smartlink

September 5, 2014

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

Re:	**Notice of Exempt Modification**
	Proposal to Add Three (3) Remote Radio Heads
Property Address:	**57 Cook Drive, Montville, CT 06382 (the "Property")**
Applicant:	**New Cingular Wireless PCS, LLC ("AT&T")**

Dear Ms. Bachman:

AT&T currently maintains a wireless telecommunications facility on an existing 193-foot guyed tower location on the Property, owned by Wireless Solutions, Inc., (the "Tower"). AT&T's facility consists of nine (9) wireless telecommunication antennas at a height of 180 feet.

The Connecticut Siting Council (the "Council) approved AT&T's use of the tower in the following prior decisions; Dockets No. EM-CING -086-070815, EM-AT&T-086-140210, EM-CING-086-080922 and EM-CING-086-130130. In its decision dated February 20, 2013, (the "Decision"), the Council approved AT&T to install six (6) Remote Radio Heads ("RRUs"), but AT&T installed only three (3) RRUs. AT&T now intends to install the remaining RRUs to complete the installation. This exempt modification notification is necessary because the Decision is over one year old. Please refer to Tab 1 for further specifications of the RRUs.

Please accept this correspondence as notification pursuant to R.C.S.A. §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 Ronald K. McDaniel, Mayor for the Town of Montville, CT and the land owner; Wireless Solutions, Inc.

The planned modifications to AT&T's 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 Tower. AT&T's new RRUs will be installed at or below the height of its existing antennas currently on the Tower.

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2. The proposed modifications will not involve any changes to ground-mounted equipment and, therefore, will not require and extension of the site boundary.
3. The proposed modifications will not increase the noise levels at the facility by six decibels or more, or to levels that exceed state and local criteria.
4. The operation of the modified facility will not increase radio frequency (RF) emissions at the facility to a level at or above the Federal Communications Commission (FCC) safety standard. A RF emissions calculation for AT&T's modified facility was provided in the application which led to the - Decision. See Tab 2 attached.
5. The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site.
6. The Tower and its foundation can support AT&T's proposed modifications. (See Structural Analysis Report included in Tab 3).

For the foregoing reasons, AT&T respectfully submits that the proposed modifications to the above referenced telecommunications facility constitutes an exempt modification under R.C.S.A. §16-50j-72(b)(2).

Sincerely,

Adam F. Braillard

cc: Wireless Solutions, Inc., PO Box 374, Uncasville, CT 06382
Ronald K. McDaniel, Montville Town Hall, 310 Norwich-New London Turnpike, 2nd Floor, Uncasville, CT 06382

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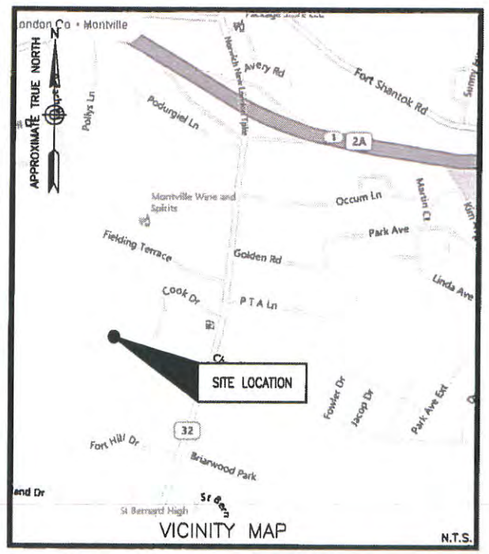
TAB 1

at&t Mobility

SITE NAME: UNCASVILLE
SITE NUMBER: CT2171
57 COOK DRIVE,
UNCASVILLE, CT 06382



DIRECTIONS FROM 500 ENTERPRISE DRIVE, ROCKY HILL, CT:

HEAD NORTHEAST ON ENTERPRISE DR TOWARD CAPITAL BLVD. TURN LEFT ONTO CAPITAL BLVD. TURN LEFT ONTO WEST ST. TAKE RAMP LEFT FOR I-91 N. AT EXIT 25, TAKE RAMP RIGHT FOR CT-3 N TOWARD GLASTONBURY. TAKE RAMP RIGHT FOR CT-2 E TOWARD NORWICH. KEEP STRAIGHT ONTO CT-2 E/CT-32 S. AT EXIT 28S, TAKE RAMP RIGHT FOR I-395 S TOWARD NEW HAVEN. AT EXIT 79A, TAKE RAMP RIGHT FOR CT-2A E TOWARD PRESTON/LEDYARD. AT EXIT 1, TAKE RAMP RIGHT FOR CT-32 TOWARD UNCASVILLE/NORWICH. TURN RIGHT ONTO CT-32/NORWICH NEW LONDON TPKE. TURN RIGHT ONTO COOK DR. THE SITE WILL BE ON THE RIGHT.

SITE COORDINATES:
LATITUDE: N 41° 28' 29.99"
LONGITUDE: W 72° 6' 18.19"
*AS PER GOOGLE EARTH

ELEVATION DATA
GRADE ELEVATION AT TOWER ≈ 364'± A.M.S.L
AS PER GOOGLE EARTH

ANTENNA ELEVATION (TO CENTER OF ANTENNA)
ALPHA SECTOR: 180-0"± A.G.L.
BETA SECTOR: 180-0"± A.G.L.
GAMMA SECTOR: 180-0"± A.G.L.

SITE INFORMATION

- ADD (1) RRUS-12 PER SECTOR FOR A TOTAL OF (3) NEW RRUS-12'S

PROJECT DESCRIPTION

SITE NAME:
UNCASVILLE

SITE NUMBER:
CT2171

LOCATION:
57 COOK DRIVE, UNCASVILLE
NEW LONDON COUNTY, CT 06382

LANDLORD:
WIRELESS SOLUTIONS, INC.
PO BOX 374
UNCASVILLE, CT 06382

APPLICANT/LESSEE:
AT&T MOBILITY
500 ENTERPRISE DRIVE, SUITE 3A
ROCKY HILL, CONNECTICUT 06067

PROJECT INFORMATION

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

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

SHEET NUMBER	DESCRIPTION
T-1	TITLE SHEET
G-1	GENERAL NOTES
C-1	SITE PLAN & EQUIPMENT PLANS
C-2	ANTENNA LAYOUTS & ELEVATIONS
C-3	ANTENNA SCHEDULE & CONSTRUCTION DETAILS
E-1	GROUNDING DETAILS

SHEET INDEX

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

smartlink
1997 ANNAPOLIS EXCHANGE PARKWAY
SUITE 200
ANNAPOLIS, MD 21401

CT2171
UNCASVILLE

CONSTRUCTION DRAWINGS

Q	09/04/14	ISSUED AS REV Q

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

STATE OF CONNECTICUT
JIANG YU
LICENSED
PROFESSIONAL ENGINEER
CT LICENSE NO. PEN.0023222

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

DRAWN BY:	JC
REVIEWED BY:	PD
CHECKED BY:	GHN
PROJECT NUMBER:	50063024
JOB NUMBER:	50063038
SITE ADDRESS:	

57 COOK DRIVE
UNCASVILLE, CT 06382
NEW LONDON COUNTY

SHEET TITLE

TITLE SHEET

SHEET NUMBER

T-1

GENERAL NOTES:

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

SITE WORK GENERAL NOTES:

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

CONCRETE AND REINFORCING STEEL NOTES:

1. ALL CONCRETE WORK SHALL BE IN ACCORDANCE WITH THE ACI 301, ACI 318, ACI 336, ASTM A184, ASTM A185 AND THE DESIGN AND CONSTRUCTION SPECIFICATION FOR CAST-IN-PLACE CONCRETE.
2. ALL CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 4000 PSI AT 28 DAYS, UNLESS NOTED OTHERWISE. A HIGHER STRENGTH (4000 PSI) MAY BE USED. ALL CONCRETING WORK SHALL BE DONE IN ACCORDANCE WITH ACI 318 CODE REQUIREMENTS.
3. REINFORCING STEEL SHALL CONFORM TO ASTM A 615, GRADE 60, DEFORMED UNLESS NOTED OTHERWISE. WELDED WIRE FABRIC SHALL CONFORM TO ASTM A 185 WELDED STEEL WIRE FABRIC UNLESS NOTED OTHERWISE (UNO). SPLICES SHALL BE CLASS "B" AND ALL HOOKS SHALL BE STANDARD, UNO.
4. THE FOLLOWING MINIMUM CONCRETE COVER SHALL BE PROVIDED FOR REINFORCING STEEL UNLESS SHOWN OTHERWISE ON DRAWINGS:
   CONCRETE CAST AGAINST EARTH.....3 IN.
   CONCRETE EXPOSED TO EARTH OR WEATHER:
   #6 AND LARGER .....2 IN.
   #5 AND SMALLER & WWF.....1 1/2 IN.
   CONCRETE NOT EXPOSED TO EARTH OR WEATHER OR NOT CAST AGAINST THE GROUND:
   SLAB AND WALL .....3/4 IN.
   BEAMS AND COLUMNS.....1 1/2 IN.
5. A CHAMFER 3/4" SHALL BE PROVIDED AT ALL EXPOSED EDGES OF CONCRETE, UNO, IN ACCORDANCE WITH ACI 301 SECTION 4.2.4.
6. INSTALLATION OF CONCRETE EXPANSION/WEDGE ANCHOR, SHALL BE PER MANUFACTURER'S WRITTEN RECOMMENDED PROCEDURE. THE ANCHOR BOLT, DOWEL OR ROD SHALL CONFORM TO MANUFACTURER'S RECOMMENDATION FOR EMBEDMENT DEPTH OR AS SHOWN ON THE DRAWINGS. NO REBAR SHALL BE CUT WITHOUT PRIOR CONTRACTOR APPROVAL WHEN DRILLING HOLES IN CONCRETE. SPECIAL INSPECTIONS, REQUIRED BY GOVERNING CODES, SHALL BE PERFORMED IN ORDER TO MAINTAIN MANUFACTURER'S MAXIMUM ALLOWABLE LOADS. ALL EXPANSION/WEDGE ANCHORS SHALL BE STAINLESS STEEL OR HOT DIPPED GALVANIZED. EXPANSION BOLTS SHALL BE PROVIDED BY RAMSET/REDHEAD OR APPROVED EQUAL.
7. CONCRETE CYLINDER TEST IS NOT REQUIRED FOR SLAB ON GRADE WHEN CONCRETE IS LESS THAN 50 CUBIC YARDS (IBC 1905.6.2.3) IN THAT EVENT THE FOLLOWING RECORDS SHALL BE PROVIDED BY THE CONCRETE SUPPLIER;
   (A) RESULTS OF CONCRETE CYLINDER TESTS PERFORMED AT THE SUPPLIER'S PLANT,
   (B) CERTIFICATION OF MINIMUM COMPRESSIVE STRENGTH FOR THE CONCRETE GRADE SUPPLIED.
   FOR GREATER THAN 50 CUBIC YARDS THE GC SHALL PERFORM THE CONCRETE CYLINDER TEST.
8. AS AN ALTERNATIVE TO ITEM 7, TEST CYLINDERS SHALL BE TAKEN INITIALLY AND THEREAFTER FOR EVERY 50 YARDS OF CONCRETE FROM EACH DIFFERENT BATCH PLANT.
9. EQUIPMENT SHALL NOT BE PLACED ON NEW PADS FOR SEVEN DAYS AFTER PAD IS POURED, UNLESS IT IS VERIFIED BY CYLINDER TESTS THAT COMPRESSIVE STRENGTH HAS BEEN ATTAINED.

STRUCTURAL STEEL NOTES:

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

SOIL COMPACTION NOTES FOR SLAB ON GRADE:

1. EXCAVATE AS REQUIRED TO REMOVE VEGETATION & TOPSOIL EXPOSE UNDISTURBED NATURAL SUBGRADE AND PLACE CRUSHED STONE AS REQUIRED.
2. COMPACTION CERTIFICATION: AN INSPECTION AND WRITTEN CERTIFICATION BY A QUALIFIED GEOTECHNICAL TECHNICIAN OR ENGINEER IS ACCEPTABLE.
3. 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.
4. 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.
5. 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:

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

CONSTRUCTION NOTES:

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

ELECTRICAL INSTALLATION NOTES:

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

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STATE OF CONNECTICUT
JIANG YU
NO. 23
LICENSED
PROFESSIONAL ENGINEER

JIANG YU
CT LICENSE No. PEN.0023222

DRAWN BY:	JC
REVIEWED BY:	PD
CHECKED BY:	GHN
PROJECT NUMBER:	50063024
JOB NUMBER:	50063038
SITE ADDRESS:	

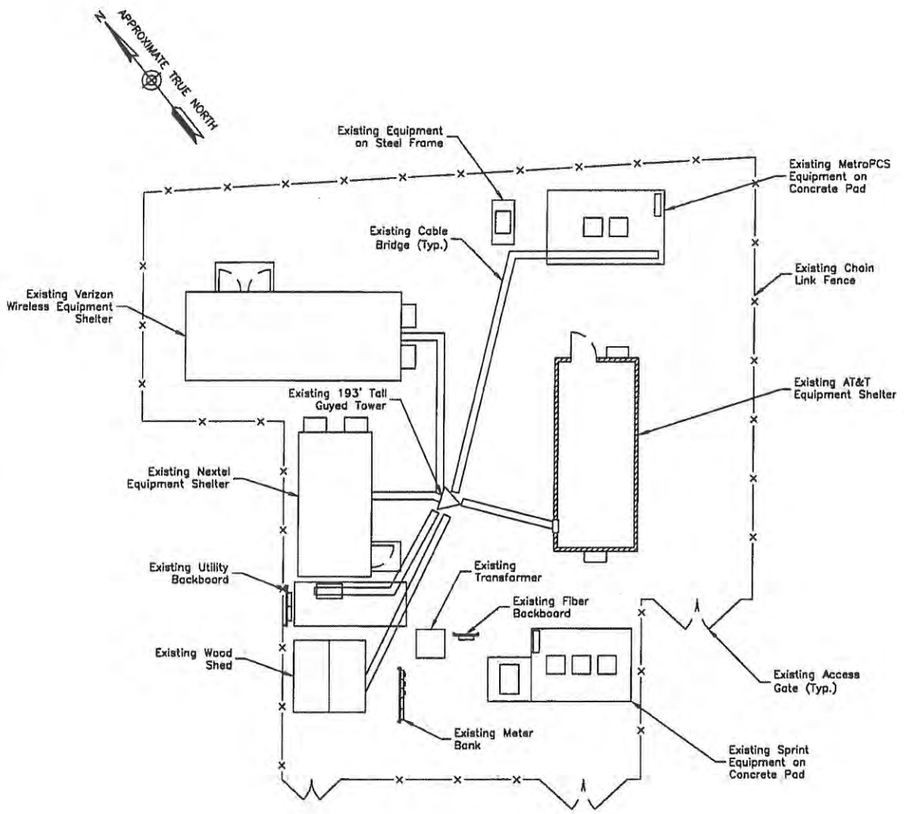
57 COOK DRIVE
UNCASVILLE, CT 06382
NEW LONDON COUNTY

SHEET TITLE

GENERAL NOTES

SHEET NUMBER

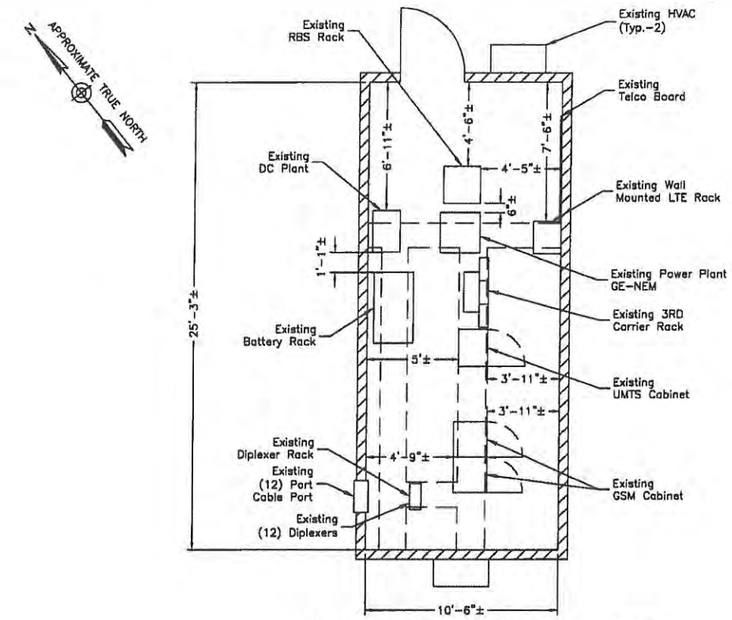
G-1



SITE PLAN (1)

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

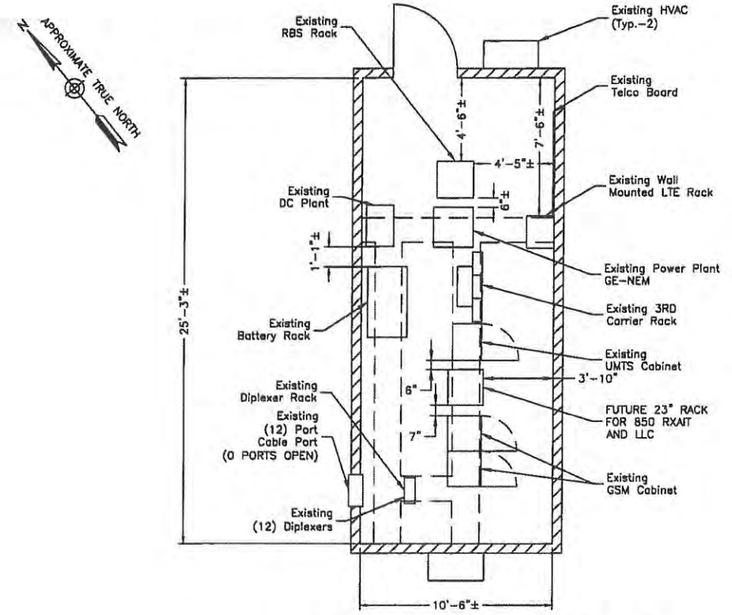
0' 10' 20'



EXISTING EQUIPMENT PLAN (2)

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

0' 4' 8'



PROPOSED EQUIPMENT PLAN (3)

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

0' 4' 8'

NOTES:

1. NORTH SHOWN AS APPROXIMATE.
2. MOUNT ALL ANTENNAS COAX SURGE ARRESTORS, RRUS, ETC. IN ACCORDANCE WITH STRUCTURAL ANALYSIS.
3. NOT ALL INFORMATION IS SHOWN FOR CLARITY.

