ice	1.43	1.43	0.02
(2) 6' x 2" Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	120.00	1/2"	1.92	1.92	0.03
						Ice	2.29	2.29	0.05
						No Ice	1.43	1.43	0.02
***119*** 800MHZ RRH	A	From Leg	1.50 0.00 3.00	0.0000	119.00	1" Ice			
						No Ice	2.13	1.77	0.05
						1/2"	2.32	1.95	0.07
800MHZ RRH	B	From Leg	1.50 0.00 3.00	0.0000	119.00	Ice	2.51	2.13	0.10
						1" Ice			
						No Ice	2.13	1.77	0.05
800MHZ RRH	C	From Leg	1.50 0.00 3.00	0.0000	119.00	1/2"	2.32	1.95	0.07
						Ice	2.51	2.13	0.10
						No Ice	2.13	1.77	0.05
1900MHz RRH	A	From Leg	1.50 0.00 3.00	0.0000	119.00	1" Ice			
						No Ice	2.49	3.26	0.04
						1/2"	2.70	3.48	0.08
1900MHz RRH	B	From Leg	1.50 0.00 3.00	0.0000	119.00	Ice	2.91	3.72	0.11
						1" Ice			
						No Ice	2.49	3.26	0.04
1900MHz RRH	C	From Leg	1.50 0.00 3.00	0.0000	119.00	1/2"	2.70	3.48	0.08
						Ice	2.91	3.72	0.11
						No Ice	2.49	3.26	0.04
Side Arm Mount [SO 102-3]	C	None		0.0000	119.00	1" Ice			
						No Ice	3.00	3.00	0.08
						1/2"	3.48	3.48	0.11
***73*** Side Arm Mount [SO 701-1]	B	None		0.0000	72.00	Ice	1.43	3.01	0.09
						1" Ice			
						No Ice	0.85	1.67	0.07
(2) GPS_A	B	From Leg	3.00 0.00 1.00	0.0000	72.00	1/2"	1.14	2.34	0.08
						Ice	1.43	3.01	0.09
						No Ice	0.26	0.26	0.00
***						1" Ice	0.32	0.32	0.00
						Ice	0.39	0.39	0.01
						No Ice	0.26	0.26	0.00

## Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.6 Wind 0 deg - No Ice

Comb. No.	Description
3	0.9 Dead+1.6 Wind 0 deg - No Ice
4	1.2 Dead+1.6 Wind 30 deg - No Ice
5	0.9 Dead+1.6 Wind 30 deg - No Ice
6	1.2 Dead+1.6 Wind 60 deg - No Ice
7	0.9 Dead+1.6 Wind 60 deg - No Ice
8	1.2 Dead+1.6 Wind 90 deg - No Ice
9	0.9 Dead+1.6 Wind 90 deg - No Ice
10	1.2 Dead+1.6 Wind 120 deg - No Ice
11	0.9 Dead+1.6 Wind 120 deg - No Ice
12	1.2 Dead+1.6 Wind 150 deg - No Ice
13	0.9 Dead+1.6 Wind 150 deg - No Ice
14	1.2 Dead+1.6 Wind 180 deg - No Ice
15	0.9 Dead+1.6 Wind 180 deg - No Ice
16	1.2 Dead+1.6 Wind 210 deg - No Ice
17	0.9 Dead+1.6 Wind 210 deg - No Ice
18	1.2 Dead+1.6 Wind 240 deg - No Ice
19	0.9 Dead+1.6 Wind 240 deg - No Ice
20	1.2 Dead+1.6 Wind 270 deg - No Ice
21	0.9 Dead+1.6 Wind 270 deg - No Ice
22	1.2 Dead+1.6 Wind 300 deg - No Ice
23	0.9 Dead+1.6 Wind 300 deg - No Ice
24	1.2 Dead+1.6 Wind 330 deg - No Ice
25	0.9 Dead+1.6 Wind 330 deg - No Ice
26	1.2 Dead+1.0 Ice+1.0 Temp
27	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
28	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
29	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
30	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
31	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
32	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
33	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
34	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
39	Dead+Wind 0 deg - Service
40	Dead+Wind 30 deg - Service
41	Dead+Wind 60 deg - Service
42	Dead+Wind 90 deg - Service
43	Dead+Wind 120 deg - Service
44	Dead+Wind 150 deg - Service
45	Dead+Wind 180 deg - Service
46	Dead+Wind 210 deg - Service
47	Dead+Wind 240 deg - Service
48	Dead+Wind 270 deg - Service
49	Dead+Wind 300 deg - Service
50	Dead+Wind 330 deg - Service

### 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	160 - 152	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-10.77	0.06	-0.04
			Max. Mx	20	-4.68	49.57	-0.02
			Max. My	14	-4.68	0.04	-49.56
			Max. Vy	20	-5.78	49.57	-0.02
			Max. Vx	2	-5.78	0.03	49.51
			Max. Torque	24			
L2	152 - 111.29	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-47.22	0.31	0.43
			Max. Mx	20	-21.84	587.77	-0.59
			Max. My	2	-21.83	-0.47	588.05
			Max. Vy	20	-21.82	587.77	-0.59
			Max. Vx	2	-21.83	-0.47	588.05

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L3	111.29 - 77.42	Pole	Max. Torque	17			0.40
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-58.38	0.31	0.43
			Max. Mx	20	-29.90	1354.59	-1.40
			Max. My	2	-29.90	-1.28	1355.37
			Max. Vy	20	-24.43	1354.59	-1.40
			Max. Vx	2	-24.44	-1.28	1355.37
L4	77.42 - 36.46	Pole	Max. Torque	21			-0.11
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-76.90	0.15	0.34
			Max. Mx	20	-44.26	2397.83	-2.38
			Max. My	2	-44.26	-2.27	2399.21
			Max. Vy	20	-27.51	2397.83	-2.38
			Max. Vx	2	-27.53	-2.27	2399.21
L5	36.46 - 0	Pole	Max. Torque	13			0.12
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-101.60	0.15	0.34
			Max. Mx	20	-64.46	3655.75	-3.42
			Max. My	2	-64.46	-3.31	3657.77
			Max. Vy	20	-30.15	3655.75	-3.42
			Max. Vx	2	-30.16	-3.31	3657.77
		Max. Torque	13			0.12	

### Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	27	101.60	-0.00	9.07
	Max. H <sub>x</sub>	20	64.48	30.12	-0.02
	Max. H <sub>z</sub>	2	64.48	-0.02	30.13
	Max. M <sub>x</sub>	2	3657.77	-0.02	30.13
	Max. M <sub>z</sub>	8	3655.45	-30.12	0.02
	Max. Torsion	13	0.12	-15.04	-26.08
	Min. Vert	11	48.36	-26.07	-15.05
	Min. H <sub>x</sub>	8	64.48	-30.12	0.02
	Min. H <sub>z</sub>	14	64.48	0.02	-30.13
	Min. M <sub>x</sub>	14	-3657.69	0.02	-30.13
	Min. M <sub>z</sub>	20	-3655.75	30.12	-0.02
	Min. Torsion	25	-0.12	15.04	26.08

### Tower Mast Reaction Summary

Load Combination	Vertical K	Shear <sub>x</sub> K	Shear <sub>z</sub> K	Overturing Moment, M <sub>x</sub> kip-ft	Overturing Moment, M <sub>z</sub> kip-ft	Torque kip-ft
Dead Only	53.73	0.00	0.00	-0.03	0.12	0.00
1.2 Dead+1.6 Wind 0 deg - No Ice	64.48	0.02	-30.13	-3657.77	-3.31	0.09
0.9 Dead+1.6 Wind 0 deg - No Ice	48.36	0.02	-30.13	-3620.71	-3.31	0.09
1.2 Dead+1.6 Wind 30 deg - No Ice	64.48	15.08	-26.11	-3169.47	-1830.65	0.05
0.9 Dead+1.6 Wind 30 deg - No Ice	48.36	15.08	-26.11	-3137.34	-1812.14	0.05
1.2 Dead+1.6 Wind 60 deg - No Ice	64.48	26.10	-15.09	-1831.91	-3167.43	-0.01
0.9 Dead+1.6 Wind 60 deg - No Ice	48.36	26.10	-15.09	-1813.34	-3135.37	-0.01

Load Combination	Vertical K	Shear <sub>x</sub> K	Shear <sub>z</sub> K	Overturning Moment, M <sub>x</sub> kip-ft	Overturning Moment, M <sub>z</sub> kip-ft	Torque kip-ft
1.2 Dead+1.6 Wind 90 deg - No Ice	64.48	30.12	-0.02	-3.50	-3655.45	-0.06
0.9 Dead+1.6 Wind 90 deg - No Ice	48.36	30.12	-0.02	-3.45	-3618.46	-0.07
1.2 Dead+1.6 Wind 120 deg - No Ice	64.48	26.07	15.05	1825.84	-3163.97	-0.11
0.9 Dead+1.6 Wind 120 deg - No Ice	48.36	26.07	15.05	1807.35	-3131.95	-0.11
1.2 Dead+1.6 Wind 150 deg - No Ice	64.48	15.04	26.08	3165.94	-1824.66	-0.12
0.9 Dead+1.6 Wind 150 deg - No Ice	48.36	15.04	26.08	3133.87	-1806.21	-0.12
1.2 Dead+1.6 Wind 180 deg - No Ice	64.48	-0.02	30.13	3657.69	3.62	-0.10
0.9 Dead+1.6 Wind 180 deg - No Ice	48.36	-0.02	30.13	3620.65	3.54	-0.10
1.2 Dead+1.6 Wind 210 deg - No Ice	64.48	-15.08	26.11	3169.39	1830.96	-0.05
0.9 Dead+1.6 Wind 210 deg - No Ice	48.36	-15.08	26.11	3137.28	1812.36	-0.05
1.2 Dead+1.6 Wind 240 deg - No Ice	64.48	-26.10	15.09	1831.83	3167.74	0.01
0.9 Dead+1.6 Wind 240 deg - No Ice	48.36	-26.10	15.09	1813.28	3135.60	0.01
1.2 Dead+1.6 Wind 270 deg - No Ice	64.48	-30.12	0.02	3.42	3655.75	0.07
0.9 Dead+1.6 Wind 270 deg - No Ice	48.36	-30.12	0.02	3.40	3618.68	0.07
1.2 Dead+1.6 Wind 300 deg - No Ice	64.48	-26.07	-15.05	-1825.92	3164.28	0.11
0.9 Dead+1.6 Wind 300 deg - No Ice	48.36	-26.07	-15.05	-1807.41	3132.18	0.11
1.2 Dead+1.6 Wind 330 deg - No Ice	64.48	-15.04	-26.08	-3166.02	1824.97	0.12
0.9 Dead+1.6 Wind 330 deg - No Ice	48.36	-15.04	-26.08	-3133.92	1806.43	0.12
1.2 Dead+1.0 Ice+1.0 Temp	101.60	0.00	0.00	-0.34	0.15	0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	101.60	0.00	-9.07	-1091.46	-0.52	0.02
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	101.60	4.54	-7.86	-945.64	-545.72	0.01
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	101.60	7.85	-4.54	-546.54	-944.65	-0.01
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	101.60	9.07	-0.00	-1.10	-1090.41	-0.02
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	101.60	7.85	4.53	544.52	-943.95	-0.03
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	101.60	4.53	7.85	944.13	-544.51	-0.03
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	101.60	-0.00	9.07	1090.66	0.88	-0.02
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	101.60	-4.54	7.86	944.83	546.08	-0.01
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	101.60	-7.85	4.54	545.73	945.01	0.01
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	101.60	-9.07	0.00	0.30	1090.77	0.02
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	101.60	-7.85	-4.53	-545.33	944.31	0.03
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	101.60	-4.53	-7.85	-944.94	544.87	0.03
Dead+Wind 0 deg - Service	53.73	0.01	-7.01	-846.20	-0.67	0.02
Dead+Wind 30 deg - Service	53.73	3.51	-6.08	-733.23	-423.40	0.01
Dead+Wind 60 deg - Service	53.73	6.07	-3.51	-423.81	-732.65	-0.00
Dead+Wind 90 deg - Service	53.73	7.01	-0.01	-0.83	-845.55	-0.02
Dead+Wind 120 deg - Service	53.73	6.07	3.50	422.36	-731.85	-0.02
Dead+Wind 150 deg - Service	53.73	3.50	6.07	732.37	-422.02	-0.03