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JIANG YU
No. 22222
PROFESSIONAL ENGINEER
JIANG YU
CT LICENSE No. PEN.0023222

DRAWN BY:	JC
REVIEWED BY:	PD
CHECKED BY:	GHN
PROJECT NUMBER:	50063024
JOB NUMBER:	50063038
SITE ADDRESS:	

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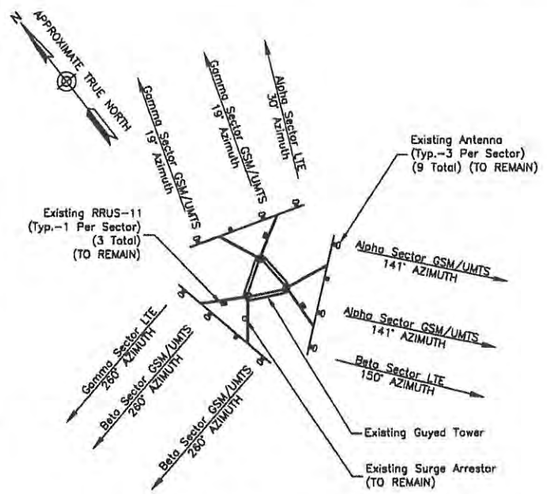
SHEET TITLE

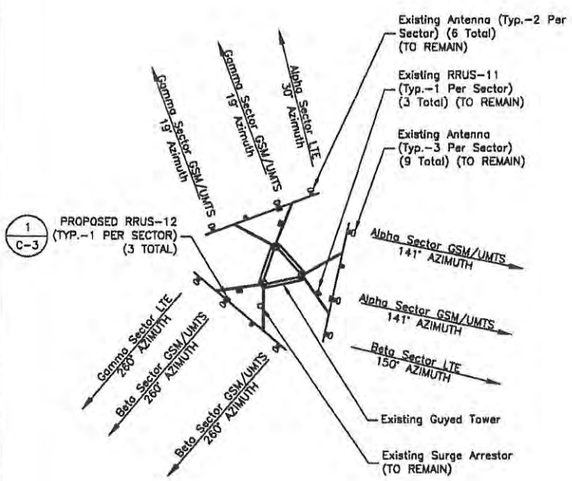
SITE PLAN &
EQUIPMENT PLANS

SHEET NUMBER

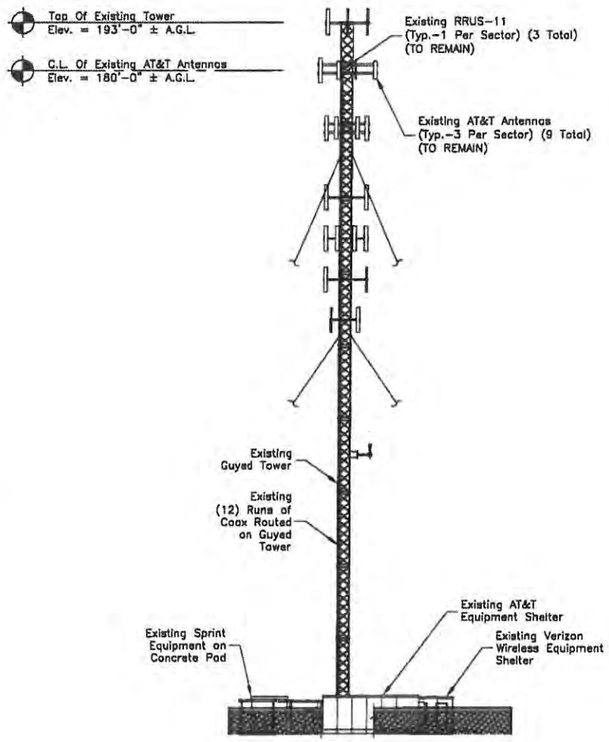
C-1



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

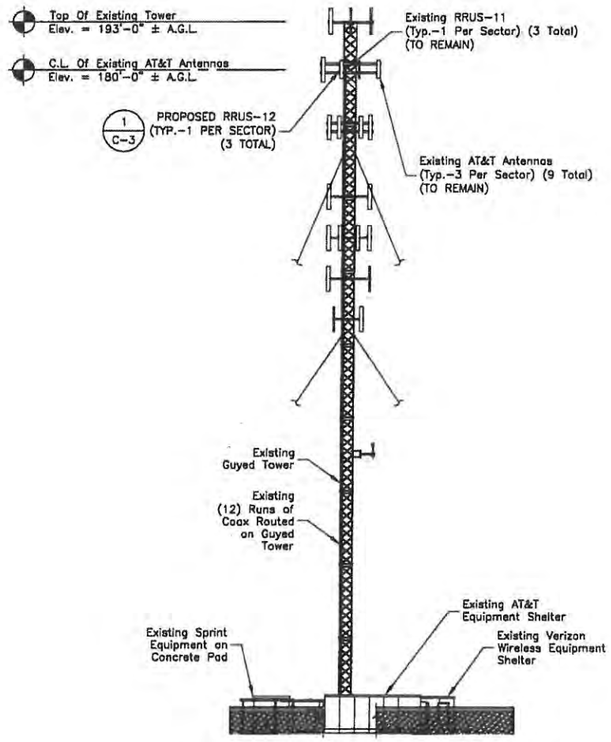


PROPOSED ANTENNA LAYOUT (2)
SCALE: N.T.S.



EXISTING SOUTHWEST ELEVATION (3)
SCALE: 1"=40' FOR 11"x17"
1"=20' FOR 22"x34"

0' 20' 40'



PROPOSED SOUTHWEST ELEVATION (4)
SCALE: 1"=40' FOR 11"x17"
1"=20' FOR 22"x34"

0' 20' 40'

NOTES:

1. PRIOR TO START OF ANY WORK, A PASSING STRUCTURAL ANALYSIS SHALL BE PROVIDED BY A CONNECTICUT LICENSED P.E. CONTRACTOR TO OBTAIN A COPY BEFORE STARTING ANY WORK.
2. ALL ANTENNAS, COAX, SURGE ARRESTORS, RRUS, ETC TO BE INSTALLED IN ACCORDANCE WITH STRUCTURAL ANALYSIS AND FINAL AT&T RF DATA SHEET.

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JIANG YU
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CHECKED BY:	GHN
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JOB NUMBER:	50063038
SITE ADDRESS:	

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SHEET TITLE

ANTENNA LAYOUTS
& ELEVATIONS

SHEET NUMBER

C-2

EXISTING ANTENNA SCHEDULE

SECTOR	MAKE	MODEL#	SIZE (INCHES)
ALPHA:	POWERWAVE	7770	55x11x5
	ANDREWS	SBNH1D6565C	96.42x11.85x7.1
	POWERWAVE	7770	55x11x5
BETA:	POWERWAVE	7770	55x11x5
	KMW	AM-X-CD-16-65	96x11.8x5.9
	POWERWAVE	7770	55x11x5
GAMMA:	POWERWAVE	7770	55x11x5
	KMW	AM-X-CD-16-65	96x11.8x5.9
	POWERWAVE	7770	55x11x5

PROPOSED ANTENNA SCHEDULE

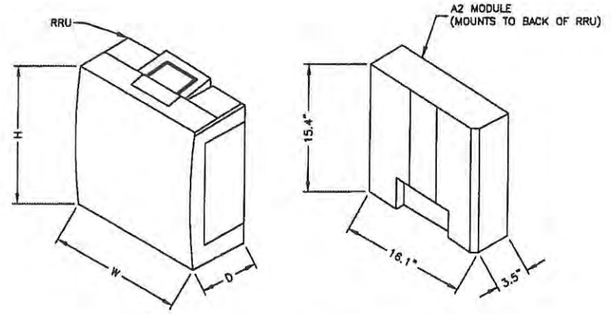
SECTOR	MAKE	MODEL#	SIZE (INCHES)
ALPHA:	POWERWAVE	7770	55x11x5
	ANDREWS	SBNH1D6565C	96.42x11.85x7.1
	POWERWAVE	7770	55x11x5
BETA:	POWERWAVE	7770	55x11x5
	KMW	AM-X-CD-16-65	96x11.8x5.9
	POWERWAVE	7770	55x11x5
GAMMA:	POWERWAVE	7770	55x11x5
	KMW	AM-X-CD-16-65	96x11.8x5.9
	POWERWAVE	7770	55x11x5

EXISTING RRUS SCHEDULE

SECTOR	MAKE	MODEL#	SIZE (INCHES)
ALPHA:	ERICSSON	RRUS-11	19.7x17.0x7.2
BETA:	ERICSSON	RRUS-11	19.7x17.0x7.2
GAMMA:	ERICSSON	RRUS-11	19.7x17.0x7.2

PROPOSED RRUS SCHEDULE

SECTOR	MAKE	MODEL#	SIZE (INCHES)
ALPHA:	ERICSSON	RRUS-11	19.7x17.0x7.2
	ERICSSON	RRUS-12	20.4x18.8x7.5
BETA:	ERICSSON	RRUS-11	19.7x17.0x7.2
	ERICSSON	RRUS-12	20.4x18.8x7.5
GAMMA:	ERICSSON	RRUS-11	19.7x17.0x7.2
	ERICSSON	RRUS-12	20.4x18.8x7.5



RRU MODEL & DIMENSIONS

ERICSSON MODEL #	DIMENSIONS (HxWxD)
RRUS-11	19.7"x17.0"x7.2"
RRUS-12	20.4"x18.8"x7.5"
RRUS-E2	20.4"x18.8"x7.5"
RRUS-32	29.9"x13.3"x9.5"

RRU NOTES:

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

RRU & A2 MODULE (1)
SCALE: N.T.S.

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No. 23222
REGISTERED
PROFESSIONAL ENGINEER

JIANG YU
CT LICENSE No. PEN.0023222

DRAWN BY:	JC
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CHECKED BY:	GHN
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JOB NUMBER:	50063038
SITE ADDRESS:	

57 COOK DRIVE
UNCASVILLE, CT 06382
NEW LONDON COUNTY

SHEET TITLE

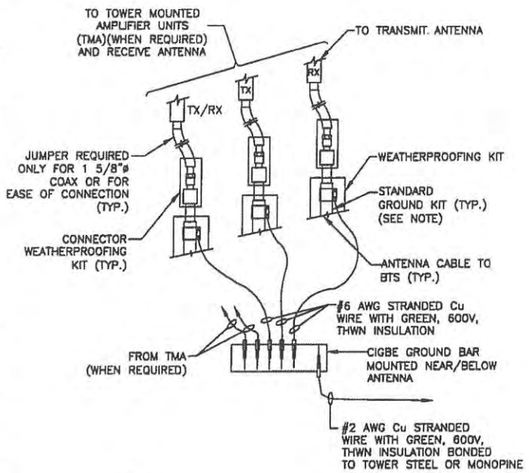
ANTENNA SCHEDULE &
CONSTRUCTION DETAILS

SHEET NUMBER

C-3

GROUNDING NOTES:

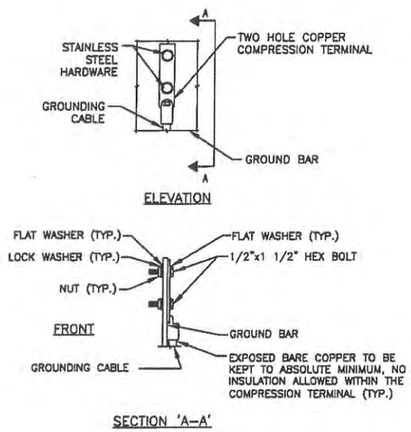
1. THE CONTRACTOR SHALL REVIEW AND INSPECT THE EXISTING FACILITY GROUNDING SYSTEM AND LIGHTNING PROTECTION SYSTEM (AS DESIGNED AND INSTALLED) FOR STRICT COMPLIANCE WITH THE NEC (AS ADOPTED BY THE AHJ). THE SITE-SPECIFIC (UL, LPI, OR NFPA) LIGHTING PROTECTION CODE, AND GENERAL COMPLIANCE WITH TELCORDIA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



NOTE:

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

CONNECTION OF GROUND WIRES TO GROUNDING BAR (CIGBE) 1

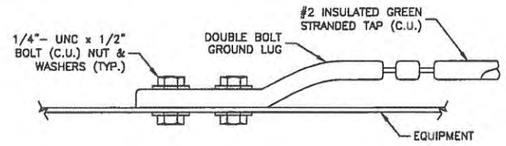


NOTES:

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

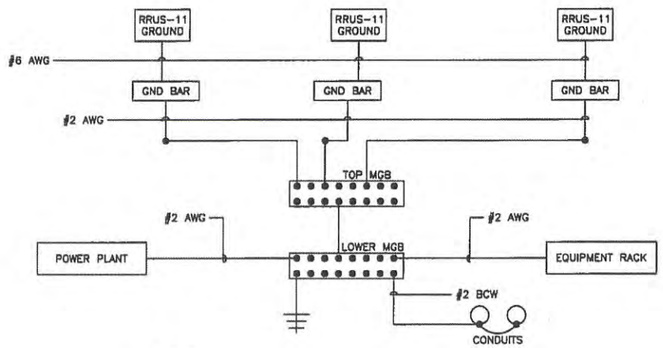
TYPICAL GROUND BAR MECHANICAL CONNECTION DETAIL 2

SCALE: N.T.S.



CONNECTION TO EQUIPMENT DETAIL 3

SCALE: N.T.S.



NOTES:

1. BOND ANTENNA GROUNDING KIT CABLE TO TOP CIGBE
2. BOND ANTENNA GROUNDING KIT CABLE TO BOTTOM CIGBE.
3. SCHEMATIC GROUNDING DIAGRAM IS TYPICAL FOR EACH SECTOR.
4. GROUND ALL EQUIPMENT PER MANUFACTURER RECOMMENDATIONS.

SCHEMATIC GROUNDING DIAGRAM 4

SCALE: N.T.S.

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57 COOK DRIVE
UNCASVILLE, CT 06382
NEW LONDON COUNTY

SHEET TITLE

GROUNDING DETAILS

SHEET NUMBER

E-1

TAB 2

Power Density Calculations

Control Number	Site	Carrier	#Channels	ERP/Ch	Ant Ht	Power Density (mW/cm2)	MHz	S	%MPE	Site Total
EM-CING-086-130130	Montville - 57 Cook Drive	AT&T UMTS	2	565	180	0.0125	880	0.5867	2.14%	
EM-CING-086-130130	Montville - 57 Cook Drive	AT&T UMTS	2	875	180	0.0194	1900	1.0000	1.94%	
EM-CING-086-130130	Montville - 57 Cook Drive	AT&T GSM	1	283	180	0.0031	880	0.5867	0.54%	
EM-CING-086-130130	Montville - 57 Cook Drive	AT&T GSM	4	525	180	0.0233	1900	1.0000	2.33%	
EM-CING-086-130130	Montville - 57 Cook Drive	AT&T LTE	1	1615	180	0.0179	734	0.4893	3.66%	
TS-Clearwire-086-101203	Montville - 57 Cook Street	Clearwire	6	285.76	120	0.0428	2500	1.0000	4.28%	
EM-MetroPCS-086-090731	Montville - 57 Cook Street	MetroPCS	3	443.61	130	0.0283	2140	1.0000	2.83%	
EM-Nextel-086-060127	Montville - 57 Cook Street	Nextel	12	100	134	0.0240	851	0.5673	4.24%	
EM-VER-086-120410	Montville - 57 Cook Street	Verizon cellular	9	288	169	0.0326	869	0.5793	5.63%	
EM-VER-086-120410	Montville - 57 Cook Street	Verizon PCS	7	233	169	0.0205	1970	1.0000	2.05%	
EM-VER-086-120410	Montville - 57 Cook Street	Verizon AWS	1	583	169	0.0073	2145	1.0000	0.73%	
EM-VER-086-120410	Montville - 57 Cook Street	Verizon LTE	1	760	169	0.0096	698	0.4653	2.06%	
EM-Sprint-086-131011	Montville - 57 Cook Street	Sprint CDMA/LTE	4	693	151	0.0437	1900	1.0000	4.37%	
EM-Sprint-086-131011	Montville - 57 Cook Street	Sprint CDMA/LTE	1	390	151	0.0062	850	0.5667	1.09%	
EM-T-Mobile-086-080604	Montville - 57 Cook Street	T-Mobile	8	157	192	0.0123	1935	1.0000	1.23%	39.11%

TAB 3

(Revised)
STRUCTURAL ANALYSIS REPORT

For

CT2171
UNCASVILLE

57 COOK DRIVE
UNCASVILLE, CT 06382

Antennas Mounted to the Tower

Prepared for:

Pinnacle Wireless

at&t

500 ENTERPRISE DRIVE, SUITE 3A
ROCKY HILL, CT 06067

Dated: March 14, 2013

Prepared by:

Hudson Design Group LLC

1600 Osgood Street Building 20 North, Suite 3090
North Andover, MA 01845
Phone: (978) 557-5553
www.hudsondesigngroupllc.com

STATE OF CONNECTICUT
GI KAI WANG
No. 28220
LICENSED PROFESSIONAL ENGINEER
3/14/2013

SCOPE OF WORK:

Hudson Design Group LLC (HDG) has been authorized by AT&T to conduct a structural evaluation of the 193' guyed tower supporting the proposed AT&T antennas located at elevation 180' above the ground level.

This report represents this office's findings, conclusions and recommendations pertaining to the support of AT&T's existing and proposed antennas listed below.

Record drawings of the existing tower were not available for our use. The previous structural analysis report prepared by All-Points Technology Corporation, P.C., dated July 30, 2009 was available and obtained for our use. The previous structural analysis report prepared by Centek Engineering Inc., dated December 8, 2011 was also available and obtained for our use.

This office conducted an on-site visual survey and tower mapping on October 15, 2012 to record dimensional properties of the existing tower and its appurtenances. Attendees included Nick Bestor (HDG - Associate) and Jay Lee (HDG - Associate).

CONCLUSION SUMMARY:

HDG performed structural analysis of the existing tower with the following proposed modifications:

1. **Strengthen tower legs from El.140' to El.180'.**
2. **Add horizontals from El.100' to El.120' and from El.140' to El.180'.**
3. **Replace tower diagonals from El.140' to El.160'.**
4. **Replace torque arm at El.162.6'.**
5. **Replace existing 1/2"Ø A325 diagonal bolts with 5/8"Ø A490X bolts from El.20' to El.40'.**
6. **Replace existing 1/2"Ø A325 bottom girt bolts with 1/2"Ø A490X bolts from El.5' to El.20'.**

Based on our evaluation, we have determined that the existing tower and foundation with the proposed modifications **are in conformance** with the ANSI/TIA-222-F Standard for the loading considered under the criteria listed in this report. The tower structure is rated at **96.9%** - (Leg at Tower Section T9 from EL.20' to EL.40' Controlling).

Hudson Design Group LLC

APPURTENANCES CONFIGURATION:

Tenant	Appurtenances	Elev.	Mount
	(3) APX16DWV-16DWVS Antennas	192.7'	12' Boom Gate
	(3) TMAs	191.5'	12' Boom Gate
	20' Omni	188'	15' Boom Gate
	6' Omni	181'	15' Boom Gate
AT&T	(6) Powerwave 7770 Antennas	180'	15' Boom Gate
AT&T	(6) TT19-08BP111 TMAs	180'	15' Boom Gate
AT&T	***SBNH-1D6565C Antenna***	180'	15' Boom Gate
AT&T	***AM-X-CD-16-65-00 Antenna***	180'	15' Boom Gate
AT&T	***P65-17-XLH-RR Antenna***	180'	15' Boom Gate
AT&T	***(6) RRUs***	180'	15' Boom Gate
AT&T	***Surge Arrestor DC6-48-60-18-8F***	180'	Tower Leg
	(6) LPA-80080 Antennas	168'	15' T-Frame
	(3) BXA-171085 Antennas	168'	15' T-Frame
	(3) BXA-70063 Antennas	168'	15' T-Frame
	7' Dipole	154.5'	4' Side Mount Standoff
	(6) DB980H90E-M Antennas	151'	15' Boom Gate
	(12) DB844H90E-XY Antennas	142'	15' Boom Gate
	(6) Kathrein 800 10504 Antennas	130'	10' T-Frame
	(6) Kathrein 860 10025	130'	10' T-Frame
	10' Dipole	124'	4' Side Mount Standoff
	Junction Box	119'	Tower Leg
	(2) 20' Omni	117'	4' Side Mount Standoff
	(3) LLPX310R Antennas	116.3'	1' Side Mount Standoff
	(3) RRHs	114.5'	1' Side Mount Standoff
	6' Yagi	113'	Tower Leg
	GPS	105'	3' Side Mount Standoff

Proposed AT&T Appurtenances shown in Bold.

AT&T EXISTING/PROPOSED COAX CABLES:

Tenant	Coax Cables	Elev.	Mount
AT&T	(12) 1 1/4" Cables	180'	Face of Tower
AT&T	***Fiber Cable***	180'	Face of Tower
AT&T	***(2) DC Power Cables***	180'	Face of Tower

****Proposed AT&T Coax Cables shown in Bold.***

ANALYSIS RESULTS SUMMARY:

Component	Max. Stress Ratio	Elev. of Component (ft)	Pass/Fail	Comments
Legs	**96.9 %**	20 – 40	PASS	**Controlling**
Diagonals	81.3 %	20 – 40	PASS	
Horizontals	3.0 %	0 – 5	PASS	
Sec. Horizontals	41.0 %	160 – 180	PASS	
Top Girt	19.9 %	20 – 40	PASS	
Bottom Girt	46.8 %	160 – 180	PASS	
Guy	92.7 %	162.6	PASS	
Torque Arm	87.3 %	162.6	PASS	
Bolts	79.6 %	162.6	PASS	

DESIGN CRITERIA:

1. EIA/TIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures

   City/Town: Montville
   County: New London
   Wind Load: 95 mph (fastest mile)
   115 mph (3 second gust)
   Nominal Ice Thickness: 1/2 inch

2. Approximate height above grade to proposed antennas: 180'

***Calculations and referenced documents are attached.**

ASSUMPTIONS:

1. Material strength of the existing structure was not available for structural analysis, and was assumed as follows:

   Tower Legs (Pipes): Fy=50 ksi
   Tower Diagonals (Pipes): Fy=42 ksi
   Angles and Channels: Fy=36 ksi

2. The appurtenances configuration is as stated in this report. All antennas, coax cables and waveguide cables are assumed to be properly installed and supported as per the manufacturer requirements.

3. The tower and foundation are properly constructed and maintained. All structural members and their connections are assumed to be in good condition and are free from defects with no deterioration to its member capacities.

4. The support mounts and platforms are not analyzed and are considered adequate to support the loading. The analysis is limited to the primary support structure itself.

5. All prior structural modification, if any, are assumed to be as per the data supplied (if available), and installed properly.

SUPPORT RECOMMENDATIONS:

HDG recommends that the proposed antennas and RRHs be mounted on the existing steel frames supported by the tower; the proposed surge arrestor be mounted on the tower leg.

Reference HDG's Latest Construction Drawings for all component and connection requirements (attached).

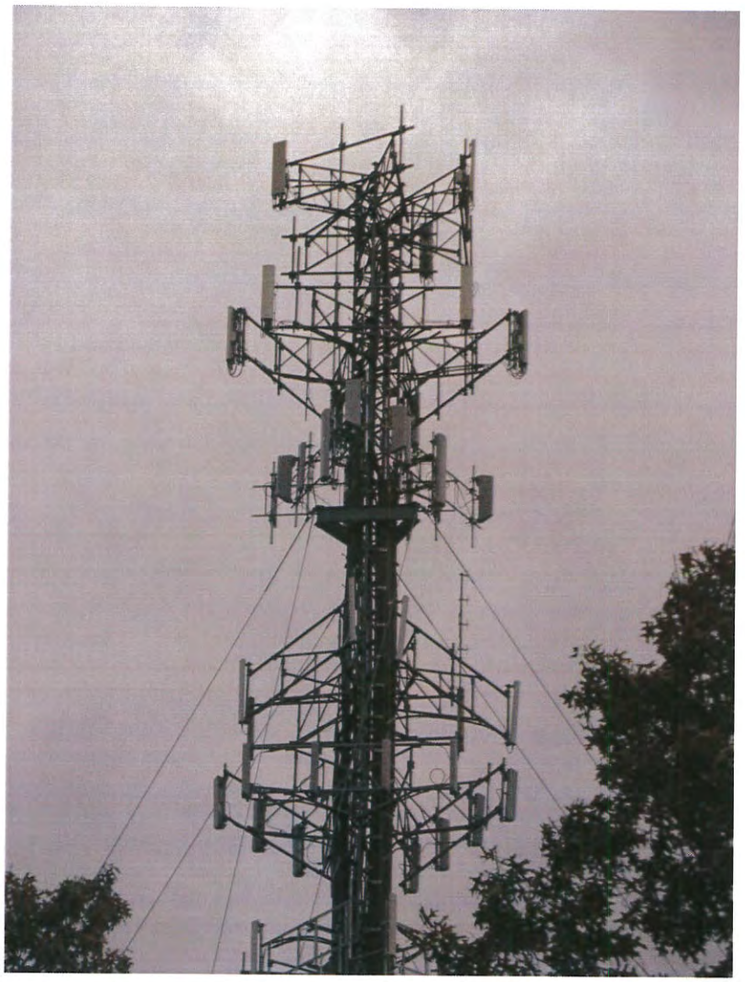
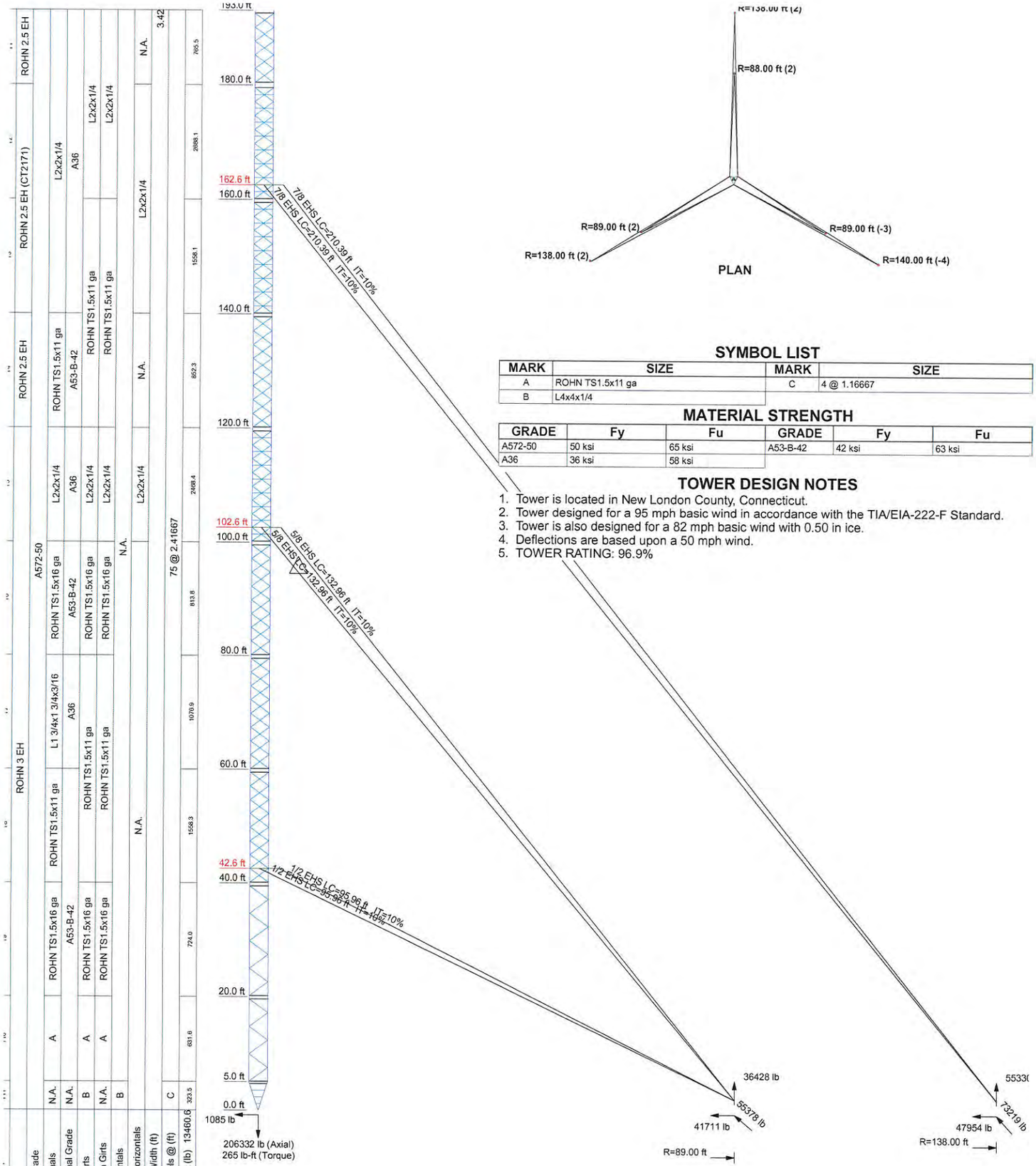


Photo 1: Photo illustrating the Tower with Appurtenances shown.

Hudson Design Group LLC

CALCULATIONS



SYMBOL LIST

MARK	SIZE	MARK	SIZE
A	ROHN TS1.5x11 ga	C	4 @ 1.16667
B	L4x4x1/4		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-50	50 ksi	65 ksi	A53-B-42	42 ksi	63 ksi
A36	36 ksi	58 ksi			

TOWER DESIGN NOTES

1. Tower is located in New London County, Connecticut.
2. Tower designed for a 95 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 82 mph basic wind with 0.50 in ice.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 96.9%

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Phone: (978) 557-5553
FAX: (978) 226-5586

Job: *CT 2171 Modifications Uncasville, CT*		
Project: *193 ft Guyed Tower*		
Client: AT&T	Drawn by: kw	App'd:
Code: TIA/EIA-222-F	Date: 03/14/13	Scale: N
Path:		Dwg No.

tnxTower

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Phone: (978) 557-5553
FAX: (978) 226-5586

Job	Page
CT 2171 Modifications Uncasville, CT	1 of 28
Project	**Date**
193 ft Guyed Tower	09:47:36 03/14/13
Client	**Designed by**
AT&T	kw

Tower Input Data

The main tower is a 3x guyed tower with an overall height of 193.00 ft above the ground line.
The base of the tower is set at an elevation of 0.00 ft above the ground line.
The face width of the tower is 3.42 ft at the top and tapered at the base.
This tower is designed using the TIA/EIA-222-F standard.
The following design criteria apply:

Tower is located in New London County, Connecticut.
Basic wind speed of 95 mph.
Nominal ice thickness of 0.5000 in.
Ice density of 56 pcf.
A wind speed of 82 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 50 mph.
Pressures are calculated at each section.
Safety factor used in guy design is 2.
Stress ratio used in tower member design is 1.333.
Local bending stresses due to climbing loads, feedline supports, and appurtenance mounts are not considered.

Tower Section Geometry

Tower Section	*Tower Elevation*	*Assembly Database*	*Description*	*Section Width*	*Number of Sections*	*Section Length*
	ft			*ft*		*ft*
T1	193.00-180.00			3.42	1	13.00
T2	180.00-160.00			3.42	1	20.00
T3	160.00-140.00			3.42	1	20.00
T4	140.00-120.00			3.42	1	20.00
T5	120.00-100.00			3.42	1	20.00
T6	100.00-80.00			3.42	1	20.00
T7	80.00-60.00			3.42	1	20.00
T8	60.00-40.00			3.42	1	20.00
T9	40.00-20.00			3.42	1	20.00
T10	20.00-5.00			3.42	1	15.00
T11	5.00-0.00			3.42	1	5.00

Tower Section Geometry *(cont'd)*

Tower Section	*Tower Elevation*	*Diagonal Spacing*	*Bracing Type*	*Has K Brace End Panels*	*Has Horizontals*	*Top Girt Offset*	*Bottom Girt Offset*
	ft	*ft*				*in*	*in*
T1	193.00-180.00	2.42	X Brace	No	No	6.0000	5.0000
T2	180.00-160.00	2.42	X Brace	No	Yes	6.0000	2.0000
T3	160.00-140.00	2.42	X Brace	No	Yes	6.0000	2.0000
T4	140.00-120.00	2.42	CX Brace	No	No	6.0000	2.0000
T5	120.00-100.00	2.42	X Brace	No	Yes	6.0000	2.0000
T6	100.00-80.00	2.42	CX Brace	No	No	6.0000	2.0000
T7	80.00-60.00	2.42	X Brace	No	No	6.0000	2.0000

Tower Section	Tower Elevation ft	Diagonal Spacing ft	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset in	Bottom Girt Offset in
T8	60.00-40.00	2.42	CX Brace	No	No	6.0000	2.0000
T9	40.00-20.00	2.42	K Brace Left	No	No	6.0000	2.0000
T10	20.00-5.00	2.42	K Brace Left	No	No	5.0000	1.0000
T11	5.00-0.00	1.17	X Brace	No	Yes	4.0000	0.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 193.00-180.00	Pipe	ROHN 2.5 EH	A572-50 (50 ksi)	Equal Angle	L2x2x1/4	A36 (36 ksi)
T2 180.00-160.00	Pipe	ROHN 2.5 EH (CT2171)	A572-50 (50 ksi)	Equal Angle	L2x2x1/4	A36 (36 ksi)
T3 160.00-140.00	Pipe	ROHN 2.5 EH (CT2171)	A572-50 (50 ksi)	Equal Angle	L2x2x1/4	A36 (36 ksi)
T4 140.00-120.00	Pipe	ROHN 2.5 EH	A572-50 (50 ksi)	Pipe	ROHN TS1.5x11 ga	A53-B-42 (42 ksi)
T5 120.00-100.00	Pipe	ROHN 3 EH	A572-50 (50 ksi)	Equal Angle	L2x2x1/4	A36 (36 ksi)
T6 100.00-80.00	Pipe	ROHN 3 EH	A572-50 (50 ksi)	Pipe	ROHN TS1.5x16 ga	A53-B-42 (42 ksi)
T7 80.00-60.00	Pipe	ROHN 3 EH	A572-50 (50 ksi)	Equal Angle	L1 3/4x1 3/4x3/16	A36 (36 ksi)
T8 60.00-40.00	Pipe	ROHN 3 EH	A572-50 (50 ksi)	Pipe	ROHN TS1.5x11 ga	A53-B-42 (42 ksi)
T9 40.00-20.00	Pipe	ROHN 3 EH	A572-50 (50 ksi)	Pipe	ROHN TS1.5x16 ga	A53-B-42 (42 ksi)
T10 20.00-5.00	Pipe	ROHN 3 EH	A572-50 (50 ksi)	Pipe	ROHN TS1.5x11 ga	A53-B-42 (42 ksi)
T11 5.00-0.00	Pipe	ROHN 3 EH	A572-50 (50 ksi)	Equal Angle		A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Top Girt Type	Top Girt Size	Top Girt Grade	Bottom Girt Type	Bottom Girt Size	Bottom Girt Grade
T1 193.00-180.00	Equal Angle	L2x2x1/4	A36 (36 ksi)	Equal Angle	L2x2x1/4	A36 (36 ksi)
T2 180.00-160.00	Equal Angle	L2x2x1/4	A36 (36 ksi)	Equal Angle	L2x2x1/4	A36 (36 ksi)
T3 160.00-140.00	Pipe	ROHN TS1.5x11 ga	A53-B-42 (42 ksi)	Pipe	ROHN TS1.5x11 ga	A53-B-42 (42 ksi)
T4 140.00-120.00	Pipe	ROHN TS1.5x11 ga	A53-B-42 (42 ksi)	Pipe	ROHN TS1.5x11 ga	A53-B-42 (42 ksi)
T5 120.00-100.00	Equal Angle	L2x2x1/4	A36 (36 ksi)	Equal Angle	L2x2x1/4	A36 (36 ksi)
T6 100.00-80.00	Pipe	ROHN TS1.5x16 ga	A53-B-42 (42 ksi)	Pipe	ROHN TS1.5x16 ga	A53-B-42 (42 ksi)
T7 80.00-60.00	Pipe	ROHN TS1.5x11 ga	A53-B-42 (42 ksi)	Pipe	ROHN TS1.5x11 ga	A53-B-42 (42 ksi)
T8 60.00-40.00	Pipe	ROHN TS1.5x11 ga	A53-B-42	Pipe	ROHN TS1.5x11 ga	A53-B-42