Load Combination	Vertical	Shear <sub>x</sub>	Shear <sub>z</sub>	Overturning Moment, M <sub>x</sub>	Overturning Moment, M <sub>z</sub>	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
Dead+Wind 180 deg - Service	53.73	-0.01	7.01	846.13	0.93	-0.02
Dead+Wind 210 deg - Service	53.73	-3.51	6.08	733.17	423.66	-0.01
Dead+Wind 240 deg - Service	53.73	-6.07	3.51	423.74	732.90	0.00
Dead+Wind 270 deg - Service	53.73	-7.01	0.01	0.77	845.80	0.02
Dead+Wind 300 deg - Service	53.73	-6.07	-3.50	-422.42	732.10	0.02
Dead+Wind 330 deg - Service	53.73	-3.50	-6.07	-732.43	422.27	0.03

## Solution Summary

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
1	0.00	-53.73	0.00	0.00	53.73	0.00	0.000%
2	0.02	-64.48	-30.13	-0.02	64.48	30.13	0.000%
3	0.02	-48.36	-30.13	-0.02	48.36	30.13	0.000%
4	15.08	-64.48	-26.11	-15.08	64.48	26.11	0.000%
5	15.08	-48.36	-26.11	-15.08	48.36	26.11	0.000%
6	26.10	-64.48	-15.09	-26.10	64.48	15.09	0.000%
7	26.10	-48.36	-15.09	-26.10	48.36	15.09	0.000%
8	30.12	-64.48	-0.02	-30.12	64.48	0.02	0.000%
9	30.12	-48.36	-0.02	-30.12	48.36	0.02	0.000%
10	26.07	-64.48	15.05	-26.07	64.48	-15.05	0.000%
11	26.07	-48.36	15.05	-26.07	48.36	-15.05	0.000%
12	15.04	-64.48	26.08	-15.04	64.48	-26.08	0.000%
13	15.04	-48.36	26.08	-15.04	48.36	-26.08	0.000%
14	-0.02	-64.48	30.13	0.02	64.48	-30.13	0.000%
15	-0.02	-48.36	30.13	0.02	48.36	-30.13	0.000%
16	-15.08	-64.48	26.11	15.08	64.48	-26.11	0.000%
17	-15.08	-48.36	26.11	15.08	48.36	-26.11	0.000%
18	-26.10	-64.48	15.09	26.10	64.48	-15.09	0.000%
19	-26.10	-48.36	15.09	26.10	48.36	-15.09	0.000%
20	-30.12	-64.48	0.02	30.12	64.48	-0.02	0.000%
21	-30.12	-48.36	0.02	30.12	48.36	-0.02	0.000%
22	-26.07	-64.48	-15.05	26.07	64.48	15.05	0.000%
23	-26.07	-48.36	-15.05	26.07	48.36	15.05	0.000%
24	-15.04	-64.48	-26.08	15.04	64.48	26.08	0.000%
25	-15.04	-48.36	-26.08	15.04	48.36	26.08	0.000%
26	0.00	-101.60	0.00	0.00	101.60	0.00	0.000%
27	0.00	-101.60	-9.07	-0.00	101.60	9.07	0.000%
28	4.54	-101.60	-7.86	-4.54	101.60	7.86	0.000%
29	7.85	-101.60	-4.54	-7.85	101.60	4.54	0.000%
30	9.07	-101.60	-0.00	-9.07	101.60	0.00	0.000%
31	7.85	-101.60	4.53	-7.85	101.60	-4.53	0.000%
32	4.53	-101.60	7.85	-4.53	101.60	-7.85	0.000%
33	-0.00	-101.60	9.07	0.00	101.60	-9.07	0.000%
34	-4.54	-101.60	7.86	4.54	101.60	-7.86	0.000%
35	-7.85	-101.60	4.54	7.85	101.60	-4.54	0.000%
36	-9.07	-101.60	0.00	9.07	101.60	-0.00	0.000%
37	-7.85	-101.60	-4.53	7.85	101.60	4.53	0.000%
38	-4.53	-101.60	-7.85	4.53	101.60	7.85	0.000%
39	0.01	-53.73	-7.01	-0.01	53.73	7.01	0.000%
40	3.51	-53.73	-6.08	-3.51	53.73	6.08	0.000%
41	6.07	-53.73	-3.51	-6.07	53.73	3.51	0.000%
42	7.01	-53.73	-0.01	-7.01	53.73	0.01	0.000%
43	6.07	-53.73	3.50	-6.07	53.73	-3.50	0.000%
44	3.50	-53.73	6.07	-3.50	53.73	-6.07	0.000%
45	-0.01	-53.73	7.01	0.01	53.73	-7.01	0.000%
46	-3.51	-53.73	6.08	3.51	53.73	-6.08	0.000%
47	-6.07	-53.73	3.51	6.07	53.73	-3.51	0.000%
48	-7.01	-53.73	0.01	7.01	53.73	-0.01	0.000%

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
49	-6.07	-53.73	-3.50	6.07	53.73	3.50	0.000%
50	-3.50	-53.73	-6.07	3.50	53.73	6.07	0.000%