Tower Elevation ft	Top Girt Type	Top Girt Size	Top Girt Grade	Bottom Girt Type	Bottom Girt Size	Bottom Girt Grade
T9 40.00-20.00	Pipe	ROHN TS1.5x16 ga	(42 ksi) A53-B-42 (42 ksi)	Pipe	ROHN TS1.5x16 ga	(42 ksi) A53-B-42 (42 ksi)
T10 20.00-5.00	Pipe	ROHN TS1.5x11 ga	(42 ksi) A53-B-42 (42 ksi)	Pipe	ROHN TS1.5x11 ga	(42 ksi) A53-B-42 (42 ksi)
T11 5.00-0.00	Equal Angle	L4x4x1/4	A36 (36 ksi)	Equal Angle	L4x4x1/4	A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	No. of Mid Girts	Mid Girt Type	Mid Girt Size	Mid Girt Grade	Horizontal Type	Horizontal Size	Horizontal Grade
T11 5.00-0.00	None	Solid Round		A572-50 (50 ksi)	Equal Angle	L4x4x1/4	A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Secondary Horizontal Type	Secondary Horizontal Size	Secondary Horizontal Grade	Inner Bracing Type	Inner Bracing Size	Inner Bracing Grade
T2 180.00-160.00	Equal Angle	L2x2x1/4	A36 (36 ksi)	Solid Round		A572-50 (50 ksi)
T3 160.00-140.00	Equal Angle	L2x2x1/4	A36 (36 ksi)	Solid Round		A572-50 (50 ksi)
T5 120.00-100.00	Equal Angle	L2x2x1/4	A36 (36 ksi)	Solid Round		A572-50 (50 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
T1 193.00-180.00	0.00	0.3750	A36 (36 ksi)	1	1	1	Mid-Pt	36.0000
T2 180.00-160.00	0.00	0.3750	A36 (36 ksi)	1	1	1	Mid-Pt	36.0000
T3 160.00-140.00	0.00	0.3750	A36 (36 ksi)	1	1	1	Mid-Pt	36.0000
T4 140.00-120.00	0.00	0.3750	A36 (36 ksi)	1	1	1	Mid-Pt	36.0000
T5 120.00-100.00	0.00	0.3750	A36 (36 ksi)	1	1	1	Mid-Pt	36.0000
T6 100.00-80.00	0.00	0.3750	A36 (36 ksi)	1	1	1	Mid-Pt	36.0000
T7 80.00-60.00	0.00	0.3750	A36 (36 ksi)	1	1	1	Mid-Pt	36.0000

Tower Elevation	Gusset Area (per face)	Gusset Thickness	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals	Double Angle Stitch Bolt Spacing Horizontals
ft	ft^2	in					in	in
T8 60.00-40.00	0.00	0.3750	A36 (36 ksi)	1	1	1	Mid-Pt	36.0000
T9 40.00-20.00	0.00	0.3750	A36 (36 ksi)	1	1	1	Mid-Pt	36.0000
T10 20.00-5.00	0.00	0.3750	A36 (36 ksi)	1	1	1	Mid-Pt	36.0000
T11 5.00-0.00	0.00	0.3750	A36 (36 ksi)	1	1	1	Mid-Pt	36.0000

Tower Section Geometry *(cont'd)*

Tower Elevation	Calc K Single Angles	Calc K Solid Rounds	K Factors[1] Legs	X Brace Diags X	X Brace Diags Y	K Brace Diags X	K Brace Diags Y	Single Diags X	Single Diags Y	Girts X	Girts Y	Horiz. X	Horiz. Y	Sec. Horiz. X	Sec. Horiz. Y	Inner Brace X	Inner Brace Y
ft																	
T1 193.00-180.00	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
T2 180.00-160.00	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
T3 160.00-140.00	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
T4 140.00-120.00	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
T5 120.00-100.00	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
T6 100.00-80.00	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
T7 80.00-60.00	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
T8 60.00-40.00	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
T9 40.00-20.00	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
T10 20.00-5.00	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
T11 5.00-0.00	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

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

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U
T1 193.00-180.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T2 180.00-160.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T3 160.00-140.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T4 140.00-120.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T5 120.00-100.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T6 100.00-80.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T7 80.00-60.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T8 60.00-40.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T9 40.00-20.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T10 20.00-5.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T11 5.00-0.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Connection Type	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
		Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.
T1 193.00-180.00	Flange	0.7500 A325N	4	0.6250 A325N	2	0.6250 A325N	2	0.6250 A325N	2	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	0
T2 180.00-160.00	Flange	0.7500 A325N	4	0.6250 A325N	2	0.6250 A325N	2	0.6250 A325N	2	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	0
T3 160.00-140.00	Flange	0.7500 A325N	4	0.6250 A325X	1	0.5000 A325N	1	0.5000 A325N	1	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	0
T4 140.00-120.00	Flange	0.7500 A325N	4	0.5000 A325N	1	0.5000 A325N	1	0.5000 A325N	1	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	0
T5 120.00-100.00	Flange	0.7500 A325N	4	0.6250 A325N	2	0.6250 A325N	2	0.6250 A325N	2	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	0
T6 100.00-80.00	Flange	0.7500 A325N	4	0.5000 A490X	1	0.5000 A325N	1	0.5000 A325N	1	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	0
T7 80.00-60.00	Flange	0.7500 A325N	4	0.6250 A325X	1	0.5000 A325N	1	0.5000 A325N	1	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	0
T8 60.00-40.00	Flange	0.7500 A325N	4	0.5000 A325X	1	0.5000 A325N	1	0.5000 A325N	1	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	0
T9 40.00-20.00	Flange	0.7500 A325N	4	0.6250 A490X	1	0.5000 A325N	1	0.5000 A325N	1	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	0
T10 20.00-5.00	Flange	0.7500 A325N	4	0.5000 A490X	1	0.5000 A325N	1	0.5000 A490X	1	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	0
T11 5.00-0.00	Flange	0.7500 A325N	4	0.5000 A325N	0	0.5000 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	0

Guy Data

Guy Elevation ft	Guy Grade		Guy Size	Initial Tension lb	%	Guy Modulus ksi	Guy Weight plf	L_u ft	Anchor Radius ft	Anchor Azimuth Adj. °	Anchor Elevation ft	End Fitting Efficiency %
162.583	EHS	A	7/8	7970.00	10%	19000	1.581	210.20	138.00	0.0000	2.00	100%
		B	7/8	7970.00	10%	19000	1.581	216.08	140.00	0.0000	-4.00	100%
		C	7/8	7970.00	10%	19000	1.581	210.20	138.00	0.0000	2.00	100%
102.583	EHS	A	5/8	4240.00	10%	21000	0.813	132.20	88.00	0.0000	2.00	100%
		B	5/8	4240.00	10%	21000	0.813	136.67	89.00	0.0000	-3.00	100%
		C	5/8	4240.00	10%	21000	0.813	132.85	89.00	0.0000	2.00	100%
42.5833	EHS	A	1/2	2690.00	10%	21000	0.517	94.98	88.00	0.0000	2.00	100%
		B	1/2	2690.00	10%	21000	0.517	98.10	89.00	0.0000	-3.00	100%
		C	1/2	2690.00	10%	21000	0.517	95.88	89.00	0.0000	2.00	100%

Guy Data(cont'd)

Guy Elevation ft	Mount Type	Torque-Arm Spread ft	Torque-Arm Leg Angle °	Torque-Arm Style	Torque-Arm Grade	Torque-Arm Type	Torque-Arm Size
162.583	Torque Arm	7.33	0.0000	Channel	A36 (36 ksi)	Channel	C15x50
102.583	Torque Arm	7.33	0.0000	Channel	A36 (36 ksi)	Channel	C15x40
42.5833	Torque Arm	7.33	0.0000	Channel	A36 (36 ksi)	Channel	C12x25

Guy Data (cont'd)

Guy Elevation ft	Diagonal Grade	Diagonal Type	Upper Diagonal Size	Lower Diagonal Size	Is Strap.	Pull-Off Grade	Pull-Off Type	Pull-Off Size
162.58	A572-50 (50 ksi)	Solid Round				A36 (36 ksi)	Flat Bar	
102.58	A572-50 (50 ksi)	Solid Round				A36 (36 ksi)	Flat Bar	
42.58	A572-50 (50 ksi)	Solid Round				A36 (36 ksi)	Flat Bar	

Guy Data (cont'd)

Guy Elevation ft	Cable Weight A lb	Cable Weight B lb	Cable Weight C lb	Cable Weight D lb	Tower Intercept A ft	Tower Intercept B ft	Tower Intercept C ft	Tower Intercept D ft
162.583	332.33	341.63	332.33		4.32 3.6 sec/pulse	4.56 3.7 sec/pulse	4.32 3.6 sec/pulse	
102.583	107.48	111.11	108.01		1.66 2.2 sec/pulse	1.77 2.3 sec/pulse	1.68 2.2 sec/pulse	
42.5833	49.10	50.72	49.57		0.86 1.6 sec/pulse	0.92 1.7 sec/pulse	0.88 1.6 sec/pulse	

Guy Data *(cont'd)*

Guy Elevation ft	Calc K Single Angles	Calc K Solid Rounds	Torque Arm K_x	Torque Arm K_y	Pull Off K_x	Pull Off K_y	Diagonal K_x	Diagonal K_y
162.583	No	No	1	1	1	1	1	1
102.583	No	No	1	1	1	1	1	1
42.5833	No	No	1	1	1	1	1	1

Guy Data *(cont'd)*

Guy Elevation ft	Torque-Arm Bolt Size in	Torque-Arm Number	Torque-Arm Net Width Deduct in	Torque-Arm U	Pull Off Bolt Size in	Pull Off Number	Pull Off Net Width Deduct in	Pull Off U	Diagonal Bolt Size in	Diagonal Number	Diagonal Net Width Deduct in	Diagonal U
162.583	0.0000 A325N	0	0.0000	1	0.6250 A325N	0	0.0000	0.75	0.6250 A325N	0	0.0000	0.75
102.583	0.0000 A325N	0	0.0000	1	0.6250 A325N	0	0.0000	0.75	0.6250 A325N	0	0.0000	0.75
42.5833	0.0000 A325N	0	0.0000	1	0.6250 A325N	0	0.0000	0.75	0.6250 A325N	0	0.0000	0.75

Guy Pressures

Guy Elevation ft	Guy Location	z ft	q_z psf	q_z Ice psf	Ice Thickness in
162.583	A	82.29	30	22	0.5000
	B	79.29	30	22	0.5000
	C	82.29	30	22	0.5000
102.583	A	52.29	26	20	0.5000
	B	49.79	26	19	0.5000
	C	52.29	26	20	0.5000
42.5833	A	22.29	23	17	0.5000
	B	19.79	23	17	0.5000
	C	22.29	23	17	0.5000

Guy-Tensioning Information

Guy Elevation ft		H ft	V ft	Temperature At Time Of Tensioning: 0 F Initial Tension lb	0 F Intercept ft	20 F Initial Tension lb	20 F Intercept ft	40 F Initial Tension lb	40 F Intercept ft	60 F Initial Tension lb	60 F Intercept ft	80 F Initial Tension lb	80 F Intercept ft	100 F Initial Tension lb	100 F Intercept ft	120 F Initial Tension lb	120 F Intercept ft
162.583	A	135.93	160.58	9325	3.70	8870	3.89	8418	4.09	7970	4.32	7526	4.57	7088	4.85	6656	5.16
	B	137.93	166.58	9288	3.92	8845	4.11	8406	4.33	7970	4.56	7538	4.82	7112	5.10	6692	5.42
	C	135.93	160.58	9325	3.70	8870	3.89	8418	4.09	7970	4.32	7526	4.57	7088	4.85	6656	5.16
102.583	A	85.96	100.58	5040	1.40	4772	1.48	4506	1.56	4240	1.66	3976	1.77	3713	1.89	3453	2.04
	B	86.96	105.58	5005	1.50	4749	1.59	4494	1.67	4240	1.77	3987	1.89	3736	2.01	3486	2.15
	C	86.96	100.58	5050	1.41	4779	1.49	4509	1.58	4240	1.68	3972	1.79	3707	1.92	3443	2.06
42.5833	A	85.96	40.58	3678	0.63	3347	0.70	3017	0.77	2690	0.86	2366	0.98	2046	1.14	1734	1.34
	B	86.96	45.58	3637	0.68	3320	0.75	3004	0.83	2690	0.92	2379	1.04	2072	1.19	1773	1.40
	C	86.96	40.58	3681	0.64	3349	0.71	3019	0.79	2690	0.88	2365	1.00	2044	1.16	1731	1.37

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number	Number Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
1 5/8	C	Yes	Ar (CaAa)	192.00 - 8.00	6	3	0.0000	1.9800		1.04
3/8	C	Yes	Ar (CaAa)	192.00 - 8.00	1	1	0.0000	0.5000		0.25
7/8	A	Yes	Ar (CaAa)	178.00 - 8.00	1	1	0.0000	1.1100		0.54
7/8	C	Yes	Ar (CaAa)	178.00 - 8.00	1	1	0.0000	1.1100		0.54
1 1/4 (AT&T - Existing)	A	Yes	Ar (CaAa)	180.00 - 8.00	12	12	0.0000	1.5500		0.66
1 5/8	C	Yes	Ar (CaAa)	168.00 - 8.00	18	12	0.0000	1.9800		1.04
1 5/8	A	Yes	Ar (CaAa)	151.00 - 8.00	6	6	0.0000	1.9800		1.04
1 5/8	A	Yes	Ar (CaAa)	151.00 - 8.00	1	1	0.0000	1.9800		1.04
1 1/4	B	Yes	Ar (CaAa)	141.00 - 8.00	12	12	0.0000	1.5500		0.66
1 5/8	B	Yes	Ar (CaAa)	129.00 - 8.00	6	6	0.0000	1.9800		1.04
1 5/8	B	Yes	Ar (CaAa)	129.00 - 8.00	6	6	0.0000	1.9800		1.04
1 1/4	A	Yes	Ar (CaAa)	120.00 - 8.00	1	1	0.0000	1.5500		0.66
3" conduit	C	Yes	Ar (CaAa)	115.00 - 8.00	1	1	0.0000	3.5000		3.00
1 1/4	A	Yes	Ar (CaAa)	107.00 - 8.00	1	1	0.0000	1.5500		0.66
7/8	A	Yes	Ar (CaAa)	108.00 - 8.00	1	1	0.0000	1.1100		0.54
7/8	A	Yes	Ar (CaAa)	104.00 - 8.00	1	1	0.0000	1.1100		0.54
7/8	A	Yes	Ar (CaAa)	108.00 - 8.00	1	1	0.0000	1.1100		0.54
**********										
FB-L98B-002 (AT&T - proposed)	A	Yes	Ar (CaAa)	180.00 - 8.00	1	1	0.0000	0.4000		0.25
WR-VG122ST-BRDA (AT&T - proposed)	A	Yes	Ar (CaAa)	180.00 - 8.00	2	2	0.0000	0.4000		0.25

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
Rohn 6'x12' Boom Gate (3)	A	None		0.0000	192.00	No Ice	49.80	49.80	1680.00
						1/2" Ice	59.30	59.30	2100.00
APX16DWV-16DWVS w/mount pipe	A	From Leg	5.00 0.00 0.00	0.0000	192.70	No Ice 1/2" Ice	10.00 10.59	6.39 7.30	40.40 110.14
APX16DWV-16DWVS w/mount pipe	B	From Leg	5.00 0.00 0.00	0.0000	192.70	No Ice 1/2" Ice	10.00 10.59	6.39 7.30	40.40 110.14
APX16DWV-16DWVS w/mount pipe	C	From Leg	5.00 0.00 0.00	0.0000	192.70	No Ice 1/2" Ice	10.00 10.59	6.39 7.30	40.40 110.14
Gen. TMA	A	From Leg	5.00 0.00 0.00	0.0000	191.50	No Ice 1/2" Ice	0.68 0.80	0.45 0.56	13.20 18.38
Gen. TMA	B	From Leg	5.00 0.00 0.00	0.0000	191.50	No Ice 1/2" Ice	0.68 0.80	0.45 0.56	13.20 18.38
Gen. TMA	C	From Leg	5.00 0.00 0.00	0.0000	191.50	No Ice 1/2" Ice	0.68 0.80	0.45 0.56	13.20 18.38

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
**********									
Omni 3"x20'	C	From Leg	5.00 0.00 0.00	0.0000	188.00	No Ice 1/2" Ice	6.00 8.03	6.00 8.03	50.00 93.17
Omni 3"x6'	B	From Leg	5.00 0.00 0.00	0.0000	181.00	No Ice 1/2" Ice	1.77 2.13	1.77 2.13	20.00 33.24
**********									
Rohn 6'x15' Boom Gate (3) (AT&T - Existing)	A	None		0.0000	179.00	No Ice 1/2" Ice	53.20 63.30	53.20 63.30	1790.00 2230.00
(2) Powerwave 7770 w/mount pipe (AT&T - Existing)	A	From Leg	5.00 0.00 0.00	0.0000	180.00	No Ice 1/2" Ice	6.02 6.47	4.10 4.75	57.25 101.14
(2) Powerwave 7770 w/mount pipe (AT&T - Existing)	B	From Leg	5.00 0.00 0.00	0.0000	180.00	No Ice 1/2" Ice	6.02 6.47	4.10 4.75	57.25 101.14
(2) Powerwave 7770 w/mount pipe (AT&T - Existing)	C	From Leg	5.00 0.00 0.00	0.0000	180.00	No Ice 1/2" Ice	6.02 6.47	4.10 4.75	57.25 101.14
(2) Powerwave TT19-08BP111-001 (AT&T - Existing)	A	From Leg	5.00 0.00 0.00	0.0000	180.00	No Ice 1/2" Ice	0.64 0.76	0.52 0.62	16.00 21.80
(2) Powerwave TT19-08BP111-001 (AT&T - Existing)	B	From Leg	5.00 0.00 0.00	0.0000	180.00	No Ice 1/2" Ice	0.64 0.76	0.52 0.62	16.00 21.80
(2) Powerwave TT19-08BP111-001 (AT&T - Existing)	C	From Leg	5.00 0.00 0.00	0.0000	180.00	No Ice 1/2" Ice	0.64 0.76	0.52 0.62	16.00 21.80
**********									
SBNH-1D6565C w/mount pipe (AT&T - Proposed)	A	From Leg	5.00 0.00 0.00	0.0000	180.00	No Ice 1/2" Ice	11.69 12.40	10.29 11.81	113.11 203.89
KMW AM-X-CD-16-65-00T-RET w/mount pipe (AT&T - Proposed)	B	From Leg	5.00 0.00 0.00	0.0000	180.00	No Ice 1/2" Ice	8.50 9.15	6.30 7.48	74.05 136.21
Powerwave P65-17-XLH-RR w/mount pipe (AT&T - Proposed)	C	From Leg	5.00 0.00 0.00	0.0000	180.00	No Ice 1/2" Ice	11.75 12.47	9.39 10.90	122.11 209.23
(2) Ericsson RRU (AT&T - Proposed)	A	From Leg	4.00 0.00 0.00	0.0000	180.00	No Ice 1/2" Ice	2.07 2.26	1.08 1.23	44.00 58.64
(2) Ericsson RRU (AT&T - Proposed)	B	From Leg	4.00 0.00 0.00	0.0000	180.00	No Ice 1/2" Ice	2.07 2.26	1.08 1.23	44.00 58.64
(2) Ericsson RRU (AT&T - Proposed)	C	From Leg	4.00 0.00 0.00	0.0000	180.00	No Ice 1/2" Ice	2.07 2.26	1.08 1.23	44.00 58.64
Surge Arrestor (DC6-48-60-18-8F) w/mount pipe (AT&T - Proposed)	A	From Leg	0.50 0.00 0.00	0.0000	180.00	No Ice 1/2" Ice	2.45 2.95	2.45 2.95	38.25 64.62
**********									
PiROD 15' T-Frame	A	From Leg	1.50 0.00 0.00	0.0000	168.00	No Ice 1/2" Ice	15.00 20.60	15.00 20.60	500.00 650.00
PiROD 15' T-Frame	B	From Leg	1.50	0.0000	168.00	No Ice	15.00	15.00	500.00

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
			0.00			1/2" Ice	20.60	20.60	650.00
			0.00						
PiROD 15' T-Frame	C	From Leg	1.50	0.0000	168.00	No Ice	15.00	15.00	500.00
			0.00			1/2" Ice	20.60	20.60	650.00
			0.00						
(2) LPA-80080-4CF w/mount pipe	A	From Leg	2.50	0.0000	168.00	No Ice	2.87	7.24	30.25
			0.00			1/2" Ice	3.24	7.95	74.63
			0.00						
BXA-171085-8BF-EDIN w/mount pipe	A	From Leg	2.50	0.0000	168.00	No Ice	3.17	3.34	28.75
			0.00			1/2" Ice	3.54	3.95	58.78
			0.00						
BXA-70063-6CF-EDIN w/mount pipe	A	From Leg	2.50	0.0000	168.00	No Ice	7.99	5.82	42.55
			0.00			1/2" Ice	8.64	6.99	100.70
			0.00						
(2) LPA-80080-4CF w/mount pipe	B	From Leg	2.50	0.0000	168.00	No Ice	2.87	7.24	30.25
			0.00			1/2" Ice	3.24	7.95	74.63
			0.00						
BXA-171085-8BF-EDIN w/mount pipe	B	From Leg	2.50	0.0000	168.00	No Ice	3.17	3.34	28.75
			0.00			1/2" Ice	3.54	3.95	58.78
			0.00						
BXA-70063-6CF-EDIN w/mount pipe	B	From Leg	2.50	0.0000	168.00	No Ice	7.99	5.82	42.55
			0.00			1/2" Ice	8.64	6.99	100.70
			0.00						
(2) LPA-80080-4CF w/mount pipe	C	From Leg	2.50	0.0000	168.00	No Ice	2.87	7.24	30.25
			0.00			1/2" Ice	3.24	7.95	74.63
			0.00						
BXA-171085-8BF-EDIN w/mount pipe	C	From Leg	2.50	0.0000	168.00	No Ice	3.17	3.34	28.75
			0.00			1/2" Ice	3.54	3.95	58.78
			0.00						
BXA-70063-6CF-EDIN w/mount pipe	C	From Leg	2.50	0.0000	168.00	No Ice	7.99	5.82	42.55
			0.00			1/2" Ice	8.64	6.99	100.70
			0.00						
**********									
Rohn 6'x15' Boom Gate (3)	A	None		0.0000	151.00	No Ice	53.20	53.20	1790.00
						1/2" Ice	63.30	63.30	2230.00
(2) DB980H90E-M w/Mount Pipe	A	From Leg	5.00	0.0000	151.00	No Ice	4.27	3.86	34.05
			0.00			1/2" Ice	4.86	4.95	69.84
			0.00						
(2) DB980H90E-M w/Mount Pipe	B	From Leg	5.00	0.0000	151.00	No Ice	4.27	3.86	34.05
			0.00			1/2" Ice	4.86	4.95	69.84
			0.00						
(2) DB980H90E-M w/Mount Pipe	C	From Leg	5.00	0.0000	151.00	No Ice	4.27	3.86	34.05
			0.00			1/2" Ice	4.86	4.95	69.84
			0.00						
Pirod 4' Side Mount Standoff (1)	B	From Leg	2.00	0.0000	151.00	No Ice	2.72	2.72	50.00
			0.00			1/2" Ice	4.91	4.91	89.00
			0.00						
7' Dipole	B	From Leg	4.00	0.0000	154.50	No Ice	2.10	2.10	20.00
			0.00			1/2" Ice	2.64	2.64	35.37
			0.00						
**********									
Rohn 6'x15' Boom Gate (3)	A	None		0.0000	141.00	No Ice	53.20	53.20	1790.00
						1/2" Ice	63.30	63.30	2230.00
(4) DB844H90E-XY w/Mount Pipe	A	From Leg	5.00	0.0000	142.00	No Ice	3.10	4.92	28.25
			0.00			1/2" Ice	3.48	5.60	64.88
			0.00						
(4) DB844H90E-XY	B	From Leg	5.00	0.0000	142.00	No Ice	3.10	4.92	28.25

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
w/Mount Pipe			0.00 0.00			1/2" Ice	3.48	5.60	64.88
(4) DB844H90E-XY w/Mount Pipe	C	From Leg	5.00 0.00 0.00	0.0000	142.00	No Ice 1/2" Ice	3.10 3.48	4.92 5.60	28.25 64.88
**********									
PiROD 10' Lightweight T-Frame	A	From Leg	1.50 0.00 0.00	0.0000	129.00	No Ice 1/2" Ice	9.30 14.50	9.30 14.50	251.00 344.00
PiROD 10' Lightweight T-Frame	B	From Leg	1.50 0.00 0.00	0.0000	129.00	No Ice 1/2" Ice	9.30 14.50	9.30 14.50	251.00 344.00
PiROD 10' Lightweight T-Frame	C	From Leg	1.50 0.00 0.00	0.0000	129.00	No Ice 1/2" Ice	9.30 14.50	9.30 14.50	251.00 344.00
(2) Kathrein 800 10504 w/mount pipe	A	From Leg	3.00 0.00 0.00	0.0000	130.00	No Ice 1/2" Ice	3.71 4.18	3.29 4.11	41.90 73.39
(2) Kathrein 800 10504 w/mount pipe	B	From Leg	3.00 0.00 0.00	0.0000	130.00	No Ice 1/2" Ice	3.71 4.18	3.29 4.11	41.90 73.39
(2) Kathrein 800 10504 w/mount pipe	C	From Leg	3.00 0.00 0.00	0.0000	130.00	No Ice 1/2" Ice	3.71 4.18	3.29 4.11	41.90 73.39
(2) Kathrein 860 10025 RCU	A	From Leg	3.00 0.00 0.00	0.0000	130.00	No Ice 1/2" Ice	0.16 0.23	0.14 0.20	1.20 2.76
(2) Kathrein 860 10025 RCU	B	From Leg	3.00 0.00 0.00	0.0000	130.00	No Ice 1/2" Ice	0.16 0.23	0.14 0.20	1.20 2.76
(2) Kathrein 860 10025 RCU	C	From Leg	3.00 0.00 0.00	0.0000	130.00	No Ice 1/2" Ice	0.16 0.23	0.14 0.20	1.20 2.76
**********									
Pirod 4' Side Mount Standoff (1)	B	From Leg	2.00 0.00 0.00	0.0000	119.50	No Ice 1/2" Ice	2.72 4.91	2.72 4.91	50.00 89.00
10' Dipole	B	From Leg	4.00 0.00 0.00	0.0000	124.00	No Ice 1/2" Ice	4.00 4.97	4.00 4.97	25.00 53.13
**********									
1' Standoff T-Arm (6' face width)	A	From Leg	0.50 0.00 0.00	0.0000	115.50	No Ice 1/2" Ice	3.50 4.20	3.50 4.20	85.00 110.00
1' Standoff T-Arm (6' face width)	B	From Leg	0.50 0.00 0.00	0.0000	115.50	No Ice 1/2" Ice	3.50 4.20	3.50 4.20	85.00 110.00
1' Standoff T-Arm (6' face width)	C	From Leg	0.50 0.00 0.00	0.0000	115.50	No Ice 1/2" Ice	3.50 4.20	3.50 4.20	85.00 110.00
Argus LLPX310R w/mount pipe	A	From Leg	1.00 0.00 0.00	0.0000	116.30	No Ice 1/2" Ice	4.94 5.32	2.81 3.32	43.60 78.53
Argus LLPX310R w/mount pipe	B	From Leg	1.00 0.00 0.00	0.0000	116.30	No Ice 1/2" Ice	4.94 5.32	2.81 3.32	43.60 78.53
Argus LLPX310R w/mount	C	From Leg	1.00	0.0000	116.30	No Ice	4.94	2.81	43.60

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
pipe			0.00			1/2" Ice	5.32	3.32	78.53
			0.00						
RRH	A	From Leg	1.00	0.0000	114.50	No Ice	2.79	1.69	51.00
			0.00			1/2" Ice	3.02	1.87	72.75
			0.00						
RRH	B	From Leg	1.00	0.0000	114.50	No Ice	2.79	1.69	51.00
			0.00			1/2" Ice	3.02	1.87	72.75
			0.00						
RRH	C	From Leg	1.00	0.0000	114.50	No Ice	2.79	1.69	51.00
			0.00			1/2" Ice	3.02	1.87	72.75
			0.00						
Junction Box 2'x2'	A	From Leg	0.50	0.0000	119.00	No Ice	5.60	1.40	15.00
			0.00			1/2" Ice	5.92	1.60	44.78
			0.00						
**********									
6' Yagi	C	From Leg	1.00	0.0000	113.00	No Ice	1.40	0.35	35.00
			0.00			1/2" Ice	1.88	0.48	85.85
			0.00						
3' Side Mount Standoff	B	From Leg	1.50	0.0000	104.00	No Ice	1.90	1.90	40.00
			0.00			1/2" Ice	3.30	3.30	70.00
			0.00						
GPS	B	From Leg	3.00	0.0000	105.00	No Ice	0.21	0.21	5.00
			0.00			1/2" Ice	0.32	0.32	7.52
			0.00						
Pirod 4' Side Mount Standoff (1)	B	From Leg	2.00	0.0000	108.00	No Ice	2.72	2.72	50.00
			0.00			1/2" Ice	4.91	4.91	89.00
			0.00						
Omni 3"x20'	B	From Leg	4.00	0.0000	117.00	No Ice	6.00	6.00	50.00
			0.00			1/2" Ice	8.03	8.03	93.17
			0.00						
Pirod 4' Side Mount Standoff (1)	A	From Leg	2.00	0.0000	108.00	No Ice	2.72	2.72	50.00
			0.00			1/2" Ice	4.91	4.91	89.00
			0.00						
Omni 3"x20'	A	From Leg	4.00	0.0000	117.00	No Ice	6.00	6.00	50.00
			0.00			1/2" Ice	8.03	8.03	93.17
			0.00						

Load Combinations

Comb. No.	Description
1	Dead Only
2	Dead+Wind 0 deg - No Ice+Guy
3	Dead+Wind 90 deg - No Ice+Guy
4	Dead+Wind 180 deg - No Ice+Guy
5	Dead+Ice+Temp+Guy
6	Dead+Wind 0 deg+Ice+Temp+Guy
7	Dead+Wind 90 deg+Ice+Temp+Guy
8	Dead+Wind 180 deg+Ice+Temp+Guy
9	Dead+Wind 0 deg - Service+Guy
10	Dead+Wind 90 deg - Service+Guy
11	Dead+Wind 180 deg - Service+Guy

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical lb	Horizontal, X lb	Horizontal, Z lb
Mast	Max. Vert	6	206332.39	-59.94	-682.02
	Max. H_x	7	192667.38	138.92	607.38
	Max. H_z	3	180286.13	-118.15	668.65
	Max. M_x	1	0.00	2.05	2.98
	Max. M_z	1	0.00	2.05	2.98
	Max. Torsion	4	-37.35	17.75	-1084.64
	Min. Vert	1	101665.35	2.05	2.98
	Min. H_x	10	102753.54	-429.38	7.69
	Min. H_z	4	139726.80	17.75	-1084.64
	Min. M_x	1	0.00	2.05	2.98
	Min. M_z	1	0.00	2.05	2.98
	Min. Torsion	2	-265.46	-73.23	-588.69
Guy C @ 138 ft Elev 2 ft Azimuth 240 deg	Max. Vert	4	-4688.26	-3678.97	1517.27
	Max. H_x	4	-4688.26	-3678.97	1517.27
	Max. H_z	3	-55329.73	-41855.90	23412.13
	Min. Vert	3	-55329.73	-41855.90	23412.13
	Min. H_x	3	-55329.73	-41855.90	23412.13
	Min. H_z	4	-4688.26	-3678.97	1517.27
Guy B @ 140 ft Elev -4 ft Azimuth 120 deg	Max. Vert	3	-1336.04	680.06	685.39
	Max. H_x	2	-48906.93	35335.98	21556.02
	Max. H_z	2	-48906.93	35335.98	21556.02
	Min. Vert	2	-48906.93	35335.98	21556.02
	Min. H_x	3	-1336.04	680.06	685.39
	Min. H_z	3	-1336.04	680.06	685.39
Guy A @ 138 ft Elev 2 ft Azimuth 0 deg	Max. Vert	2	-532.48	0.14	-273.90
	Max. H_x	9	-3494.48	0.29	-3101.17
	Max. H_z	2	-532.48	0.14	-273.90
	Min. Vert	4	-51206.02	-6.12	-44414.88
	Min. H_x	7	-26622.78	-1195.80	-23034.84
	Min. H_z	4	-51206.02	-6.12	-44414.88
Guy C @ 89 ft Elev 2 ft Azimuth 240 deg	Max. Vert	4	-2805.04	-3166.63	1473.62
	Max. H_x	4	-2805.04	-3166.63	1473.62
	Max. H_z	3	-36427.63	-36299.08	20549.84
	Min. Vert	3	-36427.63	-36299.08	20549.84
	Min. H_x	3	-36427.63	-36299.08	20549.84
	Min. H_z	4	-2805.04	-3166.63	1473.62
Guy B @ 89 ft Elev -3 ft Azimuth 120 deg	Max. Vert	3	-783.33	581.49	501.74
	Max. H_x	2	-33198.08	30772.23	18433.04
	Max. H_z	2	-33198.08	30772.23	18433.04
	Min. Vert	2	-33198.08	30772.23	18433.04
	Min. H_x	3	-783.33	581.49	501.74
	Min. H_z	3	-783.33	581.49	501.74
Guy A @ 88 ft Elev 2 ft Azimuth 0 deg	Max. Vert	2	-341.80	0.17	-306.72
	Max. H_x	9	-2790.47	1.89	-3920.73

Location	Condition	Gov. Load Comb.	Vertical lb	Horizontal, X lb	Horizontal, Z lb
	Max. H_x	2	-341.80	0.17	-306.72
	Min. Vert	4	-34174.54	-14.67	-38765.52
	Min. H_x	7	-16641.92	-837.75	-19405.92
	Min. H_z	4	-34174.54	-14.67	-38765.52

Tower Mast Reaction Summary

Load Combination	Vertical lb	$Shear_x$ lb	$Shear_z$ lb	Overturning Moment, M_x lb-ft	Overturning Moment, M_z lb-ft	Torque lb-ft
Dead Only	101665.35	-2.05	-2.98	0.00	0.00	88.96
Dead+Wind 0 deg - No Ice+Guy	201504.77	73.23	588.69	0.00	0.00	265.46
Dead+Wind 90 deg - No Ice+Guy	180286.13	118.15	-668.65	0.00	0.00	175.09
Dead+Wind 180 deg - No Ice+Guy	139726.80	-17.75	1084.64	0.00	0.00	37.35
Dead+Ice+Temp+Guy	133510.81	-6.18	-6.52	0.00	0.00	116.20
Dead+Wind 0 deg+Ice+Temp+Guy	206332.39	59.94	682.02	0.00	0.00	262.89
Dead+Wind 90 deg+Ice+Temp+Guy	192667.38	-138.92	-607.38	0.00	0.00	150.50
Dead+Wind 180 deg+Ice+Temp+Guy	170433.14	-19.29	618.74	0.00	0.00	65.30
Dead+Wind 0 deg - Service+Guy	102483.67	4.36	-445.12	0.00	0.00	101.13
Dead+Wind 90 deg - Service+Guy	102753.54	429.38	-7.69	0.00	0.00	87.34
Dead+Wind 180 deg - Service+Guy	102704.57	-6.77	426.38	0.00	0.00	77.58