**Non-Linear Convergence Results**

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.0000001	0.0000001
2	Yes	4	0.0000001	0.00028838
3	Yes	4	0.0000001	0.00014468
4	Yes	5	0.0000001	0.00076130
5	Yes	5	0.0000001	0.00036426
6	Yes	5	0.0000001	0.00076090
7	Yes	5	0.0000001	0.00036409
8	Yes	4	0.0000001	0.00028624
9	Yes	4	0.0000001	0.00014272
10	Yes	5	0.0000001	0.00075473
11	Yes	5	0.0000001	0.00036121
12	Yes	5	0.0000001	0.00075856
13	Yes	5	0.0000001	0.00036317
14	Yes	4	0.0000001	0.00027447
15	Yes	4	0.0000001	0.00013183
16	Yes	5	0.0000001	0.00076030
17	Yes	5	0.0000001	0.00036372
18	Yes	5	0.0000001	0.00076038
19	Yes	5	0.0000001	0.00036377
20	Yes	4	0.0000001	0.00027315
21	Yes	4	0.0000001	0.00013057
22	Yes	5	0.0000001	0.00075870
23	Yes	5	0.0000001	0.00036320
24	Yes	5	0.0000001	0.00075519
25	Yes	5	0.0000001	0.00036137
26	Yes	4	0.0000001	0.0000001
27	Yes	5	0.0000001	0.00038299
28	Yes	5	0.0000001	0.00046525
29	Yes	5	0.0000001	0.00046529
30	Yes	5	0.0000001	0.00038227
31	Yes	5	0.0000001	0.00046324
32	Yes	5	0.0000001	0.00046364
33	Yes	5	0.0000001	0.00038229
34	Yes	5	0.0000001	0.00046487
35	Yes	5	0.0000001	0.00046468
36	Yes	5	0.0000001	0.00038267
37	Yes	5	0.0000001	0.00046497
38	Yes	5	0.0000001	0.00046471
39	Yes	4	0.0000001	0.00005120
40	Yes	4	0.0000001	0.00024193
41	Yes	4	0.0000001	0.00024167
42	Yes	4	0.0000001	0.00005112
43	Yes	4	0.0000001	0.00023817
44	Yes	4	0.0000001	0.00024168
45	Yes	4	0.0000001	0.00005114
46	Yes	4	0.0000001	0.00024106
47	Yes	4	0.0000001	0.00024119
48	Yes	4	0.0000001	0.00005110
49	Yes	4	0.0000001	0.00024200
50	Yes	4	0.0000001	0.00023862

**Maximum Tower Deflections - Service Wind**



Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	160 - 152	16.478	46	0.8968	0.0002
L2	152 - 111.29	14.981	46	0.8891	0.0002
L3	116.71 - 77.42	8.825	46	0.7385	0.0001
L4	83.59 - 36.46	4.428	46	0.5024	0.0000
L5	43.54 - 0	1.205	46	0.2488	0.0000

### Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
160.00	Lightning Rod 5/8x4'	46	16.478	0.8968	0.0002	62443
153.00	RRUS 32 B2	46	15.167	0.8905	0.0002	45041
149.00	7770.00 w/ Mount Pipe	46	14.423	0.8838	0.0002	29929
140.00	(2) APL868013-42T0 w/ Mount Pipe	46	12.776	0.8583	0.0001	17586
122.00	Miscellaneous [NA 510-1]	46	9.669	0.7712	0.0001	9640
120.00	APXVSP18-C-A20 w/ Mount Pipe	46	9.346	0.7592	0.0001	9187
119.00	800MHZ RRH	46	9.186	0.7530	0.0001	8993
72.00	Side Arm Mount [SO 701-1]	46	3.254	0.4236	0.0000	8309

### Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	160 - 152	71.283	16	3.8831	0.0007
L2	152 - 111.29	64.807	16	3.8499	0.0007
L3	116.71 - 77.42	38.182	16	3.1977	0.0003
L4	83.59 - 36.46	19.158	16	2.1750	0.0001
L5	43.54 - 0	5.212	16	1.0764	0.0001

### Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
160.00	Lightning Rod 5/8x4'	16	71.283	3.8831	0.0007	14580
153.00	RRUS 32 B2	16	65.614	3.8559	0.0007	10513
149.00	7770.00 w/ Mount Pipe	16	62.396	3.8271	0.0007	6977
140.00	(2) APL868013-42T0 w/ Mount Pipe	16	55.271	3.7167	0.0006	4095
122.00	Miscellaneous [NA 510-1]	16	41.834	3.3396	0.0003	2242
120.00	APXVSP18-C-A20 w/ Mount Pipe	16	40.435	3.2873	0.0003	2136
119.00	800MHZ RRH	16	39.743	3.2605	0.0003	2091
72.00	Side Arm Mount [SO 701-1]	16	14.075	1.8336	0.0001	1923

### Compression Checks

### Pole Design Data

Section No.	Elevation ft	Size	L ft	L <sub>u</sub> ft	Kl/r	A in <sup>2</sup>	P <sub>u</sub> K	φP <sub>n</sub> K	Ratio $\frac{P_u}{\phi P_n}$
L1	160 - 152 (1)	TP30.62x29x0.1875	8.00	0.00	0.0	18.111	-4.68	1135.55	0.004
L2	152 - 111.29 (2)	TP38.86x30.62x0.25	40.71	0.00	0.0	29.766	-21.83	1934.28	0.011
L3	111.29 - 77.42 (3)	TP45.09x37.263x0.3125	39.29	0.00	0.0	43.194	-29.90	2892.94	0.010
L4	77.42 - 36.46 (4)	TP52.62x43.2359x0.4375	47.13	0.00	0.0	70.504	-44.26	5028.09	0.009
L5	36.46 - 0 (5)	TP59x50.3353x0.5	43.54	0.00	0.0	92.839	-64.46	6604.55	0.010

### Pole Bending Design Data

Section No.	Elevation ft	Size	M <sub>ux</sub> kip-ft	φM <sub>nx</sub> kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M <sub>uy</sub> kip-ft	φM <sub>ny</sub> kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L1	160 - 152 (1)	TP30.62x29x0.1875	49.58	711.82	0.070	0.00	711.82	0.000
L2	152 - 111.29 (2)	TP38.86x30.62x0.25	588.49	1493.86	0.394	0.00	1493.86	0.000
L3	111.29 - 77.42 (3)	TP45.09x37.263x0.3125	1356.39	2592.38	0.523	0.00	2592.38	0.000
L4	77.42 - 36.46 (4)	TP52.62x43.2359x0.4375	2400.95	5245.66	0.458	0.00	5245.66	0.000
L5	36.46 - 0 (5)	TP59x50.3353x0.5	3660.25	7939.54	0.461	0.00	7939.54	0.000

### Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V <sub>u</sub> K	φV <sub>n</sub> K	Ratio $\frac{V_u}{\phi V_n}$	Actual T <sub>u</sub> kip-ft	φT <sub>n</sub> kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	160 - 152 (1)	TP30.62x29x0.1875	5.78	567.77	0.010	0.00	1425.37	0.000
L2	152 - 111.29 (2)	TP38.86x30.62x0.25	21.85	967.14	0.023	0.03	2991.37	0.000
L3	111.29 - 77.42 (3)	TP45.09x37.263x0.3125	24.46	1446.47	0.017	0.03	5191.10	0.000
L4	77.42 - 36.46 (4)	TP52.62x43.2359x0.4375	27.54	2514.05	0.011	0.05	10504.17	0.000
L5	36.46 - 0 (5)	TP59x50.3353x0.5	30.18	3302.27	0.009	0.05	15898.50	0.000

### Pole Interaction Design Data

Section No.	Elevation ft	Ratio P <sub>u</sub> φP <sub>n</sub>	Ratio M <sub>ux</sub> φM <sub>nx</sub>	Ratio M <sub>uy</sub> φM <sub>ny</sub>	Ratio V <sub>u</sub> φV <sub>n</sub>	Ratio T <sub>u</sub> φT <sub>n</sub>	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	160 - 152 (1)	0.004	0.070	0.000	0.010	0.000	0.074	1.000	4.8.2
L2	152 - 111.29 (2)	0.011	0.394	0.000	0.023	0.000	0.406	1.000	4.8.2
L3	111.29 - 77.42 (3)	0.010	0.523	0.000	0.017	0.000	0.534	1.000	4.8.2
L4	77.42 - 36.46 (4)	0.009	0.458	0.000	0.011	0.000	0.467	1.000	4.8.2
L5	36.46 - 0 (5)	0.010	0.461	0.000	0.009	0.000	0.471	1.000	4.8.2

Section No.	Elevation ft	Ratio $P_u$	Ratio $M_{ux}$	Ratio $M_{uy}$	Ratio $V_u$	Ratio $T_u$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
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### Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$\phi P_{allow}$ K	% Capacity	Pass Fail
L1	160 - 152	Pole	TP30.62x29x0.1875	1	-4.68	1135.55	7.4	Pass
L2	152 - 111.29	Pole	TP38.86x30.62x0.25	2	-21.83	1934.28	40.6	Pass
L3	111.29 - 77.42	Pole	TP45.09x37.263x0.3125	3	-29.90	2892.94	53.4	Pass
L4	77.42 - 36.46	Pole	TP52.62x43.2359x0.4375	4	-44.26	5028.09	46.7	Pass
L5	36.46 - 0	Pole	TP59x50.3353x0.5	5	-64.46	6604.55	47.1	Pass
Summary								
Pole (L3)							53.4	Pass
<b>RATING =</b>							<b>53.4</b>	<b>Pass</b>

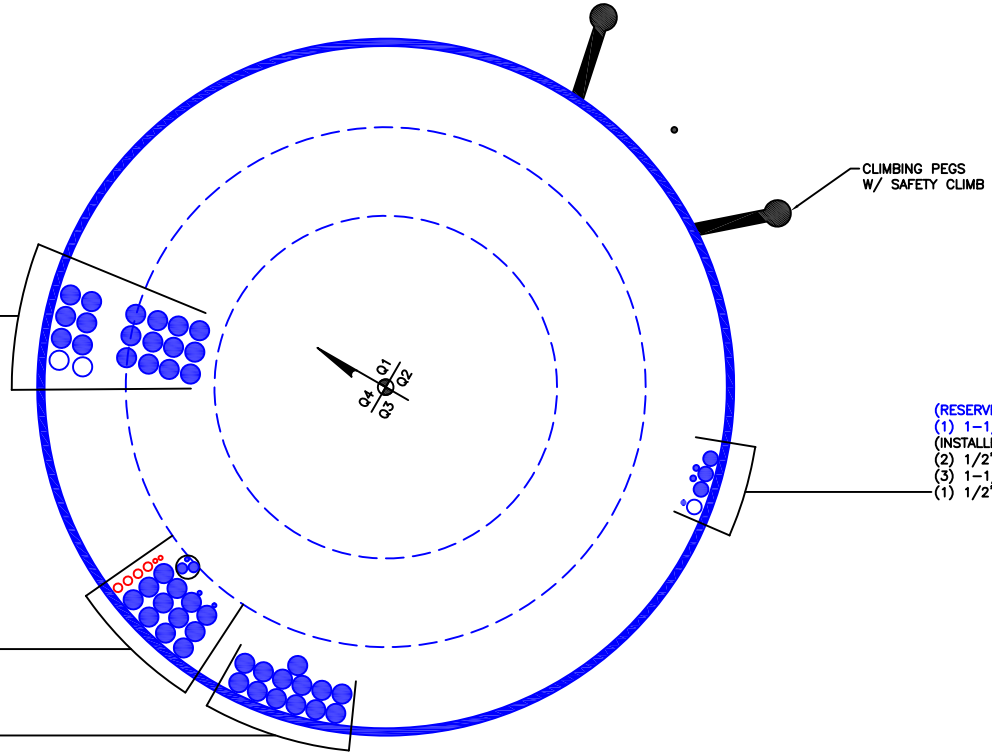
**APPENDIX B**  
**BASE LEVEL DRAWING**



(RESERVED)  
(2) 1-5/8" TO 140 FT LEVEL  
(INSTALLED)  
(18) 1-5/8" TO 140 FT LEVEL

(PROPOSED)  
(2) 3/8" TO 149 FT LEVEL  
(4) 3/4" TO 149 FT LEVEL  
(INSTALLED-IN CONDUIT-TO BE REMOVED)  
(1) 3/8" TO 149 FT LEVEL  
(2) 7/8" TO 149 FT LEVEL  
(INSTALLED-TO BE REMOVED)  
(2) 3/8" TO 153 FT LEVEL  
(INSTALLED)  
(12) 1-5/8" TO 149 FT LEVEL

(INSTALLED)  
(13) 1-5/8" TO 160 FT LEVEL



(RESERVED)  
(1) 1-1/4" TO 120 FT LEVEL  
(INSTALLED)  
(2) 1/2" TO 120 FT LEVEL  
(3) 1-1/4" TO 120 FT LEVEL  
(1) 1/2" TO 72 FT LEVEL