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX lb	PY lb	PZ lb	PX lb	PY lb	PZ lb	% Error
1	-0.00	-39274.20	0.00	-4.60	39273.80	-2.82	0.014%
2	-6.13	-39483.88	-78757.63	6.10	39483.78	78755.88	0.002%
3	78413.86	-39255.55	2.11	-78412.06	39255.44	-1.08	0.002%
4	6.13	-39064.37	78307.06	-5.35	39064.32	-78305.81	0.002%
5	-0.00	-63210.79	0.00	-4.23	63210.72	-1.68	0.007%
6	-11.82	-63594.79	-68944.63	11.75	63594.61	68941.56	0.003%
7	68845.83	-63175.29	3.73	-68844.29	63175.20	-2.79	0.002%
8	11.82	-62826.68	68830.60	-11.15	62826.63	-68829.45	0.001%
9	-1.70	-39332.32	-21816.52	1.68	39332.31	21815.99	0.001%
10	21721.29	-39269.06	0.58	-21720.63	39269.05	-0.14	0.002%
11	1.70	-39216.09	21691.71	-1.70	39216.07	-21689.86	0.004%

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	193 - 180	3.961	9	0.2153	0.0122
T2	180 - 160	3.376	9	0.2026	0.0082
T3	160 - 140	2.680	9	0.0974	0.0033
T4	140 - 120	2.396	9	0.0746	0.0117
T5	120 - 100	1.981	9	0.1172	0.0215
T6	100 - 80	1.513	9	0.0835	0.0171
T7	80 - 60	1.238	9	0.0743	0.0109
T8	60 - 40	0.891	9	0.0894	0.0081
T9	40 - 20	0.525	9	0.0710	0.0045
T10	20 - 5	0.301	9	0.0659	0.0124
T11	5 - 0	0.079	9	0.0736	0.0033

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
192.70	APX16DWV-16DWVS w/mount pipe	9	3.947	0.2154	0.0121	74927
192.00	Rohn 6'x12' Boom Gate (3)	9	3.915	0.2154	0.0119	74927
191.50	Gen. TMA	9	3.892	0.2155	0.0118	74927
188.00	Omni 3"x20'	9	3.732	0.2151	0.0108	74927
181.00	Omni 3"x6'	9	3.420	0.2055	0.0086	30211
180.00	(2) Powerwave 7770 w/mount pipe	9	3.376	0.2026	0.0082	27182
179.00	Rohn 6'x15' Boom Gate (3)	9	3.333	0.1992	0.0079	24423
168.00	PiROD 15' T-Frame	9	2.906	0.1412	0.0041	10329
162.58	Guy	9	2.743	0.1100	0.0033	8105
154.50	7' Dipole	9	2.578	0.0783	0.0044	12406
151.00	Rohn 6'x15' Boom Gate (3)	9	2.530	0.0716	0.0057	22759
142.00	(4) DB844H90E-XY w/Mount Pipe	9	2.423	0.0715	0.0105	20242
141.00	Rohn 6'x15' Boom Gate (3)	9	2.410	0.0729	0.0111	17662
130.00	(2) Kathrein 800 10504 w/mount pipe	9	2.215	0.0994	0.0179	21695
129.00	PiROD 10' Lightweight T-Frame	9	2.193	0.1020	0.0184	23022
124.00	10' Dipole	9	2.079	0.1130	0.0206	33178
119.50	Pirod 4' Side Mount Standoff (1)	9	1.968	0.1173	0.0216	62084
119.00	Junction Box 2'x2'	9	1.956	0.1174	0.0217	70576
117.00	Omni 3"x20'	9	1.905	0.1167	0.0217	174256
116.30	Argus LLPX310R w/mount pipe	9	1.887	0.1161	0.0217	383167
115.50	1' Standoff T-Arm (6' face width)	9	1.867	0.1153	0.0217	293771
114.50	RRH	9	1.842	0.1141	0.0216	125871
113.00	6' Yagi	9	1.804	0.1118	0.0213	67761
108.00	Pirod 4' Side Mount Standoff (1)	9	1.682	0.1015	0.0201	26689
105.00	GPS	9	1.614	0.0944	0.0190	19571
104.00	3' Side Mount Standoff	9	1.592	0.0921	0.0186	17995
102.58	Guy	9	1.563	0.0889	0.0181	16362
42.58	Guy	9	0.564	0.0736	0.0040	20309

Bolt Design Data

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt lb	Allowable Load lb	Ratio Load / Allowable	Allowable Ratio	Criteria
T1	193	Leg	A325N	0.7500	4	0.00	19437.30	0.000 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.6250	2	1441.88	6442.72	0.224 ✓	1.333	Bolt Shear
		Top Girt	A325N	0.6250	2	247.04	6442.72	0.038 ✓	1.333	Bolt Shear
		Bottom Girt	A325N	0.6250	2	541.54	6442.72	0.084 ✓	1.333	Bolt Shear
T2	180	Leg	A325N	0.7500	4	4370.66	19359.80	0.226 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.6250	2	6440.46	6442.72	1.000 ✓	1.333	Bolt Shear
		Top Girt	A325N	0.6250	2	757.76	6442.72	0.118 ✓	1.333	Bolt Shear
		Bottom Girt	A325N	0.6250	2	4582.81	6442.72	0.711 ✓	1.333	Bolt Shear
T3	160	Leg	A325N	0.7500	4	7613.62	18933.30	0.402 ✓	1.333	Bolt Tension
		Diagonal	A325X	0.6250	1	8971.99	9203.88	0.975 ✓	1.333	Bolt Shear
		Top Girt	A325N	0.5000	1	669.16	4123.34	0.162 ✓	1.333	Bolt Shear
		Bottom Girt	A325N	0.5000	1	834.13	4123.34	0.202 ✓	1.333	Bolt Shear
T4	140	Leg	A325N	0.7500	4	0.00	19423.00	0.000 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.5000	1	3043.47	4123.34	0.738 ✓	1.333	Bolt Shear
		Top Girt	A325N	0.5000	1	855.18	4123.34	0.207 ✓	1.333	Bolt Shear
		Bottom Girt	A325N	0.5000	1	974.92	4123.34	0.236 ✓	1.333	Bolt Shear
T5	120	Leg	A325N	0.7500	4	0.00	19385.70	0.000 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.6250	2	3646.93	6442.72	0.566 ✓	1.333	Bolt Shear
		Top Girt	A325N	0.6250	2	614.84	6442.72	0.095 ✓	1.333	Bolt Shear
		Bottom Girt	A325N	0.6250	2	2408.60	6442.72	0.374 ✓	1.333	Bolt Shear
T6	100	Leg	A325N	0.7500	4	0.00	19323.80	0.000 ✓	1.333	Bolt Tension
		Diagonal	A490X	0.5000	1	2511.70	3197.25	0.786 ✓	1.333	Member Bearing
		Top Girt	A325N	0.5000	1	900.26	3197.25	0.282 ✓	1.333	Member Bearing
		Bottom Girt	A325N	0.5000	1	558.92	3197.25	0.175 ✓	1.333	Member Bearing
T7	80	Leg	A325N	0.7500	4	0.00	19433.50	0.000 ✓	1.333	Bolt Tension
		Diagonal	A325X	0.6250	1	2466.68	8156.25	0.302 ✓	1.333	Member Bearing
		Top Girt	A325N	0.5000	1	954.11	4123.34	0.231 ✓	1.333	Bolt Shear
		Bottom Girt	A325N	0.5000	1	1035.41	4123.34	0.251 ✓	1.333	Bolt Shear
T8	60	Leg	A325N	0.7500	4	0.00	19417.90	0.000 ✓	1.333	Bolt Tension
		Diagonal	A325X	0.5000	1	5118.83	5890.49	0.869 ✓	1.333	Bolt Shear
		Top Girt	A325N	0.5000	1	1039.91	4123.34	0.252 ✓	1.333	Bolt Shear
		Bottom Girt	A325N	0.5000	1	2147.32	4123.34	0.521 ✓	1.333	Bolt Shear
T9	40	Leg	A325N	0.7500	4	0.00	19343.60	0.000 ✓	1.333	Bolt Tension
		Diagonal	A490X	0.6250	1	4272.69	4110.75	1.039 ✓	1.333	Member Bearing
		Top Girt	A325N	0.5000	1	1567.73	3197.25	0.490 ✓	1.333	Member Bearing
		Bottom Girt	A325N	0.5000	1	452.51	3197.25	0.142 ✓	1.333	Member Bearing
T10	20	Leg	A325N	0.7500	4	0.00	19431.10	0.000 ✓	1.333	Bolt Tension
		Diagonal	A490X	0.5000	1	1945.99	7853.98	0.248 ✓	1.333	Bolt Shear
		Top Girt	A325N	0.5000	1	659.37	4123.34	0.160 ✓	1.333	Bolt Shear
		Bottom Girt	A490X	0.5000	1	7019.79	6615.00	1.061 ✓	1.333	Member Bearing

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt lb	Allowable Load lb	Ratio Load / Allowable	Allowable Ratio	Criteria
T11	5	Leg	A325N	0.7500	4	0.00	18129.30	0.000 ✔	1.333	Bolt Tension

Guy Design Data

Section No.	Elevation ft	Size	Initial Tension lb	Breaking Load lb	Actual T lb	Allowable T_a lb	Required S.F.	Actual S.F.
T2	162.58 (A) (594)	7/8 EHS	7970.00	79699.84	34181.80	39850.00	2.000	2.332 ✔
	162.58 (A) (595)	7/8 EHS	7970.00	79699.84	34115.80	39850.00	2.000	2.336 ✔
	162.58 (B) (590)	7/8 EHS	7970.00	79699.84	32432.00	39850.00	2.000	2.457 ✔
	162.58 (B) (591)	7/8 EHS	7970.00	79699.84	32163.70	39850.00	2.000	2.478 ✔
	162.58 (C) (586)	7/8 EHS	7970.00	79699.84	36945.10	39850.00	2.000	2.157 ✔
	162.58 (C) (587)	7/8 EHS	7970.00	79699.84	36787.30	39850.00	2.000	2.167 ✔
T5	102.58 (A) (606)	5/8 EHS	4240.00	42399.99	18178.70	21200.00	2.000	2.332 ✔
	102.58 (A) (607)	5/8 EHS	4240.00	42399.99	17899.10	21200.00	2.000	2.369 ✔
	102.58 (B) (602)	5/8 EHS	4240.00	42399.99	17013.00	21200.00	2.000	2.492 ✔
	102.58 (B) (603)	5/8 EHS	4240.00	42399.99	16843.50	21200.00	2.000	2.517 ✔
	102.58 (C) (598)	5/8 EHS	4240.00	42399.99	19529.80	21200.00	2.000	2.171 ✔
	102.58 (C) (599)	5/8 EHS	4240.00	42399.99	19199.70	21200.00	2.000	2.208 ✔
T8	42.58 (A) (618)	1/2 EHS	2690.00	26900.04	8465.69	13450.00	2.000	3.178 ✔
	42.58 (A) (619)	1/2 EHS	2690.00	26900.04	8359.67	13450.00	2.000	3.218 ✔
	42.58 (B) (614)	1/2 EHS	2690.00	26900.04	8120.55	13450.00	2.000	3.313 ✔
	42.58 (B) (615)	1/2 EHS	2690.00	26900.04	7984.90	13450.00	2.000	3.369 ✔
	42.58 (C) (610)	1/2 EHS	2690.00	26900.04	9043.74	13450.00	2.000	2.974 ✔
	42.58 (C) (611)	1/2 EHS	2690.00	26900.04	8894.96	13450.00	2.000	3.024 ✔

Compression Checks

Leg Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	Mast Stability Index	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T1	193 - 180	ROHN 2.5 EH	13.00	2.42	31.4 K=1.00	1.00	26.980	2.2535	-19468.50	60800.70	0.320 ✔
T2	180 - 160	ROHN 2.5 EH (CT2171)	20.00	1.21	15.6 K=1.00	1.00	28.746	3.0280	-103912.00	87044.00	1.194 ✔
T3	160 - 140	ROHN 2.5 EH (CT2171)	20.00	1.21	15.6 K=1.00	0.98	28.064	3.0280	-92076.50	84979.40	1.084 ✔
T4	140 - 120	ROHN 2.5 EH	20.00	2.42	31.4 K=1.00	0.98	26.356	2.2535	-54605.10	59394.60	0.919 ✔
T5	120 - 100	ROHN 3 EH	20.00	1.21	12.8 K=1.00	0.96	27.720	3.0159	-84118.60	83602.10	1.006 ✔
T6	100 - 80	ROHN 3 EH	20.00	2.42	25.5 K=1.00	0.97	26.809	3.0159	-80981.60	80854.60	1.002 ✔
T7	80 - 60	ROHN 3 EH	20.00	2.42	25.5 K=1.00	0.95	26.395	3.0159	-73171.20	79606.70	0.919 ✔
T8	60 - 40	ROHN 3 EH	20.00	2.42	25.5 K=1.00	0.96	26.677	3.0159	-98625.70	80454.70	1.226 ✔
T9	40 - 20	ROHN 3 EH	20.00	2.42	51.0 K=2.00	1.00	24.188	3.0159	-94246.00	72947.80	1.292 ✔
T10	20 - 5	ROHN 3 EH	15.00	2.42	51.0 K=2.00	1.00	24.188	3.0159	-72171.80	72947.80	0.989 ✔
T11	5 - 0	ROHN 3 EH	5.38	1.25	13.2 K=1.00	0.96	27.670	3.0159	-74772.60	83451.10	0.896 ✔

Diagonal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T1	193 - 180	L2x2x1/4	4.19	1.73	69.9 K=1.31	16.440	0.9380	-2883.77	15421.10	0.187 ✔
T2	180 - 160	L2x2x1/4	4.19	1.73	69.8 K=1.32	16.453	0.9380	-12880.90	15432.60	0.835 ✔
T3	160 - 140	L2x2x1/4	4.19	1.81	71.6 K=1.29	16.265	0.9380	-8971.99	15256.70	0.588 ✔
T4	140 - 120	ROHN TS1.5x11 ga	4.19	3.89	95.4 K=1.00	14.684	0.5202	-3043.47	7639.10	0.398 ✔
T5	120 - 100	L2x2x1/4	4.19	1.70	69.2 K=1.32	16.516	0.9380	-7293.87	15492.30	0.471 ✔
T6	100 - 80	ROHN TS1.5x16 ga	4.19	3.83	90.1 K=1.00	15.535	0.2627	-3203.57	4081.86	0.785 ✔
T7	80 - 60	L1 3/4x1 3/4x3/16	4.19	1.78	76.6 K=1.23	15.725	0.6211	-2466.68	9766.64	0.253 ✔
T8	60 - 40	ROHN TS1.5x11 ga	4.19	3.83	93.9 K=1.00	14.936	0.5202	-5118.83	7770.58	0.659 ✔
T9	40 - 20	ROHN TS1.5x16 ga	4.19	3.83	90.1 K=1.00	15.535	0.2627	-4421.41	4081.86	1.083 ✔
T10	20 - 5	ROHN TS1.5x11 ga	4.19	3.83	93.9 K=1.00	14.936	0.5202	-1945.99	7770.58	0.250 ✔

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$

Horizontal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T11	5 - 0	L4x4x1/4	2.39	2.10	75.9 K=2.39	15.409	1.9400	-1185.98	29892.40	0.040 ✔

Secondary Horizontal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T2	180 - 160	L2x2x1/4	3.42	3.17	91.5 K=0.94	14.024	0.9380	-7196.87	13154.00	0.547 ✔
T3	160 - 140	L2x2x1/4	3.42	3.17	91.5 K=0.94	14.024	0.9380	-804.65	13154.00	0.061 ✔
T5	120 - 100	L2x2x1/4	3.42	3.13	90.8 K=1.47	14.107	0.9380	-2643.64	13232.20	0.200 ✔

Top Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T1	193 - 180	L2x2x1/4	3.42	2.75	102.3 K=1.21	12.691	0.9380	-480.21	11904.00	0.040 ✔
T2	180 - 160	L2x2x1/4	3.42	2.74	102.1 K=1.21	12.707	0.9380	-1476.21	11919.40	0.124 ✔
T5	120 - 100	L2x2x1/4	3.42	2.70	101.5 K=1.22	12.793	0.9380	-193.08	12000.00	0.016 ✔
T9	40 - 20	ROHN TS1.5x16 ga	3.42	3.13	73.6 K=1.00	17.983	0.2627	-1253.52	4725.13	0.265 ✔

Bottom Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T1	193 - 180	L2x2x1/4	3.42	2.75	102.3 K=1.21	12.691	0.9380	-1083.08	11904.00	0.091

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T2	180 - 160	L2x2x1/4	3.42	2.74	102.1 K=1.21	12.707	0.9380	-7434.59	11919.40	0.624
T3	160 - 140	ROHN TS1.5x11 ga	3.42	3.17	77.7 K=1.00	17.395	0.5202	-129.30	9049.49	0.014
T5	120 - 100	L2x2x1/4	3.42	2.70	101.5 K=1.22	12.793	0.9380	-2935.19	12000.00	0.245
T8	60 - 40	ROHN TS1.5x11 ga	3.42	3.13	76.7 K=1.00	17.548	0.5202	-819.31	9129.49	0.090
T9	40 - 20	ROHN TS1.5x16 ga	3.42	3.13	73.6 K=1.00	17.983	0.2627	-204.33	4725.13	0.043