**APPENDIX C**  
**ADDITIONAL CALCULATIONS**

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

### Site Data

BU#: 841290  
 Site Name: GREENWICH NORTH  
 App #: 421390 Rev. 1

Reactions		
Mu	49.58	ft-kips
Axial, Pu:	4.68	kips
Shear, Vu:	5.78	kips
Elevation:	152	feet

Bolt Threads:
X-Excluded
$\phi V_n = \phi(0.55 A_b F_u)$
$\phi = 0.75, \phi V_n$ (kips):
38.88

Pole Manufacturer:	Other
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If No stiffeners, Criteria: TIA G <-Only Applicable to Unstiffened Cases

Bolt Data			
Qty:	12		
Diameter (in.):	1	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:	100	<-- Disregard	
N/A:	75	<-- Disregard	
Circle (in.):	35		

**Flange Bolt Results**  
 Bolt Tension Capacity,  $\phi^*T_n, B1$ : 54.54 kips  
 Adjusted  $\phi^*T_n$  (due to  $V_u = V_u/Q_t$ ), **B**: 54.54 kips  
 Max Bolt directly applied  $T_u$ : 5.28 Kips  
 Min. PL "tc" for **B cap. w/o Pry**: 0.825 in  
 Min PL "treq" for actual **T w/ Pry**: 0.188 in  
 Min PL "t1" for actual **T w/o Pry**: 0.257 in  
 T allowable w/o Prying: 54.54 kips  
 Prying Force, q: 0.00 kips  
 Total Bolt Tension= $T_u + q$ : 5.28 kips  
 Non-Prying Bolt Stress Ratio,  $T_u/B$ : 9.7% Pass

Rigid
$\phi^*T_n$
$\phi T_n [1 - (V_u / \phi V_n)^2]^{0.5}$

Plate Data		
Diam:	38	in
Thick, t:	1	in
Grade (Fy):	60	ksi
Strength, Fu:	75	ksi
Single-Rod B-eff:	8.10	in

**Exterior Flange Plate Results** Flexural Check  
 Compression Side Plate Stress: 3.9 ksi  
 Allowable Plate Stress: 54.0 ksi  
 Compression Plate Stress Ratio: 7.3% Pass  
**No Prying**  
 Tension Side Stress Ratio,  $(t_{req}/t)^2$ : 3.5% Pass

$\alpha' < 0$  case

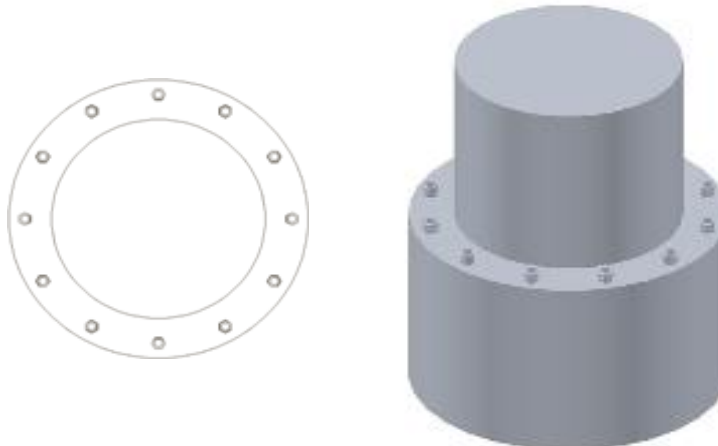
Rigid
TIA G
$\phi^*F_y$
Comp. Y.L. Length:
16.95

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

n/a  
**Stiffener Results**  
 Horizontal Weld : n/a  
 Vertical Weld: n/a  
 Plate Flex+Shear,  $f_b/F_b + (f_v/F_v)^2$ : n/a  
 Plate Tension+Shear,  $f_t/F_t + (f_v/F_v)^2$ : n/a  
 Plate Comp. (AISC Bracket): n/a

**Pole Results**  
 Pole Punching Shear Check: n/a

Pole Data		
Diam:	30.62	in
Thick:	0.1875	in
Grade:	65	ksi
# of Sides:	18	"0" IF Round
Fu	80	ksi
Reinf. Fillet Weld	0	"0" if None



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

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

## Stiffened or Unstiffened, UngROUTED, Circular Base Plate - Any Rod Material

**TIA Rev G**

Assumption: Clear space between bottom of leveling nut and top of concrete **not** exceeding (1)\*(Rod Diameter)

### Site Data

BU#: 841290
Site Name: GREENWICH NORTH
App #: 421390 Rev. 1
Pole Manufacturer: <b>Other</b>

### Anchor Rod Data

Qty:	24	
Diam:	2.25	in
Rod Material:	A615-J	
Strength (Fu):	100	ksi
Yield (Fy):	75	ksi
Bolt Circle:	67	in

### Plate Data

Diam:	73	in
Thick:	2.25	in
Grade:	60	ksi
Single-Rod B-eff:	7.80	in

### Stiffener Data (Welding at both sides)

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

### Pole Data

Diam:	59	in
Thick:	0.5	in
Grade:	65	ksi
# of Sides:	18	"0" IF Round
Fu	80	ksi
Reinf. Fillet Weld	0	"0" if None

### Reactions

Mu:	3660	ft-kips
Axial, Pu:	64	kips
Shear, Vu:	30	kips
Eta Factor, η	0.5	TIA G (Fig. 4-4)

If No stiffeners, Criteria: **AISC LRFD** <-Only Applicable to Unstiffened Cases

### Anchor Rod Results

Max Rod (Cu+ Vu/η): 114.5 Kips  
 Allowable Axial, Φ\*Fu\*Anet: 260.0 Kips  
 Anchor Rod Stress Ratio: 44.0% **Pass**

Rigid
AISC LRFD
φ*Tn

### Base Plate Results

Base Plate Stress: 28.0 ksi  
 Allowable Plate Stress: 54.0 ksi  
 Base Plate Stress Ratio: 51.8% **Pass**