Torque-Arm Top Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T2	180 - 160 (588)	C15x50	3.67	3.54	131.8 K=1.00	8.600	14.7000	-1217.44	126423.00	0.010
T2	180 - 160 (589)	C15x50	3.67	3.54	131.8 K=1.00	8.600	14.7000	-12140.10	126423.00	0.096
T2	180 - 160 (592)	C15x50	3.67	3.54	49.0 K=1.00	21.600	14.7000	0.00	126423.00	0.000
T2	180 - 160 (593)	C15x50	3.67	3.54	131.8 K=1.00	8.600	14.7000	-14862.10	126423.00	0.118
T2	180 - 160 (596)	C15x50	3.67	3.54	131.8 K=1.00	8.600	14.7000	-12900.30	126423.00	0.102
T2	180 - 160 (597)	C15x50	3.67	3.54	131.8 K=1.00	8.600	14.7000	-12194.30	126423.00	0.096
T5	120 - 100 (600)	C15x40	3.67	3.52	126.2 K=1.00	9.382	11.8000	-1084.11	110710.00	0.010
T5	120 - 100 (601)	C15x40	3.67	3.52	126.2 K=1.00	9.382	11.8000	-6856.43	110710.00	0.062
T5	120 - 100 (604)	C15x40	3.67	3.52	47.7 K=1.00	21.600	11.8000	0.00	110710.00	0.000
T5	120 - 100 (605)	C15x40	3.67	3.52	126.2 K=1.00	9.382	11.8000	-8174.55	110710.00	0.074
T5	120 - 100 (608)	C15x40	3.67	3.52	126.2 K=1.00	9.382	11.8000	-7008.19	110710.00	0.063
T5	120 - 100 (609)	C15x40	3.67	3.52	126.2 K=1.00	9.382	11.8000	-7042.54	110710.00	0.064
T8	60 - 40 (612)	C12x25	3.67	3.52	113.5 K=1.00	11.196	7.3500	-325.09	82292.40	0.004
T8	60 - 40 (613)	C12x25	3.67	3.52	113.5 K=1.00	11.196	7.3500	-4109.11	82292.40	0.050
T8	60 - 40 (616)	C12x25	3.67	3.52	54.2 K=1.00	21.600	7.3500	0.00	82292.40	0.000
T8	60 - 40 (617)	C12x25	3.67	3.52	113.5 K=1.00	11.196	7.3500	-5309.44	82292.40	0.065
T8	60 - 40 (620)	C12x25	3.67	3.52	113.5 K=1.00	11.196	7.3500	-4700.77	82292.40	0.057
T8	60 - 40 (621)	C12x25	3.67	3.52	113.5 K=1.00	11.196	7.3500	-4197.71	82292.40	0.051

Torque-Arm Top Bending Design Data

Section No.	Elevation ft	Size	Actual M_x lb-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y lb-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
T2	180 - 160 (588)	C15x50	-103259.17	-23.032	21.600	1.066	-0.00	-0.000	21.600	0.000
T2	180 - 160 (589)	C15x50	-93869.17	-20.937	21.600	0.969	-0.00	-0.000	21.600	0.000
T2	180 - 160 (592)	C15x50	-92595.83	-20.653	21.600	0.956	-0.00	-0.000	21.600	0.000
T2	180 - 160 (593)	C15x50	-101317.50	-22.599	21.600	1.046	-0.00	-0.000	21.600	0.000
T2	180 - 160 (596)	C15x50	-89480.83	-19.959	21.600	0.924	-0.00	-0.000	21.600	0.000
T2	180 - 160 (597)	C15x50	-93906.67	-20.946	21.600	0.970	0.00	-0.000	21.600	0.000
T5	120 - 100 (600)	C15x40	-53456.33	-13.795	21.600	0.639	-0.00	-0.000	21.600	0.000
T5	120 - 100 (601)	C15x40	-48484.92	-12.512	21.600	0.579	-0.00	-0.000	21.600	0.000
T5	120 - 100 (604)	C15x40	-49232.50	-12.705	21.600	0.588	-0.00	-0.000	21.600	0.000
T5	120 - 100 (605)	C15x40	-51861.83	-13.384	21.600	0.620	-0.00	-0.000	21.600	0.000
T5	120 - 100 (608)	C15x40	-46578.33	-12.020	21.600	0.556	0.00	-0.000	21.600	0.000
T5	120 - 100 (609)	C15x40	-48458.83	-12.506	21.600	0.579	-0.00	-0.000	21.600	0.000
T8	60 - 40 (612)	C12x25	-13806.67	-6.875	21.600	0.318	-0.00	-0.000	21.600	0.000
T8	60 - 40 (613)	C12x25	-12279.75	-6.114	21.600	0.283	-0.00	-0.000	21.600	0.000
T8	60 - 40 (616)	C12x25	-14237.83	-7.089	21.600	0.328	-0.00	-0.000	21.600	0.000
T8	60 - 40 (617)	C12x25	-12910.50	-6.428	21.600	0.298	-0.00	-0.000	21.600	0.000
T8	60 - 40 (620)	C12x25	-12831.42	-6.389	21.600	0.296	-0.00	0.000	21.600	0.000
T8	60 - 40 (621)	C12x25	-12375.33	-6.162	21.600	0.285	0.00	-0.000	21.600	0.000

Torque-Arm Top Interaction Design Data

Section No.	Elevation ft	Size	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
T2	180 - 160 (588)	C15x50	0.010	1.066	0.000	1.076 ✔	1.333	H1-3 ✔
T2	180 - 160 (589)	C15x50	0.096	0.969	0.000	1.065 ✔	1.333	H1-3 ✔
T2	180 - 160 (592)	C15x50	0.000	0.956	0.000	0.956 ✔	1.333	H1-3 ✔
T2	180 - 160 (593)	C15x50	0.118	1.046	0.000	1.164 ✔	1.333	H1-3 ✔

Section No.	Elevation ft	Size	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
T2	180 - 160 (596)	C15x50	0.102	0.924	0.000	1.026 ✔	1.333	H1-3 ✔
T2	180 - 160 (597)	C15x50	0.096	0.970	0.000	1.066 ✔	1.333	H1-3 ✔
T5	120 - 100 (600)	C15x40	0.010	0.639	0.000	0.648 ✔	1.333	H1-3 ✔
T5	120 - 100 (601)	C15x40	0.062	0.579	0.000	0.641 ✔	1.333	H1-3 ✔
T5	120 - 100 (604)	C15x40	0.000	0.588	0.000	0.588 ✔	1.333	H1-3 ✔
T5	120 - 100 (605)	C15x40	0.074	0.620	0.000	0.693 ✔	1.333	H1-3 ✔
T5	120 - 100 (608)	C15x40	0.063	0.556	0.000	0.620 ✔	1.333	H1-3 ✔
T5	120 - 100 (609)	C15x40	0.064	0.579	0.000	0.643 ✔	1.333	H1-3 ✔
T8	60 - 40 (612)	C12x25	0.004	0.318	0.000	0.322 ✔	1.333	H1-3 ✔
T8	60 - 40 (613)	C12x25	0.050	0.283	0.000	0.333 ✔	1.333	H1-3 ✔
T8	60 - 40 (616)	C12x25	0.000	0.328	0.000	0.328 ✔	1.333	H1-3 ✔
T8	60 - 40 (617)	C12x25	0.065	0.298	0.000	0.362 ✔	1.333	H1-3 ✔
T8	60 - 40 (620)	C12x25	0.057	0.296	0.000	0.353 ✔	1.333	H1-3 ✔
T8	60 - 40 (621)	C12x25	0.051	0.285	0.000	0.336 ✔	1.333	H1-3 ✔

Tension Checks

Leg Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T1	193 - 180	ROHN 2.5 EH	13.00	0.42	5.4	30.000	2.2535	17485.80	67606.20	0.259 ✔
T2	180 - 160	ROHN 2.5 EH (CT2171)	20.00	1.21	15.6	30.000	3.0280	94954.90	90840.70	1.045 ✔
T3	160 - 140	ROHN 2.5 EH (CT2171)	20.00	1.21	15.6	30.000	3.0280	30454.50	90840.70	0.335 ✔
T5	120 - 100	ROHN 3 EH	20.00	1.21	12.8	30.000	3.0159	14377.20	90477.90	0.159 ✔

Diagonal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T1	193 - 180	L2x2x1/4	4.19	1.73	38.4	29.000	0.5629	2832.16	16323.40	0.174 ✔
T2	180 - 160	L2x2x1/4	4.19	1.73	38.3	29.000	0.5629	10949.50	16323.40	0.671 ✔
T3	160 - 140	L2x2x1/4	4.19	1.81	38.3	29.000	0.5629	7184.34	16323.40	0.440 ✔
T4	140 - 120	ROHN TS1.5x11 ga	4.19	3.89	95.4	25.200	0.5202	2150.58	13110.20	0.164 ✔
T5	120 - 100	L2x2x1/4	4.19	1.70	37.7	29.000	0.5629	4771.86	16323.40	0.292 ✔
T6	100 - 80	ROHN TS1.5x16 ga	4.19	3.83	90.1	25.200	0.2627	2511.70	6621.31	0.379 ✔
T7	80 - 60	L1 3/4x1 3/4x3/16	4.19	1.78	42.8	29.000	0.3604	1435.69	10450.20	0.137 ✔
T8	60 - 40	ROHN TS1.5x11 ga	4.19	3.83	93.9	25.200	0.5202	4453.69	13110.20	0.340 ✔
T9	40 - 20	ROHN TS1.5x16 ga	4.19	3.83	90.1	25.200	0.2627	4272.69	6621.31	0.645 ✔
T10	20 - 5	ROHN TS1.5x11 ga	4.19	3.83	93.9	25.200	0.5202	1216.56	13110.20	0.093 ✔

Horizontal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T11	5 - 0	L4x4x1/4	1.60	1.30	12.5	21.600	1.9400	130.99	41904.00	0.003 ✔

Secondary Horizontal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T2	180 - 160	L2x2x1/4	3.42	3.17	62.5	21.600	0.9380	7006.69	20260.80	0.346 ✔
T3	160 - 140	L2x2x1/4	3.42	3.17	62.5	21.600	0.9380	2130.14	20260.80	0.105 ✔
T5	120 - 100	L2x2x1/4	3.42	3.13	61.6	21.600	0.9380	5563.68	20260.80	0.275 ✔

Top Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T1	193 - 180	L2x2x1/4	3.42	2.75	62.7	29.000	0.5629	494.08	16323.40	0.030 ✓
T2	180 - 160	L2x2x1/4	3.42	2.74	62.5	29.000	0.5629	1515.53	16323.40	0.093 ✓
T3	160 - 140	ROHN TS1.5x11 ga	3.42	3.17	77.7	25.200	0.5202	669.16	13110.20	0.051 ✓
T4	140 - 120	ROHN TS1.5x11 ga	3.42	3.18	77.9	25.200	0.5202	855.18	13110.20	0.065 ✓
T5	120 - 100	L2x2x1/4	3.42	2.70	61.6	29.000	0.5629	1229.68	16323.40	0.075 ✓
T6	100 - 80	ROHN TS1.5x16 ga	3.42	3.13	73.6	25.200	0.2627	900.26	6621.31	0.136 ✓
T7	80 - 60	ROHN TS1.5x11 ga	3.42	3.13	76.7	25.200	0.5202	954.11	13110.20	0.073 ✓
T8	60 - 40	ROHN TS1.5x11 ga	3.42	3.13	76.7	25.200	0.5202	1039.91	13110.20	0.079 ✓
T9	40 - 20	ROHN TS1.5x16 ga	3.42	3.13	73.6	25.200	0.2627	1567.73	6621.31	0.237 ✓
T10	20 - 5	ROHN TS1.5x11 ga	3.42	3.13	76.7	25.200	0.5202	659.37	13110.20	0.050 ✓
T11	5 - 0	L4x4x1/4	3.19	2.90	27.8	21.600	1.9400	9277.40	41904.00	0.221 ✓

Bottom Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T1	193 - 180	L2x2x1/4	3.42	2.75	62.7	29.000	0.5629	1041.51	16323.40	0.064 ✓
T2	180 - 160	L2x2x1/4	3.42	2.74	62.5	29.000	0.5629	9165.62	16323.40	0.562 ✓
T3	160 - 140	ROHN TS1.5x11 ga	3.42	3.17	77.7	25.200	0.5202	834.13	13110.20	0.064 ✓
T4	140 - 120	ROHN TS1.5x11 ga	3.42	3.18	77.9	25.200	0.5202	974.92	13110.20	0.074 ✓
T5	120 - 100	L2x2x1/4	3.42	2.70	61.6	29.000	0.5629	4817.20	16323.40	0.295 ✓
T6	100 - 80	ROHN TS1.5x16 ga	3.42	3.13	73.6	25.200	0.2627	558.92	6621.31	0.084 ✓
T7	80 - 60	ROHN TS1.5x11 ga	3.42	3.13	76.7	25.200	0.5202	1035.41	13110.20	0.079 ✓
T8	60 - 40	ROHN TS1.5x11 ga	3.42	3.13	76.7	25.200	0.5202	2147.32	13110.20	0.164 ✓
T9	40 - 20	ROHN TS1.5x16 ga	3.42	3.13	73.6	25.200	0.2627	452.51	6621.31	0.068 ✓
T10	20 - 5	ROHN TS1.5x11 ga	3.42	3.13	76.7	25.200	0.5202	7019.79	13110.20	0.535

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
										✔

Torque-Arm Top Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T2	180 - 160 (588)	C15x50	3.67	3.54	49.0	21.600	14.7000	3152.28	317520.00	0.010*
T2	180 - 160 (589)	C15x50	3.67	3.54	49.0	21.600	14.7000	20220.50	317520.00	0.064
T2	180 - 160 (592)	C15x50	3.67	3.54	49.0	21.600	14.7000	10866.90	317520.00	0.034
T2	180 - 160 (593)	C15x50	3.67	3.54	49.0	21.600	14.7000	10821.70	317520.00	0.034
T2	180 - 160 (596)	C15x50	3.67	3.54	49.0	21.600	14.7000	3162.16	317520.00	0.010*
T2	180 - 160 (597)	C15x50	3.67	3.54	49.0	21.600	14.7000	3134.94	317520.00	0.010*
T5	120 - 100 (600)	C15x40	3.67	3.52	47.7	21.600	11.8000	1606.88	254880.00	0.006*
T5	120 - 100 (601)	C15x40	3.67	3.52	47.7	21.600	11.8000	10912.50	254880.00	0.043
T5	120 - 100 (604)	C15x40	3.67	3.52	47.7	21.600	11.8000	5749.37	254880.00	0.023
T5	120 - 100 (605)	C15x40	3.67	3.52	47.7	21.600	11.8000	5406.27	254880.00	0.021
T5	120 - 100 (608)	C15x40	3.67	3.52	47.7	21.600	11.8000	1604.85	254880.00	0.006*
T5	120 - 100 (609)	C15x40	3.67	3.52	47.7	21.600	11.8000	1618.83	254880.00	0.006*
T8	60 - 40 (612)	C12x25	3.67	3.52	54.2	21.600	7.3500	65.41	158760.00	0.000
T8	60 - 40 (613)	C12x25	3.67	3.52	54.2	21.600	7.3500	6822.91	158760.00	0.043
T8	60 - 40 (616)	C12x25	3.67	3.52	54.2	21.600	7.3500	3638.02	158760.00	0.023
T8	60 - 40 (617)	C12x25	3.67	3.52	54.2	21.600	7.3500	3739.83	158760.00	0.024
T8	60 - 40 (620)	C12x25	3.67	3.52	54.2	21.600	7.3500	1669.09	158760.00	0.011*
T8	60 - 40 (621)	C12x25	3.67	3.52	54.2	21.600	7.3500	1653.89	158760.00	0.010*

* DL controls

Torque-Arm Top Bending Design Data

Section No.	Elevation ft	Size	Actual M_x lb-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y lb-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
T2	180 - 160 (588)	C15x50	-26632.83	5.940	21.600	0.275	-0.00	0.000	27.000	0.000
T2	180 - 160 (589)	C15x50	-55479.17	12.374	21.600	0.573	-0.00	0.000	27.000	0.000
T2	180 - 160 (592)	C15x50	-92595.83	20.653	21.600	0.956	-0.00	0.000	27.000	0.000
T2	180 - 160 (593)	C15x50	-90712.50	20.233	21.600	0.937	0.00	0.000	27.000	0.000
T2	180 - 160 (596)	C15x50	-27150.67	6.056	21.600	0.280	0.00	0.000	27.000	0.000
T2	180 - 160 (597)	C15x50	-26653.08	5.945	21.600	0.275	-0.00	0.000	27.000	0.000
T5	120 - 100 (600)	C15x40	-13801.25	3.562	21.600	0.165	-0.00	0.000	27.000	0.000
T5	120 - 100 (601)	C15x40	-29276.00	7.555	21.600	0.350	0.00	0.000	27.000	0.000
T5	120 - 100 (604)	C15x40	-49232.50	12.705	21.600	0.588	-0.00	0.000	27.000	0.000
T5	120 - 100 (605)	C15x40	-46638.33	12.036	21.600	0.557	-0.00	0.000	27.000	0.000

Section No.	Elevation ft	Size	Actual M_x lb-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y lb-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
T5	120 - 100 (608)	C15x40	-14383.42	3.712	21.600	0.172	0.00	0.000	27.000	0.000
T5	120 - 100 (609)	C15x40	-13915.83	3.591	21.600	0.166	-0.00	0.000	27.000	0.000
T8	60 - 40 (612)	C12x25	-12138.08	6.044	21.600	0.280	-0.00	0.000	27.000	0.000
T8	60 - 40 (613)	C12x25	-8540.58	4.253	21.600	0.197	0.00	0.000	27.000	0.000
T8	60 - 40 (616)	C12x25	-14237.83	7.089	21.600	0.328	-0.00	0.000	27.000	0.000
T8	60 - 40 (617)	C12x25	-12558.08	6.253	21.600	0.289	-0.00	0.000	27.000	0.000
T8	60 - 40 (620)	C12x25	-6453.77	3.213	21.600	0.149	0.00	0.000	27.000	0.000
T8	60 - 40 (621)	C12x25	-5969.45	2.972	21.600	0.138	-0.00	0.000	27.000	0.000

Torque-Arm Top Interaction Design Data

Section No.	Elevation ft	Size	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
T2	180 - 160 (588)	C15x50	0.010	0.275	0.000	0.285* ✔	1.000	H2-1 ✔
T2	180 - 160 (589)	C15x50	0.064	0.573	0.000	0.637 ✔	1.333	H2-1 ✔
T2	180 - 160 (592)	C15x50	0.034	0.956	0.000	0.990 ✔	1.333	H2-1 ✔
T2	180 - 160 (593)	C15x50	0.034	0.937	0.000	0.971 ✔	1.333	H2-1 ✔
T2	180 - 160 (596)	C15x50	0.010	0.280	0.000	0.290* ✔	1.000	H2-1 ✔
T2	180 - 160 (597)	C15x50	0.010	0.275	0.000	0.285* ✔	1.000	H2-1 ✔
T5	120 - 100 (600)	C15x40	0.006	0.165	0.000	0.171* ✔	1.000	H2-1 ✔
T5	120 - 100 (601)	C15x40	0.043	0.350	0.000	0.393 ✔	1.333	H2-1 ✔
T5	120 - 100 (604)	C15x40	0.023	0.588	0.000	0.611 ✔	1.333	H2-1 ✔
T5	120 - 100 (605)	C15x40	0.021	0.557	0.000	0.578 ✔	1.333	H2-1 ✔
T5	120 - 100 (608)	C15x40	0.006	0.172	0.000	0.178* ✔	1.000	H2-1 ✔
T5	120 - 100 (609)	C15x40	0.006	0.166	0.000	0.173* ✔	1.000	H2-1 ✔
T8	60 - 40 (612)	C12x25	0.000	0.280	0.000	0.280 ✔	1.333	H2-1 ✔
T8	60 - 40 (613)	C12x25	0.043	0.197	0.000	0.240 ✔	1.333	H2-1 ✔
T8	60 - 40 (616)	C12x25	0.023	0.328	0.000	0.351 ✔	1.333	H2-1 ✔
T8	60 - 40 (617)	C12x25	0.024	0.289	0.000	0.313 ✔	1.333	H2-1 ✔
T8	60 - 40 (620)	C12x25	0.011	0.149	0.000	0.159* ✔	1.000	H2-1 ✔
T8	60 - 40 (621)	C12x25	0.010	0.138	0.000	0.148* ✔	1.000	H2-1 ✔