### Flexural Check

Rigid
AISC LRFD
φ*Fy
Y.L. Length:
31.75

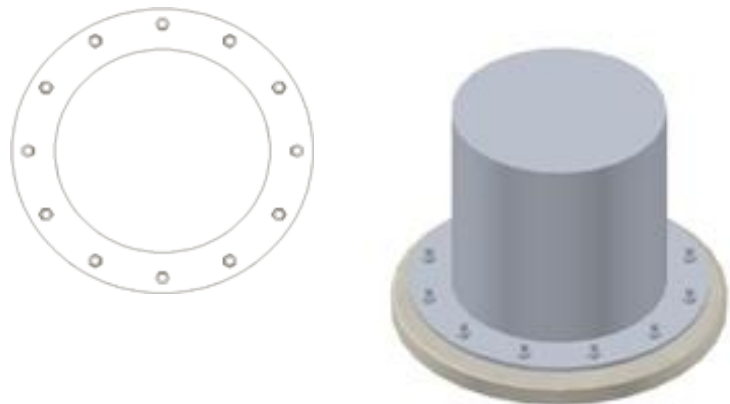
**n/a**

### 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



# Pier and Pad Foundation



**BU #:** 841290  
**Site Name:** GREENWICH NOF  
**App. Number:** 421390 Rev.1

**TIA-222 Revision:** G  
**Tower Type:** Monopole

**Block Foundation?:**

Superstructure Analysis Reactions		
Compression, $P_{comp}$ :	64	kips
Base Shear, $Vu_{comp}$ :	30	kips
Moment, $M_u$ :	3660	ft-kips
Tower Height, $H$ :	160	ft
BP Dist. Above Fdn, $bp_{dist}$ :	2.75	in

Foundation Analysis Checks				
	Capacity	Demand	Rating	Check
<i>Lateral (Sliding) (kips)</i>	375.91	30.00	<b>8.0%</b>	<b>Pass</b>
<i>Bearing Pressure (ksf)</i>	22.50	3.70	<b>16.4%</b>	<b>Pass</b>
<i>Overturning (kip*ft)</i>	10156.81	3966.88	<b>39.1%</b>	<b>Pass</b>
<i>Pier Flexure (Comp.) (kip*ft)</i>	5555.39	3825.00	<b>68.9%</b>	<b>Pass</b>
<i>Pier Compression (kip)</i>	31187.52	112.51	<b>0.4%</b>	<b>Pass</b>
<i>Pad Flexure (kip*ft)</i>	6340.37	1297.28	<b>20.5%</b>	<b>Pass</b>
<i>Pad Shear - 1-way (kips)</i>	1397.27	165.39	<b>11.8%</b>	<b>Pass</b>
<i>Pad Shear - 2-way (ksi)</i>	0.19	0.02	<b>10.1%</b>	<b>Pass</b>

Pier Properties		
Pier Shape:	Square	
Pier Diameter, $dpier$ :	7.0	ft
Ext. Above Grade, $E$ :	0.50	ft
Pier Rebar Size, $Sc$ :	11	
Pier Rebar Quantity, $mc$ :	22	
Pier Tie/Spiral Size, $St$ :	4	
Pier Tie/Spiral Quantity, $mt$ :	9	
Pier Reinforcement Type:	Tie	
Pier Clear Cover, $cc_{pier}$ :	4	in

**Soil Rating:** 39.1%  
**Structural Rating:** 68.9%

Pad Properties		
Depth, $D$ :	9.5	ft
Pad Width, $W$ :	25.0	ft
Pad Thickness, $T$ :	4.5	ft
Pad Rebar Size, $Sp$ :	10	
Pad Rebar Quantity, $mp$ :	23	
Pad Clear Cover, $cc_{pad}$ :	3	in

Material Properties		
Rebar Grade, $Fy$ :	60000	psi
Concrete Compressive Strength, $F'c$ :	4000	psi
Dry Concrete Density, $\delta c$ :	150	pcf

Soil Properties		
Total Soil Unit Weight, $\gamma$ :	120	pcf
Ultimate Gross Bearing, $Q_{ult}$ :	30.000	ksf
Cohesion, $Cu$ :	0.000	ksf
Friction Angle, $\phi$ :	34	degrees
SPT Blow Count, $N_{blows}$ :	16	
Base Friction, $\mu$ :	0.2	
Neglected Depth, $N$ :	5.00	ft
Foundation Bearing on Rock?	Yes	
Groundwater Depth, $gw$ :	None	ft

--Toggle between Gross and Net

# CCISeismic - Design Category

Per 2012/2015 IBC

Site BU: 841290  
 Work Order: 1517661  
 Application: 421390 Rev. 1



	Degrees	Minutes	Seconds		
Site Latitude =	41	3	58.60	41.0663	degrees
Site Longitude =	-73	40	17.39	-73.6715	degrees
Ground Supported Structure =	Yes				
Structure Class =	II				(Table 2-1)
Site Class =	D - Stiff Soil				(Table 2-11)
Spectral response acceleration short periods, $S_s$ =	0.259				<a href="#">USGS Seismic Tool</a>
Spectral response acceleration 1 s period, $S_1$ =	0.070				
Importance Factor, $I$ =	1.0				(Table 2-3)
Acceleration-based site coefficient, $F_a$ =	1.6				(Table 2-12)
Velocity-based site coefficient, $F_v$ =	2.4				(Table 2-13)
Design spectral response acceleration short period, $S_{DS}$ =	0.275				(2.7.6)
Design spectral response acceleration 1 s period, $S_{D1}$ =	0.112				(2.7.6)
Seismic Design Category - Short Period Response =	B				ASCE 7-05 Table 11.6-1
Seismic Design Category - 1s Period Response =	B				ASCE 7-05 Table 11.6-2
Worst Case Seismic Design Category =	B				ASCE 7-05 Tables 11.6-1 and 6-2

1:9000  
1"=750'



7/12/2017 9:22:51 AM

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PARCEL NUMBER  
10-4035

Parent Parcel Number  
LOT NO PT 25 RIVERSVILLE E51

Date  
01/07/2011 GREENWICH COUNCIL OF BOY SCOUTS INC Bk/Pg: 6081, 35 \$0  
02/21/1974 NA Bk/Pg: 880, 287 \$0

Property Address  
RIVERSVILLE ROAD 0363

Neighborhood  
162100 MID COUNTRY WEST - DIST 10 [3]

Property Class  
699 Exempt Open Space

TAXING DISTRICT INFORMATION

Jurisdiction 57 Greenwich, CT

Area 001

Corporation 057

District 10

Section & Plat 091

Routing Number 7227E0051

Site Description

Topography:

Public Utilities:  
Electric

Street or Road:

Neighborhood:

Zoning: 1 Residential Land  
RA-2 Single Family 2 2 Open Space 1

Legal Acres:  
91.0000

# EXEMPT

## VALUATION RECORD

Assessment Year	10/01/2005	10/01/2007	10/01/2010	10/01/2015	10/01/2015	10/01/2016
Reason for Change	2005 Reval	2007 List	2010 Reval	2015 Prelim	2015 Final	2016 List
VALUATION	I 7866600	7866600	7162500	3010000	3810000	4710000
Market	B 271100	82200	44600	63500	63500	63500
	I 8137700	7948800	7207100	3073500	3873500	4773500
VALUATION	I 5506620	5506620	5013750	2107000	2667000	3297000
70% Assessed	B 189770	57540	31220	44450	44450	44450
	I 5696390	5564160	5044970	2151450	2711450	3341450

## LAND DATA AND CALCULATIONS

Rating	Measured	Table	Prod. Factor	Base	Adjusted	Extended	Influence	Value
Soil ID	Acres	Effective	Depth	Rate	Rate	Value	Factor	
-or- Frontage	-or- Frontage	-or- Depth	-or- Square Feet					
4.0000	87.0000	1.00	1.00	525000.00	525000.00	2100000		2100000
		1.00	1.00	30000.00	30000.00	2610000		2610000

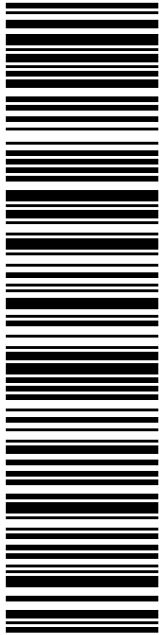
BP15: 15-1382: 3 antennas: \$15,000  
 BP16: 16-0675 nvc \$20,000 replace 3 antennas  
 DBA: Portion of Seton Boy Scout Reservation southeast of Merritt  
 Parkway Supporting parcel w/ most improvements on 10-4035,  
 northwest of Merritt.  
 GEN: Revised NBHD from 180100 to 162100. RCS - 11/30/15.

Supplemental Cards  
 TRUE TAX VALUE 4710000

Supplemental Cards  
 TOTAL LAND VALUE 4710000

**SHIP TO:** PETER TESEI  
TOWN OF GREENWICH  
101 FIELD POINT RD  
GREENWICH CT 06830-6463

**USPS TRACKING #**



**9405 8036 9930 0615 3198 01**

MARK J ROBERTS  
QC DEVELOPMENT  
PO BOX 916  
STORRS CT 06268-0916

**0006**

**P** usps.com **Click-N-Ship®**

**US POSTAGE \$6.70** Flat Rate Env

03/31/2018 Mailed from 06268 024P

**PRIORITY MAIL 2-DAY™** Expected Delivery Date: 04/02/18



Cut on dotted line.

### Instructions

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2. Place your label so it does not wrap around the edge of the package.
3. Adhere your label to the package. A self-adhesive label is recommended. If tape or glue is used, DO NOT TAPE OVER BARCODE. Be sure all edges are secure.
4. To mail your package with PC Postage®, you may schedule a Package Pickup online, hand to your letter carrier, take to a Post Office™, or drop in a USPS collection box.
5. Mail your package on the "Ship Date" you selected when creating this label.

### Click-N-Ship® Label Record

**USPS TRACKING # / Insurance Number:**  
**9405 8036 9930 0615 3198 01**

Trans. #:	431300899	Priority Mail® Postage:	<b>\$6.70</b>
Print Date:	03/30/2018	Insurance Fee	<b>\$0.00</b>
Ship Date:	03/31/2018	Total	<b>\$6.70</b>
Expected Delivery Date:	04/02/2018		
Insured Value:	\$50.00		

**From:** MARK J ROBERTS  
QC DEVELOPMENT  
PO BOX 916  
STORRS CT 06268-0916

**To:** PETER TESEI  
TOWN OF GREENWICH  
101 FIELD POINT RD  
GREENWICH CT 06830-6463

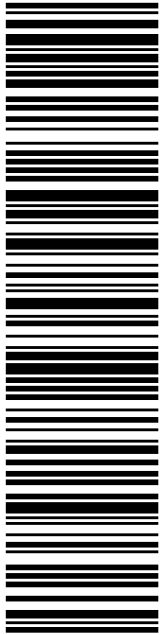
\* Retail Pricing Priority Mail rates apply. There is no fee for USPS Tracking® service on Priority Mail service with use of this electronic rate shipping label. Refunds for unused postage paid labels can be requested online 30 days from the print date.



Thank you for shipping with the United States Postal Service!  
Check the status of your shipment on the USPS Tracking® page at usps.com

**SHIP TO:**  
GREENWICH COUNCIL OF BOY SCOUTS INC.  
63 MASON ST  
GREENWICH CT 06830-5501

**USPS TRACKING #**



**9405 8036 9930 0615 3197 71**

MARK J ROBERTS  
QC DEVELOPMENT  
PO BOX 916  
STORRS CT 06268-0916

**0006**

**P**

usps.com 9405 8036 9930 0615 3197 71 0067 0000 0020 6830  
**US POSTAGE \$6.70**  
 Flat Rate Env  
 03/31/2018 Mailed from 06268 024P

**PRIORITY MAIL 2-DAY™**

Expected Delivery Date: 04/02/18

**C051**

**Click-N-Ship®**



Cut on dotted line.

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**9405 8036 9930 0615 3197 71**

Trans. #:	431300899	Priority Mail® Postage:	<b>\$6.70</b>
Print Date:	03/30/2018	Insurance Fee	<b>\$0.00</b>
Ship Date:	03/31/2018	Total	<b>\$6.70</b>
Expected Delivery Date:	04/02/2018		
Insured Value:	\$50.00		

**From:** MARK J ROBERTS  
 QC DEVELOPMENT  
 PO BOX 916  
 STORRS CT 06268-0916

**To:** GREENWICH COUNCIL OF BOY SCOUTS INC.  
 63 MASON ST  
 GREENWICH CT 06830-5501

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