* DL controls

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	$SF*P_{allow}$ lb	% Capacity	Pass Fail
T1	193 - 180	Leg	ROHN 2.5 EH	3	-19468.50	81047.33	24.0	Pass
T2	180 - 160	Leg	ROHN 2.5 EH (CT2171)	42	-103912.00	116029.65	89.6	Pass
T3	160 - 140	Leg	ROHN 2.5 EH (CT2171)	123	-92076.50	113277.53	81.3	Pass
T4	140 - 120	Leg	ROHN 2.5 EH	202	-54605.10	79173.00	69.0	Pass
T5	120 - 100	Leg	ROHN 3 EH	261	-84118.60	111441.60	75.5	Pass
T6	100 - 80	Leg	ROHN 3 EH	342	-80981.60	107779.18	75.1	Pass
T7	80 - 60	Leg	ROHN 3 EH	399	-73171.20	106115.73	69.0	Pass
T8	60 - 40	Leg	ROHN 3 EH	456	-98625.70	107246.11	92.0	Pass
T9	40 - 20	Leg	ROHN 3 EH	513	-94246.00	97239.41	96.9	Pass
T10	20 - 5	Leg	ROHN 3 EH	546	-72171.80	97239.41	74.2	Pass
T11	5 - 0	Leg	ROHN 3 EH	571	-74772.60	111240.31	67.2	Pass
T1	193 - 180	Diagonal	L2x2x1/4	14	-2883.77	20556.32	14.0	Pass
T2	180 - 160	Diagonal	L2x2x1/4	52	-12880.90	20571.65	62.6	Pass
T3	160 - 140	Diagonal	L2x2x1/4	195	-8971.99	20337.18	44.1	Pass
T4	140 - 120	Diagonal	ROHN TS1.5x11 ga	212	-3043.47	10182.92	29.9	Pass
T5	120 - 100	Diagonal	L2x2x1/4	273	-7293.87	20651.23	35.3	Pass
T6	100 - 80	Diagonal	ROHN TS1.5x16 ga	391	-3203.57	5441.12	58.9	Pass
T7	80 - 60	Diagonal	L1 3/4x1 3/4x3/16	409	-2466.68	13018.93	18.9	Pass
T8	60 - 40	Diagonal	ROHN TS1.5x11 ga	468	-5118.83	10358.18	49.4	Pass
T9	40 - 20	Diagonal	ROHN TS1.5x16 ga	543	-4421.41	5441.12	81.3	Pass
T10	20 - 5	Diagonal	ROHN TS1.5x11 ga	570	-1945.99	10358.18	18.8	Pass
T11	5 - 0	Horizontal	L4x4x1/4	583	-1185.98	39846.57	3.0	Pass
T2	180 - 160	Secondary Horizontal	L2x2x1/4	55	-7196.87	17534.28	41.0	Pass
T3	160 - 140	Secondary Horizontal	L2x2x1/4	199	2130.14	27007.65	7.9	Pass
T5	120 - 100	Secondary Horizontal	L2x2x1/4	284	5563.68	27007.65	20.6	Pass
T1	193 - 180	Top Girt	L2x2x1/4	4	-480.21	15868.03	3.0	Pass
T2	180 - 160	Top Girt	L2x2x1/4	43	-1476.21	15888.56	9.3	Pass
T3	160 - 140	Top Girt	ROHN TS1.5x11 ga	125	669.16	17475.90	3.8	Pass
T4	140 - 120	Top Girt	ROHN TS1.5x11 ga	205	855.18	17475.90	4.9	Pass
T5	120 - 100	Top Girt	L2x2x1/4	262	1229.68	21759.09	5.7	Pass
T6	100 - 80	Top Girt	ROHN TS1.5x16 ga	343	900.26	8826.21	10.2	Pass
T7	80 - 60	Top Girt	ROHN TS1.5x11 ga	401	954.11	17475.90	5.5	Pass
T8	60 - 40	Top Girt	ROHN TS1.5x11 ga	457	1039.91	17475.90	6.0	Pass
T9	40 - 20	Top Girt	ROHN TS1.5x16 ga	515	-1253.52	6298.60	19.9	Pass
T10	20 - 5	Top Girt	ROHN TS1.5x11 ga	549	659.37	17475.90	3.8	Pass
T11	5 - 0	Top Girt	L4x4x1/4	574	9277.40	55858.03	16.6	Pass
T1	193 - 180	Bottom Girt	L2x2x1/4	7	-1083.08	15868.03	6.8	Pass
T2	180 - 160	Bottom Girt	L2x2x1/4	46	-7434.59	15888.56	46.8	Pass
T3	160 - 140	Bottom Girt	ROHN TS1.5x11 ga	127	834.13	17475.90	4.8	Pass
T4	140 - 120	Bottom Girt	ROHN TS1.5x11 ga	209	974.92	17475.90	5.6	Pass
T5	120 - 100	Bottom Girt	L2x2x1/4	265	4817.20	21759.09	22.1	Pass
T6	100 - 80	Bottom Girt	ROHN TS1.5x16 ga	346	558.92	8826.21	6.3	Pass
T7	80 - 60	Bottom Girt	ROHN TS1.5x11 ga	405	1035.41	17475.90	5.9	Pass
T8	60 - 40	Bottom Girt	ROHN TS1.5x11 ga	462	2147.32	17475.90	12.3	Pass
T9	40 - 20	Bottom Girt	ROHN TS1.5x16 ga	517	452.51	8826.21	5.1	Pass
T10	20 - 5	Bottom Girt	ROHN TS1.5x11 ga	550	7019.79	17475.90	40.2	Pass
T2	180 - 160	Guy A@162.583	7/8	594	34181.80	39850.00	85.8	Pass
T5	120 - 100	Guy A@102.583	5/8	606	18178.70	21200.00	85.7	Pass
T8	60 - 40	Guy A@42.5833	1/2	618	8465.69	13450.00	62.9	Pass
T2	180 - 160	Guy B@162.583	7/8	590	32432.00	39850.00	81.4	Pass
T5	120 - 100	Guy B@102.583	5/8	602	17013.00	21200.00	80.3	Pass
T8	60 - 40	Guy B@42.5833	1/2	614	8120.55	13450.00	60.4	Pass
T2	180 - 160	Guy C@162.583	7/8	586	36945.10	39850.00	92.7	Pass
T5	120 - 100	Guy C@102.583	5/8	598	19529.80	21200.00	92.1	Pass
T8	60 - 40	Guy C@42.5833	1/2	610	9043.74	13450.00	67.2	Pass
T2	180 - 160	Torque Arm Top@162.583	C15x50	593	-14862.10	168521.85	87.3	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	$SF*P_{allow}$ lb	% Capacity	Pass Fail
T5	120 - 100	Torque Arm Top@102.583	C15x40	605	-8174.55	147576.42	52.0	Pass
T8	60 - 40	Torque Arm Top@42.5833	C12x25	617	-5309.44	109695.76	27.2	Pass
							Summary	
						Leg (T9)	96.9	Pass
						Diagonal (T9)	81.3	Pass
						Horizontal (T11)	3.0	Pass
						Secondary Horizontal (T2)	41.0	Pass
						Top Girt (T9)	19.9	Pass
						Bottom Girt (T2)	46.8	Pass
						Guy A (T2)	85.8	Pass
						Guy B (T2)	81.4	Pass
						Guy C (T2)	92.7	Pass
						Torque Arm Top (T2)	87.3	Pass
						Bolt Checks	79.6	Pass
						RATING =	**96.9**	**Pass**

DATE: 2/12/2013
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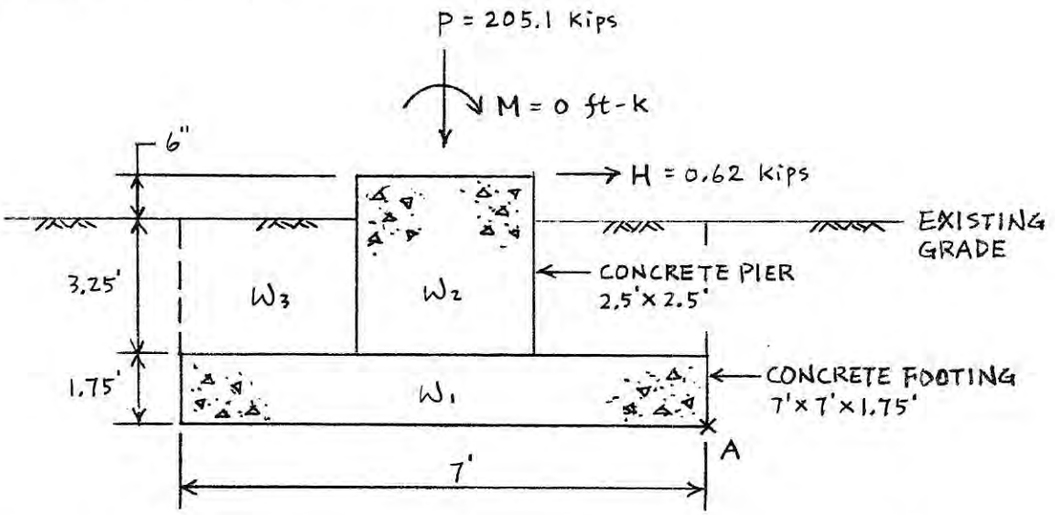
FOUNDATION ANALYSIS (TOWER MAST)



FOUNDATION INFORMATION ARE BASED ON STRUCTURAL ANALYSIS REPORT BY CENTEK ENGINEERING, DATED 12/8/2011.

$\gamma_{CONC.}$ = 150 pcf

γ_{SOIL} = 125 pcf

$\gamma_{SUB.}$ = 0.06 pcf

K_a = 0.31

K_p = 3.25

ALLOWABLE BEARING PRESSURE = 6 ksf

GROUND WATER LEVEL IS 5.5 ft BELOW GRADE

MAXIMUM REACTIONS AT TOWER BASE

P = 205.1 kips

H = 0.62 kips

M = 0 ft-kips

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NEGLECT SOIL PRESSURE & HORIZONTAL REACTION

$W_1 = 0.15 \times 7 \times 7 \times 1.75 = 12.9$ kips

$W_2 = 0.15 \times 2.5 \times 2.5 \times 3.75 = 3.5$ kips

$W_3 = 0.125 \times (7 \times 7 - 2.5 \times 2.5) \times 3.25 = 17.4$ kips

$\Sigma W = 33.8$ kips

$$\text{F.S. (SLIDING)} = \frac{0.45 \times (210.1 + 33.8)}{0.23} = 477.2 \quad \text{OK}$$

$$\text{BEARING PRESSURE} = \frac{205.1 + 33.8}{7 \times 7} = 4.88 \text{ ksf} \quad \text{OK}$$

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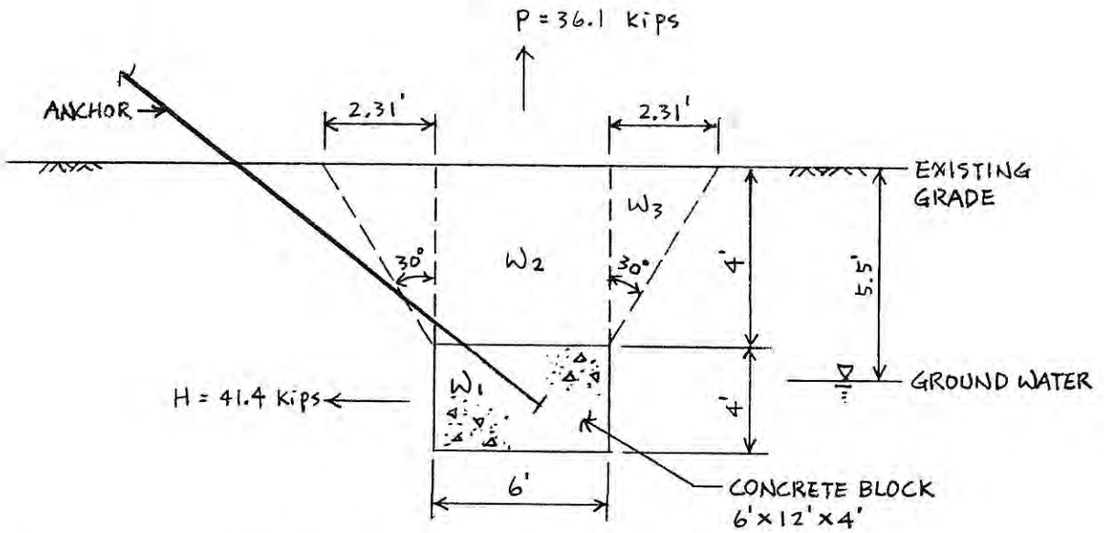
GUY ANCHOR (INNER)



MAXIMUM REACTIONS AT GUY ANCHOR

P = 36.1 kips

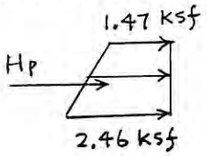
H = 41.4 kips

$W_1 = 0.15 \times 6 \times 12 \times 1.5 + 0.088 \times 6 \times 12 \times 2.5 = 32.0$ kips

$W_2 = 0.125 \times 6 \times 12 \times 4 = 36.0$ kips

$W_3 = 0.125 \times (8.31 \times 14.31 - 6 \times 12) \times 4 = 23.5$ kips $\quad \Sigma W = 91.5$ kips

SOIL PRESSURE



$Hp = \frac{1}{2} \times (1.47 + 2.46) \times 4 \times 12 = 94.3$ kips

$$F.S.\ (SLIDING) = \frac{0.45 \times (91.5 - 36.1) + 94.3}{41.4} = 2.9 \quad OK$$

CHECK UPLIFT

$$\frac{W_R}{2} + \frac{W_c}{1.25} = \frac{59.5}{2} + \frac{32.0}{1.25} = 55.4 \text{ kips} > 36.1 \text{ kips} \quad OK$$

$$\frac{W_R + W_c}{1.5} = \frac{91.5}{1.5} = 61 \text{ kips} > 36.1 \text{ kips} \quad OK$$

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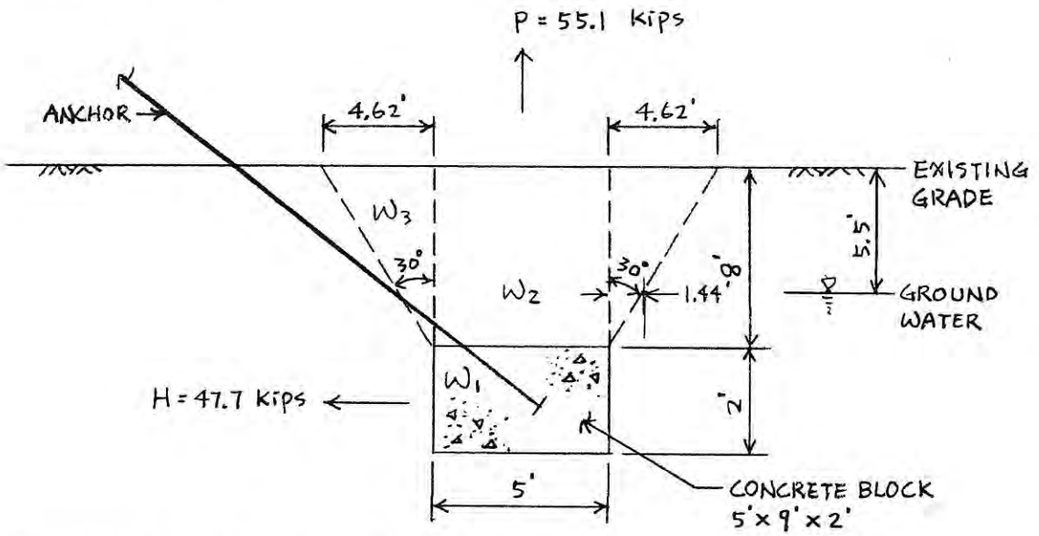
GUY ANCHOR (OUTER)



MAXIMUM REACTIONS AT GUY ANCHOR

P = 55.1 kips

H = 47.7 kips

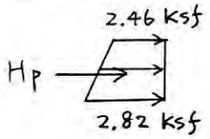
$W_1 = 0.088 \times 5 \times 9 \times 2 = 7.9$ kips

$W_2 = 0.125 \times 5 \times 9 \times 8 = 45.0$ kips

$W_3 = 0.125 \times (11.06 \times 15.06 - 5 \times 9) \times 5.5 = 83.6$ kips

$= 0.06 \times (6.44 \times 10.44 - 5 \times 9) \times 2.5 = 3.3$ kips $\quad \Sigma W = 139.8$ kips

SOIL PRESSURE



$Hp = \frac{1}{2} \times (2.46 + 2.82) \times 2 \times 9 = 47.5$ kips

$F.S.(\text{SLIDING}) = \frac{0.45 \times (139.8 - 55.1) + 47.5}{47.7} = 1.8$ OK

CHECK UPLIFT

$\frac{131.9}{2} + \frac{7.9}{1.25} = 72.3$ kips $>$ 55.1 kips OK

$\frac{131.9 + 7.9}{1.5} = 93.2$ kips $>$ 55.1 kips OK

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REFERENCE DOCUMENTS

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CONSTRUCTION DRAWINGS

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MODIFICATION DRAWINGS